

**WIRELESS AND THE ATLANTIC—By Charles Levine**

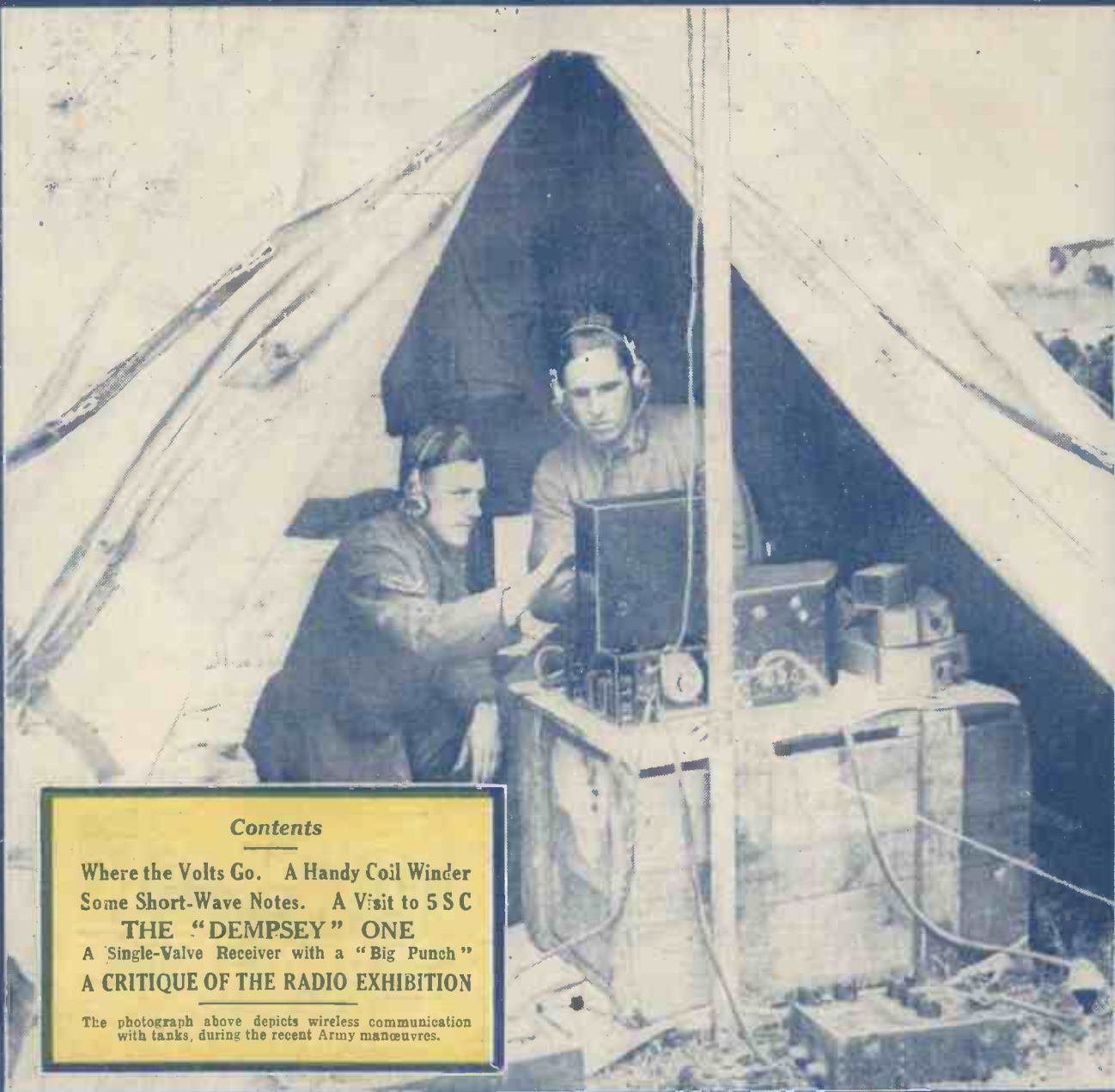
# Popular Wireless

Every Thursday  
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No. 279. Vol. XII.

INCORPORATING "WIRELESS"

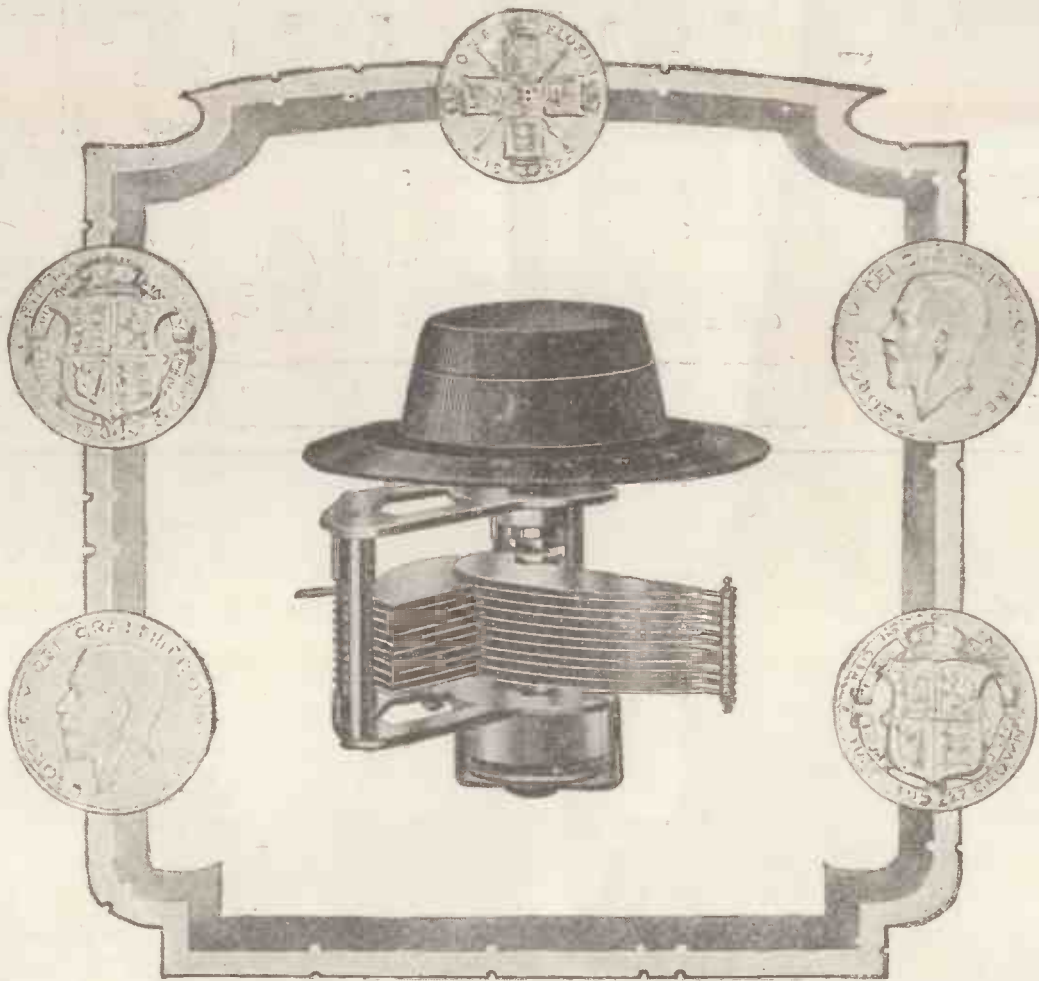
October 8th, 1927.



### Contents

Where the Volts Go. A Handy Coil Winder  
 Some Short-Wave Notes. A Visit to 5 SC  
**THE "DEMPSEY" ONE**  
 A Single-Valve Receiver with a "Big Punch"  
**A CRITIQUE OF THE RADIO EXHIBITION**

The photograph above depicts wireless communication with tanks, during the recent Army manoeuvres.



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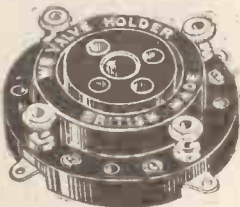
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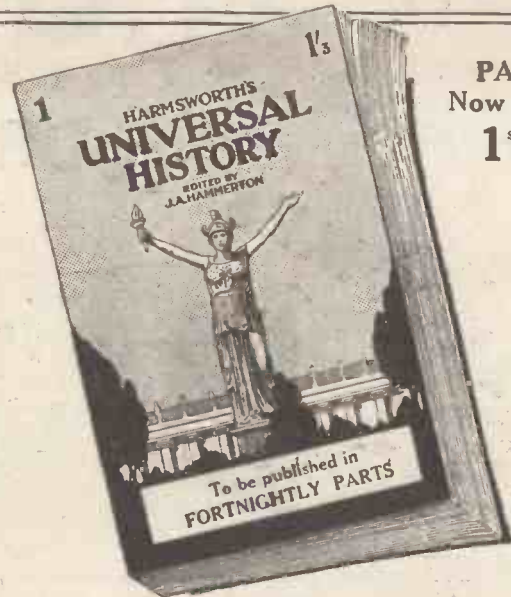
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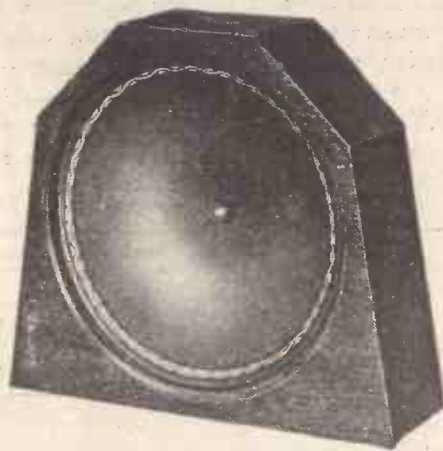
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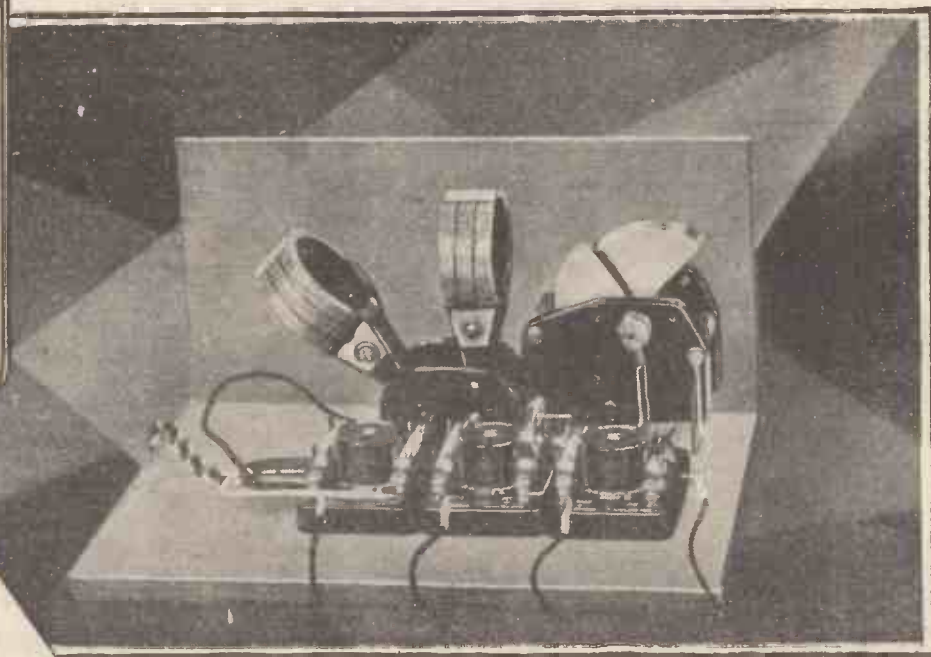
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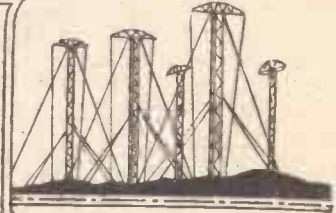
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# Popular Wireless



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## RADIO NOTES AND NEWS.

The "Show" of 1927—New Short-wave Station—"Light"—News from Japan—"Ariel's" Lucky Dips—Sydney Received Direct—5G B Notes—Our Mystery Story.

### The "Show" of 1927.

ALAS! this is now over. One wishes that it were possible to spend a whole day over the exhibits, free from other people's elbows. Looking back, there is ample evidence of progress. Prices lower, refinements and improvements multiplied. With the developments on the transmitting side which the coming year is sure to bring forth the prospect of the listener, be he of the common or garden domestic type or the keen experimenter, is rosy almost to scarlet. Soon the world will be at everyone's backyard.

### The "Radio Times."

ONLY those who have experience of editing can appreciate the remarkable work of the late editor of the "Radio Times," whose sudden death shocked a myriad of listeners. May I, in the name of "P.W." and all its readers, extend our deepest sympathy to the family and colleagues of Mr. Fuller, who edited our contemporary with such distinction?

### First of Its Kind.

I HAVE received a copy of a book entitled "On the Air," written by Mr. Paul D. Augsburg. I think this must be the first published collection of short stories each of which has a radio interest. It comprises eighteen stories, very American in style and some not lagging far behind the work of the great O. Henry. All are readable and some very clever. One refers to the microphone as follows: "As he talked Leander K. could see nothing but Iron Mike—and Iron Mike's old man is Calvin C. Sphinx, the poker face of the Nile."

### New Short-wave Station.

"RADIO-WELT" reports that the American Westinghouse Company is building a 20-kw. station (crystal control) at Chabarowsk, Siberia. It will work on 20-100 metres. For broadcasting purposes it will employ 10 kw., and it is expected to have a range of 1,000 kms.

### Great Radio Trek.

MOST of the leading lights in the radio world have just got to the end of the long trail to Washington, where the International Radio Telegraph Con-

ference is now sitting. They are in for some hard work because their task is to revise regulations made in 1912, since when the whole international situation as regards wireless has become enormously complicated as the result of the great advances made in the art.

### "Light."

FROM a contemporary called "Light," a periodical full of dark and creepy sayings, I learn that "the brain is an electro-magnetic battery. . . ." We need more "light" on this, as such a battery is unknown to electricians and would be exceedingly useful. I learn also that, according to two Swiss scientists, the effect of the hand on a radio set is due to "emanations," called "Anthropoflux R," which

come from the knuckle of the left hand. Anyone finding that his left fist upsets his receiver unduly would do well to challenge Tunney, I should think!

### News from Japan.

THE Tokio station, JOAK (I do like that call-sign) has got a slogan. "Truth and Sincerity to all corners of the world." This is a fine mark to aim at, especially in a world shaped like an oblate spheroid. If any of you are thinking of laying out one of these fine days for a bit of truth from JOAK, you will be glad to learn that the announcements from that station are made in English. Metres 375; K.C. 800. Power 1 kw. to be increased to 40 kw.

(Continued on next page.)

## RADIO IN RUSSIA.



The Soviet Government of Russia is very keen on the dissemination of information in the highways and byways of its domains, and for this reason radio exhibitions, which are really radio schools, are being held in all the principal centres of the country. The above photograph shows one of these so-called "exhibitions" under way.

## NOTES AND NEWS.

(Continued from previous page.)

## Heard Czecho Slovakia?

I BELIEVE this country was called Bohemia in the good old days before peace was declared. Bohemia, the home of music! The music from the National Theatre at Prague is regularly broadcast. There are three stations, Prague (Praha), 349 m.; Brno, 441 m.; Bratislava, 300 m.; also an experimental transmitter at Kosice.

## Ariel's Lucky Dips.

OCTOBER 6th, "Romance," from Bournemouth, 2 L O and 5 X X; — October 7th, National Concert at Queen's Hall, conducted by Sir. H. Wood; Manchester, October 8th, Relay from North Pier, Blackpool; Glasgow, October 9th, Programme by staff of G.P.O., Glasgow.

## Empire Broadcasting.

HERE'S something definite at last! In a statement on Empire Broadcasting, the B.B.C. announces that an experimental short-wave transmitter is being erected at the Marconi Works at Chelmsford. This will make use of the two 480-ft. masts there, and will carry out experiments working chiefly on a wave-length of 24 metres. The call-sign is 5 S W, and the station will use power up to about 25 kw.

Better late than never!

## Sydney Received Direct.

ON a set using two Mullard valves P.M.5X (Det.) and P.M.6 (L.F.), Mr. G. A. Hood, of Kingstown, Ireland, successfully received a short-wave programme direct from Sydney, N.S.W., on the evening of September 4th. It has been ascertained that the B.B.C. were not relaying Sydney at the time. Most of the programme was received on the detector valve only. So far as I know, this is a record for one valve, but I should love to hear from anyone who has equalled the performance.

## Two Popular "Returns."

OUR old friends Flotsam and Jetsam will have a week's appearance before 2 L O's mike, beginning on October 10th. And the B.B.C. tell me that at least eight of next (or this) winter's Hallé concerts will be broadcast from Manchester and relayed elsewhere, including 2 L O. So the future is bound not to be entirely gloomy.

## 5 G B Notes.

A ST. LEONARD'S-ON-SEA reader, who has praise for the B.B.C. programmes, is upset about 5 G B, which in that locality is swamped by Morse, and has only 50 per cent of 5 X X's volume. A man from Carnarvon tells me that there 5 G B fades badly at sunset; it does not fade in my corner of Kent, and I have not heard such a complaint about 5 G B before. The van which is used by the B.B.C. in testing 5 G B's signal strength has covered about 10,000 miles and been all over England.

## "Direct Action."

THE listeners of Carinthia, a province of Austria, have won distinction—and I confess, admiration on my part. A Vienna report states that they have given

an ultimatum to the Austrian Broadcasting Company declaring that they will relinquish their licences from January next unless the Government takes effective steps to deal with the nuisance of electro-medical apparatus which is making reception hopeless. Very brisk! But I presume they know their own bureaucrats best.

## We Beg to Differ.

MR. A. DAWSON, secretary to the model engineer's exhibition, is reported to have said: "While wireless wonders never cease the possibilities from a constructional point of view are soon exhausted." Also: "The wireless craze, so far as construction is concerned, has waned." A pity to be dogmatic as well as ignorant of the facts! However, having unearthed this error, I can safely leave Mr. P. W. Harris to scotch it, if worth while.

## In Restraint of Trade?

THE Borough Council of West Ham has been flirting with the idea of banning public loud speakers if these are operated so as to be annoying to the public. I am afraid such a by-law would do more harm than good; that is, it might save the ears of a few people resident near the loud speaker, whilst damaging the business of numerous traders. I hope that the gentle

## SHORT WAVES.

A wireless conversation between New York and London cost \$200. Yes, there was a woman at one end.—"Star."

"Is your set off colour?" is a question asked in the Western Daily Press.

Well, we have noticed a good deal of fading lately.

## ABERDEEN CALLING.

The Aberdonians have given up buying eggs. They now send their eggshells to the B.B.C. and have them relayed.—"Daily Mirror."

In an annual report a schoolmaster stated that the boy was very backward, dense, dull, and abnormally lacking in general intelligence. A regular "dull emitter" in fact.

There was a young fellow named Jones  
Whose set "pulled" only the 'phones;  
He altered its wiring,  
And now he is hiring  
An expert—per hour, three "bones."—  
American Magazine.

"The C.A.T.S. have very kindly consented to broadcast part of their repertoire from Mr. —'s experimental radio station at 2 a.m. on Sunday morning next."—Calcutta Paper. To reassure the neighbours it should be explained that the C.A.T.S. in question belong to the Calcutta Amateur Theatrical Society.—"Punch."

## OPEN TO OPINION.

It is often remarked that headphones are not a success where there is a large family.

But have you ever tried to listen to the loud speaker when a family of twelve are taking soup?

## THE RADIO FAN'S CREED.

If you can keep your head when all about you  
The room is filled with squeals and howls  
and roars;

If you can trust your set, when all about you  
Are cursing theirs and blaming it on yours;

If you can bear to hear the truth you've spoken  
About the stations you have reached each  
night

Twisted to suit the whims of all your neighbours,  
And not get fiery mad and want to fight;

If you can get an ear clear full of static,  
And keep your temper sweet and not get  
"het"

Then you will be a perfect fan, my brother,  
A fan that people will not soon forget.  
—"Radio News."

art of Borough Councillors in West Ham will be tempered with tolerance and a sense of proportion.

## Chamber Music Going Strong.

AN alarmed reader calls my attention to a remark in the "Radio Times" to the effect that Chamber Music is by no means the last in popularity and that there is to be oceans more of it. The writer of this sickening information adds that Chamber Music "broadcasts well." That is as it may be, but a lot of us think that it does not sound well; and that is the criterion the B.B.C. should adopt. It ought to be called "Lethal Chamber Music."

## Transmitting Note.

THE radio station of Mr. F. Eustance, formerly 5 X M, situated at 92, Briardale Road, Mossley Hill, Liverpool, is now 2 B Y J, 28, Heatherdale Road, Mossley Hill, Liverpool. Artificial aerial. Transmits telegraphically on I.C.W.

## Penetration of Waves.

REMARKABLE results have been obtained by Mr. G. L. Allen in America with a nine-valve set used underground. At a depth of 220 ft. he detected K F E L, Denver (248 metres), on the loud speaker. At 550 ft. he got K O A, Denver (326 metres), on the L.S., using in both these instances a frame aerial. His experiments have revealed that long waves penetrate far more than short ones, a curious reversal of the usual game played by long and short waves above the surface.

## Us and Fritz.

A SCRUTINY of all available reports about the Berlin Radio Exhibition, held during the last week of September, shows that the German manufacturers have produced few novelties. They have the "all mains" supply ideas, which fell somewhat flat, but the cheapness of the sets is striking. What about a three-valve Reinartz at £5 15s.? By the way, the horn type of loud speaker has practically disappeared there.

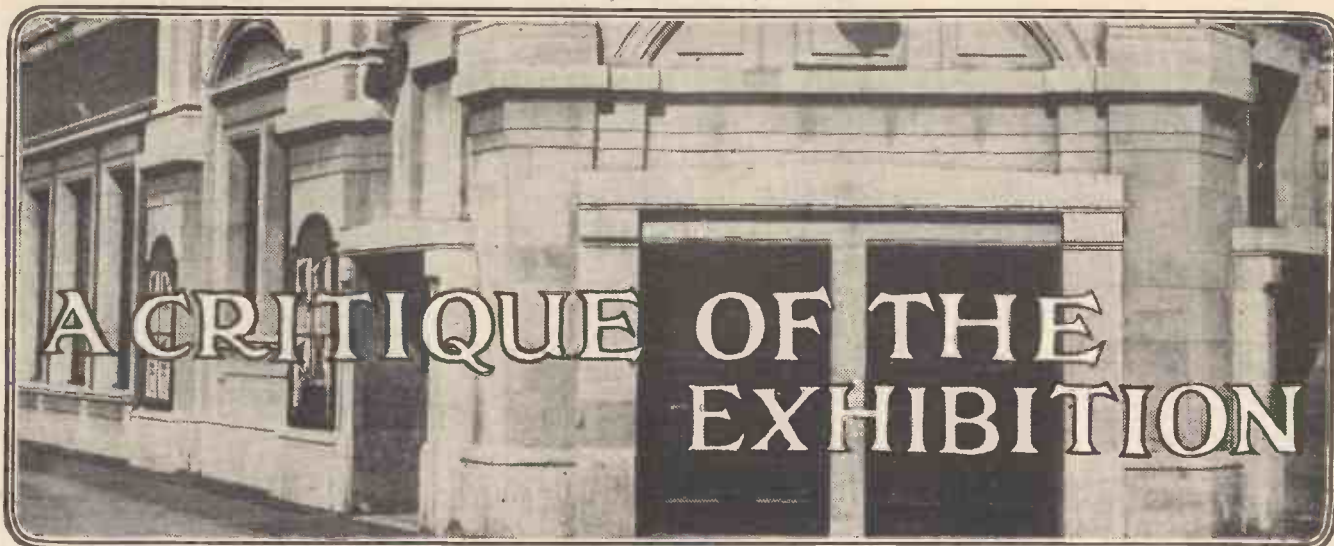
## Stop Press News.

SINCE writing the paragraph headed "Sydney Received Direct," I have had a number of letters from other readers who got 2 M E relaying 2 F C. The results are remarkable, and I shall give some special notes about them next week. Will reporting readers be good enough never to omit mention of the number of valves used and type of circuit, and thus make their news so much more interesting and valuable?

## Our Mystery Story.

MR. H. W. (Wishaw) informs me that on Sunday, September 11th, at 2.12 a.m. he intercepted on about 350 metres the following strange message: "Ory. Disaster. well. terrible vac. air spaces. 700 miles off." H. W. admits that the message is mutilated and states that the signals were very faint. He used a two-valve set. One wonders whether this has some connection with the recent air disasters, and someone with a file of newspapers handy might be interested enough to check up the date and time.

ARIEL.



IS the science of radio reception *really* advancing nowadays? What practical improvements have we to show as a result of the 1926-1927 season? Is wireless cheaper now than it was last year? Are the sets easier to handle, and can we get more programmes per valve? Or, putting it briefly and bluntly, what *value* are we getting for the money spent on set-building?

These and similar thoughts were in my mind as my bus approached Olympia on the opening day of the National Radio Exhibition. The sun was shining magnificently, there was a most invigorating nip in the air, the bus conductor was so polite and pleasant that I should like to have introduced him to Mr. Cairns, but somehow, in my heart of hearts, I was feeling disgruntled and acidly critical. Critical of things in general, and wireless in particular.

"It will have to be *some* exhibition if it's going to please me," I thought, for I fairly loathe exhibitions. And it was in that mood I entered Olympia.

**An Air of Distinction.**

At the top of the entrance steps, where one caught a first glimpse of the show, honesty compelled me to admit that it looked rather well. The blue-and-gold furnishings were tastefully done; the bandstand was arranged, aptly enough, to hold the Royal Air Force band high up in the air (out of everybody's way, and yet right in the middle of the picture); and the general lay-out of the baseboard, so to speak, looked promising.

The leather-lunged gentleman who later on was to startle all the small boys when he announced "OFFICIAL CATALOGUE

\*-----\*  
 Some outstanding impressions of  
 the National Radio Exhibition at  
 Olympia, as seen on the opening  
 day.  
 By P. R. BIRD.  
 \*-----\*

AND BAND PROGRAMME SIXPENCE" had not taken up his duties at the foot of the steps, so I lingered a moment to get the hang of the place, and then took a preliminary look round before the crowd arrived.



A new Cabinet Cone Loud Speaker in the "Symphony" range (A. J. Stevens and Co., Ltd.).

The stalls looked good. Even a quick march-past showed that the display was tastefully done, that many of the exhibits were decidedly handsome, and that the big cabinets, complete sets, loud speakers, etc., had an air of distinction. Wireless, it seems, is passing out of the box-of-tricks stage, and because it enlivens the home there is no reason why it cannot beautify it as well.

**The First Man In.**

Lingering over a Caxton cabinet I missed the opening minute at the main entrance. The first man who clicked a turnstile was Mr. Ivor Goddard, of Sandown, Isle of Wight. And as he set foot inside the show he "clicked" once more, for he was the lucky winner of a special prize unexpectedly awarded by the promoters to the first member of the public to buy a ticket!

The prize took the form of a two-valve

short-wave receiver, complete with loud speaker and all the etceteras. And the fact that it was no dud became apparent when it was announced that this set had tuned in as clear as a bell the Tunney-Dempsey fight broadcast a few nights earlier! Lucky Mr. Goddard!

With this little incident in mind, everybody began looking for short-wave receivers, for at last year's show short-wavers were very few and far between. But there were plenty this year. In fact, this was where the exhibition opened the scoring, and it was certainly a point in its favour to find nice little sets, not at all tricky-looking, which could dive down to well below twenty metres.

As you know, twenty metres represents a frequency of 15,000,000 per second. And if the manufacturers could produce and put into the hands of the public a set capable of disporting itself satisfactorily upon these waves, then radio is going forward.

**Short-Wave Sets.**

With the advent of Empire Broadcasting, and the filling of the ordinary wave-bands with alternative programmes, there is sure to be a great boost of short-wave sets in the near future. So it was encouraging to find that the manufacturers are ready for it now. If the show had no other new feature to its credit, it certainly deserved marks for this interesting and important development.

When keeping an eye out for the short-wave sets I had been astonished by the uncommonly good selection of complete receivers that Olympia had to show. What a variety! What a range of styles! Portables, trans-portables, all-the-juice-from-

*(Continued on next page.)*



An "Efescaphone" product—the Wolfe Two-valver.



A "Gecophone" Four-valve stabilised set.

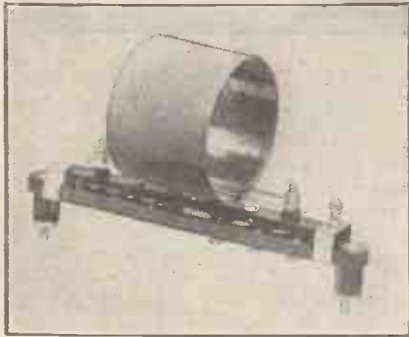
## A CRITIQUE OF THE EXHIBITION.

(Continued from previous page.)

the-mains sets, push-the-knob-to-start sets, one-dial sets, frame-aerial-in-the-lid sets, and even real *wire-less* sets—no speaker, aerial, nor earth-wires whatever!

As I said before, I hate exhibitions, but this year's was beginning to seem quite interesting compared with most. Designs, I found, were distinctly improved in appearance, short-wave sets had come to stay, so apparently had gramophone pick-ups, and all previous displays of complete sets were beaten to a frazzle.

Before lingering over particular stalls I took one general stroll right round the



A coil and mount with many novel features (Formo Co.).

exhibition to see the sights as a whole. And I might as well confess right away that before I returned to my starting-point I was convinced through and through that radio is on the up-grade. That fact was quite evident to anyone with only 25 per cent of normal optical equipment.

### A Record Crowd.

For one thing, the show was thoroughly alive, and the crowd—a record one, by the way—was enjoying itself. Many of the stands had such a crush round them that it was difficult to approach them. Mullard's, for instance, not only had an attractive display, but they gave away copies of "Radio for the Million." And at times it looked as though most of the million had called for their copies!

Some stands had press-the-button displays which were irresistible. Lissen's was one of



A Dual-Range Portable Receiver (A. J. Stevens and Co., Ltd.).

the brightest, I thought, with its L.F. transformers sitting soaked around a fountain, and the scales with the bowler hat that weighed a pair of 'phones high up into the air. The milliammeter that showed the effect of grid bias, swinging the needle from 5 milliamp over to 40 milliamps when the G.B. battery was switched out, was a little object lesson that greatly impressed visitors.

For another thing, prices were definitely lower all round. A year or so ago it was usual to reckon that valve sets worked out roughly at £5 a valve—but that basis is no good to-day. Lamplugh's, for instance, had an elegant and complete *two-valver* on show for £5. The Brownie people had a two-valve amplifier priced at £2 2s., and another interesting instance was the Burne-Jones three-valver, complete in a handsome little cabinet, for £10 10s. These are merely instances—practically all the stalls had really appreciable reductions.

Another point I liked was that makers' claims are getting very definite. The Peto-Scott sets of the Three-Thirty-One type (meaning 3 valves, 30 stations, 1 dial) afforded a good instance of this tendency. I overheard an Igranite salesman, too, explaining a battery charger. Not on the basis of what it had done, or what it could do, but on what it *would* do when the other fellow connected it up on his mains. There was an air of confidence everywhere.

### Simplified Radio.

Simplified wireless, and the switch-off-when-you-like style, had many adherents. Besides the various selectors and clocks, the Lotus Remote Control was attracting a good deal of attention, and the many units for coupling, and single-control sets, all pointed to progress in the direction of simplified radio. The supply problem, both L.T. and H.T., has produced so many units, chargers, etc., that this section of the exhibition will be dealt with in detail in next week's issue of POPULAR WIRELESS.

At no previous exhibition has there seemed to be such a break with conventional ways of doing things and making things. There were new ideas not only in the make-up and appearance of components and accessories, but *fundamentally* new features, full of promise and pep.

The new valves, of course, were surrounded all the time. Apart from the indirectly-heated-cathode type, which a year ago would have created a sensation, there were the "double-doings" valves (as one fellow called them whilst standing upon my only corn in an endeavour to catch a glimpse of the interior of an "Interdyne")!

### Aerials Becoming Unnecessary?

The new shielded grid valve was showing at the G.E.C. and at the Marconiphone stands, and the Interdyne receivers incorporating the Robinson valve were on view at R. I. Varley's. There is not space here to do more than refer to these valves, and the extraordinary prospect of better radio reception that they open up, but they can be instanced as a fundamental step forward in radio research. Their possibilities seem illimitable.

Illustrating the vigour and freshness of the exhibition were other points about the stands where the new valves were showing. The sets in which the shielded grid valves were incorporated had, for instance, midget frame aerials, with sides less than a foot in length, that looked as though they weren't

big enough to pick up the local, let alone distant stations. But the magnification obtainable is so great that distant stations simply romp in. And it was a significant fact that the R. I. Varley stand was specialising on *all* new lines, there being no room for or even the most successful of last year's crop!



A good example of modern valve design—the Marconi and Gram D.E.P.215.

On the whole, last year's show was far less artistic than this year's display, the improvement being particularly noticeable in cabinets, complete sets, and loud speakers.

The simplification of the complete receivers has had much to do with their enhanced appearance, for it was impossible to make a row of rheostats, for instance, look really attractive. And, similarly, the popularity of the cone type has saved the situation as regards loud speakers.



A "Peerless" Three-valve (Bedford Radio Electric Co., Ltd.).

On the large stands that specialised in loud-speaker equipment—Amplion's, for instance—it was possible to note at a glance how greatly loud-speaker design has progressed by comparing the handsome exhibit with the same firm's show two years ago.

The B.B.C.'s exhibit, however, was less attractive than last year's. It was interesting, of course, but too technical to appeal to the majority.

Summing it all up in a few words, I should say that this was not only the best exhibition that we have had, but that it was far more promising than any of its predecessors. It shows that apparatus is not only cheaper than it has ever been before, but it is much more efficient, so there is a double gain. Couple this again with alternative programmes, and the 1927 Radio Exhibition proves that nowadays radio entertainment is just about *three times as cheap* as it has ever been before.

### Better and Cheaper.

The improvement in the general appearance of radio apparatus really needs an exhibition to make one realise it. For as new types of instrument appear during the year, each a little better than its predecessor, one is not conscious of the great advances that are continually going on. But when all the various models are collected together into one show each year, the advance during the twelve months can be appreciated.



**T**HERE is more waste in the L.T. circuit of our valve receivers than in any other portion of the set, even counting that 1 per cent efficient instrument the loud speaker or headphone. For, after all, the current that heats our filaments is nothing more or less than absolute waste, a monument to our inability to discover the cold valve.

For some reason or other we have become so used to filament current that we rarely give the matter a thought. We still may be seen carting heavy accumulators to the charging station down the road, or trying to persuade our power company to feed our filaments via complicated transformers and rectifiers.

All this heavy current does is to heat our filaments when we connect these accumu-

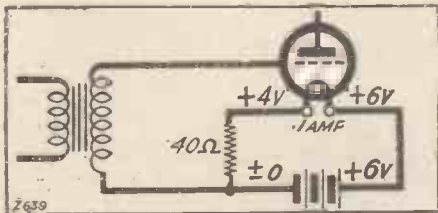


Fig. 1.—Illustrating the waste of "volts" that occurs when a 6-volt battery is employed to run a 2-volt valve.

lators to them. When our filaments are sufficiently warm they kindly evaporate electrons for us and they surge round our plate circuits, getting on with their jobs. Provided we guide and push these electrons in the way they should go the result is a wireless that works.

**Absolute Waste.**

Incidentally the power used to warm up our filaments is enormously greater than the power used anywhere else. In fact, when an amateur transmitter states that he worked New Zealand on 10 watts he carefully ignores the 5 or more watts of wasted power used to heat his filaments. Admittedly our filaments are getting better and better every day.

Yet while we have to heat filaments we may as well do so as economically as possible.

Our aim, of course, is to connect a suitable voltage across the filament, and heat it to the heat at which it works best with due regard to long life. The makers of our valves tell us all about that.

\*-----\*  
 An article which the constructor will find of really practical value.  
 By E. A. ANSON.  
 \*-----\*

Now every single fraction of a volt wasted outside the filament is really like throwing good money into the sea. Well, let us see where these precious volts get lost.

Take the worst possible case, a 6-volt accumulator used for 2-volt valves. In order to avoid an excessive flow of current through the 2-volt filament we have got to lose 4 volts somehow or other. Suppose our valve filament takes .1 amp. at 2 volts. Then the volts we wish to lose divided by the current taken by the valve gives us the necessary external resistance we must add in series with the valve filament. Thus in this case 4 divided by .1 gives us 40 ohms. (See Fig. 1.)

Deliberately we shall set about to waste two-thirds of our accumulator energy. We make the accumulator push a current of .1 amps. through a piece of parasitical eureka wire for no other purpose but absolute waste.

It is, however, possible to use the lost volts to supply grid bias to our valve.

But our grid really merely asks for volts alone and takes no energy at all. It merely wants sufficient negative voltage with respect to the valve filament to avoid running into grid current and giving distortion.

It is very much more economical to supply the necessary grid bias from cheap small dry cells. These only require renewing once a year and give no trouble. Besides, in the first case, if the valve is controlled

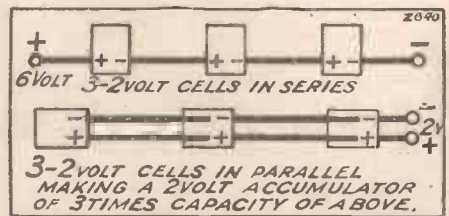


Fig. 2.—Three 2-volt cells connected in series (top) and parallel (bottom).

by a variable resistance every alteration of this resistance will give us a different grid-bias voltage. With a variable resistance, who shall know what voltage is placed across the filament without a voltmeter. How many of us use voltmeters for this purpose? Who can resist the temptation to improve results by turning her up a bit, at the expense of long life?

If it is really necessary to use a 6-volt accumulator and you happen to have a three-valve set with 2-volt valves it is possible to connect the valves in series and make the otherwise wasted volts do some work of a useful kind.

In reality the two other filaments replace the 40-ohm resistance.

But on the whole it is very much better to feed a 2-volt valve from a 2-volt accumulator. Sometimes a 6-volt accumulator may be split up into three separate 2-volt accumulators. It can then

(Continued on next page.)



Testing a soldered joint. The joints under test are connected across the two terminals on the ebonite strip. On the left is the millivoltmeter, and on the right is the ammeter. The small square box (left front) is merely a rheostat.

## WHERE THE VOLTS GO.

(Continued from previous page.)

be used all in parallel as a 2-volt accumulator, or one after another in turn. (See Fig. 2.) If used in parallel it will have three times the capacity of the original 6-volt

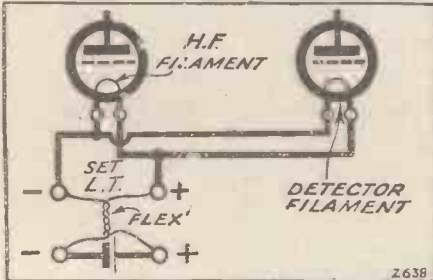


Fig. 3.—Small voltage drops occurred across the flexible filament-connection leads.

accumulator. If the original had a capacity of 50 ampere hours, that is it would deliver 1 ampere for 50 hours, the parallel connected 2-volt accumulator would have a capacity of 150 ampere hours, giving a discharge of 1 ampere for 150 hours.

Even if we do use a 2-volt accumulator on our 2-volt valves we cannot avoid wasting something. It will be small but measurable with delicate instruments.

For the wires leading to our filaments will have small resistance however solid we make them. It is just as well to realise this, for in a nine-valve set quite a large current flows. So great was this current in the days of bright-emitter valves that the L.F. wiring for a multi-valve set resembled the busbars used in power stations. For then the L.F. filament current would be in the nature of 8 or 9 amperes.

### To Solder, or Not to Solder?

Before proceeding any further, we are up against the problem of to solder or not to solder. To test this, two terminals were inserted about two inches apart in a piece of ebonite. Across from one terminal shank to the other a piece of 18 S.W.G. tinned copper wire was connected. First it was merely clamped down between two nuts. When a current of .5 amps. was passed from terminal to terminal the volts lost were .00054. Due partly to the resistance of the wire and partly to the contact resistance of the clamped wire. Without disturbing the wire the top nut was removed and the wire carefully soldered to the shank, leaving the bottom nut in place. With .5 amp. flowing as before the volts lost in the wire were .00056. More than before the soldering was done. It is justifiable to conclude that the extra volts lost in the last case must have been due to soldering the wire. The temperature at which the tests was made was identical in both cases. Thus the clamped wire gave a resistance of .00108 ohms and the same wire soldered gave .00112 ohms.

The soldered connection had a higher resistance. It is curious because most of us seem to think that soldering does the reverse. However, a soldered joint will keep its resistance constant whilst a clamped joint is bound to become dirty and increase in resistance.

Having examined the vexed question of

soldering let us go back to a two-valve set using soldered connections.

A D.E. 2 H.F. was used in the H.F. circuit and a similar valve as detector. They were both fed from a 2-volt accumulator. Where do the volts go? Well, mostly across the filament; but not all.

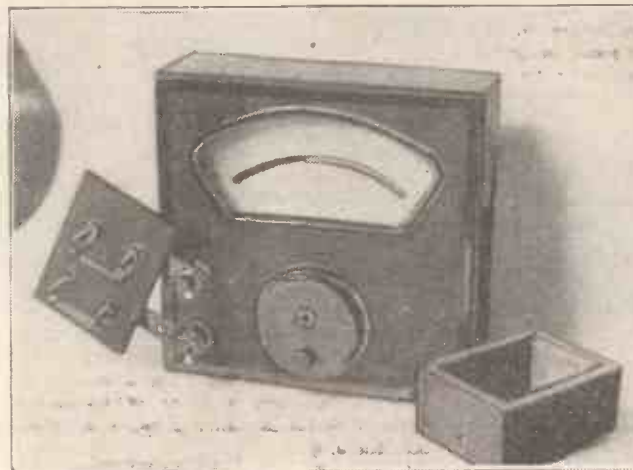
For these tests a very sensitive Cambridge Unipivot voltmeter was used reading 2.4 millivolts for full deflection and having a coil resistance of 10 ohms. A millivolt is a thousandth part of a volt. With this voltmeter it was possible to read as low as a hundred-thousandth part of a volt. A copper and silver coin held between damp blotting-paper made the voltmeter needle go hard over!

The diagram Fig. 3 shows the L.T. circuit of the receiver tested. The volts start to get lost at once.

### Losses in Leads.

From the L.T. plus terminal of the accumulator to L.T. plus terminal on the receiver, connected by flex, 3.5 millivolts had managed to go astray. The negative lead lost a similar amount, making 7 millivolts in all. The H.F. valve was taking .13 amps. and the detector filament .12 amps. From L.T. plus terminal on the receiver to the valve-pin only .21 millivolts got lost, and .26 from L.T. minus to valve-pin.

In the case of the detector the losses



The delicate galvanometer used to measure voltage on anodes. On the left is the series resistance, consisting of 25 megohms metallised grid leaks, mounted on an ebonite panel.

were greater, because the wiring was slightly longer. In this case .6 and .5 millivolts failed to turn up. Perhaps all this can be made clearer by a table.

	Millivolts.	
	H.F. Valve.	Detector Valve.
Accumulator L.T. via flex to set L.T. plus	3.5	3.5
To L.T. minus as above	3.5	3.5
L.T. plus terminal of set to valve-pin ..	.21	.6
L.T. minus as above ..	.26	.5
	7.47	8.1

Thus we are losing .00747 volts in feeding the detector and .0081 in feeding the detector valve.

The actual voltage of the accumulator was 2.03 volts, so the filaments were

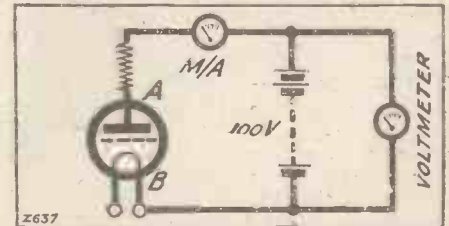


Fig. 4.—The voltage across A and B will not be the voltage of the H.T. supply.

receiving 2.025 and 2.022 volts actually. These losses are, of course, very small, but faulty connection in wires or long leads might easily waste so much voltage that

the valves would work at too low a voltage. For instance, suppose the flex connecting the accumulator to the set had been 20 ft. long, instead of 1 ft. Further, suppose we had been using a six-valve set. We should have been losing nearly half a volt, and our valves would have had only 1.5 volts across their filaments. Thus it is really important to realise where the volts go, and take care they go where we want them—across the filament.

Therefore it is wise, in our L.T. circuit, to avoid long leads, to use stout leads, to keep all terminals clean, and

to wire the inside of the set with wire not smaller than about 18 S.W.G. copper wire.

But volts do get lost in our anode (Continued on next page.)

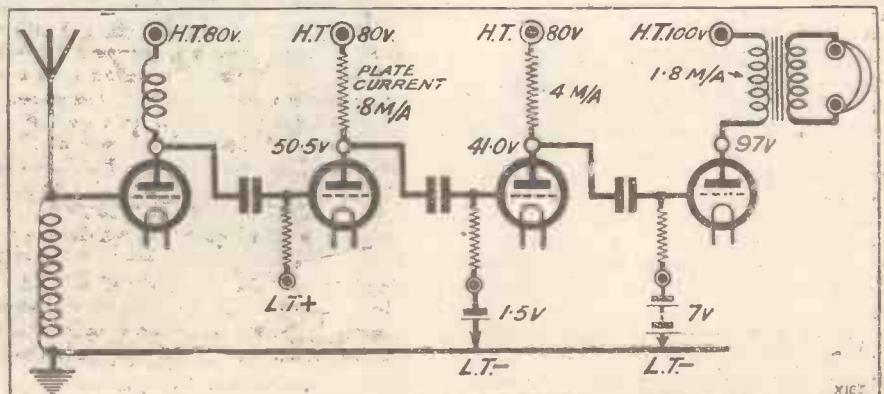


Fig. 5.—Showing some of the points at which voltage tests were made by the author.

## WHERE THE VOLTS GO.

(Continued from previous page.)

circuits, too; particularly when using resistance amplification. The volts lost in this case may be calculated by multiplying the current flowing in amperes by the resistance inserted in the anode of the valve. If these lost volts are subtracted from the voltage of the H.T. battery



Make sure which is the anode pin of the valve. When inserting fit valve on with a tilt and make sure the L.T. and grid pins are in their correct sockets.

feeding the anode, we shall get the actual voltage on the anode itself. It is very difficult to measure the voltage on the plate of a resistance-coupled amplifier, because the voltmeter takes as much, or more, current than the valve itself. This naturally gives a reading lower than it is actually, for when more current flows, more volts get dropped across the resistance. A fairly normal voltmeter takes about 5 M.A. at 100 volts.

### Some Practical Measurements.

In Fig. 4 our problem is to find the voltage across A B.

Some actual practical measurements were made with a very sensitive voltmeter that only took 24 microamps for full deflection. (A microamp is a millionth part of an ampere; a milliamper is a thousandth part of an ampere.)

When this special Unipivot microammeter was used as a voltmeter, it was necessary to add a series resistance of ten million ohms giving about 40,000 ohms per volt. This series resistance took the form of a series of metallised grid leaks, as these keep their resistance constant at all voltages. They have given very good results, and have not altered their resistance during two years of constant use. The extra volts dropped due to an additional current of a few microamps is negligible. With an anode resistance of 1 megohm only 10 volts would be dropped from the insertion of this voltmeter. The Unipivot instrument used was obtained from the Cambridge Instrument Co.

The following table shows where the volts were going in a clear manner:

H.T. Battery Volts.	Detector Plate Volts
80	50.5
100	54.5
1st L.F. Plate Volts.	2nd L.F. Plate Volts.
41	97 (H.T. 100)
49.5	97

Anode resistances about 74,000 ohms.

The L.F. anode resistances were nominally 80,000 ohms. The detector plate current was .8 milliamps, and the H.F. valve 1—first L.F., .4; second L.F. took 1.8 milliamps. The circuit diagram is shown in Fig. 5.

It is worth noticing that increasing the H.T. on the L.F. plates from 80 to 100 only increases the H.T. on the plates of these valves by a few volts. For when the H.T. is increased the current flowing tends to increase, and, as a consequence, the voltage drop across the resistances increases. It is partly for this reason that it is possible to use quite normal H.T. voltages with the more modern high mu valves using anode resistances of a megohm or so. The plate currents are very small.

### Economical Circuits.

In addition, it is noteworthy that the popular tuned anode circuits, including, of course, H.F. transformers, coupled to the ubiquitous L.F. transformers, are very economical with the volts. The plate of the valve gets very nearly the actual value of the H.T. battery.

But with modern low-resistance valves this problem is worth a thought. For when a super loud speaker takes some 20 milliamps plate current the volts dropped across a 2,000-ohm transformer will be 40, or more. Thus conditions might be upset quite easily and distortion result.

The trend of modern valves is to have

lower and lower plate impedances. It will not be long before constructors are writing to the query columns of the wireless papers bewailing their lost volts.

For the low-impedance valves of the future will call for an entire revision of our coupling components.

## A FLEXIBLE LINK.

It often happens that, when testing a wireless set, either before or after completion, it is necessary to short circuit certain points for the purpose of trying out alternative arrangements. When this short circuit has to take place between two sockets it is not wise just to insert the twisted ends of a flexible lead in the two sockets, for a poor contact generally results.

I have frequently made use of a flexible connector consisting of a spiral wire spring terminating in two split plugs.

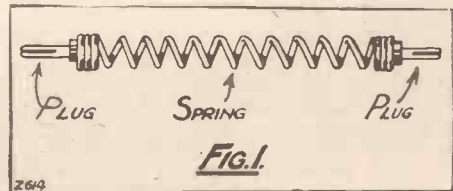


Fig. 1 shows the gadget I have in mind, the length of the spring when closed being about 4 1/2 ins., while the plugs are screwed into each end. It is sold by Bulgin's, nominally as an H.T. battery connector, but in addition may be used in the manner indicated. Apart from the contact made by the split pins the spring itself keeps both pins under tension. There are many uses to which this handy little connector can be placed, and I always keep one or two by me when undertaking tests.

H.J.B.C.



Receiving messages on the automatic telegraph instruments at the London Central office, which arrive via the recently inaugurated Indian Beam service.

## TECHNICAL NOTES

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

## LOFTIN'S LATEST DISCOVERIES

REACTION—CAPACITY REACTION, Etc.

## Loftin's Latest Discoveries.

THE many readers who were so interested in the Loftin-White circuits, described recently in this Journal, will be glad to have some advance information as to some new developments made by Mr. Loftin. In a letter he says: "As a bit of advance information, we have about completed the design of a system for radio-frequency amplification in which there is apparently no limit to the number of stages of radio-frequency amplification that can be employed, compared to what appears to be the practical limit now of three stages, and we find that the new system avoids many of the previous difficulties in multiplying the number of stages of amplification. This new system gives such promise in the matter of increasing H.F. amplification that we think it will not be long before receivers can be easily built which will permit of reliable listening to broadcast stations on both sides of the Atlantic.

"We also have about finished the design of a new type audio system that is devoid of frequency characteristics. In other words, it will amplify uniformly from  $\frac{1}{2}$  cycle per year to 15,000 or more per second. It is very simple and inexpensive, eliminating entirely costly audio transformers.

"For patent and commercial reasons we are not ready just yet to release information as to these systems, but when the time comes, I will be pleased to furnish you with all details."

When further details come to hand, they will be given in Technical Notes.

## Reaction.

It would be very advantageous if variable reaction control could be eliminated altogether and if, instead, a fixed amount of reaction could be used which would be more or less constant over the whole of the desired range of wave-length. Although opinions differ as to the degree to which this desirable state of affairs has been reached by the Loftin-White circuits (mentioned above, and recently described in this Journal), there is no doubt that this system represents a very important step in the right direction.

Ordinary magnetic reaction has, as everyone knows, great disadvantages. With this type of reaction, which is still widely used, energy from the plate circuit of a valve is fed back into the grid circuit by means of variably coupled coils. A change in the coupling of the plate and grid coils results, not only in a change in the volume of the sound, but also in an alteration of the frequency to which the set is tuned. Moreover, it is often a matter of difficulty to keep the reaction just below the oscillation point, and such a set in the hands of an unskilled user is liable, even quite contrary to the user's intention, to be a serious nuisance.

## Capacity Reaction.

Capacity feed-back arrangements have the great advantage that they render tuning very much simpler, since the reaction control only affects the volume of the reproduction, and is, for all practical purposes, without effect upon the tuning.

## H.F. Amplification.

One of the most important directions in which attention and research are being concentrated at the present time is towards the control of oscillation, so that much higher degrees of H.F. amplification may be reached than have hitherto been possible. The practical limit of H.F. amplification falls very far short of the theoretical limit, owing to the bugbear of oscillation. One of the best methods of stabilising a circuit is, of course, to use some form of neutralisation, by means of which the capacity between grid and plate is neutralised or balanced out, and the corresponding feedback or regenerative effect prevented. Neutralisation, whilst producing stability, does not impair the sensitivity of a circuit by introducing damping. It seems fairly certain that the various neutralisation methods will be more and more adopted in the future in this country; they are already very widely adopted in the United States.

## Standardisation.

In view of the introduction of valves working direct from the electric-lighting supply and the various power-supply devices which are now being placed upon the market, it is interesting to note that under the new Electricity Control scheme the various types of electric supply throughout the country will, in the course of time, become more and more uniform. At present in this country the electric supply may be D.C. in one district and A.C. in another district half a mile away. The voltage may be anything between 100 and 250 volts and, in the case of A.C., the frequency or periodicity may vary between very wide limits.

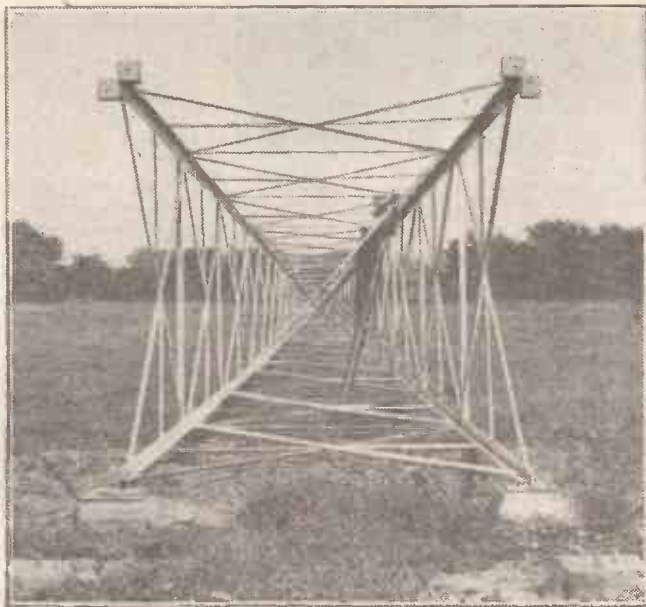
All this imposes a much greater burden upon the manufacturer, who is obliged to standardise apparatus for the types of electric supply which are most common, and to be prepared also to make apparatus for the unusual or less frequent types of

electric supply. Standardisation, which has been achieved to a much greater extent in the United States than in this country, simplifies enormously the business of the electrical manufacturer, whether he be producing radio or any other type of electrical device.

## Eliminators.

A certain section of radio users now employ eliminators of various kinds, which permit the current from the house electric-lighting current to be used for the wireless set without the intermediary of any batteries. It is necessary to employ, in any such device, choke coils and smoothing condensers to render the supply sufficiently smooth so as not to produce any unpleasant hum or "background" in the reproduced sound of the set.

The alternative is to employ a battery, H.T. or L.T. as the case may be, complete with trickle-charger and connected to the mains. When the set is in use, the battery is connected to the set and disconnected from the mains, whilst when the set is not in use, the battery is connected to the mains and disconnected from the set. Therefore, for all practical purposes, the system is exactly the same as the eliminator, since ample current is always available from the mains. But it has the important advantage



One of the masts ready for erection at the new Air Ministry station at Mitcham.

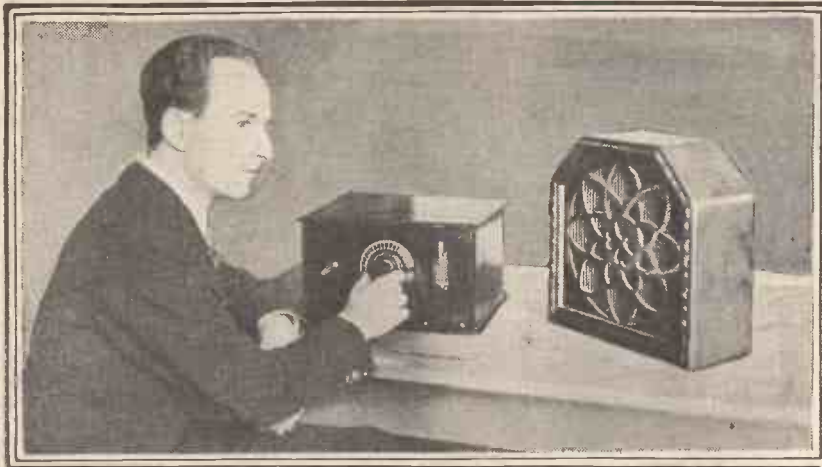
over the eliminator that the electric supply delivered to the set is absolutely steady and does not depend upon the efficiency of any choke coils or condensers, since the mains are actually disconnected during the time the set is in use.

## Which is Better?

Notwithstanding the many quite commendable eliminators now available, I personally have never found any eliminator which was to be compared (from the point of view of volume and purity of reproduction) with H.T. and L.T. accumulators. Granted that you are going to employ H.T. and L.T. accumulators, you have only to incorporate H.T. and L.T. trickle-charging arrangements, which are very simple and inexpensive (much less expensive than

(Continued on page 316.)





# The "DEMPSEY" ONE

A Small Set with a Big Punch. The "Tunney" One would, perhaps, have been a better title!

By C. P. ALLINSON, A.M.I.R.E.

THOSE who live close to a local broadcasting station and who desire loud-speaker results with a minimum of outlay and upkeep cannot do better than by using a reflex receiver. The very maximum of economy is to be obtained

which reaction was obtained by coupling the tuned anode coil with the grid coil.

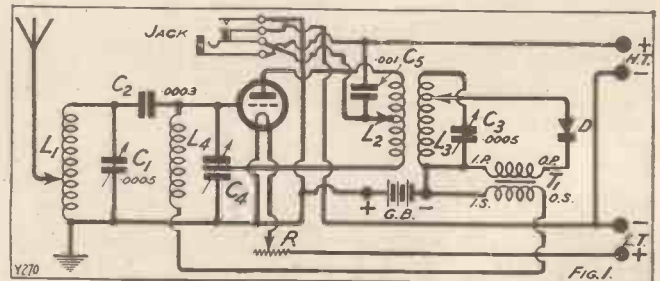
With the present-day methods of set building this is not, in my opinion, a very satisfactory method of obtaining reaction. Not only does it prevent us, unless we make special mounting for them, from using coils of the single-layer, solenoid type, which can be wound to have a very high degree of efficiency, but it also makes it difficult to employ an auto-coupled aerial in which a number of taps are provided so as to obtain the utmost efficiency with any particular aerial and earth system; and, further, it makes it difficult to use the proportional crystal tap by means of which the crystal is tapped across only a portion of the output inductance instead of the whole of it.

the receiver is used fairly close to a broadcasting station, where it may be frequently necessary to use a super-power valve in order to handle the combined grid swings of both H.F. and L.F.

The combination, therefore, of a low

### COMPONENTS REQUIRED.

- 1 Cabinet with panel, 12 in. x 7 in. x 4 in., baseboard 9 in. deep (Camco).
  - 1 Gang condenser, .0005 each half (Utility).
  - 1 L.F. transformer, 6 to 1 ratio (Marconi Ideal).
  - 1 Antiphonic valve holder (Burndept).
  - 1 Panel-mounting balancing condenser (Peto-Scott).
  - 1 Crystal detector (Burndept).
  - 1 Fixed condenser, .0003 (Lissen Ltd.).
  - 1 Baseboard filament resistance (Lissen Ltd.).
  - 1 Fixed condenser, .001 (Lissen Ltd.).
  - 1 Single-circuit single-filament control jack and 'phone plug (Ashley Wireless Ltd.).
  - 1 H.F. choke (McMichael Ltd.).
  - 2 Lengths ebonite tube, 3 in. diameter and 3 in. long.
  - 1 Set of battery leads (Lewco).
  - Wire for winding the coils.
  - 2 Terminals for aerial and earth connections, and a small piece of ebonite on which they should be mounted.
  - 2 Wander plugs for G.B., and a quantity of Glazite for connecting up.
- (The makes of components given above are those actually used. Other good makes can of course be used where desired.)



This diagram shows the circuit of the "Dempsey" One.

impedance valve with an extremely high impedance output circuit is not the most favourable one from the point of view of obtaining the maximum H.F. amplification and selectivity. Further, the use of swinging coils for reaction is frequently

(Continued on next page.)

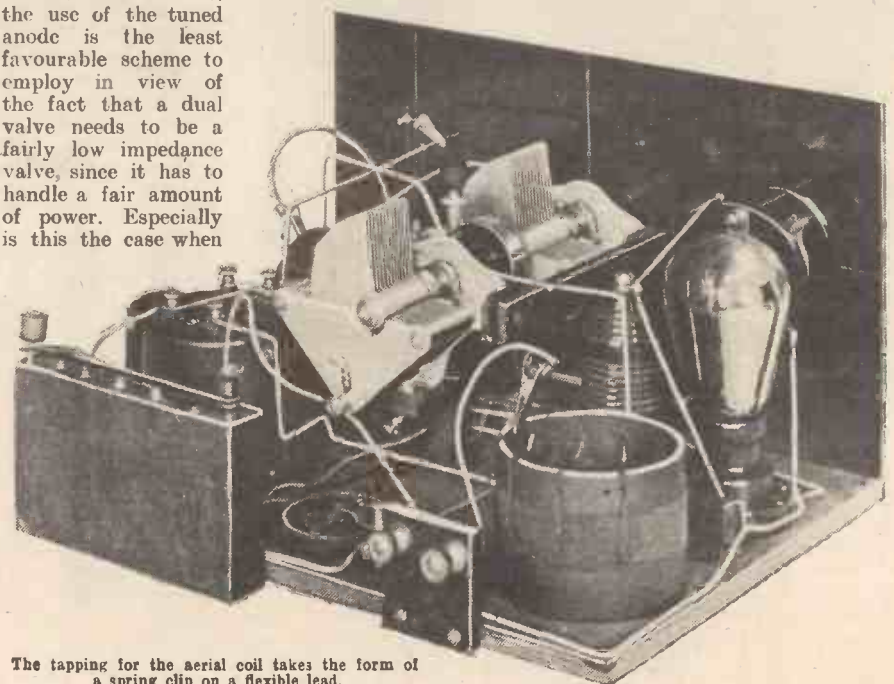
### Choosing the Circuit.

At the same time, the use of the tuned anode is the least favourable scheme to employ in view of the fact that a dual valve needs to be a fairly low impedance valve, since it has to handle a fair amount of power. Especially is this the case when

by the use of a dual valve with a crystal detector, since in this case L.T. and H.T. current are required only for the valve which is being used in a dual function, the crystal detector itself consuming no current whatsoever.

### Question of Reaction.

I have done a considerable amount of work on reflex circuits, and the biggest drawback which has always struck me about the use of a crystal detector is that it is difficult to obtain reaction by any of the more usual methods, in that it is necessary to couple the output of the H.F. valve back on to its own input in order to obtain reaction effects. One of the most favoured circuits for the single-valve crystal reflex is the old tuned anode, in



The tapping for the aerial coil takes the form of a spring clip on a flexible lead.

## THE "DEMPSEY" ONE.

(Continued from previous page.)

attended by mechanical back-lash, while a very small variation in the coupling between the two coils has a considerable effect on tuning.

A further consideration that led me to reject the use of swinging coils in the receiver which I am going to describe, was the fact that I wished to control both H.F. and detector circuits by means of a gang condenser. This meant that whatever form of reaction control was used it must have as little effect on the tuning as possible, and although it is not possible to find a circuit which will have no effect on the tuning at all, as can be done in the case of the reaction detector, the scheme I have employed gives the smallest variation of any that I have so far tried.

### Gang Control.

The use of gang control is, of course, perfectly feasible in a crystal-valve reflex, since the heavy damping of the crystal across its tuned circuit makes the tuning very flat. The use of a gang condenser is not therefore attended by any appreciable drop in efficiency, whilst the greater simplicity of control is a very great boon when carrying out distant reception.

The circuit I have used is shown in Fig. 1, and it will be seen that it consists of the split-primary form of H.F. neutralisation. I have chosen this in preference to the split-secondary method, since it enables the full H.F. signal to be applied between grid and filament of the H.F. valve, whereas with the split-secondary method it is generally accepted that only half the incoming signal is applied to the grid, though actually

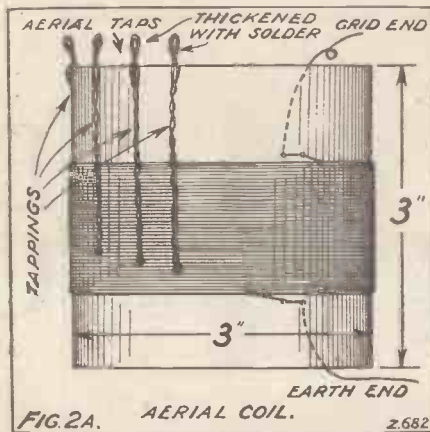


The receiver is of neat and pleasing appearance, as shown.

in the latter case the efficiency is far higher than you would be led to expect from a superficial examination of the circuit.

It is also easier to get the split-primary circuit to oscillate than the split secondary, which I have found to be more stable inherently than the split-primary type of neutralised circuit.

I found, however, that the use of the ordinary neutralising condenser with the split-primary circuit would not give a sufficiently positive degree of reaction control over the whole band of wave-lengths covered by the tuning condenser,



and I therefore evolved the present method, which I have found extremely satisfactory in use.

The anode coil,  $L_2$ , is provided with a centre tapping, which is connected to the H.T. battery through the telephones. One end of this winding goes to the plate of the valve, whilst the other goes to the spindle of a balancing condenser of a type which is no doubt familiar to most experimenters. This consists of two sets of stationary vanes and two sets of moving vanes, which are so arranged that as the capacity between the moving vanes and one portion of the condenser is increased that between the moving vanes and the other portion is decreased.

### Auto-coupled Aerial.

By this means I have found it possible to obtain a perfectly satisfactory control of reaction. The aerial is auto-coupled to the grid circuit of the H.F. valve, the coils being home-made. Details of these will be given later on in the article.

Shunt-feed is used for the reflex part of the circuit. A small fixed condenser,  $C_2$ , capacity .0003, is connected in the grid lead of the valve, and the L.F. impulses are fed to the grid through an H.F. choke marked  $L_4$ , which is connected direct to the grid as shown. A high-ratio transformer, T, is used to couple the rectified output from the crystal detector back into the grid circuit of the dual valve, this being reproduced in amplified form in a pair of telephones or a loud

speaker connected in the plate circuit and shunted by a fixed condenser,  $C_5$ , of .001 capacity.

The crystal detector can be tapped across a portion of the coil  $L_3$ , which is tuned by a variable condenser  $C_3$ , and the two tuning condensers  $C_1$  and  $C_2$  are connected on a common spindle. It has been found in practice that when searching for distant stations the neutralising condenser can remain set to give the required degree of reaction over quite a wide wave-band, so that the receiver actually becomes a single-control receiver.

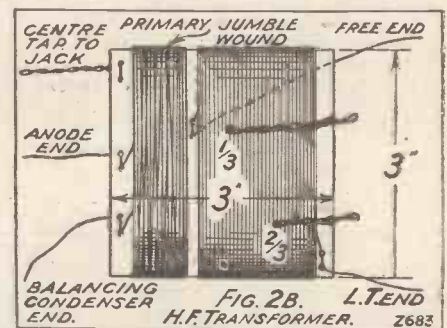
An examination of the photographs of this receiver will show that it is exceedingly neat and compact.

The results obtained with it are exceedingly promising, especially in view of the conditions obtaining of late for distant reception. The local station, of course, comes in at comfortable loud speaking, while in daylight it has been possible to tune in one or two stations at weak loud-speaker strength.

### Results Obtained.

Among the stations heard in daylight on this receiver, apart from the local station 2 L O, are Cardiff, Birmingham, Brussels, Munich, Langenberg, and 5 G B, while Croydon was heard on its harmonic on 450 metres. 5 G B was received at fair loud-speaker strength in daylight.

A direct comparison was made between this receiver and a single-valve reaction detector with a view to ascertaining whether the reflex receiver was really pulling its weight. In every case the reflex receiver gave a marked increase in signal strength, as compared with the reaction detector, and further, once a sensitive spot had been found on the crystal, it was found, on the whole, easier to handle. In each case, of course, there was only one tuning control, but in the case of the reflex receiver I



found that the reaction needed less adjustment than on the single-valve receiver, and I was very struck by the performance which the set gave.

### A Filament "Lock."

The lay-out of the receiver panel has been made as symmetrical as possible. In the centre is the gang control tuning condenser dial, while on the left we have the reaction control and on the right the crystal detector. A filament control jack has been used so that when the telephones or loud speaker are plugged into circuit the set is switched on, a very convenient arrangement, as it further prevents the set being tampered with when switched off, since the 'phone plug can be taken away, thus acting as a filament lock. Battery leads enable the set to be connected to its batteries with great ease, and since only 4 leads are necessary identification is a simple matter.

This set has been designed purely for maximum efficiency upon the 200-600-metre wave-band, and the coils have therefore not been made interchangeable, since this would not allow of the requisite number of tappings being taken from the two inductances  $L_1$  and  $L_2$ .

The coils are wound on 3-in. ebonite formers, and the following are the details for their construction.  $L_1$  consists of 50 turns of gauge 30 D.S.C. wire, wound side

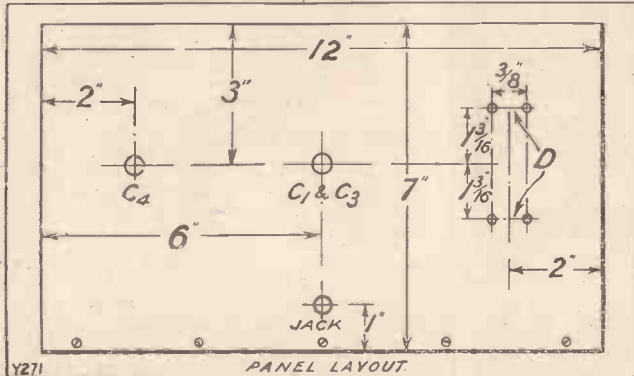
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THE "DEMPSEY" ONE.

(Continued from previous page.)

by side. Taps are taken at one end at 5, 8, 11, and 15 turns.

These tappings are taken by making knots in the wire, leaving a long loop so that there is no need to break the continuity of the winding. The loops are then twisted together when the coil is finished and threaded through holes made in the



top edge of the former, and the ends are bared and tinned so as to make a solid job. The details shown in Fig. 2 at A will make this point clear, as also the photographs taken from behind the panel.

In the case of the H.F. transformer, two wires were wound on simultaneously for the primary. I have used D.C.C. for one wire, and D.S.C. for the other, so that it should show up more clearly in the photograph how the primary was wound. The two wires were joined at the beginning, this forming the centre tap which was taken to H.T. via the 'phones, while one end of the winding was taken to plate, and the other end to the spindle of the balancing condenser  $C_1$ . The primary winding consists of 15 turns. Only two taps were taken on the secondary winding (which consisted of 50 turns of 30 gauge D.S.C., so as to match the other coil) since I have found that a large number of taps was not necessary. These tappings were, therefore, taken at  $\frac{1}{3}$  and  $\frac{2}{3}$  down the coil, namely at 17 and 34 turns. Further details of this coil will be seen in Fig. 2 at B.

Mounting the Coils.

The two coils are mounted so that their axes are at right angles, one being mounted vertically, i.e. the aerial coil, and the other being mounted horizontally. The aerial coil was mounted by cutting a piece of wood which just fitted inside the tube and screwing this to the baseboard, while the coil which was mounted horizontally simply had two holes drilled at opposite ends of the former through which screws were passed to the baseboard, washers being placed underneath so as to raise the coil clear of the baseboard.

The chief difficulty that the constructor will find in building this set is in the mounting of the gang condenser, since the fixing bush for this requires a  $\frac{5}{8}$ -in. hole. This can either be done by drilling a number of small holes around the inside of a  $\frac{3}{8}$ -in. circle, running them together with a small file and then filing out to size, or else by using the biggest drill you have to drill the first

hole, and then reaming out the hole with the tang of a large file or with the large blade of an old pair of scissors.

All the components should now be mounted in position bar the gang condenser, since some of the wiring should be done with this out of the set. Care should be taken, therefore, that any leads which cross from one side of the set to the other should be taken so that they do not foul the condenser when it is put in position. In particular, I would ask the constructor to note, from the wiring diagram which also gives the lay-out of the components on the

baseboard, the position of the shunting condenser  $C_5$ , which has been placed at an angle in order to clear the support for the gang condenser. This support, incidentally, is rather short for a thin 3-ply baseboard, and it may be necessary to pack it up with a piece of ebonite or some washers.

Having mounted the various components in their respective positions, make sure that none of them fouls the

gang condenser and leave ample room for the biggest valve you are likely to use to be inserted.

The following leads should be completed before placing the gang condenser in the set. Finish off all L.T. and H.T. leads to the valve holder and jack, etc. Then connect the grid of the valve to one side of the fixed condenser  $C_2$ , and one side of the choke

$L_1$ , connect the other side of the choke to the O.S. terminal on the L.F. transformer.

Then connect the balancing condenser, one set of fixed vanes to the grid and the other set to L.T. negative and join L.T. negative to the earth terminal. Join the centre of the split-primary winding to the third tag on the jack from the top. Connect one end of the split-primary winding to the anode and the other end to the spindle of the balancing condenser. Connect the fixed condenser  $C_5$  across the two bottom tags of the jack, which are the output tags.

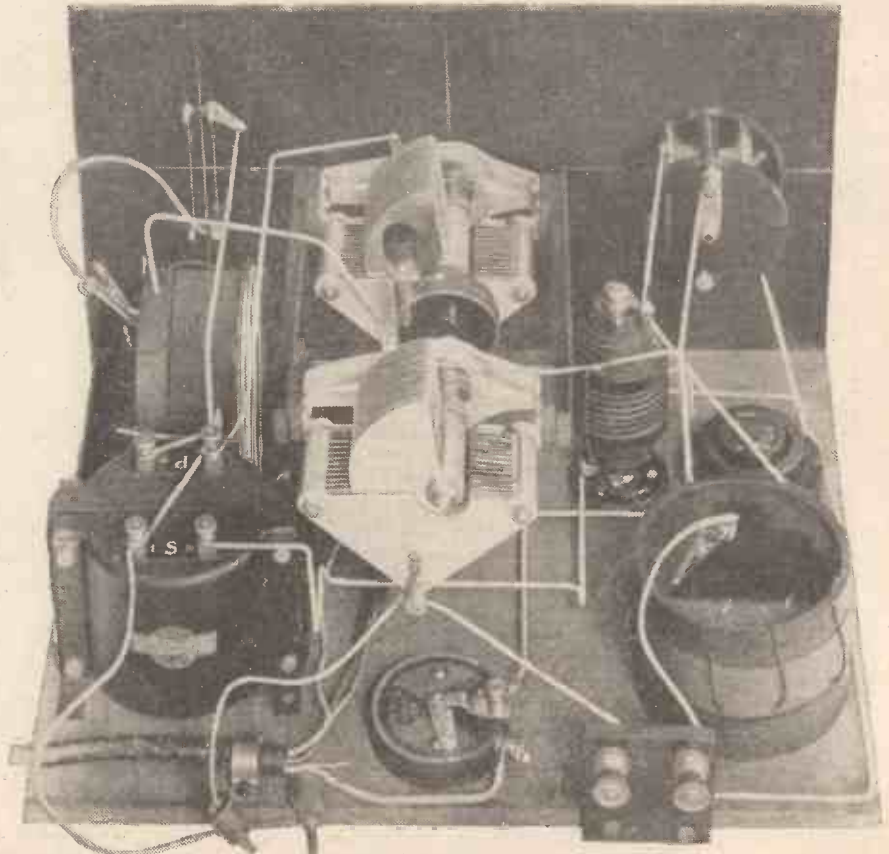
Completing Construction.

Now put the gang condenser in, connect one end of the secondary winding  $L_3$  to the I.P. terminal of the L.F. transformer and to the moving vanes of the portion of the gang condenser which is closest to the panel. Join I.P. to I.S. and O.P. to one side of the crystal detector. The other side of the crystal detector has a flexible lead soldered on to it which finishes in a spring clip by means of which the crystal may be tapped across the whole or only a portion of the coil  $L_3$  as required.

The remaining connections may now be put in, in their most convenient order, and will not call for any special comment. Make sure, however, that the end of the coil  $L_1$ , which is connected to earth, is that nearest to the tappings and this end of the coil is connected to the fixed vanes of the furthestmost portion of the gang condenser. Since this portion of the condenser is furthest from the panel, no hand capacity effects will be experienced.

Having completed the wiring of the receiver it should now be checked over care-

(Continued on next page.)



The connections to the condensers, which cannot be shown clearly in a wiring diagram, are clearly illustrated here.

**THE "DEMPSEY" ONE.**  
(Continued from previous page.)

fully so as to make sure that there is no mistake in the wiring at any point which might, if passed over, result in the loss of a valve.

The receiver may now be tested out, and to do this connect the battery leads to the respective batteries and insert the valve in the valve holder.

With regard to the question of the valve, I would advise you to use a small power

impedance (thus spoiling faithfulness of reproduction), but also because it is extremely liable to buzz when reaction is used, whilst owing to its high impedance and the low value of anode current passed it is difficult to get a satisfactory control of reaction.

**Suitable Valves.**

If, however, the receiver is to be used fairly close to a broadcasting station then a small power valve, such as the D.E.5, B.4, P.M.6, or the like, is to be recommended, while when used within two or three miles of a transmitter it may be advisable to use a super-power valve, such as the

When making your first tests, I would suggest that you connect the crystal detector across the whole of the coil  $L_3$ , whilst the aerial is connected to the top tap on the H.F. grid coil  $L_1$ . If, however, your local station has a very low wave-length I would not advise you to connect the aerial higher than the second tap.

Having tuned in your local station adjust the crystal until you get the loudest signal, and after this balance up the gang condenser in order to get the maximum signal strength.

The gang condenser I have used (Utility) has a very ingenious method of varying the coupling between the two sets of moving vanes, which enables the balancing up to be carried out with the greatest ease. It is simple to operate and is quickly locked once the right setting has been found.

**Adjusting the Condenser.**

Care should be taken when searching not to let the H.F. valve oscillate, for not only does the amplification of the valve drop off very considerably when it is oscillating, so that the heterodying of the carrier is not a suitable way of searching with this set, but also you will disturb nearby listeners and, further, may upset the setting of your crystal detector.

The spindle of the condenser  $C_3$ , therefore, should be rotated until no sign of a hissing or rushing noise is heard, as is usually found when the set is oscillating.

A little time needs to be devoted to this receiver if the very best is to be obtained from it. It will be found, for instance, when shifting the crystal tap that it will be necessary to readjust the gang condenser, whilst it will also be found an advantage to shift the aerial tap when receiving the higher or lower broadcast wave-lengths.

Should it be found that there is a great discrepancy between the setting of the two halves of the gang condenser, then it will be advisable to adjust the coils in order to allow the two portions of the gang to be matched up fairly accurately. It will be found in practice that the coils do not actually match up, although they have been wound with exactly the same number of turns in each case, and on my own receiver I found that I had to strip about 5 turns off the aerial coil in order to obtain a satisfactory balance on the gang condenser.

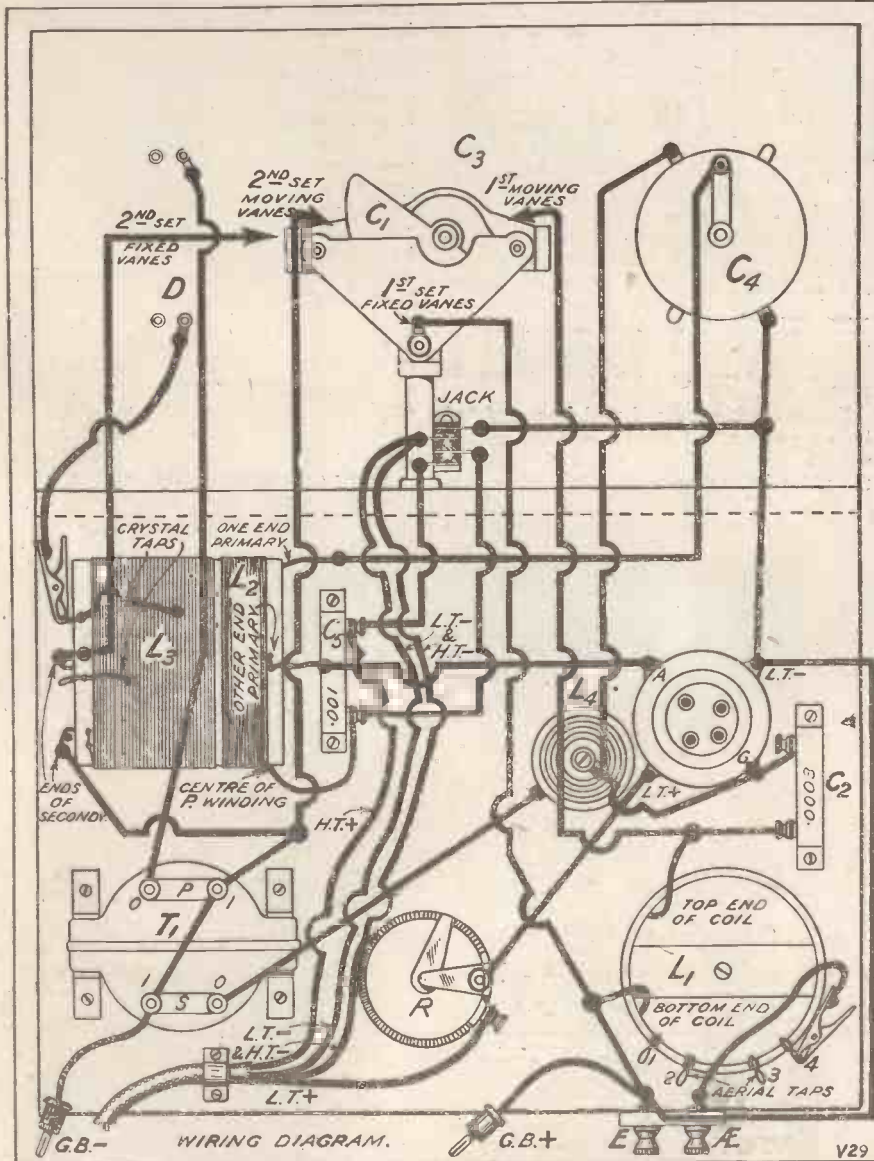
**Operating Details.**

It is clear, of course, that the coil which requires the least amount of condenser to tune it will be the coil which is too big, thus if it is found that when the gang condenser is adjusted one set of the moving vanes has to be interleaved considerably more than the other set, then that first set is tuning the coil which has the lower inductance, and therefore the turns should be removed from the other coil until the two halves of the condenser match up within a few degrees.

When searching for distant stations careful use should be made of the reaction condenser  $C_3$ , and it will be found that its adjustment has a slight effect on the tuning. Under these circumstances every adjustment of this reaction condenser should be followed by a slight re-adjustment of the gang condenser.

It will be found that by the choice of a suitable aerial tap that the reaction demand of the set will remain fairly constant, so that the balancing condenser will

(Continued on page 315.)



valve unless you are very far indeed from a broadcasting station, in which case a medium impedance valve, such as the P.M.5X in the 6-volt class, or the P.M.3 in the 4-volt class or a similar valve, may be used.

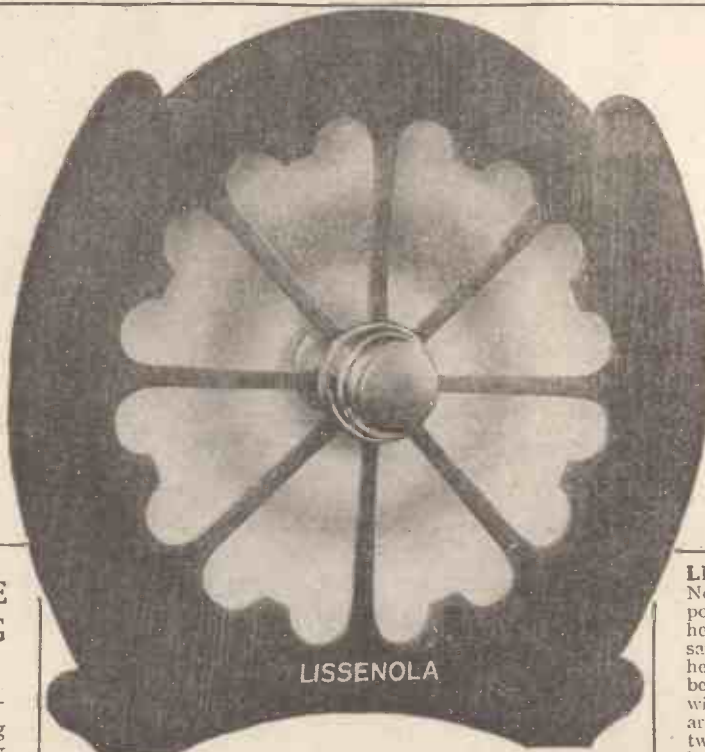
I do not advise the use of a valve having an impedance higher than 20,000 or 22,000 ohms in a reflex receiver, for although it may have a higher amplification factor it will not give such good quality owing to the impedance of the 'phones or loud speaker being low compared with the valve

P.M.256, D.E.5A, or a similar valve either in the 6- or 4-volt class.

Personally, I prefer the use of 6-volt valves, since I find that the greatest efficiency is to be obtained from a receiver as a whole when using them. The filament resistance  $R$  should be set at a suitable point according to your valve and battery.

Attach the loud speaker or headphones to the telephone plug, and plug it into the circuit. Adjust the crystal detector approximately and rotate the tuning condenser, and search for the local station.

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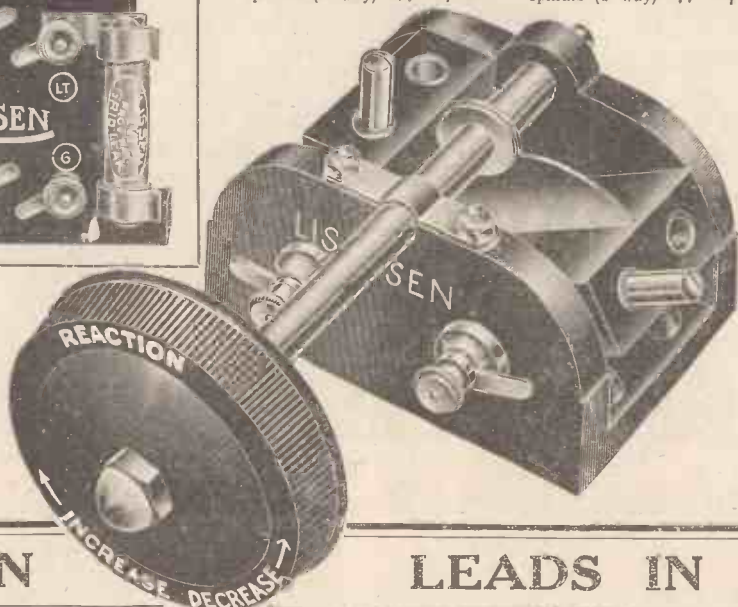


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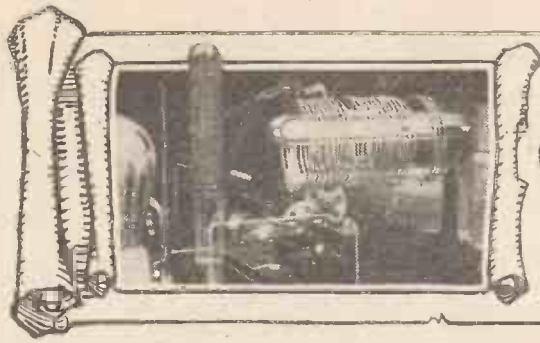
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# Some Short Wave Notes

**JUDGING** by some of the letters received by the Editor and the "P.W." Query Department, many readers have apparently been lured by the various articles on short-wave reception which have appeared from time to time to take up this branch of radio, "for better or worse." Quite a large number of them, however, apparently consider it a delusion and a snare, since, although they have had no difficulty at all in constructing their short-wave receiver and making it work, they have been almost completely at a loss to make anything of the signals they have been receiving.

It should be made clear from the first that the principal occupants of the band of wave-lengths ranging from about 20 to 60 metres, as far as numbers are concerned, are the amateur experimenters, who are granted transmitting licences simply for experimental purposes, and are in no way to be regarded as broadcasting stations. There are some three thousand of them in this country, and in the United States there are rather more than 10 times this number. Practically every country on the face of the globe boasts its own amateur transmitter—in some countries there is but one!

## Mostly Morse.

The vast majority of these stations operate on "C.W.," or continuous wave, by means of the Morse code. There are some who use telephony, but they are certainly in the minority.

In addition to the amateurs, there are quite a large number of commercial stations, who operate on fixed wave-lengths, and, for the most part, serve as useful "calibration points" for the listener. Among them are the "Beam" system stations.

Lastly, we have what is by far the greatest attraction for those who are unable to read Morse, namely, the three or four American broadcasting stations which operate on the shorter waves. W G Y works on 32.79 metres and several other wave-lengths below 30 metres, and K D K A (Pittsburg) works on about 65 metres.

In the writer's opinion it is not worth while taking any special pains to build a short-wave receiver or even to attempt to receive short waves on one's own broadcast set unless one can either read Morse or is prepared to learn to do so. It is probably quite safe to state that 95 per cent of the transmissions below 100 metres are Morse.

## The Call-Sign Problem.

To commence with, one must, of course, acquaint oneself with the actual letters of the alphabet, and figures. This, however, is hardly sufficient, since there are certain details of routine in calling-up, etc., which are observed by all the amateur transmitters (and, for that matter, all commercial

Useful tips and interesting information from an expert who devotes a great deal of his time to the fascinating high frequencies.

By W. L. S.

stations as well) that should be learnt as quickly as possible.

Each amateur station is, of course, allotted a call sign. This consists generally of a figure and two or three letters, although there are exceptions from this rule. Most call signs, however, are of the "2 L O" form.

## Not Enough to Go Round.

This system worked very well when there were not many amateur licences granted, but in time it was found that some other method of classification was necessary. For instance, in 1922 all the British call signs began with a 2, which was followed by two letters. The French amateurs were allotted 8, their call signs being 8 A A, 8 A B, etc. When Belgian transmitters first started up they allotted themselves call signs beginning with a 4. Then the British "2's" overflowed, and a new sequence began, using 5 A A, 5 A B, etc. Later on the 6's were also brought into use.

Thus it soon became impossible to distinguish the nationality of the station received by the figure in the call sign. To surmount this difficulty "prefixes" were allotted to the various countries, Great

Britain taking G, France F, Belgium B, United States U, and so on. This was very satisfactory for a considerable time, until the growth of amateur transmission became such that there were not enough letters to go round! When this calamity occurred the American Radio Relay League, the great amateur organisation in America, solved the problem, by allotting two-letter prefixes or "intermediates" to each country, and this is the scheme that is in force at present. A complete and up-to-date list of these prefixes appears on another page.

The method adopted when one amateur station calls another is as follows: Suppose, for example, that British 2 E X has heard French 8 Z Z and wishes to get into touch with him, he would send the following: 8 Z Z 8 Z Z 8 Z Z eg 2 E X 2 E X 2 E X. Thus the nationality of 2 E X is given by the two letters immediately before his call sign. 8 Z Z would, of course, reply 2 E X 2 E X 2 E X eg of 8 Z Z, etc.

## The Admiralty Abbreviations.

In some cases the station sending gives the prefix in front of his call sign on every occasion, and for the "break" uses "de" or "from," thus: eg 8 Z Z of 8 Z Z of 8 Z Z de eg 2 E X eg 2 E X eg 2 E X. In any case, it will be seen that there should be no difficulty in deciding the nationality of the station heard, or in distinguishing his call sign from that of the station being called up.

Other signals, and groups of letters, are in use for the purpose of shortening the task of the transmitting station. Principal among these are the following: AR, "end of message." "K," please transmit. "CQ," all stations. "VA," closing down, and a whole series of abbreviations beginning with Q. These "Q" signals may be learnt from the Admiralty handbook, and from numerous books on wireless telegraphy, and form an extremely useful set of abbreviations.

## America and Australasia.

As an instance of their utility, "QRK" means "I am receiving you well." If sent with a query, thus: "QRK?" it naturally means, "Are you receiving me well?" These signals are in general use among the amateur stations as well as all the commercial and other high-power stations.

Regarding the wave-lengths used by amateur stations, in this country, transmission is permitted on 23 metres, 45 metres, 90-200 metres, and, in some cases, 440 metres.

The 45-metre band is probably the most thickly-populated. The United States stations work on wave-lengths between 17

(Continued on next page.)



The aerial at M. Leon Deloy's villa near Nice. M. Deloy is a noted short-wave enthusiast, and has many DX records to his credit.

## SOME SHORT-WAVE NOTES.

(Continued from previous page.)

and 22 metres, and roughly 33-41 metres, and on the latter band these stations may be logged in dozens practically any night after dark.

Australian stations and New Zealanders also use these wave-lengths. Broadly speaking, the Australians may be heard best in this country between 6.30 and 8



The crystal-controlled 32-metre transmitter used by A 2 C M of Sydney, Australia.

p.m., and the New Zealand stations between 6 and 8 a.m.

It is quite a novel experience to receive stations at the Antipodes at almost equal strength with our own stations in this country, and once one has embarked on short-wave reception its fascination lasts.

### The Set to Use.

Probably the most useful set for all-round short-wave work is the conventional "Det. and L.F.," sometimes known as the "0-v-1." This can be made to work quite satisfactorily down as low as 12 metres or so, and the only precautions necessary are to see that the coils are well-spaced from any other components, and to look after the efficiency of the coils themselves. Many prefer coils wound with bare No. 12 or 14, with as little dielectric material as is possible. "Space-wound" coils of this type certainly are very efficient for short-wave work, but the favourite "basket-weave" coil is also very useful, and has been successfully used by the writer for a long time. It is preferable to do away with plugs and sockets completely, and to mount the coils in some other way. Many efficient methods have been described from time to time.

### Small Tuning Condenser.

The other point that needs watching is the size of the variable condensers. A .0005 condenser across the aerial or secondary coil is practically useless, even if fitted with the most efficient slow-motion device. With a 9-turn coil a .0001 condenser will comfortably cover the range from about 28 to 60 metres, and nearly all the short-wave transmissions of any interest take place within these limits.

## List of International Prefixes.

### EUROPE.

- |                      |                         |
|----------------------|-------------------------|
| E A—Austria          | E D—Denmark             |
| E B—Belgium          | E E—Spain               |
| E C—Czecho-Slovakia  | E F—France              |
| E G—Great Britain    | E R—Rumania             |
| E H—Switzerland      | E S—Finland             |
| E I—Italy            | E T—Poland              |
| E J—Jugo-Slavia      | E U—Russia              |
| E K—Germany          | E V—Albania             |
| E L—Norway           | E W—Hungary             |
| E M—Sweden           | E X—Luxemburg           |
| E N—Holland          | E Y—Greece              |
| E O—Irish Free State | E Z—Zone of the Straits |
| E P—Portugal         |                         |
| E Q—Bulgaria         |                         |

### ASIA.

- |                       |               |
|-----------------------|---------------|
| A A—Arabia            | A M—Malay     |
| A B—Afghanistan       | A N—Nepal     |
| A C—China             | A O—Oman      |
| A D—Aden              | A P—Palestine |
| A E—Siam              | A Q—Iraq      |
| A F—French Indo-China | A R—Syria     |
| A G—Georgia           | A S—Siberia   |
| A H—Hedjaz            | A T—Turkey    |
| A I—India             | A Y—Cyprus    |
| A J—Japan             | A Z—Persia    |

### NORTH AMERICA

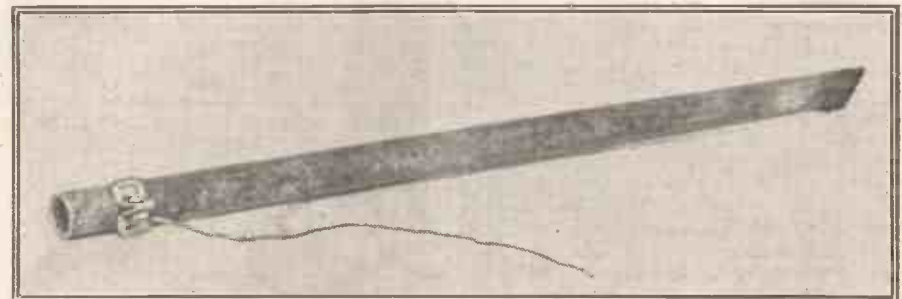
- |                        |                      |
|------------------------|----------------------|
| N A—Alaska             | N N—Nicaragua        |
| N B—Bermuda            | N O—British Honduras |
| N C—Canada             | N P—Porto Rico       |
| N D—Dominican Republic | N Q—Cuba             |
| N F—Bahamas            | N R—Costa Rica       |
| N G—Guatemala          | N S—Salvador         |
| N H—Honduras           | N T—Haiti            |
| N I—Iceland            | N U—U.S.A.           |
| N J—Jamaica            | N X—Greenland        |
| N L—Lesser Antilles    | N Y—Panama           |
| N M—Mexico             | N Z—Canal Zone       |

### SOUTH AMERICA

- |                    |                      |
|--------------------|----------------------|
| S A—Argentina      | S K—Falkland Islands |
| S B—Brazil         | S L—Colombia         |
| S C—Chile          | S N—Ascension Island |
| S D—Dutch Guiana   | S O—Bolivia          |
| S E—Ecuador        | S P—Peru             |
| S F—French Guiana  | S U—Uruguay          |
| S G—Paraguay       | S V—Venezuela        |
| S H—British Guiana |                      |

### AFRICA.

- |                             |                           |
|-----------------------------|---------------------------|
| F A—Abyssinia               | F N—Nigeria               |
| F B—Madagascar              | F O—Union of South Africa |
| F C—Belgian Congo           | F P—Portuguese Guinea     |
| F D—Angola                  | F Q—Cameroon              |
| F E—Egypt                   | F R—Rio de Oro            |
| F F—French West Africa      | F S—Sierra Leone          |
| F G—Gambia [land]           | F T—Eritrea               |
| F H—Italian Somali-         | F U—Rio Muni              |
| F I—Libya                   | F V—French Somali-        |
| F J—Somaliland Protectorate | land                      |
| F K—Kenya                   | F W—Gold Coast            |



The earth clip joined to a length of inch piping.

- |                                 |                |
|---------------------------------|----------------|
| F L—Liberia                     | F X—Seychelles |
| F M—Morocco, Algeria, and Tunis | F Z—Mozambique |

### OCEANIA

- |                            |                 |
|----------------------------|-----------------|
| O A—Australia and Tasmania | O H—Hawaii      |
| O D—Dutch East Indies      | O I—Micronesia  |
| O E—Melanesia              | O O—Polynesia   |
|                            | O P—Philippines |
|                            | O Z—New Zealand |

## AN EARTH CLIP AND TUBE.

By H. J. B. C.

PERFECTION in wireless reception is not the outcome of efficiency in any one portion of a complete receiving equipment. Essentially it is the combined effect of the whole system—receiver, aerial, earth, batteries, loud speaker, etc.—and any weak link in this chain is liable to mar what otherwise might be absolute enjoyment of the broadcasting fare. As has been emphasised on numerous occasions in the columns of this journal, not the least important of the whole arrangement is the earth. It is readily appreciated that the greatest difficulties encountered by some people, as far as good reception is concerned, hinges on the aerial system, as this often has to be designed according to the dictates of environment. Where possible, however, experiments should be conducted with alternatives, and this is where the earth affords scope for the home constructor.

### Effective in Practice.

Different types of earth tubes or plates may be tried out, and the effects of the different metals recorded for comparison purposes. Resort may then be made to the water-pipe or any other convenient form of earth, such as a buried tin or bowl, bearing in mind always that ample "earth surface" is desirable and a damp situation must be chosen.

The other day I had occasion to undertake a few quick tests on earths and to make the changes rapidly from one earth tube to another and then to the water-pipe I pressed into service an earth clip. This consists of a plated copper strip which is bent round the periphery of any pipe or tube, the ends then being slipped in the slots of special shaped end pieces. With the aid of a screw and nut pressure is applied between these two end pieces, so that a good grip and electrical connection is made with the tube. The earth wire may now be held between a nut and washers on this same screw. This little gadget proved very effective in practice, and in the accompanying illustration there is shown the clip gripping a home-made earth tube. The tube

consisted of a length of inch piping flattened over at one end by heating in a flame and hammering while hot, so that it could then be driven readily into the soil. The whole arrangement served as a very efficient earth for testing purposes, and has the advantage of being particularly cheap and easy to construct.



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For a given input voltage the amplification is constant over a wide band of frequencies, thus eliminating resonance. The inductance of the primary winding is much larger than usual, giving good amplification at low frequencies.

No condenser need be shunted across the primary winding. When used, it may be found necessary to use grid cells for biasing purposes to obtain purest results. To use grid bias all that is necessary is to insert cells between L.T. Sec. and the negative terminal of the L.T. Battery such that the L.T. Sec. terminal is connected to negative terminal of cell, and the negative terminal of L.T. Battery is joined to positive terminal of cell. Cells from 1.5 to 8 volts should be tried. The unit is well protected mechanically, and the shielding is such that transformers may be placed close together without interaction. The insulation between primary and secondary coils and also from these to laminations is very high.

As well as ordinary terminals for connection, soldering tags are provided.

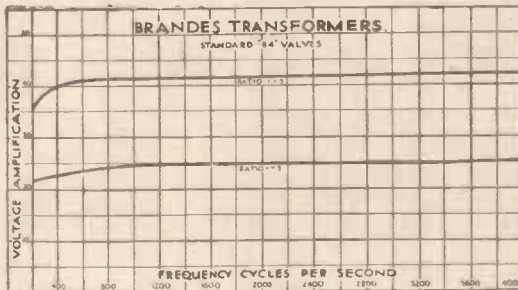
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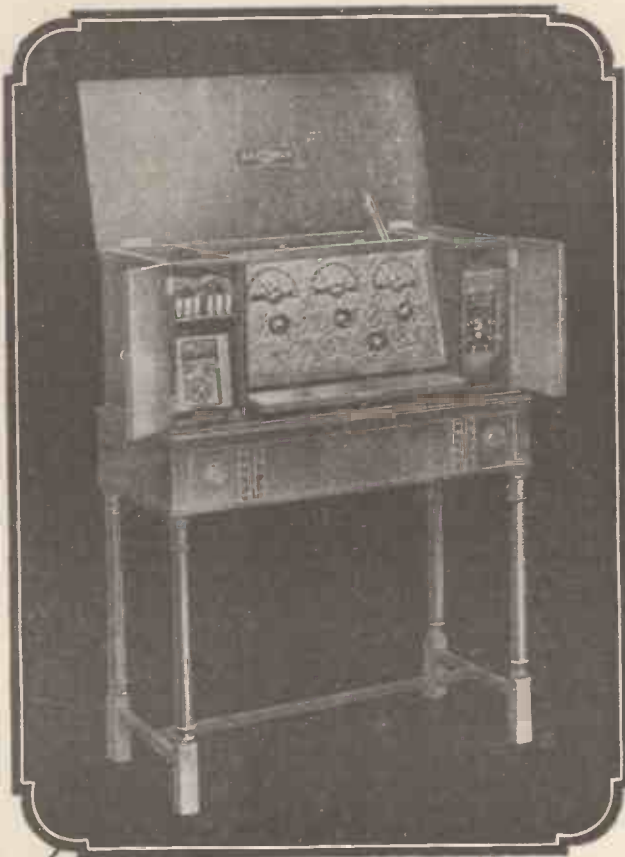
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# MET-VICK (COSMOS)

## Wireless Sets and Components for the New Season

The illustration shows the new Met-Vick 5 with the eliminators contained in the side cupboards. It can be plugged into a lighting circuit just like any other Electric appliance. If used with H.T. and L.T. batteries these can be accommodated in the cupboards. The circuit employs two phase-balanced and stabilised H.F. stages before the detector, and two resistance-coupled L.F. stages.

Operation is extremely simple, the local station can be easily cut out and a wide range of alternative programmes obtained.

Special attention has been paid to running costs which are remarkably low.

The Met-Vick 5 is a really beautiful instrument and while a distinct advance on any 1926 model it still remains at a reasonable price. Obtain Leaflet 4117/9.

### MET-VICK

#### Battery Eliminators

"Met-Vick" Battery Eliminators are supplied in two models. The H.T.-G.B. Model can be used on various supply voltages of 40-100 periods. Grid Bias tapings are provided at 5, 10, 15 and 20 volts. A high voltage (up to 250 volts) can be applied to the last valve. The L.T. Model gives an output of 5 amperes at 4 volts without hum. List 7117/8.

#### A.N.P. (Astatic-Non-Parasitic) Coils

These new "Met-Vick" products provide a clever solution of a difficult problem. They overcome, simply and efficiently, the three difficulties associated with H.F. amplification, namely, Magnetic coupling between coils—Stabilisation and Parasitic Oscillation. List 4117/8.

#### Resistance Coupling Units

"Cosmos" ("Met-Vick") Resistance Coupling Units are well known to all wireless enthusiasts. The "V" type can now be obtained fitted with new "Met-Vick" A.C. Valve Holder. The latter is also supplied separately. List 7117/8.

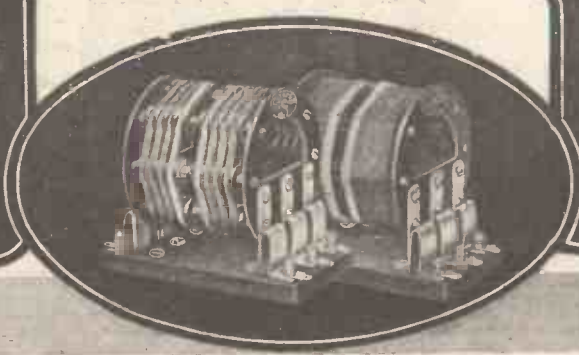
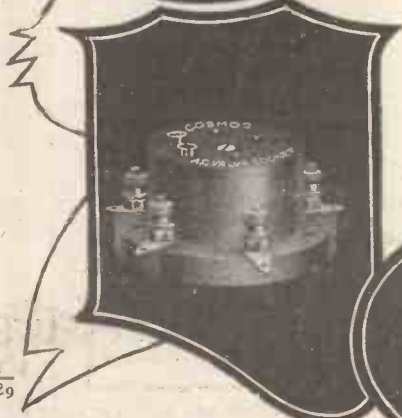
Have you seen the New "Met-Vick" A.C. Valves? Obtain Lists 4117/3 and 4117/8.

The various literature mentioned above gives full details and prices. Ask for your copies.

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# A HANDY COIL WINDER

Showing how a hand-drill can easily be rigged up for coil-winding and other useful purposes.

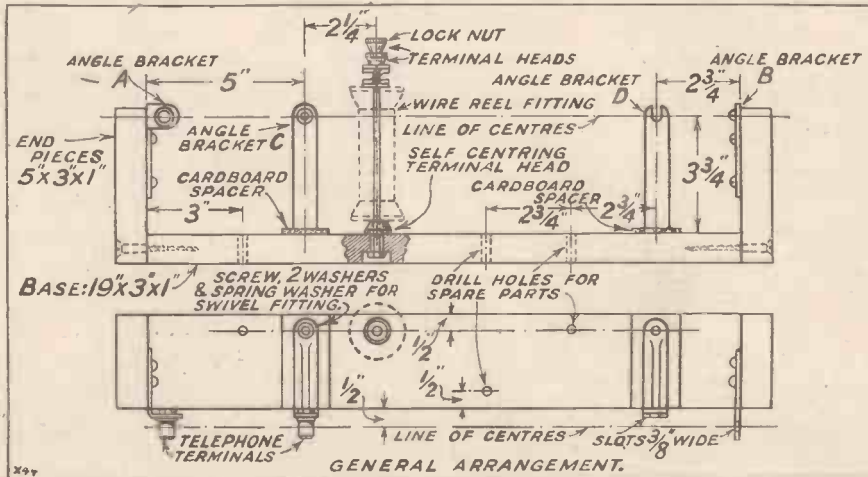
By H. BRAMFORD.

**E**XACTLY how useful a hand-drill can be is the subject of this article, which describes how one can practically rig up the equivalent of a small lathe, using this instrument as the fundamental factor. The complete device is something

up the bed, drill three holes, as shown, which are indicated as drill holes for spare parts. Also drill a 4 B.A. clearance hole in the position shown, as indicated, for the wire reel fitting. This hole is recessed on the under side of the bed to

This item is very important, if true work is to be carried out upon the device. Before turning our attention to the small parts, the wire reel fitting may be secured to the bed, as shown. The bed is finally clamped to the work bench itself, ready for use.

A further diagram is given showing the details of the small fittings. It will be seen



## MATERIALS REQUIRED.

- 3 ft. of rough or planed wood (deal), 3 in. wide by 1 in. thick.
- 4 angle brackets, as will be described later.
- 3 or 4 12-in. lengths of 4 B.A. rod.
- Some spare wire reels.
- A carborundum or emery wheel of any suitable size.
- A number of W.O. terminal heads and nuts.
- Some 1/2-in. wood screws and a few 2-in. wood screws.
- A piece of cardboard.
- And lastly, a hand-drill.

which is not only unique in its way, but which is also quite new in both its design and practical use. Whoever undertakes its construction will be well rewarded by possessing a bench equipment which, from a wireless constructional point of view, will answer almost every purpose for which it is required.

However, to get to the interesting part of this article, we will proceed to describe as briefly as possible the various details of construction.

It will be seen from the list of materials that most of the items will be in the possession of the average constructor, the whole thing being practically made up from odd parts, etc.

### Preliminary Preparations.

First proceed to prepare the bed of this device. For this we shall require a base, which is made from a piece of wood measuring 19 in. by 3 in. by 1 in., and two side pieces of wood each measuring 4 in. by 3 in. by 1 in. The sides are screwed to the base, as shown in the fully detailed drawing of the general arrangement, which to a large extent is self-explanatory. Having built

receive a 4 B.A. nut. The rest of the construction amounts to the fixing of the four brackets to the bed itself, in such a way as to bring the line of centres in each case in the positions shown in the drawing.

that brackets A and B are similar, excepting for the fact that one bracket is provided with a 1/2-in.-wide slot, whereas the other bracket is bent over, as shown. These brackets are procurable in the standard sizes given from any ironmonger, ready drilled. Brackets C and D are merely angle brackets, which are stayed centrally

(Continued on next page.)



The device in use as a grindstone. The blade of a screwdriver is being sharpened.

# A HANDY COIL-WINDER

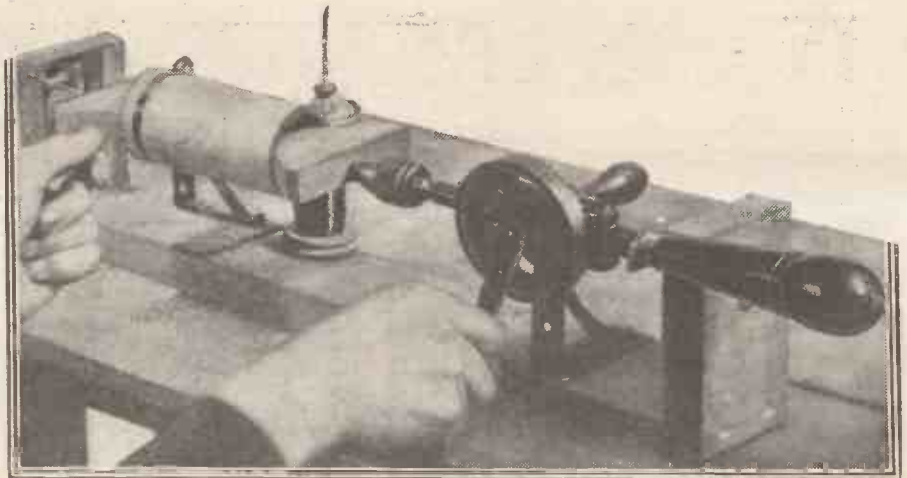
(Continued from previous page.)

for security. These brackets are exactly similar, and may be procured in sizes suitable for the occasion. One of the brackets is provided with a 3/8-in.-wide slot, as shown. First secure bracket A to the side piece of the bed by means of 3/4-in. wood screws. Also attach a telephone terminal to this bracket, as shown. Secure bracket B to the other side piece of the bed, keeping in mind in every instance the line of centres, both in the vertical and horizontal planes.

### Completing Construction.

Secure brackets C and D in the positions given. It will be seen that bracket C is made to swivel, being secured only by one screw, two washers, and a spring washer. Bracket D is fixed in position by means of two screws. Cardboard spacers are interposed beneath each of these two brackets for two purposes, one to enable us to get the position of the line of centres, and the other to allow a clearance for the swivelling bracket, C. The device is now complete.

The photographs given clearly show the lathe with the hand-drill attached, in various phases of use. First we will suppose that we are going to wind a coil upon a cylindrical former. To do this it will be necessary to make up an attachment, as shown in the drawing. This attachment is made from two wood end pieces, a 12-in. length of 4 B.A. rod, two terminal heads, which are self-centring by reason of the tapered face, and one nut. Attach this device when made to the lathe, as shown in the photograph, the chuck of the hand-drill securing one end, and the terminal bracket A acting as a bearing for the other end of the 4 B.A. spindle. In this instance the swivel bracket C is moved round to be out of the way. Any length or diameter of former for winding purposes may be used. Secure your reel of wire to the wire reel fitting, and all is ready for winding. Guide the wire by means of the left hand, or any suitable guiding device, and wind by turning the handle of the hand-drill with the right hand. In less than a minute any type of winding



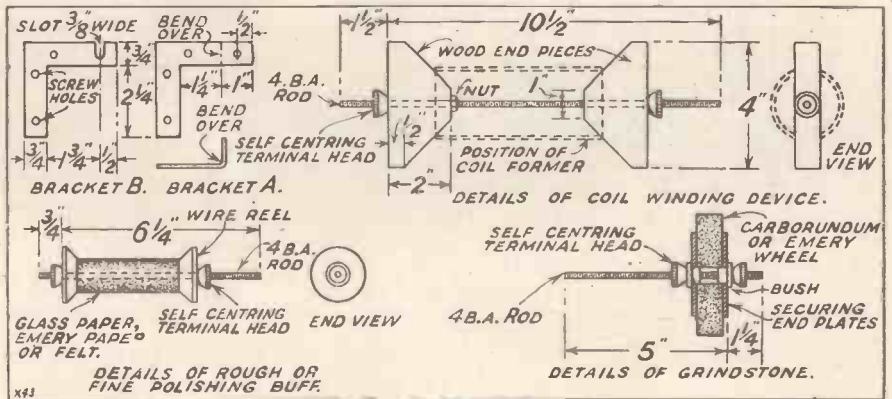
"In less than a minute any type of winding may be made in this manner."

may be made in this manner, both accurately and neatly.

### The Polishing Buff.

Details of how to make a polishing buff are also shown in the drawing. This consists of a 7-in. length of 4 B.A. rod, an empty wire reel, and two self-centring terminal heads. Glass paper, emery paper, or felt is wrapped around the wheel. One end of the 4 B.A. spindle is secured to the chuck of the drill, the terminal of the swivel bracket C acting as a bearing for the other

To make a grinding wheel all we require is a carborundum or emery wheel of practically any size up to 6 in., a 6 1/4-in. length of 4 B.A. rod, two self-centring terminals, two bushes, and two cylindrical securing end pieces. These latter items may easily be made by cutting off the flanges of a large wire reel. These are secured in the manner shown in the drawing. One end of the 4 B.A. spindle is secured in the chuck of the drill, the terminal of the swivel bracket C acting as a bearing for the other



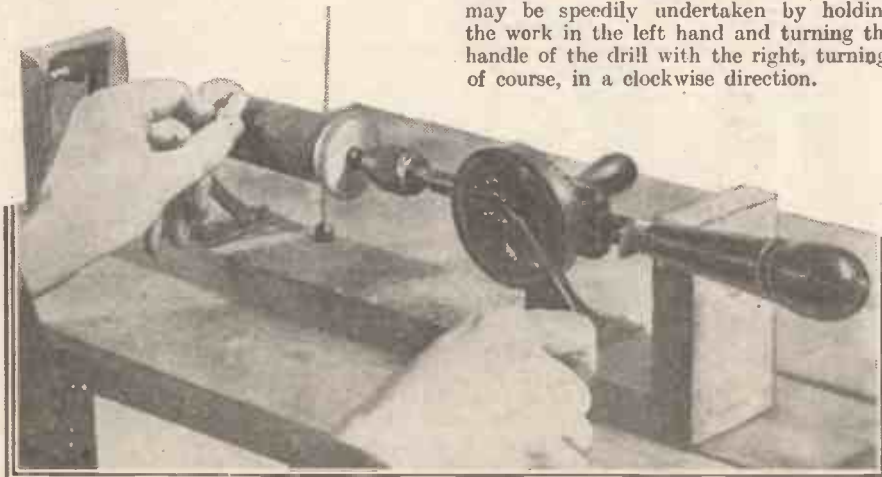
swivel bracket C acting as a bearing for the other end. Rough or fine polishing may be speedily undertaken by holding the work in the left hand and turning the handle of the drill with the right, turning, of course, in a clockwise direction.

end. The grindstone may be used for practically any purpose, as before.

### Extremely Useful.

In addition to the number of uses which I have already described, it will be obvious to the reader that this device may be put to many other purposes. The essential factor, however, of the whole thing, as regards construction, is to make it strong and rigid and to have the line of centres dead true.

The drilling of some panels may also be greatly simplified by using the drill mounted in the position shown, though for some tasks it will be better to remove the drill from its clamping bracket and to employ it in the more orthodox vertical position. In any case, the removal of the drill is but the work of a minute or so, and the extra advantages accruing to the possession of the home-made "lathe" fully repay any trouble taken in its construction. For the winding of coils, generally a tricky and tedious business, it will be found invaluable.



"Guide the wire by means of the left hand or any suitable guiding device, and wind by turning the handle of the hand-drill with the right hand."



# “WIRELESS WILL CONQUER THE ATLANTIC”

by Charles A. Levine

THE Atlantic has, of course, already been conquered, at any rate in its most favourable moods. That it is possible to cross the 3,000 miles of ocean waste by air has already been amply proved: before this summer was over I had hoped to prove that the Atlantic could be flown equally well from East to West, but weather conditions have been unfriendly.

Perhaps it is going too far, therefore, to say that we have *conquered* the Atlantic. Certainly we are only at the beginning of the story, but I am quite sure that our progress in this direction is going to be extremely rapid. What is the next four or five years going to show?

Prophecies are dangerous, but I am sure of one thing, and that is that whatever progress will be made within the next year or two, wireless is going to take an important part in it.

That statement may seem a little strange when I add that my machine, the “Miss Columbia,” which brought me safely to Europe and in which I hope to return to the United States, is not fitted with wireless apparatus of any kind. The reason for this is that when the “Columbia” was built I did not attach quite the same importance to wireless installation as I do now.

### When Wireless was Wanted.

A week or two ago, when I was waiting to leave Cranwell Aerodrome for New York, I considered very carefully the installation of a wireless apparatus on board her. Had I done so it would have meant the jettisoning of some of our petrol supply. Two vital alternatives—but I dared not cut down the supply of fuel.

But when I have my next machine constructed there will certainly be a wireless set in its equipment.

*It is my opinion that before very long Government regulations will compel every machine that takes the air to carry a wireless installation, just as English Board of Trade regulations compel a passenger-carrying sea-going boat to carry a compass. I think that is as it should be.*

To conquer the Atlantic—I use the word conquer in its fullest sense—the element of safety and security must be preserved and encouraged. Wireless is the only means of

\*-----\*

A special and timely article upon a topic of universal interest. By one of the few men qualified to speak from experience.

\*-----\*

doing that—wireless coupled with intensive and careful developments of aeronautical science.

One incident comes very vividly to my mind at this moment. There was that memorable night when we arrived over Germany. We were excited and tired, and felt instinctively that we were at our journey's end, but we had not the vaguest notion where we were. For a long time in the darkness we flew over Germany, and it was some hours before we eventually landed. Wireless would have given us our position at once. Moreover, it might have saved a possible crash.

There is, of course, a more urgent side to it. The tragedy of the “Old Glory” (which

possessed a wireless installation) has proved that it is not an infallible means of securing assistance should it be necessary. but think of the utter helplessness of the machine that comes down in a stretch of ocean without any means of signalling for help. No one will deny that wireless is going to be the factor that will destroy the idea of danger and isolation which most people now associate with transatlantic flying.

I foresee something more than this purely utilitarian aspect of wireless in the Atlantic flight—I say Atlantic flight, although, of course, before long the stretches of the Pacific and the other oceans of the world will become familiar tracks to the aviator. I can already think of broadcasting and the passenger-laden machines which—not so very far ahead—will link Europe and the United States. Fantastic? Not a bit.

### The Entertainment Value.

Even to-day I have noticed in Europe that a blasé flying public go to sleep, read a book, write letters, whilst hopping from Berlin to Copenhagen, Paris to London, Cologne to Budapest, and so on. Not so very far ahead the thrill of the Atlantic flight will have been lost in the ease and comfort with which it will be accomplished. Wireless will have made it safe, uneventful—perhaps boring—and then wireless will have to make it amusing. You and I, I have no doubt whatever, will one day be able to fly from London to New York and listen to, say, the music of the Savoy Band playing here in London, or the music of the Philadelphia Symphony Orchestra playing in the United States. As a matter of course we shall be able to get in touch with anyone with whom we wish to speak on either side of the Atlantic.

Ten, fifteen or, at the most, twenty years, will see that, I believe. In the meantime, I want to see every use being made of wireless to make long distance flying an uneventful undertaking.

Aviation and broadcasting are the petted children of the science of our time. They ought to grow up together. For it seems to me that the story of aviation and the story of radio are from now onwards going to be so linked as to make it difficult to consider the former individually.



Mr. Charles A. Levine.

# BROADCAST NOTES.

FROM OUR BROADCASTING CORRESPONDENTS.

A B.B.C. Failure—The Cesarewitch—More Henry Arthur Jones—Vaughan Williams Night—The Waratahs at Twickenham—G.B.S. and G.K.C.—B.B.C. and Controversy—Mother and Daughter Turn.

## A B.B.C. Failure.

THE B.B.C. let down British listeners so badly in connection with the big fistic championship that considerable new fuel is now available for the coming storm in Parliament about the smugness and self-complacency of Savoy Hill, not to mention its serene disregard of Empire broadcasting and new developments generally. There was no excuse whatever for not taking the Dempsey-Tunney encounter. It is useless to suggest that "tests" were failures.

Anyone with a decent short-wave set could pick up the fight direct, and Keston is not badly equipped. It is understood that the engineers responsible for this end of the B.B.C. are heartbroken by the continual discouragement from their administrators. It might be a good thing if one of these fellows resigned in order to tell the public the truth about the B.B.C. and Empire Broadcasting.

Incidentally, practically nothing has been done, and October is here. What about all the fine promises? Hot air will not cover any more retreats. Plain speaking at this stage is in the best interests of the B.B.C. itself. It is incredible that "little Englandism" is so solidly entrenched at Savoy Hill that there is not a trace of enthusiasm for the cause of Empire.

They appear mesmerised by this footling Union at Geneva, where British interests are calmly bartered for imaginary settlements of the wave-length problem. Let's get back to sane patriotism in our Broadcasting policy; and let the outer Empire share our magnificent service.

Coming as he does straight from the Dominion Office, Lord Clarendon is expected to safeguard Imperial interests at Savoy Hill. On the other issue of missing good programme material in the Tunney-Dempsey scrap there is no excuse. The running commentary was so successful in the States that eight listeners died of excitement during the broadcast, and about 200 others were removed to hospital subsequently. It was described as a "real ham-dinger radio event."

## National Concert at People's Palace.

On Friday, October 14th, Mr. Percy Pitt will conduct the second of the new season of National Concerts—the first to be performed at the People's Palace, Mile End Road. The concert will be relayed through 2 L O, 5 X X and most other stations. Siegfried's "Forest Murmurs," the Good Friday music from "Parsifal," the Prelude and Liebestod from "Tristan and Isolde" will be included. The soloists are Miriam Licette, and Walter Widdop.

If the experiment at the People's Palace is a success, the B.B.C. will extend its venues throughout the East End and the suburbs, thus gradually giving more people

what will probably be their first chance of actually attending a good concert. This is a policy to be commended most highly. Mr. Pitt and his devoted little staff, Mr. Wright, Mr. Millar-Craig, Mr. Clarke, and Mr. Tillett deserve great credit. It has taken them years to overcome the crass obstinacy of the administration, but now they are well away.

## The Cesarewitch.

A well-known racing man will give the running commentary on the Cesarewitch from Daventry Experimental at 3 p.m. next Wednesday, October 12th. There have been rumours of a possible attempt to cut the line, and spoil the transmission at the last minute. Since the Croyland Abbey sabotage of two years ago, nothing of this kind has succeeded.



A portable set amuses some campers during one of the recent (and short!) spells of fine weather.

## More Henry Arthur Jones.

The immediate radio success of "The Liars," Mr. Henry Arthur Jones' play, is to be followed by the broadcasting on Thursday, October 20th, from 5 G B, of a new and hitherto unacted play by the same author, entitled, "Her Tongue." This is reputed to be a comedy of unusually witty passages suitable for the "mike."

## Vaughan Williams Night.

Next Wednesday (October 12th) 2 L O and 5 X X will give a special programme in celebration of the fifty-fifth birthday of Dr. Ralph Vaughan Williams. The Wireless Singers and the Wireless Orchestra will combine to show Dr. Vaughan Williams in his lighter moods. The orchestra will play the suite from all the incidental music to

"The Wasps," and the Folk Song Suite. The singers will include a rendition of the composer's Five Folk Songs for unaccompanied chorus.

## The Waratahs at Twickenham.

On Saturday, October 22nd, the B.B.C. will give a running commentary of the Rucker game between the Waratahs of New South Wales, and a composite side drawn from all the strongest London clubs. This should provide a broadcast of exceptional interest.

## G.B.S. and G.K.C.

"Do we agree?" is the subject to be debated before the microphone by George Bernard Shaw and G. K. Chesterton on October 28th.

## B.B.C. and Controversy.

Reading between the lines of an announcement issued by the B.B.C. after the Radio Manufacturers' Dinner, one notes an element of anxiety that not too much should be made of Sir John Reith's remark at the dinner that he was sailing very close to the wind in the matter of controversy, and was proposing shortly to make representations to the P.M.G. for an extension of powers.

It is believed that this anxiety was due to an understandable desire not to damage the cause of extension by negotiation through premature public discussion. Cap-

tain Ian Fraser made a new point when he suggested that the B.B.C. were not actually using the powers already vested in them by the Charter as a result of the report of the Crawford Committee of which he was a member. Perhaps the B.B.C. will take the tip and be a little bolder this season, whatever happens to the representations to the P.M.G.

## Mother and Daughter Turn.

At 6 p.m. on Thursday next (October 13th), Mrs. Jessie Macdonald, and her daughter Flora, will give a joint dramatic recital from the Dundee Station. These artistes are very well known North of the Tweed, and much is being made of this occasion.

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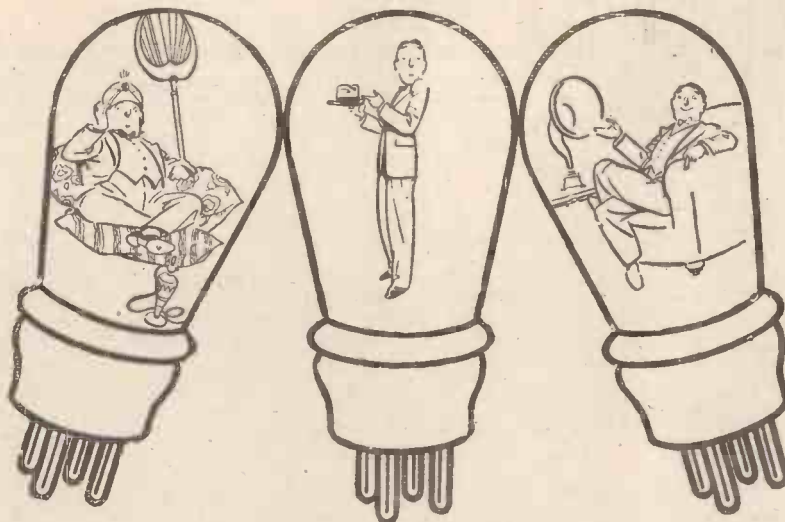


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Again, we could prose about a grid strong enough to hang your hat upon. Yet, talk of hatstands belongs rather in the furniture shops.

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5 SC's headquarters and studio building in Blythswood Square.

# 5 SC

An Investigation at the Glasgow Broadcasting Station.  
By G. V. DOWDING, Grad.I.E.E.  
(Technical Editor.)

ing, and came to the conclusion that the staff must be both numerous and prosperous. But later I learnt that the autos were the properties of members of the R.A.C. of Scotland, whose headquarters were situated around the corner!

### The "Station."

Blythswood Square is very much like any one of the dozens of fashionable London squares, only most of its houses occupy greater frontages than in these, and are rather shabbier. The B.B.C. has managed to secure one of the corner buildings, and has done little to the outside of this in the way of alterations or decorations, except to fasten a business-like brass plate to the porticoed doorway. Entering through this last I found myself in a gloomy entrance hall and at first, except for the aforementioned brass plate and a wooden bench on my right, I might have thought I had made a mistake and wandered into an unoccupied place. But a moment later I spotted the enquiry window on the left. And had I enquired for the stationmaster instead of for the station *director* I think I could have been forgiven, for if there is anything more like a railway booking-office than the entrance to the 5 SC studios and offices except another railway booking-office, I have yet to see it! Had a notice or two been hanging on the walls and had there been a telephone booth in one of the corners, the illusion would have been complete.

However, I asked the young fellow in the enquiry office whether Mr. Cleghorn-Thompson, the Station Director, were available and was told that a Mr. Fitch had taken over that duty.

"And has Mr. Cleghorn-Thompson taken the 'Radio Chiltern Hundreds' then?" I asked, rather staggered by the information. "Oh no, he has gone out to lunch," replied the youth loftily.

### Another Upheaval!

"Surely, my dear young broadcaster, you are not telling me that Mr. Thompson has accepted the position of chief auntie, or something subservient and lowly?" I pursued breathlessly. But the dignified juvenile was not communicative, and I had to wait until the arrival of Mr. Fitch before things were made clear to me. It appeared that there had been another upheaval at 5 SC, and Mr. Cleghorn-Thompson had been elevated to the position of Controller of the Northern Area and Mr. Fitch appointed director of 5 SC in his place.

And shortly after I had made the acquaintance of Mr. Fitch, Mr. Cleghorn-Thompson arrived, and we were soon seated in the office of the former engaged in an animated conversation. I had ample opportunity, during the following hour or so, to study both of these men, and I found

it mighty interesting to do so in view of all the aforementioned facts. And I should imagine two more sharply contrasted characters would be difficult to discover. Mr. Thompson's is a brilliant personality, but it is the brilliance of a diamond. He has a polished presence and is a polished conversationalist, but he has affability. And when I say that Mr. Fitch is a genial sort of individual, perhaps the finer shades of meaning I am endeavouring to impart to those words will be made clear. I thought of those two broadcasters, one as a soldier and the other as a politician, and then had them classified exactly to my liking. A few weeks later I learnt of the admirable war record of Mr. Fitch, and of the thrustful liberalism of Mr. Thompson, and in consequence my self-estimation rose quite two degrees!

During the uninformal conference in the office at 5 SC, into which drifted several others of the more important members of the staff, many most interesting facts were brought to my notice. I learnt, for instance, that Sir John Reith takes a special interest in the Glasgow station, and that ever since he was present at its opening to the skirl of bagpipes on March 6th, 1923, he has been a more or less regular visitor, although many of his visits are of an unofficial character.

### An Admission!

And as befits the broadcasting station in the second largest city in our country, 5 SC can boast of at least one achievement and that is that it was the first station to experiment with schools transmissions, and as early as in February of 1924 organised a complete series of lectures for children in classrooms. It was also the first station to broadcast Beethoven's thirty-two sonatas, but personally I am of the opinion that this was more of an imposition than an achievement! Had I listened to those



From a road leading from the square in which the studio building is situated one can see in the distance the power-station chimneys between which 5 SC's aerial is erected.

efforts, it might have so happened that I should have had to doze through thirty-one before the "Moonlight" Sonata came "on air," for I admit, without shame, that this is the only one of the great master's sonatas that appeals to me—an admission which, no doubt, will cause many of my readers pain.

I naturally asked the Glasgow people questions in regard to "nationalist" programmes and apropos this:

"We have made a feature of works by

(Continued on next page.)

THERE is a very great difference between the "front" and the "back" of a microphone. I have listened with enjoyment to some of the liveliest programmes ever put "on air," knowing all the time that they have emanated from the most depressing of studios and have been compiled by the dullest of people. On the other hand, listeners would be surprised by the apparent pomposity of the broadcasters guilty of some of the lowest of "low-brow" transmissions! And further, one of the most high-brow of super-chamber wireless concerts ever conceived was schemed alone and unaided by a man who has the outward appearance of an Arraenian railway clerk!

### "Prepared for Anything"

For these reasons, I was prepared for anything when I visited the Glasgow station. I had heard that it was the centre of a seething mass of discontent, that its programmes were at once anathema and the cause of despair to listeners, and that the most desperate remedies had been resorted to by the authorities to save it from itself. Indeed, some one who should know, whispered to me that it had even been considered a probability that the whole station would be ruthlessly wiped out.

But although I was, as I say, prepared

### NOTE THESE DATES!

5 XX, 5 GB, 6 BM, 5 WA, 5 IT, 2 ZY and 5 NO, have been dealt with, and the remaining articles in the series will appear as under:

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BELFAST .. .. .	Oct. 22
LONDON (2 LO) .. .. .	Oct. 29

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for shocks, I found everything very peaceful and apparently happy at the 5 SC studios and offices in Blythswood Square. And I noted with interest and considerable surprise that some fifty very expensive-looking motor-cars were lined up opposite the build-

## 5 S C.

(Continued from previous page.)

living Scottish composers and many of these have been conducted by the composers themselves," Mr. Thompson explained.

"But did they prove popular?" I queried, and was not surprised when informed that they did not, for it frequently happens that musicians as well as prophets have to explore other countries for their profits!

**A Successful Broadcast.**

Nevertheless, I must not forget to mention that one of Glasgow's most successful broadcasts was that of "Rob Roy," which was the station's first big transmission. It was given on August 31st, 1923, and in response to many requests was subsequently repeated. It is interesting to note that the studio proved quite inadequate in size and that the band flowed half-way down the stairs. But this was at the old studio in Bath Street, which was vacated towards the end of the following year.

Another ambitious broadcast from 5 S C was John Masfield's "Good Friday" which was given on a Good Friday together with incidental music. This occasioned two large crowds of artistes and, so Mr. Thompson informed me, it was an arduous task shuffling these about, although it was accomplished quite successfully.

"How do you get on with the various musical and other associations in Scotland?" was another of my enquiries. This time it was Mr. Fitch who answered.

"Very well, indeed," he said. "We are in close contact with the Scottish National Theatres Society and other organisations."

Now, this was at variance with what I had heard from other sources, but I did not say so, for if anyone should know the truth of such matters surely it should be the people with whom I was in conversation.

**Children's Radio Circle.**

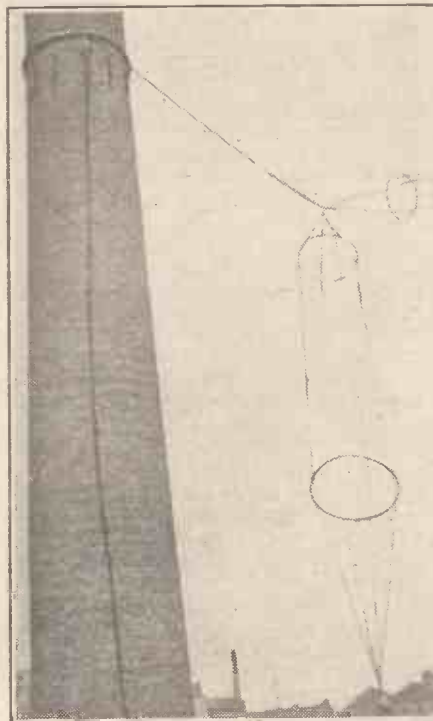
As I have already indicated, we continued our discussion for about an hour, and I am afraid lack of space prohibits me from recording the proceedings verbatim. I have, therefore, condensed my voluminous notes somewhat and extracted the items of greatest general interest. I must not omit to give at least passing reference to the valuable work of Miss Cathline Garscadden, a talented pupil of Sir Henry Wood and now responsible, among other things, for 5 S C's Children's Radio Circle. It appears that this numbers well over 6,000, and is spread all over the world. These radio circles which have been formed by our broadcasters are excellent organisations. They have been instrumental in raising substantial sums of money for charitable purposes and, this is even more important, they are inculcating in thousands of our future citizens a cheery spirit of fellowship and humanity, the effect of which may truly be not only national but international.

On the subject of local talent I did not find the Glasgow staff very enthusiastic, although I learnt that 5 S C's auditions are notable in that they abound in very fine lady elocutionists. Curiously enough there are very few men.

As a concluding question, I asked Mr.

Thompson whether many programme criticisms were received at the Glasgow station. After sending for and examining the quarterly correspondence report, he showed me that of the letters received concerning the programmes 72 per cent were directly appreciative. But too much significance cannot be paid to a post-bag which, at its greatest, is representative of but a minute section of the listeners, and when I brought this point forward everyone present agreed with me.

It will be noticed that I have not as yet recorded many remarks made by Mr. Fitch, the Station Director; but it must not be thought that he acted mainly as a listener. On the contrary, he played a leading part in the discussion, and I found his contributions to this so interesting that I was extremely pleased when he offered to conduct me personally round the studios and offices. In the control room we were joined by Mr. Marshall, the Engineer-in-Charge. It was he who explained the



5 S C's aerial, showing the "feeder" running down to the transmitter. Note the halyard which enables the engineers to let the aerial down.

control room was once used as a kitchen, and pointed out how useful the large built-in dresser affair was as a bench for some of the instruments. I noticed, too, that a series of large lockers provided excellent storage space for spare gear. And for some reason I found it amusing that the quondam wine cellar was in use as a band-room!

Returning to the control room, I noticed an ordinary brick hanging by a wire outside the window, and discovered that this marked the termination of a receiving aerial which consisted of a wire suspended from an upper window. By the way, it is an interesting fact that at many of the B.B.C. stations the Daventry station is picked up on a wireless receiving set and then passed on to the amplifiers for relaying, and is not connected by landline on these occasions.

The main studio at the Glasgow station is fairly large, but is crowded with music-stands, pianos and tubular bells. A distinc-

tive feature is that large oil paintings are hung on its walls over the usual drapings.

"You have a fairly large orchestra?" I suggested to Mr. Fitch.

"Yes," he replied. "We have a permanent station orchestra of twenty-one, and frequently this is considerably augmented."

For a short time we stood in the studio chatting, and then I suggested to Mr. Marshall that I should have a look at his transmitter, for I had occupied a great deal of Mr. Fitch's time, and I could see that the hours of studio activity were rapidly approaching.

**The Transmitter.**

The 5 S C transmitter is situated at the Port Dundas Power Station, a mile or so away from the studio premises. The aerial is, of course, suspended between two of the chimneys. The generators are neatly railed off in the corners, just inside the doorway through which one enters the power station; but the transmitter is in a room right at the top of the building, and one has to climb first of all several flights of ordinary stairs, and then a long spiral staircase in order to get to it.

But I found the somewhat tedious climb very well worth while, as will be seen. First of all the engineer who was acting as my guide, sidetracked me through a door on to a narrow bridge, which runs right over the main hall of the power station, and for a time, completely fascinated, I stood watching the huge turbines and generators humming away.

Arrived eventually in the small room allotted to the B.B.C. outfit, I was greeted most cheerily by the two maintenance engineers.

"Seen a set like this before?" asked one of them, pointing to a small panel in which was standing an ordinary receiving valve. It looked like an ordinary one-valve set of a simple and straightforward character to me, and I said as much. But to my astonishment I was told that it was operating the large loud speaker which was roaring away lustily, and that it was doing this without using any batteries whatever.

**Some Selectivity.**

"Easy enough to pick up 5 S C here," grinned the engineer, adjusting the variable condenser, across the plates of which sparks were flashing every now and then. I agreed that it certainly should be, but to emphasise the point, the engineer continued.

"If you wear a pair of ordinary telephone receivers, you can pick up our stuff without any set at all by holding one tag of the 'phones in one hand and touching the other tag against anything metallic in this room."

"And do you know," broke in the other engineer, "a listener once wrote to us asking if he could demonstrate his set in this transmitter-room."

"Do you mean that he had the idea he would be able to cut 5 S C out and receive another station in such circumstances?" I asked in amazement, for my watch-chain was "alive" with the energy that was emanating from the transmitting apparatus.

"Yes," laughed the engineer. "He was so proud of the selectivity of his set that he was certain that it would cut 5 S C out

(Continued on page 312.)

# CONTROVERSIAL BROADCASTS.

Some interesting statements on the subject by Sir John Reith and Lord Birkenhead.

By THE EDITOR.

AT the Annual Dinner of the Radio Manufacturers' Association some interesting remarks in connection with broadcasting were made by Lord Birkenhead and Sir John Reith. The former, in proposing the toast of the Radio Industry and the success of the Exhibition, pointed out that when he opened a transmitting station in 1923 there were 250,000 people, out of a population of 44,000,000, with receiving sets. To-day there are 2,500,000 people with receiving sets listening (he hoped for their own good) to what was daily and nightly broadcast.

### Sailing Close to the Wind.

Lord Birkenhead also pointed out that no great statesman in the past, before modern press developments, ever enjoyed the opportunities of making the acquaintance of his fellow countrymen which it might one day be in the power of the B.B.C. to afford. No statesman, even with the enormous influence which it was in the power of the modern press to exert, would ever have the opportunity of appealing to his countrymen with the certainty and the directness of contact which it was in the B.B.C.'s power to afford, and he, for one, looked forward to the B.B.C.'s increasing influence.

Sir John Reith, in his speech, pointed out that when the B.B.C. was established they received explicit instructions from the Postmaster-General to avoid anything in the nature of religious, political or industrial controversy. "We have sailed as close to the wind as we dared, and we are now engaged in making representation to the Postmaster-General," added Sir John Reith.

This is good news for, although the B.B.C. have touched on the fringe of controversial subjects, it is obvious there is greater scope awaiting them, especially in the field of politics. The Englishman takes his politics with a considerable amount of seriousness, despite the flippant tone with which he may be heard to discuss politics, say, in the train in the morning coming to the office. And if ever there was a time when intelligent interest in politics should be fostered it is now.

### Political Plans.

We pointed out in a recent article that the B.B.C. should be urged to do their very best to obtain permission from the Postmaster-General to increase the scope of what may be termed the controversial side of broadcasting.

Providing a strict impartiality is observed, there is absolutely no reason why regular political talks should not be broadcast—and they would probably be more entertaining and certainly more instructive than the majority of talks which have been broadcast by the B.B.C. during the last twelve months.

It is amazing how few people to-day really appreciate the aims and objects of the various political parties in Parliament. The average young man grows up with a

very hazy idea as to the object and ideals of, either the Conservative, Labour or Liberal Parties. But with broadcasting at its present state of development there is a unique opportunity of instructing the younger generation, not unfairly or with any prejudice, but instructing them in such a way that they get a clear idea as to the aims and objects of the British political schools of thought. It is then up to them to decide which school of thought they are going to support.

We are not suggesting that broadcasting should be used to favour this or that political party, or that broadcasting should be used as an instrument for influencing any particular party's votes at, say, the

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next General Election. But to-day the influence exercised on the political thoughts of the public is almost entirely left to the newspapers. No doubt this is very admirable, but, on the other hand, there are many people who would like to hear all sides of the question, and if one particular section of the press is devoting its energies to supporting one particular body and one happens to be a subscriber to that particular section for other than political reasons then, unless one is a subscriber to more than one newspaper, one does not obtain an all-round impartial general knowledge of the trend of political thought in the country to-day.

Broadcasting, by initiating a series of political talks and by inviting, say, leading members of each political party to address the public by wireless, would enable thousands of people hitherto vaguely, if not entirely, ignorant of the expressions of individual parties to obtain a clear and authentic knowledge of political thought to-day.

We hope that Sir John Reith's assurance that the B.B.C. is now engaged in making representations to the Postmaster-General will bear fruit, and that the Postmaster-General will give sanction to the B.B.C. to increase its activities in this direction, and to permit a wider boundary and a greater scope with regard to the broadcasting, not only of controversial matter in connection with politics, but with other matters of general public interest.

### Results from 5 G B.

Interesting plans have been revealed by the B.B.C. in connection with the Daventry Experimental Station. It is stated that greater power will shortly be employed, and that the aerial will be increased in height. This is due to the fact that complaints have been received (in considerable number, we understand) from listeners in Birmingham that the reception from 5 G B has not been so good as from the old Birmingham station.

Birmingham listeners are undoubtedly entitled to a certain amount of sympathy. With the old Birmingham station reception could be obtained by almost any means in the immediate locality of the station. With a piece of coal, even, for a crystal, many an amateur received his local station quite adequately.

But, with the demise of the Birmingham broadcasting station and the advent of 5 G B these conditions have been considerably altered, and many hundreds of listeners in the Birmingham neighbourhood have found it imperative to instal a much better-class receiving set in order to hear the substitute for the Birmingham station.

These complaints have been exhaustively tested by the B.B.C.'s technical experts, and—much to their credit, let it be said—they have decided to make the improvements as enumerated above. These are likely to be put into effect in about two weeks' time. The new aerial will be 325 feet high instead of, as previously, 100 feet, and 5 G B's working power, at present under 20 kilowatts, is to be increased to probably more than 25 kilowatts. It is even likely that 30 kilowatts will be the figure.

This increased strength should enable many more listeners to reach out past their local station, and to receive 5 G B's programmes, and it certainly should improve the receiving conditions of Birmingham's listening population.

### The National Radio Exhibition.

One of the chief impressions gained at the National Radio Exhibition at Olympia was the general all-round reduction in prices, and, furthermore, the great advances made in the simplification of apparatus designed for general listeners without any technical knowledge. Here is an example, taken from one firm, which shows how substantial are the reductions compared with last year.

	Last year's price.			This year's price.		
	£	s.	d.	£	s.	d.
Two-valve set	10	15	0	7	0	0
Three-valve set	12	0	0	10	0	0
Four-valve set	24	0	0	18	0	0

The reduction in the price of valves certainly had a good effect on the exhibition, for trade reports indicate that business was very brisk, and everything augurs well for a most prosperous season.

**IS H.F. AMPLIFICATION NECESSARY?**

The Editor, POPULAR WIRELESS.

Dear Sir,—Since you very kindly published my letter giving my "DX" results for the 1926/27 winter, under the heading of "Is High Frequency Amplification Necessary?" I have received so many letters from fellow wireless enthusiasts—well over 70—asking for particulars of circuit, components and layout, etc., that I find it a dire impossibility to answer all personally—as much as I should like to. So I am taking the liberty of writing to you in the hope that you may be able to spare a little of your valuable space for the publication of this further letter.

Before I proceed, I should just like to mention that my set is situated in a very good wireless locality at about 50 miles from the local station, and I therefore do not suffer from interference; and I am sure this factor, coupled with the use of a very efficient aerial, enables me to "reach out" so successfully.

As will be seen from Fig. 1, the circuit is perfectly straightforward, consisting of a detector valve incorporating a form of Reinartz tuner so arranged that the moving vanes of both grid-tuning and reaction condensers are earthed. This is very important, since it leads to the suppression of hand capacity effects—so disastrous to fine tuning. Following the detector valve are two transformer-coupled low-frequency stages, one or both of which can be used at will; plug and jack switching being employed. The circuit is a well-known one, and is used in this or slightly modified form in all the "straight" short-wave, etc., receivers described in "P.W."

To give the circuit diagram by itself is of no value, since so much depends upon the design, lay-out and

**CORRESPONDENCE.**

**IS H.F. AMPLIFICATION NECESSARY?**

**H.F. LEAKAGE—NOT SO SERIOUS AFTER ALL?**

Letters from readers discussing interesting and topical wireless events, or recording unusual experiences, are always welcomed; but it must be clearly understood that the publication of such does in no way indicate that we associate ourselves with the views expressed by our correspondents, and we cannot accept any responsibility for information given.—EDITOR.

A rough idea of the disposition of components on baseboard will be seen from Fig. 2 which, while not to scale, will give some idea of relationship of one component to another. The high-frequency choke should be kept well away from the tuning coils, and can be placed quite near the first L.F. transformer. This choke is quite an important component, and should be capable of "choking" on all waves

between valve legs removed—will be lost. All grid leads must be kept short, and the grid leak and condenser (Dubilier) should be soldered straight on to the (grid) valve leg. The two L.F. transformers are "Ferrantis" (3-1), and should be placed at right angles, as far away as possible from each other and earthed, with correct grid bias applied—according to make and type of valve used. No extra condenser should be placed across the primaries as one is already included inside each transformer.

Tuning is simple, there simply being two dials to rotate. With correct coils, etc., inserted, rotate C<sub>1</sub> until station is received, and increase volume by rotating C<sub>2</sub> towards its maximum reading. If this fails to bring set into oscillation, reversing the leads to reaction coil should be tried.

Valves in use are:

V<sub>1</sub>—Cossor (Point 1—Det., or L.F.) with 60v. H.T.

V<sub>2</sub>—Mullard P.M.1—L.F. with 80v. H.T.

V<sub>3</sub>—Cosmos S.P. 18/RB double red spot, with 100v. H.T., all taking a 2-volt filament supply.

Coils in use are "Edison Bell" and "Igranic," and are to be recommended owing to their air-spaced windings. The following coils should be used:

Wave	IGRANIC SHORT WAVE.	Aerial	Reaction
20 to 45 metres	4	6	6
31 to 70 "	6	9	9
45 to 120 "	9	15	15

Wave	EDISON BELL.	Aerial	Reaction
300 to 520 metres	50	50	50/75
Davenport	200	150	150

Coils for other wave-lengths accordingly.

If great power is to be handled, two power valves can be placed in parallel in the last L.F. stage. Again asking your forgiveness for the length of this letter, and thanking you in anticipation of relieving me of an almost impossible task, I beg to remain, dear sir, Yours truly,

Bedford. BERNARD B. STONEBRIDGE.

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**H.F. LEAKAGE.**

The Editor, POPULAR WIRELESS.

Dear Sir,—I was highly interested in your reply to W.B. (Devsbury, Yorks), re H.F. installation, as this is a subject that has often puzzled me. Is H.F. leakage such a serious thing, after all?

Some years ago I had an aerial which had been up some time and had got badly corroded. Now I cut that portion of the aerial which was part of the down lead and bound it together (not too tightly either) with a piece of string, taking care that only the corroded parts touched and not the clean metal that was cut.

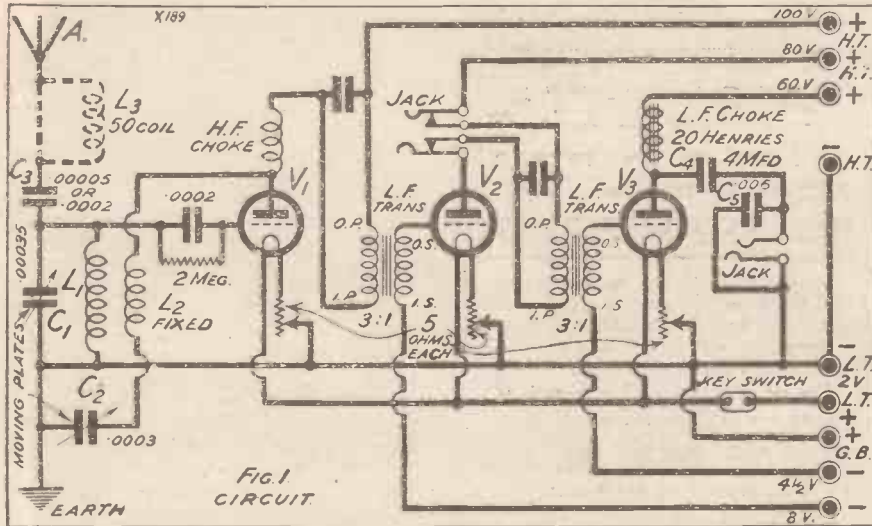
Results? Not a bit of difference from the soldered connection, excepting, of course, a very slight additional capacity was needed across the aerial coil to tune in. This applied to crystal set, 1-v-1, and 0-v-1, and to both British and Continental stations.

We are told to solder our lead-in, and also we are told we can put a fixed condenser (even as low as '0001 in the aerial lead!

I have run an aerial lead close to the wall, and I have brought it through the window clean to the centre of a room, and the only result was variations in tuning.

In conclusion, I believe it is what we pick up on the aerial that matters, and losses and leakages are not so serious as we are led to suppose.

Your faithfully, A. S. POSNER.



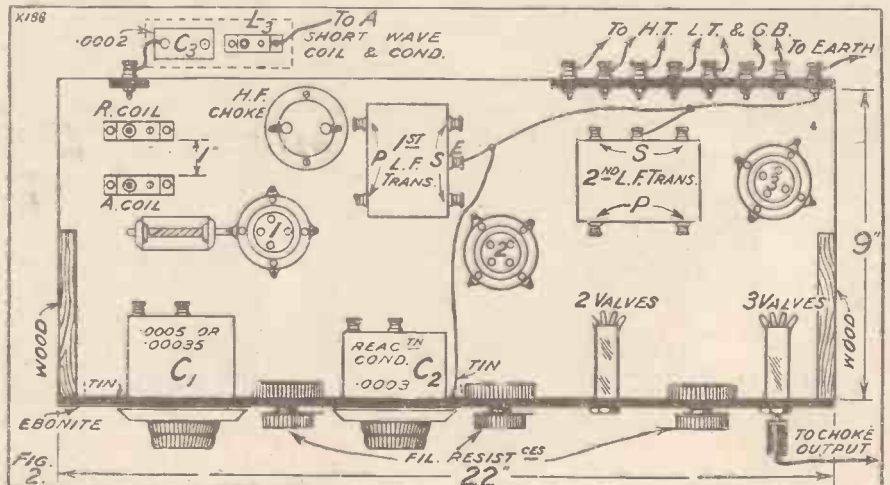
correct choice of components. As was previously stated, the set was designed for efficient short-wave reception (down to 20 metres), and, therefore, great care had to be taken in the choice and arrangement of components. In fact, the detector portion of the set was re-wired and re-spaced six times before complete satisfaction was obtained, and, after all, if one can insure complete satisfaction and stability on short waves, there should be little to worry about on the higher B.B.C. waves.

A choke-condenser output system is employed, relieving the loud-speaker windings of the high-tension current, and making possible the use of the one wire—return to earth—extension system. The size of the condenser across the loud speaker, of course, depends upon the size and type of loud speaker used. In my case the output system forms a separate unit.

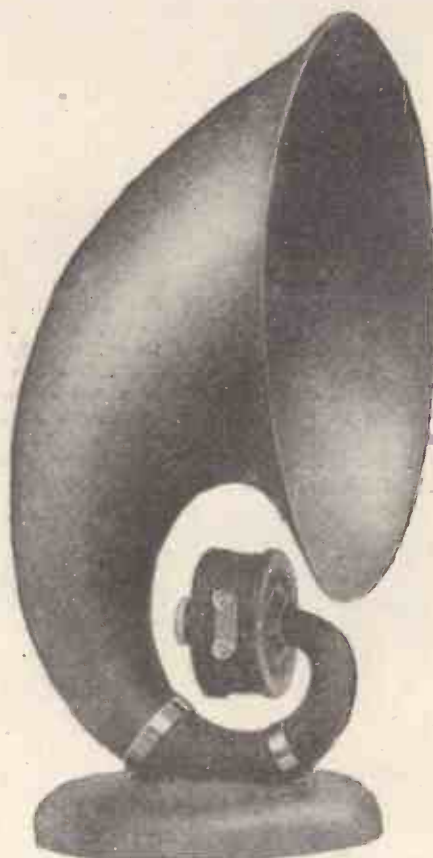
All values are marked on circuit and should be strictly followed, and all components should be of the best procurable. For the short waves a 50-turn coil is inserted at L<sub>3</sub>, and C<sub>3</sub> is a '00005 or '0001 condenser—"plug-inable" type—while on the B.B.C. bands L<sub>3</sub> should be shorted, and a '0003 condenser inserted at C<sub>2</sub>. The object of L<sub>3</sub> is to remove the natural wave-length of the aerial well above the short-wave band being received, and it, therefore, removes damping effects. In fact, if a long aerial is used the set will not oscillate on waves below 60 metres without this 50-turn coil. Selectivity with this arrangement is very good unless the reader lives very near a B.B.C. station, when I should advise the use of a wave-trap.

As the moving plates of both tuning and reaction condensers are at earth potential, a sheet of tin can be inserted between the frames of condensers and the ebonite panel, eliminating all traces of hand capacity—even on 20 metres. Ormond S.L.F. condensers are used—having, by the way, a very low minimum capacity—and these are provided with an earthing plate. Ormond 55-1 ratio vernier dials are used, and are quite essential if fine tuning is to be accomplished.

from 20 to 3,000 metres. The only two I have found to function efficiently in this respect are "R.I." and "Varley." The coil holders for L<sub>1</sub> and L<sub>2</sub> are mounted—coupling fixed—at about one inch apart, and the aerial lead is brought in the back of cabinet, after passing through L<sub>2</sub> and C<sub>3</sub>, which are mounted on the outside of cabinet so as to be kept well away from the tuning coils. The detector-valve holder must be one of the anti-phonetic, anti-capacity type, or the advantage—on short waves—of using the "Cossor" valve—a valve with all superfluous



# THE FERRANTI SPEAKER



PRICE £3 : 3 : 0

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---



# Apparatus Tested

Traders and manufacturers are invited to submit wireless sets and components to the "P.W." Technical-Department for test. All tests are carried out with strict impartiality in the "P.W." test-room, under the supervision of the Technical Editor, and the general reader is asked to note that this weekly article is also intended to provide a reliable and unbiased guide as to what to buy and what to avoid.—EDITOR.

### VALVE PRICE REDUCTIONS.

**T**HE Dario Micro Bivolt valve, which takes the very low filament current of .05 amps. at 2 volts, has been reduced in price to 7s. 6d., and not 5s. 3d., as recently stated in these columns. Also, the Dario Super-Power Valve retails at 10s. 9d., and not 7s. 6d.

These valves are handled by Impex Electrical, Ltd., of 538, High Road, Leytonstone, London, E.11, and from them we have received a Radio Micro Special .06 valve for test. This is one of the oldest types of valves handled by the Impex people, and it has enjoyed considerable popularity. It is the genuine "Radio Micro," a useful and economical valve, consuming but .06 amps. at 3 to 3.5 volts. It is a well-made valve and has not the "rawness" of appearance of many similar foreign productions.

It makes a very good detector (grid leak

and condenser stage) and is just the sort of valve required in many one-valvers. Its impedance is too low to render it of much service on the H.F. side, but in some first L.F. stages it operates quite satisfactorily. It is certainly one of the most successful French valves obtainable in this country.

### A SUPER TWO-VOLTER.

For the first time a super-power valve is available in the 2-volt class. This is the D.E.P.240, and samples have reached us from both "Osram" and the Marconi people. The following are its characteristics: Fil. Volts, 2; Fil. Current, 0.4 amps.; Amplification Factor, 3.5; Impedance, 3,000 ohms. Price £1.

The D.E.P.240 is a most extraordinary little valve, and represents a real achievement in valve design. Its characteristics are actually superior to those of the D.E.5a, a well-known super-power valve

in the 6-volt class, and it can handle a grid swing of 30 volts.

Hitherto, although it has been admitted that for H.F. work and detection 2-volters are well able to hold their own, it had to be conceded by even the most rabid of 2-volt enthusiasts, that one had to go to the 6-volters when it was desired to handle really powerful signals on the L.F. side. But this D.E.P.240 appears to bring the 2-volt class well in line with 6-volters, and it will no doubt be hailed with delight by thousands of amateurs desirous of operating cone and other such speakers economically and with efficiency.

A super-power valve is a valve capable of handling a very large input without distortion, and, as we have said, the D.E.P.240 can do this and fully deserves the title. And it seems strange to be operating a 2-volter with upwards of 15 volts grid bias, or at least it appeared to be strange to us, but with 120 volts H.T. the D.E.P.240 requires it.

We have had this new 2-volter in the last stage of a five-valver, and it was able to handle a considerable volume without the slightest signs of distress.

Apparently it derives its wonderful characteristics mainly through the use of a very long "W"-shaped filament, and it is stated that this is the first time such has been successfully incorporated in a 2-volt valve. The filament current consumption might be considered high in comparison with those of many other types of 2-volters, but remembering the results obtainable in point of power carrying capacity, it must be reckoned as current

(Continued on page 302.)

**WAS 24 NOW 12/6**

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 SUPER SENSITIVE TELEPHONES.

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Tungstone, with its two Perfectly Scientifically Balanced H.T. Plates, without Wood Separators, is far more efficient and steadier in working with assured longer life than when three unbalanced Plates are used necessitating Wood Separators.

All Tungstone High Tension Plates are SCIENTIFICALLY BALANCED in correct weight proportions of the Grid and Pure Lead Paste, so that the Ampere Hour Capacity is evenly used up by an automatic proportional discharge of current from Positive and Negative Plates securing steady voltage. No abrupt changes in the potential. The drop slow and imperceptible. No Wood Separators prevent Voltage fluctuations due to polarization and internal resistance which is negligible. No frothing or foaming. No Sulphation. No Parasitical Noises in Phones or Loud Speaker. No sudden Plate failure at a critical moment demanding Voltage adjustments. The respective Plates are Certain to get their required proportionate charge of current. If correctly first charged is a guarantee against uneven strain and irregular drain on Plates on Charge and Discharge, and there is no chance of a separate Cell discharging and reversing long before the others. The loss of charge on standing is low and the local action small.

The open Circuit Voltage will give due warning of the approach of the Battery to a discharged state. As H.T. Cells are small it is difficult to test the Specific Gravity. Balanced Plates allow greater dependability to be placed on voltage readings. Cells are not permanently ruined by being left standing for months.

### A FULL CHARGE IS ALWAYS SECURED IN SHORTER TIME AT LESS COST

All De Luxe H.T. 3 a.h. Tungstone Accumulators from 12 to any Volts are fitted with a Patent Charging Equipment whereby each series of 12 Volts can be coupled in parallel so that they can be charged to the full on a 12-16 Volt Charging Plant.

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TUNGSTONE ACCUMULATOR CO., LTD., The Independent Battery of the British Empire,  
3, St. Bride's House, Salisbury Square, London, E.C.4.

**APPARATUS TESTED.**  
(Continued from page 300)

very well spent. That it is now possible to operate a large multi-valver throughout with 2-volt valves and obtain 6-volt results must mean a very appreciable further advance in the popularity of the 2-volter



Senator Guthrie broadcasting from the 3 L O station, Melbourne, a running commentary on the Waterloo Cup at Geelong.

which already heads the list of voltage classes in this respect.

**AN EFFICIENT CRYSTAL DETECTOR.**  
E. T. Brewin, of 10, Adelaide Road,

Richmond, Surrey, recently sent us one of his "Champion" semi-permanent crystal detectors. This is of the now familiar design of a small barrel having a small knob for adjusting purposes. A milled nut at the one end permits single-hole panel mounting and forms one connecting point, and a similar milled terminal at the other end completes the circuit.

The detector is of the double crystal type, and it is very sensitive. There is no difficulty whatever in finding a sensitive point, and once "set" the detector retains its sensitivity for very long periods even if subjected to a certain amount of mechanical vibration. It is stable, too, and will stand considerable inputs and can, therefore, be used in reflex receivers. Mechanically, it is not what we should style "well made," but the little device certainly operates efficiently, and this is the main requirement for such a component.

**"DAREX" SAFETY FIRST TERMINALS.**

Loose battery leads are a very great source of danger; if one of the H.T. leads is disconnected and left for a moment hanging loose some evil spirit frequently seems to possess it and make it snake across to an L.T. terminal with a consequent burn-out of valves. Again, two loose accumulator leads can cause a very violent short circuit in which red hot wires and real risks of fire prominently figure. All this can be avoided by using "Darex" terminals, which are made by the Darex Radio Co., of Forest Hill, London. These are very ingenious. They consist each of a plug and a socket, but the socket part is affixed

to the end of the lead and the plug to the panel. The socket part has all its metal protected by an insulating material and cannot make contact with anything it knocks against. Additionally, special H.T. and L.T. types are available and the former are smaller in size. Thus it is impossible accidentally to plug the H.T. leads on to the L.T. plugs for the simple reason that they will not fit. The terminals cost 6d. each, and we can hardly think of a better investment for the amateur in the case of his "household" set, or even for his experimental hook-ups for that matter!



One of the latest drawings by Louis Wain, the original of which was offered for sale at Olympia, on behalf of a charity, by the B.T.H. people.

# Have you tried this new Lewcos Coil?



Two Centre Tapped Coils for B.B.C. and Daventry Ranges have now been added to the famous range of LEWCOS Plug-in Coils. Wound with Litz wire, they maintain, in construction and performance, the high standard of efficiency as the ordinary type Inductance Coil. Obtainable from radio dealers everywhere.

Coil No.	'00003 mfd.	'00025 mfd.	'0005 mfd.	Price each	100	297	652	885	<b>5/3</b>
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60	188	391	555		<b>LEWCOS "X" COILS (Double Tapped).</b>				
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				X 200	595	1410	1960	<b>7/-</b>	

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10 ft. Coils	1/2 10d.
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# LEWCOS CENTRE TAPPED COIL

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# GREAT WIRELESS INVENTION.

ELIMINATING THE ACCUMULATOR.  
 DETAILS OF AN AMAZING NEW SET.

(By L. FINER.)

The sensation of this year's Radio Exhibition at Olympia is undoubtedly the new General Radio Model.

This new set has some very remarkable points of advantage and of advanced design.

The new features include a revolutionary invention which will rid your wireless for ever of its greatest bug-bear—the Accumulator.

No longer will you have to trudge to the local garage to get your Accumulator re-charged; no longer need you experience the failure of your set through lack of "juice" just at the most entertaining part of the programme. The new invention called the "Filonator"—sees to that. It can be re-charged at home in a minute or so by the simple process of dropping in compressed tablets supplied by the makers at 1s. a charge. One charge lasts about six weeks with average use on a good Loud Speaker set.

The sole rights of this important and far-reaching invention have been acquired by the General Radio Co., Ltd., of 235, Regent Street, London, W.1., who are now supplying this "Filonator" as standard equipment, at no extra cost, with their new model.

### OTHER NEW FEATURES.

The new General Radio model has other startling new features of advanced design. There is a patent "Astatic" vario-coupler which provides perfect selective tuning of great sensitiveness with only *one* control. This means that anyone can master the set and get the best possible results in a few minutes. New double power and double life valves are fitted. A patent "magnetic-cone" Loud Speaker is built into the set, thus doing away with the now unnecessary horn and giving far greater volume and purity of tone.

### THE HONEST POLICY.

One great feature of the General Radio Co.'s announcement is that they quote an "all-in" price for their sets. Many firms just now are offering Two-Valve or Three-Valve "receivers" for from 50s. to a few pounds. These "receivers" are really only the shell of the wireless set. They contain no Valves, no Accumulator, no Battery, no Loud Speaker, and the royalty is not even paid!

It will easily be seen that the new General Radio set is far better value at its all-in price of £12 cash (or 20s. down and deferred terms). This price also includes their free installation and service after purchase anywhere in Great Britain.

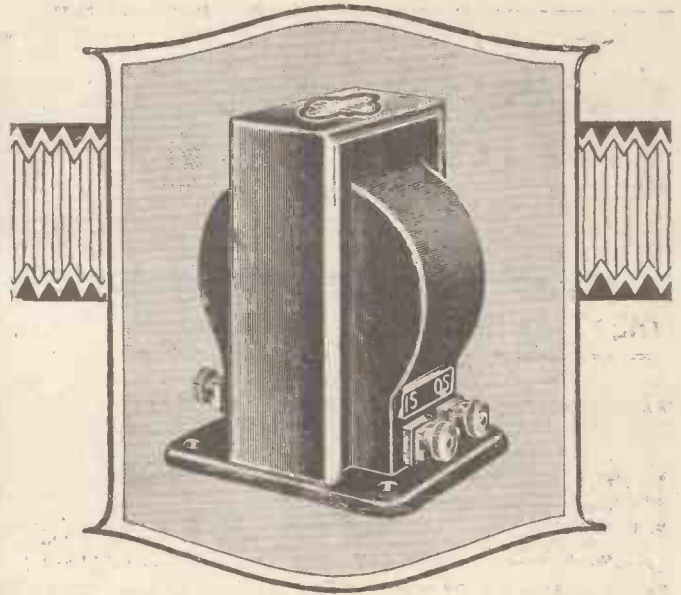
Intending purchasers of wireless sets this winter could not do better than secure full particulars of this fine-toned powerful Loud Speaker set, and I understand that their new descriptive catalogue will be sent to anyone on receipt of a postcard.

## ANNOUNCEMENT.

GENERAL RADIO CO., LTD., announce a new range of Cabinet Receiving Sets. These sets need no Accumulator. The new patent magnetic cone Loud Speaker and all accessories are built inside the handsome polished walnut case. Prices are unchanged at £12 cash, or 20/- down and 20/- a month for 12 months. Free installation anywhere in Great Britain. Send a postcard for the new Catalogue. No. E31.

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It is Igranitic "G" Type L.F. Transformer—the latest product of Igranitic research. For high amplification and faithful reproduction of all audible frequencies it is unapproached by any other instrument at present obtainable. Whenever L.F. Transformers are needed, use Igranitic "G" Type. Totally enclosed to prevent interaction, and wound to entirely eliminate breakdowns.

It is made in two ratios—3.6 to 1 for use in first and single stages, and 7.2 to 1 for second stages and for use with low impedance valves.

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# RADIOTORIAL

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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 receivers. As much of the information given in the columns of this paper concerns the most recent developments in the Radio world, some of the arrangements and specialities described may be the subject of Letters Patent, and the amateur and the trader would be well advised to obtain permission of the patentees to use the patents before doing so.

## Questions and Answers

### CHOKO FILTER FOR NEW VALVE.

H. C. E. (Gravesend).—"Since fitting a new last valve to my set I have been troubled by occasional distortion on loud notes, and I am told that this would probably be eliminated if

I employed a choke-filter circuit for the output instead of running the anode current through the loud-speaker windings. Is it possible that the filter would effect a cure?"

It is quite possible that a heavier-than-formerly anode current will introduce distortion owing to magnetic saturation, and in any case the advantages of a filter circuit are so great that we should advise you to adopt this method.

### SHORT WAVE-LENGTHS AND HARMONICS.

"SHORT-WAVE SEARCHER" (Newquay, Cornwall).—"What wave-lengths are now being used by K D K A, the East Pittsburg short-wave transmitter?"

K D K A has two regular short-wave transmissions, on 62-00 metres and 14-00 metres respectively. In addition, this station is often picked up in Europe and at other long distances on the third harmonic of the 62-metre transmission, i.e. upon 20.6 metres. This, however, is not a separate transmission, though sometimes this harmonic is easier to pick up than either of the genuine transmissions upon 62 and 14 metres.

### GOOD ONE-VALVE AMPLIFIER.

T. J. (Thornton Heath, Surrey).—"I get 5 G B all right and several of the European stations, but of course not so well as London, which is received strong and clear. I should like to bring these other stations up a bit, and am thinking of adding a one-valve amplifier for that purpose. Where can I get particulars of a good unit of this kind?"

You will find a how-to-make description of a unit of this type in the September issue of "Modern Wireless." It is called "A Modern Amplifier," and incorporates a volume control and a filter circuit for the output, a system which has many advantages.

### USE OF SUPER-POWER VALVES.

S. E. (Abingdon, Berks).—"Recently I purchased one of the new super-power valves, and, although it is intended for a new set I am making, I tried it out on my old receiver to

(Continued on page 306.)

## AT LAST!!!



A Resistance that cannot vary no matter how treated or overloaded—even boiling in water will not affect it—fitted with terminals and soldering tags—fits in either series or parallel with our condensers direct.

GUARANTEED ACCURATE.

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50,000 ohms to 1/2 meg

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\*003 to \*006 .. 1/6

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Remember, too, that the "Voltron" has the hardest vacuum—triple pumped—a unique "Voltron" feature—a guarantee of long life.



Price does not form a basis of comparison. You may pay more, you may pay less, but you cannot buy a better Valve than Voltron.

- Type 202. H.F., Det., L.F. 1.8 volts. 2 amps. 5/9
- .. 201. H.F., Det., L.F. 1.8 volts. 1 amp. 7/6
- .. P.2. Power .. 1.8 volts. 2 amps. 9/-
- .. 401. H.F., Det., L.F. 3.7 volts. 1 amp. 7/6
- .. P.4. Power, 3.7 volts. 1.5 amps. 10/9
- .. 601. H.F., Det., L.F. 5.5 volts. 1 amp. 12/-
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 169, City Road, London, E.C.1

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**FOR LONG SERVICE—NO ATTENTION**  
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- ADVANTAGES:**
1. Do not need periodical re-charging (particularly useful in Country Districts).
  2. Require no attention whatever.
  3. No acids to spill.
  4. No Fumes.
  5. Can be placed in any position.

When an accumulator is used with low current consumption valves, there is always the danger of over-discharging (i.e. running the battery down well below the normal limit when re-charging should take place). This results in excessive sulphation leading to accumulative deterioration of the plates, a disadvantage which is not present with the L.T. Dry Battery. Its abundant energy can be used therefore to the full.


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**CATALOGUE No. 650**  
*deals fully with the L.T. Dry Cells and Batteries, and will assist you to choose the correct type for your set. It also contains much interesting material concerning the care and maintenance of Radio batteries, and a complete price list of the Siemens range. Post free upon request.*

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Complete instructions and other information are contained in our 6d. manual which will be forwarded to you free on receipt of 1½d. stamp. Send to-day to—

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ALL communications respecting advertising must be made to—  
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## RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 304.)

see the effect. Instead of being a great improvement, as I expected, there was nothing to choose between the super-power and my old power valve. True I did not increase the H.T. in use, but surely there ought to be a big difference, even without more high tension?"

We are afraid that you have been a little misled by the term "super power." This does not mean that a valve will give super-powerful reproduction when compared with an ordinary power valve, on the same set. But it means that the super-power valve is capable of handling far more volume than a power valve.

For instance, suppose that the B.B.C. decided to put up a powerful broadcasting station quite close to Abingdon (this, of course, is pure supposition, there is not the faintest prospect of such a thing happening, so far as we are aware), the effect would be to put such a powerful input into your receiver that the loud speaker would fairly "jump," and your last valve, if a power valve of ordinary type would be hopelessly overloaded. It being unable to handle the output from the set, signals would be frightfully distorted, and you would have to de-tune the set until the strength was no better than when you were receiving from 2 L.O. But if instead you fitted a super-power valve in the last stage, it would be able to handle enormous power without distortion, and you would get full benefit of the louder signals.

In the same way an ordinary power valve can handle the output from a small set quite satisfactorily, and the use of a super-power valve in such a set will not improve reception. This is what is happening in your present case. But if you are building a more ambitious set, the superior power it will develop will require a super-power valve, and the advantages of this type over the ordinary power valve will become apparent.

(Incidentally, we should not have been surprised to find that your super-power valve gave less volume than the other in the way you have tried it, for its amplification factor is likely to be much lower than that of the other valve. But when used with a correct value of H.T. and grid bias, as the last valve of a powerful receiver, you will find it fully lives up to its name of "super" valve.)

### CUTTING DOWN THE VOLTAGE.

S. C. (Hackney Downs, London, E.)—  
"What value of resistance should be used to reduce the 200-volt mains down to 45 volts?"

You do not give sufficient data to enable us to say definitely, as it is necessary to know how much current it is required to pass at 45 volts before the value of the requisite resistance can be given. If, however, the 45 volts are required to supply the H.T. to a detector valve, the resistance required will usually be of the order of 50,000 ohms.

### RULES FOR RESISTANCES.

L. R. (Forest Gate, E.7.)—"Should not the first example given on page 32, 'P.W.' 274, read 15,000 ohms, instead of 16,666?"

Yes, 15,000 ohms is correct.

### CARE OF ACCUMULATORS.

S. G. (Fakenham, Norfolk.)—"Not being used to anything of the kind, can you give me some hints upon looking after my new accumulator?"

To begin with, a new accumulator should be given a good start by making sure that its first charge is given in accordance with the makers' instructions. The acid used should be of the exact specific gravity recommended in the instructions which accompany every new accumulator.

After the first charge, a new battery should be given plenty of work to do until its plates have "formed."

Charging and discharging the battery should be done only within the limits laid down by the makers. No accumulator should stand for long periods in a discharged or partly discharged condition, or sulphating is pretty sure to commence.

A watch should be kept to see that sediment does not form at the bottom of the cell, as if this is allowed there is a possibility of serious damage.

The specific gravity or "strength" of the acid should be tested frequently with a hydrometer.

The plates of the accumulator should be covered by the acid, and any losses by evaporation of the electrolyte should be made good by the addition of distilled water.

Finally, the exterior of the cell should be kept clean and in good condition, the terminals being kept thinly coated with vaseline to prevent them being attacked by the acid.

### STABILISING RESISTANCE.

"EXPERIMENTER" (Jersey).—"I am building up a three-valve circuit from a theoretical diagram in an American magazine, and there is only one thing I do not understand. Half-way along the tapped aerial coil is connected a 'stabilising resistance,' the other end of which goes to L.T. negative. What is a stabilising resistance? How many ohms should it be, and what is its purpose in the circuit?"

The "stabilising resistance" is an ordinary non-inductive resistance, like that used, for instance, for resistance-capacity coupling. Its resistance should be high, but is not at all critical, and generally is of the order of 100,000 ohms (1 meg.), or more.

The purpose of the stabilising resistance is to damp out parasitic oscillations. These readily occur in neutrodyned circuits at frequencies other than those to which the set is tuned, but the insertion of the resistance at the point named checks them, while not interfering with the ordinary operation of the set.

### L.S. FILTER UNIT.

"CHOKE-COUPLED OUTPUT" (Southport, Lancs).—"I wish to employ a large choke-coil that I possess for the purpose of 'filtering' the output from my three-valve set. The choke is marked '20 henries.' Is this a suitable value, and what is the minimum number of condensers that I can use with it to form a complete filter unit?"

The choke is quite suitable, and you need have only one extra condenser, with a capacity of 1 mfd.

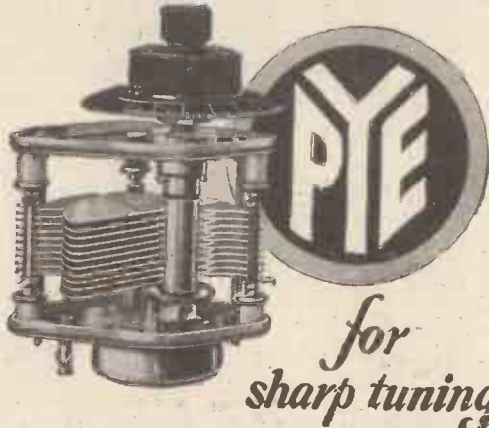
### CONTENTS OF DRY BATTERY.

D. H. (Paisley).—"Opening up old dry-cells from batteries generally discloses some sawdust, or other similar material, at the top of the cell. What is this for?"

Although a dry-cell or battery has no liquid electrolyte like a wet battery, it has the equivalent in the form of paste. Moreover, when the cell

(Continued on page 310.)

You must have a  
precision instrument



for  
sharp tuning

Modern radio circuits call for critical tuning—critical tuning demands precision condensers—precision condensers means Pye condensers for accuracy and reliability. Pye precision condensers are scientific instruments made one at a time with great care. You need them to get the best from your set.

PRICES—'0001, '0002, '0003 Mfd. 17/6 each.  
'0005 Mfd. 18/6 "  
'00075 Mfd. 22/6 "



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CAMBRIDGE.

Certainty!  
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& OTHERS

With **BRITISH GENERAL**

AERIAL TUNING UNIT

STANDARD  
MODEL

18/6



DE LUXE  
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30/-

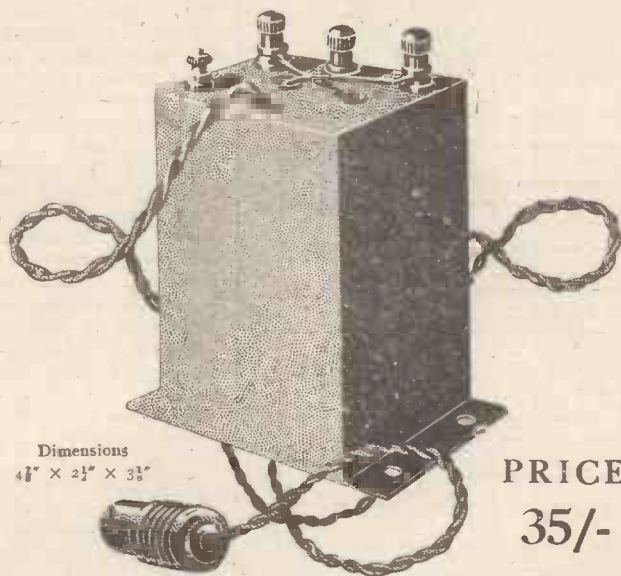
Any wave-length from 250-2,000 metres by means of a simple 10 Stud Tapping Switch. No plug-in coils required; reaction smooth over entire wave-band. Simple two-hole fixing. Can be obtained from all reputable dealers or direct from

BRITISH GENERAL MANUFACTURING  
CO., LTD., Brockley Works, LONDON, S.E.4.

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*Save the money you spend on  
H.T. Batteries*

Why not use power direct from your house electric supply and have the benefit of this wonderful radio convenience? The initial outlay is small and upkeep costs next to nothing. Simply plug the unit into an ordinary lampholder and you obtain continuous and steady H.T. Supply requiring no attention or refilling, no adjustments or H.T. renewals.



Dimensions  
4 1/2" x 2 1/2" x 3 1/2"

PRICE  
35/-

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For One or Two Valve Receivers.

Designed to provide H.T. from direct current mains for receivers employing not more than 2 valves. Its simple and sturdy construction ensure unfailing reliability. All components and wiring are enclosed in a sealed metal case, the whole unit being extremely compact so that it will fit into any existing battery compartment or pedestal. Ample smoothing is provided and an unusual refinement is the possibility of reversing the smoothing circuit to cope with exceptional cases which may arise in areas where a "3-wire" system is in use. The current consumption is only 1/20th of that of an average electric light bulb.

Two models are available, one for supply voltages between 100 and 125 and the other for between 200 and 250 volts.

MARCONIPHONE MODEL D.C.2 H.T. SUPPLY UNIT for DIRECT CURRENT. With output more than sufficient for any standard receiver. Two models suitable for use on 100 to 250 volt mains. Price each 82/6

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**2 Volt**  
**Osram**  
**Valve**

*means*

**Super Power**  
**for Your Set!**

**DEP 240**  
*Super Power Amplifying Valve*

Try this new valve in the last L.F. stage of your set to-day. You will be astounded at the immediate improvement in tonal quality.

The remarkable characteristics of the new OSRAM D.E.P.240 stamp it as a Super-Power Valve far above the ordinary—and it requires a 2-volt (one-cell) accumulator only! Particularly designed for use with cone speakers.

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are DUSTPROOF and house the whole apparatus, leaving no parts to be interfered with. All you do is **UNLOCK & TUNE IN.**

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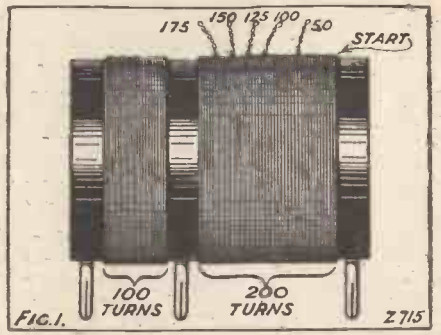
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From £4 15 0. Write to-day for descriptive pamphlet and suggestions for adapting your receiver or panel in our Standard Cabinets. Immediate Delivery.

**THE "TOURIST"  
TWO ON THE  
LONG WAVES.**

By **GEORGE T. KELSEY.**

**S**INCE the publication of the "Tourist" Two in "P.W." (No. 278), the set has been thoroughly tested out on the long-waves with satisfactory results, and for the benefit of readers who have constructed this receiver it is proposed in the following notes to give constructional



coil in the matters of turn numbers and gauge of wire. The wire required for the coil is No. 36 enamelled, and 1/2 lb. will be ample.

From Fig. 1 the exact turn numbers and tapping points can be determined, but care should be taken to see that the reaction coil is wound in the same direction as the grid coil.

Having completed the long-wave coil, the lower wave-band coil should be removed, and in its place the new coil should be fitted. It will also be necessary to change the plug-in coils, and for L<sub>1</sub> a No. 150 should be about right, while a No. 250 centre-tapped coil will probably suit for L<sub>2</sub>.

The operating instructions given in the constructional article hold good for the long waves, and it is, therefore, unnecessary to repeat them.

With regard to results, the set was tested at about 100 miles from 5 X X, and gave good results from this station.

Radio - Paris and Koenigswusterhausen were also received at sufficient strength to be comfortable in the telephones.

**HEADPHONES REPAIRED**

Rewound and re-magnetised 4/- per pair. Loud Speakers repaired 4/-. Transformers rewound 5/- each. All work guaranteed and tested before delivery. Write for Trade Prices. Phone: Clerk. 1795. **MASON & CO., 44, East Rd., City Ed., N.1.**

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Dario Radio Micro Super Power, 3.5-v. .1 amp. 10/9  
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Dario Radio Bivolt Power, 2-v. .1 amp. 10/9  
Triotron, 2-v. .05 amp. 5/9

Silver Star, 2-v. .2 amp. 5/-  
Silver Star, 4-v. .06 amp. 6/-  
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60-v. H.T. Batteries, 3-v. tapping, guaranteed 3 months 5/9

**ALL GOODS SENT POST FREE**  
TRADE INQUIRIES SPECIALLY INVITED.  
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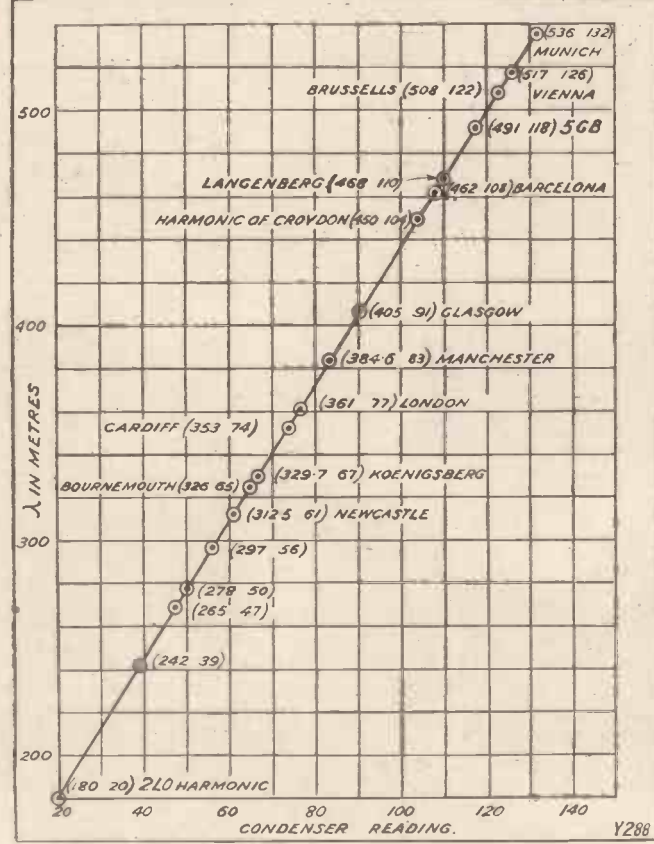
**AMPLIFIERS: 1-VALVE, 19/-; 2-VALVE, 30/-**  
2-Valve All-Station Set, £4. Approval willingly. Wet H.T. Batteries—Jars, Zincs and Sacs complete, 3/6 per doz. (18 volts). Post 9d. extra. Sample 6d. 3 doz. upwards, in divided cartons. Bargain List Free.  
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details of the special long-wave coil, together with some of the results obtained.

The coil for the Daventry range should be wound on a former having exactly similar dimensions to the broadcast wave-band coil, and it only differs from this latter

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Trays for above, 7/-

Free advice given as to best battery for your set on hearing number and type of valves.

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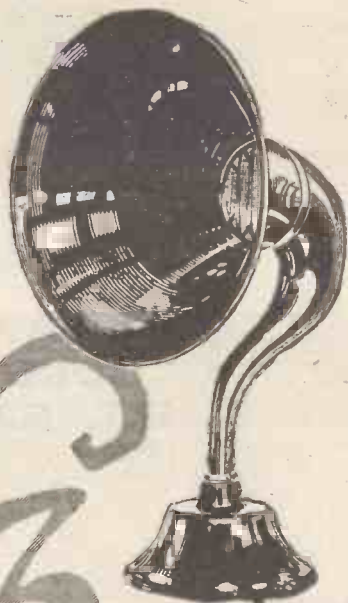
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FOR the modest sum of three pounds you can become the possessor of a full-sized, full-toned B.T.H. Loud Speaker—a speaker that has no rival in quality of reproduction or appearance, at anywhere near the same price. Quality and price considered this loud speaker is an amazing bargain. Ask your dealer to let you compare it with any other make.

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P.W. BLUE PRINT  
Number

1. DETECTOR VALVE WITH REACTION.
2. UNIDYNE DETECTOR VALVE WITH REACTION.
3. 1-VALVE L.F. AMPLIFIER.
4. CRYSTAL DETECTOR WITH L.F. AMPLIFIER.
5. H.F. (Tuned Anode) AND CRYSTAL, WITH REACTION.
6. H.F. AND CRYSTAL (Transformer Coupled, without Reaction).
7. 1-VALVE REFLEX WITH CRYSTAL DETECTOR (Tuned Anode).
8. 1-VALVE REFLEX AND CRYSTAL DETECTOR (Employing H.F. Transformer, without Reaction).
9. H.F. AND DETECTOR (Tuned Anode Coupling, with Reaction on Anode).
10. H.F. AND DETECTOR (Transformer Coupled, with Reaction).
11. DETECTOR AND L.F. (With Switch to Cut Out L.F. Valve).
12. DETECTOR AND L.F. UNIDYNE (With Switch to Cut Out L.F. Valve).
13. 2-VALVE REFLEX (Employing Valve Detector).
14. 2-VALVE L.F. AMPLIFIER (Transformer Coupled, with Switch to Cut Out Last Valve).
15. 2-VALVE L.F. AMPLIFIER (Transformer-Resistance Coupled, with Switch for Cutting Out Last Valve).
16. H.F. (Tuned Anode), CRYSTAL DETECTOR AND L.F. (With Switch for Last Valve).
17. CRYSTAL DETECTOR WITH TWO L.F. AMPLIFIERS (With Switching).
18. 1-VALVE REFLEX AND CRYSTAL DETECTOR, with 1-VALVE L.F. AMPLIFIER, Controlled by Switch.
19. H.F. DETECTOR AND L.F. (With Switch to Cut Out the Last Valve).
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25. 2-VALVE REINARTZ (Det. and L.F.).
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# 5 G B or Copenhagen?

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Leave nothing to chance with that set of yours. Incorporate "Utility" Components—they cost no more, they're incomparable for design and finish and they are guaranteed against defect!

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**"Utility" ON and OFF SWITCH**

An efficient main switch for cutting off L.T. supply. Push-pull design, 12-point contact, to reduce resistance to the minimum. One-hole fixing; nickel-plated finish. The finest switch of the type on the market.

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It mounts above, or below, the base-board. Rigid—no end play. Ball-bearing centre spindle. No risk of accidental misadjustment.

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An improvement on our old model (which we still list) in that an aluminium dial—surveyed by a hair-line and cursor, for easier reading is incorporated. Can be fitted to ALL Condensers.

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Light—thimble solid dielectric (walls only 1/16" thick). Vernier pattern fitted with our Micro Dial. One-hole fixing. Six capacities at prices from 7/6 up!



Write to the makers for Lists!  
**WILKINS & WRIGHT LTD.**  
 "Utility" Works, Kenyon St., Birmingham.

## RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 336.)

is in operation there is a tendency for this paste to "gas" like the liquid in an accumulator does, and the purpose of the sawdust is to provide a gassing-space in the cell, so that it can work normally and at the same time remain completely self-contained and dry.

### THE NEW SCREENED-GRID VALVE.

L. W. C. (Bourne End).—"What are the chief characteristics of the new shielded-grid or screened valves?"

At the time of writing the only type on the market has a magnification factor of 110, whilst the filament supply required is 6 volts and .25 amps.

The makers give the "impedance" as 175,000 ohms, the anode current being of the order of three milliamperes, and that of the screen .5 milliamperes.

### TRACING TROUBLE.

S. G. E. (Newport, Mon.).—"How can one be sure that a crackling noise heard in the 'phones is caused by something wrong in the set, and not by atmospherics?"

## THE TECHNICAL QUERY DEPARTMENT

Is Your Set "Going Good"?

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

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

This can very easily be determined by disconnecting the aerial lead from the set. If the noise has been caused by atmospherics it will now be inaudible, because no disturbance in the aerial caused by atmospherics can reach the set and affect the 'phones. But if the source of the crackling noise is in the set, or in a faulty battery connected to it, the removal of the aerial lead will not cause the noise to cease, because the 'phones will still be connected to the source of the disturbance.

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G. A. (Stowmarket).—"I am a little undecided about my earth-lead. In order to keep it as short as possible I decided to bury it right under the window from which the earth-lead leaves the house. But a friend tells me the proposed situation, being sheltered (by an overhanging roofing) from rain, will be too dry. Will the extra five or six feet necessary to take it clear of the roof be an advantage or otherwise in the circumstances?"

We should certainly not bury the earth in dry soil, as this is sure to prove unsatisfactory. Use a good stout insulated earth-wire, and lead it direct to the nearest damp soil. An extra few feet of length will not be half so detrimental as a poor contact due to dry soil.



## THE ELTAX "GOLD SEAL" H.T. BATTERY

GIVES an average discharge of 15 milliamperes. The Eltax "Gold Seal" Battery gives highest efficiency with lowest Internal Resistance and is the ideal power source for sets employing three to four valves. Every Eltax "Gold Seal" Battery is tested before leaving the factory and their

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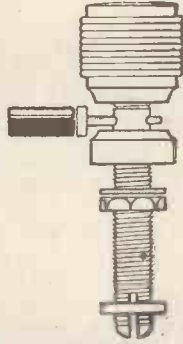
### Show you what's what

The brilliantly coloured tops enable you to recognise connections on sight. Terminals are nickel plated and take pin connectors, spade terminals or both. A coloured ring is supplied with each terminal for affixing to the pin or other connector.

Fit your set with Rainbow Terminals—they will end identification worries and enhance its appearance—in nine distinctive brilliant colours.

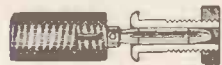
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contains everything you need to ensure simple, efficient connection. Fit your set with CLIX fittings—they have banished contact troubles for thousands.



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nickel plated with red or black insulators.

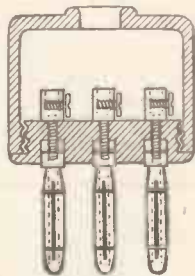
Price **2d. Each.**

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a combination terminal designed to fit any ordinary valve holder as a two, three or four way plug.

The mounting and wiring is extremely simple—the plugs being the patented CLIX Parallel type, longitudinally slotted and permanently resilient. The plugs are also free and interchangeable.



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Efesca Centadyne Screened Coils are constructed in accordance with the standard specification laid down by the technical Press and will compare favourably with any on the market.

Split Primary  
H.F. TRANSFORMER  
with optional reaction.

250 to 550 metres:

8/6 each.

1000 to 2000 metres:

8/6 each.

Aerial Coil

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5/- each.

1000 to 2000 metres:

5/- each.

Split Secondary  
H.F. TRANSFORMER.

250 to 550 metres:

8/6 each.

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**EFESCA VARIABLE H.F. CHOKES.**

The Efesca Variable H.F. Choke is subdivided into sections and tapped by a switch enabling equal efficiency to be obtained over all frequencies. Wound in staggered slots to minimise self-capacity, with tapping brought to a dead-ending switch.

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**EFESCA H.F. CHOKES.**

Wound on polished Ebonite Former with heavy gauge wire to possess low resistance, minimum self-capacity and appropriate inductance suitable for wave-lengths up to 2600 metres.

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**FALK, STADELMANN & CO., LTD.,**

*Efesca Electrical Works,*

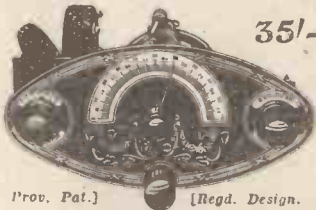
83/93, FARRINGTON ROAD, LONDON, E.C.1.

And at Glasgow, Manchester, Birmingham, Dublin, Newcastle, Cardiff

5 S C.  
(Continued from page 296.)

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Prov. Pat. [Regd. Design.]

More than half a set. No Ebonite Panel required. Can be fitted to any form of Cabinet. Complete wiring diagrams for building 2 or 3 valve Loud Speaker sets. No coils to change. Daventry, 5 GB and all local stations at good loud-speaker strength. Black and Gold or Black and Silver finish.

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Finest Ruby Mica is used as the Dielectric in a manner that it is impossible to short-circuit. Once the Condenser is set it will remain set.



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BIRMINGHAM.

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right inside the very transmitting station." "Well," said I, "he couldn't get much closer than that to his local station. Did you allow him to try the experiment?"

But it appeared that the kindly engineers had managed to dissuade the confident listener, and so it is probable that he still retains his optimism unimpaired.

The spiral staircase up which we had climbed continued through the transmitter room, and, after inquiring whether I could negotiate narrow ladders, my guide suggested we examine the aerial from a vantage point so made accessible. I must confess that I was quite dizzy after the ensuing few minutes of mountaineering. Mounting narrow ladders through pitch-dark lofts and ceiling spaces of unknown dimensions is rather nerve-racking, and I was not sorry when eventually I climbed through a small trap-door and emerged into the light of day on a platform on the top of one of the highest towers of the high building.

**The Engineer "Fan."**

From here I obtained a bird's-eye view of the whole of Glasgow. I could trace miles of the shimmering Clyde snaking its way through a mass of diminutive and tightly-packed buildings, and eventually broadening out into what I knew to be the great docks. And as I looked at the radio aerial suspended from the chimneys but, comparatively, a few feet away from me, I wondered into how many of the thousands of homes spreading away from beneath me that music radiating from it was penetrating.

"See those hills?" remarked my companion, pointing to a misty range in the far distance. "I live over there."

"And do you listen to 5 SC when you are at home and off duty?" I queried.

But it appeared that he was something of a "fan," and wandered further afield in the ether than his own station. And, for some reason, the fact that this B.B.C. engineer should spend his spare time building receivers and exploring the ether struck me as being curious, although I suppose that it was quite a natural sort of thing for him to do.

On my return from Glasgow I tried to gather together my new ideas concerning the Glasgow broadcasting station, and I found it a difficult task. On the one hand were those stories I had heard about the alleged unsatisfactory service of the station, and on the other there were the indisputable facts that everybody at 5 SC seemed to be happy and thoroughly pleased with themselves and their work. Surely, I argued, such a station, such people, are managing to do anything but antagonise their listeners? Surely they must even manage to carry on their broadcasting as satisfactorily as any other bunch of broadcasters? But only 5 SC listeners can supply the necessary answers; as I have previously stated, there is a vast difference between the "back" and the "front" of a microphone!

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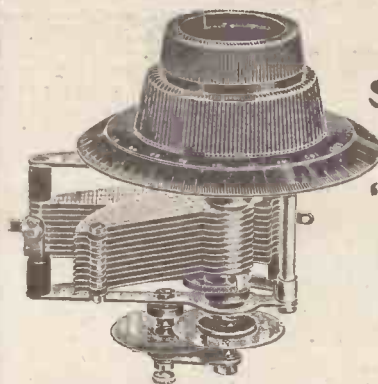
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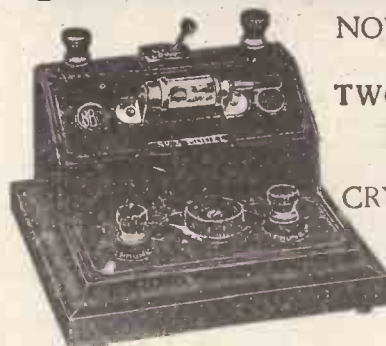
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2. The Sap from the tree is now taken by the oxen-carts to the tanks.

**W**AY back in a Malay rubber plantation our tree is giving forth its latex. This latex, or sap, is now collected in pails by the native and transferred to an oxen-drawn cart. This takes it to the factory where is begun the long process of transformation from a milky fluid into a Resiston Panel.

Only the pick of the rubber is used to make Resiston Panels. The slightest flaw which has crept in during the many stages of manufacture bars a piece of rubber from ever becoming a Resiston Panel. Utter purity is the Resiston Standard.

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Resiston Panels come in 13 stock sizes in black and Mahogany-grained. From 6 in. x 9 in. in black, 3/5, to 8 in. x 30 in. Mahogany-grained 19/-.



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## THE DEMPSEY-TUNNEY BROADCAST.

It seemed nothing short of marvellous that the evening of the great Dempsey-Tunney fight should coincide with the best evening I have ever known for short-wave transatlantic telephony.

From 11.30 p.m., when 2 XAF was first tuned in, until 4.45 a.m., when the great fight finished, not once were signals lost, and every item of the fight, even to the clicking of typewriters by business-like reporters at the ringside, was heard with surprising clarity.

### "Here Comes Jack"

When music was first received from 2 XAF at 11.30 p.m., signals were so distinct that a strong suspicion prevailed as to the genuineness of the transmission, and I fully expected to hear an announcement to the effect that I was listening to a local amateur. However, those thrilling words "Station WGY" dispelled all doubts, and I there and then settled down to listen to what proved to be one of the most exciting broadcasts I have ever heard.

The long hours of waiting prior to the announcement "Here comes Jack," were by no means uninteresting, and even the news at 12.30 a.m. that there was to be a further talk in the series on the History of America did not effect a removal of the headphones.

### An "M.W." Set.

The set used for this reception was the "America Two," exactly as described in "Modern Wireless" for December, 1926, but with the addition of one resistance-coupled L.F. stage.

Signals were picked up on the ordinary broadcast aerial and earthing system, consisting of a wire about 45 feet long and 25 feet high and a lead to a water-pipe, unfortunately longer than is desirable.

For fear of "missing" anything, I did not change over from telephones to loud-speaker, although there was little doubt that signals were sufficiently strong for this purpose, particularly at about 1 a.m.

Throughout the whole period that 2 XAF was received (nearly 5½ hours), there was an almost unnatural absence of atmospherics; and fading, although noticeable, was never really troublesome.

### B.B.C.'s Lost Opportunity.

It is rather interesting to place on record that the average strength of signals seemed to increase up to about 1.30 or 2 a.m., after which there was a noticeable decrease, until at 5 a.m. they were weaker than at any other time during the broadcast.

In conclusion, it seemed to me to be a great pity that the B.B.C. did not attempt a re-broadcast for the benefit of thousands who do not possess short-wave receivers. Judging by my own results there is little doubt that such an effort by the B.B.C. would have been classified as one of their most successful American re-broadcasts.

G.K.

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are the best Bargain ever offered to Radio users. £10 worth of precision, Multi-range, Mirror scale, Jewelled knife-edge 55/- Instrument for ..



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7x 5, 1/-	6x 6, 1/-
7x 6, 1/3	8x 5, 1/2
8x 6, 1/4	9x 6, 1/7
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12x 10, 3/-	12x 9, 2/10
14x 12, 4/-	14x 10, 3/6
14x 7, 2/7	16x 9, 3/6
16x 8, 3/2	3 in. thick Post Free.

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THE NEW

## STUTZBERG

M.B.S. THE SUPER NATURAL CRYSTAL

## THE "DEMPSEY" ONE.

(Continued from page 282.)

not have to be re-adjusted continually when searching.

I found the provision of alternative tapping points for the aerial a decided advantage. For instance, tap No. 4 would give me the best signal strength when listening to Langenberg, Bournemouth, Brussels and Munich on the higher waves, whereas when listening on the lower waves the bottom tap, or tap No. 2, would be found more advantageous.

The choice of the correct aerial tap also had an effect on the reaction control of the receiver, and with an unsuitable aerial tap it might be found difficult on certain parts of the broadcast wave-band to obtain a satisfactory control of reaction.

### Fierce Reaction.

If it is found that reaction is very fierce, going in with a loud plonk and showing a marked amount of back-lash, this is an indication that the crystal detector is not connected to a suitable tapping and is probably not correctly set, and also that the gang condenser is not correctly matched up. You will also find that if too-large a value of negative bias is applied to the grid of the valve very harsh reaction will result.

It has been my experience with this receiver that when using 100 to 120 volts H.T. with a 6-volt power valve  $4\frac{1}{2}$  to  $7\frac{1}{2}$  volts negative grid bias is ample if smooth reaction is to be obtained on distant stations. If more negative bias is used not only does reaction become fierce, but the signal strength on distant transmissions drops.

With a medium impedance valve not more than  $1\frac{1}{2}$ , or at the outside 3 volts negative, will be required, while with a super-power valve 12 to 15 volts is indicated.

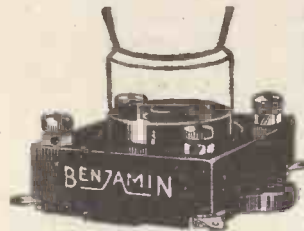
### Fairly Selective.

In many cases where an efficient aerial is in use fairly close to a local transmitter, it will be advisable to use 150 volts in conjunction with a super-power valve, since otherwise the valve will be overloaded, thus resulting in distortion due to rectification.

When tested on an aerial somewhat below the average size at a distance from London where it was necessary to use a wave-trap in order to cut out interference from this transmission, some 16 to 20 stations were picked up at varying strengths in the headphones. Besides the local transmission it was also found possible to put two or three other stations on the loud speaker although, of course, the strength was not great. 5 G B, however, was quite good at night.

Although not showing a very high degree of selectivity as regards the elimination of the local transmission a mile distant the tuning was, nevertheless, found to be very sharp. This was no doubt due to the fact that the crystal tap was used, thus allowing the crystal damping to be considerably reduced in the crystal tuned circuit.

The quality of reproduction on the local station was extremely good, and when working with the correct valve under the correct conditions my loud speaker (a Celestion) gave ample power to fill a fairly large room, whilst the tonal balance of orchestral pieces was very good. Speech was crisp and clear, and the receiver is an ideal one for local work where very great volume is not required.

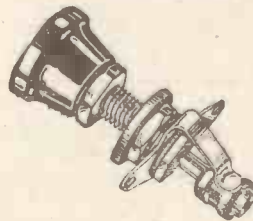


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- (1) Valve sockets and springs are made in one piece with no joints or rivets to work loose and cause faulty connections.
- (2) Valves are free to float in every direction.
- (3) Valves can be inserted and removed easily and safely.
- (4) Valve legs cannot possibly foul the base-board.
- (5) Both terminals and soldering tags are provided.

Price 2/- each



### BENJAMIN BATTERY SWITCH

A sturdy positive action switch for high or low tension. It's OFF when it's IN, thus preventing the accidental turning on of current. Single contact. One-hole fixing.

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There is a story told of a famous singer that he could sing a certain note into a wineglass and smash it into fragments by the vibration.

This is an extreme instance of the damage vibration can do. Nearer and dearer to you is the damage vibration does to the delicate filaments of your valves.

Every time a lorry rumbles past your house a wave of vibration travels to your radio set. Every time you walk across the floor another wave is sent.

The only way you can thoroughly stop vibration reaching the filaments is to fit Benjamin Anti-microphonic Valve Holders.

The smallest shock and vibration is quenched by the wonderful one-piece springs. Microphonic noises are entirely eliminated. The life of the valve is trebled at least.

# BENJAMIN

ANTI-MICROPHONIC VALVE HOLDER

PRICE 2/- EACH

THE BENJAMIN ELECTRIC LTD.

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## The "LINDLEY" "5" PORTABLE

This efficient British-made Portable Receiver has a wonderful range of reception and gives excellent volume from the self-contained Amplion loud speaker, over a distance of 300 miles from Davenport, 100 miles from the local and several Continental stations. Wholly self-contained, requires no aerial or earth, and is enclosed in handsome cabinet. All-in Price (including Royalties) **£30**

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not only give the best results, but are unlimited in use, as they can be employed in any circuit, centre-tapped or otherwise.



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a2	4/10	18
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A	5/-	30
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C	5/9	75
D	6/3	100
E1	6/9	150
E	7/9	200
F	8/3	300
G	10/-	500

There is a Gambrell Coil Holder specially designed for use with above coils which does away with all flexible leads. Price 1/9 each.

Prices Quoted Centre-Tapped 6d. Extra Coils.

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Fixed Permanent Detector and Stabilising Unit. No Batteries required with Crystal Circuits. Indispensable for Reflex Circuits. From all dealers, 2/6, or post free from Patentees, 2/8.

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Treble Capacity Sacs 1/8 per dozen  
Glass Jars - - - - 1/6 " "  
Zincs - - - - - 9d. " "

Send 8d. for samples and lists direct to the manufacturers:

THE DIRECT BATTERY CO. LOW VALLEY, BARNSELY (note change of address)

### TECHNICAL NOTES (Continued from page 278.)

eliminators) and you have all the advantages of the eliminator with the added advantage of unlimited volume and the highest possible purity.

#### Radio-photography.

A new system of enlarging photographs which are sent by wireless has been developed by scientists of the Radio Corporation of America. The possibilities of this new receiving device were illustrated at a demonstration recently, when full-size advertisements from a fashion magazine were successfully transmitted. Already it has been possible to enlarge photographs to nine times their original size, and the scientists in charge of the experiment hope soon to increase the enlargement to twenty times the original. A special sensitive paper is used for the reception, this paper being so sensitive that, according to reports, even a blast of hot air will make an impression upon it. The actual enlarging is done by a small asbestos device attached to a rubber tube, through which hot air is constantly being blown. A tiny opening at the end of the tube allows hot air to blow on the paper, making a black mark. The pictures are produced, however, by a second tube carrying cold air, the passage of which to the paper is controlled by the radio signals. If the cold air passes in front of the current of hot air, it prevents the hot current from making a mark on the paper. Thus there is obtained the succession of black dots and lines and white spaces which, when seen together, form the picture.

\* \* \* \* \*

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Among the **Special Constructional Articles**

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a Det. and L.F. Receiver with specially sharp tuning— and

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by

PERCY W. HARRIS, M.I.R.E.

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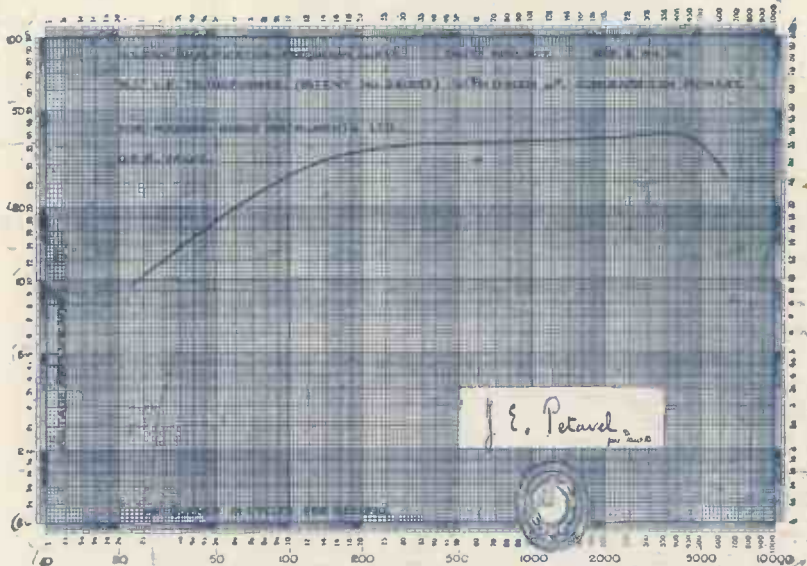
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