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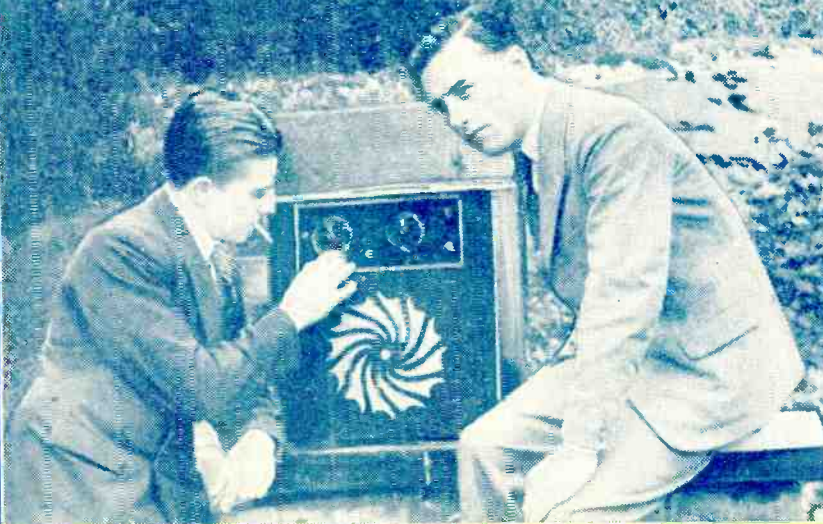
No. 429. Vol. XVII.

INCORPORATING "WIRELESS"

August 23rd, 1930.

The "MERCURY" FOUR

FULL
DETAILS
INSIDE
OF THIS
FINE
PORTABLE



OTHER SPECIAL FEATURES THIS WEEK

LOSING THOSE LOW NOTES

By C. E. Field, B.Sc.

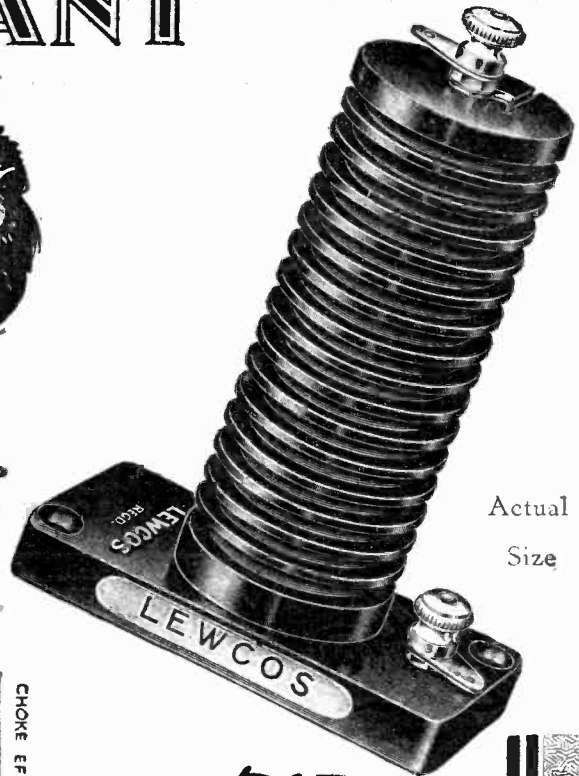
WHAT WE WANT TO KNOW

By G. V. Dowding, Associate, I.E.E.

CAPT. ECKERSLEY'S QUERY CORNER.

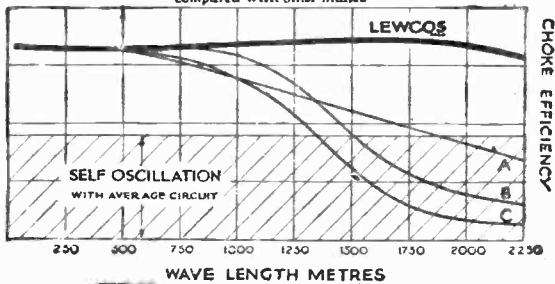
BROADCASTING YORK MINSTER

PREDOMINANT IN ITS OWN SPHERE



Actual
Size

H F CHOKE CURVES
Showing the performance of the Lewcos H.F. Choke
compared with other makes



The LEWCOS H.F. CHOKE

The Lewcos Choke is "The most efficient choke we have tested," and "Its design places it in the front rank of high-class components," writes Industrial Progress (International) Ltd., of Bristol.

A fully-descriptive leaflet, Ref. R.33, giving tested values, will be sent on request.

THE L.F. TRANSFORMER—the latest development of the Lewcos Laboratories—is the natural and inevitable bridge between the High Frequency side of your Receiver (tuned with the world-famous Lewcos Coils) and your Loud Speaker.

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THE
LEWCOS
L.F.
TRANSFORMER

VISIT OUR STAND, No. 41
AT THE RADIO EXHIBITION.

THE LEWCOS H.F. CHOKE, ILLUSTRATED ABOVE, IS SPECIFIED IN THE 'MERCURY 4' RECEIVER DESCRIBED IN THIS ISSUE.

WE ARE EXHIBITING AT



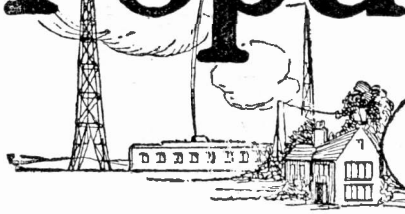
THE NATIONAL RADIO
EXHIBITION
OLYMPIA (LONDON)
SEPT. 19th - 27th 1930



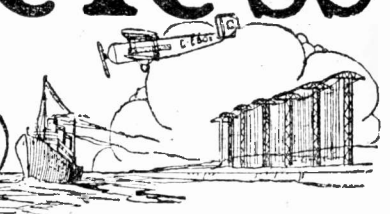
THE LONDON ELECTRIC
WIRE COMPANY AND
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Church Road, Leyton, London,
E.10.

LEWCOS RADIO PRODUCTS FOR BETTER RECEPTION

Popular Wireless



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



MORE RAIN!
G.B.S. AND B.B.C.
AMERICAN NEWS.
A CANDID FRIEND.

RADIO NOTES & NEWS

RADIO EXCHANGES.
FARADAY CENTENARY.
SPAIN TRIES AGAIN.
HOW NOT TO EARTH.

Ruminations on Rain.

STARING, for inspiration, out of the window, I see a dripping garden waved over by angry trees, wind-swept, and general anti-holiday conditions. *Pro* : Good for the lawn, the ducks and the reservoirs. *Con* : Bad for holiday-makers, cricket, cats, postmen. Worse, there are below me two hefty youngsters, one of each sort, robbed of a picnic. To content them to-day will be as easy as teaching a tortoise to use a sextant! I wonder what a woman would do with 'em! What would Amy Johnson make of the situation? Radio cannot cope with it—they grew weary of that somewhere about 1926. Shall I take off my collar and start something strenuous, or take the coward's way out—and say Daddy "is awfully busy to-day."

Ariel's Criterion.

THIS woman business is all very fine and large, all due respect being reserved for Miss. A. Johnson and her sisters of the motor car and speed boat. I am far from convinced that women are men's equals in the field of action. For one thing, they don't originate. Quote me no exceptions, prithee, lest I argue proof of the rule. However, when first a woman produces a real advance in radio practice, based on an original idea, I will bump my head thrice upon the macadam and apologise for my present refusal to be rushed off my feet because of one or two clever and charming dare-devils who don't realise their luck.

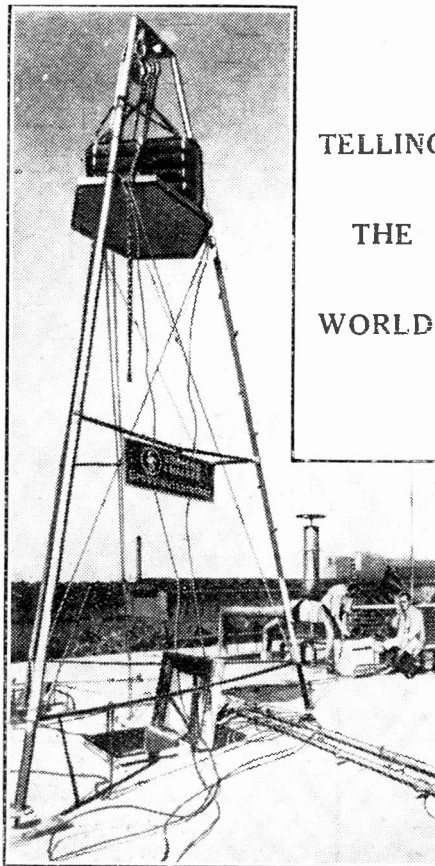
G.B.S. and the B.B.C.

MAYBE you missed your copy of this month's "Modern Wireless" because of your preoccupation with the salt sea waves and all that. Don't do it! Now that you have returned to town and your work-a-day mind, rush round till you find an odd copy. You will want to read about G. B. Shaw and the B.B.C.! Then for consideration, you are offered details of several new sets, a special section about "power for your set", a lot of short-wave matter, and many miscellaneous articles, all fresh and full of punch. A notable shillingsworth.

Another Chance for Explorers.

IT is quite fashionable nowadays to accompany expeditions all over the world—by radio. If you missed making contact with the Byrd boys in the south, why not try for the Rumanian Arctic

Expedition. This outfit sailed last month for the north, under Dr. K. Dumbrava, and is well equipped with wireless gear. Call sign: X O R C. Waves: 23, 40, and 65 metres, the last mentioned being for communication with the aircraft attached to the expedition. Who will be the first to report X O R C?



A new terror in loud speakers is this giant Siemens, which can be heard telling the world over distances up to 15 miles.

An Objection Met.

THIS being the season of *alfresco* meals, I may perhaps mention appropriately enough that the objection to the taste of the cork of the vacuum flask, which I raised some time ago, has been met, for a Colombo reader has sent me a page of a dealer's list offering vacuum flasks with glass stoppers. Another useful feature of

these improved models is the construction of the lip; odd drips do not get into the casing and thereafter come tumbling into one's drink. Good business.

American News.

LAATEST despatch from Mr. Easter. H R B (Tegucigalpa, Honduras) has raised its power to 2 K.W., and is transmitting on 79.9 metres; should be heard in Europe. Station W 8 X K, operates daily between 4 p.m. and 2 a.m., G.M.T.; and on Weds. and Sats. on two extra transmitters, from 12 noon to 4 p.m. (19.7 m.) and from 9 p.m. to 4 a.m. (48 m.). His usual wave-length is 25.4 m. The Federal Radio Commission has authorised the Mutual Telephone Co. of Hawaii to work on wave-lengths ranging from 11.9 m. to 5.36 m. for two-way radio-telephony amongst the islands of the Hawaiian group.

Something to See.

MAKE a note in advance of the International Exhibition of Inventors which is to take place Oct. 1st-11th, inclusive, at the Central Hall, Westminster, under the auspices of the Institute of Patentees. Everything there will be of interest to active-minded people and it is quite likely, indeed it is hoped, that the exhibition will stimulate not only trade but imagination and inventiveness. If you wish to exhibit some of your own work, apply to The Institute of Patentees Inc., 39, Victoria Street, London, S.W.1.

The Candid Friend.

J. A. L. (Cawood) writes one of those letters which are so artfully composed of compliments and bricks that the sum effect upon one is a sort of shot grey feeling. However, we do genuinely welcome his letter, and shall be glad to have another whenever he has something to say "to the point." He wants more short-wave articles—and other things, and this request has been handed to the editor in hope. Our policy is that although we *may* have a circulation of 2,863,947 weekly (or thereabouts!) that is no reason why we should not try to please everybody.

Have You Yachted?

THIS enquiry does not refer to the Liptonish sort of "yot." It is the latest slogan of select short-wave circles, and the "yot" in question is the yacht
(Continued on next page.)

TELLING
 THE
 WORLD!

RADIO NOTES AND NEWS.

(Continued from previous page.)

"Elettra," that is, Marconi's yacht. The inventor was still busily experimenting with his telephony-apparatus as recently as July 28, when J. P. S. was happy enough to pick up the signals on his Screened-Grid Three, a short-waver described by W. L. S. The yacht was then at sea, 50 miles from Rome. This is an item which no keen amateur should miss; no log is complete without a Marconi yacht intercept.

The British Expedition.

BUT supposing that you have already successfully yotted! Well, have you followed up the British Arctic Air Route Expedition which sailed in the "Quest," Shackleton's ship, on July 6th, to investigate an all-British air route across the frozen north to Canada. There will be a short-wave station at each base camp in Greenland, (Mullard's valves, by the way). I haven't the wave-length and call-sign by me at the moment, but I will try to squeeze them in next week.

Radio Exchanges.

WHEN the idea of a radio exchange first began to be put into practice, I used to record in these columns the opening of each new exchange. But the thing ran away from me, and now the Postmaster General tells us that at June 30th last, there were fifty-six exchanges, with a total of 12,172 subscribers who for small weekly payments receive the programmes at loud-speaker strength. I am of opinion that, subject to the vagaries of Town Councils, who have queer notions about aeriols, this system is going to grow enormously.

International Wireless Chart.

TO those who love maps and charts I commend the new international radio chart, which has been issued with the assistance of the Dansk Radio Aktieselskab. It does not register broadcasting stations, but wireless coast stations and wireless beacons and fog-signals all over the world. It measures about 45" x 33" and costs 10s. It was prepared by experts and would be a useful addition to the walls of a club or keen radio "fan." The chart is sold from the office of the Scandinavian Shipping Gazette, Copenhagen, K., Denmark.

"Dagenite."

AT first I thought that the salubrious district of Dagenham had been the scene of the discovery of a new element. But no! "Dagenite" is the name given to the new accumulator by the National Accumulator people.

I make a note of this because it is a good plan to keep an eye lifting for what other folk are using—and I happened to spot that these particular cells were used for the television demonstration at the Coliseum.

The Faraday Celebration.

THE arrangements to celebrate, in September, 1931, the Centenary of Faraday's discovery of electro-magnetic induction, which was the basis of electrical engineering are proceeding steadily under the auspices of the Royal Institution, and the Institution of Electrical Engineers. Faraday came, in 1813, a youth of 22 years, to the R.I. house in Albemarle

Street as assistant to Sir Humphrey Davy, whom he eventually succeeded as Professor of Chemistry. The celebrations are fixed provisionally for September 21st, 22nd and 23rd, 1931, followed by a Faraday Exhibition at the Albert Hall for ten days.

The Famous Diary.

THE most important celebration of all will be the publication, in 6 or 8 volumes, of Faraday's diary of his experimental work. It is hoped that two or more of the volumes will be ready by September, 1931. To book-lovers this will be an event. Even now I can smack my lips over the reading of the great man's daily notes, but I hope that in their laudable anxiety to make a good job of the undertaking the Institution will not arrange for a production which will be costly beyond the general public's pocket. At a few bob a volume there may be some hope for you and me.

SHORT WAVES.

A correspondent declares that he always sleeps with his head beneath the bedclothes. We suppose he hasn't the pluck to go next door and ask his neighbour to switch off the wireless set.—"Humorist."

"All talks on the wireless, political, or otherwise, should be confined to between 2 and 4 p.m., the only period when what pugilists call the 'sleep punch' can be usefully delivered," we read in the "Evening News." This certainly sounds quite an effective "wipe out."

OUTSIDE THE BAN.

Coventry City Council has prohibited noises by gramophone or wireless in public places. Politicians and other nuisances, however, will still be tolerated.—"Birmingham Daily Mail."

Manager of Boiler Factory: "Listen, men, we've stopped the work to tell you the B.B.C. are going to broadcast our noises—so be careful of your language."—"Passing Show."

TELEVISION AND THE THEATRE.

It is reported that Stanley Lupino, in an interview concerning the ultimate future of the theatre, recently said: "There won't be any theatres, but people will sit at home and press buttons and get their theatrical stuff by radio and television. But I won't mind, because, having taken monkey glands by then, I shall probably be too young to go on the stage."

WRONG STATION.

Father was tuning-in the wireless set when suddenly he gave a howl of pain. "Whatever's happened?" asked his wife. "I believe I'm getting lumbago," he replied. His wife sniffed contemptuously. "Whatever's the use of that?" she asked. "You'll never be able to understand what they are saying."—"Answers."

Valve Development.

NOT for a moment is it to be believed that the valve has reached the peak of development. It is revealed that the chief engineer of the De Forest Radio Company has invented a new form in which the grid is caused to rotate by the impact of the electron stream from the filament, something like the Crookes "radiometer," in which four vanes are rotated by light energy.

This new-old idea appears to present interesting possibilities and we shall watch closely for its emergence in the form of a finished instrument, reporting faithfully to our readers. One claim made for the revolving grid device is that it can be used as a frequency changer.

Try the R.A.F.

DURING this time of widespread unemployment it is well to let as many people as possible know that the Royal Air Force requires five hundred lads between the ages of fifteen and seventeen as aircraft apprentices for entry into its Schools of Technical Training at Halton, Bucks, and Cranwell, Lincs. Amongst the jobs available are some for wireless operator-mechanics. A fine chance for handy, healthy fellows who don't quite know what to do. Details from the R.A.F. (Aircraft Apprentices' Depot), Gwydyr House, Whitehall, London, S.W.1.

Spain to Try Again.

ALTHOUGH Spanish stations can be heard, broadcasting in Spain—as we know the business here—is as dead as mutton. It never has lived. But now there is a scheme afoot for reorganising the system in the hope that the gay Dons will become listeners and pay licence fees. A 30-kilowatts station, four 15-kilowatts stations, and a short-waver, form the backbone of the plan.

A Visit of Inspection.

I HAVE recently had the pleasure of visiting at Croydon the new factory of that firm with the royal and imperial initials, R.I. Everything I saw impressed me with the feeling that I was looking at a model lay-out. The works are all on one level, well-lighted and equipped, with plenty of room for expansion. The most important part of the works—i.e. the staff, is excellently cared for; there is even a garage for their private motor-cars! A go-ahead, virile organisation, complete with new electrified sales manager. Good luck to them, and may they succeed in holding up the flag in the export market.

How Not to "Earth."

I AM indebted to S. M. F. (Dover) for three interesting "snaps," a bright letter and an anecdote, part of which I should like to repeat for educational purposes. A friend owned a fine four-valver which ought to have delivered all the goods required, but didn't. Apart from the fact that the valves were being ill-treated (another story!) S. M. F. found that the "earth" lead was 40-ft. long, and made of No. 28 D.C.C. run on insulated hooks all over the house! Inquiry revealed that the local expert who had installed the set believed that an "earth" wire should be as long, as thin and as insulated as possible. No! Keep it short and fat and don't worry about insulation at all.

Another Radio Story.

IT is reported from the U.S.A.—without a blink of an eyelid—that Mr. J. H. Thornton, of Barnegat, N.J., has increased the egg production of his chickens by 15 per cent by installing loud speakers in their houses. This action, says J. H. T., was the result of his observation that the chickens showed "increased animation and cheer" when he was whistling or singing around. Animation, perhaps; but cheer is hard to detect in a domestic fowl, the features being standardised and only slightly mobile! Well, there you are, amigos! America is a wonderful country.

ARIEL.

WHAT WE WANT TO KNOW

by
G.V. DOWDING. ASSOCIATE. I.E.E.



WHY is there still so much mystery in radio? There is no need at all for it. What I mean is this. A firm spends no end of money developing something really good in the way of a radio component or accessory and then, instead of telling the public the real facts about it, they waste their advertising spaces by filling them with colourful generalities.

There are a number of exceptions, of course, there always are in this kaleidoscopic universe, but the fact remains that many manufacturers refuse to credit the radio public with any real seriousness.

Where are They?

Is it because they fear to frighten "laymen" with technicalities? If it is, it is high time a leaf was taken from the book of the motor merchants. Here you find perfect amalgamations of the "technical" and "non-technical." You get all the glowing generalities artfully interspersed with solid mechanical data on which the discerning can base their real judgments.

In radio there is frequently little difference between the announcements of the big, sound concerns and the small fry. Naturally, a proportion of the latter are, in their way, just as sound.

But where are to be seen the fruits of the huge organisations, the big research staffs, and what not that are part and parcel with a number of the larger manufacturers? The fruits may be the actual gear manufactured—but that is not always apparent to the uninitiated.

Pretty Pictures!

Whatever pretty pictures were drawn around a car or motorcycle of a certain make, and whatever the maker's name and brand it carried, you would not buy it if you were not given technical information as to its horse-power, its petrol consumption, its brake-power, its actual road performance, and so on, would you? But would you buy a piece of radio gear without first acquiring similar information about it? I am sure you would, because if you didn't there is a lot of wireless stuff you would never buy at all—as often so few

A friendly criticism of the present methods of the radio industry—and an interesting suggestion that merits careful consideration.

real details about it are made generally available.

Let me get down to brass tacks and point out some examples.

There are many fine H.T. batteries on the market—I could name a dozen makes right away—but where are the advertisements or leaflets that tell you the actual facts about these batteries? And they are facts that no one need be afraid to publish broadcast. You are informed that such and such a battery gives you silky power, that it improves your results and so on.

There should be none of this fear of technicalities, because listeners would soon manage to grasp the significance of the more important details. Anyway, what advert. copywriter would admit he couldn't teach them very quickly?

Then again what about the loud speaker?—here indeed is a flagrant case. There are heaps of excellent loud speakers being sold, but I am convinced that those makers who have the best ones would do a bigger trade if they came right into the open with performance curves.

Wonderful Tone!

We are told that the "XYZ" loud speaker gives you terrific bass and colossal high notes, is wonderful in tone, etc. But I am positive that a performance chart would be much more convincing even to the most inexpert listener.

Admittedly the frequency characteristic of the best loud speaker in the world would look pretty "dud" compared with that of a L.F. transformer, but is it not possible to present the case for the loud speaker in other ways? Of course it is, and most of the manufacturers must know how to, although goodness knows why they do not act on their knowledge.

Enterprise Needed.

A loud speaker is not a musical instrument that has to play sweet tunes of its own; it is an electrical device the purpose of which is to handle a medley of electrical frequencies as efficiently as it can.

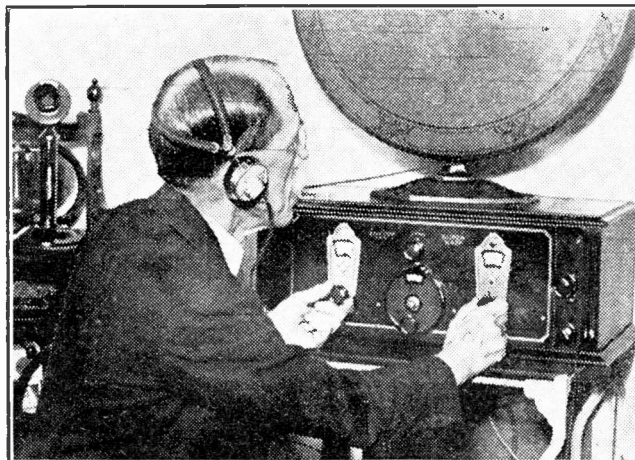
To revert to the motor-car simile once more, if a manufacturer of a motor-car were to keep the horse-power and number and size of cylinders of one of his models absolutely in the dark and shouted that the car had terrific

speed, colossal acceleration, etc., he wouldn't get away with it. People would be suspicious—at least, most people would.

But apparently no one worries about a radio component's specification overmuch. However, again I must add that there are exceptions. Indeed, in cases there are very notable exceptions, which only goes to show what can be done.

(Continued on page 632.)

THE "DX" DOCTOR



Dr. Fowler, the Health Officer for the district of Columbia, built this four-valve short-waver, and regularly receives programmes on it from Australia, England, Holland, and other distant quarters.

But such statements are mere generalities such as can be said moderately safely about any not-quite-up-to-the-average battery.

What the discriminating purchaser wants to know is how long such a battery might last in various circumstances (a fair approximation being quite permissible), its internal resistance, its maximum life "off load" (its shelf-life—a "dry" battery deteriorates even while it is not in use), etc., etc.

C-157

PITY THE POOR ETHER!

Ever since it was first postulated, the ether has been the subject of fierce controversy and contradictory statements. But here is an article showing it in an entirely new light—an object of pity!

By N. F. E.

"THE ether," says Sir John Reith, "should not be put at the mercy of money."

"The ether," says the "Morning Post," "should not be put at the mercy of Party propagandists, who already have ample scope for their activities in the Press and on the platform."

"The ether is overcrowded and no more wave-bands are available for British long-wave broadcasting stations," says an official of the B.B.C., when questioned about the possibility of duplicating 5 X X.

"We must abandon the present hypothesis of the ether," says Professor Einstein. "So-called ether waves are merely the manifestations of the alternating electromagnetic field of force which extends through all space."

What They Say—

And so on. The above extracts are but a few from the many references to the ether which have appeared in the press during the last couple of weeks or so, and they are sufficiently varied to warrant a little comment in this issue of "P.W."

Sir John Reith has ideals about the ether. To him, it is an all-pervading medium, doubtless designed by Providence for the express purpose of enabling nation to speak unto nation—in a style, manner, mode, call it what you will, as specifically ordained by Sir John Reith.

For example, the ether should be used for the propagation of programmes "under the auspices of the State, but not controlled by the State." In other words, in accordance with the principles of the B.B.C.

And one of the chief principles which have been evolved at Savoy Hill—by no less an authority than Sir John Reith himself—is that the public should be given not what they want, but what they ought to have.

Educating the Public.

The policy of "giving the public what it wants" has no place in the scheme of things at Savoy Hill, and with the indispensable aid of the ether the B.B.C., as listeners are well aware, puts this axiom into practice—especially on Sundays, and during "talks" hours.

Our ether, in short, has been commandeered by the B.B.C., for a considerable portion of each day, for the purpose of aiding and abetting a stated policy of giving the public something it does not want; or at least, something it is considered it does not want.

If by any chance something gets across which the public *does* want, no doubt the ether squirms uncomfortably and hopes the B.B.C. wont blame it. When unfortunate exceptions to a general rule like this do happen the ether, no doubt, does its best, and gives extra assistance to atmospherics and what not; but the ether is in a delicate position, and we, at least, sympathise with it.

After all, how would *you* like to be at the beck and call of someone who had power to make you carry out orders whether you wanted to or not? Orders which *you* were sometimes blamed for and which, when they were carried out, caused, for example, the "Daily Telegraph" to state:

"In mere amusement the standard is not above 'what the public wants,' it is

HOLED IN ONE?



SIR OLIVER LODGE

Our Scientific Adviser—one of the great champions of the ether—is also a firm believer in the good old saying about "All Work and No Play—"

not what anybody ought to want. In the matter of information there seems to be no attempt to distinguish the proper function of broadcasting from that of the printed word. The proper medium for elementary instruction in any subject is reading. Broadcasting is, as yet, a new force, and on the whole it has been in our country wisely and usefully organised. But its functions and its limitations are not yet clearly understood by those who control it."

Now, no self-respecting ether likes to hear things like that about its master. If the worm will turn, why not the ether?

The ether has another justifiable complaint. It not only wastes our time, but it is like one of the old omnibuses during a perpetual rush hour: it is overcrowded.

"Licensed to carry so many passengers," it has to put up with a number far in excess of the normal.

Its guardians, like the 'bus inspectors, never seem to be there when wanted. No wonder the ether feels a bit fed up with the International Bureau, and turns in pathetic bewilderment to old friends like Sir Oliver Lodge and Captain Eckersley, hoping against hope that something will be done about it.

It Doesn't Exist!

After all, the ether has excellent credentials; its character has been vouched for by Hertz and Clerk Maxwell, and even Marconi treated it with consideration when spark gaps jolted it persistently in the stomach, and C.W. was unthought of.

And to cap it all Professor Einstein now turns round and, supporting the late Dr. Steinmetz, practically tells the ether to its face it doesn't exist!

Well, well, what a life!

"When an electro-magnetic field is disturbed by radiations from a transmitting wire it causes vibrations which affect the receiving aerial, and the receiver translates them back to the music or speech which first produced them . . ."

In short, Einstein now contends that the ether-wave theory is merely a form of words designed to enable scientists to find their way out of a difficulty.

Pity the poor ether! Even though it is told it doesn't exist it still gets all the kicks. However, like the old soldier, it refuses to die; perhaps it will just fade away.

HAVE YOU HEARD THEM?

Katowice, Poland, sometimes indicates the industrial nature of its neighbourhood by hammer strokes on an anvil as interval signals.

The Cracow station uses sleigh bells as its interval signal.

The call of the cuckoo has been chosen by Leningrad, Russia, on 1,000 metres, and Ljubljana, Yugo-Slavia, on 575 metres, as a distinctive call-sign.

Instead of sounding a gong or ringing a bell the Wilno (Poland) station sounds a huntsman's horn during pauses in the programme.

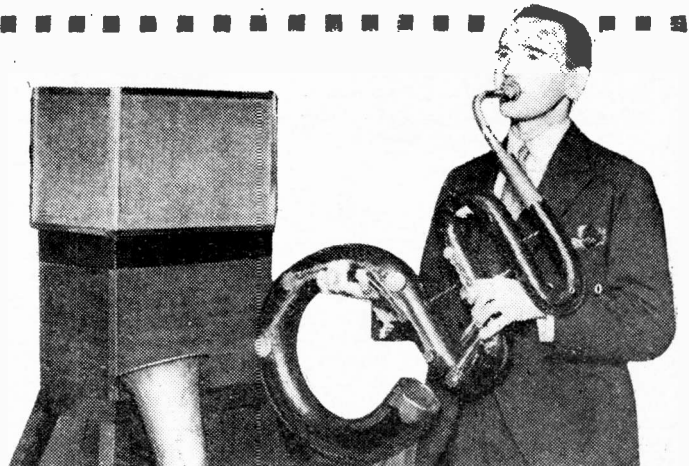
A melodious gong struck seven times denotes that you are listening to Stamboul, which works on 1,200 metres.

The nightingale's song used by Turin (Italy) as a call-sign is well known, but it is not usually realised that a gramophone with electrical pick-up is responsible for this.

The loud ticking of a clock or metronome is often the signal by which you can identify stations, as many of the Europeans use this, ticking at a certain specified speed, to help identification by long-distance listeners.

The Rabat (Morocco) station uses a metronome that beats 60 times a minute.

Losing those Low Notes



YOU are probably all quite familiar with the main types of distortion encountered in wireless reproduction.

You know, for instance, that if signals are too loud for your receiver, or, in other words, if your valves are too small or are not operated correctly, overloading occurs, and your results acquire a harsh, rasping quality.

Again, if on account of the use of poor transformers or a badly designed circuit, your set does not amplify high notes and low notes to the same extent, your results will be either "woolly" or high pitched.

In addition to the above troubles, however, you have probably experienced what can only be described as an "unnaturalness" about your reproduction. You have felt instinctively that the transmission was

By C. E. FIELD, B.Sc.
A thoroughly practical and fascinating account of one of the most vital aspects of radio reception.

You will find, and your friend will confirm the impression, that your voice sounded very low-pitched and boomy.

There you have it! As soon as the voice becomes louder than normal, without being raised in pitch (as in shouting), an impression of boominess is produced.

"That is all very well," you may say, "but making your own voice louder without shouting is an unnatural physical effort, whereas a broadcast transmitter and receiver take a natural voice and magnify it electrically without altering the pitch." That is quite true, but the effect is very largely psychological. You will realise this if you think for a moment of the difference between a conversation as rendered on the stage or on the "talkies."

The Case of the "Talkies."

In the first case, you are quite well aware that the players are shouting (i.e. raising their voices, both in volume and pitch), but if the acting is good, even at the back of the theatre, speech is somewhat what you expect it to be.

In the case of the "talkies," however, the players are not shouting, but *talking* so loudly that they can be heard all over the theatre, the result, as you know, being a boomy quality to which it takes you some little time to become accustomed.

So much for speech. When we consider the reproduction of a band or orchestra we have to deal with a very large volume of sound, consisting of music from several instruments, some high-pitched and some low-pitched. Even though the wireless transmitter and your own receiver may be almost perfect, there is another link in the chain which is not perfect, and that is *your own ear*.

Your ear is in some ways like a crystal or anode-bend detector, in that when sounds fall below a certain strength it fails to detect them. This does not apply equally to all sounds, however, for very low tones require to be much stronger before they become audible than do higher tones. We can plot a characteristic curve of a typical ear, just as we can of a valve, showing how the

loudness of the weakest perceptible sound varies according to the pitch of the sound.

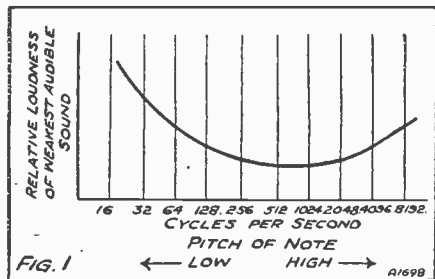
Such a curve is shown in Fig. 1, from which you will see that as the pitch of a sound becomes lower, the strength must be very much increased before it becomes audible.

"The Lowest Sounds Disappear."

Evidently, then, if a complicated sound such as orchestral music is reduced in volume, at a certain point the lowest sounds will commence to disappear, and more and more of these low tones will vanish as the volume is further weakened.

(Continued on next page.)

HOW EARS HEAR



As the pitch of a sound becomes lower, the strength must be very much increased before it becomes audible.

all that could be desired and that your own set was behaving perfectly. There was no sign of overloading and no reason to suppose that the very high or very low notes were missing, and yet something was not quite right.

If this is the case, it is highly probable that the trouble is due to the fact that you are not obtaining from your receiver the volume that is most suited to the type of programme to which you are listening.

An Interesting Experiment.

Consider first the case of speech, and try for yourself the following experiment: Read to a friend a short passage from a book in an ordinary conversational voice. Now move fifty or a hundred feet away from him and read again, but this time make your voice louder until your friend hears it at the same strength as before. But (and this is the important part of the experiment) *do not shout or raise the pitch of your voice.*

NOTES THAT VANISH

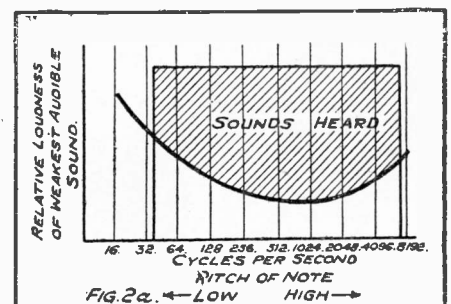


Fig. 2a. ← LOW HIGH →

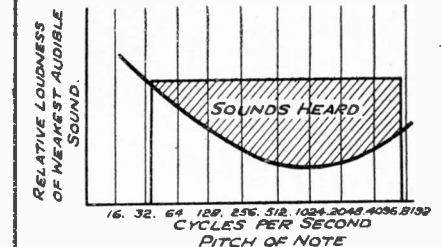


Fig. 2b. ← LOW HIGH →

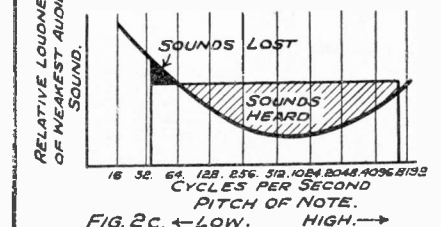


Fig. 2c. ← LOW HIGH →

As the volume is reduced, so certain of the sounds become inaudible.

PRACTICAL POINTERS.

Some Useful Hints and Tips for Home Constructors.

TAPPING A FRAME AERIAL.

If you do any experimenting with a frame aerial, you will find at some time or another that you wish to make a tap on it. Many frame aerials are, of course, centre tapped, but this tap does not answer all purposes of reaction and inductance variations.

A simple method of making a tap at any point, no matter of what type of wire the aerial is constructed, is provided by an ordinary pin. You will find that it is an easy matter to push it through the insulation and between the strands of the wire, which is almost certain to be flexible.

A flex lead can be twisted round, or soldered to the head end of the pin for making connection to the tapping.

'WARE WET GROUND.

In nearly all portable sets a frame aerial is wound round a frame of some sort just inside the case, and generally this means that when you place the set on the table one side of the frame is parallel with it and barely an inch away.

With a table or other insulator this has no effect whatever, but if you were to replace the table by a sheet of metal joined to earth, it is quite possible that it would cause sufficient damping to stop reaction effects. This would more or less stop the set from giving results because, as you know, there are few portable sets which will work without some reaction.

When you are out of doors with your portable, you probably place it on the ground, and therefore if the ground is damp you may get poor results. Wet ground is a very good conductor, and would have a similar effect to an earthed copper plate.

So if you find results from your portable are not very good with it on the ground, try raising it a foot or so.

TESTING FIXED CONDENSERS.

HERE is a good way to test all your fixed condensers. Connect them momentarily across an H.T. battery of about 60 volts, and then leave them for a couple of minutes. (It is necessary to give them a good dust before starting the test.)

After the two minutes connect a pair of telephones across them, when you should hear a good click, which will be louder on the larger-capacity ones.

Condensers above about 0.3 mfd. should not be discharged with telephones, as they hold a large enough charge to cause damage to the receivers. All you need do with large-capacity condensers is to short them after the two minutes with a piece of copper wire.

A spark, whose size will vary with the capacity, will indicate that they are O.K. You will soon know how loud a click or how large a spark to expect from a given capacity condenser.

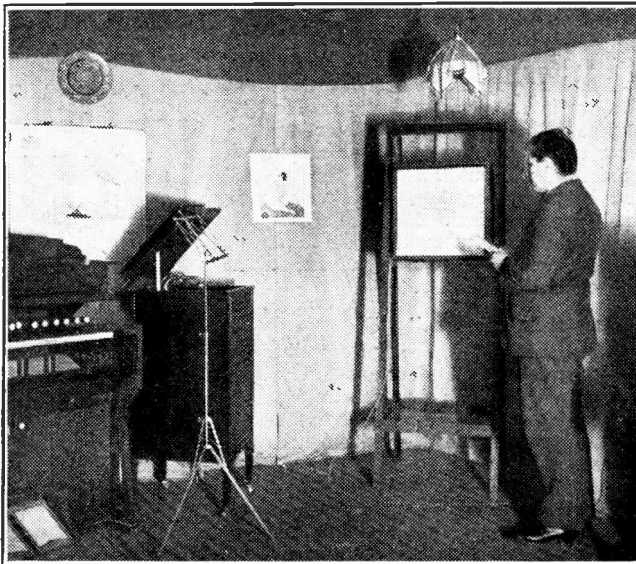
A REAL COMPARISON.

IT is an unfortunate fact that it is impossible to keep the mind completely unbiased. For instance, if you are trying to decide which of two loud speakers is the better, and one is an expensive one of well-known make and the other, say, a cheap foreign one, you will find that you are inclined to feel that the expensive one sounds nicer even against the judgment of your own ears.

Here is a simple tip by which you can make a truer comparison of two, three or more speakers. Arrange them close together and all pointing the same way.

Next connect one side of each together, and join the common lead to one output terminal of the set. To the other sides of the loud speakers connect leads of exactly the same sort of wire and twist them

HILVERSUM'S STUDIO



The studio at Hilversum. Hilversum employs 6.5-kw. power, and operates on a rather low wave-length of 298 metres up to 5.40 p.m. After this a wave-length of 1,071 metres is employed. In the above photo an announcer is broadcasting news.

together until you cannot distinguish which is which.

Now sit with your back to the speakers and connect up each one separately to the other output terminal of the set. You will find it very difficult to tell which is which loud speaker if they are at all alike, and will be able to judge them entirely from what you hear.

The object of sitting with your back to the loud speakers is to overcome any directional effects that might give away which speaker was which. The backwards stunt is surprisingly effective in doing this.

Afterwards it is a very easy matter to find out which speaker was the one which pleased you most.

LOSING THOSE LOW NOTES.

(Continued from previous page.)

In order to obtain a clearer picture of this effect look at Fig. 2. In Fig. 2a is shown the same curve as in Fig. 1, and a rectangle is marked out to represent a uniform loudness at all pitches, which we might, for the sake of illustration, imagine to be the sound received from a loud speaker reproducing an orchestral item.

If the volume is reduced, first a little, and then considerably, we get the conditions shown in Figs. 2b and 2c respectively. A glance at Fig. 2c shows that not only is sound as heard by the ear reduced in volume, but that the lowest tones are absent.

Reducing the volume of orchestral music thus has the effect of raising the pitch, so that in order to obtain the most realistic results the volume must be such that the true pitch of the music is obtained. Obviously the volume which will furnish these results is that which originally comes from the orchestra, or, rather, the volume which would reach your ear if you were listening at a reasonable distance from the concert platform.

Vary the Volume.

It evidently pays, therefore, when receiving an orchestral programme, to obtain the maximum possible volume from your receiver, providing that you do not overload it, and this will generally be louder than the volume which will give you the most pleasing results when listening to speech.

In short, if you really desire to get the best possible quality of reproduction from your set, you require to be able to adjust the volume to suit the programme.

The various means for accomplishing this cannot be considered here, but the ideal is obviously to have a set capable of providing a really loud volume, fitted with a convenient volume control for reducing the signal strength to the most suitable level, according to the type of programme that is being received.

FOR YOUR NOTEBOOK.

All H.T. accumulator contacts must be kept perfectly clean, the insulation must be dry, and the accumulator must be kept properly charged, if H.T. supply coupling effects are to be avoided.

A large set employing a super-power valve may take 20 to 30 milliamps from the H.T. supply, and it is quite useless to expect a small mains unit designed for 15 milliamps' supply to work this satisfactorily.

Whatever form of H.T. supply is used, it is generally an advantage to have a separate H.T. plus lead to the different valves or stages in a three-, four-, or five-valve set.

If your L.F. transformer is provided with a terminal marked "earth" or "E," a connection from this point to the filament-earth circuit can be made to improve stability.

THE B.B.C. TODAY

BY THE EDITOR



THE more picturesque public personalities of broadcasting used to be in the ranks of those actually engaged on microphone work. But the persistent application of anonymity has had its effect at the programme end. Public interest is now more concerned with some of the administrative personalities.

Sir John Reith remains the outstanding figure, intellectually, physically, and administratively. When I last reviewed the personalities of the B.B.C. I paid due tribute to Sir John, but I expressed the hope that he would cultivate some greater measure of toleration and urbanity than had characterised him so far.

Sir John's Idealism.

Although I have not the temerity to claim the credit, I am naturally glad to be able now to record that when I met Sir John at lunch the other day after a long interval, I was captivated by just those qualities of sympathetic understanding which I had accused him of lacking.

I believe that a process of evolution has gone a long way in mellowing and enriching the character and personality of the executive chief of British broadcasting. For

THE INFORMATION CHIEF



Mr. Gladstone Murray is "establishing a reputation for courageous and skilful public service."

This fifth article of a vitally informative and interesting series comprises a review of Savoy Hill's great administrative personalities. The work of Sir John Reith, Mrs. Philip Snowden, Mr. Gladstone Murray, Mr. Noel Ashbridge and Admiral Carpendale in the furtherance of the ideals of British broadcasting is discussed, and an estimate of their success, individually and collectively, is advanced.

one thing, I cannot imagine that there is now any substance in the rumours of Sir John's tyrannous temper and Mussolini methods.

For another thing, I do not believe there is any reasonable chance of Sir John leaving the broadcasting service for many years. He remains, of course, among the first half dozen chief executives of the English-speaking world; but he is much more than this.

He stands for the Christian ethic in no uncertain way, and his high idealism has placed the characteristic stamp on British broadcasting. Now that he is taking a more active interest in imperial affairs, Sir John will become a powerful ally of those who believe that the salvation of Britain is bound up with the development of Greater Britain.

Those Sunday Programmes.

I still have my quarrels with Sir John. For instance, I think he is quite wrong about the Sunday programmes in not tolerating appropriate musical alternatives to religious services. Nor do I hold with the present educational policy of the B.B.C.: these National Councils of adult education and school education and so on have far too much to say about programme matters. But such complaints are not crucial.

The principal new personality of British broadcasting is Mrs. Philip Snowden. To understand Mrs. Snowden and her place in the broadcasting firmament, one must begin with her background. Mrs. Snowden is the embodiment of Yorkshire sincerity, frankness, and unbending strength of character.

Her powerful advocacy has been on the side of all the great progressive movements

of the past quarter of a century. For peace, international and industrial; for temperance; for democracy; for women's rights; for better and wider education; for music and the arts: for good causes too numerous to recount here, Mrs. Snowden has toiled unremittingly, always with distinction, and usually with marked success.

When she became a member of the Board of Governors of the B.B.C., Mrs. Snowden threw herself wholeheartedly into another field of public service. Realising the tremendous potentialities of broadcasting, she regarded the present organisation of the B.B.C. as a preliminary to a Department of State in which the officials would have the security and advantages of the Civil Service.

A Woman of Ideas.

Mrs. Snowden also has very definite ideas about the development of the musical side of broadcasting. She wants the B.B.C. to take a more definite and constructive lead

(Continued on next page.)

AN ABLE ADMINISTRATOR



"Admiral Carpendale has become a stronger factor for considered counsels and stable development."

THE B.B.C. TO-DAY.

(Continued from previous page.)

in all such movements as the county festivals, and also to encourage the popularisation of opera.

There is, too, the scheme of a National Theatre. I think I would not be far wrong if I said that Mrs. Snowden looks upon the B.B.C. as a potential Ministry of the Arts. Such ability, idealism, and character are obviously a tremendous gain to the B.B.C.

A Popular Personality.

But the collision of temperaments has delayed their being turned to full account. I believe, however, that co-operation between Sir John Reith and Mrs. Philip Snowden will be fostered under the ægis of

finds it useful to obscure by a smoke-screen of gentle cynicism and convincing misanthropy. That the B.B.C. has now embarked on comparatively calmer seas is due in no small measure to Gladstone Murray.

The universal esteem with which he is regarded in Fleet Street, and the steadily augmenting profits from publications revealed in the annual reports of the B.B.C., are proof that he does his ordinary work efficiently. But it is in the things that he does outside his ordinary work that he is of chief value and in which he is establishing a reputation for courageous and skilful public service.

And now I come to Admiral Carpendale, whose very efficiency as a disciplinarian caused me some doubts when last I discussed his place in broadcasting. But here, as in the case of Sir John Reith, there is progress to report.

The gallant admiral has much more to think about now than whether the office-

gramme side as well as on the purely staff side.

Next to Mrs. Philip Snowden, the most interesting new personality at Savoy Hill is Mr. Noel Ashbridge, the new chief engineer. Mr. Ashbridge had the advantage of many years close association with his predecessor, Captain P. P. Eckersley: but, even so, he had a particularly difficult problem in taking over from one who had become a national figure in the job.

But it speaks worlds for Mr. Ashbridge's personality and reserves of character that he set to work quietly and confidently and within a year is as firmly established as was his brilliant predecessor.

A Beneficial Influence.

Mr. Ashbridge is a very sound technician, which, of course, is invaluable now that the regional scheme is being completed under his administration. His technical qualifications are also as catholic as they are thorough. For he is also able to handle the Broadcasting House venture literally "in his stride."

But it would be a hopelessly inadequate account of the new chief engineer that stopped with a recital of his technical qualifications. Behind his self-effacing, quiet demeanour is a very decisive personality, with clear-cut views, and a steady strength of character accustomed to get its way perhaps more by incisive penetration than by frontal attack; but, nevertheless, to get its way.

Mr. Ashbridge is a close student of the programmes, and is aware that as a member of the Control Board of the B.B.C. he shares the responsibility for the content and quality of what his engineers put on the air.

I regard it as extremely fortunate that there should be this influence in the inner counsels of the B.B.C. Mr. Ashbridge is eminently sane, and detached from any specialised interest in programmes.

He would interpret the wishes of the sane "man-in-the-street" rather more faithfully than any of his colleagues, and certainly more exactly than any of the various programme specialists. More power to his elbow!

RADIO ON THE RIVER



A broadcast concert assisting at a picnic on the bank of the Thames at Henley. The famous Temple Island is in the background.

Mr. Whitley, the new Chairman. If this co-operation can be made effective, the broadcasting service will gain tremendously.

I would say that next to Sir John and Mrs. Snowden the other chief personality now at Savoy Hill is my friend Mr. Gladstone Murray. He is both an old and a new personality of broadcasting, but he has come very much to the fore in the past year or so.

Intrigue and strife ebb and flow, but the Information Chief manages to focus in himself the elements of stability and continuity. His success in politics, high or low, is due, I believe, to an astonishing capacity for detachment, and patent disinterestedness.

His sole object is the success of the broadcasting service, an object which he

boys are correctly dressed, or the typists are on time. For five years he has been the President of the International Union of Broadcasters, and is now an established figure in the life of Europe.

He is extraordinarily and deservedly popular on the Continent, where it has been discovered that he is not only a typical and picturesque product of the British naval tradition, but also a most conscientious and able administrator as well as a shrewd and effective diplomat.

The New Chief Engineer.

His success on the Continent has had its effect at Savoy Hill. Admiral Carpendale has become a stronger factor for considered counsels and stable development. Moreover, his views are counting on the pro-

NOTEBOOK NOTIONS.

The Bucharest station on 394 metres opens its programme with five minutes of metronome-ticking, at the rate of 160 beats per minute.

The Konigswusterhausen station (Zeesen), on 1,635 metres, uses a 40-beats-in-ten-seconds metronome as an interval signal.

Sixty beats per minute is the interval signal for the Belgrade station on 432 metres, and Breslau 325 metres.

There is often very little difference between a circuit used for short waves and that used for ordinary waves, so that a great many ordinary broadcasting sets when fitted with short-wave coils can be operated as short-wavers.

Nearly all novices at short-wave work turn the dials much too quickly until experience proves how easy it is to lose stations altogether in this way.

Short-wave enthusiasts nearly always wear telephones instead of using a loud speaker, so as to make sure that nothing is missed when tuning-in.



CAPT. ECKERSLEY'S QUERY CORNER

OVERLOADING A UNIT?—MORE OVERLOADING—THE MOVING COIL'S FIELD—
A CURIOUS G.B. EFFECT.

Under the above title, week by week, Captain P. P. Eckersley, M.I.E.E., late Chief Engineer of the B.B.C., and now our Chief Radio Consultant, comments upon radio queries submitted by "P.W." readers. But don't address your queries to Captain Eckersley—a selection of those received by the Query Department in the ordinary way will be dealt with by him.

Overloading a Unit?

J. N. (Catford).—"I have an A.C. mains unit which was giving very satisfactory results when used in conjunction with a straight two-valve receiver. I have now converted this receiver into a three-valver by adding an extra L.F. stage, and I have placed a super-power valve in the last socket.

"When I attempt to use the mains unit there is now a loud hum, and signals are rather distorted. Could this be due to the fact that the mains unit is now being overloaded?"

Your explanation is correct—almost certainly, I should say. The mains unit constitutes a rectifier which feeds unidirectional pulses of electricity into a condenser. This condenser fills up to the brim and then you can take steady current from it. If, however, the load across the condenser is such that it could never keep full, you become aware of the gulches of electricity feeding into the condenser intermittently. If you want an analogy think of a pump which feeds water into a tank intermittently in gulches. If there is a tap in the bottom of the tank you can get a steady flow of water from the tank even though the pump is putting water into the tank intermittently. But if you turn on the tap so full that the tank never gets full, you will get an intermittent feed. The cure in your case is a mains unit with greater output, which feeds in more electricity per gulch than the present one.

More Overloading.

L. H. (Stamford Hill).—"Can you give me an idea of the type of rectifier valve I should use so as to prevent it overloading when I tune in fully the Brookmans Park transmissions at fifteen miles, assuming I employ an S.C. H.F. stage without volume control and an outdoor aerial?"

Do you not think it is better to cut down the volume coming into the aerial than to be in danger of overloading your detector? Do you not think that a good method of doing this would be to connect variable resistances in series with any of the tuned circuits that happen to be convenient and which are connected in the pre-detector stages? I personally would much prefer this arrangement, and always prefer to think that the different volumes of different stations are adjusted in the pre-detector stages, so as, ideally, always to bring the detector to the same condition. There are

so many ways of cutting down a signal that, provided you have a sensitive set, it should not be difficult to choose one, and the one I suggest is to put a resistance in series with any particular tuned circuit. If this is not enough, have a switch which throws in a potentiometer across a closed circuit; keep a rectified feed meter and always adjust the rectified feed to the same value, unless, of course, the station you are receiving is too weak.

* * *

The Moving Coil's Field.

A. M. V. (Winchester).—"The field of my moving-coil loud speaker is fed from a large 6-volt accumulator. I notice, however, that the instrument still functions

The moving-coil loud speaker works, of course, by putting A.C. currents in a coil which is free to move in a strong magnetic field. The magnetic field is created by passing current through a coil which magnetises an iron circuit; switching off the current from the accumulator weakens, but does not destroy, the field, and so the loud speaker continues to work—but with far less volume. Unfortunately, however, the effect of a weak field is to give a partial distortion, and the designers of the speaker would be careful to work out their quantities so that the necessary movements, eddy current losses, etc., were worked out for a constant field; while the value of this need not be kept absolutely constant, its variation might be deleterious to quality. The suggestion is ingenious, but in practice might not give the best quality throughout the range of volumes.

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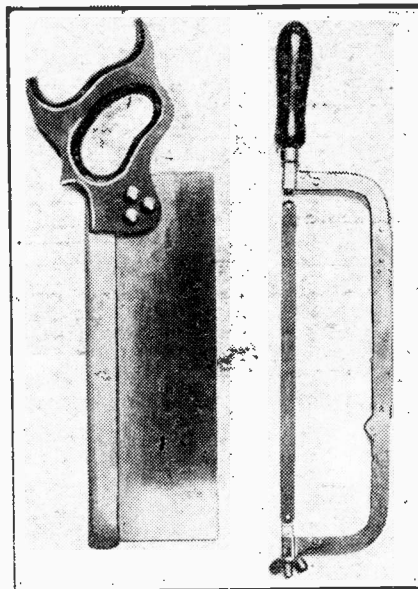
A Curious G.B. Effect.

H. A. C. (Southampton).—"The last valve of my receiver is of the super-power type, and I usually adjust the grid bias so that the anode current is within the limits stipulated by the makers for the value of H.T. I use.

"Recently, when so adjusting the bias, I carelessly omitted to switch off the filament when I removed the G.B. — plug. Much to my surprise, the milliammeter did not show the violent increase of anode current which should have occurred. Why is this?"

The effect you mention is quite common: when you remove your grid plug you leave the grid completely disconnected. Negative particles of electricity were collected on the grid because your grid-bias battery had charged it negative. If the charge never leaked away that would constitute a negative charge on the grid and would prevent the electron flow from filament to anode. (You could probably find that this is true, because if you caught hold of the grid-bias plug with one hand and put the other on the earth, you would see the current gradually rise because you would be removing the negative charge from the grid.) If you have any leaky components between the grid and earth that also would allow the anode current gradually to rise by leaking away the grid negative charge. You can try all this in practice if you promise to switch off H.T. directly the current gets to a foolishly high value.

FOR THE SET BUILDER



Of course you have a hacksaw, like the one on the right, but have you a tenon saw? (left). It's surprising how much better the small wood-work goes when this is used instead of a larger saw.

when the accumulator is disconnected, but the volume is decreased.

"From this it seems to me that a good arrangement of volume control could be effected by adjusting the field current by means of a rheostat in one of the leads from the accumulator to the magnet field. Is there any objection to doing this?"

LATEST BROADCASTING NEWS.

ANOTHER
CONTINENTAL RELAY.

SIR FREDERICK COWEN'S
MUSIC—NATIONAL ORCHE-
STRA OF WALES—A BACH CAN-
TATA HOLIDAY—BLACK COUN-
TRY COMEDY, ETC.

A MOZART concert, relayed by the Continental land-line system from the Salzburg Festival, will be heard by London listeners on Saturday, August 30. It will be conducted by one of the most distinguished German musicians, Herr Bruno Walter. The programme will include the "Hoffner" Symphony and a Concerto in E flat, for two pianos and orchestra.

Sir Frederick Cowen's Music.

The music of Sir Frederick Cowen, the eminent Midland composer, will figure largely in a concert to be given in the Birmingham studio on Saturday, September 6.

Part of his "Scandinavian Symphony," a work inspired by Sir Frederick's several visits to Norway and Sweden, will be included, and also a pianoforte concerto, written for Paderewski and played by him thirty years ago, will be heard.

The concerto will be played on September 6 by Winifred Browne, who has made a name for herself by broadcasting pianoforte concertos which are rarely heard by listeners.

National Orchestra of Wales.

The National Orchestra of Wales returns from holiday on Sunday, August 31, when with Kate Winter (soprano) as singer, they will be heard in a string orchestral programme from the Cardiff studio.

Other concerts during the same week will be given by the orchestra as follows: Monday, Sept. 1, Museum Concert; Tuesday, Sept. 2, Afternoon concert in the studio with Bernard Ross (baritone); Wednesday, Sept. 3, Symphony Concert at the Museum (1.15 p.m.), a Light Orchestral Programme from the studios (4 p.m.), and a programme of excerpts from English Light Opera with Mai Ramsay (7.45 p.m.); Saturday, Sept. 6, Museum Concert at 12 noon.

A Bach Cantata Holiday.

The Bach cantatas which have been suspended during the summer holidays, are to be resumed on Sunday, August 31. Some would say it is a pity the B.B.C. remembered!

Black Country Comedy.

A play by a Staffordshire doctor and playwright will be performed in the Birmingham studios for Midland Regional listeners on Monday, September 1. Its author is Dr. F. G. Layton, and the play, a Black Country comedy is said to be founded on a true story of life among the people where he has his practice. Dr. Layton calls the play "The Invalid."

"Through the Looking Glass."

Two performances of Lewis Carroll's "Through the Looking Glass," specially

adapted for the microphone by Cecil Lewis, will be given in the London studios on Monday and Tuesday, September 15th and 16th. The first performance will begin at 8 p.m., but the second is to start at 6.40 p.m.—a most unusual time for serious radio drama to be heard. The reason for this is to give children an opportunity of hearing the performance.

Talk Features.

Major Walter Elliot, M.P., who is no stranger to the microphone, is to open a series of twelve talks, the aim of which is to give a comprehensive picture of Africa from all aspects, and which is one of several new series arranged for the autumn. Equally interesting is a series entitled "International Conversations," which will consist of debates between an Englishman and a

foreigner, and a description of how people of other nations look at England.

The foreigners so far selected represent America, France, Germany, Italy, Turkey and Russia. "Science and Religion" is the title of yet another series of talks to which many well-known personalities will contribute.

Old Favourites.

Albert Townsend and Miss Grace Field, two artists whose first appearances before the microphone goes back to the days before there was any B.B.C., when they took part in Captain Eckersley's experimental transmissions from Writtle, in Essex, are taking part in the Midland Regional programmes on Thursday, September 4th. Miss Field is now soprano soloist at the Church of the Messiah, Birmingham.

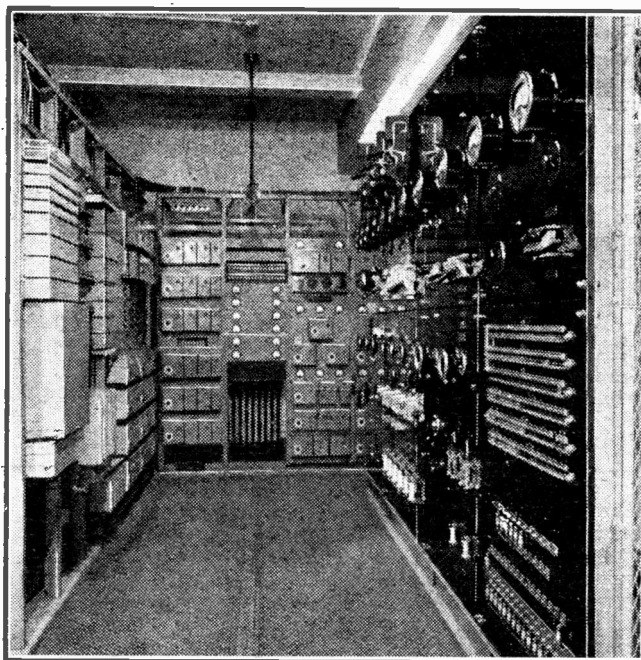
Cockles and Cockling.

An antiquarian, who has devoted many years of study and inquiry to that somewhat despised shellfish, the cockle, is visiting the Cardiff studio on Thursday, August 28th, to tell listeners all about his discoveries.

He is Mr. George Eyre Evans, the Hon. Secretary of the Carmarthenshire Antiquarian Society, whose research work reveals that there are no fewer than 200 living species of the cockle, one of which is sold in large quantities in some towns round the coast.

The title of Mr. Evans' talk is "Cockles and Cockling," and he will deal particularly with the village of Llansaint, where the husbands do the housework and mind the babies, while their wives go cockling on the Ferryside.

BEHIND THE SCENES AT 2ZY



This is not a power-house, but a view of the apparatus room at the B.B.C.'s Manchester Station.

FOR THE LISTENER

This week our popular contributor—who is holiday-making in Italy—tells of his amusing experiences there with "Belinda," the portable set.

By "PHILEMON."

The Proms.

BY the time these Notes appear, the new Promenade Concert season will have opened. The advance programme has reached me, and it is full of attractive items.

Most attractive of all will be the appearance of the new B.B.C. Symphony Orchestra which has been organised and trained, and will be conducted by Sir Henry Wood. It is not yet quite at its full strength, but may be expected to give a good account of itself, and in time should take its place high in the first flight of the great orchestras of the world.

We shall meet with old friends among the vocalists; and Arthur Catterall will be there! Few parts of the B.B.C. programmes

give more widespread pleasure than the Symphony Concerts; and it is pleasing to note that, although old and favourite music will dominate, new works are to be presented, notably a new Concerto by John Ireland with Helen Parkin at the piano.

Alice in Wonderland.

I hear that there is to be a revival of the Radio version of this immortal fantasy towards the end of September.

When I told Belinda about it, "And I will be the Red Queen!" she cried, I said that Athene Seyler, who made a hit in that part on the first production, would not be likely to stand down for her. "Tweedle-

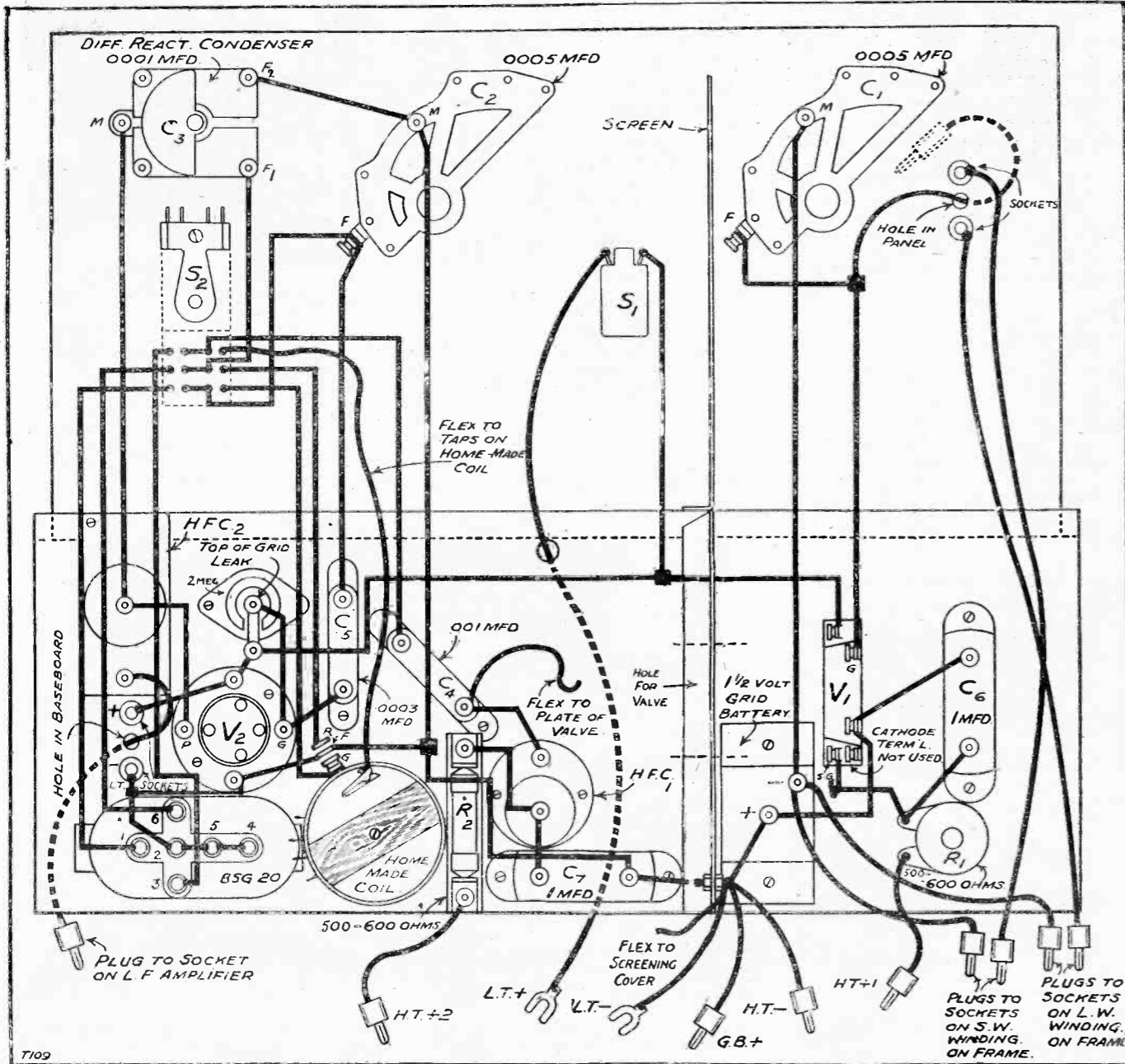
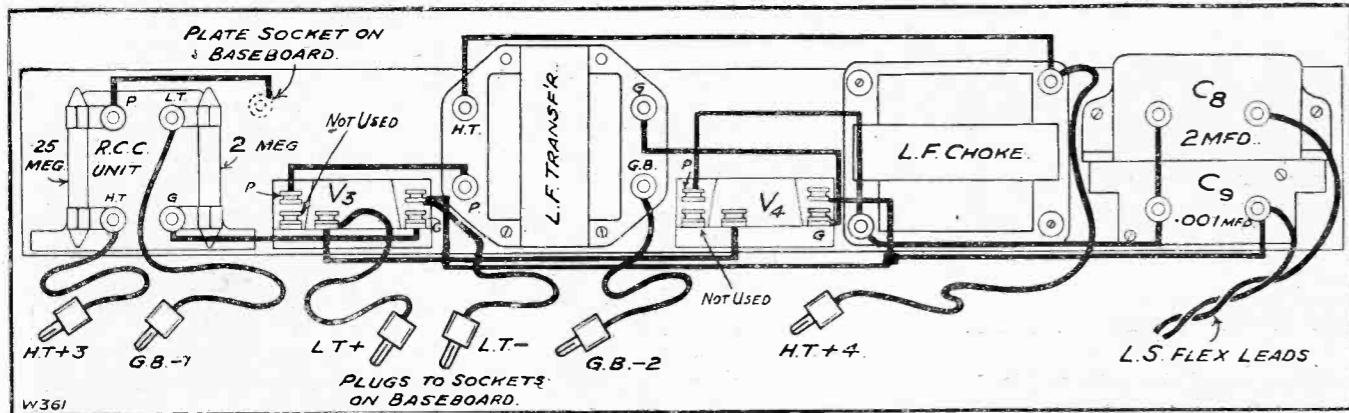
(Continued on page 650.)

THE "MERCURY" FOUR.

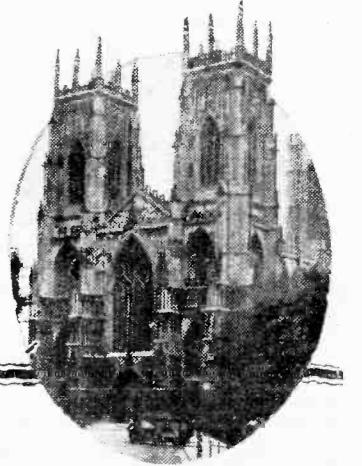
(Continued from previous page).

that it is even possible to tune-in the foreigners quickly and easily, in which the differential control of reaction is a great help. Actually, you will discover the set will bring in quite a lot of foreign stations on the speaker after dark.

We have now given you a general idea of the set's capabilities and characteristics and there we must stop. A receiver like this calls for pretty detailed treatment and this we shall be continuing in our next issue.



Broadcasting York Minster



An intimate inside view of the complicated control work which is necessary when a broadcast from the famous cathedral is taking place—work which makes all the difference between a well-balanced broadcast and a failure.

By OUR CORRESPONDENT.

I HAVE just spent a bewildering morning in the B.B.C.'s most extraordinary control-room.

The paraphernalia of broadcasting seems completely out of place in the venerable room near the minster organ (so near that its panelled walls shiver audibly in resonance with certain of the bass notes).

York has such a genius for elaborate ceremonial that a broadcast from the minster generally involves almost as much fading and cross-fading of microphones as a complicated radio play.

The last time I was at York was on Military Sunday. It was half an hour before the broadcast was due to commence when I introduced myself to the three engineers in the vestry.

"I suppose that now you have nailed all those terrific echoes which used to distract you here, and now that the minster is permanently wired with microphone circuits, a broadcast from here is just a matter of routine?"

That Echo.

"Well, not quite," he replied. "It's one of the worst places for echo. These massed bands, you know. They are playing in the minster to-day right under the great tower, and the resonance. . . We had a test last night (the bands very kindly came along), and at first the resonance of some instruments was extraordinary. We spent a long time shifting them about until we got the right balance."

I was impressed then, and several times later, by the

close collaboration between the B.B.C., the military forces, and the minster authorities.

A bell rang. One of the engineers spoke into a telephone and then reported that the lines were through to Leeds.

"We have two land lines from here to Leeds," explained the "O.C." to me. "One for 'music' and the other for 'control.' From Leeds the broadcast is distributed to the various stations on the usual land-line circuits."

The Microphone Tests.

"Ask Leeds if they want atmosphere," he added to the man at the 'phone. "Atmosphere?" I queried.

STATELY AGE AND MODERN SCIENCE



In a little room, hidden by the architectural grandeur of our forefathers, sits the broadcast engineer, surrounded by amplifiers, switches, telephones, etc., looking after the very heart of the system which links cathedral and broadcast station.

"Crowd noises in the building before the service," explained the O.C.

With ten minutes to go he and his mates made a final test of all the microphones (getting an engineer in London to listen on each of them in turn) and it was arranged on the telephone that the announcer at Savoy Hill should make his announcement at 9.47 a.m. and that all stations should "come over" at 9.49.

Last-Minute Trouble.

At 9.4 an engineer noticed that the "music" line had become noisy. So had the other. The fault was reported to Leeds.

At 9.45 the lines were still noisy. The engineers looked distressed.

At 9.46 "London" reported that from his end the lines "sounded" quiet. The relief of this news was immediately followed by the tension and suspense of "going over."

Through the vestry door I could see the vast audience which packed the great minster. They waited patiently for the service or ceremonial (call it which you like) to begin. But they did not know that really they were waiting for a young man in a little room in London 200 miles away to say his piece.

The engineer-in-charge had seated himself at the "mixer"—the boxes containing microphone potentiometers. Eight large knobs, one of which was a spare, faced him.

He made sure that they were all at the "off" position except one—the one controlling the microphone suspended over the massed bands. Engineer No. 2 sat at the telephone. No. 3 stood at the door.

"Over!" cried No. 2.

The Relay Commences.

No. 3 walked into the aisle outside the vestry where he could see the bandmaster. He made a signal. Immediately the music crashed out up to the vast roof throbbing and re-echoing and out from the aerials of a score of transmitting stations up and down the land.

My watch showed 9.50. The second band piece was Rawlinson's "Maid of Orleans" overture. "Watch this carefully for blasting," said the O.C. There came a thunderclap of drums and a blare of trumpets. Swiftly the "mike" control was turned back a bit.

After the preliminary band music the service proper commenced and then the engineer at the "mixer" really got busy.

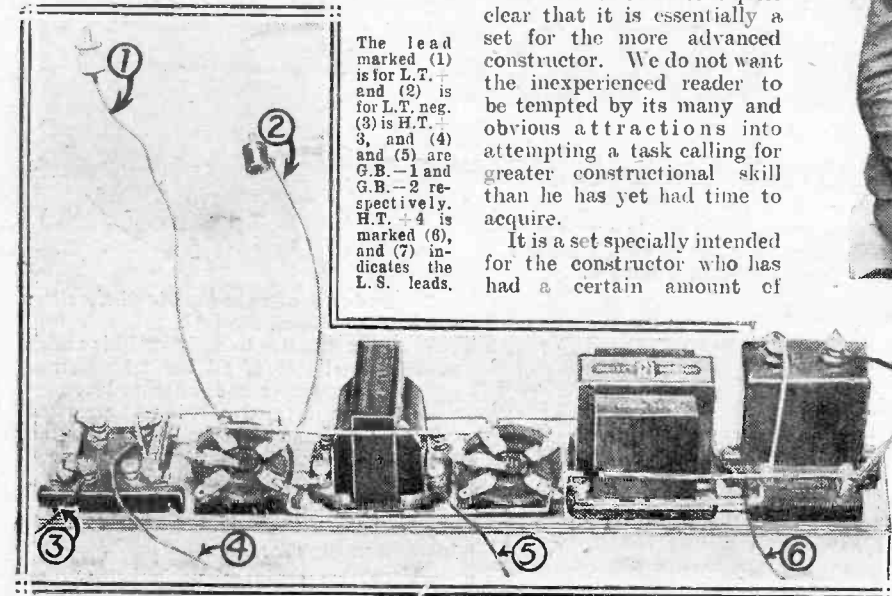
WE have been receiving requests for some time now for a portable set design of a really ambitious kind, giving a superlative performance and requiring no external accessories of any sort, more particularly no aerial and earth.

Our correspondents mostly seemed to require such a set for convenient home use rather than as a true outdoor receiver, and

gives a fine performance on its built-in frame aerials, and is elaborate and no small job of work to undertake.

Its sensitivity and selectivity are both exceptionally good, and it is an extremely attractive proposition, but that just makes us all the more anxious to make it quite clear that it is essentially a set for the more advanced constructor. We do not want the inexperienced reader to be tempted by its many and obvious attractions into attempting a task calling for greater constructional skill than he has yet had time to acquire.

It is a set specially intended for the constructor who has had a certain amount of



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so did not mind whether we gave them what they wanted during the holiday season or not. Moreover, they were emphatic that they were not afraid of tackling something elaborate, so long as it gave the results they craved.

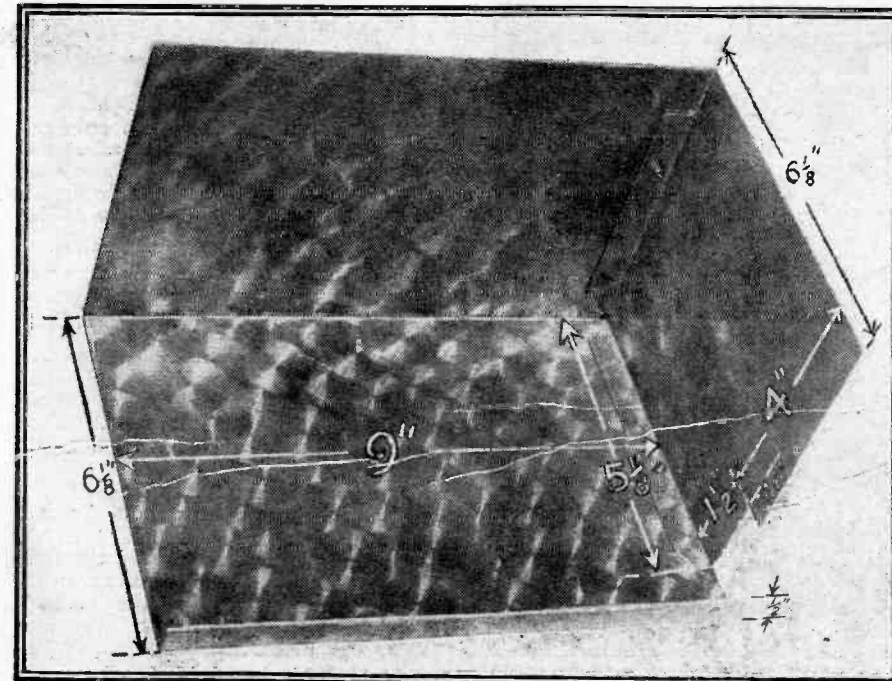
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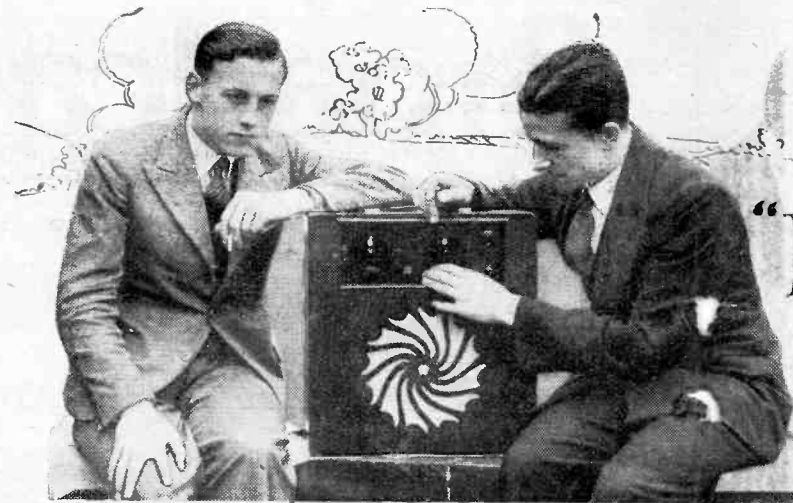
experience, particularly with screened grid valves, and who feels that he can turn out a job which is 100 per cent correct, and knows how to adjust it and get it working properly.

This may sound rather a strange way to write about a set which we have praised so whole-heartedly, but it is only part of our settled policy of trying to make perfectly clear the exact application of every set we design. Only by helping our readers to

"SEEN ON THE SCREEN"



All the necessary screen dimensions are shown on this illustration.



The "MERCURY FOUR"

Designed and Described By The "P.W." RESEARCH DEPT.

This fine "all-in" set was evolved by going "all-out" for efficiency. Aerial, batteries and loud speaker are inside the cabinet, but you get simply magnificent volume and plenty of programmes to choose from. Readers have often asked "P.W." for a hot portable 4-valver—this is IT!

choose just the right set to suit them can we serve their interests best. Now, the fact is that the more advanced type of portable is really a set in a class by itself. It is an instrument which will stand no liberties, and demands that it be made up with extremely careful attention to every constructional detail.

For one thing, it has not the powerful help of the large pick-up of energy of an outside aerial. It depends upon the very much smaller pick-up of a frame aerial, and so a very slight lowering of its efficiency due to imperfect workmanship, unsuitable components, or what not, may make all the difference.

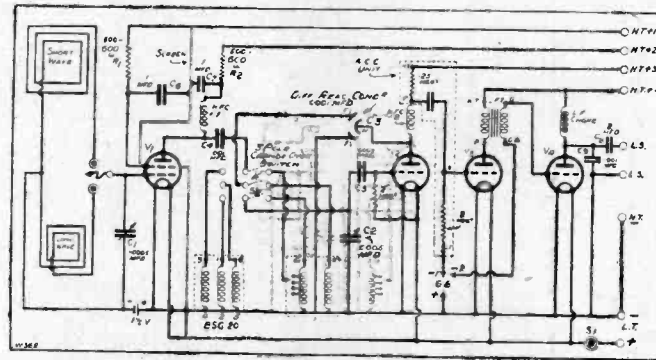
Again, it lacks the soothing influ-

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Our own model gave an extraordinarily fine performance on test. It separated the two Brookmans Park

A SLICK-LOOKING CIRCUIT



Note the simplicity of the frame aerial switching, and the easy change from one coil unit to the other. Differential reaction is embodied, and another valuable refinement is the output filter for the loud speaker.

THE PARTS YOU NEED TO BUILD IT.

- 1 "Favourite" type cabinet with 5 1/2-in. baseboard (Camco).
- 1 14 x 7 ins. panel.
- 2 .0005-mfd. variable condensers (Lotus or other compact type, e.g., Formo).
- 2 Small vernier dials (Igranite Junior, or similar type).
- 1 .0001, .00013 or .00015-mfd. differential reaction condenser (Lissen or Lotus, Ready Radio, etc.).
- 1 L.T. switch (Igranite or Lissen, Lotus, Benjamin, Bulgin, etc.).
- 1 Double-pole change-over switch (Wearite, small type).
- 2 1-mfd. condensers (Lissen, etc.).
- 1 2-mfd. condenser (T.C.C. or Lissen, Dubilier, etc.).
- 2 600 or 500 ohm resistances (Ready Radio and Olimax, or Paroussi, Wearite, Bulgin, etc.).
- 3 Horizontal type valve holders (W.B. or Bulgin unit, Paroussi, etc.).
- 1 Ordinary valve holder (small type necessary here). (W.B., or Lotus, Formo, Benjamin, etc.).
- 2 H.F. chokes (Lewcos and Wearite, or Lissen, Bulgin, Ready Radio, etc.).
- 1 .0003-mfd. fixed condenser (T.C.C., or Lissen, Dubilier, Mullard, Ediswan, Ferranti, etc.).
- 2 .001-mfd. fixed condensers (T.C.C., or Lissen, etc.).
- 1 2-meg. grid leak and holder (Dubilier, or Lissen, etc.).
- 1 B.S.G. 20 coil (Lewcos).
- 1 R.C. unit, anode resistance 1/2 meg., grid leak 1 or 2 meg. (Lissen, etc.).
- 1 L.F. transformer (Lotus, or other very small type, e.g., R.I. Hypermite, Lissen Hypernik, Varley Nicore, Igranite J., etc.).
- 1 Output filter choke (R.I. Hypercore, or other very compact type). Materials for coil and frame windings (see text), piece of wood 15 by about 2 ins. for amplifier baseboard, sundry plugs and sockets, loud speaker assembly (see text), screens, etc.

THE SET THAT WILL STAGGER YOUR PALS!

transmissions with the greatest of ease, with quite a large space between them, and it brought in the Midland Regional at excellent volume with only just a trifle of reaction. (It could be heard at moderate strength on the speaker with no reaction at all.)

The strength of the local programmes (about 15 miles) was so great as to overload the last valve heavily. It was necessary to cut the volume down, and to

do so sufficiently we found we had to turn the set so that the frame aerial was nearly at right angles to the direction for maximum strength.

Punch from Paris

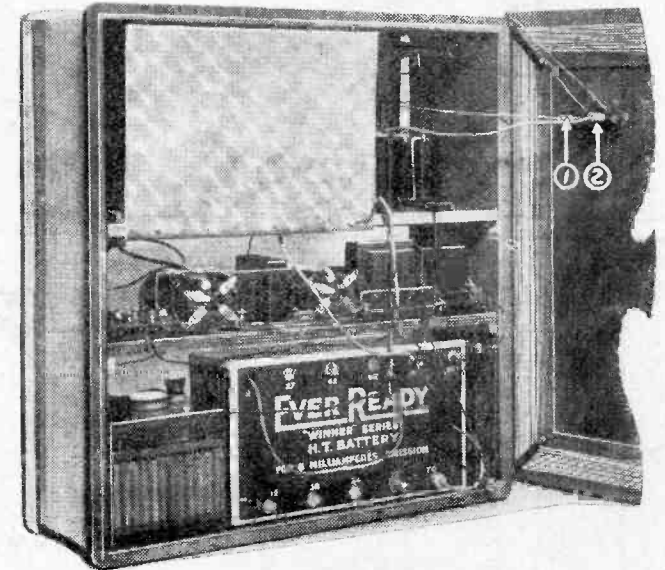
The reader will understand, of course, that in common with all frame aerial sets, this receiver must be turned about in various directions to get the maximum volume from the different stations.

On going over to long waves by shifting the plug controlling the frame aerials and moving the wave-change switch 5 X X came in at excellent volume with very little reaction. On tuning with a little more care and using a moderate amount of reaction, Radio-Paris was picked up, and likewise gave loud-speaker strength quite sufficient to be enjoyable.

Selectivity was extremely good on both wave-bands, and tuning was consequently very sharp on the dials. Indeed, just a little practice is required to get the knack of running them in step before searching can be accomplished successfully.

Sharp Tuning

It is not really difficult, but we think it as well to mention the point for the benefit of those readers who have been accustomed to the relatively broad tuning of the average set working on an outside aerial. They might otherwise be inclined to imagine they

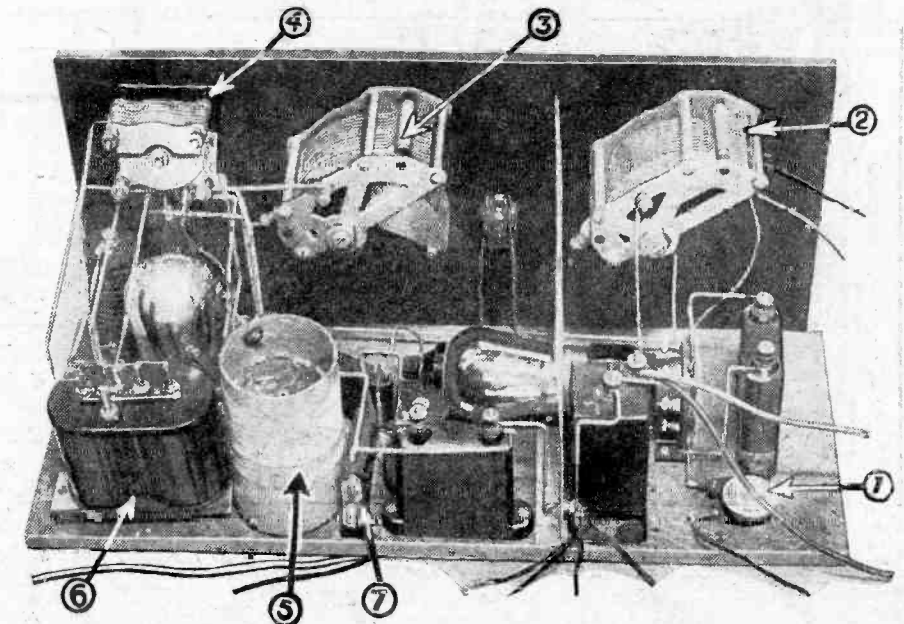


This shows the general arrangement of the interior—a triumph of compact efficiency.

was something wrong on finding that quite close-tuning was needed before they could hear even the local station!

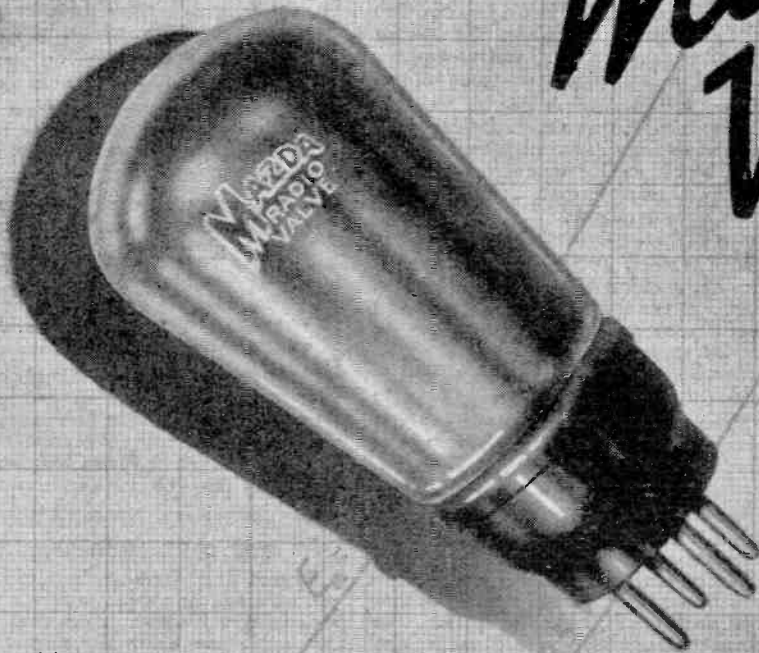
A little practice will show you how to handle the dials, and then you will discover (Continued on next page.)

HOW THE POWER IS PACKED IN



Compare this with the wiring diagram overleaf. (1) is the S.G.'s resistance, R₁, and (2), (3) and (4) the aerial tuning, H.F. tuning and reaction condensers respectively. (5) is the home-made coil, and (6) the B.S.G. 20 coil. The decoupling resistance R₂ is shown at (7).

Another Amazing Mazda Valve!



The **P.220A**
PRICE **13/6**

CHARACTERISTICS

Filament volts	-	-	-	2.0
" amps	-	-	-	0.2
Max. \pm T. volts	-	-	-	150
Amplification factor	-	-	-	6.5
Anode A.C. resistance (ohms)	-	-	-	1850
Mutual A.C. conductance (mA/V)	-	-	-	3.5

With Mazda valves in all positions your set will give a performance many times better than before.

Never before have such fine characteristics been approached by a power valve consuming only 0.2 amps filament current. With its impedance of only 1850 ohms it can accept a very large input and the remarkably high amplification factor of 6.5 gives a good stage gain. A high output may therefore be maintained together with remarkably fine quality.

The AMAZING MAZDA RADIO VALVES



THE EDISON SWAN ELECTRIC CO., LTD.

Incorporating The Wireless Supplies, Lighting, Engineering, Refrigeration and Radio Business of The British Thermocouple Co., Ltd.

Radio Division

*In Newman Street, Oxford Street W.1
Showrooms in all 15 Provincial Towns*

EDISWAN

V67

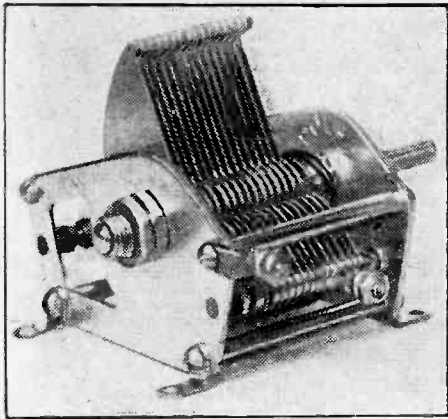
FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found—?



POLAR UNIVERSAL CONDENSER.

THE new Polar Universal Condenser is so designed that it can be used singly in the usual way, or ganged in two or three units, and the single hole fixing is duplicated at both ends so that it can be attached to screens.



The latest Polar Component.

It is one of the trimmest and yet most robust condensers that I have come across. It is made of hard brass throughout, and you will find it a difficult job to make the moving vanes bend over to the fixed vanes, even if you tried to do so.

Nevertheless, it is not cumbersome, and has clean lines and is very nicely finished.

It can be fixed down to a baseboard by means of four screws in addition, or as well as single hole panel mounting. There are ball bearings, and the movement is well up to Polar standard, which is saying a lot.

There is an extremely small amount of solid insulating material in the structure, so that its dielectric losses are practically nil.

Altogether it is an excellent production. It is quite apparent that Messrs. Wingrove and Rogers are still manufacturing "to form"!

The price of the single Universal Condenser is 7s. 6d. for the .0005 mfd. and 7s. for the .0003 mfd.

WONDERFUL VALVE CHARACTERISTICS.

If valves continue to improve at the same rate as they have been improving this last few years, the future has some marvels in store for us! At present there is no sign at all of a slackening—indeed, the pace seems to be growing faster.

For instance, I have just received one of

the new Osram P.X.4 valves. The P.X.4 was a very good valve, but with its new characteristics I do not know of another valve in its class that can touch it.

It is an output power valve with a 4-volt filament taking 6 amperes. It only needs 200 volts on the plate. It has an amplification factor of 3.5, and the extraordinarily low impedance of 1,050 ohms. Its mutual conductance is 3.3.

It is, of course, primarily designed for use in A.C. sets, the filament being directly heated. But it can be operated in a D.C. outfit, the filament current being supplied by a 4-volt accumulator.

And in this connection it is obvious that the P.X.4 is ideal for D.C. mains, as with these voltages above about 200 are seldom available. It enables the D.C. enthusiast to get results comparable with those given by the L.S.5A type of valve, a valve which necessitates an H.T. voltage of some 400.

Naturally the P.X.4 demands a fairly high anode current, and even with about 30 volts grid bias some 50 milliamps will be recorded when 200 volts are used. However, you get full repayment in the way of undistorted power.

On test we found the new P.X.4 just as excellent as its characteristics would indicate. It enabled a large moving-coil loud speaker to be operated at robust volume with a margin of power to spare. The P.X.4 costs 25s.

PILOT RADIO COMPONENTS.

I recently spent an hour or two testing a bunch of American components. From a patriotic point of view, I can only hope that this particular bunch represents the best that America can do. If they are merely of ordinary American standard, then all I can say is that the British manufacturer must pull himself together!

But I do not think they are because they are Pilot Radio components, and the name Pilot is of world-wide eminence.

These Pilot components were sent to me for examination by Thos. A. Rowley, Ltd., of Birmingham. These people are the sole distributors for Gt. Britain of Pilot Radio gear.

I like particularly the Pilot Knob Type

Switch which is of the quick action variety, and is capable of handling three amperes at 220 volts. It is a quite small one-hole-panel mounting component, and it is provided with a large insulating knob. The easy turn of this knob is accompanied by that most excellent snap action which represents my ideal in switches.

Then there is the Pilot Volugrad, a potentiometer device full of good points. And the Pilot L.F. transformer is a component that speaks for itself in a set! If it is not better than any British transformer it is certainly superior to many.

When you are Buying—

(28) A KIT OF PARTS.

Make sure that it really is the bargain it is claimed to be and that all the components are of good quality.

You are quite safe with kit suppliers of known reputation, but a kit that is proffered by an unknown concern or a local supplier may be full of concealed snags.

Little items of vital importance may be represented by absolute junk.

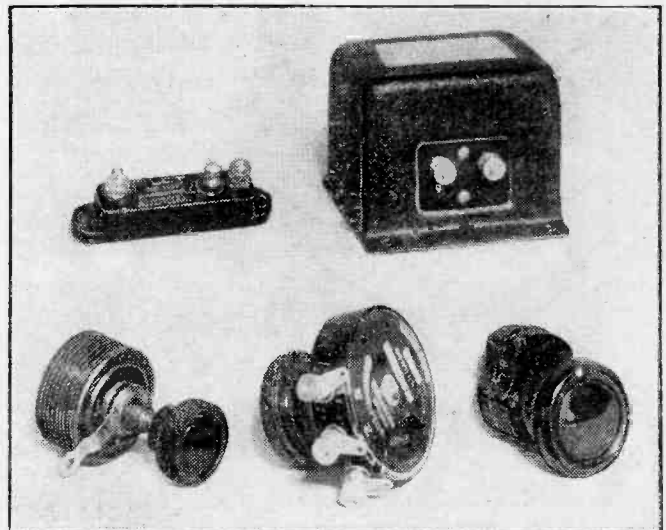
Also, the panel drilling might prove a very roughly-carried-out job. (The big kit people drill their panels by the dozen at a time, and use "jigs" to ensure absolute accuracy.)

The above applies to kits of parts for "P.W." and other such designs; the special kit-sets due to various manufacturers are generally only sold in special sealed cartons to ensure that the parts are not replaced.

FOR CONE LOUD SPEAKER.

Messrs. J. H. Weedon, Ltd., of East Ham, recently sent me a sample of their self-centre extension rod which is designed expressly for double linen or single-cone loud speakers.

The retail price is 1s. 6d. Its use obviates the usual stretching rods, while a small ball-socket movement enables exact centring to be obtained. It is a very ingenious, though a quite simple and easily-used article.



The Pilot components referred to are included in this group. The Quick-Action Switch is at the extreme right, and the Volugrad is to be seen in the centre at the bottom.

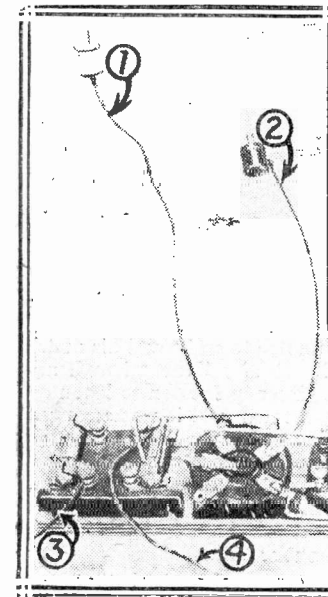
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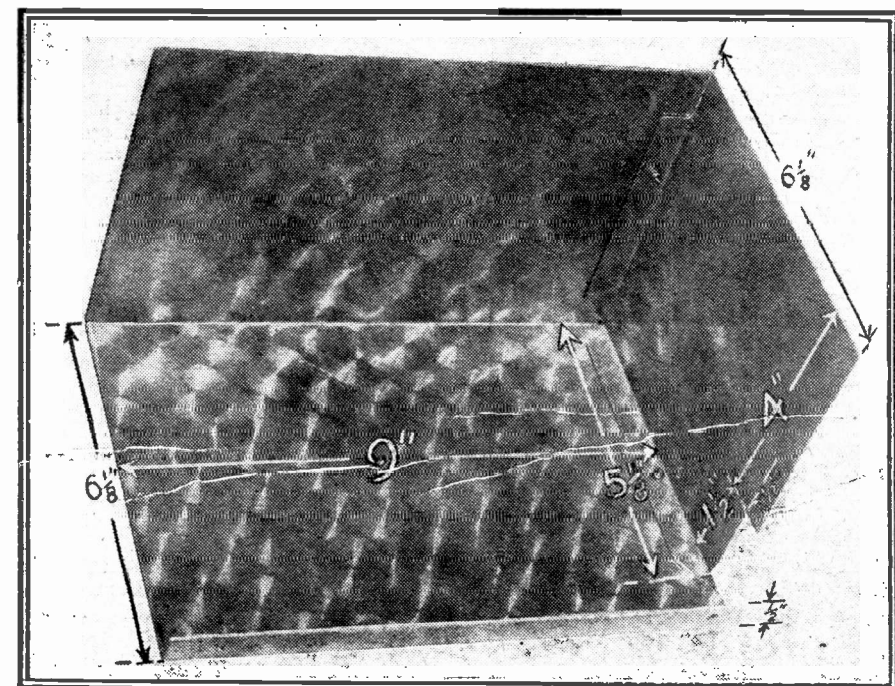
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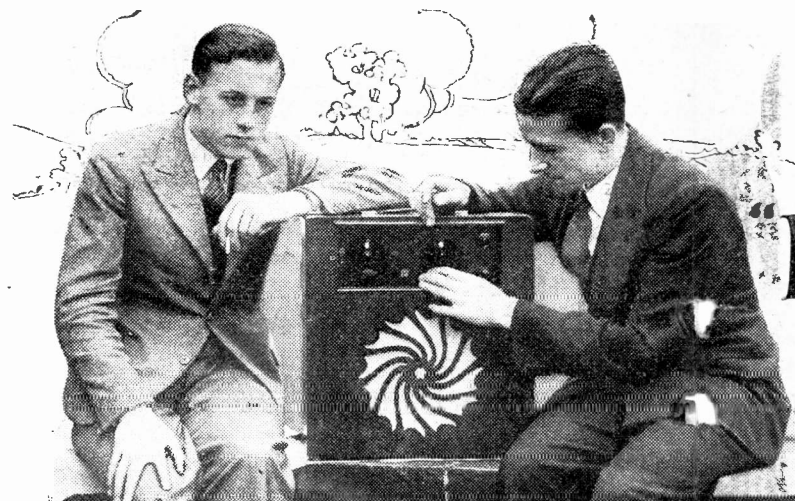
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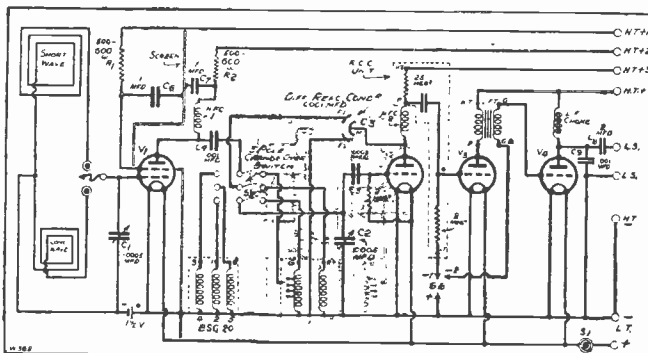
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 - 1 Double-pole change-over switch (Wearite, small type).
 - 2 1-mfd. condensers (Lissen, etc.).
 - 1 2-mfd. condenser (T.C.C. or Lissen, Dubilier, etc.).
 - 2 600 or 500 ohm resistances (Ready Radio and Climax, or Paroussi, Wearite, Bulgin, etc.).
 - 3 Horizontal type valve holders (W.B. or Bulgin unit, Paroussi, etc.).
 - 1 Ordinary valve holder (small type necessary here). (W.B., or Lotus, Formo, Benjamin, etc.).
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THE SET THAT WILL STAGGER YOUR PALS!

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The strength of the local programmes (about 15 miles) was so great as to overload the last valve heavily. It was necessary to cut the volume down and to

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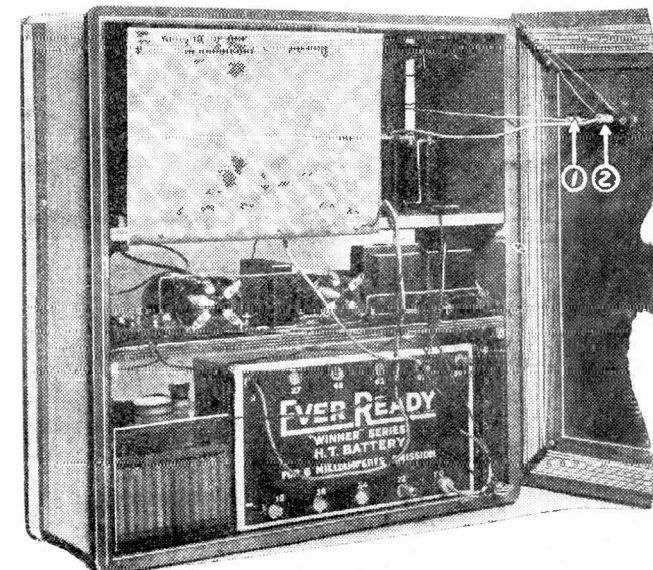
The reader will understand, of course, that in common with all frame aerial sets, this receiver must be turned about in various directions to get the maximum volume from the different stations.

On going over to long waves by shifting the plug controlling the frame aerials and moving the wave-change switch 5 X X came in at excellent volume with very little reaction. On tuning with a little more care and using a moderate amount of reaction, Radio-Paris was picked up, and likewise gave loud-speaker strength quite sufficient to be enjoyable.

Selectivity was extremely good on both wave-bands, and tuning was consequently very sharp on the dials. Indeed, just a little practice is required to get the knack of running them in step before searching can be accomplished successfully.

Sharp Tuning

It is not really difficult, but we think it as well to mention the point for the benefit of those readers who have been accustomed to the relatively broad tuning of the average set working on an outside aerial. They might otherwise be inclined to imagine there

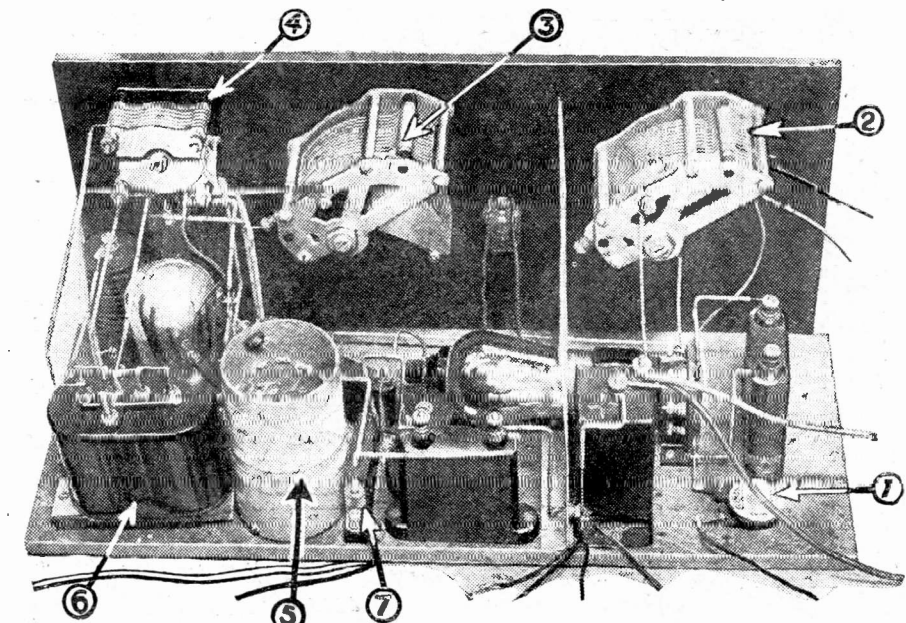


This shows the general arrangement of the interior—a triumph of compact efficiency.

was something wrong on finding that quite close-tuning was needed before they could hear even the local station!

A little practice will show you how to handle the dials, and then you will discover (Continued on next page.)

HOW THE POWER IS PACKED IN



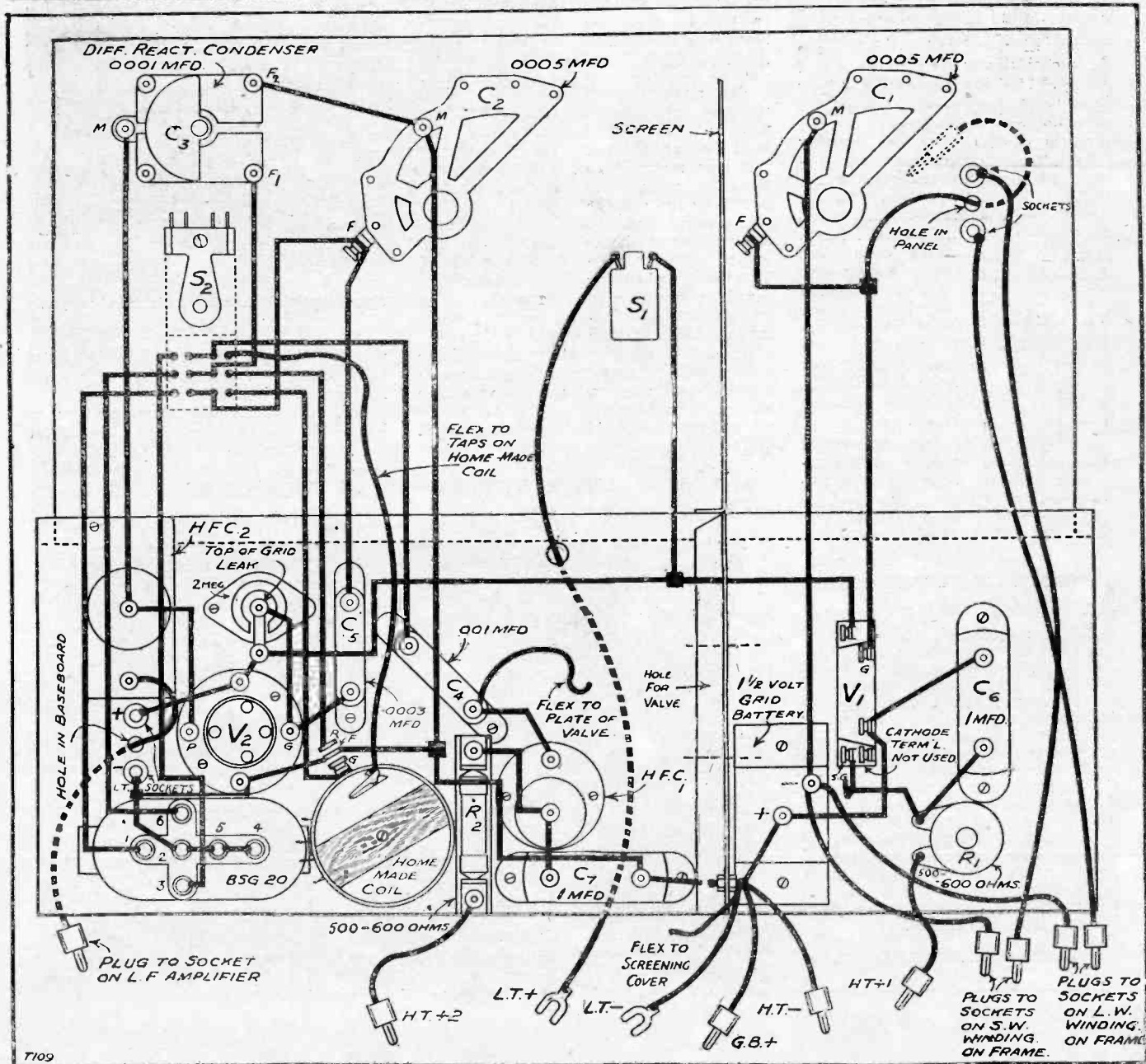
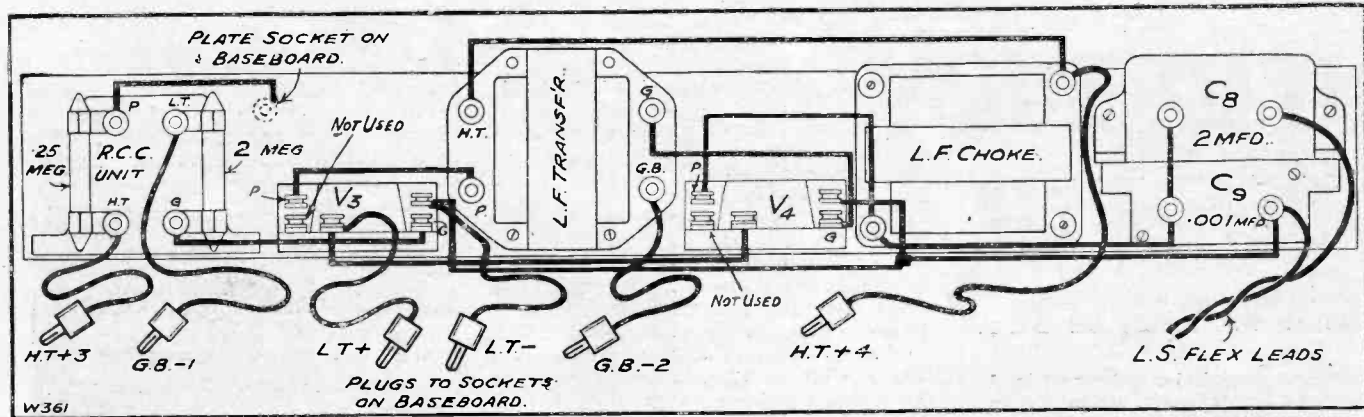
Compare this with the wiring diagram overleaf. (1) is the S.G.'s resistance, R₁, and (2), (3) and (4) the aerial tuning, H.F. tuning and reaction condensers respectively. (5) is the home-made coil, and (6) the B.S.G.20 coil. The decoupling resistance R₂ is shown at (7).

THE "MERCURY" FOUR.

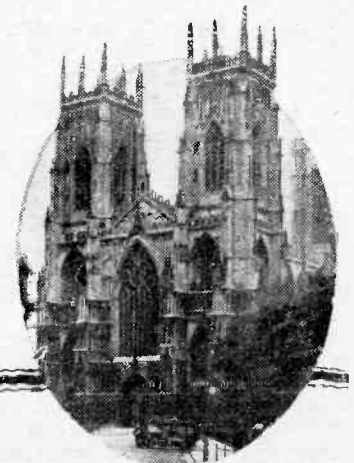
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that it is even possible to tune-in the foreigners quickly and easily, in which the differential control of reaction is a great help. Actually, you will discover the set will bring in quite a lot of foreign stations on the speaker after dark.

We have now given you a general idea of the set's capabilities and characteristics and there we must stop. A receiver like this calls for pretty detailed treatment and this we shall be continuing in our next issue.



Broadcasting York Minster



An intimate inside view of the complicated control work which is necessary when a broadcast from the famous cathedral is taking place—work which makes all the difference between a well-balanced broadcast and a failure.

By OUR CORRESPONDENT.

I HAVE just spent a bewildering morning in the B.B.C.'s most extraordinary control-room.

The paraphernalia of broadcasting seems completely out of place in the venerable room near the minster organ (so near that its panelled walls shiver audibly in resonance with certain of the bass notes).

York has such a genius for elaborate ceremonial that a broadcast from the minster generally involves almost as much fading and cross-fading of microphones as a complicated radio play.

The last time I was at York was on Military Sunday. It was half an hour before the broadcast was due to commence when I introduced myself to the three engineers in the vestry.

"I suppose that now you have nailed all those terrific echoes which used to distract you here, and now that the minster is permanently wired with microphone circuits, a broadcast from here is just a matter of routine?"

That Echo.

"Well, not quite," he replied. "It's one of the worst places for echo. These massed bands, you know. They are playing in the minster to-day right under the great tower, and the resonance. . . We had a test last night (the bands very kindly came along), and at first the resonance of some instruments was extraordinary. We spent a long time shifting them about until we got the right balance."

I was impressed then, and several times later, by the

close collaboration between the B.B.C., the military forces, and the minster authorities.

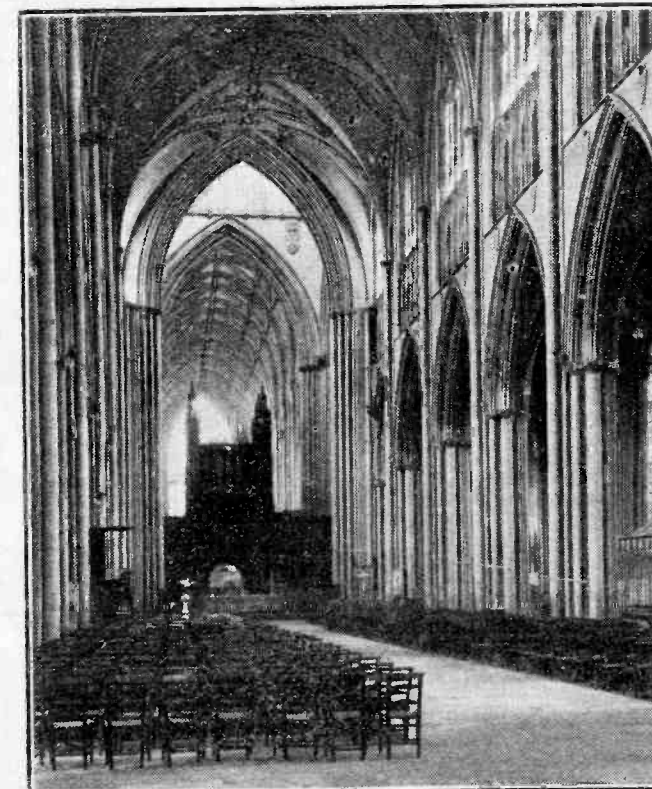
A bell rang. One of the engineers spoke into a telephone and then reported that the lines were through to Leeds.

"We have two land lines from here to Leeds," explained the "O.C." to me. "One for 'music' and the other for 'control.' From Leeds the broadcast is distributed to the various stations on the usual land-line circuits."

The Microphone Tests.

"Ask Leeds if they want atmosphere," he added to the man at the 'phone. "Atmosphere?" I queried.

STATELY AGE AND MODERN SCIENCE



In a little room, hidden by the architectural grandeur of our forefathers, sits the broadcast engineer, surrounded by amplifiers, switches, telephones, etc., looking after the very heart of the system which links cathedral and broadcast station.

"Crowd noises in the building before the service," explained the O.C.

With ten minutes to go he and his mates made a final test of all the microphones (getting an engineer in London to listen on each of them in turn) and it was arranged on the telephone that the announcer at Savoy Hill should make his announcement at 9.47 a.m. and that all stations should "come over" at 9.49.

Last-Minute Trouble.

At 9.4 an engineer noticed that the "music" line had become noisy. So had the other. The fault was reported to Leeds. At 9.45 the lines were still noisy. The engineers looked distressed.

At 9.46 "London" reported that from his end the lines "sounded" quiet. The relief of this news was immediately followed by the tension and suspense of "going over."

Through the vestry door I could see the vast audience which packed the great minster. They waited patiently for the service or ceremonial (call it which you like) to begin. But they did not know that really they were waiting for a young man in a little room in London 200 miles away to say his piece.

The engineer-in-charge had seated himself at the "mixer"—the boxes containing microphone potentiometers. Eight large knobs, one of which was a spare, faced him.

He made sure that they were all at the "off" position except one—the one controlling the microphone suspended over the massed bands. Engineer No. 2 sat at the telephone. No. 3 stood at the door.

"Over!" cried No. 2.

The Relay Commences.

No. 3 walked into the aisle outside the vestry where he could see the bandmaster. He made a signal. Immediately the music crashed out up to the vast roof throbbing and re-echoing and out from the aerials of a score of transmitting stations up and down the land.

My watch showed 9.50. The second band piece was Rawlinson's "Maid of Orleans" overture. "Watch this carefully for blasting," said the O.C. There came a thunderclap of drums and a blare of trumpets. Swiftly the "mike" control was turned back a bit.

After the preliminary band music the service proper commenced and then the engineer at the "mixer" really got busy.