

NOEL ASHBRIDGE ON EMPIRE BROADCASTING (See Page 399)

Popular Wireless

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No. 523. Vol. XXI.

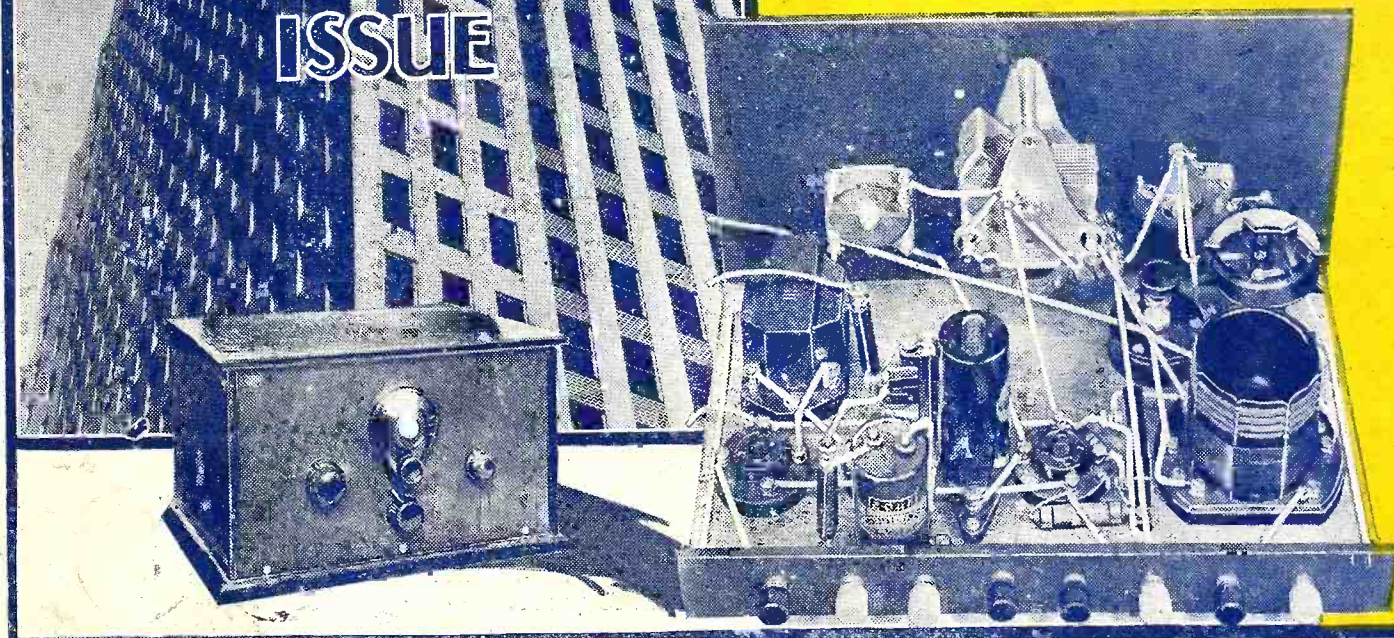
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June 11th, 1932.

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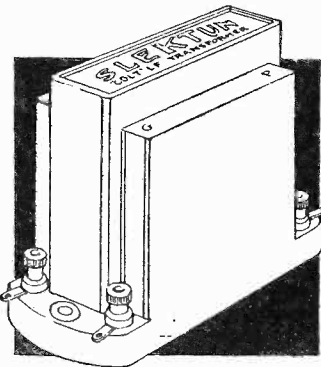
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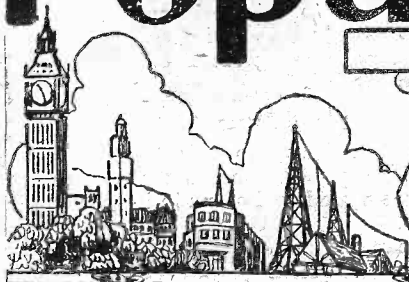
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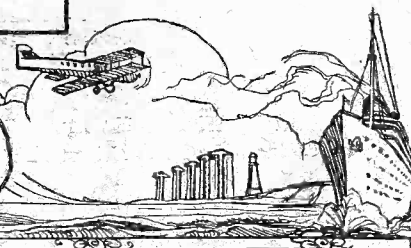
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THIS WEEK'S GEM
A LONG SHOT
STRIKING FIGURES
"P.W.'s" PULL

RADIO NOTES & NEWS

RADIO HISTORY
SPLITTING THE ATOM
BISCUIT-TIN TWO
CLASS WARFARE?

Our Best Wishes

FULL of years, honours, and, may I say, vim, Sir Oliver, on Sunday (June 12th), celebrates his 81st birthday, and on behalf of our readers and ourselves we offer him our most sincere congratulations and best wishes for his happiness and well-being.

He is a man who, after what most of us would consider to be a full life's work, is still working—mentally restless and creative—proof that work does not kill and that to the properly trained and controlled mind life has always something to bestow. He is an inspiring force to his fellow-men—and that, he might justly claim, is his greatest honour and award.

This Week's Gem.

THE Faraday House Wireless Company, in a letter to the press explaining why their name is so similar to that of the famous electrical engineering college, says: "The last thing we desire is in any way to shelter under the reputation of the Institute which also bears this name." Methinks that this might also be a two-edged sword, cutting also the other way.)

As a matter of fact, the company took over a business which was carried on in premises wherein Faraday once worked; hence its name.

Accumulator Tonics.

I HAVE always entertained a timorous curiosity about "battery solutions," "cell dopes," and the like, which are supposed to cure accumulators of the staggers, hardening of the arteries and general debility.

But I now hear the Bureau of Standards at Washington have collected about fifty of these specifics, analysed them, and found them mostly eyewash! A great pity!

A Very Long Shot.

FOR some reasons known only to themselves the Americans last month staged a "round the world" radio transmission of the sound of a shot fired by the Governor of Massachusetts in imitation of the shot which, fired 157 years ago, is said to have been the first shot of the rebellion.

From Schenectady the noise went to

Holland, then to Java, thence to Australia and back to the U.S.A. They call the original of this shot, "The shot heard round the world," which is slightly flattering to Yankee ordnance, surely.

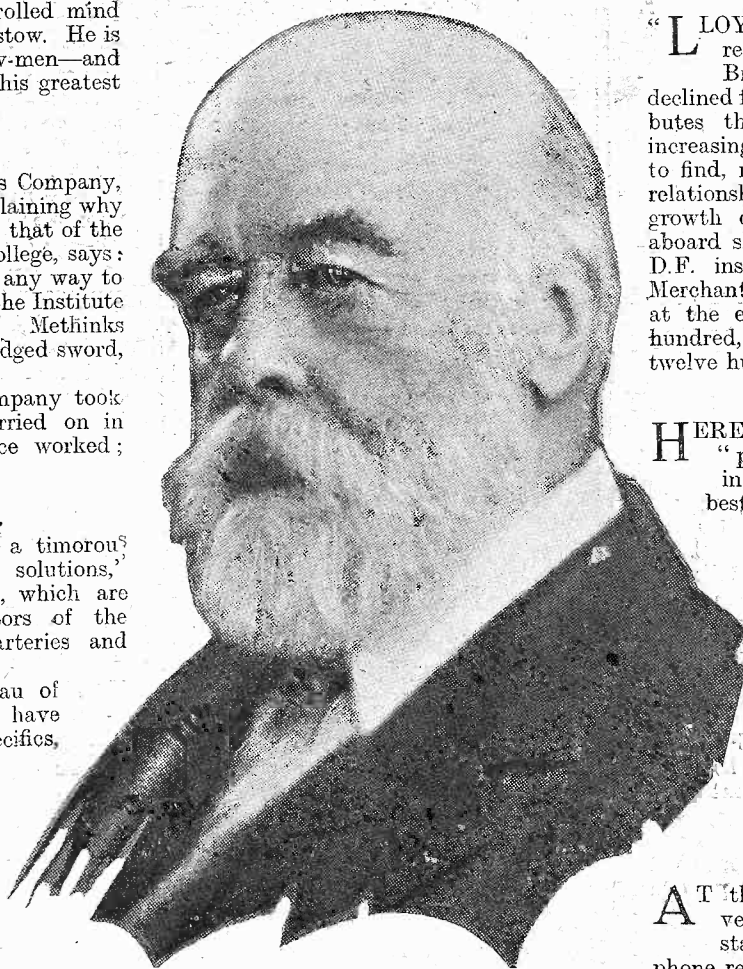
Progress of Television.

FROM the annual report (1931) of the Radio Corporation of America, the leading radio firm in the U.S.A., I extract this: "Although the develop-

ment of television is still in the laboratory, marked progress was made in 1931 in its transmission and studio phases." "Television receiving equipment will be offered to the public when experimentation has demonstrated that a reliable and serviceable system of sight transmission of practical value can be assured."

This report is dated March 14th, 1932, and can therefore be taken as the latest word on the subject.

SIR OLIVER'S BIRTHDAY



On Sunday Sir Oliver Lodge, F.R.S., celebrates the 81st anniversary of his birthday. Among the congratulatory messages from all over the world none will be more sincere than that from "P.W."—the journal which has been honoured by a long association with the great scientist, who, among his many claims to fame, was the inventor of tuning, and, of course, the first man to tune a wireless set.

Some Striking Figures.

"LOYD'S LIST" in discussing the reasons why the annual number of British ships posted as missing has declined from 29 in 1920 to 3 in 1931, attributes the improvement mainly to the increasing use of radio. It is not surprising to find, moreover, that there is a marked relationship between these statistics and the growth of the use of Direction Finders aboard ship. For in 1920 the number of D.F. instruments in use in the British Merchant Navy was not more than five; at the end of 1923 there were about a hundred, and to-day there are between twelve hundred and thirteen hundred.

"P.W." Pulls Perpetually.

HERE is a remarkable tribute to the "pulling power" of advertisements in your favourite (and the world's best) radio weekly. In July, 1929, Messrs. E. K. Cole, Ltd., ("Ekco") took a page in "P.W." for advertising a three-valve receiver and certain H.T. mains units. They now send us this page, torn from the rest by a reader with a receptive and retentive mind; on it is written this reader's inquiry for a list of battery eliminators.

An advertisement of 1929 still bringing inquiries in 1932! What a periodical!

Records of Records.

AT the British Musical Trades' Convention, held on May 9th, it was stated that nearly a million gramophone records are bought in England each week; that these records, placed edge to edge, would reach farther than from London to Bournemouth; and that if their playing tracks could be unfolded and joined up they would encircle the earth over seventimes.

(Continued on next page.)

"ARIEL'S" RUNNING COMMENTARY ON RADIO (Continued)

It appears, too, that the public taste in records has during the past two years veered from dance music to light orchestral pieces, and, at the moment, the demand is for old favourites of pre-war times and Victorian waltzes.

"Ariel's" Wireless History.

IT is characteristic of the Briton that he loves to hark back to the past. This has been amply illustrated by the letters which I have received, asking me to tell more of the apparatus of the earlier days of radio. It is a tempting subject. I confess, but these Notes are not supposed to be devoted to the dead past. However, I will shortly try to slip a few more



anecdotes past the blue pencil of the merciless sub-editor.

Meanwhile, I may say, in reply to a number of inquiries, that it is a fact that some of the earliest "feed-back" coils were about six inches long and five inches in diameter and were tricky customers indeed!

"Water, Water Everywhere."

NO alcoholic drink is allowed on the premises of the Manse, otherwise known as Broadcasting House. "Pain-killers" and toothache drops used by the staff there have to be certified 300 per cent under "proof" strength, and a man who refers lightly to herbal beer has to go "on the carpet" and get a severe quotation from John Knox.

In fact, so that there shall be plenty of water, the Director-General has, so I read in the "Evening Standard," a private bathroom! How I could frolic with that fact, if only I were allowed to do so!

Bring Out Your "Gems."

COME ON! There must be scores of jolly good radio jokes going the rounds, so trot them out for the benefit of other readers, please. S. B.



(Maltby) tells one of a man who bought some acid for the new H.T. accumulator and was charged only sixpence. Thinking that he had a bargain, he paid up and went while the going was good. His honesty was rewarded, for it was subsequently found that he had filled up some forty-five new cells—with paraffin oil!

Splitting the Atom.

NOW that the highly-coloured accounts in some of the newspapers have become drab with age, let us consider dispassionately the facts of what has been reported about Dr. E. T. Walton and Dr. J. D. Cockroft of the Cavendish

Laboratory, Cambridge, and their ill-treatment of atoms. Briefly, they have "bombaraded" hydrogen atoms with electrons and broken some of them. It was observed that when the atoms broke they left helium behind—a genuine bit of transmutation.

No "Power from Atoms" Yet

THE electrons were shot at the hydrogen atoms at a velocity of about 6,200 miles a second, and when the atoms broke up they produced 100 times more energy than that of the bombarding particles. Very encouraging, but as only about one hydrogen atom in ten million was split up, there is no immediate prospect of using the process for the production of energy on a commercial scale.

The real achievement of these scientists is that they have broken up atoms by means of a voltage of only 120,000, whereas voltages of the order of one million have hitherto been contemplated for the job. This triumph will not, however, solve the helium problem for airship builders, I fear.

"SHORT WAVES"

In a description of the interior of the new B.B.C. Headquarters, it is stated that artists are so overawed by its palatial solemnity that they forget their jokes. Yet we hesitate to give the designer credit for this intention. —"Punch."

Smith: "Well, what do you think of it? I guess you've heard worse reception on a wireless set than on this one, old man."

No answer.

Smith: "I say, I guess you've heard worse reception than this, haven't you?"

Brown: "I heard you, old chap. As a matter of fact I was just trying to remember."

As an experiment, a married man and his wife are living in separate houses. Their first quarrel will probably be over who shall be kept awake by the wireless. —"Pictorial Weekly."

A London waiter is an expert ventriloquist. When questioned by a faddy diner regarding the ripeness of a piece of Stilton, he makes the cheese speak for itself. —"Humorist."

We should like to hear this big cheese from the studio!

SO SIMPLE!

"Listeners can easily learn to RIDE Radio Kilocycles," we read in a contemporary.

BABEL.

A wireless writer, condemning "knob-twirling," says: "It's no use trying to hear two stations at once."

With my set, it's no use trying not to. —"Sunday Pictorial."

"Minimum Charge" to Radio Users.

SO many applications for electricity supply for radio only are being received at Burton-on-Trent that a minimum charge of £1 per annum is to be introduced. Although I favour the principle of minimum charge in certain instances, such as for telegrams, I feel that in this matter the charge is not in the best interests of the industry.

The charge will cause much annoyance and it will "kill" a lot of would-be electricity users, whereas a charge based solely on consumption would strike the small user as just; and the supplier, having got "juice" into the house, ought by proper sales methods to be able to induce the

householder to indulge in an electric iron and a few "points" of electric light, thus by degrees making the Burtonites "electricity-minded."

The "Cossor Courier."

I BID welcome to this "trade only" little publication. Its first number has a good deal of *mu* in it—the classic touch. Moreover, Cossor's Bristol manager, whose photograph is given, is one of the old diehards of the "love me, love my mighty pipe" school, which, I thought, had died with General Murphy on the stricken field.



Ah, and there's

a story of a man who fell down a lift shaft and escaped with only a few bruises because the "Cossor" set he was carrying acted as a shock absorber. Phew! Build your sets into "Sorbo" cabinets!

Souvenir of Faraday Exhibition.

J. L. W. (Melbourne) puts it up to me to find out for him about a souvenir of last year's Faraday Centenary Celebrations. The reply may interest collectors and others.

Souvenir catalogues of the Exhibition may be obtained from the Institution of Electrical Engineers, Victoria Embankment, London; paper covers, one shilling; cloth, with gilt edges, half-a-crown. I suppose something ought to be added for postage.

The "Biscuit Tin" Two.

INSPIRED by an article published in "P.W." some time ago, a Glasgow reader has been experimenting in the design of very compact, low-power portables, and has produced a set which fits into a biscuit tin 9 in. by 8 in. by 4½ in., complete with two valves fed by five flash-lamp batteries, giving some fifty hours' intermittent use.

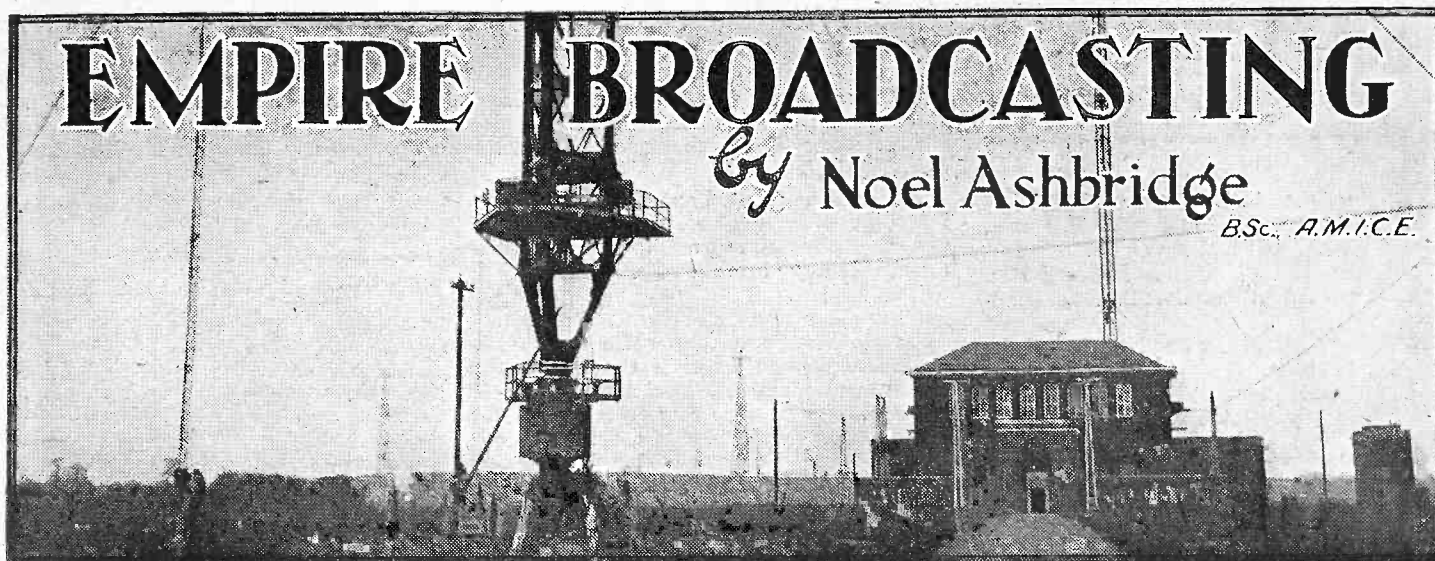
We congratulate him, and thank him for his excellent sketches. Our technical staff say, "What kind of biscuits?" Either shortbreads or oatmeal, I suggest.

More Class Wordy Warfare.

I DO not think that it is necessary to apologise for serving up the following joke, which I recently found in one of those beautifully-produced shilling "society" monthlies—whichever it was I give it full acknowledgments.

A lady, showing her new charlady over the house, remarked of her receiver: "It isn't a bad set, but we notice that it hums sometimes." "That's funny," replied the other, "we never notice any smell about ours!"





EMPIRE BROADCASTING

by Noel Ashbridge

B.Sc., A.M.I.C.E.

MOST readers of this journal will be familiar with the past history of the experiments with the short-wave station G 5 S W, which ultimately led to a decision to build a permanent station for broadcasting programmes direct to the Empire. In particular it will be remembered that the object of the transmissions from G 5 S W was to determine whether the quality of reception available overseas from such a station would be acceptable and of value from the point of view of a permanent service.

A Long Process.

These experiments were somewhat protracted owing to the fact that long-distance reception on short waves cannot be judged in a few weeks or even months. It is necessary to make regular observations extending over at least two years before an estimate can be formed of the average standard of reception which is likely to be available in any particular region.

In addition, the process of collecting reports from all the various Colonies and Dominions is of necessity somewhat lengthy. However, having once obtained sufficient data to decide that such a service had definite value, the only difficulty which remained was the financial one, and this led to negotiations with the Government and discussions at the Dominion and Colonial conferences which took place in 1931.

At one time it appeared as though the scheme might fall through owing to these difficulties, but the B.B.C. was so convinced of the importance of establishing such a service, particularly at the present time, that it decided it would be justified in building a station on economical lines at its own cost.

Not a Perfect Service.

However, the hope remains that in the future some reimbursement may be forthcoming, either from the Treasury or from those making use of the service. This stage was reached towards the end of 1931, and immediately the B.B.C. started to put into operation plans for building a station which had already been prepared.

The technical requirements for such a station are extremely interesting, mainly because the problem is a difficult one. It is fairly obvious that it is impossible to supply a service to the whole of the British Empire

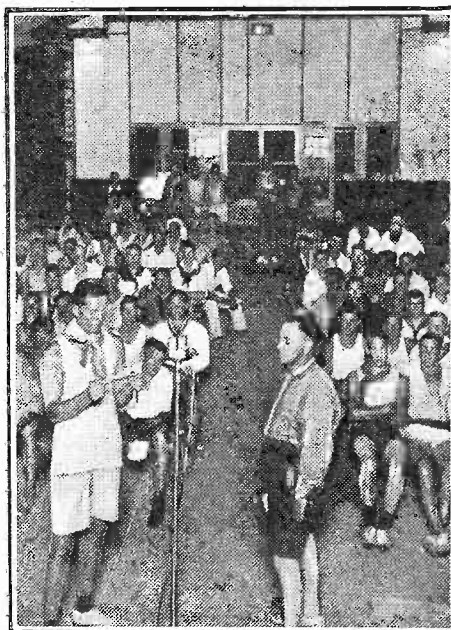
The B.B.C. now has the construction of the new Empire station at Daventry well in hand, and in the following article the entirely novel aerial arrangements and other striking features of the apparatus are described by

THE CHIEF ENGINEER OF THE B.B.C.

which can be comparable in reliability and strength with that existing, say, in the neighbourhood of London.

In fact, it cannot even approach the service available in those parts of the British Isles where reception of our National stations is at its worst. We therefore have to strive towards setting up a station which will provide at least intelligible reception in those regions which it is intended to serve.

WAY DOWN UNDER



Outside broadcasts are popular features of Australian broadcasting, and here you see Lord Somers, who until last year was Governor of Victoria, presiding over the microphone at a Boys' Camp Concert. This concert was broadcast from the famous Melbourne transmitter, 3 L O.

Musical quality of high artistic value is completely out of the question, although the lighter forms of music should provide acceptable material. The effect which this will have on the technical operation of the station will be referred to again later on.

No Band Available.

Our first technical consideration is concerned with the wavelengths which are available, and the bands allotted by the Washington Convention are as follow:

6,000-6,150 kcs.	(50-48.8 m.)
9,500-9,600 "	(31.6-31.2 m.)
11,700-11,900 "	(25.6-25.2 m.)
15,100-15,350 "	(19.85-19.55 m.)
17,750-17,800 "	(16.9-16.85 m.)
21,450-21,550 "	(14-13.9 m.)

It is hardly necessary to say that it is only the short waves below, say, 60 metres which are likely to be of value for this purpose, but even if this were not so there would be no band available for broadcasting between 50 and 200 metres.

In order to be quite certain that the equipment would cover all possible requirements, it became necessary to specify that transmission in any one of the above bands should be possible.

The next question to be answered was: Could effective use be made of directional aerials? If one examines the globe, it soon becomes obvious that to serve all parts of the Empire one has to transmit over a very wide angle, when looked at from England, and therefore a single directional aerial to transmit to the whole Empire is out of the question. Moreover, even if it were not, the same wavelength is unsuitable for transmission to all parts of the Empire, even apart from the question of difference in time.

The Zone Scheme.

A scheme was eventually adopted which divided up the Empire into five zones, from the technical point of view. These zones are determined by the following three factors:

- (a) Time of transmission.
- (b) Direction of transmission.
- (c) Distance from this country.

The actual zones are as follow, the numbering being of no significance. The description of the zone is, of course, only approximate, and many important places are included which are not mentioned.

(Continued on next page.)

EMPIRE BROADCASTING

(Continued from previous page.)

ZONE.

1. Canada and the Pacific Isles, West Indies, Trinidad and British Guiana.
2. New Zealand and Australia.
3. India, Burma, and the Malay States.
4. South Africa and East Africa, including Egypt.
5. West Africa, including Nigeria and the Gold Coast.

Unfortunately, most directional aerial arrays are only suitable for a narrow band of wavelengths, and therefore if it is necessary to transmit on more than one wavelength to any particular zone, more than one aerial must be provided for that zone.

Sixteen Aerials!

As already stated, these aerials can cover a narrow band of wavelengths, but as a rule the change of wavelength required with the season is a very big one. Thus for Zone No. 1 three aerials will be erected, to transmit wavelengths of 19, 32 and 48 metres respectively. Zone 2, on the other hand, only requires one aerial, since the only wave-band likely to be of use is that in the neighbourhood of 25 metres.

Zone 3 will have aerials for three wavelengths, namely, 17, 25, and 32. Zone 4 will have two wavelengths, 32 metres and 14 metres, the last-named being intended for transmitting when daylight exists over the whole route.

Zone 5 will have two wavelengths, namely, 48 and 32, but the latter will be arranged to cover both Zones 4 and 5. It will be realised, of course, that the smaller the angle for which the aerial is designed the greater will be the gain from the directional effect.

It should be pointed out that the wavelengths mentioned above do not indicate the exact channel which will be used, but merely the wave-band in which the channel will be located.

In working out this scheme, the main object in view was to provide the best possible reception between the hours of 6 p.m. and midnight, local time. Occasionally, transmissions may be required at other times, and in order to cover possible difficulties in this direction six omnidirectional aerials will be erected in addition to the directional ones.

Since the best wavelength to use at a certain time of the day at a certain season to reach a distant region is still not a definitely fixed quantity, it was highly desirable to adopt an aerial system which would be flexible, and which was economical in first cost.

Pigmy Masts.

The type of aerial which has been adopted is that put forward by Messrs. Standard Telephones and Cables, Ltd., who will also supply the transmitters and auxiliary plant. These aerials are simple in construction and are supported by masts less than 100 feet high.

The question now arises, how many transmitters are necessary to feed this somewhat extensive array of aerials? Remembering that the main object in view is to supply a programme between the hours of 6 and 12 o'clock midnight, local time, we are greatly helped in this matter by the difference in time between the various zones.

Economy!

Thus Montreal time is 5 hours behind G.M.T., Melbourne is 10 hours ahead of G.M.T., Calcutta 6 hours ahead of G.M.T., and so on. Thus it becomes possible to feed all these aerials at the appropriate times with only two transmitters. If at any time in the future longer hours of transmission are required, or it becomes essential to give directional transmissions to all zones simultaneously, then, of course, additional transmitters would have to be provided.

Another interesting question is, should these transmitters

have a performance exactly similar to those used in this country for national broadcasting? At first sight it would seem that an exacting specification for frequency characteristic is unnecessary, since fading, and particularly differential fading (independent fading of the carrier wave and the sidebands) is bound to stand in the way of very high-class reproduction.



TO
LONDON
5,877
MILES!

This lonely Britisher, living far away in India, is one of many distant readers of "P.W." who will greatly appreciate the new Empire service. Note the signpost—5,877 miles to London.

On the other hand, intelligibility in speech depends on the complete reproduction of the upper frequencies, between, say, 300 and 4,000 cycles per second, and therefore we find that, at any rate, we cannot afford to depreciate any frequencies in this band, and it is very desirable to arrange for a wider band.

Perhaps the reproduction of frequencies below, say, 150 or above 6,000 cycles per second is not of great importance in this case, but in actual point of fact the transmitters will be designed to have a far better over-all frequency characteristic than this.

Depth of modulation, however, would seem to be of much greater importance, and it is essential that the mean degree of modulation shall be kept as high as possible, and therefore the transmitters must be capable of modulating up to about 100 per cent. without serious distortion.

In fact, I anticipate that we shall operate these transmitters with a much higher degree of modulation than we adopt for our other stations, although of necessity this involves a certain amount of cutting of the peaks, i.e. amplitude distortion. The ordinary regional transmitter is modulated normally up to 80 per cent. on peaks, and in practice it is difficult to prevent the peaks sometimes rising to 90 or even more.

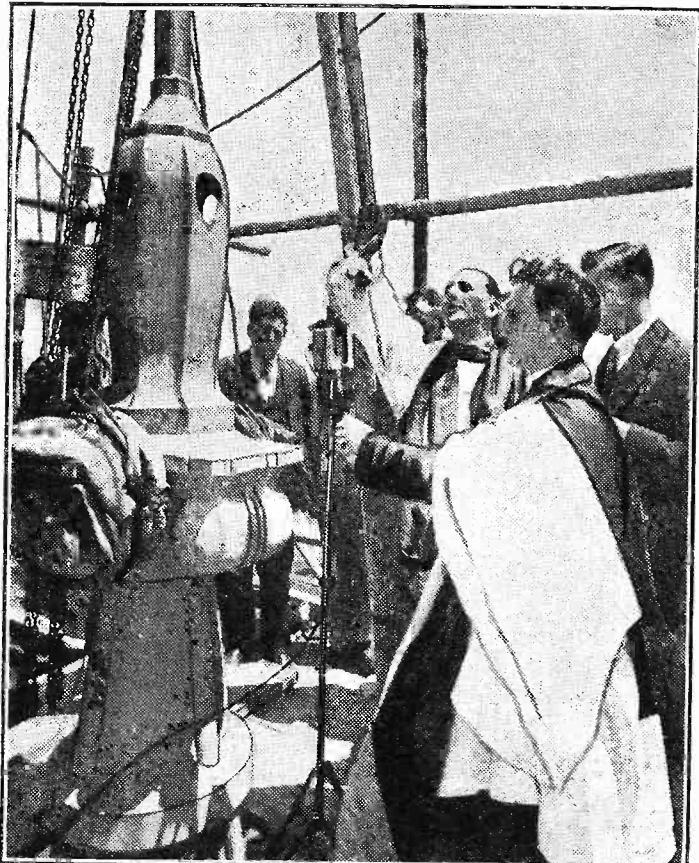
Mean Modulations.

This gives a mean modulation of the order of 25 or 30 per cent. In the case of the short-wave transmitters, however, it will probably be advantageous to allow the peaks to come up to 100 per cent., or even to be cut off somewhat in order to raise the mean modulation to as high as 40 or 45 per cent.

With regard to power, short-wave transmitters usually operate with about 15 to 20 kilowatts in the aerial, and it is doubtful whether any material advantage would be gained by raising the power much above this figure, unless it were raised to a very

(Continued on page 423.)

A NOVEL AUSTRALIAN BROADCAST



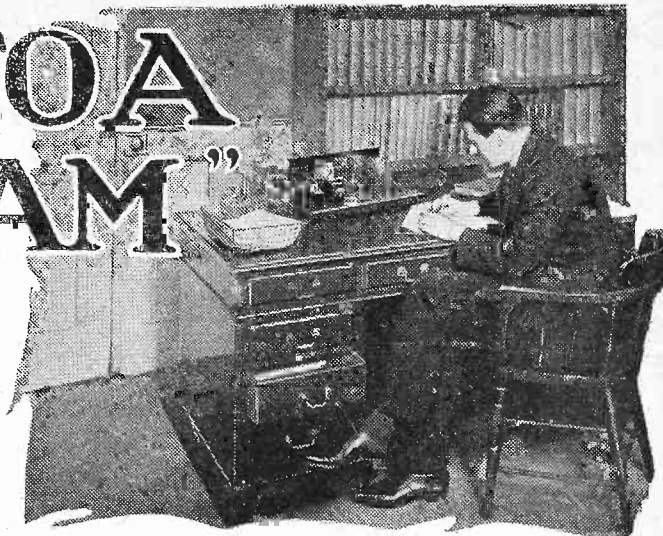
This broadcast, carried out from the dizzy heights of St. Paul's Cathedral, Melbourne, on a specially rigged platform 300 feet above the ground, was made on the occasion of a special dedication service by the Archbishop of Melbourne as the final of the spire was placed in position. The wind at such a height was considerable, and one of the Archbishop's assistants had to steady the microphone with his hand, to prevent it being blown over.

LETTERS TO A YOUNG "HAM"

by ARIEL

With the whimsical perversity which might be expected from the writer of our "Radio Notes and News," "Uncle Ariel" starts his letters to young radio enthusiasts by addressing this one to a nephew who is only six months old!

And he gives the young fellow some really good advice, too, including hints on a course of training for dial-twisting!



MY Dear Young "Ham,"—I learn on good authority that you have been a member of the population for six months. How do you find things in general? Doubtless you consider this to be a great and terrible world, composed of milk, soap, water, powder, pins, and enormous heads which hover over your cot and emit the most foolish views; they remind you of the earliest forms of loudspeakers fed by distorting L.F. amplifiers.

A little bird whispered to me that you once had a father. However, I greatly fear that you have almost lost him since he built that "All and Every" Waver.

Goteborg and Tobacco!

Still, he will make rare appearances and will be known to you for many years as the bristly man who got Göteborg, and smells of tobacco—against which I would warn you. I don't smoke myself. Only a pipe. One every hour. Study moderation, young ham, and you will not overload the reaction.

It is early days to expect you to be able to speak with authority on the subject of "fading," but in a month or two you will have to begin to buck up and follow the trend of design. We can't molly-coddle you in that cot for ever, you know. The 1932 kid who can't hook up something and pull in a Yank is a back number, out of print. You'll have to drop blowing those bubbles soon and get down to a bit of good, honest wiring—and no scamping the joints, either!

Quite Simple.

I advise you to cut out the Benger's, or take more milk with it. It is the dopiest stuff and no good at all for DX work, for which you need a clear, sleepless head. Tell ma I said so, and see if you can come to some arrangement.

Yes, I know that ma is a *leettle* obstructive. Your late father told me about it when we went to buy his ganged condensers. These women—eh? Well, I'll have to leave you to get round her in your own way, but if I might be permitted to throw out a pointer or two I would mention that a nice big tooth—she'll call it a "toosumpeg"—would mollify her a whole lot, if

you could manage it; whilst if you could humour her by saying "Dad—dad, mum—mum" whenever she holds a baby demonstration—why, she'll eat out of your hand. It's quite easy. Practise it while you are officially supposed to be asleep. You know what I mean—"bysie-bye." (Isn't it frightful stuff, this baby-Esperanto?) Quite!

A Costly Chest.

We will assume, then, that you have overcome the maternal scruples and are ready to get into the game. I advise you to talk it over with the chap in the next pram, because he has lost his father also—from the same malady which carried off your own lamented sire—except that his pa works chiefly on the South American and Australian stuff.

You will have observed, my dear young ham, that when Uncle Jim looms into your universe you find that you are levitated and pressed relentlessly against an unsympathetic semi-solid. It is Uncle Jim's chest, dear old "ham"! Nothing to be frightened

about at all. It is deuced weak and is destined to cost the Wigan United Life Insurance Co. the sum of £1,000 in about three years. But that is another story. On this uncomfortable expanse you will discover divers harder substances known as buttons. I advise you to advance your fat little hand and give them all a good twisting. This will train you in dial twisting—and get rid of Uncle Jim.

You will remember me. I am the man who discovered that you were sitting on the nutmeg-grater. Your poor mother was telephoning for the doctor, being convinced that you had the croup! I removed the annoyance and gave you my watch ("tick-tick") to play with. The darned thing loses a minute an hour now.

A Family Friend.

So you will admit that I am a friend of the family. On the strength of that I beg you to steer clear of indoor aerials, which are sapping the vigour of the amateur movement. Unless, of course, you are going to give your life to D.F., in which case I shall have to see my lawyer about my Will—and you know what *that* means!

I was talking to your new nurse the other day. She disturbed me, rather, by saying that she thought you were somewhat unorthodox on the subject of screening. That is a terrible thought and has cost me several sleepless moments. My dear chap—Benger's apart and no joking—have I deserved this? Well, if you persist in this way of life—*no bunch of keys for you to dribble all over the next time I call to inquire whether your pa has been heard of.*

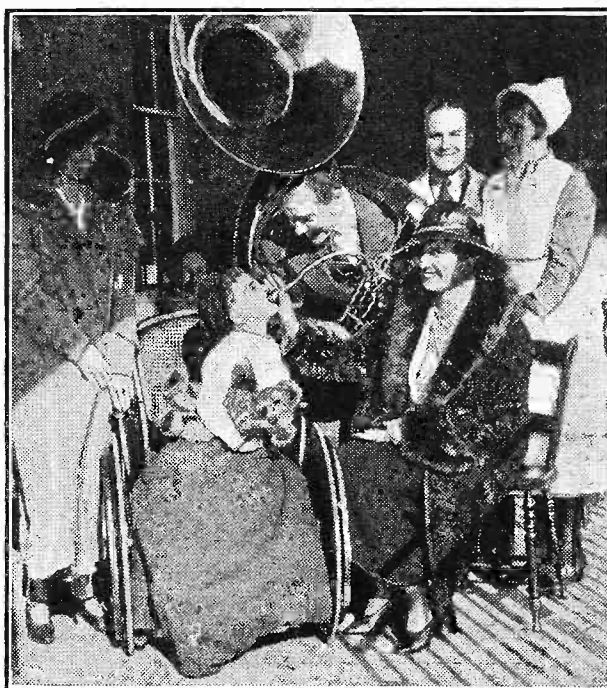
Fixing Matters.

By the way, that new nurse of yours—have you noticed any—er—well, well! I'm an old fool, I suppose, but—did you understand her to say that her brother has a really posh wave-meter? You see my point, my dear fellow? If you could fix the matter up—I should not require it for more than six months—I should be grateful. You will recollect that your first birthday is due in a few months. Could you do with a Teddy bear?

Yours in the Cause,

UNCLE ARIEL.

A LUNG TEST BY JACK PAYNE!



When Jack took his "boys" to the Sussex County Hospital at Brighton one small patient expressed a wish to blow the sousaphone. So, as shown here, Jack gave him a chance—but nobody was deafened!

THE MIRROR OF THE B.B.C.

By O.H.M.

MEMBERS OF PARLIAMENT IMPRESSED

UNNECESSARY SUSPICION—A "WATT-HULBERT" REVUE—ALONE ACROSS ATLANTIC—SUNDAY MORNING PROGRAMMES.

SO the visit of members of Parliament to Broadcasting House, exclusively forecast in this column, has come and gone. I have spoken to several "back-benchers" on both sides as well as to a few of the "nibs," and I discover a curious unanimity of attitude. They are all impressed, and also they are all a little shamefaced, that heretofore they had such little and inadequate knowledge of the enormous influence of wireless in the modern scheme of things.

Commander Kenworthy, of course, was prominent. He is one of the few members who vie with Captain Ian Fraser in knowledge of broadcasting.

Commander Kenworthy, by the way, tells me that he has always maintained personal contact with Mr. Whitley—former Speaker of the House of Commons, and before that a prominent Liberal—now chairman of the B.B.C.

Suspicion Overdone.

Although I yield to no one in the admiration I advance for Broadcasting House, I am bound to enter a mild note of protest about the new attitude of suspicion towards visitors to Portland Place.

I was "watched" the other day all the way to the official I was seeing, and he seemed mightily anxious to attend me himself until I was off the premises.

I realise, of course, that undue advantage has frequently been taken of the "freedom of Savoy Hill," but I suggest seriously to those in charge that to victimise numerous friends for a few known enemies will lead only to the increase of the latter category.

The Pace Stiffens.

The best product of the move to Broadcasting House that I have observed is a general "heart-searching" on the point of whether the old gang or part of it can live up to the necessarily higher standards that will be expected of them.

In this connection Mr. George Grossmith has decided views. He was for several years paid adviser to the programme chief, and he has consistently advocated a more "professional" view of the production of B.B.C. entertainment. He is credibly reported as stating repeatedly that the only sure way to give the public what it should want is to introduce "sponsoring" by the entertainment industry.

I hear that the other "programme adviser," Mr. Filson Young, is not of the same mind, preferring to maintain and develop present talent and enterprise. The decision should be taken by the B.B.C.

Humorists Combine.

I hear that Ashley Sterne and A. A. Thompson, two of our leading humorists in print, are collaborating in the writing of a radio revue entitled "Grand Slam," which is to be presented in the near future. And what is even more interesting, is that Mr. Sterne is not only assisting in the pre-

paration of the book, but is writing the music as well.

A Hulbert Novelty.

With this piece of news comes another item about a musical comedy show by John Watt and Claude Hulbert, with music by Harry Pepper, which is being presented for Regional and National listeners on Thursday and Saturday, June 23rd and 25th respectively.

The play has not yet been given a title, but, of course, it will have one by the time

"I WANT MY DINNER"



Budapest listeners who switched on the other day were astonished to hear the most awful roar imaginable—it was a broadcast by a hungry hippopotamus during a running commentary from the Budapest Zoo.

that Claude Hulbert is ready to take part in it with Gene Gerrard, who, I understand, is making his first important studio appearance in the leading rôle.

A Cockleshell Adventure.

The thrilling experiences of Mr. Weston Martyn in a cockleshell craft for three hundred miles down the coast of America will be described in the fifth "Hazard" broadcast talk on Saturday, June 18th.

Mr. Weston Martyn is continually undertaking long voyages in small boats at no small peril to himself, as, for example, when he sailed from Falmouth to New York and back in a small cutter, and accomplished his journey of ten thousand miles in seventy-eight days!

Sunday Extension.

Within a few weeks the mid-day Sunday programmes which started on June 5th will be as commonplace as other regular features of the broadcast fare. For the time being, however, they bear the stamp of novelty, and listeners will welcome a few details of those for Sunday, June 12th, the second week of extended hours.

For this Sunday (June 12th.) there is a concert by the Commodore Grand Orchestra, directed by Joseph Muscant, relayed from the Commodore Theatre, Hammersmith.

Such a broadcast would normally excite the greatest interest, but the items will be characteristic of Sunday programmes played by outside orchestras which are transmitted by the B.B.C. Personally, I think they are worth setting out in detail.

They are: Fantasia—Linke-Winke (Linke); Entr'acte, Two Guitars (Horlick); Medley, compiled by Joseph Muscant; Intermezzo, Nightingale in the Lilac

(Continued on page 423.)

THE LISTENER'S NOTEBOOK

A rapid review of some of the recent radio programmes.

AN article in a recent number of "Die Rundfunk Tage" (a German wireless journal), entitled "What the Listener Must Know," suggests that the German listener is just as prone to grouse at the programmes as his English cousin!

It says, among other things, "Wireless has to speak to *everybody* from 7 a.m. till midnight every day, to townspeople and to country people, to rich and poor, to high and low, to men of all parties, stations, vocations and creeds, to young and old, to the healthy and the sick—in short, to all sorts and conditions of men. . . . Since wireless is *everybody's* possession, it must consider *everybody* in its programmes, and provide suitably for *everybody*."

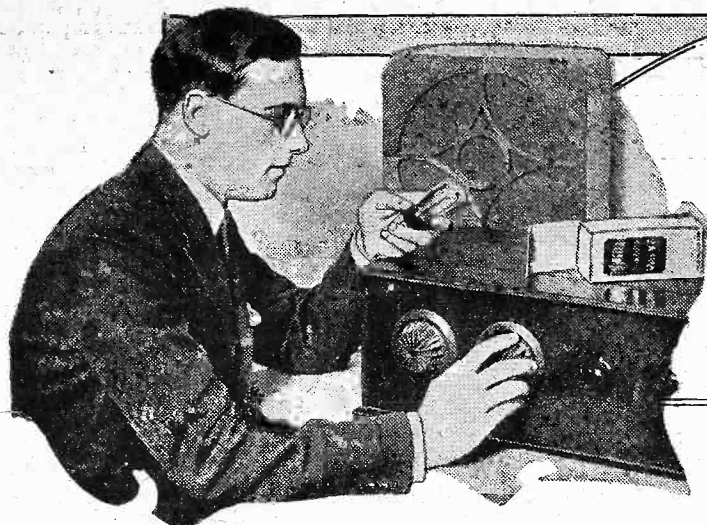
The fact that there was no commentator at all on the occasion of the foreign relay of

Gustave Carpentier's Dramatic Symphony leads one to believe that the B.B.C., far from having solved the difficult problem of commentating, have abandoned the practice altogether. Surely such a relay as "La Vie du Poète" required something in the way of an explanation, for a fuller understanding of the work?

Though I feel that America hasn't much to teach us of the art of Broadcasting, I do think, from what I hear, that their methods of commentating might be studied by us to our advantage.

When a satisfactory system has been devised, I should then plump for more of these foreign relays. Interchange of programmes between nations can only result

(Continued on page 424.)



Yesterday —And Today

A PARAGRAPH in "P.W." dated June 17th, 1922, reads as follows: "Mr. Kellaway, the Postmaster-General, recently said to an 'Evening News' representative:

"If wireless broadcasting becomes as popular in this country as it is in the U.S.A., there should be something like 500,000 receiving sets here in a short time, instead of the 7,000 or 8,000 at present. There is no doubt that we are at the beginning of the creation of a considerable new industry."

A considerable new industry!

Tremendous Advances.

Much current has flowed in the service of wireless entertainment since those prophetic words were spoken—spoken, remember, at a time when amateur wireless enthusiasts were regarded by the general public much as the medieval romancer was regarded by his fellows—as a being apart, to be viewed with considerable distrust.

The experiments of the old-time seeker after knowledge usually led him to a dark, damp dungeon, or a stout stake and a hot fire. But in 1922, a more enlightened age, men simply shrugged their shoulders at the wireless experimenter, tapped their foreheads, made pitying noises, and passed on.

Carborundum crystals held the field as detectors or rectifiers, and were judged according to their merits. Some detected and some didn't! They were generally soldered into little metal cups, and were stimulated into action by being carefully tickled with a thin spiral of wire, the "cat's-whisker."

Heigho! Only ten years ago!

But the coming of wireless telephony, as distinct from wireless telegraphy, created a real interest for a large section of the public. POPULAR WIRELESS was born, the first popular wireless weekly.

Some Queer Queries!

Readers thirsted for wireless knowledge with an avidity which flattered the editorial staff. Here are a few actual queries from 1922:

"What does H.T. stand for?"

"What is the difference between a rectifier valve and a three-electrode valve?"

"What is a capacity condenser?" (Ah, what?)

Also letters like the following, received

Wireless enthusiasts in 1932 think of the days of "crystal and cat's-whisker" much as they think of Stephenson's "Rocket"!

Yet only ten years have passed since the strange experiences recalled here by our contributor.

from earnest enthusiasts in the first flush of wireless fever:

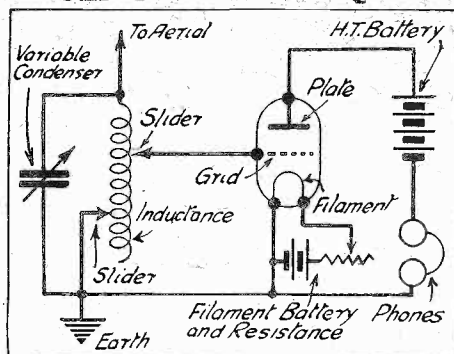
"Dear Sir,—I have made a crystal set, but cannot hear music. Please write and tell me why.

"Yours truly, _____"

And:

"Dear Sir,—I have manufactured a crystal machine, and am using the spring

OLD-TIME TECHNIQUE



This ten-year-old one-valver had the telephones connected to H.T. negative, and used no grid-condenser, or leak! A modern one-valver would knock spots off it!

of my bed as an aerial and a flower-pot for my earth. The flower-pot is right full with dirt, and the earth lead is buried in it. I cannot hear anyone speaking or singing, so I thought I would ask you if anything is wrong.

"Yours faithfully, _____"

Compare these with Captain Eckersley's "Query Corner" to-day!

In "P.W." (No. 3) appeared the ancestor of the "Titan-Magic-Comet" receivers, the forefather of all "P.W." sets.

The theoretical diagram is reproduced here. Note the position of the telephones—an accepted practice in 1922.

The valve, of course, was a bright emitter requiring 6 volts on the filament and between 60 and 80 on the plate, according to type. Oh, yes, strange as it may seem, more than one type of valve did exist! On very rare occasions they were even delivered to purchasers who had faithfully paid their money and served the necessary probationary period (enforced rigidly by the makers on all would-be customers). Did not their very advertisements state "valves are short at present"?

Thus with cash—and patience—a Marconi-Osram receiving valve could be obtained for 27s., post free; a V24 valve for 24s. 6d.; or a Mullard "O.R.A." valve for 15s. 6d.

The Good Old Days?

Other component prices ruling in 1922 make interesting reading. Here are a few. Valve holders, 2s. to 6s. 6d. each. Grid leaks, 4s. 6d. to 7s. 6d. each. Filament rheostats, 5s. 6d. to 9s. 6d. Fixed condensers, .002 mfd. and .003 mfd., 6s. 9d. each, post free. Telephones (high-resistance), 36s. a pair, post free.

Viewing this price list, one can understand why a component of any description was hoarded like miser's gold, and locked away each night for fear of dust or damage.

A really good piece of crystal, for instance, was pampered like the lap-dog of a Restoration duchess. It was bathed in alcohol and treasured in cotton-wool when not in use.

The happy owner would exhibit it proudly to a selected and favoured few, putting it through its paces ("Poldhu with the 'phones on the table, old man, if you bend down"), eyeing his pet fondly the while, and returning it to bed, exhausted, at the close of the performance. He lavished more care and consideration on its welfare than he would have done on the "Koh-i-noor."

That "New Industry."

How many wireless amateurs to-day possess a crystal? Many would hardly recognise one if they saw it. Shades of the coherer and the magnetic detector! The crystal passes to your ghostly brotherhood!

Times change, and not only crystals, but all the heavy, unwieldy components of a decade ago have gone for ever. Out of date, in many ways inefficient, expensive to make and therefore costly to buy, they have been ruthlessly eliminated by keen competition among the members of that "new industry" forecast by the Postmaster-General in 1922.

NO HOPE FROM THE MONTREUX MEETING!

Our **SPECIAL CORRESPONDENT**

is pessimistic about the results from this month's conference of European broadcasters.

THE annual general meeting of the Union Internationale de Radiodiffusion, which takes place this month, will not be at Lausanne, the usual meeting place of European Broadcasters. Instead, they will meet a little further along the lake of Geneva, at Montreux.

I have a very selective receiver and use a small indoor aerial some 20 feet in length. I can eliminate my local station, situated only two miles away, in three degrees of the dial. The set is located in Berlin, in the heart of the town. I can get Prague at any time in the day.

International Cocktail.

Langenberg also comes in, though a little weaker. But during the last weeks I have hardly been able to tune-in the North Regional lying between the two. I get either a mixture of English and Czech or a cocktail of German and English. And there is seldom an evening that London is not heterodyned by either Mühlacker or Graz.

Every month I have a good look at the extremely interesting curves published by the Brussels laboratory of the U.I.R. I see thin lines referring to Russian stations; those same Russian stations that again intend increasing their power for the coming winter. And Russia is not a member or signatory to any international radio convention.

As I say, I have a selective receiver, one that cost quite a lot. I have a short aerial and can make it even shorter (I don't mind cutting off some of the higher frequencies), but I am unable to get the station I want without a whistle or "talk-over."

I know I shall have to get an even more selective receiver for next winter. For there is no hope from Montreux and even less hope from Madrid.

Already Engaged.

A very high German Post-Office official pointed out recently that even should the broadcast waveband be enlarged at Madrid, for the whole world, this will only mean a gain of some 14-16 waves and most of these are taken up already by Swiss, German, Russian and Luxembourg stations. So

that even should we get the waves from 600-1,300 m. for broadcasting, this does not mean that we shall get more wave separation.

Granted that broadcasting gets 16 more wavelengths at Madrid (we will hardly get more because nobody wants waves below 200 metres or over 2,000 metres); granted that at the world conference the nations decide to limit the power of broadcasting stations; granted that some system of international single wavelength working is approved of, all this will first have to be ratified before it can come into force.

North v. South.

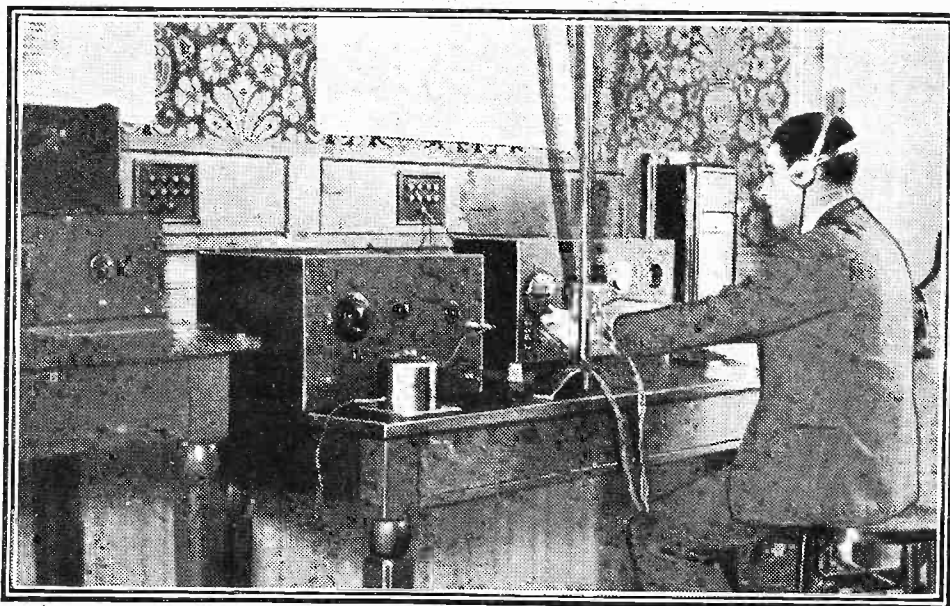
The Washington conference took place in 1927. The new regulations decided upon at that conference only came into force on January 1st, 1929! It cannot be otherwise with Madrid. The conference begins in September and will last some months.

But we always forget that the Madrid conference will only be concerned with world problems. We Europeans want more wavelength space between stations. I once suggested giving those countries with few listeners fewer wavelengths; all southern countries have less listeners per thousand inhabitants than any northern country, and this is natural, for in the south one lives out of doors, and in the north indoors.

But nobody can take somebody else's wavelengths without him agreeing to it, and for reasons of national prestige and policy no State will give up its wavelengths. Germany is prepared to give up the four waves it has "loaned" from other countries. It may be prepared to give up one wave to help generally.

Britain is prepared to do the same. But in spite of all this, we shall have to be thankful if the present 9 k.c. separation is adhered to. Even if we can hope for some relief it cannot come before 1933/34. Next winter will be the same as this, only worse.

THE WATCHER OF THE WAVELENGTHS



One of the official watchers at Brussels, who checks wavelengths, notes heterodynes, and generally "polices" the ether channels used for broadcasting.

RADIO INSTRUMENTS, LTD., has just completed its first ten years, and we offer the firm our sincerest congratulations. Archaeologically speaking, ten years is a mere moment of time, but in radio, and particularly in the radio industry, the past ten years covers an almost incredible wealth of development, success . . . and misfortune.

Full Sail Set.

And there is no greater proof of the solidity and integrity on which the foundations of the business of R.I. were built, than that this firm has weathered these ten years with full sail hoisted all the time, and emerged into 1932 in the very van of the industry.

In 1922 the name of R.I. stood for high-class production, and in later years R.I.

"R.I.'s" TENTH ANNIVERSARY

Congratulations to a Famous Firm.

was nearly unique in the manner it stalwartly refused to join the "get rich quick" scramble for easy money at the expense of an uninformed, intrigued, and excited public.

(That this policy was suicidal is proved by the records of the Bankruptcy Court.)

"P.W." owes R.I. no inconsiderable debt in that "P.W.'s" first great valve set success, the "P.W." "Combination" Receiver, could hardly have achieved its

colossal triumph had R.I. not been in existence to supply unlimited quantities of dependable, high-grade L.F. transformers.

A Golden Example.

And through the whole of the subsequent years R.I. maintained and even increased its powers and stood as a golden example for all to benefit from. R.I. has never manufactured down to a price, and enclosed shoddy materials within polished cases, so the result is that to-day, as ever, the name of R.I. is respected by engineers and public alike.

Mr. J. Joseph, the builder and captain of the good ship R.I., has ample reasons for feeling intense self-satisfaction. But we know that he won't, for he is too modest, and is a man who sets his eyes on the horizon—ever looking forward.

The B.B.C. AND THE NEW MICROPHONES

REISZ "mikes" have been used since about 1925, and the only other kind of microphone now often used in B.B.C. studios is the condenser mike.

Rumours are always going the rounds, though, that some new kind of microphone is to be introduced, and since the installation of the new Broadcasting House amplifiers for microphonic work, there have been further reasons for supposing that the Research Section of the engineering staff is on the lookout for a new kind of microphone which will work hand in hand with the Reisz microphones and overcome some of their disadvantages.

The Best All-Rounder.

When, a few days ago, I was chatting with one of the leading engineers, about studio matters, I happened to see some microphone response curves on his desk, and conversation naturally turned towards the old topic.

"I doubt if we shall get a microphone quite so generally satisfactory as the Reisz for quite a long while," said this official.

"In the 1923 days we gave up carbon microphones (Post Office type) because of the frequency cut-off, and, still later, we gave up the magnetophone (a moving-coil speaker type of instrument, working in reverse) because it was not good enough at the extreme ends of the frequency scale.

A Fine Frequency Response.

"The B.B.C., in common with many leading broadcasters on the Continent, adopted the Reisz microphone, which is really only a modification of the old carbon mike, because it has such a fine frequency response and because it is so reliable. It does not need batteries near it, as did the

Not content with putting new amplifier and control gear into Broadcasting House, the B.B.C. engineers are now testing out new microphones in an attempt still further to improve quality. These extremely interesting instruments are here described by
A SPECIAL CORRESPONDENT.

magnetophone, and it can stand a lot of kicking about—an essential thing where outside broadcast work is concerned!"

"What about the condenser microphone in the Wharf studio?" I asked. "Wasn't that a type of mike which might have been used for other transmissions?"

"It is a popular supposition that condenser microphones have been done away with," he said, "but new tests make it very likely that transmissions shortly to be heard, especially of music, will be by new condenser microphones."

The B.B.C. at the Clapham Research Department makes up microphones for its own tests and also conducts extensive experiments with large numbers of commercial types of microphones.

Condenser Instruments.

There are two kinds of condenser microphones which may shortly feature in the transmissions, one being the high-frequency condenser microphone, and the other the ordinary condenser microphone.

Both have their uses, but the output of the high-frequency condenser is so much less that it can only be used in certain circumstances. The engineer explained both systems to me and showed me the frequency curves of both types.

The high-frequency condenser goes down to about 35 cycles per second, so that organ lovers need not fear that the deep pedal notes will be "chopped off." The curve

dips a little at about 60-cycles per second but rises at the frequency point where many receivers begin to drop off, about 100-cycles per second.

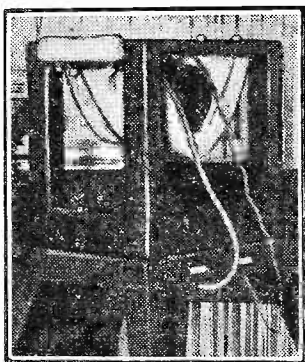
It drops to its lowest output at about middle C, and then rises progressively to about 7,000 cycles per second, in order to counteract the cut-off which the average receiving set makes here.

The output of the ordinary condenser microphone, always at a higher level than that of the H.F. job, is greatest in the bass and decreases gradually to about 2,000 cycles per second, when it rises sharply to a peak at 4,000 cycles per second, to counteract the receiver cut-off.

Balancing the Curves.

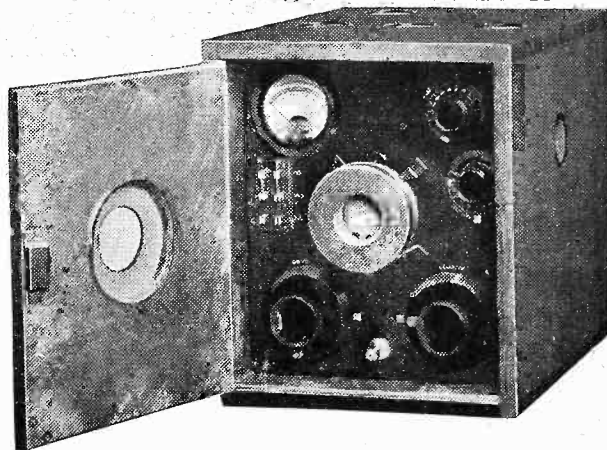
Not only do the B.B.C. engineers have to choose a good microphone, but they have to get the curve right to correspond with the reproduction curves of average receivers. Response in the average set is very poor at above about 4,000 cycles per

AN OLD TYPE



One of the old magnetophone "mikes" showing the method of suspension by a thick rubber band.

COMPLETE WITH AMPLIFIER



This is a very interesting photograph, as it shows one of the new H.F. condenser "mikes" complete with oscillator and amplifier. This type of microphone gives exceptionally brilliant quality.

second, and if the transmitter were to cut-off here, too, there would be no "top" to the radio reproduction.

The H.F. condenser mike is mounted on the ebonite panel of the oscillator and amplifier valves which are connected

(Continued on next page.)

THE B.B.C. AND THE NEW MICROPHONES.

(Continued from previous page.)

directly to it, and which are contained in a little wooden box, with a hinged front through which the microphone opening can be seen.

I was told that in the H.F. job the microphone, consisting of the two plates of a condenser, is connected across the grid of a valve which oscillates at 667 kilocycles. The little condenser modulates this miniature transmitter, and as the output is so feeble the amplifier has to be built right up to the oscillator in the same case.

High-Frequency Distortion.

The H.F. mike is not quite so simple as this, though, and the engineer explained to me that in early microphones of this kind the trouble was to get rid of the H.F. distortion. They correct this in an ingenious way. Part of the little unmodulated carrier-wave set up by the oscillator is separately detected and applied to the following amplifier after the "phase" has been changed.

This corrects any carrier-wave noise which might be present in the detected speech-wave. Technical enthusiasts will know what I mean when I say that this kind of "mike" has a ratio of signal to noise of 60 decibels.

I can best explain this by saying that, whereas an ordinary Reisz microphone has a noticeable hissing background, especially when there is nothing going on in the studio, the H.F. condenser mike is quite silent.

The controls are seen on opening the hinged front of the microphone box, they include the two tuning knobs for the oscillator and balancer circuits, a variable condenser which "tunes" the high-frequency microphone, and a double-purpose meter with a switch.

The difficulty of using an H.F. condenser microphone, or, indeed, a condenser "mike" of any type for B.B.C. outside broadcast work, is the need for batteries close to it. The H.F. condenser mike and amplifiers need 6-volts 4 amperes for the valve filaments, an H.T. battery giving 150 volts 60 milliamperes, and a 24-volt G.B. battery.

Largely Used for Records.

This makes the whole equipment rather bulky, and means running battery lines into the studio. As all the leading gramophone companies use condenser microphones, though, this should not be a serious snag for B.B.C. work. The "crispness" of tone on many new records is due to the condenser mikes.

An ordinary condenser microphone (not H.F.), has a little diaphragm of the new

metal duralumin, separated from an insulated steel backplate by a small air-gap.

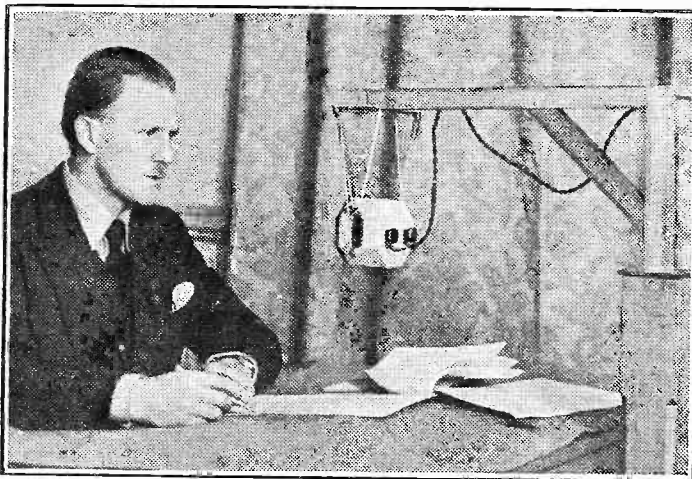
A 150-volt battery is connected between the backplate and the diaphragm, thus forming a charged condenser, the capacity of which varies as the sound waves reach the duralumin diaphragm. The "mike," in the case of one standard model, plugs into its following amplifier with a simple ball catch, and the three batteries for the L.F. valve are carried in a separate case.

Completely Screened Case.

The small wooden box which carries all the apparatus is, I saw, lined with sheet brass to screen it. If this were not done, the microphone would pick up noise from the electric light wires in the studio. In another type of condenser mike, used by the gramophone companies, and tried by the B.B.C., the single-stage amplifier is carried in a metal tube, earthed to prevent pick-up, and the microphone itself is held in a bracket beneath this canister.

New artistes who have rehearsed before a Reisz microphone must not be startled if, on entering the studio, they are faced with a weird piece of apparatus looking more like a camera than a "mike." It may be one of the new condenser-microphones, and they must blame the engineers!

REDUCING THE BACKGROUND NOISES



The great advantage of the condenser microphone is that the background noise is much less noticeable than with the Reisz type. The instrument shown in the above photograph is of the latter pattern.

A SUPER-HET. SUGGESTION.

By F. BRIGGS.

SUPER-HETS. are quite popular just now, and many enthusiasts have turned their attention towards this fascinating type of receiver. I myself have been experimenting with them for some time now, and in the course of experiments have come across several extremely interesting little points.

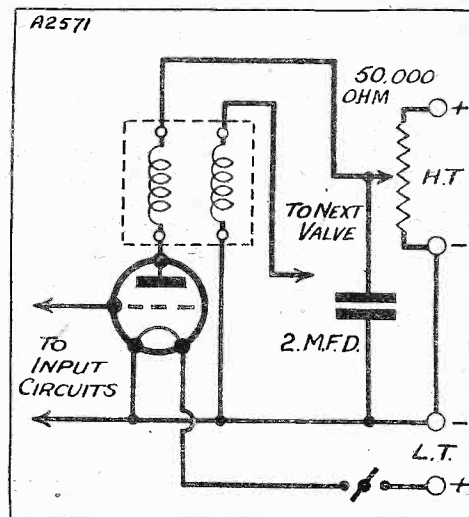
Only the other day I hit upon one which I feel sure will be of interest to readers of this journal, and especially if they are super-het. enthusiasts. Of course, there are probably a few who have already discovered the same thing for themselves, but for the benefit of those who have not, here goes.

It concerns the voltage which should be given to the anode of the first detector, and

it applies particularly to that type of "super" which employs a separate oscillator valve, and an ordinary three-electrode "tube" for the first detector.

Experience has shown me that if the

GREATER SENSITIVITY



This diagram illustrates a method of providing the 1st detector of a super-het. with a variable H.T. tapping.

set is to be worked at its maximum efficiency it is very important that the correct voltage is given to this valve. And what is more, it is surprisingly critical. A variation of a few volts makes a tremendous difference to the results obtained.

The only extra components required are a wire-wound potentiometer of about 50,000 ohms, and a large fixed condenser having a capacity of anything from 1 mfd. upwards. Fig. 1 gives all the details for connecting up, but it should be pointed out that some method must be provided for breaking the lead between the potentiometer and H.T. negative when the set is switched off.

Breaking the Pot. Circuit.

If this is not done, the H.T. will be constantly discharging through the potentiometer, no matter if the set is in use or not. If a mains unit is being used, however, this precaution is not necessary, as the unit is always disconnected from the mains when it is not in use. Of course, there is an alternative method if batteries are being used, and that is to see that the H.T. plugs are removed when the receiver is turned off, but it is not nearly so satisfactory as a proper switch. By far the best scheme is to use a three-point on-off switch in the set.

Referring to the diagram, the on-off switch should be omitted and a through connection made. But in its stead you should procure one of the three-point variety.

The New Wiring.

Now disconnect the wire going from L.T. negative to one side of the 2-mfd. condenser, etc., and also the lead from H.T. negative to one side of the potentiometer. You are now ready to insert the three-point switch.

Join each of the three points mentioned—namely, bottom side of potentiometer, H.T. negative and the junction at the bottom of the 2-mfd. condenser, to separate contacts on the switch.

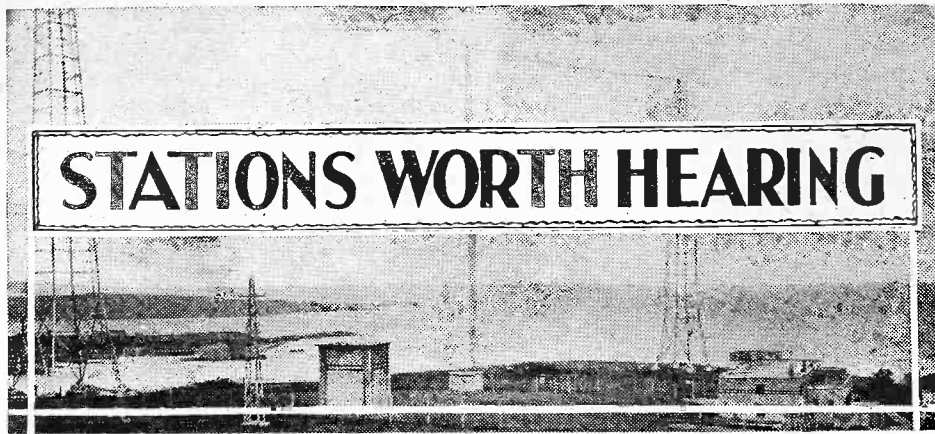
It is remarkable the difference this simple alteration makes to the range of a super-het. At any rate, just try it and see.

THE hateful atmospheric is still with us pretty frequently, though, thank goodness, the trouble that we are experiencing from this kind of interference with wireless reception is nothing like so bad as it was this time last year. So far man has failed to find any reliable method of eliminating "X's" completely; the most that we can do is to adopt such palliatives as are available and to hope for better times.

What palliatives are there? One of the most effective, if the set has plenty of H.F. amplification, is to use a frame aerial. It can be used often in such a way as to dodge atmospherics.

These are usually broadcast from one particular centre; the impulses due to them therefore reach the frame from a definite direction. If we rotate the frame slowly we frequently find that there is a position at which atmospheric interference is at a minimum. This, of course, limits one's choice of stations considerably—but half a loaf is better than no bread.

I referred recently to the very interesting conditions prevailing on the medium band, and prophesied that before very long we



Up-to-the-minute information for the long-distance searcher.

would hear little or nothing of the majority of Continental stations near its top. I seem to have proved myself a poor prophet, for during the past few days there have been very distinct signs of an increase in the strength of transmissions on wavelengths between 440 and 500 metres.

Broadcast Bandits.

Budapest, previously almost if not quite inaudible, has been heard on several occasions, and Vienna has made a welcome return to the pages of the log. Rome has shown an improvement that is nothing short of extraordinary. On several nights I have found him one of the best and strongest of the medium-wave stations.

tion, for I am sure that you will not have logged him for some time, is Belgrade. On several recent evenings remarkably good reception has been obtained from him—full loudspeaker strength with excellent quality.

Brussels No. 1 maintains the improvement that he began to show recently, and is now quite first-class. Florence varies, but is always worth trying for. Prague, recently rather weak, seems to be returning to form, and Beromunster provides fine entertainment.

Milan, the Poste Parisien. Breslau, Göteborg, Hilversum, Bratislava, Heilsberg, and Gleiwitz are all stations to make a note of at the moment.

R.W.H.

THE news of the week is hardly startling; most of my letters are informing me that Rome on his 25-metre setting is coming over well, and that CT1AA on his new wave of 31.25 metres is irregular, but generally good; 42.9 metres is quite a blank spot these days!

As a matter of fact, I doubt whether Rome will ever go back to that wave, although it is possible that some pitch between 43 and 46 metres will be filled by him when his 25-metre season is over.

Appropos my remarks recently about expressing reception in "percentages," as a correspondent suggested, I have received another list (from "J.S." of Dumbarton) which checks up quite well with the first. He, however, puts Zeesen first with 95 per cent; CT1AA is second with 90 per cent; after him come Rome, Rabat and Moscow (all 50 per cent), Radio Colonial (35 per cent), and a long "tail" composed of Americans, Sydney and Nairobi.

New Americans.

I have had confirmation of the fact that the American broadcast just above the 20-metre amateur band is from WAJ. The other new one just below the band is WQV (or W2XBJ).

"R.T.W." (Tavistock) badly wants a tip for reducing the interference from the ignition systems of cars along a nearby main road. He is already using a "detector-only" type of set, which gives better results than most in the way of quietness.

SHORT-WAVE NOTES



By W. L. S.

Cutting down the aerial and the usual dodges seem to have no effect. Short of the erection of level-crossing gates on the main road, "R.T.W." I'm afraid the only remedy is to grin and bear it. Thanks for your log.

Instant Identification.

I hear that our old friend PCJ is experimenting on 38 metres, and wants reports. Having had very little time for listening this week I have not heard him myself as yet.

Although I have already pointed out that I can't possibly give a list of amateur telephony stations in "P.W." I think it might be a help to the novices if I mentioned the "nationality prefixes" of some of the more common Europeans. Great Britain, of course, in G. France uses F, Holland PA, Belgium ON, Germany D, Denmark OZ, Czechoslovakia OK, Hungary HAF, and Spain EAR.

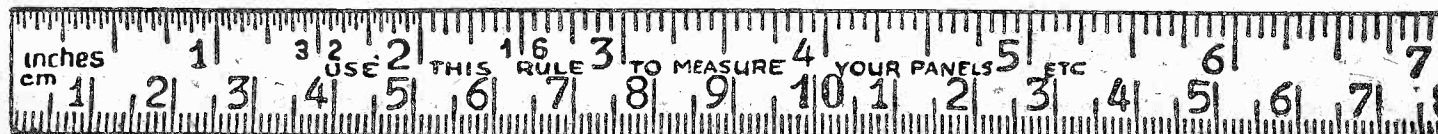
I should estimate that anyone with an average receiver ought to be able to log 500 European amateurs, and at least 100 of them on telephony, during the course of the average Sunday morning. This implies listening on both 80 and 40 metres, although I shouldn't be surprised if it were possible on 40 alone.

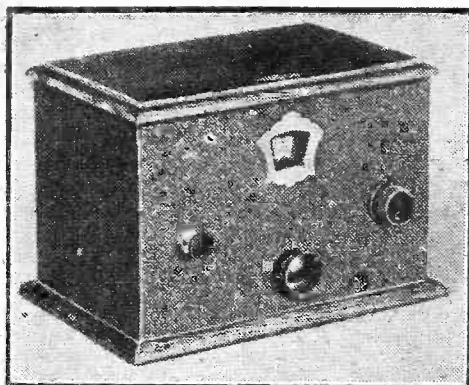
The chief trouble lies in identifying some of the unbelievably bad French transmissions, some of which sound as if the owner were trying to superimpose telephony and music on *spark*!

That "Ticking"!

How many readers remember the mysterious "ticking" that used to bother me on short waves two or three years ago! I never found out what it was, but it disappeared and saved me from further worry. I have thought no more about it until now, but here before me is a letter from "W.H.L." (Scarborough) complaining of the same sort of thing. He has no mains on the premises, and there are no motors round about.

I am rather inclined to think, "W.H.L.," that you may trace it to a gas-engine a fair distance away, with a long plug-lead that makes a nice aerial! Having heard one of these in Wales recently, I believe my own ticking and yours may be put down to something of the sort. So if you walk round the neighbourhood listening for an asthmatic "chuff-chuff" you will probably find the cause of the trouble.





The "Pilot" Band-Pass Unit measures only 9 in. × 6 in. × 6 in., and it is but the work of a few moments to fit it to your existing set.

IS band-passing the coming thing?

Perhaps that seems rather an unusual method of approach to a review of what is, I believe, the first self-contained band-pass unit to make its appearance for converting existing sets.

Yet it is, I feel, a point of view well worthy of consideration in view of the fact that considerable divergence of opinion seems to exist concerning the future of band-pass circuits in general.

The Future of Band-Passing.

Some will tell you that there is nothing to equal a band-pass circuit—others may rule out the scheme as being far too costly, or may even turn it down on grounds of complication.

While it is impossible to predict with any degree of certainty whether the band-pass circuit will ultimately become as much an accepted practice in radio design as, for instance, the "Cosmic" arrangement, the modern tendencies point quite definitely to the fact that its popularity is on the increase.

Obviously, there must be a reason for that, and I regard it as a sufficiently good one to justify the ingenious little unit which the Peto-Scott people have recently placed on the market.

A well-designed band-pass circuit does definitely give a degree of selectivity adequate for present-day conditions, and when we reflect upon the present state of the European ether, that is saying a lot in its favour. The same is true of the "Pilot" Band-Pass Unit. It is without a doubt the ideal thing for use with almost any set in which station separating difficulties are experienced. What is more, although it necessitates the manipulation of an extra tuning control—which is inevitable unless the circuits are ganged—it does not seriously complicate the operation of your existing set.

A Commendable Scheme.

For those who are interested in theoretical considerations, it may be of interest to mention that the "Pilot" unit consists of the aerial half of a more or less conventional band-pass scheme with, of course, the necessary coupling arrangements.

Obviously, it is rather a commendable scheme, because it means to say that you can make your set into a band-pass arrangement without making any alterations to the existing circuit.

At the back of the unit—which, as will be apparent from the photographs accompanying this article, is extremely neat in appearance—there are three clearly marked terminals. To the left-hand one marked

THE "PILOT" BAND-PASS UNIT

Here is a simple little unit which brings band-pass tuning within the reach of all. It is the latest product of the Peto-Scott Company, and in this article a "P.W." technician describes the results of his tests with this ingenious adaptor unit.

If you connect the aerial lead-in, while the one on the right marked A2 is joined to what is normally the aerial terminal on your existing set.

The third terminal on the back marked E is joined by a piece of flex to the earth terminal on your set, to which is also joined the usual earth lead.

Those are all the connections that it is necessary to make to put this little unit into use, and to make your set into a band-pass arrangement.

Concerning the Controls.

Before I pass on to the question of our official tests with this little unit, I am going to make just a brief reference to the controls on the front of the panel.

As a matter of fact, although there are three knobs in all, there is only one—the centre one—which requires to be operated in conjunction with the controls on your existing set. The left-hand knob is merely a wave-change switch, while the control on the right enables the selectivity of the

decidedly low order. The improvement in selectivity was excellent.

Satisfactory Separation.

The two powerful local stations which had previously spread over a considerable part of the tuning dial were found with the unit in use to be confined to reasonably narrow bands, and stations could easily be tuned in which were previously inaudible in consequence of the local station interference.

Where it was possible without interference to compare the strengths of distant stations without and with the unit in circuit, slightly greater strength was obtained when the unit was out of circuit, but then that was only to be expected, for there are very few—if any—band-pass schemes which enable such a marked improvement in selectivity to be obtained without at least some sacrifice in signal strength.

For the second test the unit was coupled to a comparatively unselective S.G.—Det.—L.F. arrangement, and again the improvement in selectivity was very marked.

In operation, we found the unit quite simple to handle, and although the dial readings did not remain in step due, of course, to differences in the tuning coils, no difficulty was experienced in keeping the two circuits in tune. That, as will be appreciated, is a very necessary procedure when operating a band-pass circuit.

The tuning condenser in the "Pilot" Band-Pass unit is fitted with an efficient slow-motion drive which is geared down to a ratio of approximately 12 to 1—a figure quite adequate for all normal uses.

Easily Read Dial.

The actual dial is calibrated in degrees from 0 to 180, and it is an easy matter to read the setting of the condenser through the neat escutcheon mounted centrally towards the top of the panel.

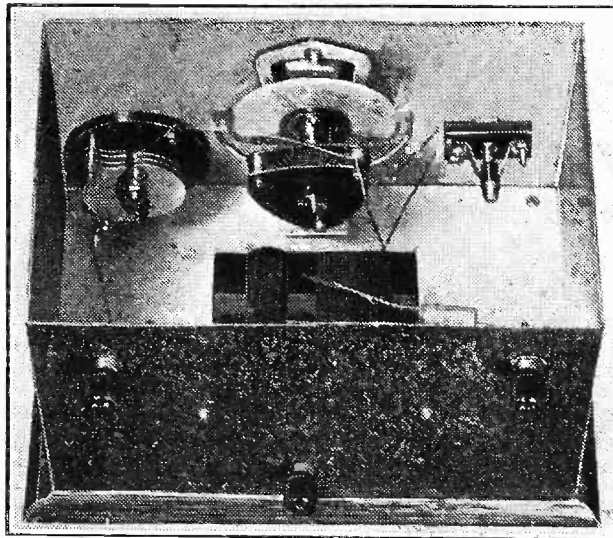
The complete unit has every appearance of being quite a solidly-built job, and as there is nothing inside which is likely to go wrong, it can aptly be described as a foolproof adaptor.

Not Expensive.

As a result of our tests, we have no hesitation in recommending the "Pilot" Band-Pass Unit as an ideal selectivity adaptor for all those who experience station-separation difficulties, and we regard the price of twenty-five shillings, which includes operating instructions, as very reasonable for what it will do.

The unit is very neat in appearance, and the finish is of the high order that one would associate with the name of Peto-Scott.

A NEAT-LOOKING INTERIOR



The "walls" of the "Pilot" Band-Pass Unit are of black crystalline-finished aluminium, which tend to minimise the possibility of direct pick-up on the unit coils.

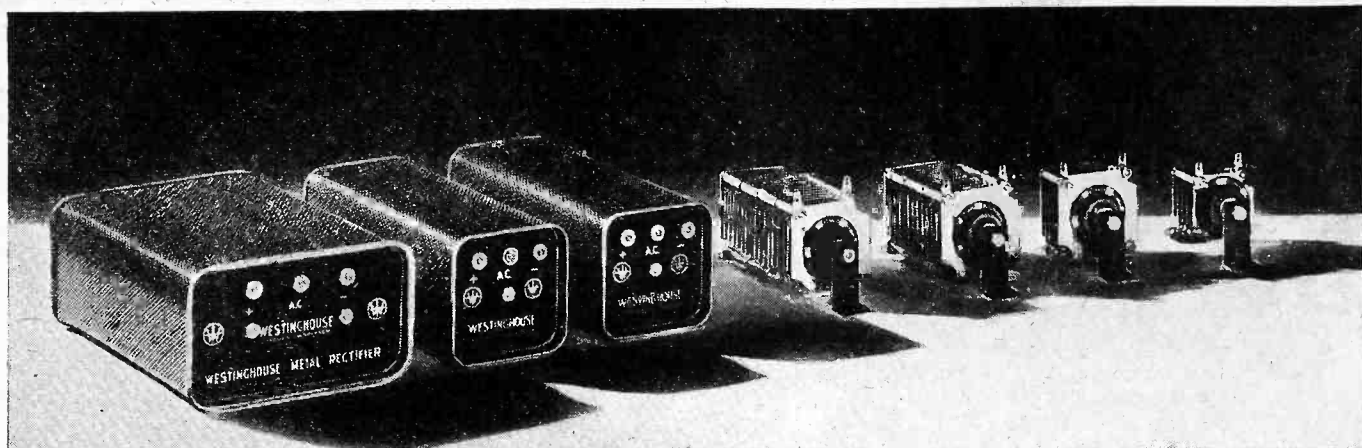
unit to be adjusted to suit your own local conditions.

Incidentally, in connection with this selectivity control it is advisable to set it with the pointer as near to the right as is consistent with adequate selectivity, for as the selectivity is increased by turning it in an anti-clockwise direction, the coupling efficiency is reduced and stations tend to become weaker. That, of course, is not a fault peculiar only to this unit, it is common to almost any circuit in which "aerial" coupling is regulated by a variable control.

Now a word or two concerning our practical tests with this little unit.

For the first test we coupled it up to a very ordinary detector and two L.F. receiver in which the selectivity was of a

NEW WESTINGHOUSE METAL RECTIFIERS



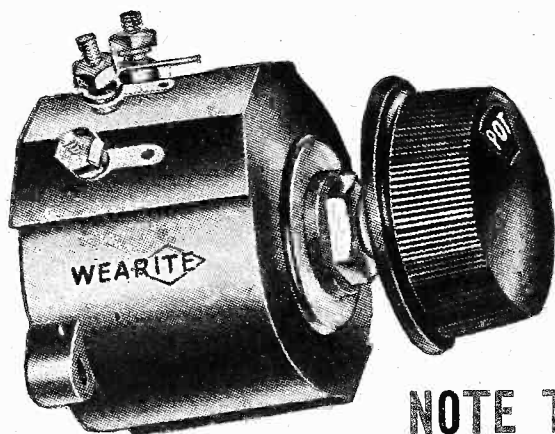
As from June 1st, 1932, the following NEW Westinghouse Metal Rectifiers will be available for constructors' use, AND THE H.T.8 WILL BE REDUCED IN PRICE FROM 21/- to **18/6**.

H.T.				L.T.			
Type	D.C. Output		Price	Type	D.C. Output		Price
	Volts	mA			Volts	Amps.	
H.T.9	300	60	21/-	L.T.1	6'0	0'25	10 6
H.T.10	200	100	21/-	L.T.2	6'0	0'5	11 -
H.T.11	500	120	35/-	L.T.4	6'0	1'0	13 -
	400	150		L.T.5	12'0	1'0	15 -

Details of these new units are given in our booklet "THE ALL METAL WAY." Send a 3d. stamp for a copy, marking your application "Dept.P.W."

THE WESTINGHOUSE BRAKE & SAXBY SIGNAL CO. LTD., 82, YORK ROAD, KING'S CROSS, LONDON, N.1.

A NEW VOLUME CONTROL BY WEARITE



NOTE THE PRICE 4/6

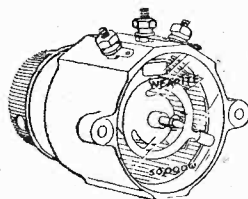
THE Q.V.C. VOLUME CONTROLS are made in the following resistances, with current-carrying capacities as under:

50,000 ohms.	10 ma. at 5 watts
25,000 "	15 " " 5 "
10,000 "	22 " " 5 "
5,000 "	30 " " 5 "
1,000 "	70 " " 5 "
600 "	90 " " 5 "

Write for full particulars and details of resistances above 50,000 ohms.

Should you have any special technical query write to our "Service Dept."—they will find the solution.

WRIGHT & WEAIRE LTD.
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Telephone: Tottenham 3847/8.



Here is shown the reverse of the Q.V.C. Note the mechanical structure, giving perfect contact with silent operation.

LOOK at the illustration of this latest Wearite product—a real workmanlike job. The Q.V.C. is just another proof of Wearite's intimate knowledge of the constructors' need. Study the following points. Where else is there such a volume control—at such a price?

SILENT IN USE
due to the special roller contact bearing working on unique principle.

SQUARE LAW ELEMENT
assures even control of volume over entire range.

SPACE-WOUND WINDING
assures free heat dissipation and ability to carry heavy current.

COMPLETELY ENCLOSED ELEMENT
with transparent fireproof protective cover.

RECESSED INSULATING BUSH
permits easy fitment to metal panel.

SPECIAL LUG BRACKETS
for baseboard mounting and for ganging.

THE WEARITE 3-POLE CHANGE-OVER SWITCH (123)

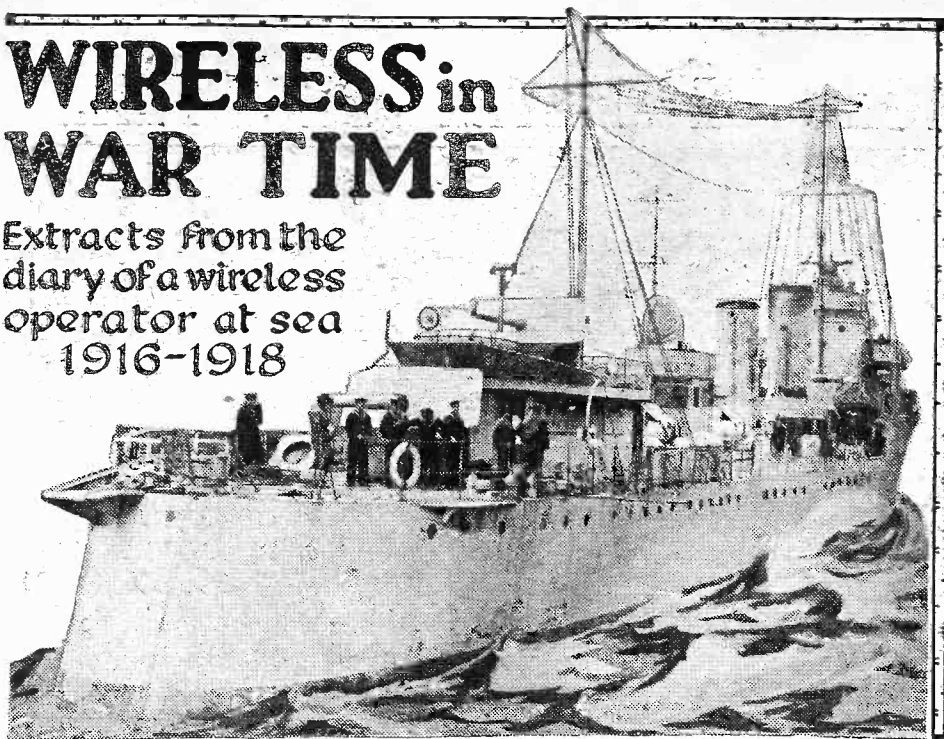
is specified for the
"DECADE"

and Paxolin Panel, 12 in. x 7 in. Price 4/6

4/-

WIRELESS in WAR TIME

Extracts from the
diary of a wireless
operator at sea
1916-1918



Visit to a Sheikh.

One evening V—and I strolled ashore after dinner and made our way to a small Arab village that lay further up the river. The weather was hot and oppressive, and when we called on the local sheikh to pay our respects, we were very glad to sit down and accept his hospitality.

The sheikh was a stately old man, courteous and hospitable. He offered us coffee, cigarettes and sherbert, the latter being very sticky and sickly. Everything was dirty and rather tawdry, but nothing could have bettered the old man's charming manners. Unfortunately, we could not stay long, for the hour of evening prayer was approaching, and from the west great dark clouds were piling up.

Calling the Faithful to Prayer.

As we walked back again along the river bank, the wind began gradually to rise, rustling the palms and blowing clouds of sand in our faces. From behind us, in the direction of the village, we could hear the beating of the muezzin's drum calling the faithful to prayer. And, suddenly, there came a long-drawn-out cry:

"All-ah!"

Following the little goat track that led through a palm belt, we heard the first distant mutter of thunder, and then suddenly, for a brief instant, the whole sky flashed into flame. From the village I again heard that cry:

"All-ah!"

An Approaching Storm.

It was almost dark. Wearily, we stumbled along the uneven path, the dust cutting our faces and parching our tongues. For the most part we were silent. The air was pregnant with the approaching storm, and the rising wind made strange noises, as it blew through the palms. It was like a woman crying, and sometimes like the sound made by a child's finger rubbing up and down on a window pane.

As we swung on to the high road, and the lights of Ashar came into view, we both felt glad to be back near the ship again.

As we walked on we could still hear, faintly, yet quite clearly, the cry of the muezzin from the Arab village:

"All-ah!"

JUNE 10TH, 1917 (Bombay).—I am continuing this diary after a lapse of over a fortnight. Failure to recount several incidents in connection with our departure from Mesopotamia is due to the fact that I have been pretty ill with dysentery. It was devilish hot up in the Gulf, and we were all glad to get away.

We Have a Night Out.

The other evening several of the officers banded together and we decided to go and have a good dinner at Green's Hotel. A change of food is always welcome after one has been on a boat for some weeks. At midnight we hired a motor-car and had a run round the city.

Later on we visited an opium den. Following our guide up a rickety flight of stairs, we were admitted by a slant-eyed Chink into a long, low, dimly-lit room. Down each side of the room lay rows of

slumbering figures. There must have been at least a couple of dozen of them. One or two were puffing slowly at pipes, and the stench was frightful.

With one exception the smokers were natives. The exception, I regret to say was a white man. Li San, the boss, jerked his finger at him, and said: "Him much fine smoker!" We did not stay long, for the heat and the smell was a bit too much of a good thing.

That Missing Mine!

We heard to-day, by the way, that the "City of Exeter" has been mined ten miles outside Bombay. It appears the Germans laid twenty-seven mines, of which twenty-six were recovered. The "City of Exeter" struck the twenty-seventh. Hard luck!

JUNE 25TH.—We are due to leave Bombay in a few hours. Yesterday we heard that the S.S. "Mongolia" had been mined thirty miles from here. Time won't allow me to describe all I have seen in Bombay, but I must say, taken all round, the place did not interest me so much as Alexandria.

JULY 7TH.—Yesterday we crossed the Equator, and I was struck by the coolness of the weather. At home I had always imagined that to be near the Equator was the equivalent of being shut up in a gas oven. It was rather a memorable day for me, for I was initiated into the freedom of the sea by undergoing the ceremony of "Crossing the Line."

Four days ago the following notice appeared in the saloon: "On or about Wednesday, the ceremony of Crossing the Line will be enforced, and the following candidates for initiation are hereby notified: Fourth Engineer, Fifth Engineer, Chief Wireless Operator."

"N.B.—Owing to war-time economy, certain concessions will be made, providing each candidate signs a chit for six bottles of beer. (Sd.): FATHER NEPTUNE."

I wagered the organiser of the ceremony, to wit, Father Neptune, that I would not be found by his four policemen on the day we crossed the line. The policemen, by the way, have the job of hunting up the victims.

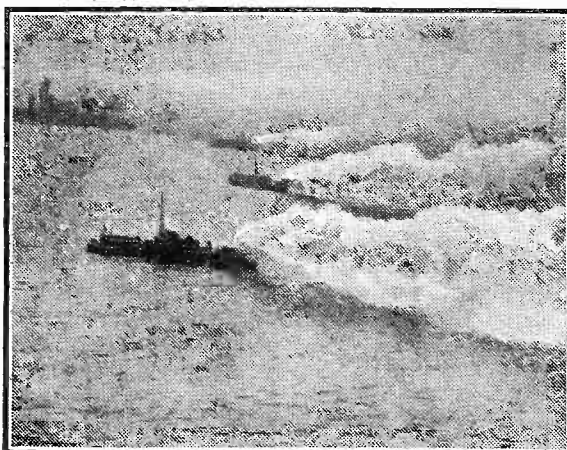
"Crossing the Line."

Well, eventually the fun started. When I came back from dinner that evening I found the lock and bolt had been removed from my cabin-door, and the porthole had been tampered with. Obviously I could not shut myself up in the cabin. I had some idea of climbing up the mast, but decided against it.

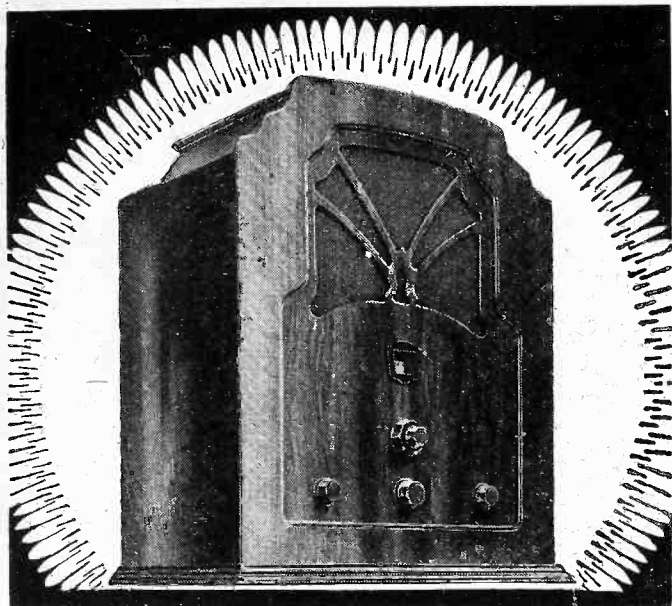
Anyhow, eventually I squeezed myself into a small wardrobe and, provided with a jug of water, I sat down to wait. I sweated in that beastly cupboard for three hours, but at last the "advance guard" arrived. They sounded rather surprised not to find me in the cabin. They then started to search the ship and, as time wore on, my hopes revived, and I thought I might win the bet. But Daddy Neptune called a consultation in my cabin, and I suppose he must have heard my breathing, or something, for he suddenly yelled out: "The young devil's in there!" The others ridiculed the idea, but Neptune got a cold chisel and—well, the game was up.

(To be continued.)

A SMOKE-SCREEN AT ZEEBRUGGE



A fine photograph of allied monitors bombarding Zeebrugge under cover of a smoke-screen supplied by a small fleet of "E.L.s." The monitors were equipped with large-calibre guns, and had a very shallow draught which made them ideal for in-shore work.



Half an hour with the magnificent new Regentone 3 valve All-Electric Receiver in your own home is more convincing than anything we can say. Let it speak for itself. Ask your local dealer to arrange a demonstration - there's no obligation, of course!

16
GUINEAS

OR 39/6 DOWN, including B.V.A. valves and royalties. For 200/250v. 40/60 cycles. Three valves. For A.C. Mains. Built-in moving coil speaker. Super-selective. Provision for mains aerial, external aerial and gramophone pick-up.
SPECIAL 25. CYCLE MODEL 14/- EXTRA



REGENTONE LIMITED, Regentone House, 21, Bartlett's Buildings, E.C.4
Telephone: Central 8745 5 lines.
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This
VALVE
for
RANGE

S.G. 215
12/6

NEW LISSEN METALLISED S.G. VALVE

THE new Lissen Metallised Screened Grid Valve will give you much higher amplification without instability. During months of research Lissen have succeeded in getting the inter-electrode capacity of this Screened Grid Valve down to the minute figure of .001 micro-microfarads. (Inter-electrode capacity causes instability and howling). Lissen have also been able to increase the magnification figure of this valve to 1,000. Get one of these new Lissen Metallised Screened Grid Valves in your receiver and get higher amplification than ever before. It will give you immensely increased range and bring in many stations you have never heard before.
Ask for Lissen S.G. 215.
Price **12/6**

LISSEN ECONOMY POWER PENTODE

The Lissen Power Pentode Valve — P.T. 225 — converts any set with one stage of L.F. amplification into a fine full-volume "Pentode-output" receiver. This valve puts new power into your loudspeaker, and new brilliance of tone, too. Use it instead of a power valve and at once you get an amazing step-up in volume. Where before you got a whisper, now you get a torrent of pure sound. And it takes no more current than the power valve it replaces — its H.T. consumption is only 7 m/A. Ask for Lissen P.T. 225.
Price **12/6**

This
VALVE
for
VOLUME



P.T. 225
12/6

LISSEN PARTS USED IN THE "DECADE."

Lissen Torex Transformer, 5/6.
Lissen Variable Condenser, 4/6.
Lissen H.F. Choke, 5/6.

LISSEN LIMITED, WORPLE ROAD, ISLEWORTH, MIDDLESEX.

It is not until you actually handle a "Decade" that you can appreciate how wonderfully it combines real flexibility with simplicity of control.

You see, it is in the struggle to make a set simple to handle that power is usually lost.

It is realised that at least fair selectivity is essential, but the problem is to achieve even this implied modest degree of station-separating qualities without resort either to expensive and complicated methods or the deliberate sacrifice of energy.

Modern Ideals.

A simple tuner of the single-winding solenoid type, with one or twoappings, can be made selective by the simple expedient of placing a very small fixed condenser in series with its aerial connection.

The same effect is possible by cutting down the aerial until it is only a few feet in length. But it is easy to see that these steps are tantamount to reducing the sensitivity of the outfit.

A crystal set so insensitive that it is able to pick up only one programme on a large aerial can logically be described as selective, for it certainly ignores the etheric clamourings of the scores of other broadcasters, but this is an extreme example of useless selectivity.

AS A "HOME" RECEIVER

THE "DECADE" IS IDEAL FOR "HOUSEHOLD" BROADCAST RECEPTION, IN THAT ITS CONTROLS ARE REDUCED TO A MINIMUM, AND THERE IS A COMPLETE ABSENCE OF CRITICAL BATTERY OR TUNING ADJUSTMENTS. ANYONE CAN TWIDDLE ITS FEW KNOBS WITH THE CERTAINTY OF GETTING GOOD RESULTS.

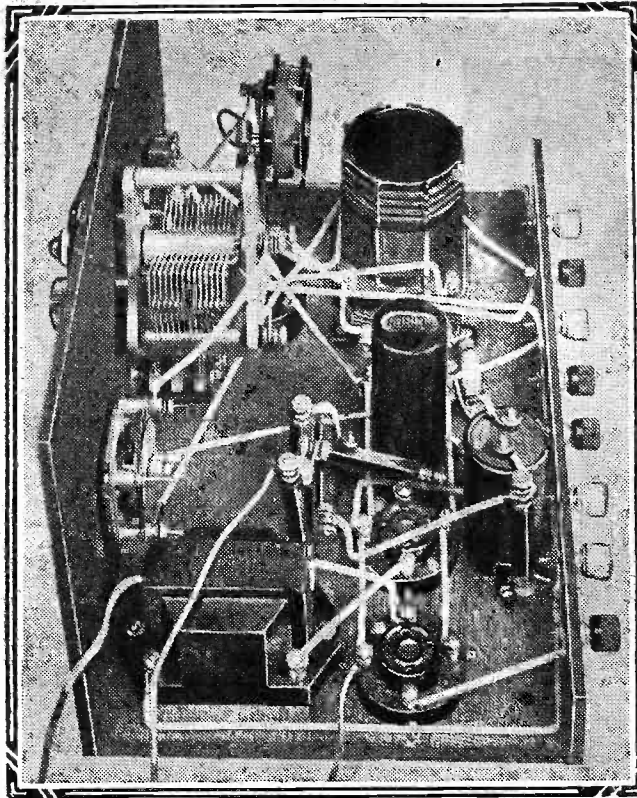
The aim of the modern designer ought to be to preserve sensitivity as well, but it doesn't always seem to be!

Those Distant Stations.

The B.B.C. are largely to blame for the cult of tuning-sharpening by throwing away power, for their engineers are constantly circulating advice which results in this wasteful practice.

But the B.B.C. naturally have no interest in the reception of distant stations; their job is to ensure that listeners get separated programmes from, at most, a pair of B.B.C. regional transmitters.

On the other hand, it is, in general,



COMPLETE STABILITY

High quality of reproduction at great volume is made possible by a combination of transformer and resistance-capacity L.F. stages and effective detector de-coupling.

"P.W.'s" job to produce sets which will enable listeners to pick and choose programmes from a wider selection than that.

And special steps must be taken if this is to be possible with apparatus within the financial reach of the majority of listeners, and which is within the operating capabilities of those whose knowledge of the art of "knob twiddling" is slight or even non-existent.

There would be no difficulty in achieving this end with standard circuits, and without great power sacrifice, if all listeners were country dwellers living scores of miles from powerful B.B.C. stations.

But they aren't: many are, indeed, right in the shadow of big transmitting aerials.

Perfect Flexibility Control.

Nevertheless, it is a fact that tens of thousands of radio enthusiasts are luckily situated at great distances from these difficult "swamp areas."

And there's the rub! How can one set hope to be able to satisfy both requirements without the one or the other class of listener having to lose something so that the local conditions of the "other fellow" can be combated?

It couldn't—before the Moderator was invented.

The "P.W." Moderator is the perfect flexibility control, for it gives a set the power to accommodate itself to those widely varying conditions. It adds only a few shillings to the cost of an outfit, and is such a "robust" little adjustment that you can leave it to anyone to manipulate with the



By G. V. DOW

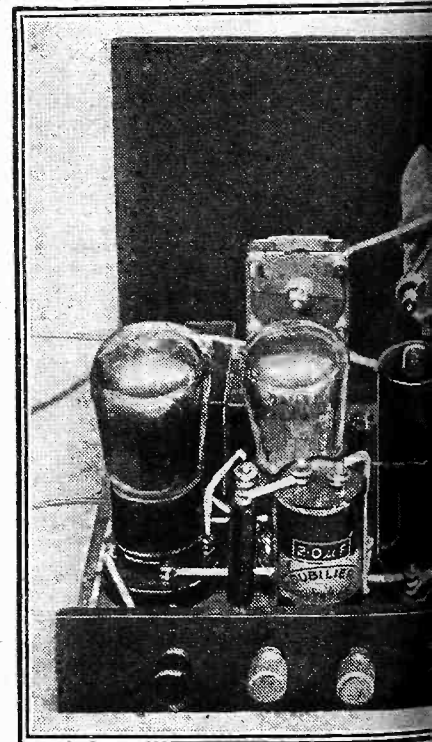
This fine receiver exemplifies the almost incredible valve sets were delicate, complicated, and expensive. This week's article how wonderfully flexible and yet

certainly that he or she is sure to get something out of it.

Its effect is so quickly discernible on the loudspeaker that they simply can't go wrong. And you have the satisfaction of knowing that it hardly matters how and when the little knob is twisted, for at any point of its adjustment it must be giving you better results than is possible without it.

You build up from the common level of inefficiency and waste, with the Moderator,

COMPACTNESS WITHOUT



We can justifiably claim that the "Decade" is a set of points of view. And it is to this fact it owes its compactness.

WITH THIS SET YOU CAN MAKE YOUR OWN COMPROMISES, WHEN



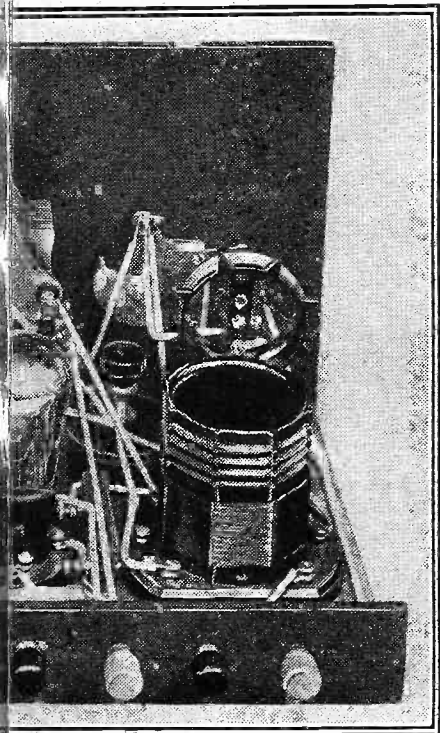
Associate I.E.E.

Progress which has been made since the days when
of apparatus. And you will learn from this
from intricacies the "Decade" is in operation.

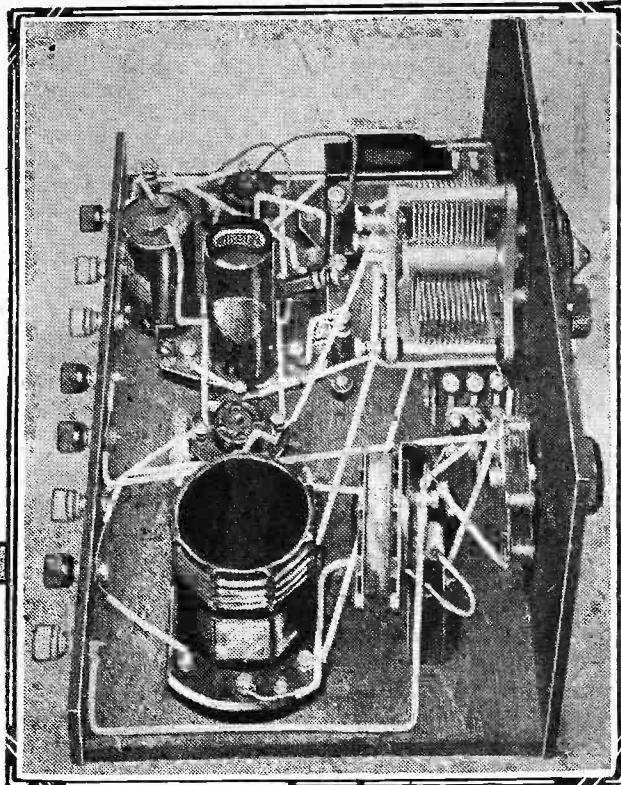
and the extent to which you build up largely
depends upon how you operate the control.
And that is why the "Decade," in which
the Moderator is a special feature, is as
satisfying to the man with D X ambitions
as it is suitable to the less adventurous
"domestic" purposes.

It is not critical in regard to accessories.
It will do full justice to the best moving-
coil loudspeaker, while it will also work the
cheapest electro-magnetic variety to its
best advantage.

CROWDING OR CONFUSION



Pretty layout, both from technical and æsthetic
of its great efficiency, for "layout" is a vital
design.



NO ENERGY WASTED

In the normal course of events energy is thrown away in the aerial
circuit in order to achieve some degree of selectivity. But in the
"Decade" practically all the available energy can be conserved and
turned to good account owing to the Moderator.

But choose your valves for it with dis-
crimination, and don't try to "make do"
with old ones of doubtful efficiency. Our
component list provides numerous alter-
native types and makes, and if you want to
compile a good log of stations don't
wander outside these.

At least 120 volts H.T. should be em-
ployed, and you will note, by the way, that
there is only one H.T. plus terminal. Not
a very important point, it is true, but just
one further item to credit against com-
plexity.

The grid-bias voltages will depend upon
the valves and H.T. used, but you will find
full details concerning this in the leaflets
provided by the valve makers in their
cartons.

Easy to Tune.

And now for the actual operating of the
"Decade." We shall deal with this in
minute detail for the benefit of those who
desire to extend this fine set to its limits.
Others must not think that the procedure
is necessarily intricate because of that, and
if they just hook the instrument up and
twiddle its few knobs more or less hap-
hazardly they will doubtless be quite
pleased with what they will get.

The first thing to be done is to insert the
valves, join up the aerial and earth, bat-
teries and loudspeaker.

Then screw down the knob of the .001-
mfd. condenser, which is on the baseboard,
as far as it will go, and insert the Moderator
coil plug in the centre socket. Set the con-
trol switch for medium waves and the

reaction for minimum re-
generation—which ought
to be hard round in the
anti-clockwise direction if
the reaction condenser is
of normal design.

You should be able to
find your local station on
the tuning dial with little
difficulty, and you should
carefully note how its
strength and the area of
the tuning dial that it
covers can both be con-
trolled by a touch the
Moderator knob.

Having got the "feel"
of these two items, the next
job is to decide which of
the Moderator coil tappings
you are going to use, for,
once you have done this,
you need seldom or ever
refer to this adjustment
again.

Testing the Taps.

You should locate two
stations of fairly widely
separated wavelengths,
say the London National
and the North Regional,
and to do this you will
probably have to employ
a little reaction.

Then try each of the
Moderator coil tappings in
turn. The one to use will
be that one which enables
the Moderator condenser

to bring both of these stations to full
strength with some little latitude.

That is to say, the lower-wave one should
be strongest just before the Moderator
condenser knob is turned right round in
an anti-clockwise direction. Similarly, you
should obtain the greatest volume from the

FOR THE DX ENTHUSIAST

NO ARBITRARY LIMITATIONS ARE
IMPOSED ON THE SENSITIVITY OF
THIS SET IN ORDER TO ACHIEVE
A STANDARDISED DEGREE OF
STATION SEPARATION, AND ITS
POWER POTENTIALITIES ARE,
THEREFORE, GREATLY ABOVE
THOSE OF THE USUAL DET. 2 L.F.
TYPE OF RECEIVER.

higher-waved station before the condenser
reaches its maximum capacity adjustment.

You do not have to adjust the Moderator
condenser for every station, but you can
set it roughly for bunches of stations in
accordance with the selectivity and volume
you need. And greatest volume means least
selectivity, and vice-versa.

Extreme Elasticity.

The position of the Moderator coil pro-
vides further elasticity in this compromise
control. You can obtain even greater
selectivity by moving the Moderator coil

(Continued on next page.)

NECESSARY, IN ORDER TO SUIT YOUR OWN LOCAL CONDITIONS

MORE ABOUT THE "DECADE."

(Continued from previous page.)

further away from the tuning coil. The same effect is obtained by dispensing with the block of wood and dropping the Moderator coil nearer to the baseboard.

But there will be only a few of you who will need to make this departure from the lay-out, and we mention it only to show how widely flexible the "Decade" is.

And now for the long waves. On this band the Moderator gives no station-by-

station control. Its function on the long waves is to prevent "break-through."

However the Moderator condenser is set it will make no difference to volume or selectivity, but you adjust it if you should happen to be so situated that a medium-wave station tends to "break through."

Similarly, the .001-mfd. condenser on the baseboard has no effect on the medium waves, but by adjusting the capacity of this you can vary the long-wave selectivity.

Long-Wave Selectivity.

You do not require to alter the capacity of this .001-mfd. condenser every time you go over to long waves and every time you tune to a different station. Indeed, once set in accordance with your requirements during your first try-out, it can be left untouched for ever afterwards.

Thus the long wave tuning resolves itself into a most elementary pair of adjustments—just the one for tuning and the reaction.

Use of Moderator.

On the medium waves you can employ the Moderator in addition while you are actually searching for stations after you have got acquainted with controls.

At first you need only decide on two or three approximate

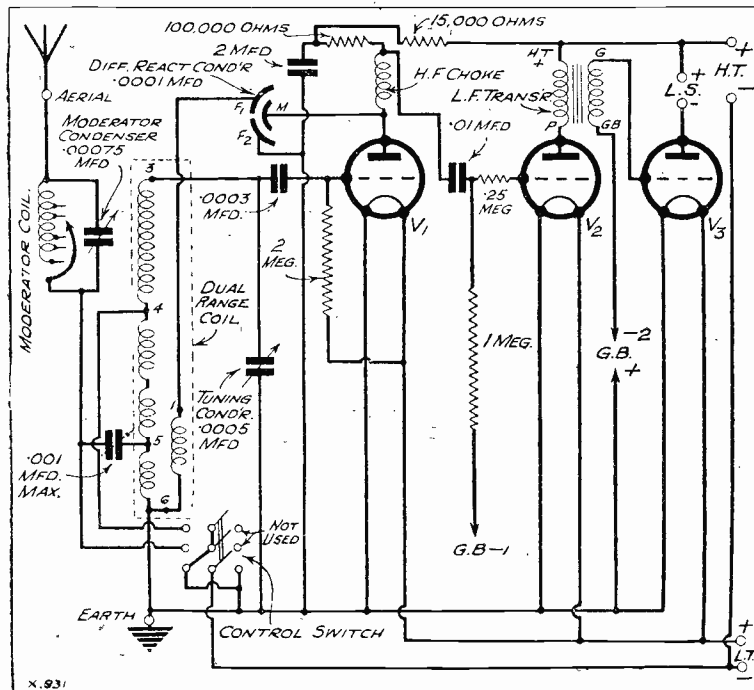
Moderator adjustments corresponding with three or so areas of the dial tuning condenser.

And then, having acquired experience, you can recruit the Moderator as an aid for searching, giving it a deft adjustment for each station as you come to it.

Finding Feeble Foreigners.

You will find it quite a marvellous subsidiary to the reaction for this purpose, and with practised handling the three controls

PERFECT TONAL COMPENSATION POSSIBLE



That "peak tuning" which Capt. Eckersley advocates as being the perfect compensation for the average loudspeaker is available to a 100 per cent. degree by adjustments of the Moderator and reaction.

THE "DECADE" ON PARADE

Concise details for installing the receiver, and abbreviated tuning instructions.

1. Carefully check the wiring.
2. Join up aerial, earth, loudspeaker, H.T., L.T. and G.B. batteries.
3. Check positions of H.T. and G.B. battery plugs, and give the battery leads a "once over."
4. Insert valves in their RIGHT holders.
5. Insert Moderator coil plug in the centre socket and screw knob of .001-mfd. condenser (on baseboard) down for maximum capacity.
6. Set reaction control at minimum and switch set on for medium waves.
7. Discover best Moderator position in accordance with instructions given in the accompanying article.
8. Switch over to long waves and adjust .001-mfd. baseboard condenser for required long-wave selectivity.
9. Now commence your tour round the Continental stations.

together (tuning, moderator and reaction) will enable you to coax programmes out of the ether which are usually to be picked up only by the biggest and most powerful of sets.

Moreover, there will be a much quieter background than you would have with complicated and expensive apparatus of that nature.

THE "DECADE" USES INEXPENSIVE AND READILY OBTAINABLE PARTS

COMPONENTS REQUIRED.

- 1 Panel, 12 in. × 7 in. (Peto-Scott, Permcol, Ready Radio, Wearite, Lissen).
- 1 Baseboard, 12 in. × 7 in. × $\frac{3}{8}$ in. Cabinet to fit (Peto-Scott).
- 1 .0005-mfd. variable condenser (Lissen, Ormond, Telsen, Polar, Cyldon, J.B.).
- 1 Slow-motion dial (Formo).
- 1 .0001-mfd. differential reaction condenser (Lotus, Ready Radio, Telsen, Cyldon, J.B., Polar, Wavemaster, Magnum).
- 1 .00075-mfd. solid dielectric condenser (Magnum, Polar, Telsen, Ready Radio).
- 1 3-pole change-over switch (Wearite 123).
- 3 4-pin valve holders (Lotus, Lissen, Telsen, Graham Farish, W.B., Tunewell, Igranie, Clix, Benjamin, Bulgin).
- 1 Dual-range coil (Colvern, R.M.3).
- 1 Moderator coil (Ready Radio, Peto-Scott, Sovereign).
- 1 .001-mfd. max. compression condenser (Lewcos, Sovereign, Goltone, Graham Farish, Formo, Polar).
- 1 .01-mfd. mica condenser (T.C.C., Dubilier, Telsen, Lissen, Graham Farish).
- 1 2-mfd. condenser (Dubilier type 9200, Telsen, Lissen, T.C.C., etc.).

- 1 .0003-mfd. fixed condenser (Lissen, etc.).
- 1 H.F. choke (Lissen, Lewcos, Telsen, Atlas, Tunewell, Graham Farish, Ready Radio, Varley, R.I., Peto-Scott, Sovereign).
- 1 2-meg. leak (with holder if required) (Igranie, Lissen, Telsen, Graham Farish, Ready Radio, Loewe, Dubilier).
- 1 15,000-ohm resistance (Graham Farish Ohmite, etc.).
- 1 100,000-ohm resistance (Graham Farish etc.).
- 1 $\frac{1}{2}$ -meg resistance (Graham Farish, etc.).
- 1 1-meg. resistance (Graham Farish, etc.).
- 1 L.F. transformer (Lissen Torex, R.I., Graham Farish, Telsen, Varley, Lotus, Igranie, Tunewell, Slektun, Ferranti).
- 1 Terminal strip, 12 in. × 1 $\frac{1}{2}$ in. (Peto-Scott, etc.).
- 8 indicating terminals (Bulgin, Belling Lee, Eelex, Igranie, Clix).
- 1 Block of wood for mounting moderator coil, 1 $\frac{3}{8}$ in. high.
- 18 gauge tinned copper wire and sleeving (Wearite), or Quickwyre, Jiflinx, Lacoline).
- Flex, screws, etc.
- Battery plugs (Belling Lee, Eelex, Clix, Bulgin, Igranie).

RECOMMENDED ACCESSORIES.

LOUDSPEAKER.—Blue Spot, Celestion, H.M.V., Marconiphone, B.T.-H., Epoch, R. & A., Cossor, Graham Farish, W.B.

VALVES.—Detector: Mazda H.L.2, Mullard P.M.1H.L., Cossor 210H.L., Marconi and Osram H.L.2, Tungram H.210, Eta B.Y.2020, Lissen H.L.2, Six-Sixty 210 H.L., Triotron H.D.2, Dario H.F.

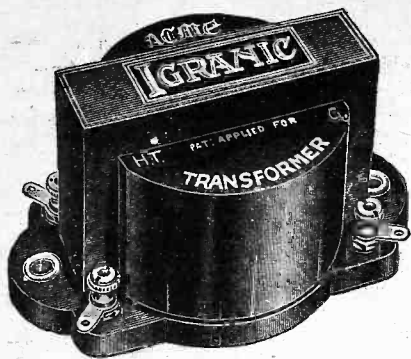
1st L.F.: Cossor 210 det. or 210L.F., Mullard P.M.1L.F., Marconi L.2/B., Osram L.210, Mazda L.210, Tungram L.210, Eta B.Y.1814, Lissen L.210, Six-Sixty 210L.F. Power: Mullard P.M.202, Mazda P.220A, Marconi P.2, Osram P.2, Cossor 220P.A., Eta B.W.602, Tungram P.220, Six-Sixty 220S.P., Lissen P.220A, Dario H.P., Triotron U.D.2.

BATTERIES.—H.T. 120 to 150 volts (Lissen, Pertrix, Ever Ready, Drydex, Siemens, Cossor). Super capacity should be used.

G.B. 16 $\frac{1}{2}$ to 18 volts (Ever Ready, etc.).

ACCUMULATOR.—2-volt (Exide, Pertrix, Lissen, Ever Ready, G.E.C., Ediswan).

MAINS UNIT.—To give 20 milliamps. at 120 volts (Atlas, Heyberd, R.I., Tunewell, Tannoy, Regentone, Formo, Lotus).



THE VERY LATEST ADVANCE IN RADIO RESEARCH!

**ONE
GUINEA**
....and worth
it!

The "ACME" L.F. TRANSFORMER

Here is the Transformer "par excellence"—the IGRANIC "ACME" L.F. The most up-to-the minute component for critical constructors. It is not low in price but it overcomes that handicap by its unrivalled performance. Made in two ratios—3-1 and 6-1. Beautifully finished with moulded Bakelite case of refined colour and design. Price 21/- and worth it made by IGRANIC, of course!

Write for illustrated Leaflet No. R188.



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A compact and very efficient choke which is used extensively in modern receivers. The inductance being of a high value, it is effective on wave bands up to 3,000 metres, while its self-capacity is so low that it can be used with equally good results on the lowest broadcast wavelengths. Highly finished in neat moulded Bakelite case.

"If it's IGRANIC
..... it's Best
for your set!"

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Ignanic Electric Co., Ltd., 149 Queen Victoria Street, London.

IMPRESSIVE Performance

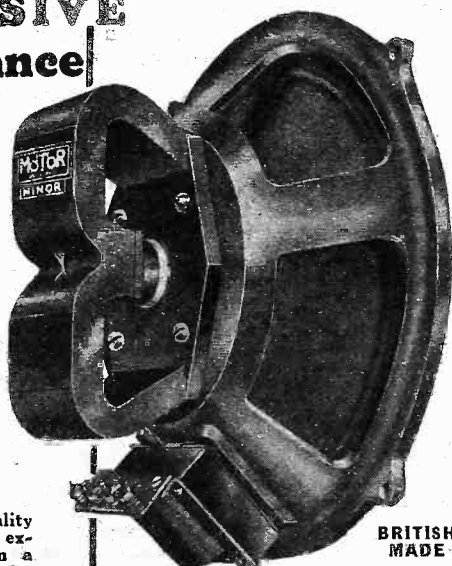
at an
Impressive
Price!

The MoToR "Minor" is not, in spite of its price, a "cheap" moving coil loudspeaker. It has a superior magnet of finest cobalt steel; a large rear suspension providing unusual flexibility; a heavy cast aluminium chassis; non-metallic spider; and every high-grade feature of construction and design for which all MoToR speakers are acknowledged.

Impressive in tone quality and sensitivity, it gives excellent results on even a two or three-valve battery operated set using ordinary output valves.

Write for free illustrated descriptive pamphlet.

**MoToR
MINOR**
Permanent Magnet
**MOVING
COIL SPEAKER**



**BRITISH
MADE**

Overall Diameter, 9 3/4"
Overall Depth, 4 1/2"
Cone Diameter, 7".

45/-

Including Trans-
former and
Baffle Board.

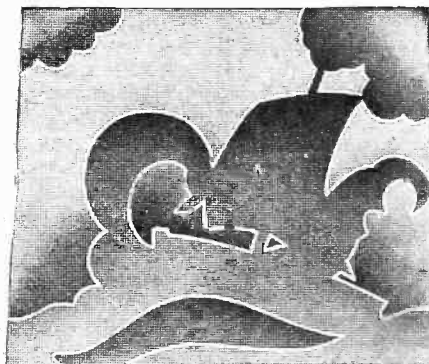
D.C. Resistance: 10 ohms.
Impedance of Speech-
coil: 5 ohms.
Approx. Coil Gap: 1mm.
Transformer Tappings:
25:1, 20:1, 15:1.

The CHESTER

The handsome figured walnut cabinet version of the MoToR Minor Moving Coil measures 16" by 15 1/2" by 8", and has no equal at anywhere near its common-sense price of **75/-**

TEKADE RADIO & ELECTRIC LTD.
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Telephone: Clerkenwell 2486.

FOREMOST AS PIONEERS



The name of Varley is associated with the earliest research work of the Electrical Industry. To-day, in Radio as in Electrical Progress, the firm which bears his name are still foremost as pioneers.

Creative force and initiative are the Varley Tradition. **The first big step forward in the quality of reproduction from L.F. Amplifiers, the first real solution to the selectivity problem came from Varley.**

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FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found-?



A USEFUL BROCHURE.

ALL "P.W." readers should make a point of securing copies of "How To Get the Most Out of Your H.T. Battery," which has recently been published by the Edison-Swan Electric Co., Ltd. It includes some very useful information and there is also a station chart.

MEASURING INSTRUMENTS FOR WIRELESS.

This is the title of a booklet published by the G.E.C., in which the G.E.C. range of meters is interestingly described and in which there is a deal of informative reading matter about meters and their uses for tracing faults in radio sets, etc.

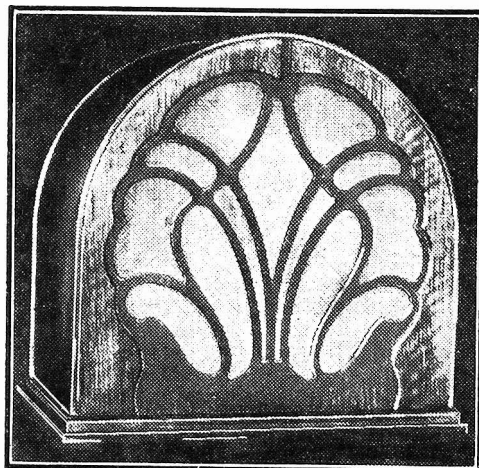
THE MARCONIPHONE 136.

The Marconiphone Co. provides an apt example of that industrial rarity, the combination of tradition and enterprise. It is easy to visualise the temptation to be complacent with such a name and history as are possessed by this particular firm, but happily there is no indication that it is tending to succumb to it. Very much the reverse, in fact, is the case.

For example, despite the existence of a range of loudspeakers of high individual merit and popularity, they have only recently added yet another instrument to it, the Model 136.

This is a permanent magnet moving-coil speaker, and, complete with transformer, in a handsome cabinet it costs £8 10s.

A NEW SPEAKER



The Marconiphone Permanent Magnet Moving Coil Type 136.

It is a very handsome instrument in appearance and, as with all Marconiphone speakers, it is not clumsily large but achieves a satisfying compactness without acoustic sacrifices—this is the hallmark of high-class loudspeaker design.

It is sufficiently sensitive to make it practical for the small-set man to enjoy its qualities, while it will, of course, handle large inputs without distress.

I particularly like its clean reproduction of high notes—you clearly hear frequencies on it which are simply not there with many speakers.

It is certainly an instrument which should be heard by all radio connoisseurs.

A SAFETY LEAD-IN.

There is a very ingenious feature in the Pressland Safety Lead-In, which is made by Pressland Products, Ltd., and this is that one end comprises a tubular sliding condenser.

By sliding this in and out you can vary selectivity and volume within surprisingly wide limits. By pushing it right in the series capacity is shorted, and the plunger can be pulled right out in order to disconnect the set entirely.

The standard 12-in. size costs 3/6, and purchasers are given a £100 guarantee that the lead-in will provide complete safety.

I have only one small criticism to make, and that is that the metal parts could with advantage be of some metal having greater corrosion-resisting powers than brass. However, in view of the price of the device and what it does one cannot but say that it is worth buying.

LOUDSPEAKER CONES.

It must be admitted that the construction of loudspeaker cones is a somewhat tricky operation. And although with care the amateur should be able to achieve fairly satisfactory results, the fact remains that it is improbable that any but a comparative few will do full justice to the units they use with their home-made cones.

But the incentive to make one's own cone is liable to recede almost to vanishing point when one examines a good and inexpensive commercial production such as the "Ripper" (G. G. Johnstone, 154, Southwark Bridge Road, London, S.E.1).

The "Ripper" is made of a tough and stiff but reasonably light paper, mounted by means of a fine linen material. The angle is rather wide although this is of little practical moment with the average electromagnetic unit and may be in fact a definite advantage.

Anyway, with either this type or with a moving-coil speaker unit the "Ripper" is perfectly satisfactory and gives splendid results.

EASY STATION FINDING.

The Custerson Tuning Dial (made by R. Custerson of Redditch) is one of the most interesting and novel devices I have come across for some time.

It is a good slow-motion dial and it is supplied with a collection of 58 small metal slips having the names of stations on them. The dial is so made that these slips can

PLEASE NOTE.

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, in any circumstances, undertake to return them, 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.

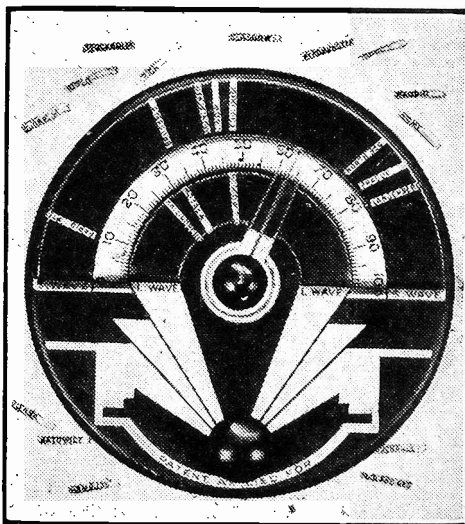
be quickly placed in position to provide a direct reference to the tuning of the various stations.

Having tuned-in a station you insert the appropriate slip at the point marked by the indicator so that at any future time you can at once return to that station merely by rotating the pointer until it points at the name of it.

Both medium and long-wave stations can be accommodated and in the event of a station changing its wavelength it is a simple matter to change the position of its slip.

The dial costs 7/6, and a useful station identification chart is supplied with it. The device should find its way to the panels of a large number of "household" sets.

THE CUSTERSON DIAL



Here you see a few of the station name slips in position while others are shown detached from the dial.

CAPT. ECKERSLEY'S QUERY CORNER



Under the above title, week by week, our Chief Radio Consultant comments upon radio queries submitted by "P.W." readers.

THE NATURE OF ELECTRICITY—SCREENING—SHORT-WAVE VARIATIONS.

What is "Positive" Electricity?

W. L. (Leith).—"I have been reading a book on elementary wireless. Electricity, it states, consists of electrons; further on, electrons are referred to as negative.

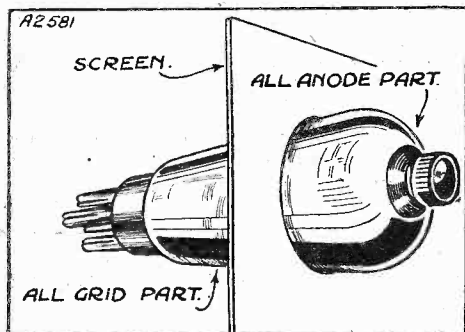
"What, then, is positive electricity?"

Nobody knows what electricity is. In science we have theories which are conveniences of expression.

When we abandon one theory it does not mean that that theory was *wrong*. It means it isn't quite so convenient as a new one.

It is convenient to say this: We do not know what is electricity. We can say

TO OBTAIN EFFICIENCY



S.G. valves of the non-metal coated type are generally best used poking through a screen.

however, that matter is composed of minute particles, electrons and protons. Electrons carry negative and protons positive charges of electricity.

We don't know what electricity is however, we only know that if we have a lot more electrons than protons in a conducting plate, then that plate is negatively charged.

An uncharged plate has as many electrons as protons in it. Forces are always acting to try and establish equilibrium. When any conductor contains as many electrons as protons—a battery by chemical action is always making the negative pole surplus to normal electron establishment and the positive pole less than normal—then, when a conductor is placed between the pole with the surplus and the pole with the least, electrons pour from negative to positive and there is a flow or current of electricity.

The Electron Flow.

This current is electrons flowing from negative and protons from positive. But protons are enormously bigger than electrons so the current is really only electrons (negative) flowing from negative to positive,

trying to establish that equilibrium, the battery (or the dynamo) is always once more upsetting.

That's a convenient theory. But lately someone's been saying there's a third party concerned called a neutron (uncharged). That doesn't say that what I have told you isn't a perfectly good way of explaining elementary electricity and magnetism.

Earth Tube or Plate?

H. K. (Ilford).—"I am installing a new earth, and I wonder if you will be kind enough to say whether an ordinary earthing tube is likely to be as efficient as a metal plate buried deeply in the ground. The earth tube appeals to me, because it is so simple to fit."

I suppose that theoretically the earthing tube may introduce an ohm or two more in the aerial circuit than if a plate were used.

But the total change in efficiency using the plate rather than the earth is probably of the order of one or two per cent only. Considering that retroaction can change the aerial efficiency from say 10 to 90% why worry?

Certainly use the tube, because it's much simpler mechanically. Give it a fair chance though and drive it into reasonably wet earth.

These Variable Short Waves.

R. O. L. (London).—"I have recently been carrying out a certain amount of short-wave reception on a three-valve short waver. I find that on some nights reception

Don't address your letters direct to Capt. Eckersley; a selection of those received by the Query Department in the ordinary way will be answered by him.

is very good, whereas on other nights practically nothing can be heard.

"This is not due to a fault in my set, and I should be grateful if you could tell me why conditions should vary so much?"

We must get you to understand the Heaviside Layer. Have you ever asked yourself why it is that you can signal by wireless to the Antipodes?

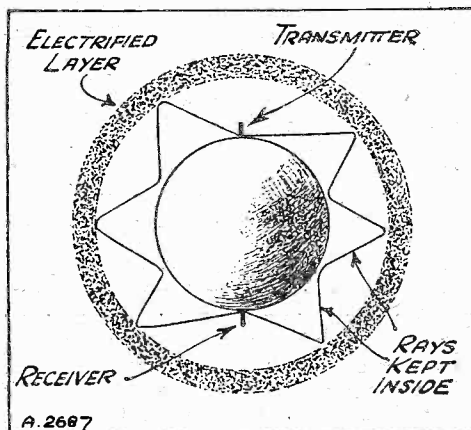
We have always known that "rays" go straight. And so obviously rays shoot along the ground. But the world is curved, so they leave the ground and go on, and would appear to shoot off into space for ever and for ever.

If there was nothing to deflect them back again on to the earth they would disappear and we should *not* be able to signal to the Antipodes or even America by wireless.

But (see my diagram) there is a layer of electrified particles or a multi-layered arrangement of electrified particles which bend the rays back again.

The layer's reflective powers depend upon: 1, wavelength; 2, time of day or night; 3, season; 4, world path; 5, momentary structural changes; 6, sunspots and magnetic and electric atmospheric states. So no wonder things vary a bit!

THE EARTH ROUNDABOUT



Showing how radio waves are reflected back and forth by the earth and Heaviside Layer, thus enabling them to travel round the globe.

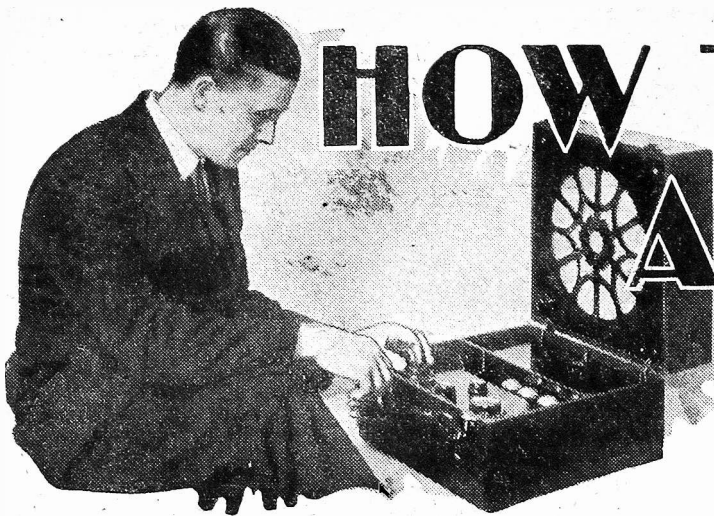
A Question of Screening.

P. M. (St. Ives).—"I have been rather puzzled as to why in some sets the S.G. valve is placed through the screen and in others it is merely placed vertically by the side of the screen. Is there any hard-and-fast rule as to why it is placed through the screen in some cases and not in others?"

If you are speaking of non-metallised valves, more complete screening is obtained by poking the valve through a screen as shown.

But sometimes the screening does not have to be so complete as to warrant all this trouble.

If you are not using metallised valves, I should prefer you to use the best screening—S.G. valves want a lot of watching!



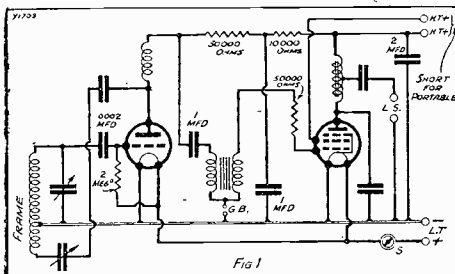
HOW TO DESIGN A PORTABLE

BY J. ENGLISH

WHEN it comes to getting the immediate benefit of the latest developments in radio, there can be little doubt that the keen constructor does score over the man who runs a manufactured receiver. This is even more noticeable in the case of portables and transportables. Here the immediate use of the latest valves and circuits and the opportunity of individual construction puts you well ahead of the owner of the mass-produced receiver.

For example, constructors have now a splendid opportunity of developing a new type of receiver which, as yet, has received little attention on the commercial side. This is what I might call the portable-cum-permanent receiver, a compact all-purpose set of economical design, based on a special arrangement of two valves.

A GOOD CIRCUIT



Although two valves only are used in this circuit, it will give excellent loudspeaker results when operated in conjunction with either a frame or a small outdoor aerial.

As a frame aerial portable for summer use it gives you excellent loudspeaker reception of local stations, and as a permanent receiver for the rest of the year the benefits of mains operation as well as far more selective tuning arrangements for external aerial and earth than you usually get with portables or transportables.

Use High-Efficiency Valves.

Some of you may wonder why a limit of two valves is suggested. Actually this is enough for adequate volume and good quality without any necessity for a "freak" circuit, but it is necessary to specify high-efficiency detector and pentode output stages. Incidentally, this is a two-valve combination which, as a loudspeaker transportable, has only recently become a practical proposition with the introduction of the new low-consumption pentodes.

A good example of the circuit we require is that of Fig. 1. This looks simple enough,

With the summer holidays before them, many readers will be considering the construction of a portable receiver. Below, our contributor describes efficient two-valve schemes, and indicates how their novel features can be embodied in complete designs.

but given sound design and the proper valves, it is really surprising what good volume and quality you get with only a frame pick-up. Reaction into the frame aerial is essential, and for this I find a simple circuit arrangement the most satisfactory, provided full and smooth control is arranged.

The frame feeds into a grid detector of the H.2 type, which makes a really sensitive detector (or type H.L.2, another good valve) with shunt-feed transformer coupling to a low-consumption pentode of the Pen.220 type. The overall magnification with critical reaction is of a high order, sufficient for good 'phone reception of many foreigners and a few at loudspeaker strength.

High-Note Compensation.

Now, in any receiver working from a frame aerial where you must use plenty of reaction to get full sensitivity, there is naturally considerable cutting of side-bands. Consequently you often get reproduction which is rather boomy and lacking in crispness unless departure from straight line response in L.F. stages and loudspeaker accidentally counteracts this tendency.

If this natural correction is insufficient the remedy is to introduce compensation on the L.F. side to accentuate the high notes. This is, of course, a modern innovation which is not used in transportable design as often as it might be.

Referring back to Fig. 1, you will see there that the pentode output is not fully compensated in the usual way for limiting high-note response, as here we can make good use of the pentode's natural tendency to emphasise the upper register.

Of course, only actual experiment can decide how much compensation your portable requires while as a permanent receiver less compensation may be needed. You can also experiment with a smaller condenser in the lead to the transformer primary, if bass-note response is excessive.

The average type of loudspeaker for use in transportables is generally lacking in

low-note response, so that this modification is only occasionally necessary. As regards the loudspeaker itself, you can now get models with windings to match the pentode without the necessity for a tapped choke output coupling.

Another interesting circuit of a special type is that of Fig. 2. Here an S.G. valve is used as detector, resistance-coupled to the output valve, which may as well be a pentode if you intend using only a frame aerial.

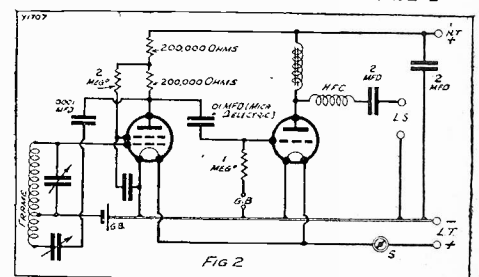
Perfectly Stable Receiver.

The arrangement of the resistance coupling is rather unusual, but with the values given in Fig. 2 you get just the right screen voltage for the detector from a common H.T. + terminal, a very useful feature.

Ample reaction is obtainable without an H.F. choke, while the reaction condenser need not be larger than .0001 mfd., or the reaction winding on the frame larger than one-quarter of the grid winding.

If you are able to use a mains unit providing up to 150 volts H.T., you will find this receiver perfectly stable and far less susceptible to mains hum than a portable with the normal type of detector, when used with a mains unit.

INCREASED SENSITIVITY



Greater sensitivity can often be obtained by using an S.G. detector. The screening-grid voltage is critical, but the arrangement of resistances shown here ensures that it will be correct.

Now let us turn to the interesting problem of how to use an outside aerial to the best advantage with this new type of receiver. When you use an external aerial and earth with a portable, results are not usually very satisfactory. Either there is poor volume on foreigners, or, more often than not, inadequate selectivity.

The usual idea of tapping the aerial lead on to the frame windings is, after all, rather primitive, isn't it? Why not be right up-to-date and introduce an adaptation of the ingenious scheme developed for the "Cosmic" receivers? This scheme, which can be applied to any portable, is one of the most effective I have yet tried.

MYSELF and the MICROPHONE

by

OLIVE GROVES



PEOPLE who have broadcast have assured me time and again that entertaining the microphone is the most cold-blooded task in the world. The wireless studio, they say, is devoid of all feeling; and the B.B.C., in sympathy with these assurances, has for years past supplied an audience to the vaudeville entertainers in an effort to catch that evasive thing—"atmosphere."

But, to my mind, the microphone has an atmosphere, albeit a different atmosphere from that of the stage or concert platform. I am never aware of unresponsiveness in the studio, but rather of a certain intimate "home" touch which is well-nigh indefinable in mere words.

Three Hundred Performances.

Nevertheless, it is to me very real, and almost tangible. Perhaps my long experience as a wireless singer has something to do with it—I made my first broadcast in April, 1926, and am now approaching my three hundredth microphone "appearance."

Another remarkable thing about broadcasting is the curiosity about the broadcast artistes. During the six years I have been singing more or less regularly for the B.B.C., I have received hundreds of letters asking about myself—what I look like, what I dress like, details of my life, and so on. People who meet me for the first time frequently remark, "Oh, I thought you were bigger"—or, "I thought you were smaller."

It is extraordinary that a single voice can create so many different mind impressions of its owner. Perhaps a psychologist could best explain it.

But if the few details of my life which I have been invited to set down serve to give some accurate idea of me as I really am (even at the risk of disillusioning a few of my admirers!), they will at least have served one useful purpose.

Born in London.

I am a Londoner, although there is a good deal of Yorkshire blood in me. There is, too, a marked musical strain in my family—especially on my father's side. My aunts and uncles include several "semi-professional" performers, which means, of course, that their musical skill earned them an occasional fee.

My mother gave me my first piano lesson when I was six. A year later I entered for an examination at the Royal Academy of Music; I can remember sitting on the examiner's knee, and telling him all I knew about melody. He must have been a

kindly man, for he passed me out top of all England with a record number of marks.

At that time I was undergoing the very unusual experience of being educated at a boys' school. That was my father's own school at Hampstead, and my sister and I were the only girl pupils.

Won Several Scholarships.

We boxed and played and roughed it generally with the boys. Mother said the experience knocked "the nonsense out of us," but my own opinion is that we were never given the opportunity of absorbing nonsense.

I was sixteen when, through my piano playing, I won a scholarship to the Royal Academy of Music. This entitled me to free tuition for three years, but at the end of that period it was extended for another year.

Incidentally, I had never thought of turning to music as a lifelong profession. Even had I done so, it would certainly have been as a pianist and not as a singer that I should have hoped to succeed. However,

SIX YEARS OF SONG



Most popular of radio singers, Miss Olive Groves has broadcast almost every week since her first appearance in 1926.

How at the age of seven she won a record number of marks at the Royal Academy of Music; how she learnt boxing at a boys' school; and how she finally won fame and popularity through the microphone—these are some of the exciting experiences which Miss Olive Groves tells below.

there is an Academy ruling that every pupil must take up a second study.

I felt no inclination for any other musical instrument, and, having a voice which I thought reasonably promising, I adopted singing. At the end of my fourth year I was granted two further scholarships for singing.

I was still at the Academy when my mother went to Cologne (where my father was in the Army of Occupation), taking with her an amateur concert party composed mostly of children, of which I was a member. Our stay was only a matter of weeks, but we appeared at the Scala Theatre, where I played and sang.

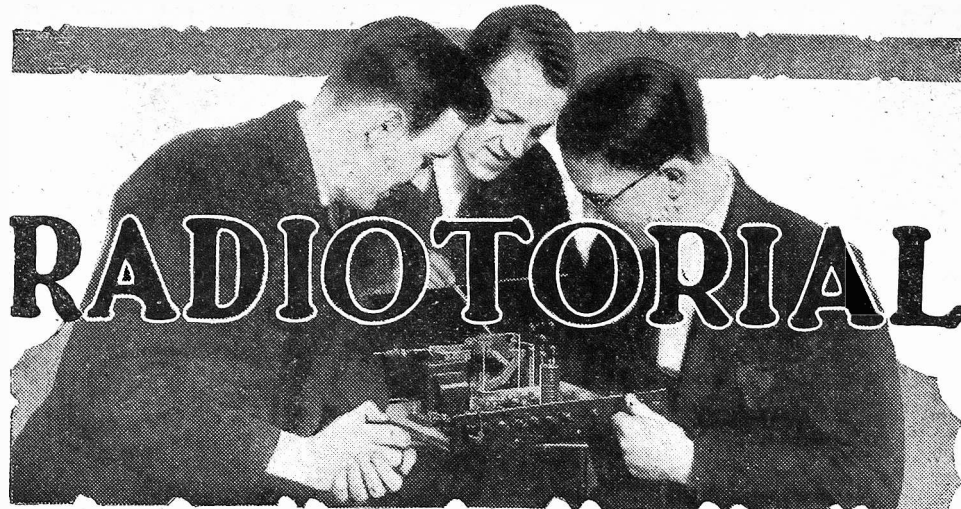
Broadcasting as a Career.

After my trip to Cologne I did a certain amount of concert work. Then there happened one of the luckiest incidents in my life. Because I did not wish to leave London, I refused an excellent offer with a travelling opera company. I was walking along the Strand, thinking that perhaps I had been rather silly about the business, when a man quite unknown to me touched me on the arm.

"You're Olive Groves," he said.

I admitted it, and he went on to explain that he was an official of the B.B.C. He had heard one of my performances at the Scala Theatre, Cologne, and somehow or other my voice and face had stuck in his mind. He invited me to an audition—which, I need hardly say, I gladly accepted.

I was found suitable for broadcasting, and I have appeared before the microphone ever since at a rough average of once a week. My work for the B.B.C. seems to have covered almost every field of singing—ballads, light opera, and musical comedy. And on one occasion I undertook the part of one of the Houston Sisters, with Mabel Constanduros as my "opposite." If ever there was a time when I wished to listen—as well as to perform—it was then!



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 MSS. not accepted for publication. A stamped and addressed envelope must be sent with every article. All inquiries concerning advertising rates, etc., to be addressed to the Sole Agents, Messrs. John H. Lile, Ltd., 4, Ludgate Circus, London, E.C.4.

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

FIVE HOLES OR FOUR?

L. J. (Lowestoft).—"When the kit came the valve holders were different from the illustration. Each of them has five holes instead of the usual four, an extra hole in the middle being joined to an extra terminal on the stationary base. Does that matter?"

Not in the slightest. Treat them just like 4-pin valve holders, ignoring the central hole and extra terminal that is connected to it.

COIL UNITS AND THE "MODERATOR."

Many inquiries mention coil units, but give insufficient circuit details of these. In general, coil units can be modified easily if they have

HOW ARE YOUR RESULTS NOW?

Perhaps your switching doesn't work properly? Or some mysterious noise has appeared and is spoiling your radio reception? Or one of the batteries seems to run down much faster than formerly?

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

Full details, including scales 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 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.

the aerial lead (or aerial-through-a-condenser-lead) connected to a separate terminal on the coil unit.

In such cases the following may be tried: Undo aerial from present terminal and join it instead to top terminal on Moderator coil. Join this end of Moderator coil to fixed vanes of Moderator condenser. Join other end of Moderator coil to moving vanes of Moderator condenser and to earth terminal.

Then place Moderator coil close up against medium-wave winding on coil unit, and try your luck.

If too powerful, space Moderator coil further from main coil. If insufficient power, vary position of Moderator coil till best coupling between this and main coil is obtained.

When a good position has been found, fix coil permanently in place. Note: The Moderator condenser must be mounted near the coil, as long leads to it may give rise to instability and other troubles.

HILVERSUM'S POWER.

"TOMMY" (Brightlingsea, Essex).—"We get the Hilversum programme very well here, and there is one point about it that has been puzzling me.

"As it is easily received we get it in daylight, and I have noticed that Hilversum seems to increase in strength far more than other stations, and quite suddenly round about tea time."

"Kalundborg, which also arrives with a good punch, seems to build up quite slowly from daylight strength to full evening strength. And so do Brussels and Hamburg, etc.

"But Hilversum seems to get stronger quite suddenly. Why is that?"

Probably you have been noting the change round about tea-time, when Hilversum increases his power. Prior to 5.48 p.m. only 7 kw. are used, but after that time the station uses an increased power of about 26 kw.

"MODERATOR" REPLIES IN BRIEF.

E. F. F. (South Norwood, S.E.25).—"For the 'Full Range' Junior you simply join one side of the Moderator condenser to one end of the Moderator coil; and the other side of the condenser to the other terminal of the coil (movable plug).

Then connect this latter terminal of the coil by clipping on to it the flex lead which for-

merly joined the aerial-series condenser to the P.J1 coil.

And connect the other sides of the Moderator coil and condenser to the earth terminal.

Push the Moderator coil up close to the centre coil of the P.J1, and adjust the condenser, finally noting the best permanent position for

DO YOU KNOW—

the Answers to the following Questions?

There is no "catch" in them, they are just interesting points that crop up in discussions on radio topics. If you like to try and answer them you can compare your own solutions with those that appear on a following page of this number of "P.W."

- (1) Who first used a valve in connection with a wireless receiver?
- (2) About how many different types of receiving valves are now available in Britain?
- (3) Which country in Europe has the greatest number of licensed listeners in proportion to population?
- (4) Why an ohm is so called?
- (5) How the voltage-drop across a resistance can be calculated if the current flowing is known?

ANSWERS to the above questions will be found on page 422.

the Moderator coil in relation to the P.J1. Also try with and without the series-aerial condenser shorted.

K. R. (Olney).

It is very doubtful, as the real trouble is the out-of-date circuit, and not merely the degree of aerial selectivity.

L. E. (Twickenham); also F. F. W. (Wargrave), E. K. (Plumstead), A. N. A. (Buckhurst Hill), P. M. (Liverpool).

Your set is not suitable.

CONSTRUCTING THE "COSMIC."

G. W. (Stowmarket).—"Having become very interested in the 'Cosmic' and determined to get in on this short-waves-as-well racket as soon as I can, I should like to know details of the articles which I have missed. Can you give me a list of the 'Cosmic' articles, with numbers and dates of the 'P.W.'s, in which they were given?"

The set was first described in the February 13th, 1932, issue of "P.W." (No. 506), and in this number there were special articles on "The Cosmic Circuit" and "Coils for the Cosmic." (A full-size blue print of the set was given away with every copy of "P.W." that week.)

The next week, February 20th ("P.W." No. 507), saw the description of the "Cosmic Star," and another free blue print of that set, (showing the Ready Radio version) was given away. There were also "Valves for the Cosmic," "Coils for the Cosmic Star" and "The Cosmic Three, Further Details."

Since then the following articles have appeared: "P.W." No. 508 (February 27th, 1932).—"Accessories for the Cosmic," "Touring the World with the Cosmic."

"P.W." No. 509 (March 5th, 1932).—"Selectivity and Power on Your Cosmic," "Your Cosmic on Short Waves."

"P.W." No. 510 (March 12th, 1932).—"Pick-up Programmes on the Cosmic Three," "Finding Those Foreigners on the Cosmic."

(Continued on page 422.)

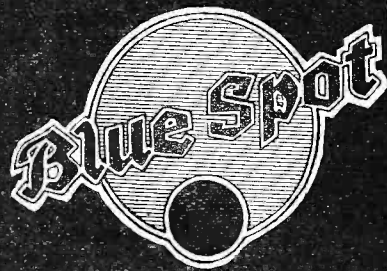
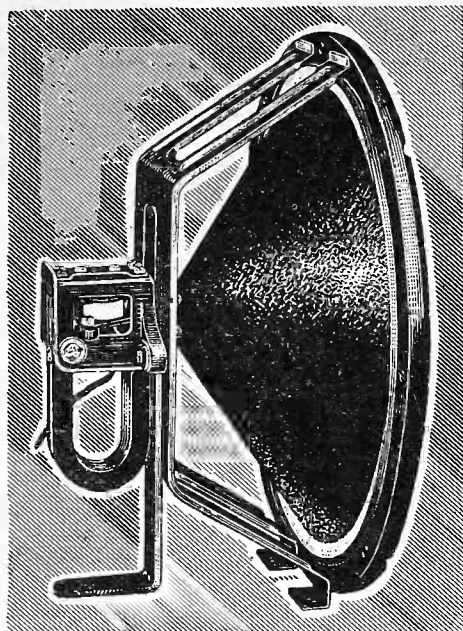
"P.W." PANEL No. 75. ABOUT THE VALVE.—A.C. RESISTANCE.

In last week's "P.W." Panel, we mentioned that the A.C. Resistance—often called the "Impedance"—of a valve is not the same as its D.C. resistance. This latter is the opposition the valve offers to steady current from the H.T. Battery.

The A.C. Resistance or "Impedance" represents the opposition offered by the valve to alternating (or "A.C.") currents in its plate circuit.

If a valve with normal H.T. and G.B. has its H.T. increased slightly, there will be a small rise in plate current; a decrease of plate voltage to below the normal will result in a fall of plate current.

Dividing the difference in plate voltage by the difference in plate current will give the A.C. resistance or "impedance" of the valve with normal voltages.



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100D, an attractively designed Cabinet Speaker in Oak, 63/-.

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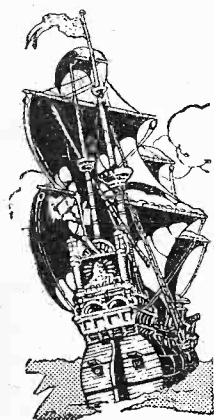
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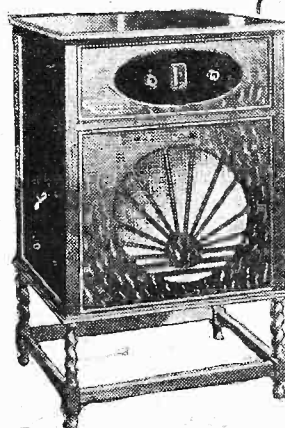
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SEND 3D. IN STAMPS FOR NEW 1932 BEAUTIFULLY ILLUSTRATED CATALOGUE.

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 420.)

"P.W." No. 511 (March 19th, 1932).—"A Filter for the Cosmic."

Also, a two-valve version of the "Cosmic" was described in "P.W." No. 516 (April 23rd, 1932), and a one-valve "Cosmic" in "P.W." No. 521 (May 28th).

TROUBLE WITH AN OLD SET.

K. E. (Retford).—"When I was only thirteen I made up a two-valve set for my father from one of the original 'P.W.' blue prints (Reinartz reaction). He has always

THE ANSWERS

—TO THE QUESTIONS ASKED ON
PAGE 420 ARE GIVEN BELOW:

- (1) Sir Ambrose Fleming, F.R.S.
- (2) Over four hundred.
- (3) Denmark.
- (4) Because it was the scientist, Georg Simon Ohm, who first established the relation between Voltage, Current and Resistance in an electric circuit.
- (5) By multiplying the number of ohms in the resistance by the number of amps. flowing through it.

DID YOU KNOW THEM ALL?

been very proud of it, and on no account would he let me replace it with a new one, as it was the first that I ever built and he says it sounds better now than any of the new ones.

"Goodness knows how many H.T. batteries have been worn out by it, and we have had four or five new valves with other odd replacements, but the last time I went over to see it, he was in the middle of his first really serious patch of trouble. In fact, until it is put right he will not be able to use the set.

"The symptoms were very, very loud crackling when he was tuning, and I noticed that small sparks appeared on the reaction condenser every time this happened. Also his H.T. battery is running down much too quickly, so I concluded that the plates were shorting the battery, as there is only the reaction condenser between filament and the plate of the valve.

"I am taking him over a new reaction condenser and I want to ask you if I am doing right in suggesting another fixed condenser between this and its 'earth.' So if the plates of the new condenser get shorted in the same way there would still be an insulator between plate and filament to prevent the battery running down as well. Also, what value should this extra condenser be?"

It would certainly be a good opportunity to put a fixed condenser in series with the Reinartz reaction arrangement, and you will find that almost any value will do provided it is considerably larger than the value of the reaction condenser itself. Probably the latter is of the order of .0003 mfd., in which case a .001 or anything about that would be perfectly satisfactory.

A .0005 mfd. might do, but in all probability the larger size would be much better, and less liable to affect reaction results.

HOT ACCUMULATOR PLATES.

B. C. N. (Hyde).—"Being of an enquiring and mechanical nature, I like to have my set and as many of the parts as possible taken to pieces when there is the slightest excuse! And, therefore, when the battery had to be topped up and vaselined again I seized the opportunity of undoing the top and pulling out the plates.

"I was doing this out of doors with the sun shining and was taking my time and doing the job carefully, as I had never tried it before. I stood the plates on an old wooden box beside me, whilst fishing for a lump of some kind of impurity, after which I was going to strain the acid, but I happened to turn round and find that the plates were 'smoking' and on touching them I found them to be quite hot.

"I was a bit windy as I was alone, and did not know what was the cause of this, but I took a chance on it and carefully put them back again in the cell as quickly as I could. To my relief nothing out of the way happened and after I had got it all fixed up and cleaned up again, I tried it on the set and it works O.K.

"What would be the cause of the smoking (which was very plain); and did it do any damage?"

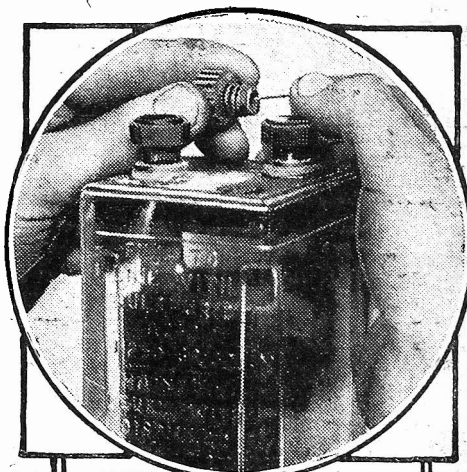
The exposure to the air of negative plates will result in them getting quite hot owing to chemical action, and you did the right thing in getting them covered again quickly. Probably there is not much, if any, damage done, but it would be advisable to make careful hydrometer and voltage tests for a time until you are sure that the battery is not adversely affected.

IMPROVING SELECTIVITY.

R. T. W. (Pembroke Dock).—"Not having tried this kind of work before, I do not see how to have the Moderator condenser and coil wired between aerial terminal and coil unit for medium waves, and Moderator condenser only for long waves. (To act as selectivity control.) Please explain how the coil is removed."

One end of the Moderator coil is joined to one of its terminals. The other end goes to the third socket, into which the plug can be fitted. And the second terminal is connected to the flex and plug, and to nowhere else.

So join one side of your Moderator condenser permanently to that terminal on the Moderator coil which goes to one end of its winding. And join the other side of your Moderator condenser to the re-



YOUR ACCUMULATOR

Nothing much will go wrong with an accumulator if it is never allowed to remain "run down," but is re-charged promptly.

Occasionally the acid will need "topping up" with distilled water—it should never be allowed to evaporate below the tops of the plates.

The holes in vent plugs should be kept open, and a smear of petroleum jelly on the terminals will keep them O.K.

maintaining terminal on the Moderator coil (which has the flex and plug attached to it).

Now if you put the plug in one of the coil tapping your Moderator condenser will tune that part of the Moderator coil you have connected it across. Which is what you want for medium waves.

For long waves you need the Moderator condenser only—no coil. So you then merely take the plug out of the socket on the coil and let it hang loose.

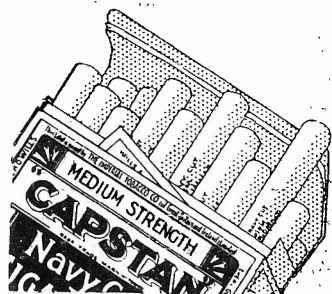
"THESE RADIO COMPONENTS."

Capt. Eckersley will continue his very popular series of articles—"These Radio Components"—next week, when he will deal with low-frequency transformers.



Never mind—have a
CAPSTAN

they suit
everyone



6⁰ FOR 10
11¹/₂ FOR 20

CC-302A

MIRROR OF THE B.B.C.

(Continued from page 402.)

Bush (Krome); Prelude in G Minor (Rachmaninoff); A Hunting Fantasia, compiled by Joseph Muscant; Intermezzo, Lazy Pete (Werner-Kersten); Paraphrase, Old Folks at Home in Foreign Lands (Roberts); Trumpet Polka, Fine Star (Carter); Pot-pourri, Grieg's works, compiled by Joseph Muscant; Intermezzo, Tea Party of the Cockchafers (Kaike); Selection, The Fortune Teller (V. Herbert).

This broadcast from the Commodore Theatre, which lasts an hour and a quarter, will be followed by a recital of operatic gramophone records.

NEXT WEEK

THE 'DECADE' WITH SIMPLIFIED TUNING

EMPIRE BROADCASTING

(Continued from page 400.)

great extent, but this presents serious practical difficulties. These transmitters, therefore, will operate with about 15 to 20 kilowatts in the aerial.

It will take some months to determine the best schedule of wavelengths for the various zones. A comprehensive system for collecting data will be devised, to make certain that we are using the right wavelength in relation to the zone, the season of the year, and the time of the transmission.

The question is often asked whether the transmissions from this station will be audible in England. It is rather difficult to give a positive answer to this question. Most of the country will probably be in the skip distance for the shorter wavelengths, and therefore reception by the normal method for waves of this order, namely, the indirect ray, is almost certain to be very weak, or non-existent altogether.

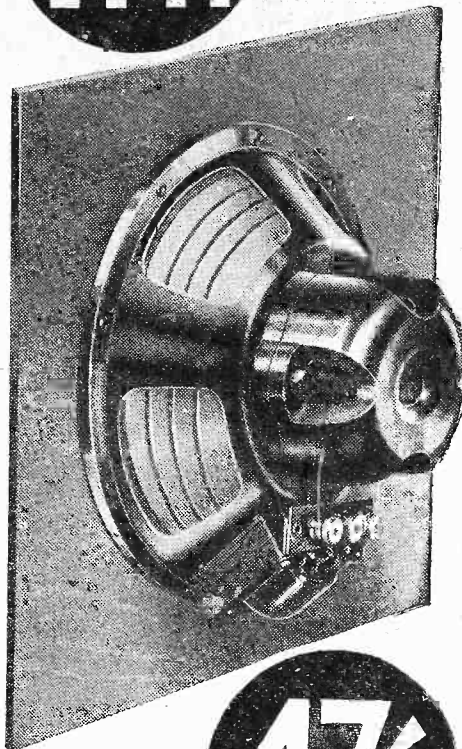
Local Reception.

Possibly, however, the two longer wavelengths, namely 32 and 48 metres, may be audible in certain districts at fair strength. In any case, reception is most unlikely to be of much value. Direct reception will, of course, be possible during both daylight and night conditions on some of the wavelengths within a radius of about 20 miles from Daventry, but the only use which could be made of this would be for experimental work on the design of receivers.

However, the reception of a direct ray on short waves is a very different thing from the reception of an indirect ray, and might therefore give misleading results.

Daventry has been chosen as the site for this station, partly for reasons of economy, and partly because it is highly suitable for a station of this kind. The work is now proceeding as rapidly as possible, and we expect to start transmitting before the end of the present year.

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CASH—C.O.D.—H.P.—Immediate Delivery.

The DECADE

Described in last week's issue.

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CASH or C.O.D. £3-9-5

or 12 monthly payments of 6/5

KIT "B" Author's Kit with valves less cabinet. CASH or C.O.D. £4-15-5 or 12 monthly payments of 8/9.

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THE LISTENER'S NOTEBOOK

(Continued from page 402.)

in a better mutual understanding. From the entertainment point of view, too, it would offer greater variety, giving us, at the same time, something which is really different.

The monotonous sameness of programmes, week after week, must in time foster in us something akin to contempt for certain items.

I even heard the Commodore Theatre Orchestra being abused the other night, for no other reason than that we hear them so often, and that they are always the same. Incidentally, I thought their programme on this occasion was as fresh as ever.

All the same, I see the dangers of oft-repeated items, and that is why I am all out for foreign relays, with a commentator whenever necessary.

"Mr. Bingham" Bungles.

Mr. C. K. Allen's observations on University discipline at Oxford and Cambridge must have sounded rather odd to American listeners, coming as they did at a time when American newspapers would be telling the story—with illustrations perhaps—of the latest undergraduate prank at Cambridge.

Americans have, I believe, a special interest in King's Chapel since the broadcast carol service at Christmas was inaugurated. I know that the last service brought a large batch of appreciative letters from across the pond.

The Review of Awe-ditions cast considerable light on the tribulations of the B.B.C.'s programme department, but why should they want to inflict some of "Mr. Bingham's" rejects on the poor public?

Nobody wanted to hear, for instance, Lena Bow's offspring make that awful row on a fiddle—it wasn't in the least funny! And he was allowed to go through a whole verse too. Really, this was very magnanimous of you, Mr. Bingham, but don't you think that some terse comment from you would have been more to the point?

■ You had a marvellous chance of producing roars of laughter, but you let it go. There's no doubt that Mr. Graham Squiers missed his way in this review. The best feature of the production was the piano accompaniment of Jack Venables.

Sickly Singers.

A newcomer to the microphone (to me, at any rate) is Mr. Charles H. Chandler, whose first talk, he says, brought him a record mail. In his second, on "Boscobel and Tong," he had a lot of interesting things to say in the kindest and most intimate manner.

There wasn't the smallest suggestion of that intellectual aloofness which is rather à la mode at present. He seemed, however, to pay more attention to the historical associations of the country he discussed than to its natural beauty. Even so, he was thoroughly entertaining.

Strath Mackay seems to own quite a good singing voice, but I suppose it is with his double-voiced business that he hopes to achieve fame. I should enjoy this feature more if he didn't sound as if he were likely at any moment to be violently sick.

There were many excellent features about the Royal Command Performance. It was, firstly, non-stop variety, well thought

out and well presented. Obviously, certain turns did not lend themselves to broadcasting so well as others. I have principally in mind Jasper Maskelyne, the illusionist, but even he was interesting, thanks to the able commentating of Leonard Henry.

Leonard, unlike his predecessors in this difficult job, really excelled himself. He just did all that was necessary, and no more. Never once did he intrude or attempt to steal the limelight of the artistes.

A Wise Selection.

It was interesting to find so many radio stars among the select body, although these are but a small fraction of all the B.B.C. vaudeville artistes. We should hardly expect to find the latter fraternity appearing exclusively in a Command performance.

I thought Jack Hylton's selection of popular melodies a very wise one and ideal for the occasion—a total absence of the hot variety was noticeable. I didn't think the comedians quite rose to the occasion. Of course we know they can't go all out, but their jokes were, on the whole, very feeble.

The Naughton and Gold turn was just a succession of crash, crash, wallop and bang. One could hear very little of their patter, but since they kept the audience in fits of laughter, there must have been more in their turn than the loudspeaker conveyed.

OFFICIAL "P.W." EXHIBITORS.

Readers are reminded that further information regarding the components for sets described in this journal can be obtained from official "P.W." exhibitors, who also display P.W. "Cosmics," etc. The latest additions to the list of Exhibitors are given below.

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MAINS UNIT VOLTS

A REMINDER.

When considering the purchase of an H.T. mains unit to work with a mains set, remember that in the majority of this class of receiver the negative grid bias obtainable is subtracted from the maximum H.T. voltage obtainable, which in the case of a power valve requiring 25 or 30 volts bias becomes a consideration of importance.

TECHNICAL NOTES

Some diverse and informative jottings about interesting aspects of radio reception.

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

Radio in the United States.

IT HAPPENED to be looking through a number of Radio journals sent over to me from the United States a few days ago, and I noticed that the number of radio receiving sets in use there has now reached such a colossal figure that one out of every two homes has a receiver. The United States Census Bureau made an investigation into this matter and showed that about 12,000,000 out of 29,000,000 homes in that country, that is over 40 per cent, had a radio set.

That census was made about a year ago. In the time which has elapsed since the census was taken it is estimated by the radio trade that about 4,000,000 more radio sets have been sold, which brings the total to over 16,000,000 or more than 50 per cent of the total number of homes. The total radio audience represented by this number of instruments is reckoned at about 30,000,000.

Of course, what the radio trade in the States look at is not so much the fact that there are 16,000,000 homes in the States which possess a radio set, but rather at the fact that there are still some 14,000,000 homes which do not possess a radio set, and therefore constitute a potential market yet to be explored!

The Little Troubles.

Have you ever noticed how it is the little things which seem to cause the most trouble, not only in the every-day affairs of life but also in regard to radio matters.

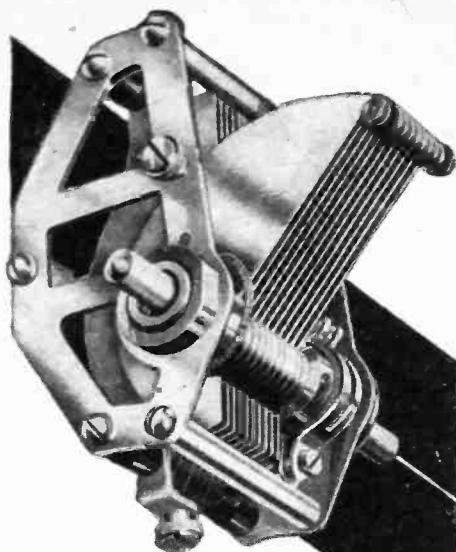
If you are an experimenter you know full well that you have more trouble over a vander-plug which simply won't stay in the socket of a high-tension battery, or which has to be rammed in with a bit of fine wire alongside of it and is liable to jump out at any moment, than you may have over a loudspeaker or even a valve.

This only goes to show that it is really economical to do every part of the job right in the first instance. In the particular case mentioned above, the proper thing to do is to make a satisfactory connection to the vander-plug and then to make sure that the prongs of the plug are widened until it fits tightly in the socket.

I have seen really experienced experimenters fiddle about with a complicated experimental layout, whilst the connections to the high-tension battery consisted of bare ends of wire resting precariously in the battery sockets with the doubtful aid of broken match-sticks. The slightest movement of anything on the bench was liable, if not to pull one of the high-tension connections entirely out from the battery, at any rate to shift it about so as to cause the most frightful crackle in the speaker.

In a sense, this kind of thing is a pardonable fault because I know only too well that

(Continued on next page.)



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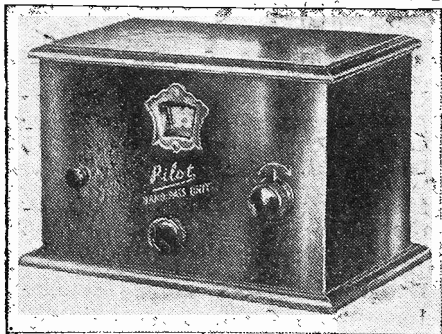
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TECHNICAL NOTES

(Continued from previous page.)

it is due to the impatience of the experimenter, who is anxious to get on and test out the circuit, or whatever it may be, that he hasn't the time to go methodically over all his little bits of arrangements at the start. But, as I said, it pays both in time and temper to do the job right in the first instance.

Locating Cracked Joints.

The other day I had a case where a set was working very badly, although apparently everything seemed to be in order, and it turned out that one of the plugs in the grid-bias battery was not making electrical contact at all, with the result that there was no G.B. applied to the valve in question—and the effect you can perfectly well imagine! Not only was the quality very poor, but the valve must have been passing a much heavier high-tension current than it was intended to do, and was liable to be damaged in the process.

Another thing which I have many times found to be quite a trouble to experimenters is a cracked soldered joint, the separation of the two parts being sufficient to make an electrical disconnection, but too small to be noticed except by very careful scrutiny. You can generally find a thing of this sort by trying the various busbars or wire conductors in the set, but be careful not to use undue force or you may cause trouble where none existed before.

Broken Spaghetti Resistances.

I don't know whether you have ever had trouble with a broken spaghetti resistance, but I have seen two or three cases of this. The spaghetti resistance, as you probably know, is wound with fine, high-resistance wire upon a soft, flexible core of insulating material and covered with an insulating sleeve.

Knowing this, many people treat it in the same way as the spiral springs used for hanging curtains, and imagine that it can be pulled out to any desired length. This is not the case at all, and a spaghetti resistance should not be stretched or pulled in any way, nor should it be twisted round very sharp bends, otherwise the high-resistance wire, which is usually quite brittle, will be broken.

Incidentally, a break inside a spaghetti resistance is often very troublesome to find because, owing to the relatively high resistance, the ordinary test is not easy to make, and there is no outward and visible sign of a mechanical fracture. I had one case recently where a lot of trouble was caused in a set due to a broken spaghetti resistance and this, as a matter of fact, was the very last thing which the owner of the set looked for.

It Won't Stretch.

If you want to use a spaghetti resistance between two points which are too far apart for the resistance to stretch across—an unusual situation, by the way—you should add a short length of insulated conductor to the end of the flexible resistance and complete the job in that way. Usually the trouble is not due to stretching the resistance, however, but to allowing it to become kinked as, of course, spaghetti is generally used in a bent or looped condition.

The good ones are really quite strong and robust, and if treated properly should give

no trouble at all. But, like anything else, if they are subjected to drastic ill-treatment they kick.

Two-Band Tuning.

When using coils and frame aerials for two different wavelength ranges, an arrangement often used is to connect the long-wave coil across the tuning condenser and to have the medium-wave coil adapted to be switched in or out of circuit in parallel with the long-wave coil. With this arrangement, when you wish to receive on the medium wavelength band, you switch in the medium-wave coil and so use the two coils in parallel.

The question is whether this arrangement is efficient. Obviously the efficiency of the whole arrangement is limited by the efficiency of the long-wave coil, since this is in circuit all the time, and therefore it is important to avoid losses as far as possible in the long-wave coil.

A good deal depends upon the design of this latter coil and upon the arrangement of the two coils together. It is obvious, however, that if there are any serious losses in the long-wave part, this will have a very adverse effect upon the efficiency of the whole combination, altogether irrespective of the efficiency of the medium-wave coil taken by itself.

Searching for Weak Stations.

I have often noticed people—and not always amateurs—endeavouring to tune-in comparatively weak stations, and frequently enough they twiddle about with the tuning-dial, moving this over quite a large number of degrees and probably passing over the very station they want to get. If you are out for very loud or powerful stations, which can scarcely be missed however badly you tune, then, of course, it is all right, but if you are looking for weak or distant stations, the longest way round is the shortest in the end.

What you want to do is to move the tuning-dial a very small amount each time—in the region, of course, of the position where you expect the station to come in—and to follow up with the reaction control so as to keep up the strength of reception to the maximum for the particular tuning position. In this way, working the two controls together, you will be much more likely to find the station you are looking for and then, holding it with the tuning, bring it up to maximum strength with the reaction. But to go shooting about all over the tuning-dial, without any regard for the corresponding adjustments of the reaction, is simply a waste of good time.

A Loud Speaker Tip.

Following my remarks in these Notes a little time back on loudspeaker units, I have had several very interesting letters from readers telling me of various dodges which they employ and the sort of results they get.

One letter, from a London reader, I think might be useful to pass on. He asks: "Is the cone the last word in diaphragms?" His letter goes on to say: "Personally, I have always preferred the pleated paper diaphragm, owing to the sweetness of the tone."

"I know one could get very little power from it in its old form, owing to the way it was attached to the frame and unit. But I have overcome this difficulty by attaching it in the baffle by a ring of linen about half-an-inch wide. This is tightened (he

(Continued on next page.)

TECHNICAL NOTES

(Continued from previous page.)

doesn't let me into the secret, but possibly by means of a dope) until it is as taut as a drum, and the results are very good indeed."

"At present I have two of these working in series, the first with a 12-in. diaphragm operated by a Blue Spot 6GP, the second with an 18-in. diaphragm operated from a Ferranti Inductor Unit."

Have You Any Ideas?

There are so many little dodges which readers find out for themselves, especially with regard to loudspeakers, that it is always very interesting to have notes of them, and I shall be very pleased to hear at any time from those of you who care to send me any hints which you think may be interesting to pass on to fellow readers.

Pentode Detectors.

I have a letter from a Northampton reader who says that although he has been a careful reader of these Notes for a long time, he doesn't remember having heard of a pentode valve being used as a detector. If I remember rightly, however, I mentioned this particular matter a little while back. In fact, I am sure I did, because other readers have mentioned it in their letters to me from time to time.

However, the letter I have before me goes on to say that he has used a pentode detector with great success, the best results being obtained when the grid leak is connected to filament positive with extra grid voltage the same as that on the anode. The reaction, he says, is remarkably smooth and permits of a tighter aerial coupling with a consequent increase of signal strength and incidentally of X's. He adds that in this way he has logged a large number of stations, and that the arrangement has been very satisfactory.

Indirectly Heated Valves.

Although mains valves have many advantages over the battery-operated type, they have certain disadvantages, an important one being the fact that they do not commence to operate the moment they are switched on. The time required for the cathode to heat up varies with different valves, but is always very considerable compared to that required for a battery-operated valve which, indeed, is practically instantaneous.

A good deal has been done lately by valve manufacturers to reduce the "lag," that is, the time between switching on and the set "coming to life," but nevertheless there is, and I suppose there must be, quite an appreciable time-interval.

Where Battery Valves Score.

Whether the lag causes any serious inconvenience to the user of the set depends on a good deal on circumstances. I had a case just recently in which I wanted to use

(Continued on next page.)

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TECHNICAL NOTES

(Continued from previous page.)

some mains valves for a special purpose—not for an ordinary receiving set at all—and it was essential for this particular purpose that the valves should commence to operate almost instantly.

So far I have been unable to obtain any mains valves which meet this case, although they are eminently suitable in other respects, and I have been obliged to fall back to battery valves.

An Effective Screen.

The metal-coated valves having a coating sprayed on to the bulbs show a good deal of improvement since the coating is connected to the cathode pin of the holder and so forms a shield which reduces pick-up and improves the operation of screen-grid valves.

This means that extra stability is obtained and the valves are quieter in operation.

That Dial Light.

I wonder how many of you use a dial light for illuminating the dial of your set? This is often regarded by owners of battery sets as rather an expensive luxury, not in first cost but in maintenance, since the pilot lamp consumes probably more current than an extra valve. But with a mains set no such consideration arises, and a pilot light is often very handy as well as adding a touch of distinction to the appearance of the receiver.

Sometimes readers complain that the lamps burn out very quickly but, if so, it must be due to poor lamps being used, or to the voltage of the lamp not being suited to the voltage of the receiver. Incidentally, you will often find that you can use a higher voltage lamp which, therefore, burns rather dimly, but nevertheless gives sufficient light for what you want.

In fact, a dim light is really preferable to a bright one as it enables you to see the controls, but does not dazzle your eyes. If a higher voltage lamp is used it will naturally last very much longer. In fact, a 6-volt lamp running at 4 volts ought to last almost indefinitely.

Summer Reception.

At the time of writing these Notes we are enjoying brilliant sunshine, and there appears to be every prospect of a real summer; perhaps by the time you read them it may be different! But nevertheless we have the summer before us, and with it a falling-off in the number of stations, especially distant ones, which will be received on most sets. If you are specially keen on long-distance reception, now is the time to get busy with a suitable receiver, because the time of testing will be during the next three or four months.

It is surprising what a difference there is in the station-getting properties of a set in the daytime and during the night, especially in the summer months. If you can receive a fair number of stations during the day you can be quite certain that while the hours of darkness persist you will have no difficulty in receiving quite a bunch.

Notwithstanding all the claims which one hears, there are precious few types of sets, apart from super-heterodynes, that will bring in really satisfactorily as many as a dozen or twenty stations during the daytime. At night, however, it is a totally different matter.

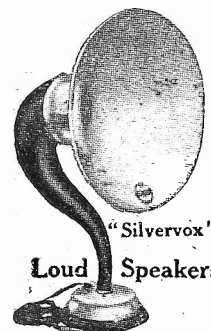
INDELIBLE LETTERINGS

Types shown: AERIAL 1, AERIAL 2, AERIAL 3, EAR, L.S., L.S., PHONES, PHONES, PICK UP, L.T., L.T., H.T., H.T., H.T., H.T., H.T., H.T., GRID, GRID, GRID, GRID, GRID, MAINS, MAINS, A.C. MAINS, L.T. A.C., FRAME, INPUT, OUTPUT, RED (PLAIN), TYPE 'B', TYPE 'R', BLACK (PLAIN).

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LOUD SPEAKERS.

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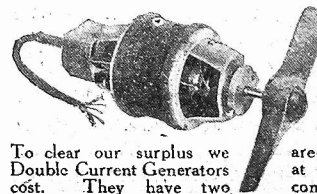
TRANSFORMERS.

Intervalve Ericsson, 2/6; Sifam, ditto, power, 4/9; Western Electric, 2-1 ratio, 2/6; Mains Parmeko, big power H.T. & L.T. £4 10s; type for 45/-; B.T.H. Panatrop, ditto, 45/-; Mains 220 v. to 8 v. 1 amp., 6/6; to 20 v. 2 amp., 15/-.



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OPERATING DATA

Filament Voltage	2.0V
Filament Current	0.1A
Max. Anode Voltage	150V

CHARACTERISTICS

(At Anode Volts 100; Grid Volts Zero)

Anode Impedance	20,000 ohms
Amplification Factor	28
Mutual Conductance	1.4 mA/V

Mullard

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ARKS

Printed and published every Thursday by the Proprietors, The Amalgamated Press, Ltd., The Fleetway House, Farringdon Street, London, E.C.4. Advertisement Offices: Messrs. John H. Lill, Ltd., Ludgate Circus, London, E.C.4 (Telephone: City 7261). Registered as a newspaper for transmission by Canadian Magazine Post. Subscription Rates: Inland and Canada, 17/4 per annum; 8/8 for six months. Abroad (except Canada), 19/6 per annum; 9/9 for six months. Sole Agents for Australia and New Zealand: Messrs Gordon & Gotch, Ltd.; and for South Africa: Central News Agency, Ltd. Saturday, June 11th, 1932. S.G. S.S. S.L.