



Popular Wireless & TELEVISION TIMES

Special Enlarged
CHRISTMAS
NUMBER

REGISTERED AT THE
G.P.O. AS A NEWSPAPER
NO. 157 VOL. 111 1937

You will find inside

JOHN SCOTT-TAGGART'S
"TELE-SOUNDER"

1937 ALL-WAVE RADIO

PICTORIAL TELEVISION
PRESENTATION

SPECIAL XMAS ARTICLES

Buy A NEW "H.M.V." ALL-WORLD RADIO in time for Christmas



YEARS of laboratory experience and research preceded the public introduction of "His Master's Voice" All-Wave Radio. As the result, even low-powered transmitters in U.S.A., Australia, and other distant countries can be received regularly (under favourable conditions) and with good quality reproduction. Those of the new "H.M.V." All-Wave models equipped with the 7-16 metres waveband will get the television sound transmission and amateur broadcasts, too. Two-speed tuning, Vernier scale which indicates exact reception point for each short wave station to be noted, and Cathode Ray Fluid-Light indicators and many other refinements are to be found in "H.M.V." All-Wave Radio.

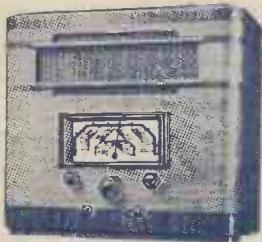
Get THE BEST RECEPTION ON ALL WAVE-BANDS



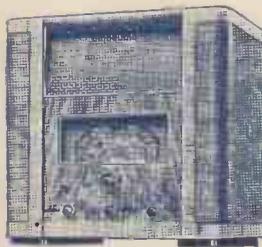
149. All-Wave Battery Receiver, 3 valves. 18-50, 195-560, 785-2000 metres. **9 1/2 GNS.**



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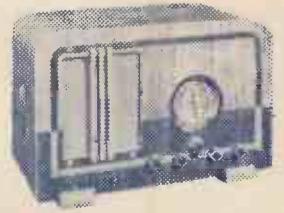
491AC. All-Wave Superhet. 5 valves (plus detector) with AVC. 16.5-52, 195-575, 725-2000 metres. **13 1/2 GNS.**



482AC. All-Wave Superhet. 6 valves (plus detector) with AVC. 16.5-51.5, 200-580, 725-2000 metres. **16 GNS.**



481AC. All-Wave superhet. 6 valves with AVC. 7-16 (covers Television Sound Transmission), 16.7-53, 46-140, 185-560, 750-2200 metres. **18 1/2 GNS.**



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487AC/DC. Universal All-Wave Superhet Radiogram. 4 valves (plus detector) with AVC. 16-50, 195-580, 750-2000 metres. **25 GNS.**



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GO NOW FOR DEMONSTRATION TO YOUR "H.M.V." DEALER
"HIS MASTER'S VOICE"
 ALL-WORLD RADIO

THIRTY-EIGHT YEARS "SOUND" EXPERIENCE



Popular Wireless

AND TELEVISION TIMES

EDITOR: G. V. Dowding
 Asst. Editors: A. Johnson Randall,
 A. S. Clark

GOOD REASONS
 ON EASY TERMS
 VERY CONFUSING

RADIO NOTES & NEWS

ROYAL RADIO
 A GOOD FRIEND
 LINER LINKS

Same to You

THE unwonted chromatic ebullience of our cover this week will have convinced you that this is, indeed, the Christmas Number of "P.W." Without confirmation from the calendar I should have said, "Impossible," for it seems a mere no-time since last I bade you charge your glasses, and allow the laws of liquidity and hydrostatics to lubricate your larynx.

We will, however, gratefully accept this annual excuse and fill 'em up once more. Are you all ready? Glasses raised?

Then here's to A Happy Christmas . . . Good health, sir . . . More hair on your chest . . . Bung-ho!

800 Good Reasons

HAVING moistened the old membranous linings, let us congratulate ourselves—old pals and newcomers alike—on the marvellous way in which radio perennially maintains its freshness and its charm. Lucky devils, we are, to have a hobby that always opens up new vistas and fresh fields.

I think 1936-37 will go down to history as the all-wave season. ("What makes me think so?" S.T.800 good reasons!) But in addition to the perfection of all-the-world reception our horizon is full of promise.

Everywhere new stations are springing up, fellows are practising yo-ho-delling and wisecracking, band-leaders are perfecting the timpani, pianos are being tuned, televisionettes are perming their hair, announcers are gargling—all, all because YOU, the radio audience, want the best that boodle can buy in the way of bright and breezy programmes.

Let's have another on the strength of it. Here's how!

On the Easy Plan

IF a gentleman calls at your house with the story that he is a B.B.C. engineer, sent to investigate complaints of interference, do not trust him, gentle reader, though his voice be low and sweet.

One plausible traveller who has been going round with this story always examines the radio set with great care, and suggests it needs a thorough overhaul with some instruments that are in his van "round the corner."

He then takes the set, vanishes round the

corner, and well—he just vanishes round the corner.

Television is from its very nature more suitable for the dissemination of all kinds of information than for entertainment . . .

* * *

Alan Hunter, in the "Manchester Evening News": . . . "If television is going to develop along the lines of a glorified magic lantern lecture course it just isn't going to develop."

Gate-Crashing Short-Wavers

A WEEK or two ago I told you about "Medium Wave" of Worksop, who specialises in flea-power station reception. I forgot to mention the curious fault that appeared on his set. For absolutely no reason at all he gets short-wave stations who work between thirty and fifty metres walking in on his set when it is adjusted at about 20 metres.

Madrid EAQ is one of these uninvented but welcome guests, and Podedrady is another. Also a huddle of amateurs, including G6DL, G2AK, G5JO, G6AG, G6BO, G2DK, G6PL, G5QC, G8HW, and a lot of their pals.

Why this jolly lot should barge in on "Medium Wave" I don't know. He doesn't seem to care, so let's pretend we are not interested. But it is odd, all the same, don't you think?

Very Confusing

EVERYONE who has appreciated what a thundering good mimic Hubert is, in Nosmo King's amusing radio appearances, will sympathise with Hubert's mother.

After the recent Belfast broadcast, for instance, Nosmo King rang up his wife in London to know how the show came over.

(Continued overleaf.)

To "P.W." Readers
 The Editor and Staff
 Wish You All a Happy
 and Merry Christmas

corner, and well—he just vanishes round the corner.

The police do not know who he is, but they know what he is; a supreme example of the man who believes in getting his radio on Easy Terms!

What They Say . . .

THE London Regional announcer: . . . "Here is a Newt! Er—here is a note on the new duties . . ."

* * *

Gerald Cook, Director of Television:

A SPECIAL TELEVISION PRESENTATION APPEARS ON PAGE 333

STUDIOS TO BE BUILT UNDERGROUND

But after the good lady had been talking to her husband for some minutes she realised it was really son Hubert, impersonating his father. So she told him off good and hard, despite his indignant protests. Finally the voice said, "I'll fetch Hubert to the 'phone, to prove it," and behold, Hubert duly came on and asked, "What are you making all this fuss about?"

His mother, to make sure there were really two people at the other end, then got them to speak *together* into the 'phone. Finally, quite satisfied, she told her husband she was sorry; to which he replied: "Oh, that's all right!"—but he spoke in *Hubert's voice!* She must have been quite glad when the exchange cut them (or was it him?) off!

A New Broadcasting House

EARLY in the New Year the old Georgian mansions used by the B.B.C. as offices will be completely de-bricked, and plans for a great extension of Broadcasting House are now under consideration. The effect will be to double the size of Broadcasting House, and the work is expected to take some three years from now.



One odd thing that has been stated

is that there will be no provision for a television studio in the new premises. This does not worry me so much as another statement to the effect that the roof will be devoted to a staff restaurant, and the bulk of the building to offices, the studios will be underground.

What, I ask you, will our programmes be like if they emanate from a vault? Will a sepulchral start ensue that snap, that quip, that roguish, chase-me flippancy for which we hope? *What a hope!*

Royal Radio

IT was stated recently in the "Bradford Telegraph and Argus" that the Duke of Kent has bought a new radio set. It has three loudspeakers and more than twenty valves.

Young King Peter of Yugoslavia is an enthusiastic set-builder, who likes nothing better than a blueprint, pair of pliers, and a screwdriver. He favours sub-baseboard wiring, and all the King's horses and all the King's men have to wait when a tricky bit of trimming engages the royal attention.

Twiddly Bits

Berlin has been experimentally broadcasting weather charts to pilots in the air.

Chap at a Los Angeles exhibition plays about nightly with giant spark of 1,500,000 volts. Has no patience with listeners who are nervous of leaving the juice on while fiddling with set!

Somebody has called the new B.B.C. school of announcers "Narkover." Broadcasting House thinks this not quite nice.

* * *

Surprise for Berlin!

HOW quaintly doth Memory, that great artist, colour the stuff of life.

A moment ago I was sitting with puckered and serious brow, thoughtfully pondering on the week's radio news, when I came upon the following item: "Experimental exchange of radio pictures between Tokio and Berlin very successful."



And it suddenly occurred to me that if the Japanese send to Berlin some of the pictures they showed me when I was out in Nagasaki—well, Berlin would get its biggest surprise since the Hitler clean-up!

A Good Friend

SOME of you chaps may find it difficult to believe that I am interested in Quakers. (I know that "Romeo" will, for he sent me a most un-Quakerlike postcard recently, about the "Smack in the Eye For Poets" paragraph I wrote in our November 7th, issue.) However, I am interested in Quakers, and I occasionally read "The Friend," which tells of their manifold activities.

In this journal recently I saw it stated



"What's a fella to do when they sit up half the night listening to the short waves?"

that the name C. F. Jenkins, of New York (often bracketed with that of J. L. Baird as one of the pioneers of television), is that of Charles Francis Jenkins, the American Friend whose inventive genius did much to make the modern cinematograph projector possible.

He's been a true Friend to scientific entertainment.

Itemised Information

COST of radio time bought by political parties in American Presidential election estimated £400,000.

* * *

Mysterious hum at East Grinstead to be abolished at cost of £320. Officially described as "300-cycle ripple from rectifier equipment." Unofficially described much more luridly.

* * *

Mr. V. A. M. Bulow, who joined B.B.C. in 1923, has gone to Bagdad to take up appointment in Posts and Telegraphs Department, of Iraq. Left umbrella behind, took topee.

* * *

Trinity House said to approve radio beacon idea for Tyne area. Would aid ships by leading them straight to river.

* * *

Woodman, Spare That Tree

A BAVARIAN woodcutter named Leonhard Schmid was swinging his axe and singing away one day when he was overheard by a music teacher who was strolling in the woods. The music teacher was so impressed by the woodcutter's yo-ho-de-lar-ios that he undertook his musical training, and now the woodcutter is often heard in the programmes of the Munich station. His Mozart arias are particular favourites.



There is, however, one minor snag in this so far true story. The Munich station's masts are made of wood, and—well, you see the snag, don't you? If the tenor gets a little absent-minded one day, when somebody has left an axe lying about, the masts of Munich may suddenly horizontalise their perpendicularity, amid a cloud of dust. Once a woodman, always a woodman!

Linking the Air-Liners

SEVEN years ago, when the first regular aeroplanes were linking Britain with the Continent, a passenger on one of the planes could not receive a radio-telegram *en route*. To-day he could do so, from the technical point of view, though regulations forbid cluttering up the ether with such messages. Italy, however, has now thrown open her ground radio stations for "airradios"—as they are called—to any destination.

On Empire routes and where the ether is not so congested the passenger in the air liner is as well placed as the passenger in the liner at sea—he is never out of touch. Soon this air-telegram service will be too commonplace to mention. Yet only seven years ago it was one of the wonderful Things to Come.

My Orchestra at Christmas



SO you want to know about the B.B.C. Dance Orchestra and its work? Well, I think at this time of the year, such a subject, interesting though it is to me, might be a little dry to you. I propose, therefore, to tell you a few things about the orchestra and our work at Christmas, and then to introduce you to some of the boys who you will hear over the air during the festival season. Though you won't be able to see us, except perhaps a few of you who are getting television sets this Christmas, the boys and myself and the Three Sisters, Molly, Marie and Mary, will be with you in spirit and in sound during the Christmas holidays.

In our studio at Maida Vale, we shall be playing and singing into the microphone while you are sitting round the fireside cracking nuts and jokes and playing the usual Christmas jokes on Uncle Joe and Auntie Bessie.

We'll Have Our Fun!

You can picture if you like the room with its white draperies, its three or four microphones and a great studio clock ticking away the seconds as we broadcast. Well, there are at least twenty-five of us in the studio, including the Three Sisters and myself, and we shall be asked to give you as much lively, seasonable music as we can. There will be no holly or mistletoe or Christmas decorations about the studio, and those of us who are married and have children will, of course, not be able to take part in the usual Christmas festivities with those at home. But we shall picture our own families seated round their loud-speakers listening to us as you will be throughout the British Isles, and as others all over Europe and perhaps America will be listening.

I have heard people say that it is a shame that we should have to work on Christmas Day. I don't know that it is, for if you knew the boys as well as I do, you would know that there will be no lack of gaiety during the B.B.C. Dance Orchestra broadcast this Christmas.

His Hobby

With George Elrick, drummer, Billy Smith, and Charlie Price, our second and first trumpet, to say nothing of Freddy Mann, the third trumpet, there is no danger of things being dull in the studio.

Freddy, in particular, is one of the biggest humorists in the band. Freddy comes from Birmingham, and his chief hobby is the breeding of chows, which he exhibits at the Dog Show and particularly Crufts.

The band is and always has been British, and its members come from all over the British Isles. George Elrick, who plays the drums and is one of the most popular comedy vocalists on the air to-day, hails from Aberdeen. Perhaps you've noticed that

when you've been listening to him. But what you probably didn't know was that his early ambition was to be a doctor. He went to Gordons College, Aberdeen, and there he started a dance band at the college. The result is that he is not a doctor but a very valuable member of the B.B.C. Dance Orchestra.

Henry Hall introduces you to some of the boys—and girls—of the B.B.C. Dance Orchestra who will help to bring fun and good cheer to your firesides this Christmas.

I don't think you need any other introduction to Charlie Price, my first trumpet, Brecon born, than the photograph which he has sent for your article. I am glad to say he doesn't bring his chum to the studio with him. I think we might have a little bit of difficulty if he did.

Incidentally, it may assist you in your

AN OFF-DUTY SNAP



A cheery glimpse of Bert Powell trying his hand at the "beer engine" as a change from playing the violin and viola in Henry Hall's orchestra. The bar, incidentally, is NOT at the B.B.C.

mental picture of the band and its make-up if I tell you that every member, with the exception of the Three Sisters and five of the boys, is married.

It is always considered indiscreet to tell a lady's age, but I may perhaps inform you that the combined ages of the Three Sisters work out at an average of only about twenty-three years.

Who is the big noise of the band? Well, it depends exactly on what you mean. If it is a matter of sheer noise, perhaps I would put George Elrick down, or Charlie Price, or perhaps Tony Thorpe, who plays trombone. They each have their moments.

Then in the saxophone section, we have our "giant," Bert Gillis. He plays the alto and baritone saxophone and the first clarinet and alto clarinet. I have known him for many years. He was with me at Gleneagles and has also had experience during a long tour in South Africa.

Single Stringers!

I have mentioned that only five of the members of the band excepting the Three Sisters are single. It is a curious fact that all those five are in the string section. There is Joe Hitchener, Cyril Harling, and Eric Cuthbertson—three fiddlers, with Cyril also doubling off the tenor sax.

Joe comes from Northampton, Cyril from Leeds, and Eric from Birmingham. Then there is Syd Williams to make up the fourth fiddle. He and Stuart Knussen break the single record of the strings.

Syd hails from Barry and plays the second violin. He is a keen Soccer player, with cricket and tennis as his summer games. He was in the New Queen's Hall Theatre Orchestra from 1926 to 1928, having been trained at the Royal Academy.

Joe Hitchener came to me straight from Trinity College, but Cyril Harling set out in life to be a schoolmaster. He found he liked dance music better, took it up and joined Sid Lipton. He came to me this year.

Most of the boys are keen golfers, but they do not all reach the expert stage that Eric Cuthbertson has. He was the winner of the Golf Championship of the B.B.C. last year, and is runner-up this year. An excellent cricketer, too. As a matter of fact, all the string section is good at games—a peculiar thing when one considers the delicate fingers they have to possess.

Our Cockney

The fourth of the unmarrieds is Herby Powell, my viola player from Barry, and number five is Theo Farrar, who plays the double bass.

One of the most versatile members of the band is Eddie Cromar. He has the most amazing aptitude in the mastery of musical instruments, and plays alto sax., baritone sax., clarinet, violin and

trumpet.

Freddy Williams, our real Cockney, has not only the second alto sax. to look after,

(Continued overleaf.)

MY ORCHESTRA AT CHRISTMAS

(Continued from previous page.)

but also the second clarinet, whistle, ocarina, goofus, etc.

Of the careers of the members of the band, probably one of the most interesting is that of Dan Donovan, the vocalist you hear so often. He first set out in life in a shipbroker's office. Perhaps, as he was

Then he started a dance band on his own in Cardiff. He played at Jimmy Wilde's Palais de Danse and, as a matter of fact, broadcast with his band from Cardiff for two years.

His instrument is the saxophone, and for some time after his Cardiff career he was with Debroy Somers. Later, he joined me.

Talking about vocalists, let me tell you about the Three Sisters—Mary, Molly and Marie. The first two were among Cochrane's Young Ladies. Marie was trained as a singer and dancer, and Molly met the other

WHO'S WHO IN THE ORCHESTRA.

HENRY HALL
F. BURTON GILLIS
E. CROMAR

ERIC CUTHBERTSON
DAN DONOVAN
GEORGE DICKINSON
GEORGE ELRICK
T. FARRAR
JACK HALSALL
J. HITCHENOR
CYRIL HARLING
S. KNUSSEN
F. MANN
HERBERT POWELL
CHARLES PRICE
BERT READ
BILLIE SMITH
ERIC TANN
TONY THORPE
FREDDIE WELSH
FREDDY WILLIAMS
S. WILLIAMS

Soprano, alto and baritone saxophone.
Alto saxophone, baritone saxophone, clarinet, violin and trumpet.
Violin and viola.
Vocalist and saxophone.
Guitar.
Drummer and vocalist.
String bass.
Tenor saxophone, clarinet, flute.
Violinist.
Violin.
'Cello.
Trumpet.
Violin and viola.
Trumpeter.
Pianist.
Trumpet.
Trombone.
Trombone.
Trombone.
Alto and bass saxophone.
Violin.

In addition to Dan Donovan and George Elrick, the vocalists include The Three Sisters.

born in Cardiff, though his parents were Irish, it was only natural. But he soon tired of that and, against his parents' wishes, he set out to become an engineer. He did, in fact, qualify as a motor engineer.

two "sisters" in a show at Drury Lane. After the show ended they stuck together and did some film work.

One day they found themselves in a scene in my film, "Music Hath Charms."

"MUSIC MAKERS" ALL



A merry group, featuring Henry Hall, the Three Sisters, and Bert Yarlett.

I heard them and thought they were pretty good, but as I had nothing to offer them at the time, I said nothing about it. Later, when I was looking for a trio, I got into touch with them, and they are now among my regular singers.

Molly is the leader of the trio, Mary is a blonde and Marie a brunette. They come, respectively, from Kent, Hampshire and Wales.

In addition to George Elrick, another "Scotty" in the band is Freddy Welsh. He plays the third trombone and doubles on the bandoneon. He comes of a family of trombonists, both his grandfather and his great-grandfather playing that instrument. Freddy started in the musical world in his home town, Glasgow, playing the



An unconventional photograph of Charles Price, first trumpeter, in Henry Hall's orchestra.

piano for the silent cinema. Then he took up dance music in 1925, and later joined Roy Fox.

It is perhaps strange to the uninitiated that so many crack dance-band instrumentalists start life as "straight" musicians. But a classical musical education is a very fine grounding, and many of my boys have been trained as classical players. But it is not often that one finds a player like Stuart Knussen, who has had fifteen years' experience with the Halle Orchestra under Sir Hamilton Harty, and yet has forsaken it to come into a dance orchestra.

Stuart played first 'cello in the Halle for four years, and is now 'cello player with me. He comes from Cardiff, and left the Halle to come to the B.B.C. dance orchestra.

I Hold the Record

One of the voices you hear over the air sometimes in the vocal trios is that of Jack Halsall. He is my tenor saxophone player, and also takes the third clarinet. Jack has had plenty of practice in hotels round Blackpool, and with Howard Baker in Liverpool. Later, he went to Billy Cotton, and eventually joined the B.B.C.

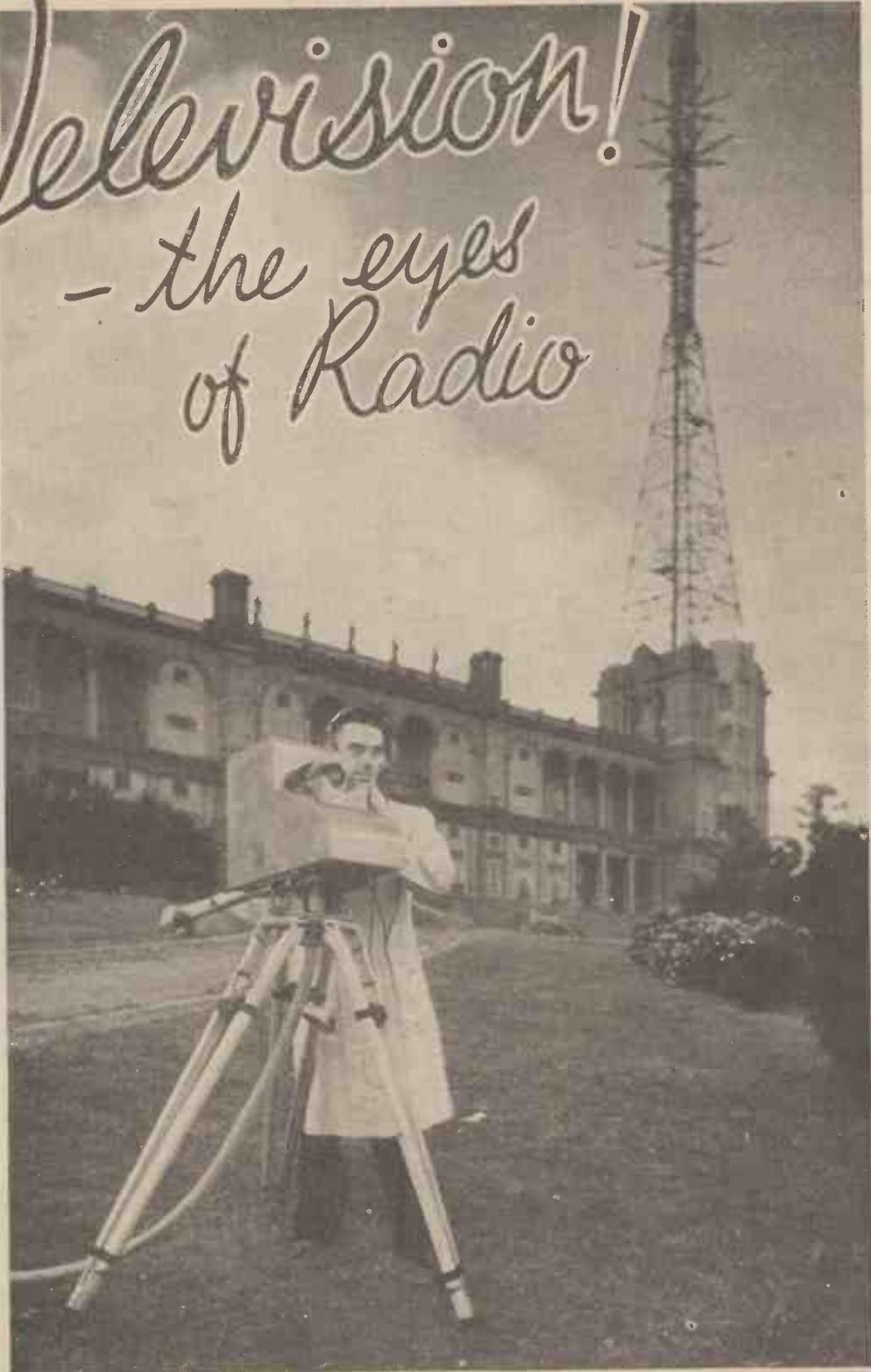
The band is one of the most cheerful bands in existence. They are probably the hardest worked, too. We do something like four hundred broadcasts a year, and goodness knows how many recording sessions and rehearsals.

I think that, as a matter of fact, in the five years in which I have been directing the dance orchestra, I hold the record for the number of broadcasts in this part of the globe. We are, undoubtedly, the most often heard broadcasters in Europe.

Even during Christmas we do not rest, as you will see by your programmes. We shall be on the air on Christmas Eve, Christmas Day, Boxing Day, and on New Year's Eve and New Year's Day. Pretty good going, but we don't mind. There is no lack of fun and festival spirit in the Maida Vale studio on such occasions.

Television!

- the eyes
of Radio

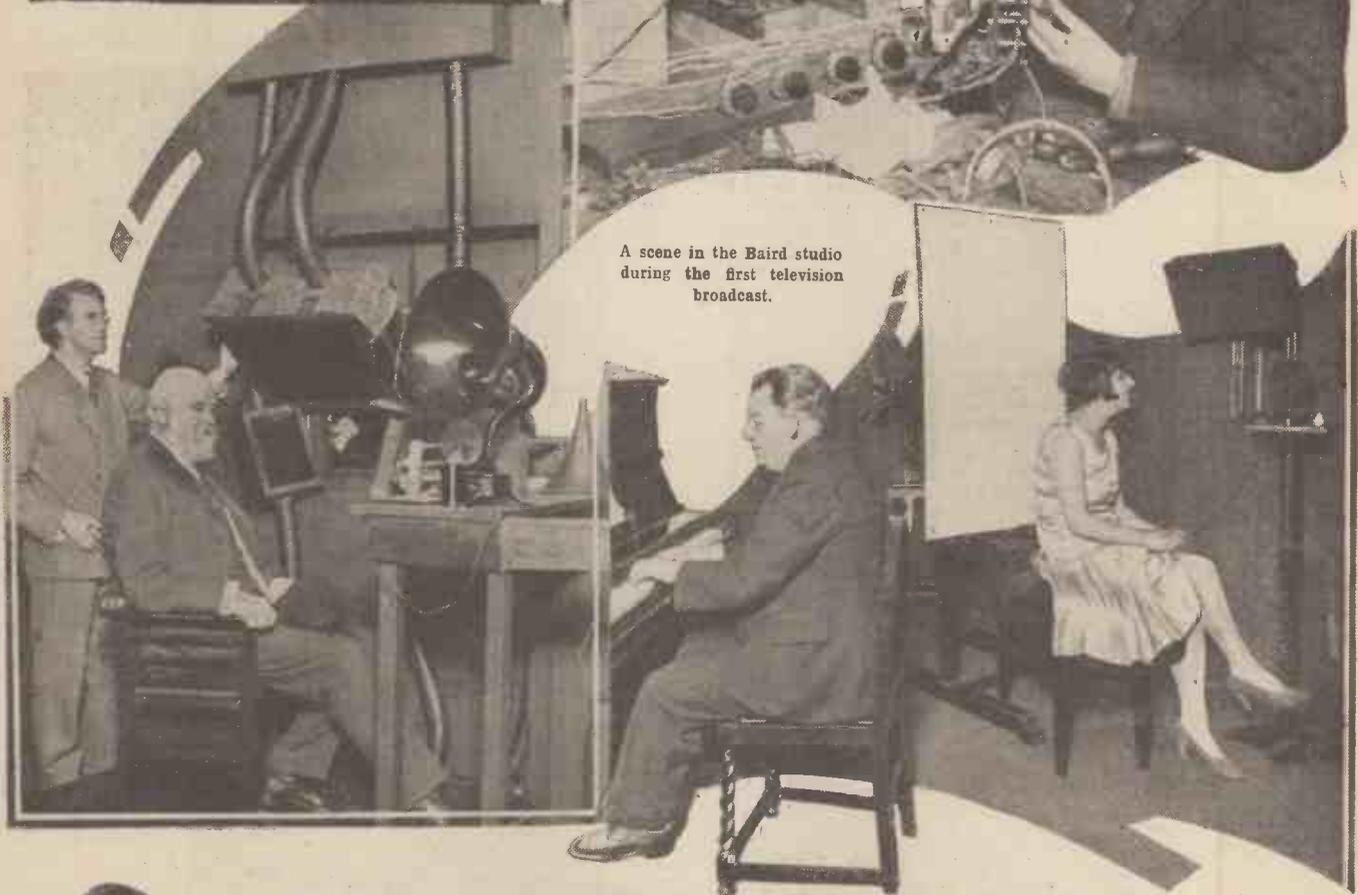


EARLY *Days*

On the right is the famous television pioneer, John Logie Baird, with some of his early apparatus, while below he is again seen, this time televising Sir Oliver Lodge.



A scene in the Baird studio during the first television broadcast.



To the left, below, is a group looking at a 30-line receiver, while to the right is a scene from the B.B.C.'s old 30-line studio.



WHEN one switches off a television outfit at the end of an all-too-brief hour of the new service to change over to the ordinary broadcasting programmes, the effect is devastating.

The radio has gone blind and become once again just sounds and voices from behind a dark, impenetrable wall.

It is like walking from a sun-lit garden into a totally unlit room.

It is obvious that television is the new broadcasting and will ultimately completely replace blind radio just as the talkies have completely replaced the silent film.

It has made a start, and technically it is superior to sound broadcasting as this was in the beginning. Far superior. The pictures are amazingly bright and detailed. As good as in the best cinemas.

Everyone seeing the new television for the first time is immensely thrilled, for its entertainment value is complete.

Programme Hours and Cost

But at the moment television is limited in programme hours, and it is expensive. It would be strange if this were not the case. Everything has to have a beginning, and the remarkable thing about television is that it has begun at such an advanced point.

Think of the early motor-car. It cost £500 or more in its very cheapest form and it gave indifferent service.

It was supposed to transport you mechanically along the road from one point to another, but it so frequently failed that a popular song called "Get Out and Get Under" achieved an immense success, and Harry Tate sprang into fame by giving music-hall skits on that method of locomotion.

No doubt railway chiefs used to smile at the idea that the motor-car would ever become a really serious rival to the railroad. More to the point, drivers of horse-drawn carriages scoffed loudly.

But where are these scoffers now? The answer is that those who are still able to work are themselves driving motor vehicles!

Television has a tremendous start in that its results are comparable with the modern car. There remains only the question of price and programme hours. The latter are in the hands of the Television Advisory Committee and the B.B.C.

Rapid Progress

Spokesmen of both have declared that there must and will be rapid progress both in numbers of hours of programme and area availability. A quarter of the population of this country is now served with television. Provincial stations will start to be erected during 1937.

Price? The cheapest outfit on the market is 85 guineas. A lot of money! But it is not an exorbitant price in view of what television can bring you.

However, only a comparatively few will be able to pay as much even on the easyway principle.

WORLD'S FIRST TELEVISION SERVICE

For a time television will be the rich man's pleasure. That won't last long. Prices will soon begin to fall.

Many things will contribute to the cheapening of television sets. First of all, you have the valuable stabilisation of transmission technique which the Advisory Committee is enforcing. Not for a period of at least two years will there be any changes made in the B.B.C. transmitters which could render obsolete a set bought to-day.

So the radio industry can go ahead on mass-production with no fear that their plans might have to be changed at a moment's notice and new models produced.

And you know how prices fall once there can be organised mass production.

Competition Will Help

Then there will be commercial competition to help. Already a dozen firms are in the field making television sets. There will be many others. A scramble to grab the plums of this brand-new trade is certain to take place.

And the "looker" is going to benefit. "Wouldn't it be possible to make a television set for £20 providing you entered into big-scale production?" asked a big man in the electrical industry the other day.

The answer is, yes, providing the scale were big enough. And in due course it will be. Take the component parts item for item. You want a sound receiver plus

loudspeaker. How much in terms of retail prices? Six pounds for a pretty good one?

A vision receiver is needed. No. L.F. power, no loudspeaker. Four pounds? Cathode-ray tube? Let us say £4 and be generous. Time base? (one multi-grid valve and two amplifiers in the not very distant future); call it £5. And add one pound for tying them together.

There's your £20 complete television set. And within five years they'll be on the market at £12 or £15? Before seven years have elapsed you'll see adverts. for cheaper ones even than that.

For the moment heavy initial research and development charges have to be levelled

THE "PICTURE PAGE" GIRL



This is Joan Miller, who appears on the screen between items of "Picture Page," one of the most popular of the television programmes.

against small sales; mass production has not yet commenced. But the wheels have begun to turn. They will soon gather momentum.

And then television as a vital new form of home entertainment will be in its stride. Who will there be who, having eyes, will not want to see? To peep into the outside world, to enter without effort into centres of sport and entertainment while yet remaining comfortably in an armchair at home?

It Has Arrived

Television! Dream of the prophetically minded novelist for countless years! It is here now. One of the Shapes of Things to Come no longer lies in the future. It has arrived.

There are plenty of people to deride this new thing. There always are. Some are merely old-fashioned reactionaries, the kind of folk who won't ride in motor-cars because they are "new-fangled." Others are inspired in their depreciation. They fear television for one reason or another.

Then there are the sceptics who are sceptical through sheer lack of (Please turn to page 337.)

IN THE ALEXANDRA PALACE GROUNDS



Many good outdoor programme items have originated in the grounds of Alexandra Palace. Here is Archie Compston demonstrating golf shots.

In Other Lands

Apart from England and America, many other countries are conducting tests and experiments in television, and the pictures on this page indicate the stages of development attained. Considerable advances have been made in Germany where the Olympic games in Berlin were televised this year. In this connection public viewing halls were thrown open to the public so that those who were unable to attend the games could see them on the television screen.



Going round the page from right to left, starting from the top, the photographs illustrate the following:

A German electron camera for direct transmission of outdoor scenes. It is of the type used at the Olympic Games this year. Note the special binocular focusing system.

The type of transmitter with which experiments are being made in Japan. A great deal of research is being carried out in this country and every endeavour is being made to reach a high standard of perfection in preparation for the 1940 Olympia Games in Tokio.

Complete Italian television receiver. The tube is mounted vertically and viewed via the mirror to be seen at the back of the aperture in the top of the cabinet. This receiver costs just under one hundred pounds and is designed for 375 line pictures. As a point of interest it may be mentioned that the cathode-ray tube is guaranteed for 2,500 hours.

Picking up a scene in the studio of Philips at Eindhoven, Holland.



GERMANY—JAPAN
ITALY AND
HOLLAND



WORLD'S FIRST TELEVISION SERVICE

(Continued from page 335.)

imagination (they cannot appreciate the immense potentialities of television); or ignorance (they haven't seen what it can do).

Or maybe they remember the ballyhoo which accompanied the B.B.C.'s abortive 30-line experiments.

This new television has no connection with that unhappy debacle. If any of you still think of television in terms of shapeless, flickering blobs and splashes, you should at once start thinking again.

Let us try to give you something of an idea of what it actually is like.

Turn to a really large newspaper illustration, one nearly a foot square, and think of this as suddenly springing into life but with somewhat better definition and certainly much brighter. Then imagine that it is, into the bargain, a talking as well as a moving picture.

That is television.

You Must See It!

Imagine you are sitting in the back row of a super-cinema, but that the pictures you see are simultaneous representations of actual events.

That is television.

Think of the radio stars coming right into your own home so clearly that you can count their eyelashes.

That is television.

In part.

For a full appreciation of its capabilities and possibilities you must see the real thing itself.

IN THE MARCONI-E.M.I. STUDIO



A rehearsal of the Griffin Brothers' comedy horse, "Pogo," and Miss Lutie.

The most remarkable aspect of it is that even at this moment the B.B.C. is able to do wonders for the handful of "lookers" that exists.

News reels can be transmitted. Studio shots dissolving from long shots to close-ups with uncanny smoothness are possible and are being done. The marvellous television camera can be taken into the open air to collect a thousand and one interesting items for immediate reproduction on the home screen.

A £20,000 television van for doing this sort

of thing has been purchased. This van is able to go almost anywhere and send its pictures back via the ultra-short waves just as can the ordinary O.B. vans for blind broadcasting.

Films taken anywhere in the world can subsequently be sent over the air to "lookers."

In truth is television the eyes of radio.

Remember These Facts

Now just let us see exactly how far television as a national service has advanced. The station at Alexandra Palace is in full programme operation. It is important to note that the transmissions are not experimental.

But they will be extended in scope and increased in duration in the course of time.

A special cable has been laid to Broadcasting House so that programme items could be originated there if desired.

Also a television cable has been laid between London and Birmingham, and this is being extended to Manchester.

The B.B.C. has said it isn't going to rush the erection of other stations. In this it is wise. A great deal is being learnt every day from the operation of the A.P. transmitters, but new stations will almost certainly be built during 1937.

And it will then merely be a matter of duplicating apparatus. The engineers will never again be faced with the pioneering difficulties encountered during the earlier months of this year.

Two Outfits

At Alexandra Palace there are two separate transmitter outfits. One is a Marconi-E.M.I. and the other a Baird. They are used on alternate weeks.

Much has been said as to the complications to receivers which this arrangement causes, but most of these observations are greatly exaggerated.

The "viewer" can change his set over from the one to the other merely by operating a simple switch which also, in some cases, controls the change over from the television wave to the ordinary broadcasting band.

No great complexity in the design is caused by this, for it is merely a method of an additional lead or two and, perhaps, an extra fixed condenser.

Another important point. There will be no fundamental change in television reception for some years. It is hard to see



MR. LESLIE MITCHELL, the television announcer at Alexandra Palace.

how there could be. As we have said, television begins at a point in technical development where most other new things leave off.

That is why it is bound to grow quickly and soon. The day when television will be in every home is not so far away.

Great Britain has the very first television service in the world. Why is it we have beaten our friends across the Atlantic in this new thing?

There are two reasons. In the first place, our broadcasting is in the hands of one central authority. In the U.S. there are numerous competitive concerns and it isn't a simple matter for any of these to embark on an entirely revolutionary development.

More important still there are technical advantages on one side. The population of Great Britain tends to mass in and around defined centres. We are compactly planted! And our towns are not composed of great skyscrapers. The ultra-short wave such as is used for the new television is given a chance to seep over large areas without meeting with obstruction.

There will be those who will resent the money being spent by the B.B.C. on the television service. Already murmurings are to be heard. Some are saying "Why should a part of the fees paid by ordinary listeners be used for television?"

The answer is that television will be for ordinary listeners. It will soon be the greatly improved ordinary broadcasting. The broadcasting of to-morrow that will not be blind.

A Sound Prophecy

Five years ago POPULAR WIRELESS was almost alone in saying that the early, purely mechanical methods of those days could lead us only a little way along the path of progress, and that something new and revolutionary was needed before television for all could become an accomplished fact.

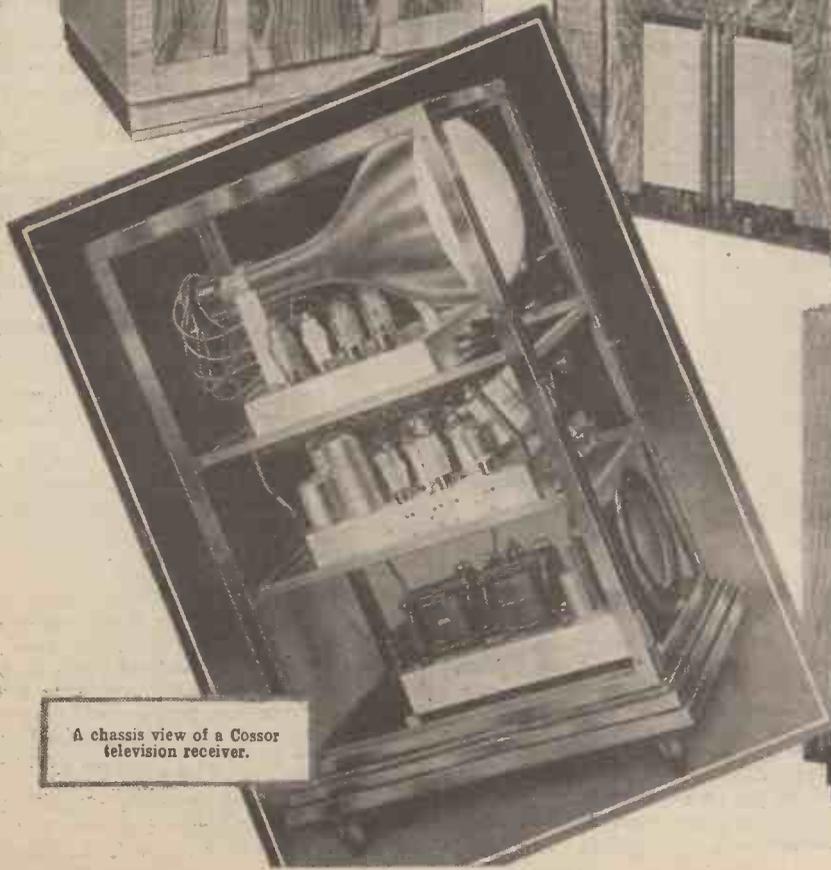
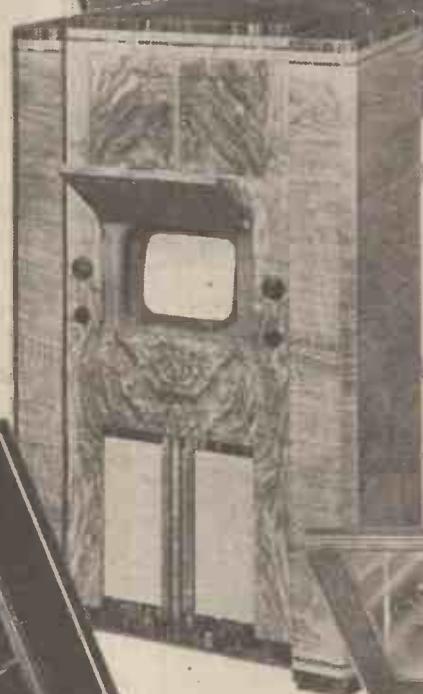
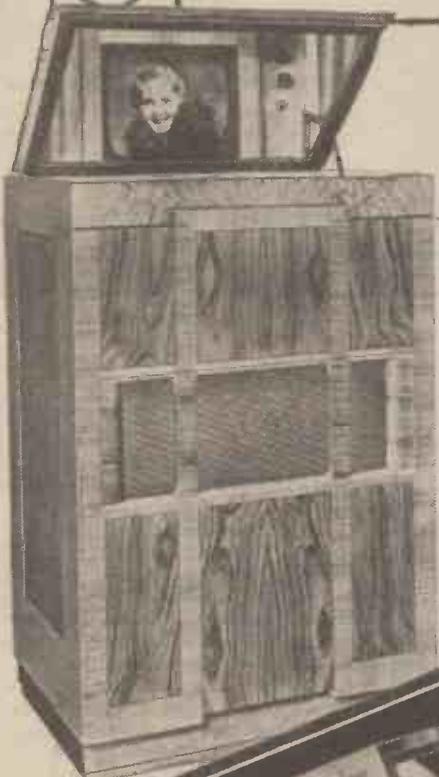
High-definition systems on ultra-short waves as at present used incorporate the required revolutionary ideas. The Eyes of Radio have arrived.

Receiving Vision Programmes

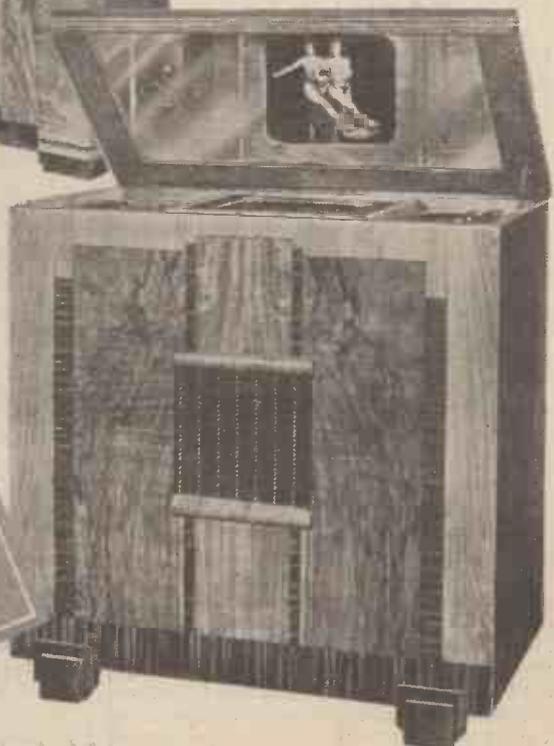
Already there is a large number of different types and makes of television receivers on the market. Some of the instruments which are available are illustrated on this page.



Above is a group of people looking at a Mickey Mouse film on a "Televisor" receiving set. On the extreme left is a Marconiphone Model 702 instrument, while that in the centre of the page is the G.E.C. television receiver and all-wave set. Below is the H.M.V. Model 900. This is a five waveband receiver which covers the ordinary medium-, long-, and short-wave broadcasting in addition to television sound and vision. A model for television only is also available.



A chassis view of a Cossor television receiver.



TELEVISION TOPICS—Collected by A. S. Clark

Technicalities, Personalities and News from all parts of the World make this "Popular Wireless" feature the finest medium by which readers can keep right in touch with all aspects of development in television.

"TELEFRAMES"

Items of general interest

WE have received a letter from a reader residing in Belfast. He says he has received the sound programmes sent out with the vision programmes from Alexandra Palace. The distance appears to be a little over 300 miles, which is good going for "optical" waves.

We wonder whether this is the record distance for "Ally-Pally" reception, or whether anyone else can beat it!

A NEW VALVE

A new valve capable of giving good amplification on ultra-short waves has been developed in America. It is a push-pull power pentode, presumably intended for transmitting, but no doubt the ideas involved will eventually be adapted for receiving types.

Common screen and suppression grids are employed for the two pentodes, which are in the same glass envelope. Complete shielding between input and output circuits is provided.

TELEVISION CLASSES

Another item from America concerns the inauguration of television classes by the New York Y.M.C.A. Schools.

ELECTRON CAMERAS

THERE are two forms of so-called "electron camera" which work on different basic principles, and as they are often confused with one another an explanation of their differences should be of some value. One of them is the Zworykin "Iconoscope," and the other the Farnsworth "Dissector Tube." They both originated in America and the "Iconoscope" is the principle on which the Marconi-E.M.I. "Emitron" cameras at Alexandra Palace are based.

The "Iconoscope"

First we will consider the "Iconoscope." The picture or scene to be televised is focused on to a plate situated in an evacuated tube. The plate consists of a sheet of metal covered with a sheet of mica on which is a layer of photo-sensitive material made up of small insulated particles.

The light focused on to this material causes the release of electrons which build up charges on the particles, in relation to the metal-plate according to the strength

of the light. These classes, which are to cover practical and theoretical work, are an indication of the growing need for properly trained people in television work. In America it

is confidently expected that television will provide careers for many thousands soon after its inception as a public service.

LOOKING-IN PARTIES

A member of the G.E.C. research staff has been giving television parties in north-west London recently. He used a standard G.E.C. receiver, and the object was to experiment on receiving conditions in the Garden Suburb of Northway.

Visitors, both young and old, were asked for their opinions. Generally they were very impressed and greatly enjoyed the programmes.

Reception was consistently good and was free from motor-car interference. The use of a rotary converter on the D.C. mains was entirely satisfactory.

EXPERIMENT A LITTLE

When you first try a special television aerial you will most likely be very surprised at the improvement in reception over the

use of an ordinary broadcast-type aerial. But don't let matters rest there.

The location of the aerial can have a tremendous effect on its pick-up, especially if it is being used indoors. There is, for instance, the question of whether to use the di-pole vertically or horizontally, and the nearness of various surrounding objects can have a big effect.

And don't forget to try different types of special aerials, half-wave di-pole, half-wave single-pole with dummy feeder, and so on.

DEMONSTRATIONS IN "N.18"

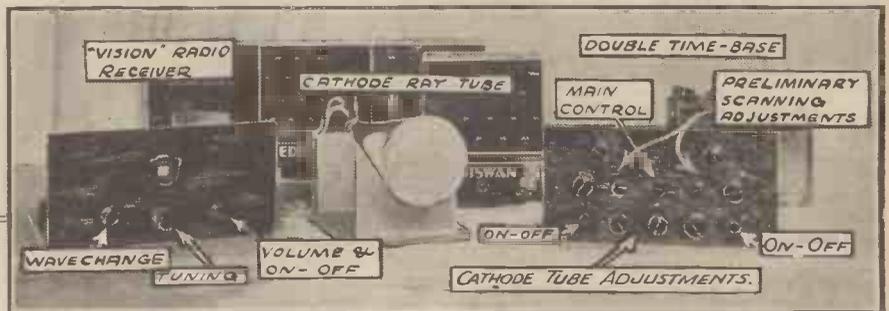
The firm The Teleradio Company of 157, Fore Street, London, N.18, is creating considerable interest in that locality with its demonstrations of a Pye "Teleceiver."

Among the distinguished local people who have "looked-in" are the Mayor, Mayoress, and Aldermen of Tottenham. Immediately after their visit the Town Hall was offered for the use of the demonstrators at a very nominal fee.

The proprietor of an important local hotel also offered his hall for demonstrations once a week after paying "Teleradio" a visit.

The public are invited to leave their names at the various branches of the Teleradio Company for invitations to be posted to them.

THE ORIGINAL CATHODE-RAY TUBE RECEIVER



A general view of the first cathode-ray tube receiver used in this country, showing what the various units do and the purposes of the controls. It is interesting to note that this receiver was developed and employed in the "Popular Wireless" Research Laboratories.

of the light. We thus have a whole collection of small charged condensers representing the light and dark components of the picture.

The next step is to provide a beam of electrons which will pass over the photo-sensitive plate in the normal scanning method of line by line. This beam is, of course, conductive, and the cathode from which it originates is connected to the metal plate behind the charged particles.

As the beam passes, therefore, the small condensers will be discharged by currents flowing through the circuit joining it to the metal plate. These currents vary with the degree of picture light, and can be made to provide corresponding voltage variations by being passed through a resistance.

In the case of the Farnsworth tube the picture is also first of all focused on to a photo-electric screen. But thereafter the action varies. In this instrument the electrons are allowed to radiate from the screen, being electrically focused on an opposite wall.

In this wall, which is really an anode, is a small hole, allowing the electrons at this particular spot to pass through on to a "collector." The current flowing from this "collector" will vary with the strength of the light on the spot of the picture opposite it.

All we have to do now is to supply the scanning. This is achieved by moving the electronic picture emitted from the photo-sensitive plate as a whole.

The Two Forms

This is achieved electrically, and in effect moves the picture line by line past the hole in the anode so that each little section has its turn of passing through the hole in the anode and affecting the "collector."

The "Iconoscope" has a stationary picture and a moving scanning device as distinct from the Farnsworth "Dissector Tube" which has a stationary scanner in relation to which the picture itself is moved.

TELEVISION TOPICS—Continued

IF the scanning circuit described last week were connected to a tube and by some lucky chance we hit the right speed on both picture and line first go off, we should get a picture on the screen if the transmission was on. The right speed of scan is only a matter of adjusting the controls carefully so that we get 240 lines and 25 pictures per second (for Baird).

Fluctuation Effects

In practice, however, we should find that after a few seconds the picture would suddenly dissolve into a series of irregular patches, and we could not bring it back to a coherent scene unless we altered the controls again. The reason for this is that the least fluctuation or disturbance in the scanning circuit will alter its speed temporarily and may make it run faster or slower than the transmitter. Then the light and dark patches would occur in the wrong places and we should get a nasty looking blur. To show how small a disturbance can affect the picture, suppose the voltage of the mains rose slightly for only 1/4th second—such as might happen if a lamp were switched off. The volts across the scanning circuit would rise to correspond and the lines would momentarily lengthen. Now each line is occupying 1/6,000th second in the drawing, so in 1/4th second we should complete 1,500 lines, or more than 6 complete pictures!

Locking

To prevent this disturbance from interrupting the smooth running of the circuit we have to provide some means of locking the scanning lines to those of the transmitter so that they run "synchronously," i.e. exactly in step, both in length and in timing. This is done very cleverly in the signal sent out from the trans-

TELEVISION FOR BEGINNERS

In which G. Stevens describes the use of synchronising

mitter itself, which provides a definite pulse both at the end of each line and each picture. The television signal really consists of two parts. During the scanning of a line by the transmitting gear the radio frequency wave is modulated by the light impulses, and these alter the magnitude of the carrier wave in exactly the same way as sound impulses modulate the wave in ordinary broadcasting. At the end of each line, however, the carrier wave is cut off completely for a moment,

to start up again at the commencement of the next line. It is these breaks in the carrier wave which provide the synchronising impulse which is applied to the scanning circuit to control the length of line.

Without going into too great detail at the moment, the action is like this: Suppose the condenser of the scanning circuit is charging slowly, the voltage rising across it as the beam is deflected across the screen.

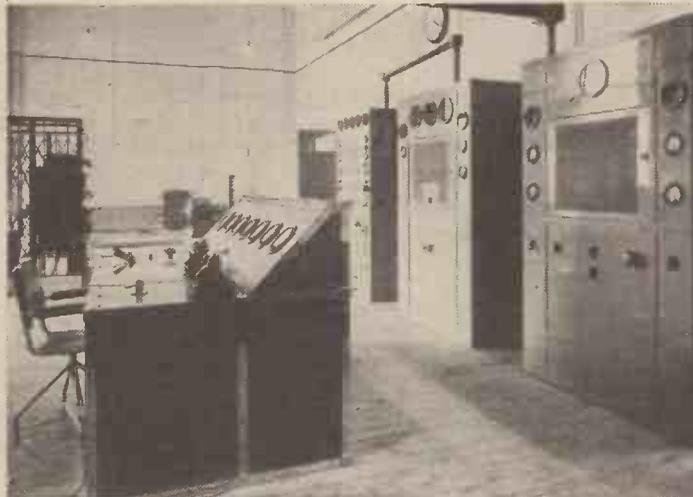
The grid bias of the relay is

adjusted so that the condenser will discharge at a given point, but it may happen that this discharge point will occur later than the end of the line transmitted. This is where the synchronising signal comes in. The impulse is fed to the grid of the relay, and at the end of the transmitted line a sudden kick is given to the grid bias which causes the discharge current to start. (You will remember that in a gas-filled relay the current does not start until the voltage on the anode has climbed to a certain value.) The effect of the synchronising impulse is thus to discharge the condenser at the end of the line transmitted whether it is ready or not.

A similar impulse is applied to the grid of the picture frequency relay every 240 lines (or 405) and the picture is completed at the same time as that transmitted.

Looking at it another way, the scanning circuit really provides the lines as nearly accurate as possible, and the synchronising impulse trims them up and holds them in step with the transmitter.

THE SOUND TRANSMITTER AT "A.P."



This is the B.B.C. transmitter at Alexandra Palace which broadcasts the sound accompaniment to the vision programmes.

A Clever Trick

There is another clever trick which the synchronising impulse does at the same time. When the beam has moved across the screen it flicks back again to the start, and this return movement is sometimes visible as a faint line on the screen. To avoid spoiling the appearance of the picture this return line is suppressed altogether by applying the synchronising impulse to the grid of the cathode-ray tube itself as well as to the scanning circuit. Then the beam is cut off at the end of each line and the return journey is not visible. The beam goes back in the dark, so to speak, and reappears to light up the screen where it started from. Well, that's all for this week. I hope I have made myself clear.

SEEN ON THE AIR

News and Views on the Television Programmes by our special radio-screen correspondent, L. Marsland Gander

ANOTHER week of television has brought me the conviction that unless there is speedy and definite improvement in programme material serious damage will be done to television prospects. In brief, the position is that the technicians have succeeded and the programme compilers have failed.

Dealers declare that while they have no fault whatever to find with the apparatus of reception, poor and unsuitable programmes are killing interest from a purchasing point of view.

In apology for the B.B.C., it may be said that though for fifty years scientists have striven to wrest from nature the secret of television, and many thousands of pounds have been spent on research, hardly a thought has been given to the programme problem. I say hardly a thought, but there was, to be

sure, the plucky long-sustained effort of Mr. Eustace Robb with low-definition programmes. I think it a great pity that some of the lessons of those thirty-line programmes have to be learned now over again.

I should possibly be more vitriolic than I am, but it happens that just before I began to write this article I saw a programme which really did show some signs of grace. It was a potted version of "The Tiger," Reginald Berkeley's play from the Embassy, dealing with the life of Clemenceau, "The Tiger." This was a new departure in the series "From the London Theatre."

Introducing Film Strips

It did not lift incomprehensible chunks from the stage play as was done in some previous efforts in this series. The producer recognised the boundaries of his medium and also its possibilities. He worked in close-ups in the studio and then very successfully introduced some illustrative strips of film when the play reached its war-time action.

I think that the film strips were an inspiration. They were probably borrowed from the Pabst film "West Front." The chief point about this production is that it was made for television. It may be hailed as the first intelligent and intelligible television play. William Devlin as "The Tiger" was great.

"Fisherman's Fortune"

Now to come to less agreeable subjects: The week under review started with one of the Movietone Magic Carpet films, "Fisherman's Fortune," which I found of moderate interest only. This particular film is one presumably not aiming at great commercial success, but depending for its merit on fine photography. Apparently it is therefore "good enough for television." But fine photography must be seen through an ideal medium. The seascapes, the tumbling wastes of water, the swirling clouds of gulls, the lonely trawlers—fine, yes, but not for television. Yet with ineptitude, which I can only describe as extraordinary, this film was shown four times during the week.

The next film shown in this particular week, "The Land of the Nile," moved with inescapable logic from the sea to the desert to be as dry as its predecessor had been (Please turn to page 350.)

RADIO BEACONS

Wireless plays a very big part in the safety of ships at sea, and one of the most important developments in recent years is the radio lighthouse, or beacon. Below you are told some highly interesting facts about this valuable aid to mariners

By CAPTAIN J. G. BISSET, R.D., R.N.R. (retd.)

RADIO beacons and direction-finding wireless constitute the most valuable aids to safe navigation since the invention of the compass over two thousand years ago.

In pre-wireless days, navigators were entirely dependent on lighthouses, lightships and fog signals to keep them from running on the numerous rocks and shoals that bestrew the coastlines of the world. Such aids to navigation were—and still are—entirely efficient until the demon fog casts his clammy blanket over the sea. Then powerful lights with normal ranges of twenty miles or more are reduced in visibility to less than two hundred yards and become practically useless.

Sound Signals Not Reliable

Fog signals such as horns, explosives, and bells are then brought into operation, but such sound signals are notoriously fickle in range and radius over water, and the wise shipmaster places little reliance on them.

Wireless was first installed on ships in an experimental way about 1902. In a few years it became general and navigators who

the direction of an enemy ship or fleet using wireless could be instantly located.

After the war the instrument known as the "direction finder" (D.F.) was perfected and came into commercial use at many coastal stations.

In those days a ship requiring a bearing had to call up the station and ask for it. When the station was ready, the ship would send a series of dots and dashes over a period of two minutes, during which time the station would determine her direction by the D.F. instrument and send it to her. This was a clumsy procedure that had to be gone through separately for each ship and it caused endless delay and congestion, especially during foggy weather.

This difficulty was overcome by fitting D.F. in the ships themselves so that they could take their own bearings at any time.

Then came the introduction of radio beacons, hundreds of which are now dotted round the coastlines of all civilised countries. They might almost be called radio lighthouses, for they are mostly erected in close proximity to existing lighthouses, and during fog the radio beam penetrates where the light cannot. But the beacon does more than that, for it can be heard at ranges of one hundred miles or more and is useful during



A ship's direction finder. Note the handwheel for moving the loop aerial, which is on the deck above, and the gyroscopic compass for reading the bearings.

All ships of any consequence carry a D.F. instrument to-day and the illustration shows a typical model. It is about the size of an ordinary home receiving set and has a compass attached. Connected with it is a pole supporting a small loop-aerial which can be moved around in azimuth by means of a wheel similar to the steering wheel of a car.

When a bearing is required, the officer listens in through headphones till he picks up the beacon signal, then moves the aerial slowly round till he achieves a complete fade-out, when a pointer on the compass card indicates the exact compass bearing.

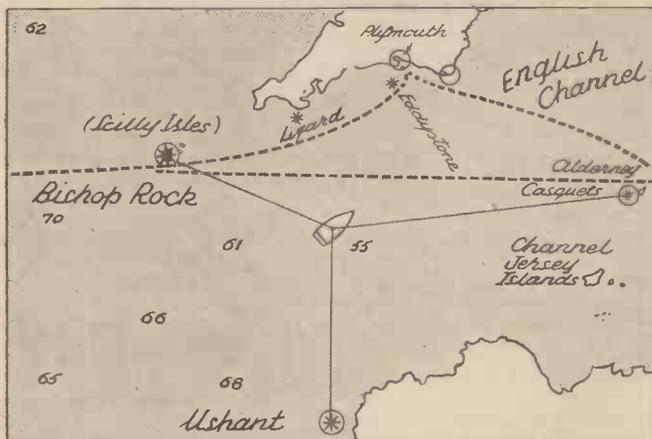
Taking Two or Three Bearings

In this manner bearings may be taken of two or three beacons in rapid succession. The bearing lines are then laid on the chart and their point of intersection represents the ship's position.

It is really not quite as simple as it sounds, because there are corrections to be applied due to the curvature of the earth and errors in the compass, but an expert navigator has these things at his finger-ends and finds no difficulty.

There is no doubt that the introduction of radio beacons and direction-finding wireless has saved many a shipmaster from going prematurely grey with anxiety when making the land in thick weather.

FINDING THE SHIP'S POSITION



This is a portion of a chart, the circles indicating radio beacons. It shows how easy it is for a ship to get an accurate bearing. In this instance bearings are being taken from three points, viz.: the beacons at Bishop Rock, Ushant, and Casquets.

could hear messages being flashed from various coastal stations began to yearn for some invention that would indicate the exact compass direction, or bearing of the wireless waves, and so enable them to determine their ship's position.

Scientists tackled this problem, and urged on by Admiralty requirements during the war they produced an instrument whereby

daylight or darkness.

Each beacon has its own distinctive call-sign and works automatically. In fine weather they operate for a few minutes every hour to enable ships to test their instruments. During fog they operate every three or four minutes, the times being arranged for certain geographical groups so that they do not interfere with one another.

ADVERTISER'S CORRECTION.

We have been asked by Messrs. New Times Sales Co., Ltd., to inform readers that in their advertisement of November 21st, the price of their "Straight Three" was given as 35/- including cabinet and valves only. This price, however, also includes the speaker, but not the batteries necessary for this receiver.

ON THE SHORT WAVES

POINTS from the
POST-BAG

W. L. S. Replies to Correspondents

THERE'S been a big run on "Verified All Continents" certificates lately, and the postbag has contained more QSL cards than interesting correspondence. I have been looking them over very carefully, and have been struck by one or two facts. First, it is extremely rare to find a batch of twelve cards that does not include our friend the Kookaburra from Sydney, V K 2 M E.

Secondly, more than half the applicants for the certificate send for their two African "veri's" the cards of SUIKG and SUI SG, the well-known Egyptian amateurs. This is not surprising, for they must be the easiest African stations to receive. But I am told that SUIKG has issued a proclamation that he won't QSL any more, as he's getting too many reports. (Is it true what they say about Egypt?)

Varied South American Cards

Thirdly, a weird and wonderful collection of cards represents South America. As opposed to those from Africa and Australia, I don't think I have seen the same South American card more than once. And why do all the Brazilian stations fill in, in the "remarks" space, "Brazil has (or 'have') the best coffee of the world"? It may be true, I mean, and all that, but why rub it into the radio racket?

V. H. T. (Londonderry), in applying for his certificate, asks me to publish a list of stations he has received, "in order to dispel the fallacy of all Londonderry listeners that this is a bad hole for distant listening." The trouble is that I *can't*—there are far too many of them.

All his listening is done with my "standard-baseboard" layout of detector and separate oscillator, to which he has added a resistance-coupled stage. He goes up the street and listens to the same stations on a friend's nine-valver, but doesn't think they are as readable as they are on his "two."

W. J. R. (Leytonstone) is adding my adaptor to the S.T.700, and wants to know where the "Grid —" terminal goes, as there is only one pick-up terminal on the "700." The answer is: to G.B.—1. Others, please note.

Reaction-Control Position

A. M. S. (Birmingham), says: "I think it is rather silly having the reaction control at the side of the sets in the standard base-board series, as I have found on the 'Simplex Two' that if the hand is placed behind the panel the signal fades away." Several points there: (a) Don't place your hand "behind the panel" if you find that. (b) The reaction condenser isn't "behind the panel," anyway; it's at the side. (c) If the "Simplex Two" had been arranged for "sideways reaction," you wouldn't find that.

The same A. M. S. uses a screened-grid detector and pentode L.F., but wants to add two more valves, one fore and one aft. In other words, a buffer stage and a power stage. Well, he'll have to drop the pentode

(but not literally) and use a triode for his first L.F. stage; and I recommend any screened-grid valve as the buffer. There's no advantage in using a pentode.

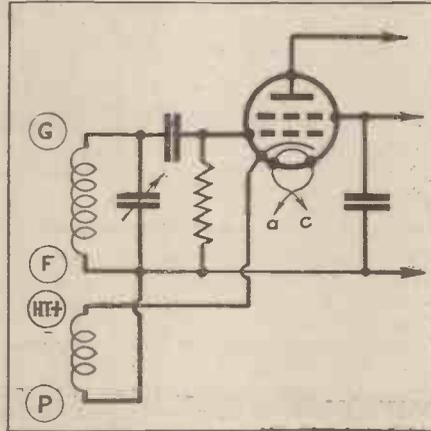
Here's a nice story for you. G. M. M. (on a hospital ship) built my "Short-Wave One" in December, 1932. Since then it has travelled 200,000 miles and never let him down! Furthermore, it caught on so badly that it now has seven "brothers" at sea. The total mileage covered by this family of babies would reach astronomical dimensions!

A Portable-Set Query

G. M. M. is interested in my portable and rather wants to make it, but also wants to introduce several modifications. I can't quite see how to do them without turning it into quite a different set, so I suggest that he either makes it as it is or sticks to his "one-valve wonder."

T. S. (Liverpool) supplies a lot of interesting news. He tells me that he heard an amateur transmitter speaking very highly of "P.W." over the air one morning, saying that he had copy Number One!

UNUSUAL CONNECTIONS



The cathode coil in this case being wound on the same former as the grid winding. Note the variations in the reaction connections as compared with the normal ones for a four-pin coil.

He has been listening to the U.S.A. police cars working just below 10 metres, and finds that on certain days they come over as strongly as the 19-metre broadcast stations. From some of the lurid extracts he sends me I should think it's as good as going to see a gangster film. He has also logged a tremendous amount of DX on the amateur 10-metre band; and has heard W9XK announcing himself as "the high-frequency experimental station W9XK," but not giving his frequency.

Talking of frequencies, by the way, what do readers think of the idea of dropping wavelengths altogether in these ramblings? I, for one, should be glad to say good-bye to them. It's just as easy to think of "the 28-mc. band" as "the 10-metre band." The amateur bands are 3.5, 7, 14, 28 and 56 megacycles, and the broadcast bands are 6, 9, 12, 15 and 18 megacycles roughly.

It's so much more logical thinking in kilocycles and megacycles, and talking about ultra-high frequencies instead of ultra-short waves. But I don't mind betting that there would be an outcry if I did it without "asking permission." What do you say, some of you keener ones?

Short Wave
News

REGULATIONS for the 1937 B.E.R.U. Contest are now published. As usual, the contest will occupy the four week-ends of February, the Senior Contest taking place on February 6th-7th and 13th-14th, and the Junior on February 20th-21st and 27th-28th.

The power limit for the Senior Contest is 250 watts and for the Junior 25 watts. The times of working are from 19.00 G.M.T. on the Saturday till 19.00 G.M.T. on the Sunday for the "Seniors," while the "Juniors" will work from 21.00 till 21.00 each week-end of their contest.

As in previous years, a Reception Contest is run concurrently with the transmitting events, but will occupy only the first and third week-ends—i.e. the first week-end of the Senior and the first week-end of the Junior Contests. Since this is only open to members of R.S.G.B., there is no point in stating the rules in full.

Plenty of D.X. About

Readers will find, however, that there is a decidedly abnormal amount of DX on the air while the contests are running, and they are well advised to do plenty of listening.

All the amateur wavebands will be used, and there is no doubt that many contacts with South Africa, Australia, and New Zealand will be made on the 10-metre band.

Speaking of 10 metres, I may as well mention that it has had several "off" periods during the last few weeks. One or two days have seen a completely dead band, and many others have been extremely poor. The consistent conditions that prevailed during September and October were not maintained during November, although, in spasms, DX was extraordinarily good.

It seems as though the 20-metre band is destined to carry the greater part of the "DX traffic" for a long time to come. It is getting more and more crowded, but that seems to be an advantage, rather than a fault, from the average listener's point of view. The transmitting men find it otherwise!

31-Metre Band Very Reliable

There is not much to be said about the short-wave broadcast bands. 31 metres seems the most reliable of them all, but really bad days on 19 metres are few and far between. Conditions down there are certainly variable at present, but one can generally find the "Yanks," even on the most indifferent of all-wave receivers.

Forty-nine metres is filling up with the usual motley crowd of South American stations, which are as difficult as ever to identify. One of these days I am going to have a systematic round-up with a calibrated receiver, and I hope to find out what the noise is all about!

A tip for those who like amateur-band reception—get busy on 80 metres from now onwards. Several of our best-known DX workers are on 80 metres at week-ends, and the Americans and Canadians come over very well late at night.

W. L. S.

1937 ALL-WAVE Radio

IN this matter of all-wave radio, and in the way that it has been launched upon, may I say, a wondering world, British manufacturers generally are deserving of a particularly hearty pat-on-the-back. That is my considered opinion now that I have had time not only to probe into the secrets of the 1937 all-wave models, but in many cases actually to test them.

As we all know, short waves are not new. They have been "in the air," so to speak, almost as long as orthodox broadcasting, and a certain clique of us have derived our radio entertainment off the beaten broadcast track for upwards of a decade.

But at no time have we been able to claim to represent more than a very minute proportion of the listening public as a whole; and although the set-makers have been aware of our presence and have, in fact, shown a lively interest in our activities, their first concern very properly has been, and is, with the masses.

That is why, until this present season, the various manufacturers have steered well clear of designs in which short-wave facilities are included, for prematurely to have entered this new sphere of manufacturing activity might well have put paid to it for good and all.

That would have been fatal. So they have waited. They have resisted the temptation to make capital out of an aspect of radio in which there is, and has been, tremendous interest, until progress technically has reached the stage where a reasonable measure of success can be guaranteed not merely to the technically minded few—the "clique," if you like—but to listeners as a whole.

Excellent Sets Available

And upon the saneness of their policy, and more particularly upon the results of that policy which are reflected in the general excellence of the models now available, they are, in my opinion, to be congratulated.

Despite the fact that this is the first season in which all-wave models can be said to have ousted ordinary two-waveband designs in so far as numbers are concerned, the instruments available are almost without exception of a very high order technically and they possess none of the shortcomings which might reasonably have been expected from "first-year" designs.

From a survey of the technical merits of the sets now available, it becomes very apparent that a lot has been going on behind the scenes, for although these instru-

ments represent the birth of all-wave radio on a large scale in this country, they are obviously the outcome of years of research, and there is certainly nothing "experimental" about them.

It is very necessary to remember, of course, that all models in which short-wave facilities

have been successfully overcome, and it can in truth be said that the stage has now been reached where, conditions permitting (and that, may I add, is more often than not) the ordinary man-in-the-street can probe to the ends of the earth for his broadcast entertainment with no more effort or technical knowledge than has hitherto been called for in connection with reception on the ordinary broadcast bands.

But none of us have money to spare for haphazard experiments, and this tremendous swing over from two- to three-, four- and even five-waveband receivers has happened with such suddenness that the ordinary listener is apt to find himself in something of a quandary as to what should be done about it.

Without a moment's hesitation I advise you all to go in for all-wave reception at the very earliest opportunity, and what more appropriate time is there than this season of the Empire and of our fraternity overseas become uppermost in our minds?

In an endeavour to give you guidance upon the selection of an all-wave receiver to suit your particular requirements, I have chosen what I consider to be an outstanding design in each of practically all of the leading makes, and the details which follow will, I hope, serve to put you *au fait* not only with present tendencies generally, but with the individual features of the various models discussed.

A Representative Survey

May I say in passing that my aim in compiling these details has been to make the survey as representative as possible. It does not follow, therefore, that where reference is made to a particular receiver that it is the *only* all-wave design in that range, nor yet that it is necessarily the most ambitious one. The mere fact that it is included in this survey may be taken as an indication that there is something about it that lifts it right out of the rut, and that is all that need concern us.

First on the list alphabetically comes Cossor, and, as one might have expected, they have entered the all-wave field with a design that is entirely unique; in fact, I believe I am correct in saying that it is the only set of its kind on the market.

Fundamentally it is a straight three on broadcast and long waves, comprising a variable-mu pentagrid H.F.

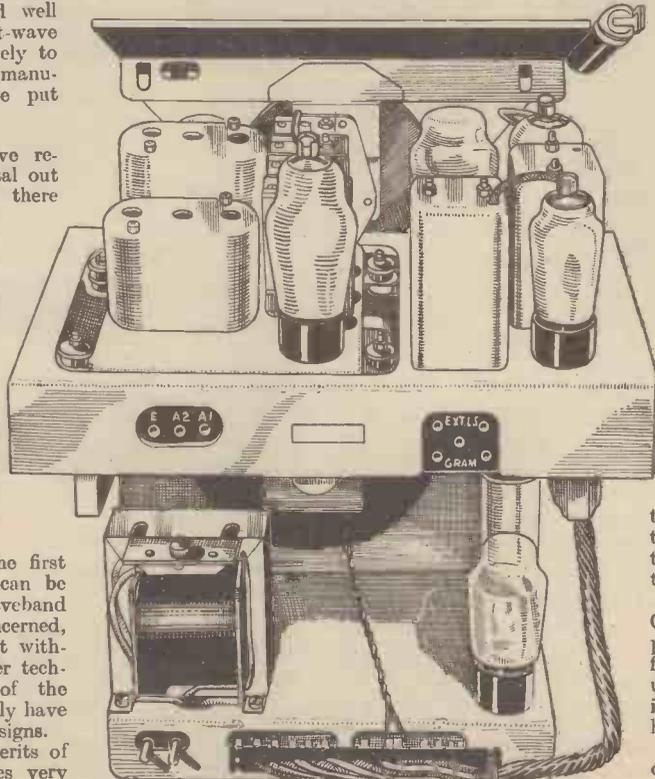
(Continued overleaf.)

The great swing-over from two- to three-, four- and five-waveband receivers has happened in such a relatively short space of time, that the ordinary listener is apt to find himself in something of a quandary as to what he should do about it.

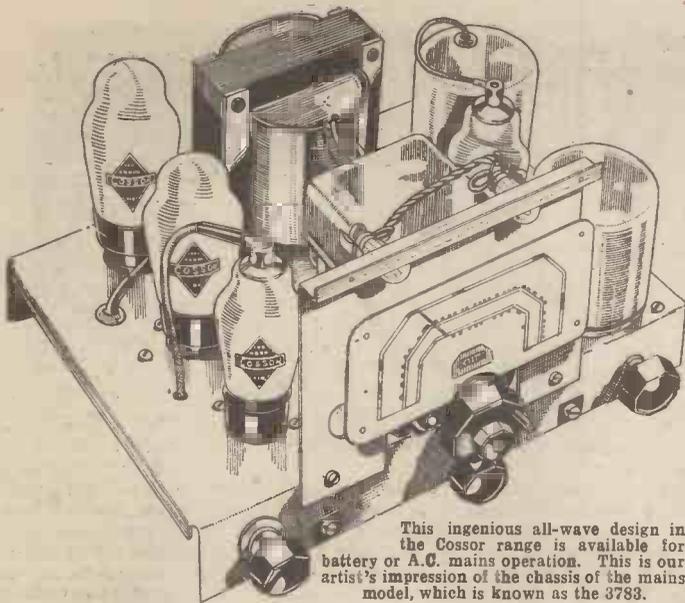
It may be stated with certainty that all-wave radio is here for good, and with this illustrated survey by G. T. Kelsey of the most outstanding models at present available, the reader will be able to become acquainted not only with the features of individual receivers but with all-wave tendencies generally.

are provided are subject to the vagaries of reception on these bands. No amount of technical skill in the design stage can overcome that.

But certainly many of the old bug-bears



The eight-stage superhet for A.C. mains operation is the first all-wave addition to the famous Ekco family.



This ingenious all-wave design in the Cossor range is available for battery or A.C. mains operation. This is our artist's impression of the chassis of the mains model, which is known as the 3783.

(Continued from previous page.)

stage, an H.F. pentode detector and pentode output, but when the wavechange switch is placed in the "short" position, the switching is ingeniously arranged to transform the set into a superhet. From the short-wave point of view this clever transformation has distinct advantages, not the least of which is the great simplicity of tuning which results on the one band where tuning ordinarily might present difficulty.

Cossor's have thus succeeded in combining all the advantages of a superhet on short waves with the attractive simplicity of a straight set on medium and long waves. But for this clever combination, the price of the Model 3733 battery receiver might well have been considerably in excess of that at which it is available—£7 15s. excluding batteries—but as it is, it is an exceptionally attractive proposition.

The 3733 is remarkably simple to tune, and the calibration of the dial both in wavelengths and station names greatly facilitates the reception and, more particularly, the identification of distant stations. The all-electric equivalent of the 3733, which is known as the 3783, retails at £9 15s., and it is designed for operation on A.C. mains. The short-wave coverage of both of these sets is from 17.25 metres to 52.5 metres.

An Ekco Masterpiece

Ekco appear to have concentrated all their research and manufacturing facilities upon the production of only one all-waver for the time being, with the not unexpected result that the set in question is nothing short of a masterpiece of design.

The AW.87, as it is called, is an eight-stage five-valve superhet with a host of clever features, for operation on A.C. mains. The circuit comprises triode-hexode frequency-changer, H.F. pentode I.F. amplifier, double-diode-triode for second detection, A.V.C. and L.F. amplification, and steep-slope pentode output, but it is in the practical conception of this fairly orthodox circuit that the set stands out a mile.

The input from the aerial to the "mixer" valve is via an inductively coupled bandpass filter except on short waves, where a single tuned circuit is employed. The aerial primary on short waves is suitably arranged for connection where desired to a doublet aerial.

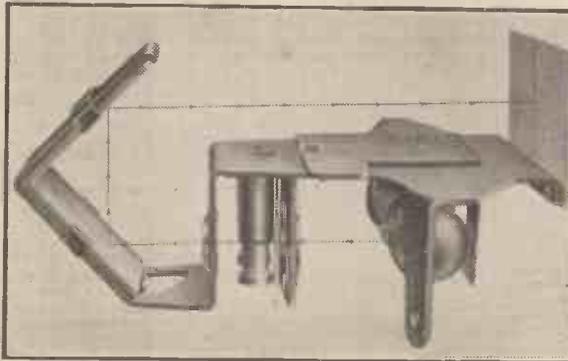
"Mixing" in the frequency-changer is effected by modulating the electron stream by

a grid in the H.F. amplifier section. Following the 460 kc. I.F. amplifying stage comes the double-diode-triode, the two diodes providing A.V.C. and demodulation, while the triode is utilised as an L.F. amplifier and is resistance-coupled to the steep-slope pentode output valve.

As a typical instance of the great care which has been lavished upon the design of this instrument, the H.F. sub-chassis is resiliently mounted on rubber buffers to eliminate the bugbear of microphony on short waves. That is but one of many such features that could be mentioned if space permitted.

The Panoramic "Edgeon" floodlit dial is calibrated in station-names and wavelengths, and the tuning range on short waves is from

A PATENTED ARRANGEMENT



By a clever system of lenses and mirrors the Ferranti Magnascopic dial-provides a "band-spread" scale which is invaluable for short-wave reception.

19 to 50 metres. The price of Ekco model AW.87 is 12 guineas.

As most of you will know, the secret of success with any set intended for short-wave reception is very largely a matter of the tuning arrangements employed, and because of the way in which short-wave stations are apt to crowd the relatively small sections of the dial at which they are received, any scheme designed to "spread them out" is of inestimable value.

It is partly because of this that I feel disposed to give top marks to the clever "Magnascopic" dial idea that is an exclusive feature of the Ferranti all-wave superhet receivers. With this ingenious scheme, the principles of which are clearly shown in one of the illustrations accompanying this article, the logging of distant stations on the short-wave

bands is literally child's play, and the settings at which they are received can be permanently and accurately recorded. It is but one of many original features which combine to make the Ferranti "Arcadia" of particular interest to the listener who may not previously have attempted short-wave reception.

Automatic Selectivity Device

The Ferranti "Arcadia" receiver, which is available as a table model, as a console, or as a radiogram, is an eight-stage four-valve (plus rectifier) superhet with a new and highly important technical development.

It is common knowledge that the return to popularity of the superhet circuit was mainly on account of the high selectivity that could be obtained from it. But high selectivity inevitably causes the higher musical notes to be under-reproduced, or even not to be reproduced at all. And because the degree of selectivity required at different parts of the tuning range is not by any means constant, it is obvious that the ideal is to have a scheme whereby the degree of selectivity can be varied.

By means of a small control fitted to the "Arcadia," when a station has been tuned-in the selectivity can be reduced to the lowest level possible consistent with the satisfactory reception of the station with, of course, the attendant advantage of improved top-note response. But the most remarkable thing about the scheme employed by Ferranti is that when the tuning control is again rotated the set automatically readjusts itself to the most selective condition!

The Ferranti "Arcadia" table model, which is for operation on A.C. mains, costs 15 guineas, and the short-wave tuning range is from 19-51 metres.

As a representative example of the fine range of sets produced by the G.E.C. I have selected for inclusion in this survey their "Fidelity Short Wave Five," a title which is something of a misnomer really, because the set covers medium and long waves as well as short.

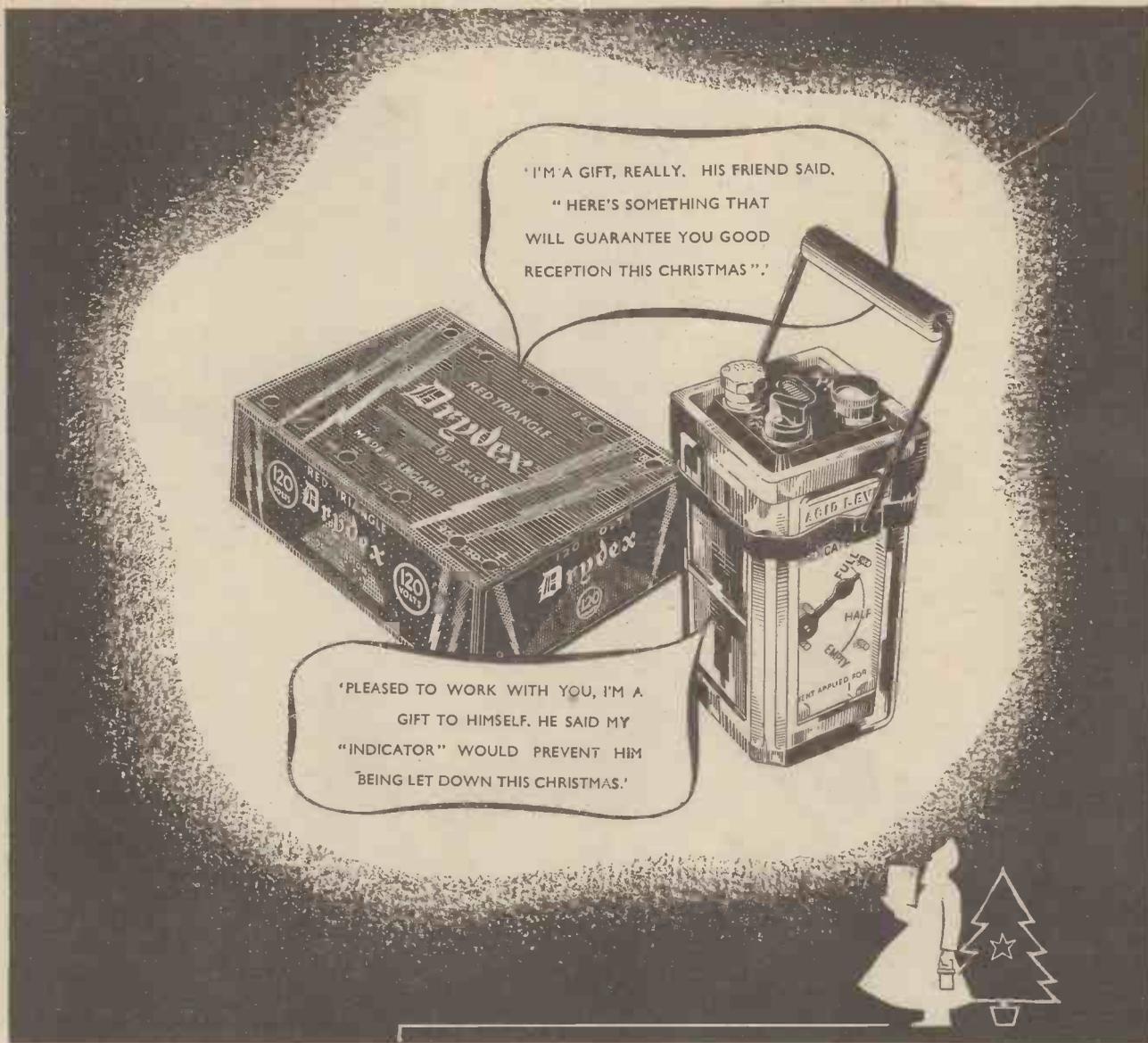
In the ordinary course of events one could feel absolutely assured that anything bearing the name of G.E.C. was second-to-none; but in this matter of all-wave radio this internationally famous firm are perhaps at more of an advantage than most other firms, for they have specialised in the production of short-wave apparatus for the

export market for many years, and the experience thus acquired no doubt accounts in large measure for the superlatively good (Please turn to page 346.)

THE MAGNASCOPIC DIAL



This close-up picture of the tuning arrangements of the Ferranti "Arcadia" receiver shows clearly the optical effect of the Magnascopic dial. The projected scale is, of course, the one above the main tuning scale.



GIVE AND GET

Exide AND Drydex

BATTERIES

THIS CHRISTMAS

'STILL KEEP GOING WHEN THE REST HAVE STOPPED'

EXIDE 'HYCAP'—the L.T. battery for modern sets

DRYDEX—the Exide H.T. battery

Obtainable from any reputable dealer or Exide Service Station. Exide Batteries, Exide Works, Clifton Junction, near Manchester. Also at London, Manchester, Birmingham, Bristol, Glasgow, Dublin and Belfast

Continued from page 344

performance given by this present model. The set is a de luxe four-valve (plus rectifier) superhet with the circuit sequence of triode-hexode frequency-changer, I.F. amplifier, double-diode-triode combining the functions of demodulation, A.V.C. and L.F. amplification, and finally pentode output. It is designed for operation on A.C. mains.

The practical conception of this most popular of all superhet circuits incorporates many novel and exclusive features, among which I should perhaps mention the special fidelity scheme for the reception of powerful stations, the variable "muting" device and the "Variable Brilliance" tuning indicator. Incidentally, the wave range on short waves is from 16-50 metres.

Receives Television Programmes

With the advent of television broadcasting in this country the term all-wave reception has assumed a new significance, for, strictly speaking, a set these days is not an all-waver unless it will receive the ultra-short waves in addition to the bands at present covered.

This fourth, or in some cases fifth, waveband will obviously become of greater importance as the regional scheme for television progresses, for, although the price of complete television receivers will be beyond most of us for some time to come, there is nevertheless widespread interest in this latest innovation, and the incorporation in commercial receivers of facilities to listen to the sound side will no doubt constitute a vital sales argument as time goes on.

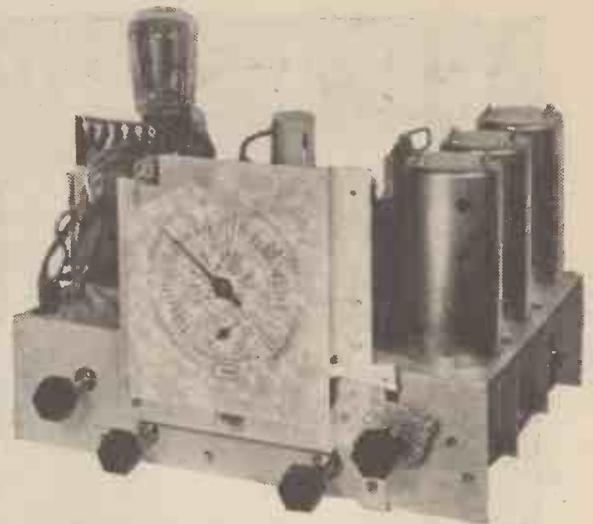
H.M.V., well to the front as usual, have already anticipated this additional listening requirement, and with characteristic enterprise have made provision for it in the design of their Model 481.

This particular receiver is probably one of the most, if not, indeed, the most ambitious all-wave design of any available in this country, and it is one of the few sets that cover from 7 metres to 2,200 metres with no important breaks in the tuning range.

This extraordinarily wide tuning range is covered in five steps of from 7-16 metres, 16-7-53 metres, 46-140 metres, 185-560 metres,

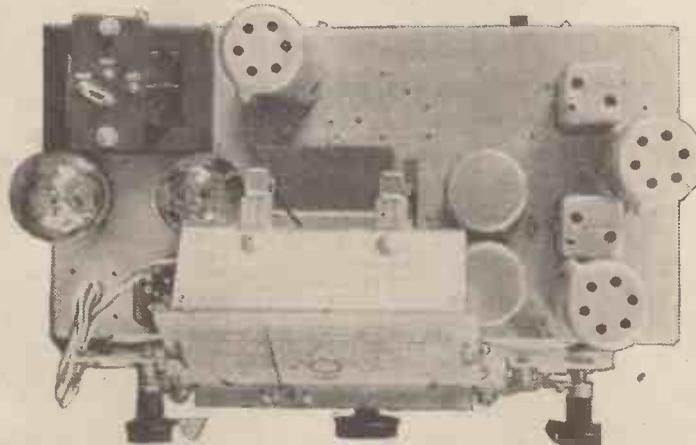
and from 750-2,200 metres. While it is true that practically all of the important short-wave broadcasting stations radiate on wavelengths between roughly 16 and 51 metres, the additional facilities provided in the H.M.V. Model 481 are very well worthwhile, and it is a fact that many of the stations to be heard off the short wave "beaten track" are even more interesting than those on it.

In keeping with the high traditions associated with all H.M.V. apparatus, the 481 is a masterpiece of design, and it is fitted with all the worthwhile refinements that stamp a set as thoroughly modern. It is a five-valve (excluding rectifier) superhet with an H.F. stage preceding the frequency-changer. This additional radio frequency stage is no doubt one of the reasons for the amazing sensitivity of the 481. It is equipped with two-speed tuning (an invaluable refinement where short waves are concerned), vernier



In this chassis view of the McMichael 362 all-waver the small "band-spread" pointer, which is so valuable on short waves and which works rather like the second hand of a watch, can be seen below the main pointer.

DESIGNED FOR QUALITY



High-fidelity is an outstanding feature of the G.E.C. "Fidelity Short-Wave Five." The clean lines of the chassis will be obvious from this bird's-eye view.

McMichael Model 362 is a four-valve A.C. superhet with a difference, and that subtle difference lifts it right out of the rut. Ordinarily, where four valves are employed in a superhet circuit, the first valve is almost without exception the "mixer" valve, and it is followed in turn by the I.F. valve, the three-in-one demodulator-A.V.C.-L.F. amplifier valve, and finally the output valve. Not so the McMichael 362.

Two-speed Tuning

The circuit sequence in this case is screened pentode H.F. amplifier, triode-pentode frequency-changer, screened pentode I.F. amplifier with a double-diode pentode as the final stage. The arrangement is certainly unusual, but the results warrant the belief that in some respects it has definite advantages over the more popular arrangement. For one thing, the sensitivity is of a much higher order, and the pre-H.F. stage ensures greater selectivity.

As a matter of fact, the whole design from beginning to end provides ample evidence of the great care with which the instrument has been thought out, as will be obvious from the following details.

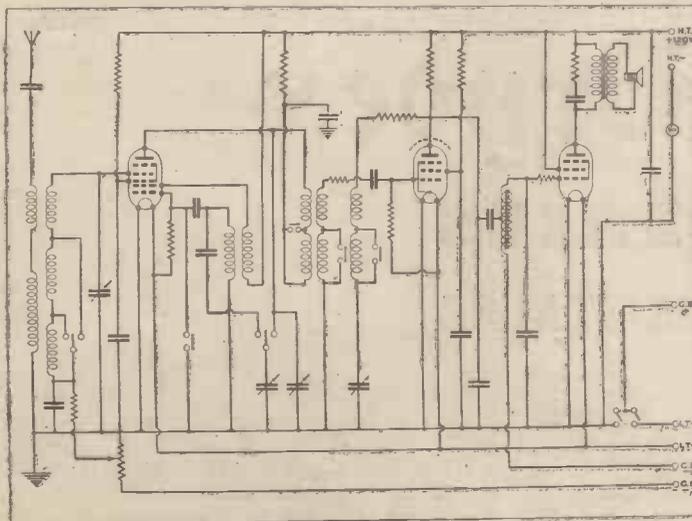
When the set is being tuned normally, a reduction ratio of 20-1 is given by the main tuning control. But invaluable as this reduction ratio is where short waves are concerned, it is apt to be a trifle irksome when it is desired to make a quick change from one part of the dial to another. The designers have therefore introduced an ingenious device whereby slight pressure on the tuning knob automatically brings into use a "fast" ratio of 3-1.

Another valuable feature on short waves is the "band-spread" pointer, a small inset scale and pointer, rather like the second hand on a watch, which rotates several times faster than the main pointer.

These are but two of many such features to be found in the design of the McMichael 362, and at 15½ guineas it seems assured of widespread popularity.

With nearly half the country still without mains of any description, it is gratifying to find that the all-wave requirements of battery users have not been overlooked.

AN INGENIOUS CIRCUIT

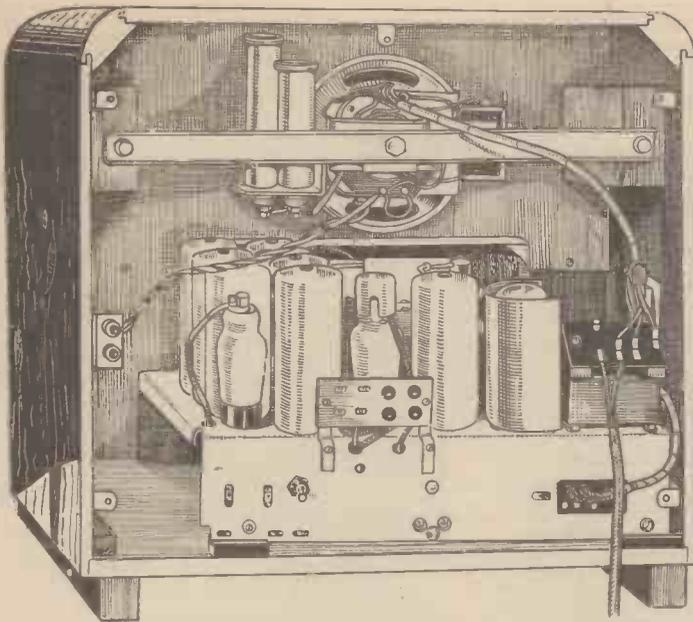


This is the circuit of the battery version of the Cossor all-wave receiver and it is catalogued as the Model 3733. The set functions as a "straight" three on medium and long waves, but is cleverly transformed into a superhet when the wavechange switch is placed in the short-wave positions.

indicator, independent bass and treble tone controls, and the dial, which is illuminated, is calibrated in station names and wavelengths. The retail price of the 481 (which is for A.C. mains operation) is 18½ guineas.

Although the vogue for all-wave radio can only be said to have started this year, the first McMichael all-wave set was actually marketed over ten years ago. The experience accumulated since that time is strikingly in evidence in their Model 362, which is a glowing example of 1937 all-wave radio at its very best.

(Continued on next page.)



This is one of the first sets ever to be produced with which the sound side of the television programmes can be received in addition to short, medium and long waves. It is the H.M.V. Model 481.

(Continued from previous page.)

The Marconiphone Model 375, for instance, is a battery-operated three-band set of which the makers have every reason to be proud, and in my opinion it justifies inclusion in this survey of the outstanding models on the three-fold score of performance, price and economy of upkeep.

The circuit incorporates several interesting refinements. The aerial arrangements comprise an aperiodic long and medium wave coil connected in parallel with a short-wave H.F. choke which, on short waves, diverts signals direct to the grid of the H.F. amplifier, which, in turn, is tuned-anode-coupled to the leaky-grid detector.

Tapped L.F.-Coupling Transformer

The L.F. coupling consists of a resistance-coupled transformer, the secondary of which is tapped to the wavechange switch. This provides two alternative ratios, the higher ratio on short waves resulting in higher gain on this waveband.

The set has only three controls: a two-ratio tuning control, a wavechange switch, and an ingenious dual volume-reaction control. This last-mentioned control acts purely as a volume control on medium- and long-wave stations, and a pre-set reaction control in the detector stage ensures that the gain remains at maximum. On the short waveband, however, reaction is applied by the volume-control, and the vernier movement enables a fine setting to be obtained.

Some idea of the economical current demands of this set will be obtained from the fact that under normal operating conditions it takes only from 6-7½ milliamps.

The price of the "375" is 9½ guineas, including all the necessary equipment. The short-wave coverage is from 18-50 metres.

The almost universal popularity of all-wave designs this season and the consequent necessity for dials with scales for the calibration of as many as five wavebands not unnaturally results in confusion from the listener's point of view unless proper precau-

tions are taken in the design to ensure that the particular band in use is clearly indicated.

It is obviously of vital importance for the various settings of the wavechange switch to be denoted either by clearly readable markings on the knob itself or by a separate indicating device coupled to, and actuated by, the switch mechanism.

In this respect particularly I feel that the Peto-Scott Company are deserving of commendation, for their all-wave S.G. battery three, Model 7032, is provided with an air-

plane colour-coded dial and a new four-way wavechange switch, the control of which is colour-coded in like manner to the dial. Confusion in this case is, therefore, quite impossible, and by reference to the colour indication the listener knows instantly over which waveband the set is being tuned. It is a simple scheme, I know, and, indeed, it appeals to me mainly because of its extreme simplicity. But it is an example that certain others would do well to emulate.

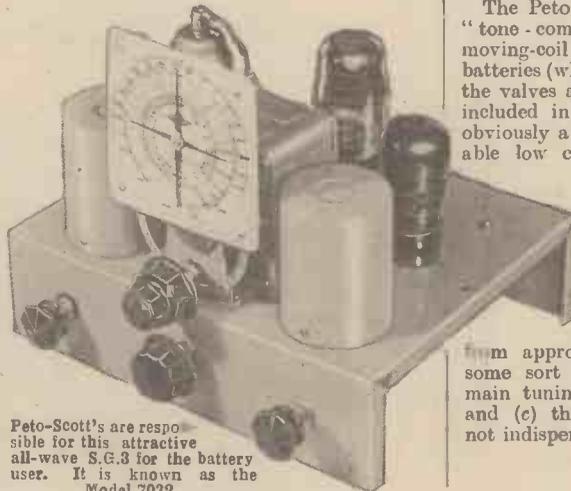
A Skilfully-Designed Receiver

This is but one of the many ways in which this battery all-waver of Peto-Scott's bears evidence of skilful design. In all other essential respects it is, in my opinion, an instrument that can be held up as a striking example of the tremendous progress that has been made in all-wave designs—and particularly in the battery-operated class—for the present season.

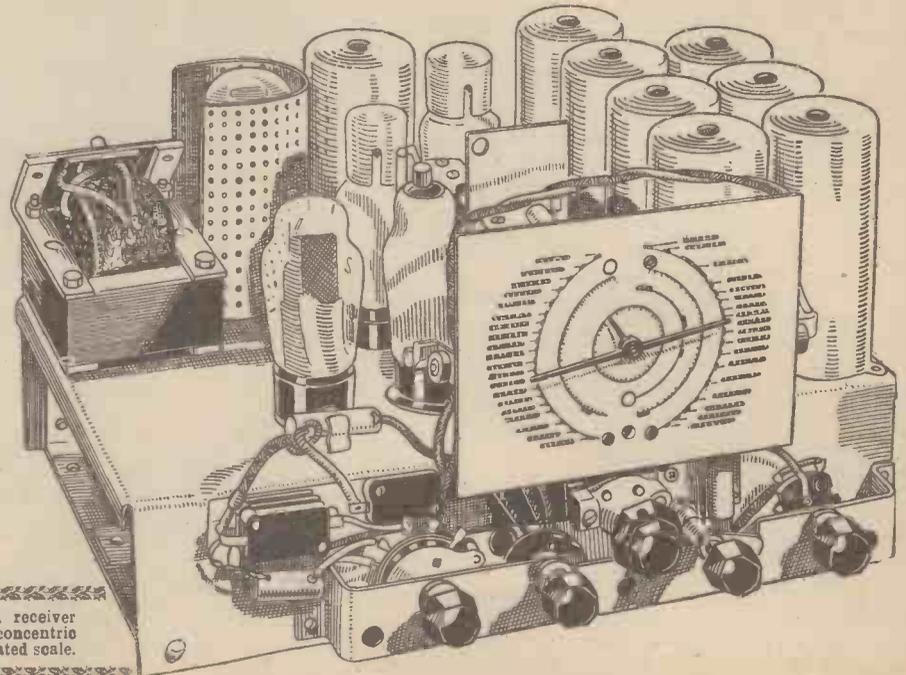
The circuit comprises a variable-mu H.F. pentode, a high-efficiency detector and a Harries output pentode, and the main tuning control provides alternative reduction ratios of 8:1 and 100:1, a gearing combination that is ideal for a set covering short waves in addition to medium and long. Incidentally, the two short-wave ranges on this set cover from 14-31 metres and from 28-62 metres.

The Peto-Scott Model 7032 incorporates a "tone-compensated" permanent magnet moving-coil speaker, and all the necessary batteries (which are housed inside the cabinet), the valves and even the aerial equipment are included in the price of £7 15s. 0d. It is obviously a set that, by virtue of its remarkable low cost and exceptionally attractive specification, is destined to become universally popular.

Insofar as the short waves are concerned, the general conclusions which may be drawn from my survey of the 1937 all-wavers are (a) that the range covered must not be less than approximately 19-51 metres (b) that some sort of slow-motion gearing on the main tuning control is absolutely essential, and (c) that wavelength calibration, while not indispensable, is highly desirable.



Peto-Scott's are responsible for this attractive all-wave S.G.3 for the battery user. It is known as the Model 7032.



The Marconiphone Model 348 is a five-waveband receiver covering from 7-2,200 metres. Note the clever concentric arrangement of the different wavebands on the calibrated scale.

FROM OUR READERS

ABOUT THE SERVICEMAN

Further Letters from Readers on the Interesting Subject Recently Raised by a Letter Printed in These Columns.

The Editor, POPULAR WIRELESS.

Dear Sir,—I was interested to read the letter of Mr. Donald T. Kear in your issue of Nov. 14th re dealers and radio repair work. A knowledge of actual facts may perhaps add something to his remarks.

Unfortunately, at the present time the radio trade is in a state of chaos. Sales and service are very often in the hands of the same person—a contrast to a similarly developed trade, that in automobiles, in which salesman and motor mechanic are two quite different occupations. In radio this combination has become almost unavoidable for the following reasons.

The average dealer is, as Mr. Kear remarks, quite ignorant of the first principles of the science—so ignorant that he expects a youth of 18-20 years to have a complete knowledge and full experience of servicing, and that at wages that would not allow him to purchase even a copy of your excellent journal if he had to depend on his work for a living. On the other hand, he knows that for every set sold he must risk, at his own expense, repeated calls on his serviceman's time, even for such trivial things as replacing the old H.T. battery with a new one.

The better-class dealer asks his "service man" to act principally as salesman so that he can offer a man a proper wage and a progressive position. Therefore he employs one with an "easy flow of talk," as Mr. Kear says (since this actually brings him profit), and has to rely on some outside firm or individual to undertake the more difficult repairs.

The fault for this state of affairs lies largely with the manufacturers who in their advertisements offer a period of guarantee with their sets and then leave the dealer to provide it. If every manufacturer stipulated that a certain small number of free service calls would be allowed, and after them a certain definite charge (in addition to the cost of replacements) would be made, the dealer would know at least exactly where he stands. In addition, his customers would be more inclined to learn something about the simpler details of the sets they have bought.

Yours faithfully,

E. FISHER.

33, Freeth St., Oldbury, Nr. Birmingham.

NOT PAID SUFFICIENT

The Editor, "Popular Wireless."

Dear Sir,—I feel I must write in support of Mr. D. T. Kear ("P.W." November 14th).

With regard to "Service Salesmen," I agree that few have any real technical knowledge, and in my experience they do not attempt to gain any. As regards those employed as "Service Salesmen" by

radio dealers generally, I think that the employer is in most cases, to blame.

After all, a really good serviceman is worth a good salary, but how often does he get more than £2 10s. per week? That is good (P) pay for a serviceman in most districts, yet the employer doesn't know probably the first thing in fault finding. I feel sure that if better wages prevailed good service engineers would be available. Also, servicemen and salesmen should work independently, as no salesman will bother about service if he has the slightest chance of inducing the unfortunate customer to buy a new set.

Personally, I believe that when dealers wake up to the fact that their sales are affected by their bad servicing they will begin to clamour for good service engineers. As long as low wages are the rule they will clamour in vain.

Now, you dealers, what about it? Correct me if I am wrong.

Wishing "P.W." staff and J. S.-T. every success,
Yours truly,

S. A. PALMER.

92, Lodge Road, Redditch, Worcs.

IN DEFENCE OF RADIO SALESMEN

The Editor, POPULAR WIRELESS.

Dear Sir,—The correspondent who, in your issue of November 14th, deprecated the attitude of the average radio salesman and suggested that there are more young fellows with an easy flow of talk than there are young fellows who are prepared to study radio, appears to me to have been singularly unfortunate in having met only this type of salesman.

My occupation brings me into contact with many young men whose job it is to sell radio sets. Most of

A READER'S SPEAKER IDEA



The suggested loudspeaker idea for the S.T.800 to which Mr. Langley refers in his letter. This is a reproduction of the actual sketch he sent.

them realise that an extensive knowledge of a set's "innards" is of vital importance to the success of their career. I use the term "career" deliberately, for many of these young men sincerely believe that the industry holds a bright future for them and, in my experience, they act accordingly.

For example, evening classes as well as independent lectures are attended regularly. Not a few of my salesman acquaintances spend considerable sums on text books. In fact, they swot up the whole business of radio in much the same way as a doctor or lawyer pursues his studies in the attempt to become proficient. Above all things, enthusiasm is always in evidence.

The example of a junior salesman in the employ of one well-known retail trader is typical of the spirit which I have always had the good fortune to find behind the radio counter. This young man is constantly trying to keep ahead of new developments and ideas in order that he may always know a little more than the most technically minded customer.

FOR THE BEST LETTER

Readers should note that a Guinea is awarded each week to the sender of the best letter in the opinion of the Editor. Literary skill is no criterion of success, nor is length, and no radio subject is barred. This week the guinea goes to Mr. E. Fisher.

To this end a careful study of manufacturers' literature is made, the new features of every set being noted and memorised. Trade papers, too, are read avidly, while journals such as POPULAR WIRELESS which, as he well knows, reflect the feelings of the keener section of the listening public, are read from cover to cover.

Another enthusiast takes so much interest in his job that he gave up a week of his holiday last summer to explore the factory of a set manufacturer fifty-odd miles from his home. This salesman, who already knows as much about television as Baird himself does, would be ashamed to admit that he ever let a receiver pass through his hands without knowing every detail of its construction.

In conclusion I should like to repeat that the writer whose opinion of radio salesmen is so poor has been unfortunate in his encounters. There are indeed many to be found who are a great credit to the industry that they represent.

Yours faithfully,

ARTHUR E. ROBBINS.

28, Union Road, Clapham, S.W.4.

P.S.—I myself am not a radio salesman.

FOR S.T.800 SETS.

The Editor, "Popular Wireless."

Dear Sir,—I am sending to you the enclosed composite sketch of my own design for a speaker cabinet to match and fit on to the top of Peto-Scott's "Easy Cabinet" for the S.T.800 set.

The sketch shows the speaker cabinet fitted to the "Easy Cabinet," and if you think it worth while I should like you to pass the design on to your readers to copy. It is made at a cost of about 2s. 6d. and I would be glad to send a carbon copy of the design to anyone wishing one at a small cost of 6d., post free.

Yours sincerely,

K. LANGLEY.

Victoria Street, Englefield Green, Surrey.

[Editor's Note: We must make it clear that while we consider Mr. Langley's design most attractive in appearance, we have not technically tested this particular speaker-set combination.]

WHERE THE CURRENT WENT

The Editor, POPULAR WIRELESS.

Dear Sir,—Being a regular reader of your interesting periodical for many years, I think the following experience I had in my service work a short time ago might prove of interest to your readers.

The receiver I was called in to service was a three-valve battery set, and the owner complained of it having consumed two H.T. batteries in the space of two weeks. The set was placed on a small table close by a window, and before making any tests I removed the table slightly from the wall. Putting a reliable milliammeter in series with the H.T. negative lead showed the current consumption to be 8 m.a., thus leading me to believe that there was no internal short-circuit.

The grid-bias battery also showed a full voltage on test and its leads were O.K. I might also add that the set was giving excellent results on the new H.T. battery which I had fitted. After everything seemed in order I was about to inform the owner that his receiver was O.K., having placed the table on which the set reposed against the wall again, when I happened to place my hand on the wallpaper over the set, receiving quite a nice shock and also noticing the dampness of the paper.

This gave me a clue, and upon examining the back of the receiver with the table in its original position I saw a loose piece of wallpaper touching the H.T. +120 battery plug.

The plugs were of the spring pattern in which a large piece of the bare plug protrudes above the level of the battery top. The solution of the problem was then simple—the wallpaper was making an earth connection due to its damp condition, and the H.T. leakage was being caused by the loose portion of the paper touching the positive plug.

Yours faithfully,

J. D. KENNY.

Killeragh, Banagher, Offaly, I.F.S.

[A puzzling fault and one which it would have been easy to miss. It goes to show how little things can cause a heap of trouble.—Ed.]

The Ideal Gift

For a Radio Man



Here's an idea for Xmas—an AvoMinor! With this accurate meter you are able to put your finger quickly on every defect that your set develops. It is thirteen testing meters in one. Gives 13 ranges of direct readings in milliamps, volts and ohms. Unique at its price for accuracy. Complete with instruction booklet.

From all good dealers.

40/-

Deferred Terms if desired.

BRITISH MADE

CURRENT
0-6 m/amps.
0-30 "
0-120 "

VOLTAGE
vols. vols.
0-6 0-12
0-120 0-240
0-300 0-600

RESISTANCE
0-10,000 ohms.
0-60,000 "
0-1,200,000 "
0-3 megohms.

The D.C. **AVOMINOR**
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The Automatic Coil Winder & Electrical Equipment Co., Ltd.

WINDER HOUSE, DOUGLAS STREET, LONDON, S.W.1. Phone: Victoria 3404/7.

COLVERN TELE-SOUNDER™ COILS
AS SPECIFIED BY
MR. JOHN SCOTT-TAGGART
PRICE TWO SHILLINGS EACH

Colvern are the makers of highly efficient short wave coils for all circuit requirements. Fully descriptive leaflets are obtainable on application.
Why not adapt your present set for short-wave reception by means of the Colvern Converter? Write to us enclosing 3d. in stamps for constructional blueprint.

COLVERN
MAWNEYS ROAD, ROMFORD, ESSEX.
LONDON DEPOT, 150, KING'S CROSS ROAD, LONDON, W.C.1.



Are

our

Condensers

the best?

Well, we think they are—but how can we prove it to you? We can say our condensers last longest, are the most reliable, and make lots of other claims for them, but you'll just reply that we're biased—and maybe we are!

Of course, we might mention at the same time that we've been making condensers for many years, that we've shown the way on many new types, and that the majority of the big wireless manufacturers fit our components. And that's something that doesn't have to be proved.

DUBILIER

DUBILIER CONDENSER CO. (1925) LTD.,
DUCON WORKS, VICTORIA ROAD, NORTH ACTON, LONDON, W 3



C. R. Casson 9

CHRISTMAS COMES BUT ONCE A YEAR—

*Claude Dampier tells readers how Mrs. Gibson
and her guests enjoy themselves at Christmas*



CHRISTMAS—Y-e-e-s. Once a year. But isn't it lovely? Just think of it. Christmas pudding—and turkey—and nuts. Oh, and of course—Mrs. Gibson—ye-e-e-s. She's very good at Christmas. She is definitely Christmas-minded.

Especially the good cheer part of it. I've been watching her make the puddings for this Christmas—wonderful conglomerations, full of flour—and water—and all those marvellous things you put in as well—orange peel—bits of meat—suet—currants—and grapes that have lost their will power—you know—raisins, and all sorts of other things.

Mrs. Gibson's Latest Idea.

Then there are the charms—very important—Mrs. Gibson's Christmas puddings are always full of surprises. Ye-e-e-s—she puts in all kinds of odds and ends—old corks—razor blades—string—and anything that might come in useful.

Her latest idea is to add a couple of camphor balls to each pudding, which is very clever, I think, because one never knows how long one might have to keep a Christmas pudding and they're horrid when the moths get in them.

You know, people are always asking me what I do at Christmas. Well, what do you do? Play games and eat, then eat and play games. That's all there is to it.

But I know some lovely games—by Jove, yes. We played them at Mrs. Gibson's last year. First of all we had "Blind Man's Biff"—a marvellous game. You give all your guests an umbrella each, and then they each have to pick out some object in the room, such as a clock or vase or whatever they fancy most, and then when they've each chosen one, you blind-fold them all and turn them round three times, then you say GO, and whoever biffs the ornament they've chosen first with the umbrella wins the forfeits. You must try it, it was a smashing success last year.

Then there was "Hunt the Kipper," which is great fun, the only thing is that to play it properly you must be quite sure that all your guests smell, because if they can't it wouldn't be fair, would it?

Father Christmas in the Loft.

Then I played Father Christmas for the children, too. That was a great success. The house had no ordinary fires, so there was a little difficulty about me coming down the chimney. Eventually we decided that I should get up into the roof—you know, the loft thing—and come down through the hole affair in the landing ceiling. The children were to be all lined up on the stairs.

Well, I went up into the loft—isn't it dirty up there—or perhaps you've never become Father Christmas—anyhow, I pity the poor fellow in the modern homes. No chimneys and only the loft to hide in, all among the water cisterns and spiders. I got my beard dripping wet when I was crawling past the cistern trying to find my way to the hole in the ceiling. I found it at last, but it was not the right hole. I put my foot between the rafters and went right through on to Mrs. Gibson's bed.

I don't think she was very pleased about it, you see she had a slight headache and was lying down for a few minutes while the children's surprise was on. But she got the surprise herself.

I think she ought to have been delighted. Not many women have Father Christmas dropping in on them like that, do they? No. But she was really annoyed, and accused me of being absent-minded. Well, perhaps I am, but I'm not the only one, she's very absent-minded herself. Ye-e-e-s. She's always losing umbrellas.

And She Finds Them Too!

I suppose she has lost about thirty this year. Terrible, isn't it? Mind you she finds them as well—heaps of them—ye-e-e-s, in trams and buses and various places. The hall at her house is simply stacked with them. All awaiting owners. I asked her why she didn't advertise for the owners, or take the umbrellas to the lost property office. "Oh no," she said,



CLAUDE DAMPIER, as he appears in private life.

"that wouldn't do. What is the good of going to the lost property office until the umbrellas are really lost. These have all been found, so the lost property office wouldn't take them, would they?"

But what I should really like to do on Christmas Eve, is to throw a party in one of the studios of the B.B.C. Do you think they'll let me? I'd like to get a good crowd together—you know—Henry Hall, John Sharman, and Bryan Michie; I thought they might do the Three Bears as a sort of charade.

Then I'd like Val Gielgud and Eric Maschwitz to take the parts of Romeo and Juliet. I think Eric would make a lovely Juliet. Ye-e-e-s. I have plenty of plans for a real good Christmas party, but I don't suppose they'll let me have it, and I shall probably end up by accepting Mrs. Gibson's invitation to go round and help her with the stuffing or any other little odd jobs—ye-e-e-s.

But joking apart, I hope you will all have a very Merry Christmas, plenty of good fun—don't forget to try the games, and think of me at Mrs. Gibson's, won't you?

SEEN ON THE AIR

(Continued from page 340.)

wet. In general the same remarks apply, even including the fact that it was also broadcast four times during the week.

My enjoyment of "Inn Signs Through the Ages," described by Mr. Fred Taylor, R.I., was somewhat marred by two black mackerel back bands across the screen due to local interference. I think this is caused by diathermy apparatus, but is easily the most serious form of interference which I have experienced.

Next day Mr. John Piper returned to the studio and brought a number of examples of pottery and sculpture on exhibition at London galleries. This was another feature with very limited appeal. I had excellent reception, but confess that I could make little of some of the curious objects shown.

"The Mask Theatre," performed on the following day, gave one of my children who entered the room a fright. Here is another problem for the weary television executive. Clearly I think, these items should be given

during the evening performance only. Another item on the same day, a description of wireless transmitting valves, would have rejoiced the radio amateur, perhaps, but not the vast majority of the television audience.

I regret that I did not see Nina Devitt, the cabaret artist, who in my view is one of the most attractive of television artists. Mr. C. H. Middleton scored a distinct success with his first television appearance, showing us how to prune fruit trees. It is a great pity that the B.B.C. cannot distinguish between a feature which appeals to nine out of ten and a feature which appeals to one in a thousand.

Pruning is obviously in the nine out of ten class and art demonstrations in the ninety-nine out of a hundred.

As I come to the end of this article I hear that the campaign of programme criticism in POPULAR WIRELESS and elsewhere is to bear fruit. "Something will be done about it," is stated by Those Who Know.

I calculate that at present television sets are selling to dealers, hotels, restaurants, and private persons at the rate of about one hundred a week. May the army of television viewers increase more and more rapidly under the stimulus of enlightened programme policy.

THE "TELE-SOUNDER"

A UNIT FOR RECEIVING THE TELEVISION SOUND PROGRAMMES ON ALMOST ANY BATTERY SET

By John Scott-Taggart, M.I.E.E., F.Inst.P., M.Am.I.E.E., M.Am.S.Mech.E., Fel.I.R.E.



GREAT new broadcasting system is now available to all constructors. At small cost an entirely different programme is available, thus giving a choice of three B.B.C. programmes.

The new television service has opened up a wonderful new field for the constructor. Once again this class of the community can dart ahead and obtain what the ordinary listener cannot achieve. Actual television will develop slowly, as the chairman of the Electrical Musical Industries stated recently. Not only will the technical development be gradual, but naturally only a comparatively few people will be able to afford the television receiver at present.

But there is one aspect of this service which is of very great interest indeed, and which can be said to be perfectly developed. That portion of the service is the sound part. As you know, the sound accompaniment—whether music, song or speech—is radiated on a wavelength of 7.23 metres, while the visual portion is radiated on 6.67 metres.

It is the sound portion which will prove such a great attraction to those listeners who do not propose at this stage to acquire a

complete television receiver. The sound programmes which accompany the radiation of pictures are excellent in themselves. Go to any demonstration of television, close your eyes, and you will still derive a very great deal of entertainment. In fact, many people think that the television programme, even treated solely as sound entertainment, is more interesting than ordinary broadcasting on the medium and long waves. This, no doubt, is due to the fact that the artists and speakers are conscious of performing naturally. Moreover, the announcers, including the two attractive-voiced girls who sometimes perform these rites, do not read their ordinary announcements. Further, other speakers and performers obviously cannot read from a manuscript. The result is that what they have to say comes over more naturally and more attractively. Personality counts for a very great deal in television, and even though you cannot see the performers on a sound receiver, yet the personality seems to come over with great effect.

A Tribute to Broadcasting

One might expect that not seeing what was happening would detract greatly from the enjoyment, but this is far from being the case. In fact, most of the time one is hardly conscious that one is missing anything. It is perhaps a tribute to ordinary broadcasting which we have accepted for years as excellent entertainment although we never see what is going on. Even when everyone has a television set, only a fraction of the time will be spent in "looking-in." Listeners will still vastly outnumber the viewers. Even assuming that the results are technically perfect, only a limited number of subjects will be improved by vision. Hearing the other day an excellent

recital of bagpipe music on the unit I am describing in this issue, I must confess that I had no particular wish to see the bagpipes being played. Nor is there any special joy in looking at a dance band. I speak, of course, for myself alone. There is very little of excitement in the evolutions of the average dance band which perhaps explains why one or two leaders of such bands have developed the technique of performing monkeys. Even a speech by a famous statesman may sound better if you do not see him blow his nose or sip a glass of water or whatever statesmen sip when they need support.

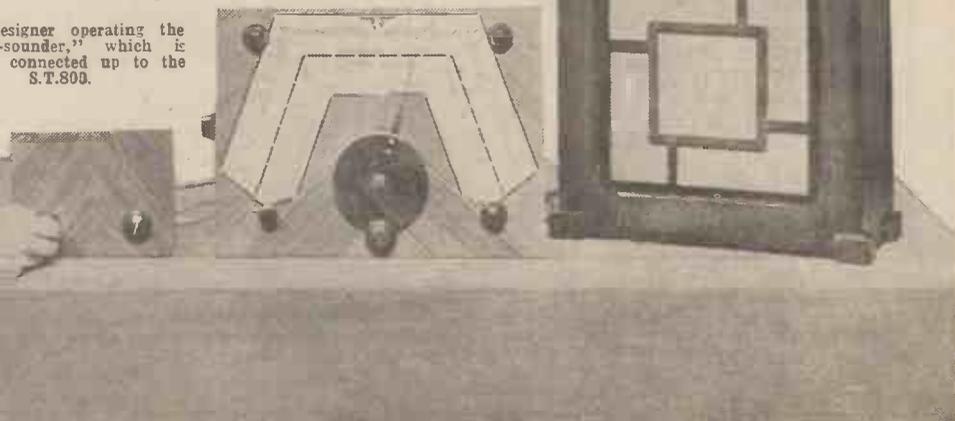
A New Source of Entertainment

Scores of items, therefore, gain little by vision, but of course, now and again, vision means everything. Nevertheless, most of the programme is excellent without the vision and think what it means! An entirely new alternative programme coming through at excellent strength and wonderful quality! The quality of reproduction is theoretically much better because there is no limitation of side-bands as in the case of the medium waves and long wave B.B.C. stations. There is also no need for selectivity; in consequence no devices have to be used which may impair to some degree the quality of reproduction. As regards loudness of signals, the present unit which I have called the "Tele-sounder," gives you full strength entertainment which is indistinguishable as regards strength from the ordinary B.B.C. broadcast signals, while the quality is excellent.

You have, therefore, an entirely new
(Continued overleaf)



The designer operating the "Tele-sounder," which is shown connected up to the S.T.809.



(Continued from previous page.)

situation. Everything that comes through is of full programme value; there is no fading, the programmes come through at excellent strength and with very good quality. Ordinary short-wave reception by its very

programmes are one hundred per cent reliable in the area served by the station at Alexandra Palace. This service area is about 30 miles but there is no doubt that much greater distances will be covered.

Needless to say, the Tele-sounder is only of interest to those within this range of London, but other readers will be specially interested as television will be extended to other centres such as Birmingham and Manchester.

But in and around London alone there is a public of about ten million people who will be intensely interested in receiving the television programmes by sound. The present unit, the Tele-sounder, can be used on practically any battery set although it was primarily intended to extend the scope of the S.T.800 so that it would cover practically every broadcast under the sun.

Think of the great scope for a revival of home-construction in this field! Many battery users who have given up home construction or are using sets a year or two old will want to have this valuable adjunct which will give them an entirely new and fascinating alternative to the ordinary B.B.C. programmes.

Not only, therefore, will you be building a Tele-sounder for your own set, but probably also for many of your friends who have only

to listen to the television sound programmes once in order to realise what they have been missing.

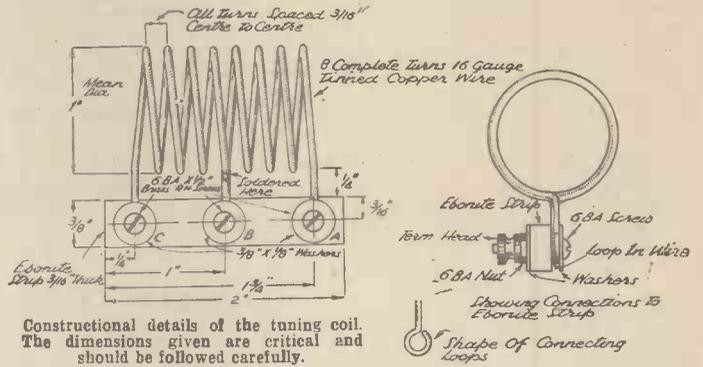
Excellent Programmes for Television

Naturally to popularise television they will be putting over excellent programmes and this tendency will obviously become more marked. People are not going to buy television receivers at a hundred pounds each, unless the programmes are very good. The policy of the B.B.C. will

THE PARTS YOU NEED

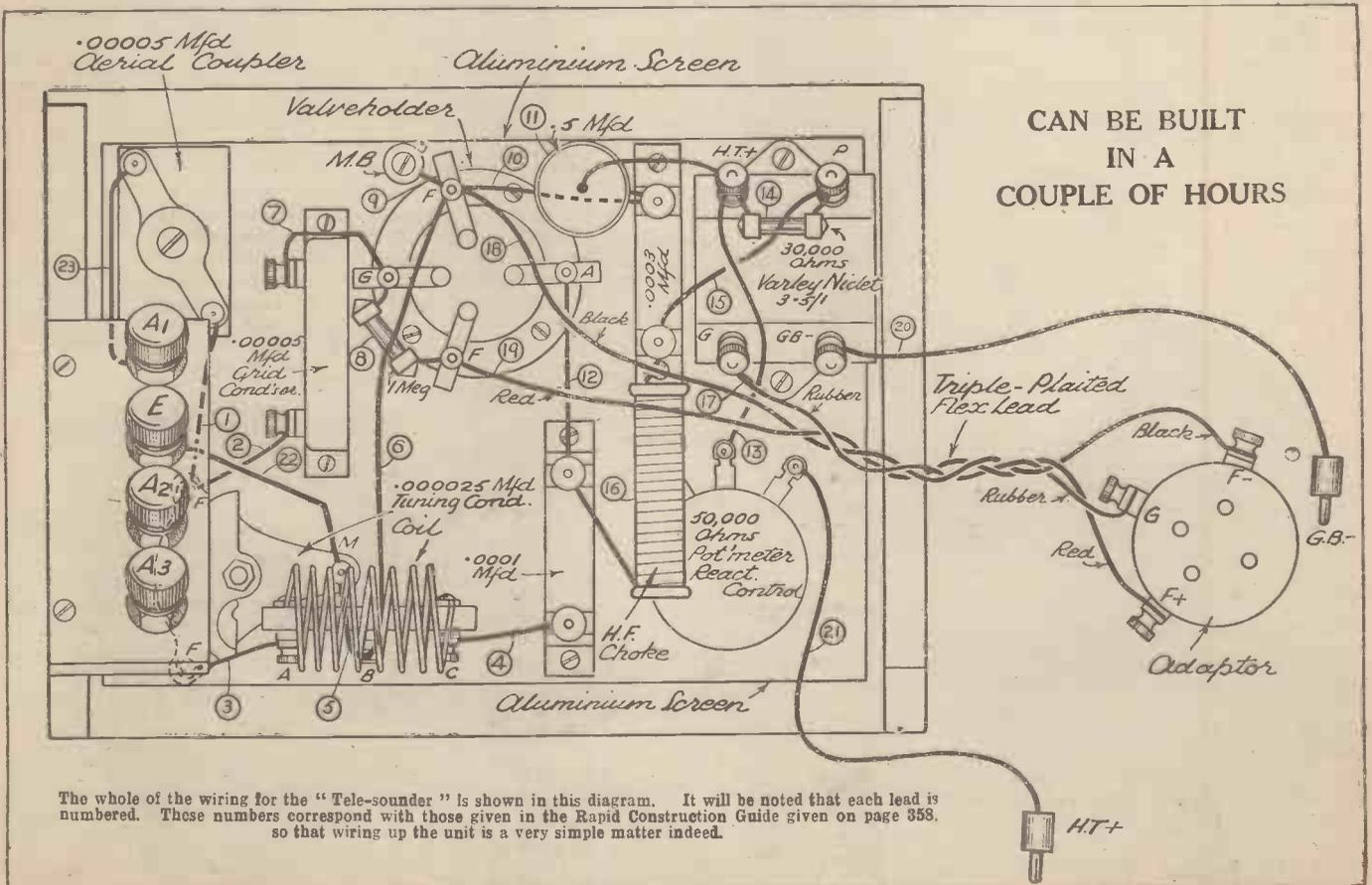
- TUNING CONDENSER: .000025-mfd., B.T.S., type S.T.C.425.
- AERIAL COUPLER: .00005-mfd., J.B., base-board trimmer.
- FIXED CONDENSERS:
 - 1 .00005-mfd., Lissen Mica.
 - 1 .0001-mfd., Dubilier type 620.
 - 1 .0003-mfd., Dubilier type 620.
 - 1 0.5-mfd., T.C.C. tubular type 250.
- VALVE HOLDER: 4-pin, Eddystone No. 949
- L.F. TRANSFORMER: Varley Niclet, standard 1:3.5.
- RESISTORS:
 - 1 1-megohm, Dubilier 1/2-watt.
 - 1 30,000-ohm, Dubilier 1/2-watt.
- POTENTIOMETER: 50,000 ohms, Erie, less switch, but with terminals.
- SPECIAL COIL (specify this unit): Colvern.
- SHORT-WAVE CHOKE: B.T.S. type U.H.F.2.
- 2 KNOBS: Bulgin, type K.20.
- VALVE HOLDER ADAPTOR: With isolated grid and tapped filament terminals, Bulgin type A.36.
- TERMINALS: A.1, A.2, A.3, E., Belling-Lee type R.
- WANDER PLUGS H.T.+ , G.B.-. Belling-Lee Midget type No. 1019.
- SCREEN: Aluminium sheet, 24 S.W.G., 7 x 5 in., Peto Scott.
- TERMINAL STRIP: 4 x 1 1/2 in., Peto Scott.
- 1 PANEL: Peto-Scott.
- 2 SIDE PIECES: Peto-Scott.
- 4 feet 18 S.W.G. tinned copper wire and 3 feet 1 m.m. insulating sleeving.

nature is not a hundred per cent reliable. You cannot, for example, guarantee the reception of Tokio at a certain given time every day. But the television sound

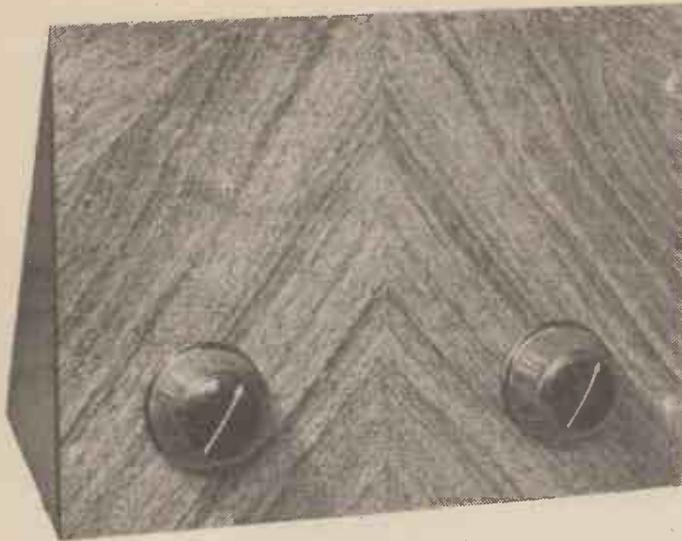


Constructional details of the tuning coil. The dimensions given are critical and should be followed carefully.

therefore be, before very long, to put on television programmes which will make the public realise how much they are missing. That is, in fact, the only way to popularise television and the owner of a Tele-sounder can benefit from this policy. If, for example, it is desired to popularise television by broadcasting such stars as Harry Lauder, nine-tenths of the entertainment will come over on the Tele-sounder. The whole policy of the B.B.C. will be directed towards making you feel you are



The whole of the wiring for the "Tele-sounder" is shown in this diagram. It will be noted that each lead is numbered. Those numbers correspond with those given in the Rapid Construction Guide given on page 353, so that wiring up the unit is a very simple matter indeed.



chimney. None of these, mind you, are essential, as I have designed this unit to work off an ordinary aerial. At the same time I have provided two terminals for the benefit of those who wish to carry

out experiments with different breeds of aerials. Such experimental work is peculiarly easy and costs only a few pence for wire.

As regards ordinary broadcast aerials, there is no incentive to experiment with these. The higher they are and the clearer of neighbouring buildings the better. There is very little we can do with them, and in any case, one cannot very well experiment with high aerials requiring lofty poles. But when you are dealing with aerials only a few feet long which can be suspended from a window or erected inside a room, the whole situation is changed and a great field for interesting experiment is opened out and none of these experiments, be it noted, need alter the receiver in the slightest, so that you can always go back to the normal arrangement.

Short-Wave Mumbo-Jumboism

In my S.T.800 article I had a great deal to say about the mumbo-jumboism of short-wave designs, and how a mysterious cult had grown up around an ordinary engineering problem. When we come down in wavelength to 7 metres, where the technique of reception certainly undergoes a great change, one may expect a revival and intensification of mumbo-jumboism. The Tele-sounder, however, is likely to nip this in the bud. In the case of short waves I waited until programmes were good enough and strong enough and numerous enough to make short-wave reception worthwhile. The situation, however, as regards the ultra-short-wave reception of television sound is entirely different. The programme is there, it is excellent in quality, the signals are strong and there is no fading. Also,

(Continued overleaf)

missing something, but if you have a sound receiver which will pick up the ultra-short transmissions you will certainly be missing very little.

I deprecate the word "fascination" as applied to wireless reception but there is no doubt that the possession of a receiver which will pick up these extraordinarily short waves which have all sorts of peculiar properties of their own brings back an enthusiasm which one has not felt since 1922. The fascination is greatly increased by the fact that the programme when obtained is so excellent and free from fading and so loud and clear. But all the time one knows that these ultra-short waves behave more like light waves travelling in straight lines so that Alexandra Palace is really shining its waves into the homes of London.

This does not mean that buildings obstruct the waves; you can put up an aerial in your own room or even do without an aerial and still pick up the signals, although if you are in a steel building the position may be modified. The ordinary constructor, however, does not live in a steel house, and he will get excellent results on the television sound programmes.

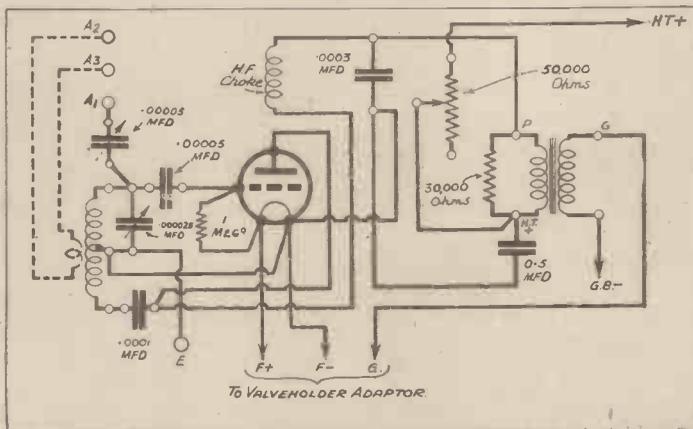
I have scoffed at the attempt to create a mystery of the ordinary short wavelengths, but when we come down to the ultra-short bands, the purely technical engineering problems are of extreme interest to anyone experimentally-minded. There is a great field for experiment here, and amateurs have wonderful scope because they have a good, reliable signal there on which to experiment.

A Complete Finished Instrument

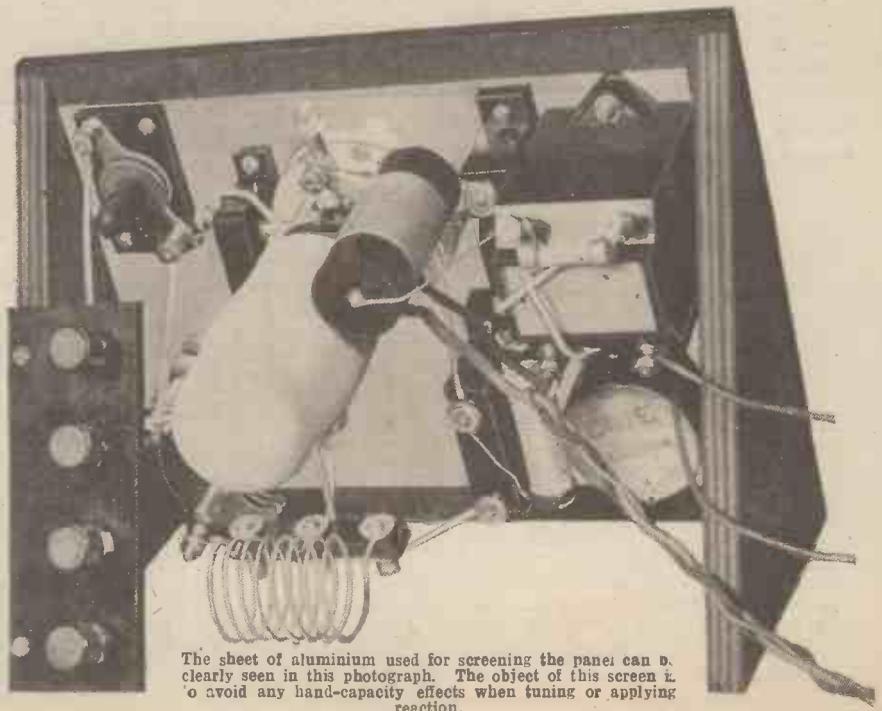
But, as I have previously explained, it is not my work to offer experimental designs. The Tele-sounder is a complete finished instrument which will give you the television sound programmes with reliability and with excellent results. But there are many interesting experiments you can perform with the aerial arrangements. There are all kinds of odd bits of wire which you can sling up inside a room, dangle outside the window or fix to your

In appearance the "Tele-sounder" is not unlike a miniature version of the S.T.800. Everything is mounted Uni-plane fashion on the panel, which is supported by two little side pieces.

RESISTANCE-CONTROLLED REACTION



The theoretical circuit of the "Tele-Sounder." It will be seen that two spare terminals (A₂ and A₃) are included. These are to enable experiments with different aerial-coupling methods to be carried out. On the ultra-short waves smooth reaction with a complete absence of "back-lash" and threshold howl is essential. That is achieved in the "Tele-sounder" by employing resistance control.



The sheet of aluminium used for screening the panel can be clearly seen in this photograph. The object of this screen is to avoid any hand-capacity effects when tuning or applying reaction.

CHILDISHLY SIMPLE TO OPERATE

(Continued from previous page.)

there is no problem of selectivity, and there is not a large variety of stations.

On the other hand, there are other problems of design. Reaction, for example, and the choice of components. But actually the Tele-sounder is much easier to operate than any other sort of receiver. (It has only one tuning knob and one reaction knob.) It is, when used in conjunction with an ordinary receiver, a "det.-and-two-L.F." receiver. We are therefore back at the stage of the most primitive receiver of broadcasting. The reason is that this arrangement is not only good enough but very good indeed. The question of selectivity does not arise and may not arise for years. The receiver of television sound is really a one-station set and this also adds greatly to the simplicity. But please do not imagine that because the Tele-sounder is so extremely simple to build and so childishly simple to operate that there is no design work in it. The work has simply been already done for you, and therefore you have no worries yourself.

Reaction Points

The rather unusual way of obtaining adjustable reaction, by altering your resistance in the anode circuit, is one of the departures from usual practice. It is highly desirable to have exceedingly smooth reaction and to arrange that changes in reaction do not alter the tuning. Nor must there be any suspicion of threshold howl or "backlash."

Perhaps the most astonishing feature of the Tele-sounder is that there is no slow-motion condenser. The omission of any such arrangement at first seems fantastic. Since a slow-motion drive is necessary on the S.T.800 when receiving short waves of very much greater length, surely when we come down to 7 metres an even slower motion drive is necessary? This is quite a fallacy. In dealing with the question of selectivity on short waves I explained in my S.T.800 article that many people believe that short waves were selective in themselves in some mysterious way and I pointed out that the fact that a station came and went over a very small movement of the condenser did not mean that the set was selective. I also pointed out that the rate of movement and the size of the condenser were all-important factors. By

the use of a small condenser, in the Tele-sounder, there is no advantage to be gained by having a slow-motion drive. Nor is there the slightest difficulty either in picking up the television sound programme or tuning it in accurately when it is once picked up. In fact, as regards handling, the Tele-sounder is very much like the most primitive valve set being used to pick up the local station. This is in no way an exaggeration, and I assure you that the operation is very much simpler than on any other waveband. Immediately remove from your mind, therefore, any feeling that

four sockets. The grid pin is omitted in order to isolate the grid socket. A terminal fitted to the side of the adaptor is connected to the grid socket. Also there is a terminal connection to each valve pin. The three wires from the Tele-sounder are taken to the two filament terminals on the filament adaptor, and the lead also goes to the Tele-sounder from the grid socket on the valveholder adaptor. All you do to receive the television sound programmes is to take out the last valve but one on the main set, i.e. the so-called "first L.F." valve, insert the valveholder adaptor in the empty valveholder and then replace the valve in the sockets of the valveholder adaptor. The set is then switched on and tuning carried out on the Tele-sounder. No attempt is made to tune on the main receiver, because only the last two valves of this are actually employed. The Tele-sounder may be used on the S.T.300, S.T.400, S.T.600, S.T.700, Centurion, and S.T.800. In fact, with any set having two triodes at the end, coupled by an L.F. transformer. Probably it would work with any battery set if decoupling is adequate.

Quite Automatic

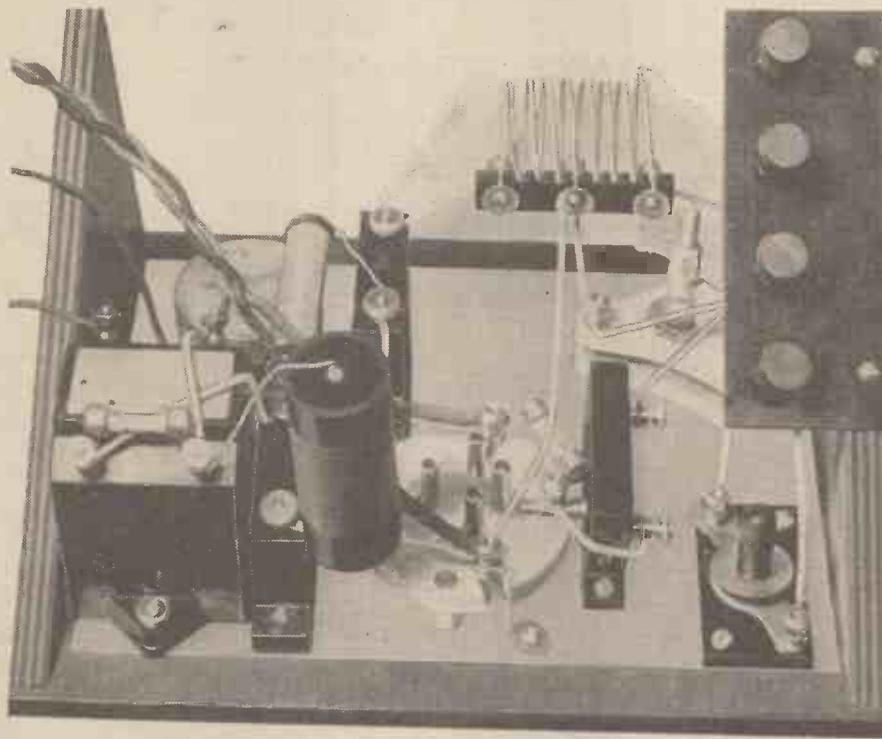
There is no question of switching on the Tele-sounder because it is automatically switched on when the valveholder adaptor is plugged into the main set. Similarly, when the valveholder adaptor is pulled out, the Tele-sounder is disconnected from the accumulator.

The normal aerial used on the main receiver will have been connected to the A1 terminal of the Tele-sounder; usually, however, such good results are obtained on simple short lengths of wire even in a room, that you will probably have such a small aerial permanently connected to the terminal A1 of the Tele-sounder.

The panel of the Tele-sounder only measures 8 in. by 6 in. and everything is mounted in Uni-plane fashion on this panel. There are two little side-pieces to support the panel so that the construction follows exactly that of the S.T.800. Needless to say, this arrangement is exceedingly cheap, while looking quite presentable and even attractive without any further alteration. But if you wish you can omit the side-pieces and simply screw the panel on to a box-like frame without a bottom. In this

(Please turn to page 356.)

PROVIDES AN ENTIRELY NEW ALTERNATIVE PROGRAMME



Builders of the "Tele-sounder" will have an entirely new source of entertainment available. The television sound programmes come through at excellent strength and with very good quality.

these waves are difficult to receive. With the Tele-sounder, they are simplicity itself.

What the "Tele-sounder" Is

What is the Tele-sounder? It is really a separate detector stage with its own tuning circuit and reaction control. It uses a Mazda L2 valve as detector, although other valves may be found suitable. Those who built the S.T.800 can simply use the detector valve in that set, and plug it into the valveholder of the Tele-sounder. No extra valve need be purchased. There is an H.T. lead from the Tele-sounder which goes to a point on the high-tension battery, while there is also a G.B.— plug which goes into the bias battery. These connections may be left permanently in circuit. There is also a valveholder adaptor. This is connected by three wires twisted together, which go into the Tele-sounder. This valveholder adaptor is really like another valveholder and consists of three plugs and

PILOT AUTHOR KITS

S.T.800 BATTERY VERSION KIT "A" Carriage Paid 67/6

Complete Kit of Components exactly as FIRST specified and used by Mr. John Scott-Taggart, with Konectakit (Gratis with Complete Kit) but less wander plugs, accumulator connectors, valves, Extractor Kit, Cabinet and Speaker.

KIT "B" Carriage Paid £4:14:0

As for Kit "A," but including set of 4 FIRST specified valves only, less cabinet and speaker, etc.

KIT "CT" As for Kit "A," but with valves and Peto-Scott S.T.800 Table Cabinet only, less speaker, etc. Carriage Paid £5/11/6.

KIT "CC" As for Kit "A," but with valves and Peto-Scott Consolette Cabinet only, with speaker baffle and battery shelf, less speaker, etc. Carriage Paid £6/9/0.

KIT "CLL" As for Kit "A," but with valves and Peto-Scott Consolette Cabinet, Type "LL" only, with speaker baffle, less speaker, etc. Carriage Paid £6/11/6.

★ If Extractor Kit is required with any of the above Kits, add £1/4/0 to Cash Price.

★ If the above kits are required complete with 8 wander plugs and 2 accumulator connectors as specified, ADD 1/9 to Cash Price.

S.T.700 to S.T.800 CONVERSION KIT

COMPLETE SET of parts necessary to convert your S.T.700 to the all-wave S.T.800, exactly as recommended by Mr. Scott-Taggart. Comprising: B.T.S. "Quad-wave" tuning unit, aerial balancer condenser, turret switch, B.T.S. H.F. choke, 3 1/2-watt resistors, 5,000 ohms and 2 1-megohm 2 mica fixed condensers, .0001 and .0005-mfd. Carriage Paid 33/6.

• A.C. MAINS S.T.800 •

KIT "A" Complete kit of components as FIRST SPECIFIED and used by Mr. J. Scott-Taggart, including Peto-Scott ready-drilled and polished walnut plywood panel, ready-drilled terminal strips, aluminium brackets, mains lead, nuts and bolts, less valves, cabinet, speaker £9:16:6 and Extractor Kit. Carriage Paid £11/15/0.

Mr. J. Scott-Taggart's

TELE-SOUNDER KIT "A" Cash or C.O.D. 38/6 Carriage Paid

Complete kit of parts, as first specified by Mr. J. Scott-Taggart, and shown below, including aluminium screen, terminal strip, ready drilled and polished panel, and two side-pieces, less valve.



Balance in 8 monthly payments of 4/6.

PARTS CONTAINED IN KIT "A." Any part available separately. Orders over 10/- sent post free.

| | s. | d. |
|--|-----------|-------------|
| 1 Peto-Scott "Tele-sounder" Structakt, comprising:—Ready drilled aluminium screen, ready drilled terminal strip, ready drilled and polished walnut plywood panel, 2 polished side pieces | 5 | 0 |
| 1 B.T.S. .00025 tuning condenser | 3 | 3 |
| 1 J.B. .00005 baseboard trimmer | 1 | 0 |
| 1 Lissen .00005-mfd. mica condenser | 2 | 6 |
| 2 Dubilier fixed condensers | 2 | 6 |
| 1 T.C.C. 5 tubular condenser | 2 | 0 |
| 1 Eddystone 4-pin valve holder | 1 | 5 |
| 1 Varley Niclet L.F. transformer | 7 | 6 |
| 2 Dubilier 1-watt resistors | 1 | 0 |
| 1 Erie 50,000 ohms potentiometer | 5 | 0 |
| 1 Colvern "Tele-sounder" coil | 2 | 0 |
| 1 B.T.S. short-wave choke | 1 | 5 |
| 2 Bulgin knobs, type K20 | 9 | |
| 1 Bulgin valve holder adaptor | 2 | 6 |
| 4 Belling-Lee type R terminals | 1 | 0 |
| 2 Belling-Lee midget wander plugs | 1 | 4 |
| Connecting wire, screws, flex | 1 | 9 |
| Kit "A," Cash or C.O.D. Carr. Pd. | £1 | 18 6 |

KIT "B" As for Kit "A," but including specified 1 valve. Cash or C.O.D. Carriage Paid £2/3/3, or 5/- down and 9 monthly payments of 4/9.

PETO-SCOTT S.T.800 FINISHED INSTRUMENTS
• DELIVERY FOR XMAS OR CASH REFUNDED •
 We give a definite guarantee that all cash orders for S.T.800 Finished Instruments received after the appearance of this advertisement, will be delivered for Xmas or cash will be refunded in full

Peto-Scott S.T.800 Finished Instruments include all first specified parts as used by Mr. John Scott-Taggart, are assembled and exactly tested by highly skilled Radio engineers, and absolutely READY TO PLAY. The specially designed cabinets for these instruments are hand French polished, and are supplied complete with extension spindle for side control. Each cabinet will accommodate all necessary batteries and accumulators or eliminator. Every Peto-Scott Finished Instrument is AERIAL TESTED ON ACTUAL BROADCASTING.

S.T.800 BATTERY VERSION CONSOLETTA MODEL

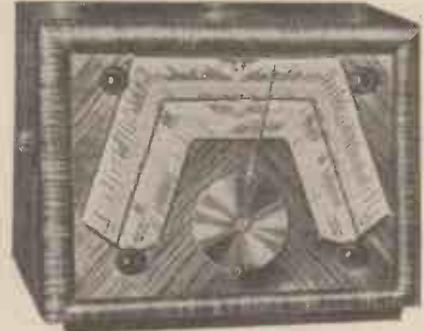


DÉMONSTRATIONS
 daily at 77, City Road, London, E.C.1 (Clerkenwell 5911); 62, High Holborn, London, W.C.1 (Holborn 3248).

Exact to Specification. Complete with FOUR FIRST SPECIFIED Valves. Including Peto-Scott Type 101 matched speaker and walnut consolette cabinet (illustrated on left), less batteries. OVERALL DIMENSIONS: Width 20 in.; Height 24 in.; Depth 12½ in.

CASH PRICE **£8:19:6**

S.T.800 BATTERY VERSION TABLE MODEL



Built exactly to Mr. J. Scott-Taggart's specification by Peto-Scott's expert technicians. Complete with FOUR FIRST SPECIFIED valves and Peto-Scott Walnut table cabinet (illustrated on left), less batteries. OVERALL DIMENSIONS: Width 18½ in.; Height 14½ in.; Depth 12 in.

CASH PRICE **£7:2:6**

S.T.800 Type "LL" MODEL

BATTERY VERSION

Exact to specification. Complete with FOUR FIRST SPECIFIED valves, Peto-Scott Matched de Luxe speaker Type 102 and walnut consolette Cabinet Type LL (as illustrated on right), less batteries.

CASH PRICE **£9:15:0**

A.C. MAINS VERSION

Exact to Specification. Complete with THREE FIRST SPECIFIED valves and specified W.B. speaker in Peto-Scott Consolette Cabinet Type LL (as illustrated on right).

CASH PRICE **£19:10:0**



W B STENTORIAN
 RECOMMENDED for the S.T.800
 YOURS FOR **2/6 DOWN**

MODEL 37S. Amazing reproduction provided by new magnet and ex-potential moulded cone. Microlode matching device.
 Cash or C.O.D. Carr. Paid £2/2/0, or 2/6 down and 11 monthly payments of 4/-.
MODEL 37J. With the new exclusive Stentorian features. Wonderful improvement in volume and realism of reproduction. Perfectly matches any receiver as principal or extra speaker.
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 Any W.B. Chassis or Cabinet Model available on attractive Easy Terms.

★ PRICED LIST OF PARTS AND FULL DETAILS OF PETO-SCOTT S.T.800 STRUCTAKITS, ETC., AVAILABLE ON REQUEST.

ORDER FORM

PETO-SCOTT CO. LTD., 77 (P.W.8), City Road, London, E.C.1. Telephone: Glasfold 9875. West End: 62 (P.W.8), High Holborn, W.C.1. Telephone: Holborn 3248.

Please supply.....
 I enclose £ s. d. M.O./P.O./Cheque.
 NAME.....
 ADDRESS.....
 EST. 1919

(Continued from page 354.)

case, the complete unit will look rather like the Triple Extractor box.

Those who have seen the Tele-sounder next to the S.T.800 have been amused to notice the similarity of construction, the Tele-sounder looking like a baby set beside its mother. But even though the Tele-sounder is so very small and is so simple to construct, the benefit of Uni-plane construction remains and adds considerably to the attractiveness of the design from the practical standpoint. The whole outfit can be constructed in a couple of hours.

Simple in Every Way

I am giving a rapid construction guide as I anticipate a very considerable popularity for this unit and I wish it to appeal to those who have no previous experience of constructing sets. There are many who already have battery sets which they themselves have not built, and there is no reason why they should not have everything made as simple as possible when they come to build the Tele-sounder. The short-wave choke and the actual coil can very easily be made by the home constructor, but they can also be purchased ready-made. Details of of the coils is given on page 352.

It will be noticed that a tapping is taken on the main tuning coil. This tapping is caused by actually soldering a wire on to the coil. *If you are building the coil yourself you must do this soldering, as any other kind of joint may lead to all kinds of trouble.* I know of many constructors who will not heed this advice, but having offered it I decline further responsibility. You will notice I have used a large tubular condenser of 0.5-mfd. It looks rather cumbersome but it was not chosen for any technical reason but simply because it serves as an excellent former on which to wind the main coil! The constructor is therefore saved any bother in hunting for some tube of suitable diameter.

A sheet of aluminium is used for screening the panel so as to avoid any hand-capacity effects which would add to the difficulty of tuning or applying reaction. It will be appreciated that on these very short wavelengths tuning is easily upset unless such precautions are taken.

Reaction is applied in much the same way as in an ordinary broadcast receiver—that is to say, there is a reaction coil coupled to the main coil, and this reaction coil is fed through a condenser from a reaction choke. Instead of using a reaction condenser, however, for varying the reaction, the reaction condenser is fixed and the reaction is altered by varying the voltage on the anode of the valve. This is done by including a variable resistance in the anode circuit of the valve.

The Coil Tapping

The evolution of the Tele-sounder may be seen from Fig. 1, Fig. 2, and Fig. 3. Although a continuous coil L_1 L_2 is wound with a tapping M taken from a point on it, yet actually this apparently continuous coil is really two coils, one L_1 being the tuning inductance while L_2 is the reaction coil. In Fig. 1 a valve is shown being used to produce a reaction effect. A short-wave air-cored choke Z is included in the anode circuit of the valve, while the variable condenser C_2 controls the amount of reaction current which is fed through the reaction coil L_2 .

CIRCUIT EVOLUTION

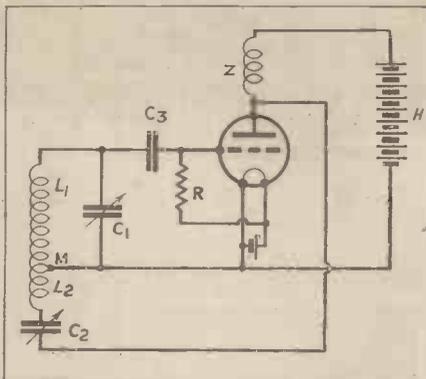


Fig. 1.—The figures 1, 2 and 3 show the evolution of the "Tele-sounder" circuit. First of all we have a normal reaction circuit.

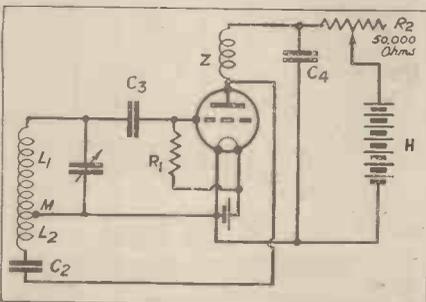


Fig. 2.—Reaction control by voltage variation on the anode avoids hand-capacity effects and prevents reaction affecting tuning.

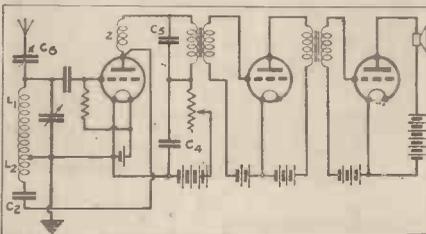


Fig. 3.—The circuit "in elementary form" of the "Tele-sounder," added to an existing battery set.

METHODS OF FEED

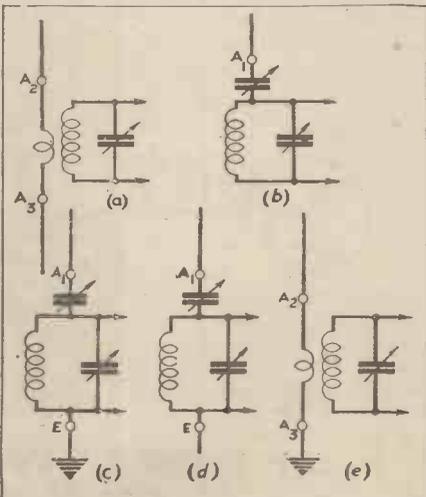


Fig. 4.—Different methods of feeding the tuned circuit are illustrated here, and may all be used with the Tele-sounder.

There are two essential requirements in obtaining reaction on these very short wavelengths. One is that the reaction shall not be susceptible to hand-capacity effects and the other is that the reaction must not alter tuning. Of course, there are other factors; for example, reaction must be very smooth, there must be a complete absence of hysteresis or "backlash," and there must be no threshold howl. All these factors govern the method whereby the reaction is obtained, and I am recommending the use of a fixed reaction condenser C_2 , as shown in Fig. 2, and the insertion of a variable resistance R_2 (having a maximum value of 50,000 ohms), inserted in the anode circuit of the valve, thereby controlling the H.T. voltage. We all know that, as we increase the H.T., reaction increases, and the present arrangement is exceedingly effective.

For Batteries or Mains Units

The condenser C_2 need not be absolutely accurate. Needless to say, you must be able to control the reaction on the resistance R_2 , but this can always be obtained by suitably adjusting the high-tension voltage tapping. This system serves an accidental additional purpose in that the resistance R_2 also provides a means of decoupling this valve. When the Tele-sounder is in use we really have a three-valve set in which the first valve is the detector in the Tele-sounder itself and the other two valves are the last two valves in the main receiver. Old readers will be aware that every set I have designed will operate either on batteries or mains units. The same applies to the Tele-sounder, and it may be built with every confidence by those who are now working their sets off mains units. There is no fear of motor-boating or distortion.

Fig. 3 shows in elementary form the three-valve outfit obtained by adding a Tele-sounder to an existing battery set. It will be seen that the circuit consists of a detector with reaction followed by two stages of low-frequency amplification. It will also be seen that there are two L.F. transformers. This is not usual practice but I have adopted it in order to gain greater sensitivity. Naturally, my first experiments involve the use of resistance coupling, which is rather cheaper. I find, however, that although it is perfectly satisfactory in many cases, yet the sensitivity is not such that I could whole-heartedly recommend the Tele-sounder for use in all conditions and with any kind of aerial. There is no question about signal strength being anything like that of a foreign station. You get full local strength on the Tele-sounder, and even without any aerial at all quite good results are obtainable. It is simply another example of my keenness to provide a very large margin of safety when it comes to sensitivity. This has characterised all my sets since the S.T.400, which was the first really popular four-valve set in recent years.

Obtaining Increased Sensitivity

Although the use of two L.F. transformers is not necessary and is therefore not adopted on medium and long wavebands, yet the increased sensitivity is very well worth while, and the quality of reception and stability remains excellent. Incidentally, there is none of the risk of distortion due to grid circuit choking which may some-

(Please turn to page 367.)

POLAR

SPECIFIED for the **S.T.800**



The **POLAR SPECIAL 'No. 2'**

Made of aluminium. Ball Bearings throughout. Supplied with special Knob and Pointer (as S.T. Specification).

ONE '0005 REQUIRED

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POLAR No. 4 CONDENSER
Direct drive, made **THREE '0005 REQUIRED**
in aluminium with (with Knob as specified)
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Condenser only 4/-

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SPECIFIED FOR THE S.T.800

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1 '004-mfd. condenser T.C.C. type M ... 1/-
1 '0001-mfd. condenser T.C.C. type M ... 8d.
2 '0005-mfd. condenser T.C.C. type M ... 9d.
*1 '1-mfd. tubular condenser T.C.C. type 250 1/4
(*Incorporated in the coil unit.)

A.C. MAINS MODEL

Each
2 0.5-mfd. tubular condensers T.C.C. type 250 ... 2/-
2 0.1-mfd. tubular condensers T.C.C. type 250 ... 1/4
3 1-mfd. Paper condensers T.C.C. type 50 2/6
1 50-mfd. Electrolytic condenser T.C.C. type FW ... 2/3
2 '8-mfd. Electrolytic (wet) T.C.C. type 802 6/-

FOR THE TELE-SOUNDER

1 .5 tubular condenser T.C.C. type 250 ... 2/-

Both the battery and mains model S.T.800 use T.C.C. condensers, because Mr. John Scott-Taggart insists upon dependability in every component. Dependability comes only from specialised experience and

T.C.C. HAVE MADE CONDENSERS AND CONDENSERS ONLY FOR 28 YEARS

THE TELEGRAPH CONDENSER COMPANY LIMITED
WALES FARM ROAD, NORTH ACTON, W.3

THE "TELE-SOUNDER"

RAPID CONSTRUCTION GUIDE

(A) Drill panel according to front of panel diagram.

(B) Drill terminal strip according to diagram.

(C) Fit terminals to terminal strip.

(D) Fit a wire (18 S.W.G. tinned copper) to A1 terminal. This should be 3 inches long from the point where it leaves the terminal.

(E) Fit a wire (18 gauge tinned copper) to E terminal. This should be 3½ inches long from the point where it leaves the terminal.

(F) Fit terminal strip to side-piece as shown in diagram.



The terminal strip is mounted on the side-piece as shown in this diagram.

(G) Cut aluminium screen to size and drill holes according to diagram.

(H) Place aluminium screen on back of panel so that holes in panel register with holes in screen. Now fit tuning condenser and 50,000-ohm potentiometer.

(J) Screw following components to back of panel, using "blue-print" drawing as guide to positions: aerial coupling condenser, .00005-mfd. grid condenser, valveholder, .0003-mfd. fixed condenser, Varley Niclet, .0001-mfd. fixed condenser.

The set is now ready to be wired. The following numbers are those of wires so marked on the "blue-print" drawing. Actually this drawing is not a blue-print but apart from the colour it is equally useful.

(1) Join terminal (nearer bottom of panel) of aerial coupler condenser to F terminal (nearer top of panel) of tuning condenser.

(2) Join same terminal of tuning condenser to terminal (nearer bottom of panel) of .00005-mfd. grid condenser.

(3) Join F terminal (nearer bottom of panel) to A terminal of coil.

(4) Join C terminal of coil to terminal (nearer bottom of panel) of .0001-mfd. fixed condenser.

(5) Join B terminal of coil to M terminal of tuning condenser.

(6) Join B terminal of coil to F terminal (nearer top of panel) of valveholder.

(7) Join terminal (nearer top of panel) of .00005-mfd. grid condenser to G terminal of valveholder.

(8) Join 1-meg. grid leak between G terminal and F terminal (nearer bottom of panel) of valveholder.

(9) Join F terminal (nearer top of panel) to aluminium screen by means of a ¼-in. No. 4 round-head brass screw and ⅜ in. by ⅜ in. brass washer.

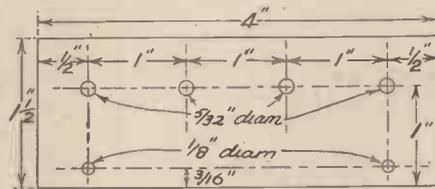
(10) Join F terminal (nearer top of panel) of valveholder to terminal nearer top of panel of .0003-mfd. fixed condenser.

(11) Join 0.5-mfd. tubular fixed condenser between terminal (nearer top of panel) of .0003-mfd. fixed condenser and H.T.+ terminal of Varley Niclet.

(12) Join terminal (nearer top of panel) of .0001-mfd. fixed condenser to A terminal of valveholder.

(13) Join centre terminal of 50,000-ohm potentiometer to H.T.+ terminal of Varley Niclet.

TERMINAL STRIP DETAILS



3/16" Ebonite

The terminal strip consists of a piece of ebonite 4 ins. x 1½ ins. in which six holes are drilled; four for the terminals and two for the fixing screws.

(14) Join 30,000-ohm resistor between H.T.+ and P terminals of Varley Niclet.

(15) Join P terminal of Varley Niclet to terminal (nearer bottom of panel) of .0003-mfd. fixed condenser.

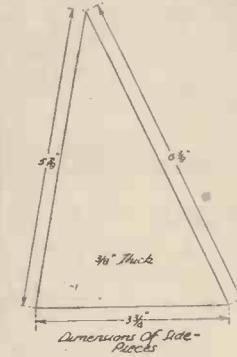
(16) Join H.F. choke between terminal (nearer bottom of panel) of .0003-mfd. fixed condenser and terminal (nearer top of panel) of .0001-mfd. fixed condenser.

(17) Join one end of rubber-covered lead of triple-plaited flex lead to G terminal of Varley Niclet, and join other end to G terminal of valveholder adaptor.

(18) Join one end of black lead of triple-plaited flex lead to F terminal (nearer top of panel) of valveholder and join other end to F terminal of adaptor.

(19) Join one end of red lead of triple-plaited flex lead to F terminal (nearer bottom of panel) of valveholder, and join other end to F+ terminal of adaptor.

(20) Join one end



Both side-pieces are exactly the same and are cut to these dimensions.

of a rubber-covered flex lead to G.B.—terminal of Varley Niclet, and fit G.B.—winder plug to the other end.

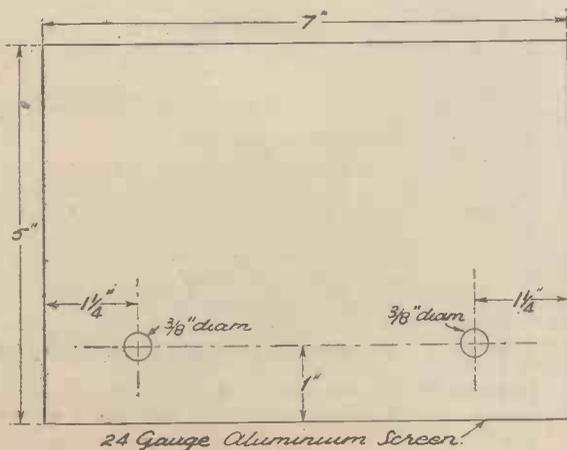
(21) Join one end of another rubber-covered flex lead to right-hand terminal of 50,000-ohm potentiometer, and fit H.T.+ winder plug to other end.

(K) Fit Side-pieces.

(22) Join free end of wire on E terminal of terminal strip to M terminal of tuning condenser.

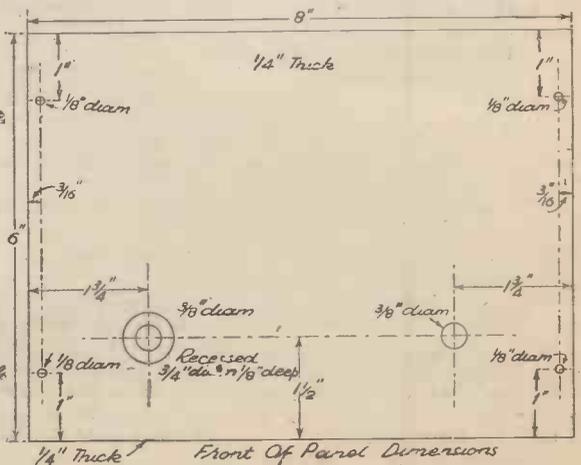
(23) Join free end of wire on A1 terminal of terminal strip to terminal (nearer top of panel) of aerial coupling condenser.

A handsome celluloid dial for the S.T. 800, similar to the card dial issued in Popular Wireless but revised up to a later date of printing, is obtainable for 2s. 6d. post free, from Celluloid Printers, Ltd., Kingston By-pass Road, Surbiton, Surrey. This is the only dial approved and checked by the designer of the S.T. 800.



24 Gauge Aluminium Screen.

On the left are the drilling details and dimensions for the aluminium screen which is half-an-inch smaller all round than the wooden panel, details of which are given on the right. Note the recessing on the panel for the reaction control fixing nut.



Front of Panel Dimensions



By H. A. Dossett

MR. JOSEPH HOBIDAY, sole representative of law and order in the village of Fuzledene, made his way slowly up the flagstoned path which led to the cottage door of Jerry Franter and eyed the closed portal much as a cat might look at a well-known but, so far, unfruitful mouse-hole.

He would have sacrificed promotion to get the better of Jerry in a battle of wits, but, as he gloomily reflected, it was doubtful if he would ever succeed. With a large fist he banged thunderously on the door until Jerry opened it.

Mr. Franter looked up at the uniformed figure and grinned.

"Morning, Joe," he said cheerfully. "Come to wish me a Merry Christmas?"

The constable snorted through his yellow moustache.

"No, I haven't because I don't!" he stated brutally. "I've just come to warn you."

Jerry's little black eyes, bright and mischievous as a jackdaw's, twinkled.

"Warn me, Joe!" he exclaimed anxiously. "What about? Is them poachers and chicken thieves loose again? If so, I must keep a close eye on my birds. I've got some valuable stock in my runs at the moment."

Considering that Jerry was the cleverest poacher and farmyard snatcher for miles around, and that the "valuable stock" consisted of two aged black hens confined behind a yard and a half of rusty wire netting, the speechless indignation of Mr. Hobiday was understandable.

"It ain't your prize poultry I'm worrying about," he retorted, with heavy sarcasm. "It's Farmer Gator's."

"Why him specially?" demanded Mr. Franter indignantly. "I've as much right to police perfection as he has!"

The pillar of the law drew a deep breath. "Now you listen to me, Jerry Franter! Every livin' soul in Fuzledene village knows you for the craftiest, cunningest rascal and thief in the place."

"Libel! That's what that is!" interrupted Jerry sharply and with great confidence. "Libel—and maybe inflammation of character! Pity there ain't no witnesses. I could have your uniform tore off your back for that! Drummed out of the police, that's what you'll be!"

The round, pink face of Mr. Hobiday gradually assumed a beautiful peony shade.

"If only I could catch you *once* in the act, Jerry Franter, something'd be tore off your back," he promised darkly. "An' now you listen to me! Not so very long ago, Farmer Gator lost a sucking pig. You don't remember that, I suppose?"

Jerry nodded solemnly.

"I do," he answered complacently. "Rats, that's what it were. Very intelligent rats is. I reckon a gang of rats got that

when Jerry Franter and his bosom friend, Bob Amblett, joined forces one night for the foray into Farmer Gator's rickyard.

With much stealth and two large and dirty sacks, they successfully negotiated the holly hedge which bordered the farm outhouses and, bending double, padded softly in the direction of the rickyard, where they fondly imagined their Christmas dinner to be awaiting them.

Suddenly, Jerry, who was in the lead, stopped abruptly in his tracks.

"Hear anything, Bob?" he whispered hoarsely.

The reply of Mr. Amblett, who had not expected the sudden halt, and had, in consequence, run his left eye on to Jerry's elbow, was personal, but not relative.

"Don't make such a row about nothing," growled Jerry unsympathetically. "I thought I heard a dog's chain rattle."

"It's your own brains," retorted the aggrieved Mr. Amblett. "They've gorn rotten and dried up like a cob-nut in its shell."

Mr. Franter ignored the thrust.

"Where's that there Rover?" he asked anxiously.

"Same place," replied his companion laconically. "Locked up in the woodshed with a bone as big and as 'ard as old Gator's 'ead."

Jerry chuckled. "How that dog do love bones! But I could 'a swore I heard a chain clink, Bob."

Mr. Amblett shifted impatiently. "You're scart of old Hobiday, that's what's the matter with you. Why don't you get a move on? Do you want them turkeys to die of old age?"

But the acute ears of Jerry had not been mistaken.

Rover, unworthy watchdog and lover of beef bones, had once again been bribed into betraying his trust, and all should have been well for the invaders. That it was not so, was due entirely to Scotty, a diminutive terrier recently acquired by Farmer Gator for ratting.

Neither Jerry nor Bob was even aware that Scotty existed until he suddenly shattered the calm of the cold peaceful night with a riot of short, staccato barks.

At the very first yap, Jerry and Bob turned like one man, and like one man

(Continued overleaf.)

When Jerry Franter, village poacher-in-chief, hit on his bright idea for getting a free Christmas dinner, he felt it was already as good as his. But he had reckoned without Fuzledene's sole representative of law and order, P.C. Hobiday

little pig. Rats is very partial to pork."

"An' I suppose it was rats that dragged a couple of geese out of his rickyard just afore Michaelmas, and swallowed 'em whole, feathers and all, eh?" the policeman demanded truculently.

Jerry screwed up his eyes and tapped his stubby chin with a dirty forefinger.

"No," he announced judiciously. "I wouldn't say it were rats had them geese. Foxes more like. Nothing foxes fancy more than a nice fat goose."

The policeman held up a fist like a bunch of twisted, well-scrubbed carrots.

"I'd like to give one of those rats or foxes a good sock on the jaw with that!" he said belligerently. "And p'raps I will before I've finished with 'em!"

"Rats is very clever, knowing animals," Jerry averred, shaking his head. "So is foxes. I doubt if you'll ever get near 'enough to 'em for that!"

"We'll see!" said P.C. Hobiday. "Anyway, you take a hint! Remember, I've warned you!"

He rearranged his helmet and, without a word of farewell, turned purposely in the narrow porch and strode with even, deliberate steps down the flagged pathway to the gate.

It was about a week before Christmas

Continuing RADIO BARRAGE

made for the hole in the holly hedge. Like one man they reached it; like one man they dived into it; and like one man, they stuck.

Old Farmer Gator flung up his bedroom window, and two seconds later flung a charge of spraying duck-shot at the dim, rustling hedge. Most of it went wide, but one stray pellet bored viciously into the seat of Mr. Amblett's corduroy trousers, and he roared almost as loudly as the farmer's old gun. Like a horse under the spur he leaped forward, taking Mr. Franter with him.

The shot from the second barrel merely ruined some very pretty holly, because the raiders were flat on their stomachs in a deep and wet ditch.

Half-an-hour later the two men faced each other across the embers of a fire in the kitchen of Jerry Franter's cottage.

Mr. Robert Amblett was sore, metaphorically and literally, and he said so in no uncertain terms. "Ow long 'as old Gator 'ad that terrier?" he wrathfully asked. "That's what I want to know."

"So do I!" Jerry mused thoughtfully. "He very nearly did for us to-night."

"Yapping little 'ound," Mr. Amblett snarled. "I'd like to wring 'is neck!"

"I'd like to wring the necks of a couple of old Gator's turkeys much better," said the disgruntled Jerry, "and what's more, I will, terrier or no terrier. I wondered why that fat pink pig of an apology for a policeman came all the way up here to warn me! He knew all about that little dog. Goading me, he was! Goading me to go out and get meself shot."

"You mean goading you, so as I could go out and get shot," corrected Mr. Amblett feelingly.

"Have it your own way, Bob," agreed

Mr. Franter. He was obviously not interested. His bright little eyes were fixed with an intense stare on the old battery radio set in the corner of the room, and he had no time for argument.

Mr. Amblett, surprised at such unexpected acquiescence, glanced at the speaker. "Goin' into a trance, or something?" he enquired, "or just listening for your brains to start rattling agen!"

"Bob," declared Mr. Franter triumphantly, "them turkeys is as good as ours!"

"I know," said Mr. Amblett. "They was last night. Nothing easier! All we've got to do, is just go an' fetch 'em. That's all; just fetch 'em!"

"Now don't you go and get peevish, Bob," soothed his companion, "just because a stray pellet hit you in the trousers. I say them turkeys is as good as ours."

Mr. Amblett nodded approvingly. "All right, if you say so, Jerry! I'll wait 'ere while you go an' get 'em. Let old Gator use the seat of your breeches for a target, 'stead of mine!"

"We got to use strategy," Jerry stated with conviction. "That there Hobiday is getting artful, and he's beginning to think. I don't like policemen who think. We got to outwit him. That's what we got to do. Outwit him!"

"Ow?" demanded the soured Bob.

Mr. Franter walked across to the ancient wireless set, and switching it on turned a knob. Immediately the room was filled with a noise like a colony of vocal cats being pursued by an express train.

"That's how," explained the proud owner. "Reaction!"

"I don't see it," Mr. Amblett objected stubbornly.

"Of course you don't," said Jerry impatiently, "but you can hear it, can't you?"

"So can all Fuzzledene, I should think!" Bob agreed grudgingly.

"Sit down, then," invited Mr. Franter, "and I'll tell you exactly what we got to do."

"You can tell me, if you like, Jerry," agreed Mr. Amblett, "but wild 'orses wouldn't make me sit down."

The night before Christmas Eve was still and frosty, with bright stars glittering in a dark velvet sky. At nine-thirty the two men emerged

Farmer Gator was a man of hasty temper and quick decisions. The last pitiful wailing had just died down to a fitful moaning, when he appeared at the bedroom window with his trusty shotgun in his hand, and murder in his heart.

from Jerry Franter's cottage, pushing a sugar-box mounted on four wheels. Within this improvised vehicle reposed the radio set. Half-way along Pondmere Road, P.-C. Hobiday, dressed in civilian clothes and hidden by the shadow of a sturdy oak, watched them go. Then he made his way carefully into the back garden of Jerry Franter's cottage and disappeared in the darkness.

All unconscious of the silent witness, who according to a well-known schedule should have been some miles away, the two conspirators proceeded to put their plan into operation.

"I think," said Mr. Franter thoughtfully, "that we ought to go to the Rectory first, then to the Hall. It'll look better afterwards."

"Wot will?" asked Bob curiously. "The 'all'?"

Jerry regarded him dispassionately.

"I know you can't help being a fool, Bob," he said, "but you needn't advertise it. That there Hobiday's bound to try and trace our movements when he finds the birds have flown, so to speak. He must write something down in his little notebook to prove that he earns his wages. Now after we've been to the Hall and the Rectory, we go over and wake up old Gator. At least, you do. Then you come back to my place when you've finished with him. Understand?"

Mr. Amblett nodded his approval.

"Right you are, Jerry. Let's get agoing."

Mr. Franter, who had spent long and lonely hours learning the secrets of his capricious battery set, installed it on the Rectory doorstep, and connected up the huge horn-type loudspeaker. In a few seconds the instrument was in full blast, and while the quality of the programme left much to be desired, there was certainly nothing to complain of on the score of volume. Half a dozen old-fashioned "waits" could not have made more noise.

The Rector beamed on them, complimented them on their adaptation of modern invention to old-world custom, and dismissed them with his blessing, two cups of coffee, some seed cake, and sixpence.

"Well," said Mr. Amblett philosophically as they pushed the home-made barrow up the hill, "a tanner's a tanner!"

"The Hall" was glad to purchase immunity from the onslaught of the raucous loudspeaker for half-a-crown and two tankards of ale, and then the two "waits" made their way to their real objective—the farmhouse of Mr. Gator.

The farmer, who was in bed and asleep, was suddenly jerked into full and palpitating wakefulness by an eldritch shriek of blood-curdling intensity, followed by a loud series of startling hoots.

He was a man of hasty temper and quick decisions. The last pitiful wailing had just died down to a fitful moaning, when he appeared at the bedroom window with the trusty shotgun in his hand, and murder in his heart.

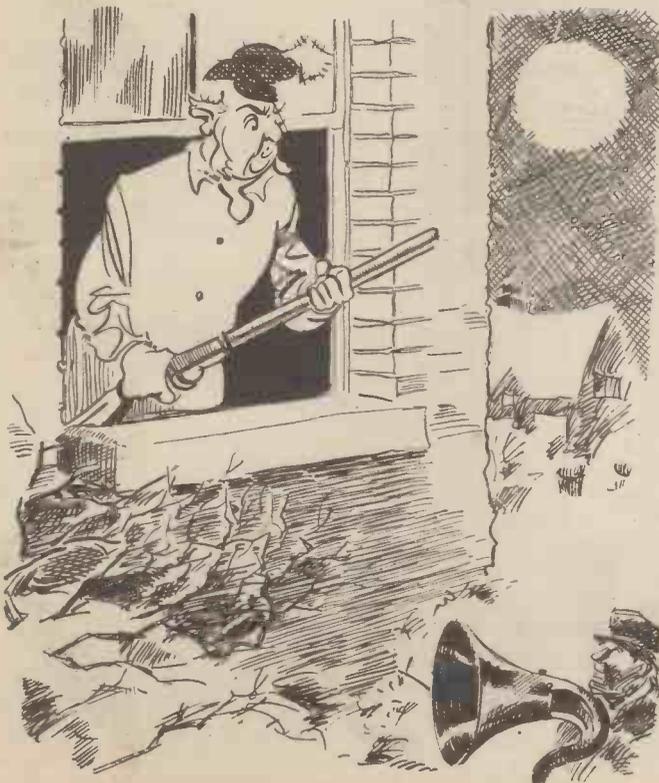
Mr. Amblett smiled up at him disarmingly.

"I'm sorry, Mr. Gator," he explained placatingly, "but something seems to have gone wrong with the works."

The farmer glared at him out of puffy, blood-suffused eyes.

"Something'll go wrong with your works

(Please turn to page 368.)



"P.W." SHORT-WAVE STATION LIST

Wavelengths and other details of many of the stations you can hear on your short-wave receiver

| Wavelength. | Station. | Call-Sign. | Power. | Wavelength. | Station. | Call-Sign. | Power. |
|-------------|-----------------------|------------|--------|-------------|-----------------------|------------|--------|
| 13-93 | Pittsburgh | W8XXK | 40 | 31-07 | Lisbon | CTIAA | 2.5 |
| 13-93 | Daventry | GSJ | 10 | 31-13 | Rome | RRO | 25 |
| 13-94 | Wayne, New Jersey | W2XE | 1 | 31-27 | Radio Nations | HBL | 20 |
| 13-97 | Daventry | GSH | 10 | 31-28 | Philadelphia, Pa. | W3XAU | 10 |
| 15-93 | Bandoeng, Java | PLE | 60 | 31-28 | Sydney | VK2ME | 20 |
| 16-86 | Daventry | GSG | 10 | 31-28 | Eindhoven | PCJ | 20 |
| 16-87 | Bound Brook | W3XAL | 35 | 31-32 | Daventry | GSC | 15 |
| 16-88 | Huizen | PHI | 23 | 31-32 | Lyndhurst, Australia | VK3LR | 1 |
| 16-89 | Zeesen | DJE | 5 | 31-32 | Buenos Aires | LRX | 5 |
| 16-89 | Wayne, New Jersey | W2XE | 1 | 31-35 | Millis, Mass. | W1XK | 10 |
| 19-52 | Budapest | HAS3 | 20 | 31-36 | Bombay | VUB | 4.5 |
| 19-57 | Schenectady | W2XAD | 18 | 31-38 | Zeesen | DJA | 5 |
| 19-60 | Daventry | GSP | 10 | 31-45 | Zeesen | DJN | 5 |
| 19-62 | Buenos Aires | LRU | 5 | 31-48 | Jeloy | LKJI | 1 |
| 19-63 | Zeesen | DJQ | 5 | 31-48 | Schenectady, New York | W2XAF | 30 |
| 19-65 | Wayne, New Jersey | W2XE | 1 | 31-55 | Melbourne, Australia | VK3ME | 1.5 |
| 19-66 | Daventry | GSJ | 10 | 31-55 | Daventry | GSB | 15 |
| 19-68 | Radio Colonial, Paris | TPA2 | 12 | 31-58 | Rio de Janeiro | PRF5 | 5 |
| 19-71 | Eindhoven | PCJ | 20 | 32-88 | Budapest | HAT4 | 5 |
| 19-72 | Pittsburgh | W8XXK | 40 | 38-48 | Radio Nations | HBP | 20 |
| 19-74 | Zeesen | DJB | 5 | 39-95 | Tokio | JVP | 20 |
| 19-76 | Daventry | GSO | 10 | 46-52 | Barranquilla | HJIABB | 1 |
| 19-82 | Daventry | GSF | 10 | 48-78 | Winnipeg | CJRO | 2 |
| 19-84 | Vatican City | HVI | 10 | 48-86 | Pittsburgh | W8XXK | 40 |
| 22-00 | Warsaw | SPW | .10 | 49-02 | Wayne, New Jersey | W2XE | 1 |
| 22-94 | Suva, Fiji Islands | VPD | — | 49-10 | Medellin, Colombia | HJ4ABE | 1 |
| 24-52 | Reykjavik | TFJ | 7.5 | 49-10 | Daventry | GSL | 15 |
| 25-00 | Moscow | RNE | 20 | 49-18 | Chicago, Ill. | W9XF | 10 |
| 25-23 | Radio Colonial, Paris | TPA3 | 12 | 49-18 | Bound Brook | W3XAL | 35 |
| 25-27 | Pittsburgh | W8XXK | 40 | 49-20 | Johannesburg | ZTJ | 5 |
| 25-29 | Daventry | GSE | 15 | 49-41 | Vienna Experimental | OER2 | 1.5 |
| 25-36 | Wayne, New Jersey | W2XE | 1 | 49-50 | Philadelphia, Pa. | W3XAU | 10 |
| 25-36 | Lisbon | CTIAA | 2 | 49-50 | Cincinnati | W8XAL | 10 |
| 25-38 | Daventry | GSN | 15 | 49-59 | Daventry | GSA | 15 |
| 25-40 | Rome | 2RO | .25 | 49-67 | Pernambuco | PRA8 | 3 |
| 25-45 | Boston, Mass. | W1XAL | 10 | 49-67 | Miami | W4XB | 2.5 |
| 25-49 | Zeesen | DJD | 5 | 49-67 | Boston, Mass. | W1XAL | 10 |
| 25-53 | Daventry | GSD | 15 | 49-83 | Zeesen | DJC | 5 |
| 25-60 | Winnipeg | CJRX | 2 | 49-85 | Bogota, Colombia | HJ3ABH | 1.6 |
| 25-60 | Radio Colonial, Paris | TPA4 | 12 | 50-00 | Mexico City | XEBT | 1 |
| 27-93 | Tokio | JVM | 20 | 50-00 | Moscow | RW59 | 20 |
| 28-01 | Tokio | JVN | 20 | 50-26 | Vatican City | HVJ | 10 |
| 29-04 | Ruyselede, Belgium | ORK | 9 | 51-28 | Maracaibo, Venezuela | YV5RMO | — |
| 29-24 | Bandoeng, Java | PMN | 3 | 51-72 | Caracas, Venezuela | YV2RC | 1 |
| 30-43 | Madrid | EAQ | 20 | 70-20 | Kharbarovsk | RV15 | 20 |



CHRISTMAS AND THE TELE-SOUNDER

What better present could you give to a constructor friend than a "Niclet"? Better still, make yourself a present of this wonderful component. Remember, it is specified exclusively for the "Tele-sounder" as it was for that record-breaker, the S.T.800.

The "Niclet" L.F. Intervalve Transformer (List-No. D.P.21) will cost you 7/6.

Varley



An Announcer's Day

You must often have wondered what sort of life a B.B.C. announcer has. Perhaps you have envisaged it as a fairly easy one, in which a few hours a day are spent pleasantly in introducing performers to the microphone, giving out press bulletins, and so on. Well, this, of course, is part of an announcer's job, but he has to do much more than that as you will see when you read this day in the life of Freddie Grisewood, the well-known London announcer, whose photograph, incidentally, appears here.

TWELVE hours a day is quite enough for any man, but at:

8.45 the alarm rings in the Grisewood household, and life begins for the day. Freddie washes, shaves and roams around in his pyjamas. After all, why not? This looks like being a slack day. He's not supposed to be on duty at Broadcasting House till 5.15, but if all goes well will have time for some tennis practice before lunch, and will turn up at Broadcasting House early in the afternoon to deal with the post. So idly he slips on a dressing-gown and has breakfast in his pyjamas—and baths afterwards! That's a fad of Grisewood's which, as a keen sportsman and an all-rounder at hockey, golf and tennis, he has never found bad for his system—but very comfortable from the domestic point of view, as it enables breakfast to be over early! But to-day, while he's still in his bath, the 'phone rings at:

The B.B.C. Calling

9.30, and Mrs. Grisewood calls from the hall, "It's the B.B.C., Freddie." Whereupon, swathed in a bath robe he emerges, picks up the receiver and enters into a friendly argument as to whether he'll turn in to the B.B.C. by midday, so that he can be at a rehearsal of a show in which he's taking part as compère. He decides that though, unofficially, there's no compulsion for him to give up his morning's freedom (and as, anyway, he won't be away from "B.H." till midnight) it would complicate the job of the producer if he's not there to read his script and have it timed. So that's that, and he gives up his morning. Bathed and dressed, you can find him around:

10.0 going through the morning papers, making plans for some carpentry he wants to do at home when there's a minute to spare, and discussing with his wife week-end holiday plans for herself and their fourteen-year-old daughter. Then, at:

10.30 he leaves for Portland Place—and smiles a cheery "Good-morning" to the old, familiar people in the Broadcasting House vestibule. The doorman has been on duty since the old Savoy Hill days, when Grisewood was a new man on the announcing staff, with a terror of the microphone.

11.50—Freddie goes through some papers in the Announcers' Room, chats with Mr. Wellington about programme times, discusses the day's programme announcing arrangements with Stuart Hibberd, and

then while on the way to the seventh floor studios meets Brian Michie in the corridors and talks over a rough outline of the remarks Freddie will make as compère in to-morrow's Variety. At:

12.0—Rehearsal starts. And like most rehearsals there's a great deal of time lost, and heel-kicking around the studio. Nothing ever goes to schedule first time. Everybody's remarks have to be cut, altered and re-timed. For years Freddie has compèred and announced shows of this kind. He always prefers to announce programmes where there's a human touch. He does announce the News, of course, with Hibberd. But he hates having to do impersonal announcements. It's well past 1.15 before the rehearsal (calculated to last twenty minutes) is over—and everybody's nerves (except

"IT'S
THE
B.B.C."



"... Enters into a friendly argument as to whether he'll turn up at the B.B.C. by mid-day..."

Freddie's) are a bit frayed, and in need of lunch to settle them! Most of the cast go along to the B.B.C. canteen, where, too, Freddie is often to be found. But to-day he's booked to lunch at a famous

West End restaurant, in the grill of which you can find celebrities of the stage, screen and radio worlds. This is a long-deferred lunch appointment with a friend in the City. At:

How Freddie Joined Up

1.30—Over a well-done steak they're chatting about the old days, when Freddie was running a big estate in Oxfordshire, and when another friend, Bob Perry, suggested that Grisewood ought to take up a more permanent job than running an estate for somebody who would probably soon die. Perry suggested that Grisewood should get a job in London. So more for fun than in any serious vein Freddie dropped a note to Peter Eckersley—though he couldn't possibly think what job he could do at the B.B.C., even if he were chosen for what was then such a rapidly-growing concern. Through lunch Freddie recalls the heart-in-the-mouth feeling he had when he went up to Savoy Hill for a test in the No. 6 studio—how he was eventually picked for the job—and how lonely he felt when he came up to London to start the job on that fatal Monday, July 28th, 1929.

Others with him in the Announcers' Room then were Hibberd (still senior announcer) and Adams, Farrar, Snagge, and many who have since found jobs in Outside Broadcasting, in variety and in jobs outside the Corporation.

Back from lunch at:

2.50 Grisewood works in the Announcers' Room for an hour on notes, on press material he has to write, and on letters which are only part of the huge postbag a B.B.C. announcer must deal with. Letters, queries, gifts, suggestions for songs in the Children's Hour, anxious enquiries about that Oxfordshire character "Old Bill," which Freddie portrays so realistically; they're only a quarter of the letters, nearly every one of which calls for a personal answer. Tea comes into the office at 3.30, but Grisewood works on without a break as he wants to have a heavy tea just before 5.0, before he goes into the Children's Hour. At:

4.15—Cecil Dixon comes on the 'phone to know what songs Freddie has decided to sing in the Hour, and will he really be able to sing, or will some urgent Empire broadcast or other compel them to fill in

(Please turn to page 364.)

WILLS'S GOLD FLAKE

CIGARETTES

specialy packed in festive
"Christmas Greetings"
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P.W. 5/12/36



AN ANNOUNCER'S DAY—Continued

the blanks with gramophone records? Choosing the songs was one of the jobs he did at home before he left in the morning, so within ten minutes the copies are brought out of the vast B.B.C. library, and Miss Dixon has time to run them over on the piano half an hour before "zero hour." Office work goes on till:

4.45, when Freddie gets away to the B.B.C. canteen, where low prices and a help-yourself service prevail. There's time for tea—and that'll be the last meal until late to-night, for from the Children's Hour onwards it's almost a non-stop evening. At:

Changing into Uniform

5.14 he's waiting in the Children's Hour studio. There's no mystery about the broadcast now. "Barbara" is back after her wedding, and the whole show goes off just as it did before the watching crowds at an exhibition, where the Children's Hour was staged. Freddie waits (an announcer has to be a patient "waiter") until he's sung his two numbers, then creeps out of the studio so that he'll have time to change into dinner jacket (B.B.C. uniform for announcers) before the 6 o'clock news. There's no time for a bath to-day, though in this section of the building there is not only a bathroom for announcers but a complete bedroom suite like a miniature bachelor flat for announcers who have to work all night. News is read at:

6.0, when Freddie handles those triple-spaced, specially typed sheets, and silently grabs at last-minute news sheets which are pushed through a window at him by the News Editor's assistants while he reads the First News bulletin. S.O.S.'s, weather bulletins, police news and all the other stocked material of the News is typed on separate sheets. Weather bulletins are sent by messenger straight from Adastral House, Kingsway. Then a few gramophone records—and a break from programme duties till 9.40. This in reality means that until:

9.10 Freddie can work in his office on the daily reports which all announcers

must keep to check up with the reception logs made out by the listening engineers. To freshen his memory he goes down to the Broadcasting House vestibule to see the huge time boards on which are marked rehearsal and programme times for every studio and every programme going on throughout the building—National, Re-

NOW FOR A SPOT OF LUNCH!



"It's well past 1.15 before the rehearsal is over and everybody's nerves (except Freddie's) are a bit frayed"

gional and Empire. "Mac"—Derek MacCulloch, the Children's Hour chief—has been working late, and for half an hour there's an informal conference of programme people, with Freddie, Mac, Michie and others discussing general ideas over

coffee in the canteen. That's how programmes are born! But all too soon, at:

9.40 Freddie goes along to compère and announce a variety programme, during which the News is read on the Regional. Freddie's dinner jacket adds tone to the party, and many of the women are in evening dress. But most of the actors and variety turns work in shirt sleeves, and there are more boiled shirts in the studio audience than in the B.B.C. folk facing the microphone!

The Old Regime

Under old programme regime Freddie had more time to himself between 6.30 and 8.0, when Regional and National were the same. But the new Late News means waiting till 11.30 for the last-minute news and the gramophone records. Freddie is not handling the records to-night, but nevertheless midnight is booming as he strides out into Portland Place, leaving the night Commissaire on duty in the vestibule to handle 'phone calls and Empire artists. And upstairs in another studio an Empire announcer is saying: "Good-morning, everybody" to a distant part of the earth.

On the way home Freddie runs through in his mind the names of his co-announcers—Lidell, Marson, Esdaile, Phillips, Maconochie, MacDermot and his own cousin Harman Grisewood. Sleepily

he tries to figure out who'll be in for the late News, who's on early duty, and so on the next day.

But he knows that the 'phone will be ringing furiously at home if by any chance he oversleeps and misses his cue!

A RADIO THRILL

The other day I was listening to the Madrid station transmitting a piano recital. It was suddenly cut short. "Excuse me, please," said the announcer in Spanish. There was a hollow rumbling and then dead silence.

A few minutes later the recital was resumed as if nothing had happened.

My opinion of the Spanish lads rose tremendously, for the next morning I read in my newspaper that the building had actually been struck by a shell.

Barcelona these days is to be found among the forty-metre amateurs. It always opens and closes with the "International" in the same way as does Moscow.

OTHER DAYS

Wandering through a market-place in East London one afternoon I came across a stall loaded with radio junk. It included a four-valve set which used to list at thirty-five [pounds]. Alas! this ancient grantee was now labelled 7s. 6d. I asked the man at the stall if it was in working order.

SOME RANDOM REFLECTIONS

By VICTOR KING.

"What d'you think, governor?" he said. "I'm asking you," I replied. "And I'm telling you it'll bring in America. Séven and a tanner with valves." I gave up the struggle and wandered on.

TWO PROGRAMMES

If you fix up an ultra short-wave set for listening to the television programmes you might care to consider this natty idea. Join the outputs of the two sets to the one output transformer and feed your speakers from this. You can now fade-from the one set and its programme to the other and vice versa. It's rather impressive, without clicks or obvious switchings, to be able to go straight over from, say, a talk on the National to the distinctive time chimes of the television programme at nine o'clock. Of course, you do this merely by operating the volume controls of the two sets. When

one set isn't required for a period you merely switch off.

I can't say you will mystify or impress your friends; it takes a lot to do that these days, doesn't it? Sometimes I feel rather annoyed when folk take it for granted that I have a television outfit and say quite casually, "What about showing us some television."

They ought to murmur in an awed whisper: "I suppose you haven't got television, have you?"

But I am bound to say practically everyone is surprised if not amazed at the clearness and brightness of the pictures.

"I suppose we would expect yours to be good," someone said t'other night.

Did I point out that any Tom, Dick, or Harry could obtain equally effective results merely by buying an outfit through their local dealer?

I did not.

We regret that pressure on our space has made it necessary to hold over Part 40 of "Learning French Through Your Radio" until next week.

**RADIOTORIAL
QUESTIONS &
ANSWERS**

By K. D. ROGERS

INCREASING RANGE

W. B. C. (York).—*I have a four-valve A.C. set with variable-mu S.G., S.G. detector, and a power output valve. I would like to convert it into a superhet if possible, or could I fit a double-diode pentode in place of the output valve? The set is a commercial one, but I want to increase its range.*

I am afraid that you cannot do much to the set in the way of increasing its range. You could add an external S.G. H.F. unit with its own power pack if you like, and the query department could give you useful hints on building one. But personally I should leave well alone and get another set when you can see your way to doing so. I am afraid you cannot very well turn the set into a superhet, and the idea of using the double-diode valve as you suggest is quite impracticable.

I regret having to be so disheartening, but the average commercial set is not easy to alter, and you would almost certainly upset the whole apple cart if you commenced to tamper with yours.

OVERLOADING AGAIN

K. G. H. (St. Albans).—*I have been troubled with distortion when tuned to my local station on a battery set that does not distort when picking up more distant ones. I cannot understand what happens, for the sound I get out of the distant stations on the loudspeaker is just as loud as that I get on the local before distortion takes place. Someone told me that the detector, or one of the H.F. valves, is overloading. Is that right? I find I cannot tune in the local fully without distortion, even if I cut down the L.F. volume control.*

You do not say whether the L.F. side of the set is going "all out" in either case, but I assume that it is even when the local is being received.

I am taking it for granted that what really happens is that before you fully load the L.F. side of the set on the local station overloading of detector or H.F. valves takes place, but that you are able to turn the L.F. volume control up on the distant stations, and you can make full use of the L.F. amplification, and that gives just as much volume as is possible with the local. Before I discuss what is happening, I may say that an aerial volume control (I gave the connections for this last week) to cut down the input from the local to your set will enable you to tune in the local fully without getting the distortion, though it will not necessarily allow you to get all the volume that you require. It certainly does seem that either the detector or the H.F. valves (or both) overload BEFORE you get enough input to overload the L.F. side.

This is easy to understand when one considers that the H.F. and detector valves have to deal with H.F. inputs, which in the case of a nearby local (yours is only a few miles away) can reach a considerable voltage.

Thus with an H.F. stage before the detector, theoretically you may get up to 220 or more volts of H.F. on the detector if you do not volume control the H.F. input. On a distant station the voltage may be only a hundredth of that.

It is very easy to overload the detector. You see, the L.F. part of the signal (which is the only part you are really interested in) may be only 50 per cent of the H.F. voltage, and it will hardly ever rise to more than 80 per cent. Thus the detector must be able to carry more H.F. than L.F., and a 1-volt L.F. input to the detector may mean a 2-volt H.F. input.

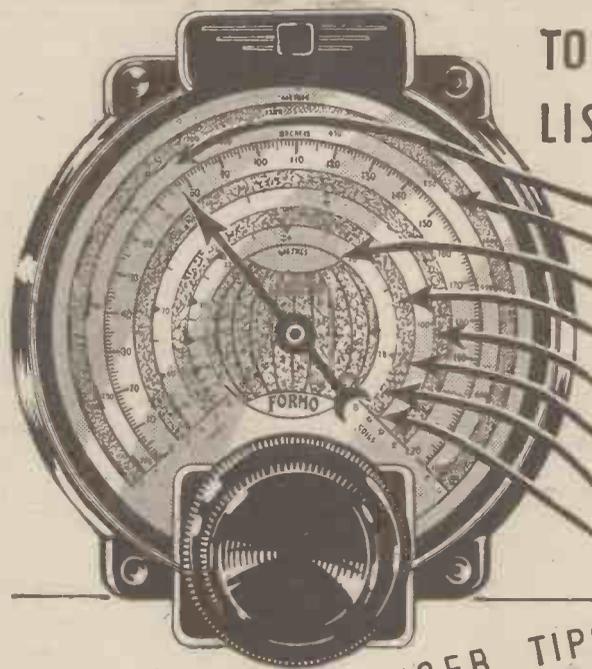
In most battery sets the detector will not stand much more than half a volt of H.F., sometimes less, without overloading. You must remember that it has a low H.T. and so the grid curve is not very long. Thus you may be able to get but a small fraction of a volt of L.F. for the detector to deal with and yet find the valve itself is overloaded.

Suppose you get half a volt of H.F. on the detector—the most it will stand. Suppose that the average level of modulation is 50 per cent. That means that you get .25-volt of L.F. on the detector. The amplification factor of the detector is usually about 30 (sometimes more, sometimes less, according to the valve used), but not all that amplification is put to full use. Only a fraction of it is actually "used," and in a resistance-coupled set with a 50,000-ohms

(Continued overleaf).

**ASTONISHING NEW
BROADCASTS NOW AVAILABLE**

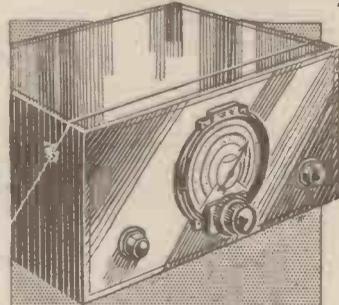
TO Every
LISTENER



- MEDIUM WAVE
- LONG WAVE
- SHORT WAVE
- TRAWLER
- AIRCRAFT
- SHIPPING
- POLICE
- AMATEUR

ALL AT YOUR FINGER TIPS ON THE...
MULTIWAVE

The amazing ALL-WAVE KIT RECEIVER
With continuous tuning from 12-2000 metres



*This amazing Kit
can be yours for less than*

14^d
PER WEEK
OR 57/6 CASH

Why be content with a receiver which is only designed to receive an infinitesimal number of the multitude of stations on the air? Imagine the interest you will find in listening not merely to broadcasts, but to vital communications between shipping, trawlers, aircraft, police and the like, to far distant amateur transmitters, and to the vast number of broadcast short-wave stations in all parts of the globe. These are the stations which the Multiwave receiver can give you, programmes of 100 per cent. interest for 24 hours of every day. Why not investigate this amazing and revolutionary design? It is not an expensive set—you can build it for less than 1s. 4d. a week. Its extremely simple construction can be undertaken by the veriest novice. It is, in short, a set which gives more stations than any yet produced, and yet at a price which defies comparison.

No. 4 "CONTACT," containing Four Star Circuits and Free 1/- Blueprint, NOW ON SALE. PRICE 1/-.

Graham-Farish Ltd., Dept. M.2. Bromley, Kent.

Dear Sirs,—Please send me:
Contact Star circuits, describing four best circuits including the Multiwave and free blueprint, price Post Free 1/-.

- I am interested in Hire Purchase.
- I am not interested in Hire Purchase.

Name

Address

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from previous page.)

resistance you may get but a matter of 10 only as a stage gain for the detector valve.

That means that the first L.F. valve gets about 2-25 volts of L.F. to deal with. If you use a fair-sized first L.F. valve it may not fully load the valve, and thus you may be faced with the position of the detector being overloaded with H.F. before the output from it will overload either the first L.F. valve or its succeeding valve.

I have mentioned some very broad figures, of course. In practice it is not always possible in a battery set to get a detector to take as much as 5-volt H.F. without overloading. Some people can give only about 100 volts H.T. APPLIED, and then they have a 25,000-ohms decoupling resistance and a 50,000 or more anode resistance in series with the anode of the valve and the H.T. That results in perhaps only about 40 volts actually "arriving" at the plate, and so the working curve of the valve is very short indeed.

In such a case it is no good whacking up the H.F. input and expecting to get stronger output. You must either keep the H.F. down and increase the L.F. amplification or you must use a greater H.T. voltage on the detector.

You may, of course, be getting overloading of one of the H.F. valves, but usually (unless a diode detector is being used) it is the detector that overloads first. Try the effect of the aerial volume control or fit a multi-mu H.F. valve and control so that you can tune in the local fully without distortion. Then try some means of getting more H.T. "on to" the detector. Increase the initial H.T. applied to it if you can. Remember that because the det. tapping on a set or on a mains unit is marked DET. and is often of lower voltage than the other taps, there is no need to keep to that voltage. You risk getting poppy reaction in some sets if you increase the H.T. on the detector, but you will not upset anything else as a rule (not if the set has been properly decoupled), and you will get a detector stage that can handle a bigger H.F. input.

In a mains set, where a big output valve is used and a large wattage output is required, the question of detector overloading sometimes reaches quite serious proportions. It is often necessary to use power grid detection in order to obtain good rectification and at the same time to have a valve that will stand a decent input—sufficient to allow fairly

low magnification stage of L.F. to be properly loaded and to give the desired power output.

As you do not tell me how many valves your set has, I cannot very well prescribe definite alterations. You may be trying to get a single power valve after the detector to give you your full output without any other L.F. amplification, but the fact that you are satisfied with the results on the distant stations leads me to believe that you have two L.F. valves, or that a pentode L.F. is being used.

Try to work backwards through the set from the output valve and see what voltage you require your detector to handle in order for the output valve to be fully loaded.

If you do not know how to do this drop me a line and tell me what valves you use, what type of couplings are employed, and the ratio of any transformer used. Then I can work back and let you know what L.F. input to the detector is necessary to load the output valve—or the first L.F. valve, if that happens to overload first.

The Editor cannot accept responsibility for manuscripts or photos. Every care will be taken to return MSS not accepted for publication. A stamped, addressed envelope must be sent with every article.

All Editorial communications should be addressed to the Editor, "Popular Wireless," Tallis House, Tallis Street, London, E.C.4.

All inquiries concerning advertising rates, etc., to be addressed to the Advertisement Offices, John Carpenter House, John Carpenter Street, London, E.C.4.

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

TELEVISION INTERFERENCE

D. T. S. (Muswell Hill).—As you can see from my address, I am pretty near the Television station at Alexandra Palace. In fact I am too close to it. I find that I get all sorts

of mixtures of television noises and sound programmes when I tune my ordinary set to London Regional, and I should like a way out of the problem. Can anything be fitted to my set to stop the interference?

An article dealing with methods of overcoming this trouble appeared on page 181 of "P.W." dated October 31st. The title of this article was "Curing Breakthrough," and in it you will find all you wish to know.

CHRISTMAS PARTY

National, December 25th.

CHARLES BREWER has, for the last three years, been responsible for the informal Party on Christmas Day. Possibly the secret of success of this irresponsible broadcast is that intimacy is the keynote. With famous artists it is possible to stretch a point and capitalise the knowledge that these artists have the power of what is called in the profession "gagging." Actually, "Christmas Party" is most carefully rehearsed, and its success is due to its spontaneity which, though sounding so unforced, is really the result of long years of training.

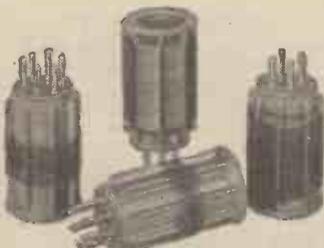
The Old Gang

It is hoped that "the old Christmas Gang" will again be present. Tommy Handley, the ace of radio comedians; Clapham and Dwyer, and the Two Leslies will again gravitate to St. George's Hall on Christmas afternoon. Charles Brewer possesses a perpetual challenge cup for musical chairs, presented by a listener in Sheffield. This will again be competed for to the running commentary of the Old Christmas Party Gang. Last year it was won by Leslie Sarony.

It Pays to Use Eddystone

Get your copy of the
**1937 EDDYSTONE
SHORT WAVE MANUAL**

From your RADIO DEALER,
W.H. SMITH, or in difficulty
POST FREE 1/-



INTERCHANGEABLE COILS

New low loss formers of DL-9 high-frequency insulation. Rigidly made and each coil matched. First-class results assured. 4-pin coils have two windings, 6-pin three windings.
No. 959 6-pin Set of 4 12-170 metres Price 16/-
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MIDGET INSULATOR
Made from Frequentite for high frequency work, with N.P. metal parts. 1" overall height.
No. 1019. Price 4½d. each

FLEXIBLE COUPLER
Free from back-lash but very flexible, this coupler banishes alignment troubles. DL9, H.F. insulation. For 2 spindles. No. 1009. Price 1/6

AIR TUNED I.F. TRANSFORMERS
Compact unit with high efficiency air trimmer and genuine litz wound coils.
Total tuning coverage 400 to 500 Kc/s.
Gives high stage gain with approximately 9 Kc/s. band-width.
No. 1014. 450 Kc/s. Price 13/6

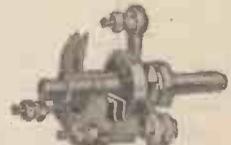


POINTER KNOB AND DIAL

A direct control comprising satin finish aluminium dial engraved 0-100% with elegant shaped bakelite pointer knob. For 2" spindles only. No. 1027. Price 1/3.

ULTRA SHORT-WAVE H.F. CHOKES

These chokes are single layer space wound on DL-9 formers, and have an exceedingly low self-capacity. 2½-10 metres.
No. 1011. D.C. Resistance 1.3 ohms. Price 1/3
No. 1021. D.C. Resistance 0.4 ohms. Price 1/3



IMPROVED MICRODENSER No. 900.

For ultra H.F. and general S.W. use CALIT insulation, low series resistance, noiseless movement, extended 2" spindle for ganging.
20 m.mfd., 3/9; 40 m.mfd., 4/3; 100 m.mfd., 5/-

BANDSPREAD TUNING OUTFIT Devised to simplify station selection.



TANK UNIT: Cat. No. 1042. Price 6/-



the Tank Condenser. Complete with dial.
TRIMMER UNIT: Cat. No. 1043. Price 6/6

EDDYSTONE SHORT WAVE COMPONENTS

STRATTON & CO., LTD., Bromsgrove Street, BIRMINGHAM. LONDON Service Depot: Webb's Radio Stores, 14, Soho Street, Oxford Street, W.

THE "TELE-SOUNDER"

(Continued from page 356.)

times occur on the resistance-capacity coupled receiver.

The opportunities for experiments with aerials are so great on 7 metres that I have been tempted to include two spare terminals on the Tele-sounder. These terminals are not actually connected to anything at all in the Tele-sounder. But when you have built and worked this unit you may desire to try different aerial arrangements. You will see five methods of feeding the tuned circuit in Fig. 4. In Fig. (a) a di-pole aerial arrangement is employed. In this case you do not use the A1 and E terminals on the Tele-sounder. Instead you connect the ends of a couple of turns of "bell wire" to the terminals A2 and A3, these two turns being arranged around the main tuning coil. You can experiment with the number of turns and also the position of this extra coupling coil. To the terminal A2 you can connect a length of wire 5 ft. 6 in. long, while to the terminal A3 a similar length of wire may be attached. These wires may be arranged horizontally or preferably vertically. Another arrangement is to connect the di-pole aerial outside the house and join it to the terminals A2 and A3 by means of a feeder. More will be said about these matters later, or you may read about them in other articles. Fig. 4 (b) shows the connection of a simple aerial to the terminal A1 through an aerial coupler of .00005 mfd. (a pre-set mica condenser in the Tele-sounder itself). No earth connection is shown, and you may try disconnecting the earth connection on the main set.

Schemes To Try

Fig. 4 (c) shows the normal connections to the Tele-sounder. You can take an earth connection from the terminal E on the main set to the E terminal on the Tele-sounder. In Fig. 4 (d) instead of using an earth connection you can disconnect the earth on the main set and attach a length of wire to the earth terminal of the Tele-sounder. Fig. 4 (e) shows another arrangement in which an aerial which may be the normal or a separate wire being connected to the terminal A2, while the terminal A3 is connected to earth. A turn or two of bell wire is passed round the main tuning coil and the ends of this bell wire joined to the terminals A2 and A3.

Needless to say, these experiments with a separate coil do not in any way call for alteration in the connections or construction of the Tele-sounder. The coils of bell wire will usually be just a little larger in diameter than the main tuning coil, but you can arrange for the coil or the coils of bell wire to be the same diameter, the turns actually passing between the turns of the main coil; the bell-wire of course is covered with insulation, so that it does not matter much if the turns actually touch.

A whole new field of experiment is thus opened up and as so little is known about the ultra-short waves, you will really be pioneering in a small way. Certainly your experiences will be of interest to all other users of the Tele-sounder. But I wish it to be clearly understood that the standard arrangement I have adopted will of itself give very-good results, and no experiments

on the part of constructors are actually necessary to obtain excellent entertainment from this unit.

J. S.-T.

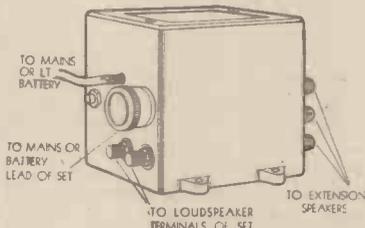
[There will be more about the "Tele-sounder" in next week's "P. W."]

"CABARET CARTOONS"

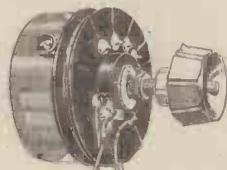
"CABARET CARTOONS" is the title of a television show on December 7th, which will develop an ingenious idea of Cecil Madden, the producer. The cartoonist will be Harry Rutherford, and his cartoons will be presented in a novel fashion. Tele-viewers will first see the names of the artists pencilled in bold characters; then, as the show proceeds, the camera will be faded over at intervals to Harry Rutherford's rapid sketches of each turn in succession. Artists on the bill will be Janet Lind, in songs and tap dancing; Levanda, foot juggler; Leona and de Leon, acrobatic dancers; and Chaz Chase, the American "silent comic."



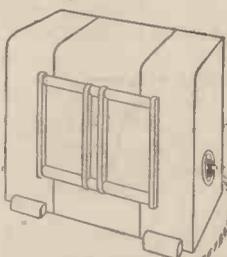
1937 Stentorian chassis, for better Christmas radio. Wider response—less colouration—greater realism. Matches any set. Prices from 23/6 upwards.



"Long Arm" remote control, for switching the set on or off from any extension point. One "Long Arm" serves any number of 1937 Stentorian extension speakers. Price 15/6.



Volume control, type R/C—for use in conjunction with the "Long Arm" and 1937 Stentorian chassis models. Price 5/6.



1937 Stentorian cabinet model. All models except the "Baby" (29/6) incorporate volume control type R/C. Prices, 29/6, 39/6, 49/6, 63/-.

A NEW CONSTRUCTOR MAGAZINE

AS we go to press with this issue of "P.W." we have received from Messrs. Graham Farish a copy of the latest edition of their popular magazine "Radio Contact and Television."

Number Four of "Radio Contact and Television" appears from a cursory examination to be bigger and better than ever, and it contains among many other interesting features full constructional details of four Star Receivers. A free shilling blueprint of one of these fine sets is also included.

A comprehensive review of this latest Graham Farish constructor magazine will appear in the next issue of "P.W." D. S.

EXTRA CHRISTMAS ENJOYMENT!

A SENSE of achievement—the thrill of enjoying (and giving your family) a brand-new extra comfort or pleasure—what else could so positively ensure an even happier "Happy Christmas" than usual?

FOR a moment, picture the real pleasure which you—in your home—can obtain from the new W.B. developments. You can have a new standard of radio reproduction, with wider frequency range and smaller "coloration" than ever possible before—or you can enjoy a novel convenience from the "Long Arm"; which (in conjunction with a 1937 Stentorian) enables you not only to listen in another room, but also to switch the set on or off without stirring from the extension-point!

THE process of fitting provides a keen interest. The results are certain—and remarkable. The cost is extremely small (and H.P. terms are available from your dealer if you wish).

MAKE up your mind that this shall be a memorable Christmas! Fit a new Stentorian, or a "Long Arm" extension point—or both. You will be glad you did!



1937 STENTORIAN

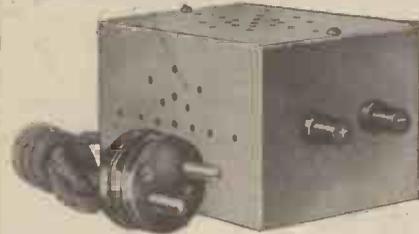
PERMANENT MAGNET MOVING-COIL SPEAKERS

TO THUMB BATTERY CHARGER!

This remarkable midget battery charger measures $3\frac{1}{2}$ " x $2\frac{1}{2}$ " x $2\frac{1}{2}$ ", incorporates a METAL RECTIFIER, and will charge a 2-volt accumulator at $\frac{1}{2}$ amp. FOR LESS THAN $\frac{1}{2}$ d. PER WEEK.

Insist on—

HEAYBERD



Complete with Mains Lead and Adaptor.
SEND NOW FOR FULL DETAILS OF THIS NEW LOW-TENSION BATTERY CHARGER.

12/6

F. C. HEAYBERD & CO., 10, Finsbury St., London, E.C.2.

ELECTRADIX BARGAINS



COIL TURN COUNTERS for checking the number of turns up to 9,999 on dial. Scaled 1/3 each.

BELL SETS. Best British Trembler, 2/- each. Porcelain super-grade Pushes, bankrupt 2/6 line for 6d. Flat Brass bell wire, 1d. per yd. Indoor bell wire, single, 100 yds. 1/6; twin, 3/-. Transformers for ringing 100-v. A.O. 1/6; 220/40 A.C. 3/9.

SPEAKER BARGAINS. Genuine bargains in high-grade moving-coil speakers by famous makers. All new and offered at less than half price. Quality reproduction of speech and music guaranteed.

MAINS ENERGISED SPEAKERS.—6in. R. & A., 2,500 ohms, with speech transformer, 7/6; Hegra, 3in. with transformer, 12/6; 8in. with transformer, 15/-. Magnavox, 6in. type, "144," 2,500 ohms, 12/6; R.K., 8in. cone, 1,000 ohms, 10/6. **A.C. MAINS SPEAKERS, WITH RECTIFIERS.** 100/250 volts, 11in. cone with transformer, 30/-; Jensen, 220-v., 7in. cone and transformer, 25/-; 100-v., ditto, 7in. cone, 20/-; 100-v. A.C., 8in. cone with transformer, 21/-.

ALL-WAVE CRYSTAL SETS for plug-in coils, 2 tuning condensers, semi-perm. detector, 7/6. **HEADPHONES.**—Sullivan, 120 ohms, 2/9. Erisson and others, 2,000 ohms, 4/6. Single high res. earpieces, 2/6.

SMALL MOTORS.—D.C. 6-v, 12/6; 50-v., 14/-; 110-v., 15/-; 220-v., 16/-. Home Cinema type, D.C. or A.C., 18/6. A.C. 250-v. induction enclosed, 1/10 h.p., 35/-. A.C. electric drills, ditto to 1in. with chuck and flex, 39/6. Universal type motors, 1/16 h.p., 35/-.

COMMUTATORS.—For dynamos, motors, interruptors and multi-switches. Engine built, 24 copper segments, mica insul., finely finished, 2/-. Worth 7/6.

ROTARY CONVERTERS AND ALTERNATORS. as new, for 110-v. or 220-v. D.C., or drive 50 to 300 watts, in silence cabinets. Also 6-v. to 150-v. sets cheap. **HOME RECORDING.** is great fun, and cheap. Record your voice with any gram. on the MIVoice Acoustic Recorders. De Luxe model in presentation carton. Two-guinea model, 18/6. Speakeasie guinea set, 10/6. Junior ditto, 5/6. Spare blank records, 4/- doz.

MICROPHONES.—We are makers and carry the largest and most varied stock in London. Prices are low and these are models for all purposes.

Table Model "W.W.11." For home broadcasting. Bakelite square body on bronze base containing transformer, switch and plugs, is a marvellous production at a low price. Worth 2 guineas. Only 15/-. **Lexid No. 10B** Pedestal, 10in. high, 12/6. **Lexid Superior No. 12BB** Ring, 14in. pedestal, 18/6. **Hand mikes** in 2-in. case, No. 11 at 5/6. **Superior type, No. 11a, 7/6.** Home microphone No. 11 is a solo general-purpose robust mike with solid bakelite body, back terminals, front metal grille, hand or sling design, 5/6.

COILS.—Short-wave coils, plug-in type, 1/6 each; Ribbed low-loss formers, 9d.; Long-wave 2-pin coils, 1/-; Reaction tuners, 9d.; Mains interference, H.F. twin chokes, with 1in. 1oz. iron travel, 2/6.

SPARK COILS.—4in., 4in. and 1in. gap, with condensers. Larger coils, 2in. to 7in. flaming spark, short wave spark transmitters for boat model, control, 17/-. 1,000 gifts in our latest Bargain List "I.M." free

ELECTRADIX RADIOS

218, Upper Thames Street, London, E.C.4.
Phone: Central 4611

RADIO BARRAGE

(Continued from page 360).

if you ain't out of my garden in ten seconds!" he hissed between his teeth. "What the devil are you supposed to be doing—imitating a menagerie on fire?"

"The idea was carols by radio," Mr. Amblett enlightened him mournfully, "but every time I try to tune-in like this—" His words were drowned by a fresh deluge of sound which whooped and bellowed and whistled, and paralysed the eardrums.

The deep barking of old Rover, and the short sharp yaps of Scotty from the yard at the rear, joined in the din, and a rudely awakened rooster flapped his wings and crowed cynically.

It took Mr. Amblett some little while to subdue his unruly charge, and by the time he had coaxed it into silence Mr. Gator had not only used up all the adjectives he could think of, but had shouted himself hoarse in the bargain.

Exhausted, he leaned against the window frame and pointed a finger at the garden gate. Then he pointed his gun at Mr. Amblett.

The purveyor of carols by radio took the hint.

Sorrowfully shaking his head he turned dejectedly away, pushing the now silent radio set before him.

Once well away from the farm, however, his demeanour changed. He whistled a few bars of "Hark the Herald Angels Sing," patted the big loudspeaker affectionately, and made his way briskly back to Jerry Franter's cottage.

He had barely rearranged the apparatus in its accustomed position, when Mr. Franter arrived. He slipped in through the kitchen door, and Mr. Amblett noted with satisfaction the bulging sack on his back.

"It come off then!" he exclaimed. "But I knew it would. There was enough noise agoing on to cover the movements of a cavalry regiment."

Jerry deposited the sack on the floor and wiped his forehead on a red-spotted handkerchief.

"It did, and it didn't," he replied carefully. "It was easy enough getting in, of course, and it was a nice dark night. But them turkeys had gone. I groped around, but I reckon he must have sold 'em all, or shifted 'em to some other place. 'Nary a one left."

"Then what you got there?" queried his friend, kicking the sack.

Jerry grinned.

"Well, not being able to find no turkeys, I thought that a couple of nice fowls would be the next best thing. After all, we went to a lot of trouble to get 'em! So I just grabbed a couple of birds which were in the house where the turkeys should have been, wrung their necks, and—" He waved significantly at the sack.

Bob Amblett scratched his head. "Better than nothing, I suppose," he admitted. "Let's 'ave a look at 'em!" He toppled the contents of the sack on to the red-tiled floor.

For a long moment they regarded the two dead birds, and then Jerry Franter turned to Mr. Amblett with a dazed look in his eye.

"I told you once afore, Bob, that I don't like policemen who think!" he said savagely. "And old Hobiday has been

thinking all right. We know now where he's been to-night."

For lying at their feet were the two aged black hens that earlier in the day had pecked for a meagre living behind a yard and a half of rusty wire netting in Jerry Franter's back garden.



Up-to-the-minute news concerning the radio industry

SPECIAL gauges for re-centring moving coil speakers are available from Messrs. Holiday & Hemmerdinger of Manchester.

These gauges, which are contained in a small leather pocket case, are made in four thicknesses, each set consisting of four gauges of distinctive colour. The four thicknesses are .015 in., .01 in., .0075 in., and .005 in.

To re-centre a speaker the centring screws are loosened, the four gauges of appropriate thickness inserted symmetrically in the gap, the screws tightened up and the gauges withdrawn.

The price of the set of gauges is 2s. 6d.

DEMAND FOR G.E.C. TELEVISION RECEIVERS

Although the official television programmes only started a few weeks ago it is interesting to note that already a considerable proportion of the 3,000 employees at the Coventry radio works of the G.E.C. are engaged in the development, production and sales of television receivers to meet the present demand.

Some idea of the work and material involved in the manufacture of a single television receiver will be gained from the fact that the standard 23-valve G.E.C. set contains 3,980 parts. The alternative set incorporating an 8-valve all-wave sound receiver carries a further 2,000 pieces. All these parts are made by the company itself mostly from the raw materials.

Some of the most highly qualified technicians in the world are engaged in the research and development laboratories of the G.E.C. The researchers at Wembley have their own high-definition transmitters, enabling them to experiment at all times of the day.

At the Coventry factory, which is at present outside the Alexandra Palace radius, the development and testing staff have produced their own test equipment, remarkable apparatus which even gives visual reproductions of the characteristics and efficiency of the many components, both before and after final assembly of the receiver.



RADIO ENGINEERING
Home Study Course
THE BEST MEANS TO A SECURED RADIO CAREER

WRITE for interesting FREE 12-page booklet and start TODAY on the road that MUST lead to SUCCESS. The Institute of Practical Engineering, First Avenue House, London, W.C.

TECHNICAL JOTTINGS

Items of Interest to All

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

Detector Adjustments.

I was talking recently in these Notes about the adjustment of the detector stage and what an important effect this had upon the performance of the set as a whole. One point I forgot to mention was the question of the voltage applied to the anode of the detector. If there is a resistance in the anode circuit of the detector valve, as is frequently the case, it is generally best to apply the maximum voltage which you can get from the high-tension source, whatever it may be, in order to make up for the drop in voltage in the resistance. It is obvious that, when any current is passing, the voltage applied actually to the anode of the detector will be less than the voltage applied to the remote end of the resistance, the difference depending, of course, in accordance with Ohm's Law, upon the value of the resistance and the amount of current which is passing.

FUN AND GAMES AT THE B.B.C.

By Victor King.

'Twas Christmas Day in the "Big House,"
The broadcasters were full of good cheer.
Holly around the microphones
And barrels and barrels of beer.

Amid laughter, frolic and shouting
Announcers cracked awfully "naice"
jokes,
And even the talks director
Referred to the others as "blokes."

Then in came the "Big House" Master,
And all became silent and still.
They wondered how he would greet them,
This personage so grim and chill.

However, he smiled quite kindly,
So they all took a long, long breath,
And shouted together like thunder,
"HAS ANYONE HERE SEEN 'GEF'?"

Voltage Drop.

To take a case in point, let us assume that the anode resistance is 25,000 ohms, with a current of 2 milliamps, then the difference of voltage or potential at the ends of the resistance will be 50 volts. If you want 70 volts on the anode of the detector, and a current of 2 milliamps passing, it means that you will need 70 plus 50, that is 120 volts applied to the other end of the resistance.

As regards the actual voltage to be applied to the anode of the detector, this naturally varies with different types of valves, some taking rather less than the value I mentioned.

Critical Detector Voltages.

The voltage for the detector used not to be very important—I mean the exact value of it—but some circuits nowadays are quite critical in regard to the detector voltage, and a very small change in voltage will make a big difference to the operation of the set. As everybody knows, if you increase the anode voltage you generally increase the sensitivity of the set, but this is not a good way of increasing the sensitivity and furthermore a limit is very soon put to it, because the set soon becomes

unstable. It is worth while to take a good deal of care to determine by trial the exact best value for the detector anode voltage and to check up now and again that the detector anode is actually receiving this voltage, neither more nor less.

The Question of Input.

I have indicated what happens if the detector anode voltage is too *high*, but on the other hand, if it is too *low*, the output volume will be reduced and furthermore the detector stage will be unable to handle signals of normal strength without distortion. As you increase the voltage, the stage is able to deal with a larger input, provided, as already mentioned, you do not go beyond the useful limit.

In the case of a circuit using a resistance-fed transformer you must regard the anode

resistance as being added to the value in the decoupling resistance.

Electrolytic Condenser Points.

I came across a set the other day in which an electrolytic condenser was fitted and this was connected the wrong way round; the owner of the set was of the opinion that electrolytic condensers were not all they were cracked up to be and you can easily see why. There seem to be quite a lot of people who do not realise that an electrolytic condenser is quite different in its *modus operandi* from an ordinary mica or paper condenser, or a variable air condenser. In the case of ordinary condensers there is, of course, no polarity and it doesn't matter which way round they are connected. With an

(Continued on next page.)

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TECHNICAL JOTTINGS

(Continued from previous page.)

electrolytic condenser, however, this is not the case. This kind of condenser is in reality a type of battery or cell. You know how in an ordinary primary battery, such as a wet Leclanché, or one of the units of a so-called "dry" battery, one of the greatest difficulties which had to be overcome was the "polarisation" of the cell.

The Polarisation Effect

When current passes and chemical action takes place in the cell, some of the products of the chemical reaction form themselves on one of the plates and tend to prevent further current from passing. In the case of all types of battery this polarising effect has had to be got rid of. This accounts for the relatively large amount of manganese dioxide mixture which surrounds the carbon rod in the centre of an ordinary "dry" Leclanché cell.

In the electrolytic condenser, however, this polarising effect is actually made use of and not only is no attempt made to do away with it, but everything is arranged so that the polarising effect will take place as instantaneously and as completely as possible. The result of all this is that when current tries to pass through the cell (I am calling it a cell for the moment) in one direction, it instantly causes polarisation, and shuts itself off, whilst when it tries to pass through the opposite direction it is able to do so. This latter is obviously the direction in which the cell is *not* to be connected.

Large Capacities Obtainable

When connected in the way in which the current *cannot* pass through it, it builds up this polarising layer on one of the electrodes and, as the layer is in extremely close proximity to the electrode, the electrostatic capacity between the two is very large, due solely to this very small distance between them, a distance which is almost infinitely smaller than anything we can achieve in building up mechanically a condenser of the ordinary type. This accounts for the extraordinarily large electrostatic capacities which can be obtained within quite a small compass with electrolytic condensers.

Chemical Action

However, to return to the question of polarity, you will see from the foregoing why it is so essential that the electrolytic condenser should be connected the proper way round. If it is connected the wrong way round, not only will it not act as a condenser, but it will allow D.C. current to pass and the chemical action which takes

place will damage the condenser. Make certain, therefore, when using one of these condensers that it is connected the right way.

Tuning Scales

What great improvements have been made in the tuning scale and, in fact, the dial or face of receivers generally during the past two or three years. It was not so long ago that the front of the receiver was a confused litter of odd valves, rheostats, knobs and switches. It wasn't very long before it dawned on somebody that the proper place for the valves was inside the set and not outside, and soon after that a general cleaning-up of the front of the receiver took place and as many components as possible were put away where they were

TEN LITTLE ANNOUNCERS

By Victor King

Ten little announcers
All in a line,
One dropped two aitches,
Then there were nine.

Nine little announcers.
One couldn't wait,
He switched off a symphony,
Then there were eight.

Eight little announcers,
Dressed fit for heaven,
But one used a made-up tie;
Then there were seven.

Seven little announcers
Went to the "ficks,"
One obeyed Mae West's request;
Then there were six.

Six little announcers,
Very much alive,
One dropped a betting slip,
Then there were five.

Five little announcers
On the ground floor,
One said "Lift? I hate uplift!"
Then there were four.

Four little announcers
Down by the sea,
One got caught by a very long wave,
Then there were three.

Three little announcers
Started to chew,
One parked some gum on "mike,"
Then there were two.

Two little announcers,
Bubbling with fun,
Put some really swift stuff over,
And, of course, they both got the sack.

out of sight and where also they were much more likely to do their job efficiently. Then came the craze for the minimum number of controls, even down to the mythical "one-knob-control" set. After a bit the swing was the other way, as it was found practically impossible to reduce the set to one-knob control if you wanted to get any comprehensive performance out of it.

(Continued on next page.)



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TECHNICAL JOTTINGS

(Continued from previous page.)

Cleaning Up the Controls.

Arising out of all this, over a period of a few years, there is no doubt that the present-day receiver has been very thoroughly "cleaned up" as regards the appearance and layout of the dial and controls. In my opinion it is not desirable that all the controls should be put inside the set, I mean all except the on-off switch and tuning, even if it were practicable, because I think you get so much better operation if you have control, on the front of the receiver, of the principal factors, in addition to those just mentioned, for example the volume control, reaction, tuning, selectivity and so on. I suppose there are plenty of people who would like a set which just switches on as simply and as easily as the electric light, but it would seem to be quite impossible to avoid some kind of tuning on the front of the set, otherwise how are you going to select different stations? Then, again, I think everybody wants to vary the loudness of the set at different times. Again you *must* have the on-off switch somewhere handy and, as well as all this, you will want various stations where the reaction control has to be adjusted and where selectivity becomes important.

"Press the Button."

So you see right away you depart from the simple press-the-button business and I don't see how you are ever going to get over it. Furthermore, the interest of the set would be much less if there were nothing more to do than just switch it on and off. It seems to me that we have by now pretty well reached the happy mean between the clutter of controls, some of which need not be at the front of the set, and the opposite extreme of so-called one-knob control. Visual tuning indicators incidentally have greatly helped in accurate tuning and this type of indicator seems to meet a long felt want.

Short-Wave Adjustments.

When using a short-wave receiver of the single-stage-tuned - H.F. - detector - reaction type it is a great help if you are able to adjust the response of the receiver when loud signals are being received without having to adjust the reaction control. In order to achieve this desirable end what you want is a suitable volume control, preferably in the aerial circuit, at any rate somewhere in the high-frequency region. When the reaction is eased off, the set is rather apt to lose selectivity, unless you have some kind of control of the type referred to above, and you will probably find yourself getting two or more stations crowding in on top of one another.

H.F. Control.

A very simple arrangement is to use a potentiometer for the purpose of the high-frequency control as mentioned above, the end terminals of the resistance element being connected to the primary of the aerial plug-in coil, whilst the tap or slider is joined to the aerial, and one end of the primary to earth. The actual resistance value of the element of the potentiometer is not very important, but a value of about 1,000 to 2,000 ohms is usually suitable.

(Continued overleaf.)

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TECHNICAL JOTTINGS

(Continued from previous page.)

Isolating Condensers in Mains Sets

In using a mains-operated set or mains-operated amplifier, whether this is connected directly to the mains or derives its current from a mains unit, it is a good plan to put a fixed condenser into each of the leads to the loudspeaker. The purpose of this obviously is to isolate the speaker from the rest of the outfit. You might think that one condenser would be sufficient, acting after the manner of a single-pole switch. But for the same reasons that it is desirable to use a double-pole switch for completely isolating one part of a circuit from another, it is desirable also to use a condenser in each lead instead of a condenser in one lead only. With a single-pole switch you break the electric circuit, but you do not completely isolate the component, whatever it may be—for example, an electric iron—from the mains, because the other pole remains connected, and it is possible to get an electric shock from the iron to earth or to some other connection. A double-pole switch, of course, completely isolates it and there is no possibility of anything of the sort. In

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the same way with the condensers, if there is one in each lead the loudspeaker is entirely isolated from the set, so far as direct connection is concerned, but is still able to operate in a normal way through the medium of the condensers.

If you use high-tension batteries for operating the amplifier or radio set, it will then be sufficient to use a condenser in only one lead, corresponding to a single-pole switch. But where connections to the mains are involved, I strongly advise you to use a connection in each lead, just as I always advise people to use a double-pole switch wherever possible instead of a single-pole switch.

For the fixed condensers to be inserted in the leads to the loudspeaker a value of 2 microfarads each or more is desirable.

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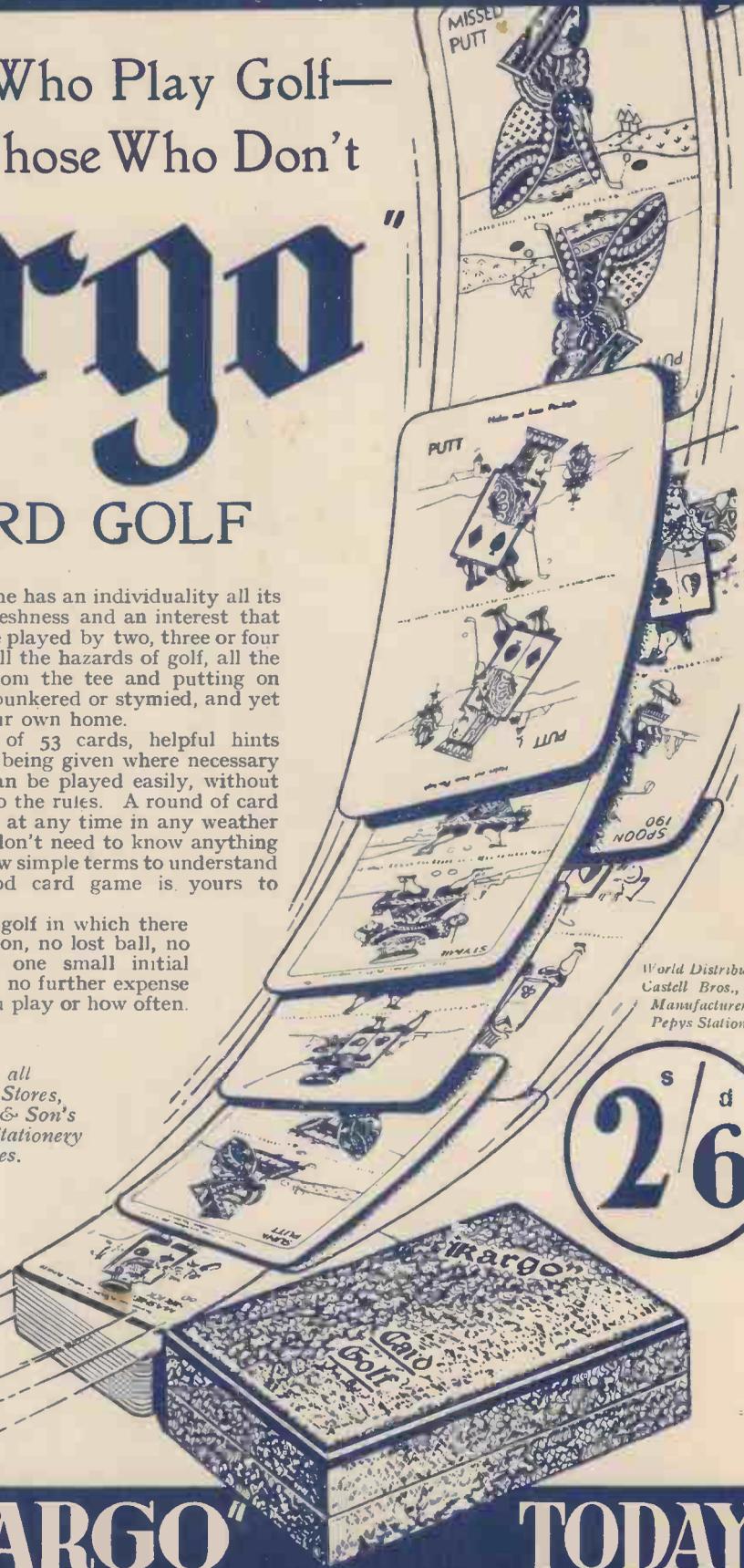
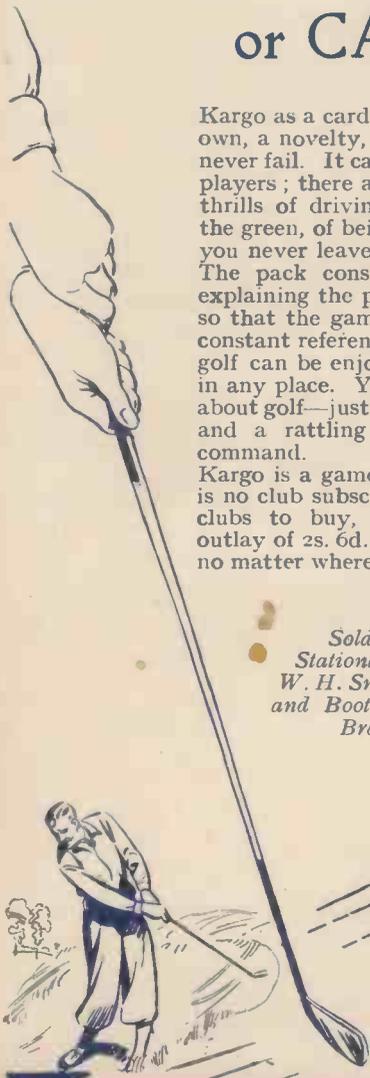
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Vol. XXX.
Dec. 12th, 1936.

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TUNING DEVELOPMENTS By **CARDEN SHEILS**

**OPERATING THE
"TELE-SOUNDER"**

And details for making the
Coil and Choke

By **JOHN SCOTT-TAGGART**

**HOW TO CONSTRUCT A NEON
LAMP TESTER**



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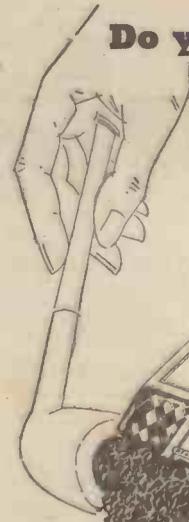
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POPULAR WIRELESS AND TELEVISION TIMES

EDITOR: G. V. Dowding

Asst. Editors: A. Johnson Randall, A. S. Clark

STATION NOTES

A NEW ONE FOR THE OUTPOSTS

RADIO NOTES & NEWS

HONOLULU HUM RECORDING ANGEL? HE LOOKED IN

Emerald Isle to Wait Awhile

ALL the talk of a short-wave station for the Irish Free State appears to have been so much boloney.

The new Minister for Posts and Telegraphs is sympathetic, but the first cost of a station would be in the neighbourhood of £50,000, and then there's the maintenance. After the station had been erected it would cost another £15,000 a year to "Keep the little divil dancin'," so the project is postponed for the present.

Dictionarical Eccentriccability

IT is a long time since we had a smile together over the gallant attempts of the foreigner to master the English language. (I say "gallant" advisedly, for some of these fellows do far better in our language than we should in theirs.)

The following letter was received not long ago by Ferranti's:

"Sir, I take the freedom to ask you if you will be so kind to send me a quite complete documentation of your alimention transformers suitable to strong and quite powerful receptors and also microphonical amplifiers reaching 20 warbled watts with their price. Thanks befor, My very respectful salutations—"

"Microphonical amplifiers" is good; but to anyone who listens ambitiously "warbled watts" is perfect.

Station Information

WILNO, Poland, on 559.7 metres, should be using his new 50-kilo-watter instead of the old 16-kw. set by the time these words appear in print.

* * *

Prague, on 470.2 metres, has been whispering on a 5-kw. set during alterations to plant, but expects to be in full voice again after only a short period.

Singapore hopes to get its medium wave station going by Christmas or the New Year. (Even if "Mad dogs of Englishmen go out in the midday sun" to fix it!)

* * *

Warsaw No. 2 is a station hoping to quadruple its power by Christmas. This will bring it to 8 kw.; the new Lwow transmitter on 50 kw. (377.4 metres) is proving a regular (L)wow!

tial election; but when that party received a mere 650,000 votes the public murmured "Oh Yeah?"

Sadly, Father Coughlin withdrew from his radio pedestal. Smilingly, Franklin D. Roosevelt switched on his set at the White House, and noticed that hole in the air. Like Little Audrey, he luffed, and he luffed, and he luffed!

Here's a New One

WHEN the P.O. sleuth suddenly pokes an interrogative nose round the door and demands to see the wireless licence of the negligent householder, that worthy often manages to find—instead of the licence—a more or less novel excuse.

Few delinquents, however, can put up such a good one as the Newcastle Emlyn, Carmarthenshire, gentleman whose case came before the Whitland magistrate.

In a letter to the court the defendant said that he had only recently returned to this country from Canada, where he had lived for the past seventeen years. In Canada, he said, once you have got the set and the licence you need not bother to renew the licence every year. He did not know that there was a different law in this country; but he had to pay 10s. for his enlightenment.

BEAUTY LISTENS-IN



This charming young lady is obviously enjoying the programme from the Corsor all-wave set. It is a four-channel six-valve superhet, and costs fifteen guineas.

A Hole in the Air

WHEN a favourite radio star ceases to broadcast in the U.S.A. they picturesquely refer to his absence as a hole in the air.

The famous American broadcaster, Father Coughlin, "Radio Priest," who was supposed to be able to sway the votes of millions of electors, has fallen right into such a hole, and it looks impossible for him to get out.

The good Father had announced that his radio audience would poll at least 9,000,000 votes for the Union Party at the Presiden-

Is Your Uncle an Eskimo?

IF your auntie ran away and married an Eskimo you will be interested to know that the Canadian Broadcasting Corporation in the kindness of their hearts will try to convey to her your Christmas greetings or other message, free of all charge. The worthy Corporation, knowing that the Eskimos, Mounties, trappers and other furry denizens of the Frozen North tune in nightly to their radio programmes, have arranged a "Northern Messenger" service at stated times, to which exiles are invited to listen.

(Continued overleaf.)

NEXT WEEK: THE A.C. A.P. THREE

FOR ORDINARY AND TELEVISION PROGRAMMES.

A LIBRARY WHICH CONTAINS 60,000 RECORDS

Relatives and friends are invited to send short messages, with particulars of address and so forth, to the Canadian Broadcasting Corporation, Ottawa. All being well the message will then go out on the next "Northern Messenger" programme. Won't auntie be pleased?

Hum in Honolulu

ONE of the Honolulu stations has been having trouble from hum. Not the nice, polite, electrical, 50-cycle type of hum either. But the good old-fashioned,



nose-assailing, perfume-demanding, skunk-like, nasal HUM, or stinko!

Engineers, holding their noses tightly, investigated in desperation, and what do you think they found? No, sir,

not dead cats, but dead lizards, which had been crawling into the transmitting coils, attracted by the warmth or something, and then had fallen victims to high voltage.

Asked how big they were, one technician said that the biggest was only about two inches. "But," he was careful to add, "you know how it is with lizards, one inch smells like one whale!"

Sidelights on Siege

FOR those who want to know the day-to-day truth about Madrid the possession of a short-wave set has proved essential. You will have noticed how the B.B.C. announcements have referred again and again to last-minute news received by wireless, and many readers have told me how they have been fascinated by sidelights of the siege.

One curious instance was quoted by the "Spectator." It was a broadcast to the effect that "Comrade Blank has lost his wallet containing 45 pesetas. Will anyone finding it return it (to such and such an address), as this amount represents the whole of this brave comrade's capital."

Apart from this, said the writer, the whole thing was a little like listening in to a murder.

Culture and Agriculture

A FEW years ago the farm-hand was a corduroy-wearing chaw-bacon, whose conversation was almost unintelligible—"E knows what she be arter, 'e dew," and the like.



Nowadays, however, rubber-tyred farm tractors are being equipped with wireless sets, and "The Farmer's Boy" has given way to "Yippy-I-Oh-Ky-Ay"—and other snappy urban melodies.

An Agricultural Engineering official of Washington has declared a policy of taking the drudgery and dullness out of farming, and in the U.S.A. radio entertainment in

the fields is being experimented with on a big scale. The rumour that powerful scent-sprays are to be fitted on machines for muck-spreadin' is so far without confirmation.

This'll Make You Whistle

THE Radio, Physical and Television Society must have had a great time at the recent lecture by Dr. C. G. Lemon, for that arch tickler of the audience's palate produced cathode-ray apparatus, oscillographs and what not that danced living patterns before the members. Pure sine waves from frequency records were demonstrated, and then the boys were invited to whistle into the mike and see the waveform which resulted.

Various vowels were sung, and "a good

HENRY HALL'S CHRISTMAS PROGRAMMES

The period around Christmas is always exceptionally busy for Henry Hall and the B.B.C. Dance Orchestra. Arrangements for this year are as follow:

They will be on the air on Tuesday, December 22nd, and Wednesday, December 23rd, from 7.20 to 8.0, and 5.15 to 6.0 respectively. On Christmas Day itself from 12.30 to 1.15 there will be a session of seasonably cheerful music, while from 9.20 to 11.0 on the same evening "Henry Hall's Christmas Tree" will be decorated with Turner Layton, Oliver Wakefield, and Haver and Lee.

This special programme will take place in Studio 4 at Maids Vale, and it is intended to set up in the studio an actual Christmas Tree decked with the hundreds of cards, calendars and other "seasonable greetings" which every year listeners send to the Dance Orchestra. The decorations on the metaphorical Christmas Tree are, of course, all well-tried and not-found-wanting broadcasters. "Turner Layton who, with his single vaudeville act, "My Piano and I," has found favour with audiences, and listeners all over the country, last broadcast on September 5th. Oliver Wakefield, whose running commentaries on dance tunes have set up a high standard in presentation, is expected to intersperse a special Yuletide flavour into his witty remarks.

On Boxing Day the Orchestra gives a late afternoon programme from 5.15 to 6.0, and a review of the dance hits of 1936 from 8.30 to 9.20. Christmas Eve and Monday of the same week will be devoted to necessarily intensive rehearsals. On December 30th the Orchestra will play from 5.15 to 6.0, and on New Year's Eve from 10.25 to 11.30 listeners will be invited to "Roll up the Carpet and Dance."

time was had by all." Any "P.W." reader hankering after this kind of uplift and joy should write to the Acting Hon. Sec., Mr. W. R. Walker, 48, Fitzjames Avenue, London, W.14.

Two More Centurions for Europe

WHEN the 100-kilowatt station first sailed into our ken I was so pleased with the three figures that I styled such stations "centurions." There have been many of them in the past few years, and now I see that we are to have two more.

One of them is under contemplation in Tunis, the first cost to be borne by the French Government and the upkeep by the Tunisians. The other 100-kilowatt is for Sweden, in the vicinity of Horby, where there is at present a ten-kilowatt.

By the way, smarties who itch to point out that Tunis is in Africa, not Europe, can save their sarcastic comments, because by universal consent the European telegraphic, telephonic and radio sphere has been extended to bring in the North African communications.

Recording Angel?

KINDLY remove your gloves for a moment and join with me in a genteel clap of the hand for Mr. Adams of the B.B.C.

"Never heard tell of him," ses you. "Shame on 'e," ses I.

Mr. Adams is the custodian of the B.B.C.'s gramophone record library—and it is a record library, for it has about 60,000 records on the racks. All kinds—song, dance, symphony, chamber, operatic, vocal, home, foreign, funny, near-funny and plain miserable.

Mr. Adams has to time every record's playing to the split second, file it where it can be grabbed in a hurry, and index it for all programmes in which it may be wanted.

He calculates that if he gave an A to Z recital of all his records he would take about twenty weeks. But he likes the work. Never gets into a groove!



More Power for the Vatican

IT has recently been disclosed that the success of the Vatican broadcasting service has encouraged the authorities there to plan another and more powerful transmitter. Instead of using a mere ten kilowatts, as at present, the new equipment will use fifty kilowatts, and will cater for the audiences in distant lands such as Australia and Japan in the east and South America and Pacific settlements in the west.

The Pope himself is greatly interested in the Vatican radio service, and when completed his new installation will be one of the most efficiently equipped short-wavers in the world.

He Just Looked In

ONE of my cheery correspondents in Malaya wants to know if I have heard this one?

During an evening broadcast from a station on the outskirts of Kuala Lumpur the doors and windows of the building stood open on account of the heat. The solitary announcer, about to read the news, was appalled to notice that the Malay attendant,



contrary to all rules, was going to butt in and say something. Sternly pointing to the SILENCE notice, the announcer glared at the would-be interrupter, and calmly carried on with his duties.

At the first break in the programme, however, he seized the opportunity of a switched-off mike to reprimand the dusky helper and ask him what he meant.

"Sir," explained the dusky, "I only wanted to tell you that a big tiger looked at your head through that window behind you. For the moment, sir, I thought he was coming in!"

ARIEL

OPERATING THE "TELE-SOUNDER"

HOW YOU CAN TUNE-IN TO THE TELEVISION SOUND PROGRAMMES AND
THUS OBTAIN A NEW SOURCE OF ENTERTAINMENT

BY JOHN SCOTT-TAGGART



WHEN I am asked to write on "how to operate the Tele-sounder" I can only reply that there is nothing to write about. Having connected the H.T.+ lead to its appropriate socket and the bias lead to the grid-bias battery, you have little to do. Pull out the first L.F. (i.e. next to the last) valve of the set, put the adaptor-valveholder in the empty valveholder and replace the valve in the sockets of the adaptor-valveholder; then take out the detector valve of the set and insert it in the valveholder of the Tele-sounder. Take the aerial off the set and connect it to terminal A1 on the Tele-sounder. The earth of the Tele-sounder may be connected to the earth, but this is not usually necessary.

You are now ready to tune-in to the television sound programmes. It will be an exciting moment. For the first time probably you will be down on a wavelength of extreme shortness. No longer do you picture great reflecting layers in the sky perhaps sixty miles up which assist in long distance reception. Now the lofty aerial of Alexandra Palace situated on high ground will be shining its waves like a searchlight into your house.

Easily Picked-up

This is an oddly exciting thought. You do not even need to hang out an aerial to "catch" the waves. They will come right into the room unless you are particularly badly shielded. The waves can almost be "handled." The aerials to pick them up can be diminutive. Certainly a dipole aerial which is specially suitable is a very simple affair—two vertical lengths of wire 5 ft. 6 in. long each. But never mind the aerial just now. Your usual one will do. In fact, you are sure to get some results even without an aerial—so even the worst is likely to be quite good.

That detector valve, i.e. the Tele-sounder's own valve, is the only one I have doubts about. If you use a Mazda L2 you will be quite all right. This is the detector valve of the S.T.800 set, so S.T.800 owners will in no case require to buy a new valve. But here again I advise you to try your own detector valve. Several types will no doubt work but others will not oscillate down to 7 metres, and unless

you can make the Tele-sounder oscillate you stand a slim chance of picking up the television radiations, because the merits of reaction are essential for satisfactorily loud reception.

Reaction is varied on the Tele-sounder, not by the usual variable condenser but by a variable resistance which alters the anode voltage of the Tele-sounder valve. Increasing the H.T. voltage will increase the reaction and if you increase the H.T. on the anode enough the Tele-sounder valve will oscillate.

valve should oscillate with the reaction knob about half-way round. You choose a suitable H.T. socket to give you this effect. Of course, the wander plugs of the main set are not altered.

H.T. Adjustment and Oscillation

If you plug in the Tele-sounder's H.T.+ at too low a voltage, even with the variable resistance at zero the valve will not oscillate. Even if it oscillates with the reaction knob at one end, this is not very satisfactory. On the other hand, you might put so much

H.T. on the H.T.+ plug that the valve would not stop oscillating even with the reaction knob at zero (i.e. maximum anode resistance).

All this is just a theoretical explanation. All you need to know and do, is to plug-in the H.T.+ plug of the Tele-sounder in a suitable socket of the H.T. battery (or mains unit) so that with the reaction knob half-way round the "set" goes into oscillation. (Remember that the "set" is now a 3-valve arrangement consisting of the detector valve in the Tele-sounder and the last two valves of your main receiver.)

You can always tell when the set is oscillating by the faint "breathing" noise. If you turn the reaction knob quickly the sudden starting of oscillation will cause a click. However, I need hardly describe what every radio constructor has experienced, and clearly no one will be working the Tele-sounder unless he has some experience of working an ordinary set.

The Tuning Note

Having made the "set" oscillate you simply search until you hear the noise of the television "vision" radiation (an erratic sort of hum) or the actual sound programme a little "higher up" the tuning condenser. The first is not very exciting and you will ignore it. The "sound" programme is what we are after.

You can tune-in on the tuning note which is given for about five minutes before the advertised time of starting (at present 3 p.m. and 9 p.m.). There is no harm in oscillating to find the station but remember that you should not use this method once the programme has started. It is very

(Continued overleaf.)



Mr. Scott-Taggart with the "Tele-Sounder." Simple construction and operation are two outstanding features of this wonderful unit.

It is advisable to remember that more H.T. and therefore more reaction can be obtained in two ways. You can either reduce the anode resistance by means of the reaction knob or you can reduce the Tele-sounder H.T. tapping on the H.T. battery itself. Obviously you would not get smooth reaction by altering the H.T., say, 12 volts at a time! The variable resistance is therefore only to provide a smooth control of the H.T. on the anode of the Tele-sounder valve.

As valves and H.T. battery voltages vary, you may need to alter the socket into which the H.T.+ of the Tele-sounder goes. The

(Continued from previous page.)

inconsiderate to so do as you will produce a whistle in perhaps thousands of homes.

As a matter of fact, once you know where to find the sound programme you can make a mark on the panel and you will find it quite unnecessary to make the set oscillate to find the Alexandra Palace.

To tune-in accurately you will find it useful to control reaction with the left

THE COMPONENTS USED IN THE "TELE-SOUNDER"

TUNING CONDENSER: .000025-mfd., B.T.S. type S.T.C.425.
AERIAL COUPLER: .00005-mfd., J.B., base-board trimmer.
FIXED CONDENSERS:
 1. 0.0005-mfd., Lissen Mica.
 1. 0.001-mfd., Dubilier type 620.
 1. 0.003-mfd., Dubilier type 620.
 1. 0.5-mfd., T.C.C. tubular type 250.
VALVE HOLDER: 4-pin, Eddystone No. 949
L.F. TRANSFORMER: Varley Niclet, standard 1:3.5.
RESISTORS:
 1 1-megohm, Dubilier 1-watt.
 1 30,000-ohm, Dubilier 1-watt.
POTENTIOMETER: 50,000 ohms, Erie, less switch, but with terminals.
SPECIAL COIL (specify this unit): Colvern.
SHORT-WAVE CHOKE: B.T.S. type U.H.F.2.
2 KNOBS: Bulgin, type K.20.
VALVEHOLDER ADAPTOR: With isolated grid and tapped filament terminals, Bulgin type A.36.
TERMINALS: A.1, A.2, A.3, E., Belling-Lee type R.
WANDER PLUGS H.T.+ G.B.-: Belling-Lee Midget type No. 1019.
SCREEN: Aluminium sheet, 24 S.W.G., 7 x 5 in., Peto-Scott.
TERMINAL STRIP: 4 x 1 1/2 in., Peto-Scott.
1 PANEL: Peto-Scott.
2 SIDE PIECES: Peto-Scott.
 4 feet 18 S.W.G. tinned copper wire and 3 feet 1 m.m. insulating sleeving.

hand while gently tuning with the right hand. I say "gently" but actually there is no need for great care. The tuning condenser is very small and no slow-motion knob is needed. You tune it very much as you tuned the ordinary detector and L.F. type of set. Nothing could possibly be simpler. The reaction is—in fact, it must be—better than on an ordinary set, so that you will delight in its smoothness and freedom from change of tuning.

The only point which calls for comment is the one I mention, namely trying different H.T.+ tapings for the Tele-sounder's own H.T.+ plug.

Note These Points

A few warnings may not be out of place. Do not, as you value your money, alter a single wire or position. On 7 metres you can get queer effects. Do not alter the way the wires run or think that this wire can go to this terminal just as well as to that one since both are joined together. It cannot. On low-frequency circuits you can

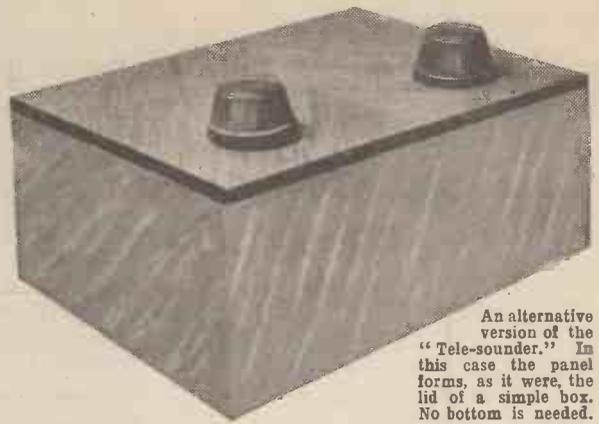
do this usually without ill-effect. You can, in fact, work from a circuit. On 7 metres you cannot safely work from a circuit. I have provided a "practical-theoretical" circuit for the Tele-sounder so that you can see the actual terminal connections. If these are altered, even though the theoretical circuit remains apparently the same, you may get odd coupling effects which may cause instability, bad reaction or threshold howl. Even an inch of wire at these very high frequencies can alter the whole operation.

If then you want to play ducks and drakes with my design to improve on it, to use different gauge wire, to avoid that soldering joint on the main coil, or otherwise ruin the unit I ask you to abandon all ideas of building it. You'll only blame me or the manufacturers if you do not get good results. You will prove a very poor advertisement for the design and we would all prefer you did not attempt it.

But if you keep to the design you are assured of success. By the way, do not place the unit on a metal tray or very close to metal objects. I once knew a man who worked a set on a zinc scrubbing board; the effect on the coils was disastrous, and naturally on 7 metres the effect is still worse. Also, don't point the speaker directly at the Tele-sounder valve or you may get a microphonous "ring."

But do not imagine that these very short waves are terribly tricky to tune. The Tele-sounder is very much easier to work than any short-wave set. The reason is partly because we are only concerned with the reception of one wavelength. This vastly simplifies matters. Naturally it is easier to work than any ordinary broadcast receiver because there are only two knobs—tuning and reaction.

I should very much like to hear from all



An alternative version of the "Tele-sounder." In this case the panel forms, as it were, the lid of a simple box. No bottom is needed.

constructors who build this unit. You should say what your aerial is like and the position of it, e.g. in the room, on the roof, etc. By telling other readers you will be adding to the sum total of knowledge on waves about which little is yet known.

NEXT WEEK we shall publish a FULL-SIZE WIRING PRINT of the "TELE-SOUNDER."

All those intending to build this remarkable unit should make a point of securing a copy of this valuable aid to construction.

In Next Week's "POPULAR WIRELESS and TELEVISION TIMES," on Sale Wednesday, December 16th

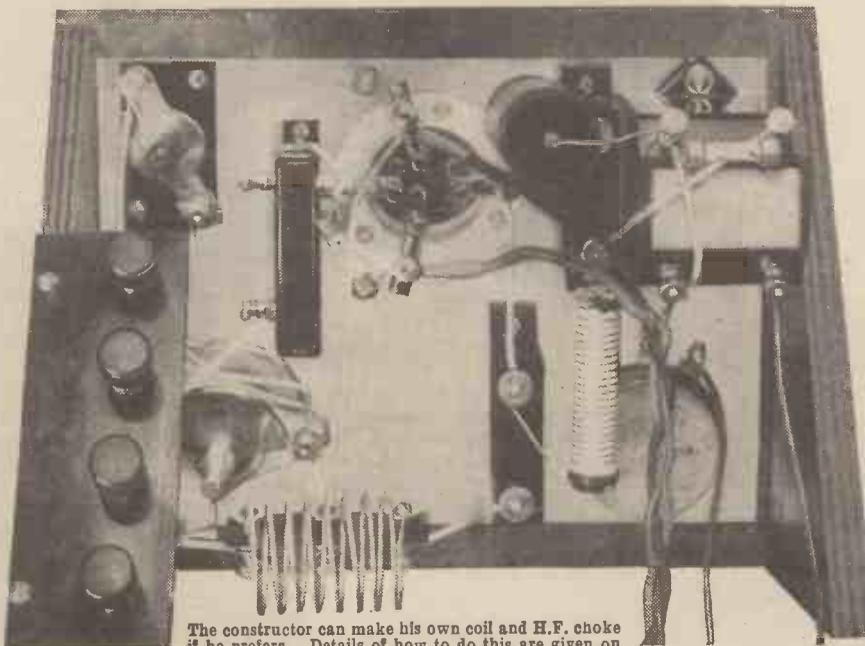
The service area for Alexandra Palace is declared to be 25 miles, so if you live beyond that distance you may set up records. Probably all the usual laws will be found to be broken by these waves.

Needless to say, the Tele-sounder is so simple that I cannot conceive of anything going wrong. There should be a 100 per cent. of successes. But do keep to the design, tighten all your terminals, and make sure the valve is one that will oscillate down to these short wavelengths.

You will get a great deal of fun out of this very successful unit and you will get real B.B.C. entertainment of the very highest grade—entertainment that you can only get if you own a television set of the £100 class. You will be "years ahead" of your neighbours even if they have all-wave sets. While if you are also owner of an S.T.800 you will certainly be in clover with everything the ether has to offer.

J. S-T.

FOLLOW THE DESIGN CAREFULLY



The constructor can make his own coil and H.F. choke if he prefers. Details of how to do this are given on the next page. An important point to remember when building the unit is to follow the design with the utmost care.

How to make

THE COIL AND CHOKE FOR THE "TELE-SOUNDER"

By John Scott-Taggart

THE ultra-short waves are likely to revive interest in coil-making. There are so few turns it is very simple to "roll your own."

For the main coil of the Tele-sounder you require to start with about 30 inches of 16 S.W.G. bare tinned copper wire. You also require to make an ebonite strip 2 in. by $\frac{3}{16}$ in. by $\frac{3}{16}$ in. The additional "material" consists of three $\frac{3}{4}$ in. 6 B.A. round head brass screws, three 6 B.A. brass nuts, and three 6 B.A. terminal heads. These last may be taken from old components, otherwise ordinary nuts may be used.

Winding the Coil

The "former" for shaping the coil is the 0.5 mfd. T.C.C. tubular condenser—which, if the manufacturers do not mind my saying so, is why this component was chosen! The finished coil will then have a mean diameter of one inch.

Using this "former," wind on nine complete turns *tightly* with adjacent turns touching. Do not leave any gaps between turns. Although the completed coil has

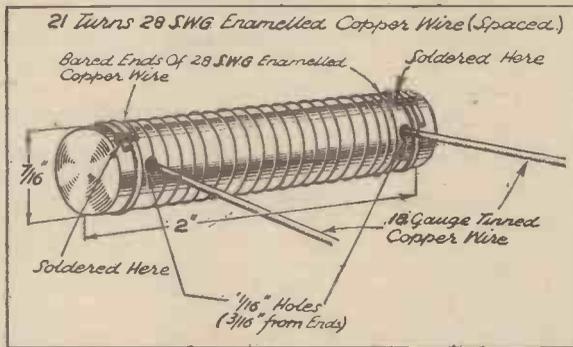
is soldered to the coil at the end of the fourth turn (see diagram).

This completes the coil itself. The dimensions of the ebonite strip are given in the diagram. The holes in the strip are $\frac{1}{16}$ in. in diameter. The method of mounting the coil on the strip is shown on a separate diagram.

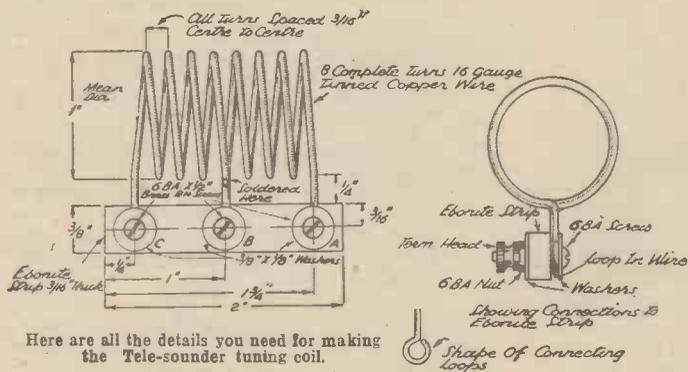
The H.F. Choke

Now let us consider how the H.F. choke may be made if it is not bought ready-made. The materials required are: 2 in. of hardwood dowel rod $\frac{7}{16}$ in. diameter; about 3 ft. 28 S.W.G. enamelled copper wire; a few inches of 18 S.W.G. tinned copper wire.

Drill a $\frac{1}{16}$ in. hole at each end of the rod. These holes are $\frac{3}{16}$ in. from their respective ends. Bare one end of the 28 S.W.G. enamelled wire for about 1 in. Pass it through the hole in one end of the rod so that the bared inch length projects on the other side. Take a piece of 18 S.W.G. tinned copper wire about 5 in. long and pass one end through the same hole in the rod so that it projects about 2 in. Bend this projection round the rod. Now solder the rod. Now solder the bared 28 S.W.G. wire and the tinned copper wire together as shown in the sketch.



The H.F. choke is quite simple in construction, as you will see from this diagram.



Here are all the details you need for making the Tele-sounder tuning coil.

only eight turns, when the coil is released from the former the turns spring out to a slightly larger diameter. The excess over the eight turns is used for making the connecting loops at the ends of the coil.

Having wound on the nine turns, release the coil from the "former" and stretch out the windings like a concertina until the turns are $\frac{3}{16}$ in. apart, i.e. from the centre of one wire to the centre of the next one to it. This requires a certain amount of coaxing with the fingers to get correct and even spacing but it is quite easy to do."

Centre Tap Connection

The ends of the coil are bent down at right angles and parallel to each other (see diagram), so that there are exactly eight turns between the bends. The length of wire projecting beyond the bends is $\frac{3}{4}$ in. These projections are looped (by means of round-nosed pliers) as shown in the diagram.

A piece of what is left of the 16 S.W.G. wire is used for the centre tap connection.

This wire is 1 in. long and is looped at one end in the same way as the ends of the coil. The other end is bent over at right angles $\frac{1}{2}$ in. from the end. This bent-over portion

Now wind 21 turns of the 28 S.W.G. enamelled wire on the rod, spacing it evenly between the two holes in the ends of the rod. The spacing is actually about $\frac{5}{64}$ in. The end of the winding is finished off in the same manner as the other end.

EVERYTHING WAS BRIGHT AGAIN

By W. NIMMONS.

IHAD just returned home after an exhausting day on my rounds as a set repairer. Sets had been unusually stubborn, and my temper, always somewhat short, was as brittle as a latchkey after sonny has "hardened" it by subjecting it to the baptism of fire and water.

The home set—a quality affair designed for local station listening only—was working smoothly as I hung up my hat and coat in the hall. I had just washed my hands, and was sitting down to a good tea when the set gave a splutter and a fizzle and then went silent.

"That's a job for you," said one of the family.

"I'm hanged——" I began. After all, you can't expect a man who has spent

NOTHING DIFFICULT HERE

the previous ten hours struggling with the innards of sets to devote his evening to the same pastime, can you?

I went on with my tea, ignoring the set, which was as dead as a doornail. A feeling of deep gloom had taken possession of me. I remembered that a rich uncle had promised to come over and hear the "posh" outfit, and it was quite on the cards that to-night would be the night—due to the general cussedness of things.

"Do hurry up and get it fixed," sister Ethel was saying, as I buttered a round of toast.

Young William volunteered to set it right, but his optimism was suppressed by his mother. I felt half inclined to let him try his hand; in fact, I was wishing all broken-down sets at the bottom of the sea.

I finished my tea and lit a cigarette. The room was miraculously empty, and I sauntered across to the set. As I did so there came a jangling sound, which gradually increased in volume and then righted itself into a cinema organ in full cry. Jolly stuff it was, too. I sat down.

The sound attracted the other members of the household.

"Hallo! Got it fixed already?" said sister Ethel.

I expanded considerably. Everything was bright again. With two eggs inside me I could afford to be genial.

"It's easy when you know how," I said; while William looked on enviously.

The music stopped. In blissful ignorance of what was coming, I beamed on them all.

"We regret the break in the transmission between——" the voice from the loud-speaker began.

A handsome celluloid dial for the S.T. 800, similar to the card dial issued in Popular Wireless but revised up to a later date of printing, is obtainable for 2s. 6d. post free, from Celluloid Printers, Ltd., Kingston By-pass Road, Surbiton, Surrey.

This is the only dial approved and checked by the designer of the S.T. 800.

TUNING DEVELOPMENTS

The radio set has improved enormously during the past year or two, particularly in regard to improvements in tuning. Automatic Volume Control is probably the most valuable technical development in this field and some of its most important features are described below

By **CARDEN SHEILS**

ALTHOUGH the design of receivers tends to get a little more complicated and "cunning" each year, the latest models are, if anything, even easier and more satisfactory to handle than their predecessors. This is, no doubt, what we all expect, but it does not by any means follow as a matter of course.

As a general rule the more complicated the "innards" of a set become, the more difficult it is to keep the controls simple and foolproof, and it is only by the exercise of considerable ingenuity that designers have managed to maintain the present standard.

To some extent it is, of course, due to the provision of larger and more cleverly-arranged tuning-dials, as well as to the use of distinctive illumination for the different wavebands, both of which fall under the heading of purely external improvements. In addition, there are various kinds of "visual" indicators to assist the accurate tuning of sets fitted with automatic volume control. These are linked up to the internal circuits because they are operated through A.V.C. voltage developed in the set.

Silence Between Wanted Stations

But when we come to the problem of "quiet" tuning, we begin to get into deeper waters. Ordinary A.V.C. makes the valves most sensitive when there is nothing useful for them to pick up. "Quiet" A.V.C. is then brought in, as a sort of hand-maiden, to suppress all the noisy rubbish which—in the absence of a worth-while programme—would get through into the loudspeaker. In other words, it automatically keeps the loudspeaker "mute" until it has something worth while to say.

Now consider what happens when the owner of a set has been listening, say, to Fécamp, down at one end of the tuning-scale, and then decides to change over to Athlone, away up at the other end of the scale. Obviously he will pass through quite a number of intervening stations, each sufficiently powerful to "release" the muting or suppressor circuit. Each of them will accordingly produce an unwanted "blurb" of sound in the loudspeaker.

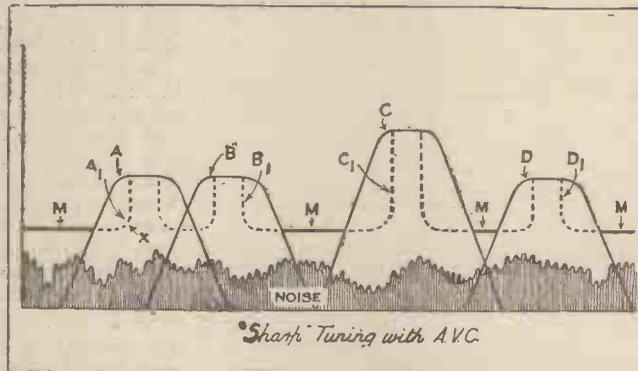
"Not a very troublesome effect," one might say, but the modern designer thinks otherwise. He aims to get absolutely quiet tuning between any two desired stations, no matter how widely they are separated on the tuning-dial. And so he has tackled this problem by giving the muting circuit an additional short time-lag, which is just sufficient to prevent any signal from getting through unless it is the one the listener wishes to hear.

In other words, a listener is able to move the control fairly slowly across the tuning-dial without hearing a whisper from the loudspeaker until he reaches the desired station. Here he simply lets the control "stay put" for half a second, and by that

time the circuits are automatically restored to normal, and the new programme comes through at full strength.

The use of "quiet" A.V.C. also lends itself to certain other refinements in tuning control. As already mentioned, its chief purpose is to distinguish between the worth-while signal and the various kinds of "noise" and low-strength signals that are not really worth listening to. This is just another way of saying that the muting circuit is set at a certain "threshold" point, below which all noise, heterodyne, and mush is cut out, and above which the received

IMPROVING THE SELECTIVITY



If an A.V.C. circuit is arranged so that the datum line, M, is made to vary with the strength of each signal, the selectivity of the circuit is improved.

signal is allowed to pass freely through to the loudspeaker.

In the figure, the shaded portion at the bottom represents the general background of "noise" which is usually present all over the tuning-dial. The straight line M indicates the datum line of the "quiet" A.V.C. bias which forms the threshold between good signals and noise. A, B, C, D represent a number of "worth-while" signals, some being stronger than others, but all rising above the datum line M.

Tuning Varied to Suit Circumstances

Now if instead of keeping the muting voltage at the same constant dead level of the line M, M, it is made to vary with the strength of each signal, as shown by the dotted line at A1, B1, C1, D1, certain advantages follow.

In the first place, the selectivity of the set is improved, because in addition to the ordinary filtering action of the tuned input circuits, the effect of the muting circuit comes into play. Actually it helps to sharpen the tuning by reducing the number of degrees on the tuning-scale over which each signal can be heard.

As soon as a strong signal is received the muting circuit, instead of being immediately released, comes into action, slowly at first, and then with a rush, as shown by

the dotted-line curve A1, B1, C1, D1. This naturally helps to cut out that part of the signal B which might otherwise interfere with the clear reception of signal A. The same applies to any other part of the tuning-scale in which worth-while stations are grouped closely together.

This sharper tuning effect is obtained by superimposing on the normal muting bias, an extra voltage which is derived from the incoming signal through a highly-tuned circuit with a "peaked" resonance curve. At a certain point on the peak, such as X, the circuits of the set are suddenly restored to normal, and the action of the muting circuit is removed. This produces the sort of band-pass effect shown in the drawing.

Visual Indicators Unnecessary

Another interesting point is that it is possible to tune a receiver fitted with this kind of "quiet" A.V.C. by ear alone, instead of having to depend upon visual indicators. As is well known, the use of A.V.C. tends to broaden the audible response of the set more or less, as shown by the flat-topped curves A, B, C and D, so that it is impossible to tell by ear whether one is

tuned accurately to the centre of the carrier-wave or to one side or other of it. A visual indicator is then usually provided to show, either by the length of the discharge column, or by the deflection of a spot of light, when the circuits are dead "on tune."

But by gingering-up the action of the muting circuit, as already explained, the audible response is narrowed down to such an extent that a station can be tuned in accurately by ear alone. Any slight movement of the control to one side or

other of the centre-line of the carrier now causes a rapid falling-off in signal strength, just as though the set were not, in fact, provided with automatic volume control.

TEA-TIME VARIETY

An Interesting Regional Programme on December 11th.

It is rare indeed that listeners are able to hear a variety programme during a mid-week afternoon, the evenings having been found, as a general rule, the most suitable time for such a broadcast. On Friday, F. H. Piffard will bring to the microphone well-known artists from many corners of the British Empire. Magda Neeld, for example, is an Australian soprano, with a voice of exceptional beauty, who will sing, accompanied on the piano by Jack Clarke, the Laughing Song from "Die Fledermaus," and a waltz, "Spring-time of Love," by Moskowski.

Al and Bob Harvey are the two well-known Canadian bunkhouse boys who have appeared many times with the "Rocky Mountaineers," while also from Canada come Nixon and Morrison, a clever cross-talk act. New Zealand is represented by Keith Wilbur, whose brilliant imitations have previously delighted listeners. Supporting this strong cast will be Harry Bidgood and his Band.

TELEVISION TOPICS—Collected by A. S. Clark

Technicalities, Personalities and News from all parts of the World make this "Popular Wireless" feature the finest medium by which readers can keep right in touch with all aspects of development in television.

"TELEFRAMES"

Items of general interest.

IN a recent television broadcast of special-ised forms of artistic decoration, the television announcer held up a hand-mirror delicately adorned on the back with figures or floral designs.

He remarked that the work was very fine, but that he did not know whether lookers would be able to see it. Whether he was referring to the decoration or the mirror itself was not clear, for as he held it up he moved it so high that all the television screen showed was his fist and a tiny bit of the handle!

A LITTLE CLOSER, PLEASE

It is generally appreciated that "funny-men" and comic turns should be greatly improved by the addition of sight to sound broadcasting, and that such turns should be the very salt of television programmes.

But those responsible must remember that this is largely true simply because of the additional effect achieved by facial play. A recent turn of this nature was largely spoiled by the inclusion of the comedian full length on the screen when a close-up or half-length picture would have done him so much more justice.

A SYNC. CLEAN UP

Television experimenters may be interested to learn that it is by no means necessary for a perfect raster shape to be obtained before the application of picture and sync. pulses for results to be satisfactory. (Not that a perfect raster of picture frame is not desirable, mark you.)

For instance, a certain percentage of

CABARET FOR TELEVISION VIEWERS

"Burnt Sepia" is the appropriate title chosen for an all-coloured cabaret show which Dallas Bower is presenting on Friday of this week in the afternoon and evening television transmissions. Mabel Scott, the celebrated vocalist who originally sang with Duke Ellington and his band, will appear; this may be one of her last performances in this country before returning to America to join Cab Calloway's ensemble. The bill also includes Garland Wilson, the famous New York pianist and vocalist, who has worked with Jack Payne and his band in London. Cyril Blake, from the Barbados, will be seen and heard in a dazzling trumpet act. That distinguished cabaret pair, Harris and Howell, famous in America for their broadcasts and film work, are also taking part. The chorus will be provided by the Sepia Chorines, directed by Buddy Bradley, one of the leading coloured dance directors in this country.

In presenting this interesting feature, Dallas Bower will use special scenery to create the real cabaret atmosphere, and televisioners will be able to imagine themselves present at a very festive occasion.

50 cycle hum on the deflectors will produce a wavy edge to the raster or frame. But if a strong sync. is applied it will pull the raster up square and a wavy picture will not be obtained necessarily.

It is a very similar effect to the masking of slight hum in a sound receiver as soon as a programme comes through.

NO DUST ALLOWED

During the spraying of the fluorescent compound on to the screens of cathode-ray tubes, special care has to be taken to avoid any foreign matter becoming attached during the process. Even specks of dust can cause bad blemishes on the screen because they spread during the process of evacuation during which the electrodes are raised to a very high temperature in order to bake out occluded gases.

FERRANTI RECEIVERS

Two interesting items recently to hand concerning the two Ferranti television receivers are as follows:

A fourteen-inch diameter screen will be used on the cathode-ray tube and will provide a picture ten inches by eight. The second is that magnetic focusing and scanning will be employed, instead of the more familiar electrostatic control for these two operations. In magnetic focusing and scanning, coils of wire are arranged round the outside of the tube through which suitable currents are passed which produce varying or steady magnetic fields as required, and these in turn influence the cathode-ray itself.

WHAT ABOUT TELEVISION HIRE?

The hire of receivers as distinct from hire purchase has caught on very widely, and there are many firms now specialising in it.

We wonder how long it will be before a similar service is started for television. Of course, the hiring charges are bound to be fairly high, but there are no doubt many who would welcome it who would not buy a set in the ordinary way.

Continual free service, and a guarantee that the sets will be kept up to date would be a far greater attraction where television was concerned than where ordinary broadcast sets are in question.

HIGH-CLASS TELEVISION

WE were recently privileged to pay a most interesting visit to the Ediswan television laboratory at their Ponders End Works. We felt it was a good omen to learn right at the start that just across the road from the television laboratory was the "hut" in which Professor Fleming, many years ago, made the first thermionic valve.

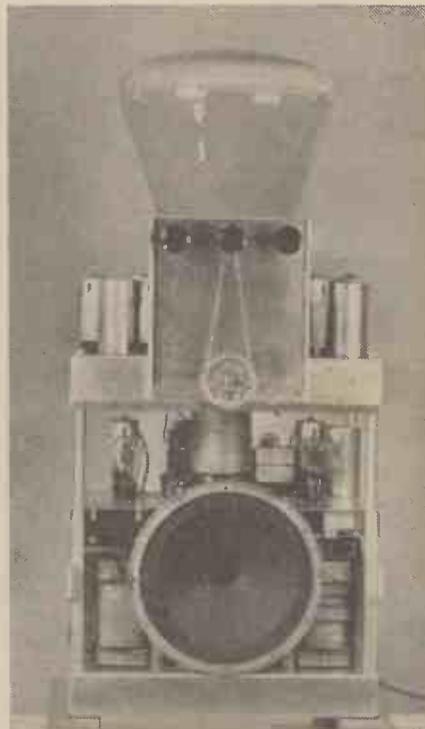
That the omen was good was well proved by the excellence of the pictures we saw and the interesting things we learnt about the research work that has been, and still is, carried on by the makers of Ediswan cathode-ray tubes. No complete television receivers for sale commercially are made by this firm, the object of the demonstrations being to show us the excellence of the various television components they make.

Special Components

These include cathode-ray tubes of varying sizes up to those with 12 in. diameter screens, special ultra short-wave receiving valves, rectifying valves, gas discharge tubes, transformers and loudspeakers.

Three receivers were in operation simultaneously from the Alexandra Palace transmissions. The first of these was an experimental

THE MURPHY CHASSIS



How the Murphy television receiver chassis looks in its completed form. It will be remembered that in our November 28th issue we showed the separate units for this receiver.

model developed in the works with the aid of a 240-line film transmitter some time before any high-definition transmissions were available.

The second was a "super" job in which no expense had been spared to obtain the best possible results. It was used in the demonstration booths at Olympia during the exhibition this year.

Excellent Results Obtained

Pictures on this set were certainly among the very best we have seen, and it is noteworthy that tuned radio frequency circuits were used in the vision receiver as opposed to the more usual superhet circuit. This throws an interesting sidelight on the announcement we have already made that we place considerable importance on the work on T.R.F. circuits for television which we are conducting in our own laboratories.

The third receiver is built on lines which

(Continued overleaf.)

TELEVISION TOPICS—Continued

would make it a "commercial" proposition, and uses a superhet circuit for vision reception working on one set of sidebands only. (This makes the provision of suitably "wide" circuits an easier proposition.)

These two latter instruments thus enable the Ediswan engineers to test tubes under normal working conditions, and also to have a first-class standard against which to judge results.

The T.R.F. set was worked from an aerial on the roof, while the superhet receiver was connected to a di-pole aerial at ground level inside the laboratory. An interesting comparison was provided between the two aerials when Mr. Price, who is in charge of the laboratories, started up his car just outside.

Interference from the set with the ground-level aerial was considerable, while the added height of the other aerial reduced the interference to proportions which could only be described as slight.

Colouring

The pictures on two of the three tubes could not be described as anything but black and white. The third had an alternative of a very slightly petunia colour.

Not until the normal electric lighting of the laboratory was turned up was it possible to detect any colour tinge in the other two screens, and then, surprisingly

enough, it was slightly bluey. But then the true white of daylight is slightly bluey in comparison with an electric bulb.

High Quality Reproduction

Full advantage of the possible high quality of the television sound transmissions is taken by the use of dual high-fidelity speakers. The second speaker is used to "smooth" the base output by staggered resonances and to extend the high-note range. The overall response is within plus or minus five decibels of level between 90 and 6,000 cycles, this giving a good quality which can be operated at low or high volumes without fatigue to listeners.

The range could be extended to be substantially level up to 8 or 9 thousand cycles, but this tended to increase the response

around 3 to 4 thousand cycles too much with the effect of a tiring brilliance on loud reproduction.

After Alexandra Palace closed down we were treated to a demonstration of film transmission on 240 lines by means of a Nipkow disc. The transmitter used exactly reproduced the Baird type of transmission, and is employed to carry on experiments by land-line link when no transmissions are on.

Another interesting item in the laboratory was a rack of six tubes undergoing a life test. These were samples from various batches of tubes manufactured and are left continuously scanning under normal operating voltages.

One was somewhat yellow in colour, while the others were bluey, and we were interested to learn that this showed a slight defect in the tube's coating, which was then nearing the end of its life. The average life, we learnt, was not far short of 1,000 hours.

Finally, we saw the testing rack in which all tubes go through every conceivable test for characteristic constancy before being despatched.

Reliability

We came away convinced that anyone who buys an Ediswan cathode-ray tube for experimental use, or who purchases a television receiver incorporating an Ediswan tube, has a tube which is as perfect and reliable as modern science can make it. And the same goes for the other Ediswan television products.

IN THE EDISWAN TELEVISION LABORATORY



In the left foreground is the tube tester, the tubes being held vertically in the hole visible in the bench. Immediately behind the tester are some tubes in a rack undergoing life tests. In the background, from left to right, are the experimental receiver, commercial-type receiver, and "super" receiver (see text). On the right is the "bench-type" receiver on which pictures transmitted from the next room were seen.

TELEVISION FOR BEGINNERS

G. Stevens explains the whys and wherefores of interlocked scanning

QUITE a lot of people are still doubtful about why there should be such an apparently complicated system as the E.M.I. "interlaced scanning," and why television pictures can't be sent out in a straightforward manner, so to speak. The answer to their doubts is first that it improves the picture, and that is sufficient answer to the "why"; and secondly, it isn't really any more complicated than the straightforward scan when you understand the principle.

The whole aim of television development is to produce a picture as good as a cinema picture, both in detail and in general appearance, and so far television falls short of this ideal in two ways—it is less sharp in definition and it has a certain amount of flicker

associated with it. Those of you who remember the very early days of cinemas will recall the nasty flicker which was a feature of the first films—how they gave you the feeling that your eyes were popping out of your head after looking at them for a time.

Not Yet Flickerless

The same trouble was present in the early television pictures, and while the present-day ones are a great improvement, we can't say yet that we are as free from flicker as the films. Flicker itself is an optical effect due to the fact that the image from the picture fades before the next image appears.

If the film is run through the projector very slowly each picture will have a pause between

it and the next so that the impression of one has faded before the next appears. The movements will then be flickering and the only way to get rid of the trouble is to speed up the rate of showing of the pictures. In the cine film this speed-up has been cleverly done by not only increasing the speed of passage of the film from 18 to 24 pictures per second, but a shutter cuts off the light during each picture, giving the effect of 48 pictures presented each second. It is generally agreed that this is a minimum speed of viewing separate pictures if any flicker is to be avoided.

Now in television to present 48 complete pictures per second would be a very difficult job, as the band of frequencies involved in the transmission would be enormous. As it is, the frequency range required to produce the fine details of 405 line 25 pictures is high, and it would be more difficult still to double it for 50 pictures.

The E.M.I. people have got

over the flicker difficulty in an ingenious way without requiring a higher frequency band by using their "interlaced scanning" method. Roughly speaking, the picture is presented in two parts, each part containing half the total number of lines. The pictures are "staggered" by the width of one line, so that they are interlaced, and the eye sees a complete picture.

A Steadier Picture

The advantage of this latter method is the same as that of cutting off the light during the passage of a cine film—the apparent frequency of the flicker is doubled, and the picture thus appears steadier. Notice the word "apparent," because we have not really doubled the frequency. If we had there would be 50 pictures per second, whereas there are only 50 half-pictures.

"SEEN ON THE AIR"

appears on page 391.

RANDOM RADIO REFLECTIONS

By Victor King

NEW USE FOR CLOTHES PEGS — TELEVISION — HANDY TOOL FOR CONSTRUCTORS

THOSE CLIPS

I SUPPOSE most of you who are experimenters own a bunch of crocodile clips. I always have at least a dozen or so lying about, many of them having leads of varying lengths attached to them.

But for some jobs the crocodiles aren't quite so good as they might be. Their teeth let things slip through them or they won't bite flat down on to the job.

Well, I've supplemented my collection with one or two clips of a special kind—home made. The sketch shows exactly how one of them is fashioned. The main part of it comprises an ordinary spring-type clothes peg.

You then take a small piece of springy brass or copper and bend it in a wavy pattern so that it is like a piece of miniature corrugated iron. A hole is drilled through this metal and also through one of the jaws of the peg. A screw with a little terminal head or nut holds the metal in place and also secures the lead.

But you should clearly be able to see the whole thing in the sketch. You will find that the clip will hold on to things most tenaciously, but don't forget to see that the surface of the metal is fairly clean.

MORE TELEVISION EXPERIMENTS

BUT this time they weren't concerned with the enlargement of the picture. I've been playing about with aerials. At my home, about six miles from the Alexandra Palace, I get an extremely good signal.

I find that sufficient pick-up is obtainable from a small indoor aerial consisting of a twelve-foot length of cotton-covered wire strung across the room. With a simple indoor di-pole, comprising two lengths each about five feet six inches along the picture rail, the signal is very powerful indeed.

So all the trouble I took to fix up an imposing outdoor di-pole appears to have been wasted! However, it looks impressive, even though it seems unlikely to be needed.

Actually, I can get good pictures on anything from a few feet of wire lying on the floor downstairs to my long, ordinary aerial.

There is no noticeable interference of any kind. I can't get any, any old how. Which is very nice from a domestic seeing and hearing point of view, but rather disappointing to me as an engineer. I'd love to have a nice slice of static, man-made or otherwise, to tackle.

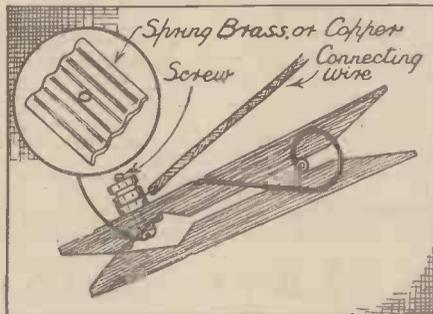
And the aerials are a mere thirty or forty feet from a busy road carrying a fair amount of motor traffic. A friend of mine was at first troubled by a complete modulation hum wipe out. But he got over that by using a vertical di-pole.

Now and then there are technical faults in the transmission which rather tend to lead one up the garden. One night the vision transmitter broke down completely for about ten minutes. I started in to fiddle about with my receiver—quite unnecessarily as it turned out. Another evening there was considerable distortion on the sound side during a Picture Page transmission.

Still, on the whole, the B.B.C. engineers have done their job very well, and the total time of the breakdowns must reveal a much smaller percentage than was the case in the early years of blind broadcasting.

I hope that fairly soon the two separate systems of vision transmission used will be merged, for it seems to me that both have complementary

TWO PRACTICAL TIPS—



How an ordinary wooden clothes peg can be adapted for radio work. When the peg is clipped on to a terminal or some other point to which connection has to be made, electrical contact is provided via the small piece of springy brass. The gadget on the right is specially designed for dealing with nuts and screws situated in awkward positions. The sketch is self-explanatory.

advantages and disadvantages. For example, E.M.I. certainly score tremendously with their Emitron Camera. No doubt about that. They can, in my opinion, handle various outdoor scenes much better than the other people, and also introduce such refinements such as dissolving one view into another, smooth "panning" and "fading" and so on.

On the other hand, the Baird system seems to me to handle film better, and for certain types of shot their spot-light scanning appears to provide sharper and brighter pictures. But then there is noticeable flicker while the E.M.I. stuff is quite flickerless.

Between the two of them we could have marvellously perfect transmissions all the week and every week.

However, during these early days it is valuable to have a spirit of keen competition with two independently operating sets of engineers in constant rivalry. Progress is bound to be rapid, though I am bound to say I think British television already provides really first-class entertainment. A really high spot was recently achieved with the transmission of a news reel that included some exciting scenes in the Foord-Neusel fight. I'd have television in my home for nothing else but the Movie-tone News. It is topical, well presented and wonderfully transmitted.

AWKWARDLY PLACED NUTS AND SCREWS

SOME of the screws and nuts in modern chassis designs are most inaccessibly placed. The other day I came across quite an exceptionally badly located pair of screws. It seemed to me that the same mechanical ends could have been served by having those screws where one could push a screwdriver straight down on to them.

And yet they were tucked underneath a ledging so that a right-angled screwdriver was the only thing which could possibly get at them. Of course, I couldn't find mine anywhere. So I had to bend the end of an ordinary one over. Even so it took a long while to move the screws because of the difficulty of applying pressure.

Getting screws and nuts back is sometimes the very dickens of a job. But a little while ago I acquired a gadget which enables this to be done fairly easily. You see it illustrated in an accompanying sketch.

The one end is split and the prongs tend to spring outwards. With this end you can grip the slot of a screw. The other end is also split, but in such a way that a nut can be held. Once the screw or nut has been "started" more than half the battle is won.

No, you needn't write and tell me that there are other ways of doing the job. I know there are lots of them, including the use of wooden skewers and Plasticine. And I am afraid I do not know where you can buy the gadget I have

just described, though I expect quite a lot of you would be able to make one easily enough.

MY RADIO PLAY

WHICH isn't yet written and may not be. But thanks to all you who have sent me letters of good wishes.

But I must make it clear that this is no *chef-d'œuvre*. Merely something set aside for some of the few leisure hours I enjoy.

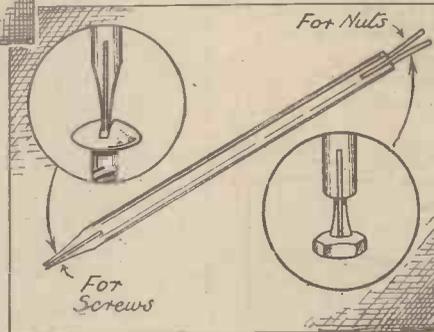
If I had had serious designs on writing for radio, I'd have taken up an invitation sent to me by one of the very big B.B.C. bosses a few months ago.

"You are just the sort of writer we want for the radio," he wrote. "Please let us have some of your stuff."

When I told an aspiring author that I didn't accept that kind invitation on the spot, at once and immediately, by return of post, he nearly threw a fit!

Strange though it may appear to some folk, I have no ambitions at all to ply my pen in a professional manner for the microphone. I get nearly all the word-juggling kick I desire by penning these "P.W." notes. But if the "Daily Telegraph" were to offer me the job of leader writer . . . !

—FOR YOUR WORKSHOP



A NEON LAMP TESTER

A simple method of carrying out continuity tests on resistances, condensers, and other radio components

THE average home constructor is sometimes called upon to undertake a fair amount of testing work and fault tracing in connection with wireless receivers, both for himself and friends, and to accomplish this it is necessary to have within easy reach some simple apparatus in order to carry out the work in a reliable and expedient manner. There are many devices available, a pair of telephones and a dry battery being a useful adjunct for many of the tasks.

D.C. Mains or Batteries Suitable

It is quite a good scheme, however, to take advantage of the interesting properties of the neon lamp, which in one of its most familiar types is the "Osglim" made by the G.E.C. This lamp can be used for continuity tests in preference to the telephones and battery. Those constructors who have D.C. electric supply in their houses can duplicate exactly the arrangement to be described, and in those cases where such a source of voltage is not available, ordinary dry batteries with a total voltage of about 180 will suffice. Fig. 1 is the simple circuit arrangement, the Osglim lamp being held in a batten lamp holder mounted on a small wooden base. Fig. 2 shows the details and necessary dimensions for making a pair of testing prods for use with a unit of this type.

THE CONNECTIONS USED

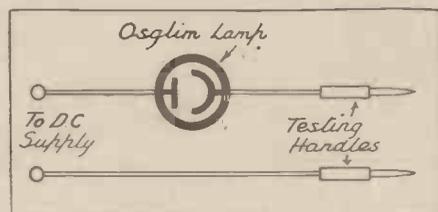


Fig. 1. The connections are very simple, the tester consisting of the lamp and two test prods connected to a source of D.C. supply.

The thick ebonite tube should be screwed internally for about $1\frac{1}{2}$ in., and the brass rod screwed externally for the same length, so that the brass screws into the ebonite and is held rigidly. Bare the insulation from one end of a length of flex and pass the ebonite tube over the end. Thread the wire end through the $\frac{1}{8}$ -in. hole in the brass rod, soldering it in place in the small channel shown at A. The ebonite tube can now be screwed over the rod and the handle is complete. This process must, of course, be duplicated for the other handle, then the pair of free flex ends should be bared of insulation and placed under terminals provided on the lamp block. As will be seen, the construction is particularly simple, and the constructor will now have in his possession a piece of test apparatus which will find application in nearly all his testing work.

In actual use the electric-light plug must be placed in an ordinary lamp holder, and the insulated portion of the handles held one in each hand. Continuity in a circuit

will be evidenced by the glowing of the neon lamp—a visual signal which will be quite definite when the metal points of the handles make contact. Only about three to four milliamps of current flow through the lamp when alight, hence the current consumption is negligible.

Checking Condenser Insulation

The handles prove very useful for getting at the internal wiring of a wireless set when making sure that all connections are intact. Coils, condensers, resistances, etc., can be tested similarly, while in the case of condensers, especially fixed ones, a test of this character is very searching. If the condenser insulation is imperfect, and the test handles are left under the condenser terminals for, say, a couple of minutes, a flicker of light will be noticed in the lamp. With the progress of another few minutes

the frequency of the flashes will gradually increase, until ultimately there is practically a continuous light, this proving that the insulation has broken down and needs replacement. A test of this character is better than one with a megger.

DETAILS OF THE PRODS

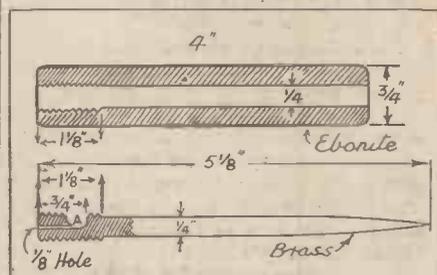


Fig. 2. Details for making the test prods. Insulated prods of this type can also be bought ready-made.

By means of the neon lamp tester it is a simple matter to trace such leakage as in the insulation of a valveholder, between grid and filament. This leakage may not be apparent in the ordinary way, but may still be enough to cause poor results.

FURTHER S.T.800 SUCCESS IN BIRMINGHAM

Dear Sir,—Enclosed herewith is a further report of reception on the S.T.800. You will notice that I succeeded in getting both Tokio and Sydney with very little trouble. The consistency of W 2 X A D and W 2 X A F has been wonderful, and I could easily invite anyone to hear them whenever they are radiating. I shall continue to send a report in each week.—Yours sincerely

LESLIE A. PERRINS.

101, Sycamore Road, Aston, Birmingham, 6.

Sunday, October 25th.—6.15 p.m. (16 m.): W L A, Lawrenceville, N.J., with G A S, Rugby. G A S giving a special pianoforte programme from London for C.B.S. I heard this at R9 after it had crossed the Atlantic twice (very little difference in quality or strength to programme originating in New York). Announced W L A on 18,408 kc.

7 p.m. (16 m.): W 3 X A L, Boundbrook. Relay from Grand Central railway station. Taken into Ticket office, Pullman Reservation office, etc., and was told that they operated 11,000 miles of line. This was part of the "Magic Key" programme. Also heard Mr. Goodman, kettledrum expert.

10.50 p.m. (31 m.): Rio de Janeiro. Call and "Good-night, Vienna"—orchestra. W 2 X A F. Lennox programme, "Painting the Clouds with Sunshine" and Smiling Ed McConnell. Catholic Hour. D J A and D J N. Concert.

Monday, October 26th.—8 p.m. (19 m.): W 2 X A D. "Pepper Young" programme. Announcer, Spencer Bailey. Oxydol—"Ma Perkins." Cryscos—"Vic and Sade." (Red Network.) 9 p.m. (31 m.): W 2 X A F. Concert. Tom Mix. Wheaties—Jack Armstrong.

Tuesday, October 27th.—8 p.m. (19 m.): W 2 X A D. "Pepper Young," etc. W 8 X K Concert. 10.15 p.m. (31 m.): W 2 X A F. Tom Mix and Jack Armstrong programmes.

Wednesday, October 28th.—8 p.m. (19 m.): W 2 X A D. "Pepper Young" etc. 9 p.m. (31 m.): W 2 X A F. Orchestra. Tom Mix. Jack Armstrong. 10.45 p.m. Miss Fleming (soprano) from Australia: "Oh, Could I But Express in Song." Orchestra: "Dance of the Desert Girls." Miss F., talk on Australia. 11 p.m. Education Series: 1600 A.D., "Galileo and the Stars."

Friday, October 30th.—7 p.m. (31.48 m.): Tokio. Talk. (19.57 m.): W 2 X A D. (19.66 m.): G S I (R6). (19.72 m.): W 8 X K (R7). 7.30 p.m. (19.8 m.): Tokio, J Z K. Orchestra with male and female vocalists. Dance Music and Call. 9 p.m. W 2 X A F. Orchestra and vocalists: "One Night of Love," "Alice Blue Gown," etc. Stocks. Orchestra from San Francisco. 10.30 p.m. Tom Mix. Jack Armstrong. Miss Fleming (soprano). 11 p.m. "Legend of a Widow Duchess," "The Norseman"—Vocal Quartet. 11.30 p.m. News. Announced that Roosevelt would speak at 10 p.m. E.S.T. Spanish Programme. Orchestra: "Did I Remember."

Saturday, October 31st.—7 p.m.: W 2 X A D. Baseball Match. 11 p.m. W 2 X A F. Tango orchestra.

Sunday, November 1st.—7.20 a.m. V K 2 M E, Sydney. Concert and Call. 1.15 p.m. (31 m.): Jeloy. Religious music. Tenor and Organ and Address. (19 m.): D J L and D J R (R9), Military Band. (40 m.) (Phone): G 6 Z A, G 5 P H, G 8 C D (R8).

2.30 p.m. (31 m.): D J A. Wagner Concert: Overture, "Flying Dutchman." G S B. Rispa Goodacre (contralto). W 2 X A D. Concert. The Famous Trio. W 3 X A L. News. W 2 X E. Concert for Children. W 2 X A D. The famous Trio: "Just a Wearin' For You," "Cherry Ripe," "Under His Wing" (hymn).



Here is a fine set which will bring in not only the French and other Continental broadcasts, but also transatlantic transmissions as well. It is the latest H.M.V. all-wave, universal mains radiogram, and costs 25 guineas.

LEARNING FRENCH THROUGH YOUR RADIO

Part 40 of the special language series contributed exclusively to "Popular Wireless"

By S. C. Gillard, M.A.

ALTHOUGH you can go a long way in French on 1st Conjugation verbs (i.e. Infinitive—ER), you can't go the whole way.

There is another class of French verbs—nothing like as big as the -ER class, of course—where the INFINITIVE ENDS IN -IR. It is about these verbs that I want to talk this week. **WE MUST LEARN HOW TO CONJUGATE THEM.** There are the same NINE tenses as before, with the same differences in meaning for each TENSE. So apply to these new verbs the knowledge you have of -ER verbs, and particularly the way in which the TENSES are used.

Now, -IR verbs can be divided into TWO classes. One class has an extra syllable "-ISS" in the Present Participle. The other HASN'T.

I will call the one class the ISS class. The other, the non-ISS class.

OUR OWN LANGUAGE HELPS US VERY CONSIDERABLY IN DECIDING WHETHER A FRENCH -IR VERB HAS THIS ISS IN THE PRESENT PARTICIPLE.

Look at the following English verbs:

TO FINISH, PUNISH, ACCOMPLISH, FURNISH, NOURISH, BANISH, PERISH, CHERISH, FLOURISH, BRANDISH, TARNISH, VARNISH, EMBELLISH.

It is this ISH termination that I am chiefly interested in. Yes, this ISH termination is nothing more than the ISS syllable I have been talking about. ALL these English ISH verbs are French words, too, but for the English ISH we find the French ISS, at least in the PRESENT PARTICIPLE and certain of the TENSES.

Let me give you the French INFINITIVES first:

FIN -IR, PUN -IR, ACCOMPL -IR, FURN -IR, NOURR -IR, BANN -IR,

PÉR -IR, CHÉR -IR, FLEUR -IR, BRAND -IR, TERN -IR, VERN -IR, EMBELL -IR.

Their PRESENT PARTICIPLES are respectively:

FINISSANT (finishing), **PUNISSANT** (punishing), **ACCOMPLISSANT** (accomplishing), **FOURNISSANT** (furnishing), **NOURRISSANT** (nourishing), **BANNISSANT** (banishing), **PÉRISSANT** (perishing), **CHÉRISSANT** (cherishing), **FLEURISSANT** (blooming), **BRANDISSANT** (brandishing), **TERNISSANT** (tarnishing), **VERNISSANT** (varnishing), **EMBELEISSANT** (embellishing).

Their PAST PARTICIPLES are just as easily formed. The PAST PARTICIPLE ending here is NOT an É, as in the case of the -ER verbs. It is just -I. Look! **FINI** (finished), **PUNI** (punished), **ACCOMPLI** (accomplished), **FOURNI** (furnished), **NOURRI** (nourished), **BANNI** (banished), **PÉRI** (perished), **CHÉRI** (cherished), **FLEURI** (flourished, bloomed), **BRANDI** (brandished), **TERNI** (tarnished), **VERNI** (varnished), **EMBELLI** (embellished).

The big thing to remember about these verbs is that the STEM of each contains this ISS syllable. That is to say,

| | | | |
|-------------|-----------|----|-------------|
| The STEM of | FINIR | is | FINISS- |
| | PUNIR | | PUNISS- |
| | ACCOMPLIR | | ACCOMPLISS- |
| | FOURNIR | | FOURNISS- |
| | NOURRIR | | NOURRISS- |
| | BANNIR | | BANNISS- |
| | PÉRIR | | PÉRISS- |
| | CHÉRIR | | CHÉRISS- |
| | FLEURIR | | FLEURISS- |
| | BRANDIR | | BRANDISS- |
| | TERNIR | | TERNISS- |
| | VERNIER | | VERNISS- |
| | EMBELEIR | | EMBELEISS- |

You must master this ISS business, if you hope to conjugate these verbs in -IR correctly.

Let me now give you TENSE No. 1 of FINIR. Note where it differs from TENSE No. 1 of an -ER verb. (See Part 18.)

| | | |
|-----------------|-----------------|----------|
| Je fin-is | fin-ee | I finish |
| tu fin-is | fin-ee | etc. |
| il fin-it | fin-ee | |
| nous finiss-ons | fin-ee-ss-o(ng) | |
| vous finiss-ez | fin-ee-ss-eh | |
| ils finiss-ent | fin-ee-ss | |

IN TENSE No. 2—I was finishing—the STEM FINISS- is used throughout. Again compare this Tense with the same Tense of an -ER verb.

| | | |
|------------------|-------------------|----------------------|
| Je finiss-ais | fin-ee-ss-eh | I was finishing etc. |
| tu finiss-ais | " | |
| il finiss-ait | " | |
| nous finiss-ions | fin-ee-ss-e'o(ng) | |
| vous finiss-iez | fin-ee-ss-e'eh | |
| ils finiss-aient | fin-ee-ss-eh | |

TENSE No. 3—I finished—is

| | | |
|---------------|-----------|------------|
| Je fin-is | fin-ee | I finished |
| tu fin-is | " | etc. |
| il fin-it | " | |
| nous fin-imes | fin-ee-ss | |
| vous fin-ites | fin-ee-ss | |
| ils fin-irent | fin-ee-ss | |

The FOUR COMPOUND TENSES should present no difficulty whatever.

| | |
|---------------|-----------------------|
| J'ai fini | I have finished |
| etc. | |
| J'avais fini | I had finished |
| etc. | |
| J'aurai fini | I will have finished |
| etc. | |
| J'aurais fini | I would have finished |
| etc. | |

Nor should TENSES 8 and 9—the FUTURE SIMPLE and the CONDITIONAL. You remember how we formed these two tenses in an -ER verb. Just the INFINITIVE plus CERTAIN TERMINATIONS. It is the same here. (See Part 21.)

| | | |
|-----------------|----------------|----------------|
| Je finir-ai | fin-ee-eh | I will finish |
| tu finir-as | fin-ee-ah | etc. |
| il finir-a | fin-ee-ah | |
| nous finir-ons | fin-ee-o(ng) | |
| vous finir-ez | fin-ee-eh | |
| ils finir-ont | fin-ee-o(ng) | |
| Je finir-ais | fin-ee-eh | I would finish |
| tu finir-ais | " | etc. |
| il finir-ait | " | |
| nous finir-ions | fin-ee-e'o(ng) | |
| vous finir-iez | fin-ee-e'eh | |
| ils finir-aient | fin-ee-eh | |

I am going to give you now a number of verbs like FINIR besides a few phrases or sentences to illustrate their meaning. Learn as many of them as you can by heart.

PÂLIR (pâlissant, pâli) to turn pale. Ses joues ont pâli His cheeks have lost their colour.
SON ÉTOILE PÂLISSAIT His star was waning.
EMPLIR (emplissant, empli) to fill, to throng. La foule emplissait les rues The crowd thronged the streets.
GUÉRIR (guérissant, guéri) to cure. Je me suis guéri de cette mauvaise habitude I have cured myself of this bad habit.
SURGIR (surgissant, surgi) to rise, to come into view. Une forme surgit des ténèbres A figure loomed out of the darkness.
APPLAUDIR (applaudissant, applaudi) to applaud. Le résultat fut vivement applaudi The result was loudly applauded.
L'ACTE DE D. EST TRÈS APPLAUDI D's act is much applauded.
ÉTABLIR (établissant, établi) to establish. L'aviateur Jim Mollison a établi un nouveau record The aviator Jim Mollison has established a new record.
GARANTIR (garantissant, garanti) to guarantee. La qualité de nos pendules est garantie The quality of our clocks is guaranteed.
FRÉMIR (frémissant, frémit) to vibrate. Les cordes d'un violon frémissent The strings of a violin vibrate.
AGIR (agissant, agit) to act. Vous agissez mal envers moi You behave badly towards me.
ABOUTIR (aboutissant, abouti) to converge on. Les grands réseaux de chemins de fer aboutissent à Paris The main railway systems converge on Paris.
UN SOUTERRAIN RELIANT L'AUBERGE AVEC LE PALAIS DU L. ABOUTISSAIT ICI. A subterranean passage joining the inn to the palace L, ended here.
ÉBLOUIR (éblouissant, ébloui) to dazzle. Il le fit pour nous éblouir He did it to dazzle us. Elle a une beauté éblouissante She has a dazzling beauty.
RÉUSSIR (réussissant, réussi) to succeed. J'ai réussi à mon examen I have passed my examination.
RALENTIR (ralentissant, ralenti) to slow down. Le train ralentissait. The train was slowing down.
SUBIR (subissant, subi) to undergo. Les six nouveaux croiseurs subissent également des retards sensibles. The six new cruisers are suffering from appreciable delays.
RÉAGIR (réagissant, réagi) to react.

CHEAPER TELEVISION

Details of a new time-base circuit in which one valve controls both line and frame scanning

By J. G. JEVONS

TELEVISION has begun officially, but with the price of a complete sound-and-picture receiver round about £100 the prospect of bringing it into the home does not look too rosy. At the figure quoted a number of the sets sold will go to the big departmental stores—who are using television as an advertising stunt—and to the more enterprising hotels and restaurants. In addition, there will be private sales to customers who do not have to count the cost of sharing in the latest novelty.

Simplifying Design

But when all is said and done, the idea behind television is to provide a new service for the benefit of the public at large—on more or less the same lines as the broadcast programmes. Listeners' money is being used for the experiment, and this can only be justified on the assumption that those who pay the price will, sooner or later, "get the goods" on something like reasonable terms.

The first thing we want is a bigger market. If the programmes catch on—even with the present limited appeal—and many more sets are sold, then the application of mass production methods will enable manufacturers to make a big cut in their costs.

Another factor that may help is the prospect of being able to simplify circuit design.

At present a sound-and-picture receiver runs to over twenty valves—to say nothing of the cathode-ray tube. The latter is a particularly expensive item, because although an old-stager in the laboratory, it is only in swaddling clothes as applied to television. In other words, it still offers plenty of scope for better and cheaper methods of manufacture. Valves, too, have by no means reached the rock bottom price at which they can be produced and sold at a profit.

A television set is necessarily a pretty complicated box of tricks. In the first place it has to handle two sets of signal—audio and visual—and feed them both to separate reproducers. Then it has to pick up two sets of synchronising impulses, separate them out from the signals proper, and put them to their proper job of work. Finally, there is the time-base circuit for scanning, which is an "extra" in every sense of the word.

There are two schools of thought as to the best way of projecting the picture on to the fluorescent screen of the cathode-ray

tube. Originally the "soft" or gas-filled type of C.R. tube was preferred because the focusing of the electron stream took place more or less automatically. But later practice favours the use of the "hard" or evacuated tube which, when fitted with focusing-electrodes, produces a sharper "spot" and clearer picture detail.

A similar difference of opinion exists in connection with the time-base or scanning circuits used for producing the line and framing frequencies. Some designers prefer to employ gas-filled discharge valves of the Thyatron type for generating the required saw-toothed oscillations; whilst others pin their faith to the "hard" valve, which can be used to produce the same type of "peaked" impulse. Then, again, one can either "earth" one of the deflecting electrodes inside the cathode-ray tube, and apply the full deflecting-voltage to the other, or, better still, drive both electrodes in push-pull about a common neutral point.

But whatever kind of time-base circuit is employed, it is standard practice to use two separate oscillators, one to give the rapid line "drive," and the other to provide the slower "framing" frequency. Here it would seem is an opportunity for simplifying matters a little by arranging for one valve to generate both these frequencies.

Line-Scanning

Fig. 1 shows the kind of circuit that is now being used for producing one set of oscillations, say those used for line-scanning. The main condenser C is first charged up at a steady rate from the high-tension supply through a pentode valve P. A blocking condenser C_1 keeps the D.C. voltage off the deflecting-electrodes inside the cathode-ray tube, though it passes on the changes in voltage caused by the discharge of the main condenser C.

As the voltage across C increases it reaches a value close to the breakdown point of the discharge valve D (which is shaded to show that it is gas-filled). The arrival of a "line" synchronising-signal then gives the finishing touch, and D spills over to short-circuit the condenser C. The

resulting pulse of voltage passes through C_1 on to the deflecting-electrode of the cathode-ray tube, causing the electron stream to sweep across the fluorescent screen. This process is, of course, repeated at the arrival of each "line" signal.

A second circuit, similar to the one shown in Fig. 1, is meanwhile generating the "framing" oscillations required for the second pair of deflecting-electrodes inside the cathode-ray tube.

A Single Valve Arrangement

By contrast, Fig. 2 shows how a single valve, V, can be arranged to supply both the line and framing oscillations at the same time. The valve is fitted with two anodes, one on each side of the cathode, and a common control grid. The condenser CL for line-scanning and the condenser CF for framing are both charged up from the H.T. supply through constant-current diodes D, and are discharged across the two separate anode-cathode paths inside the valve.

Both sets of synchronising-signals are applied to the grid of the valve across the same pair of terminals S. The line signals discharge the condenser CL at a rapid rate, through one side of the valve, to supply scanning-voltages to the P_1 deflector electrodes, whilst the framing signals discharge the condenser CF, at a slower rate, through the opposite side of the valve. The slower oscillations are fed to P deflector electrodes which control the framing of the picture.

The difference in the value of the two condensers is sufficient to keep each set of oscillations distinct, though as an additional safeguard one set of synchronising signals may also be made stronger than the other.

NORMAL PENTODE FEED

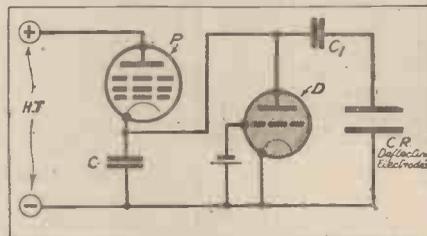


Fig. 1.—A typical pentode-fed gas-discharge sweep circuit.

A SIMPLE CIRCUIT

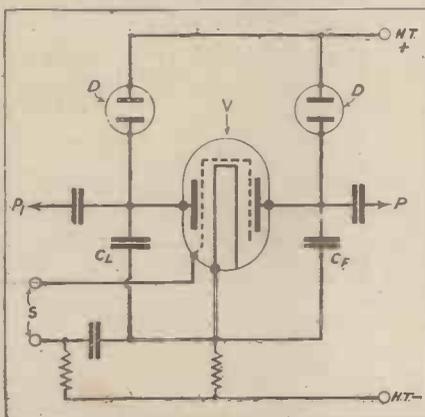


Fig. 2.—The two diode valves and dual-discharge tube seen here form a complete double time-base.

GIFT-BOOKS FOR THE MANLY BOY

EVERY lad of to-day is interested and mystified by the marvels of modern science. The **BOY'S BOOK OF EVERYDAY SCIENCE** (6s.) is a book that will not only explain how and why things work but will also create interest in important and less-known sides of science. It explains how a dam holds up 500 million gallons of water, how the prismatic binoculars work, how railway signals operate, and so on; the book is illustrated by some hundreds of remarkable photographs and drawings. In addition to these fascinating features there are safe and simple home experiments, and the true stories of great inventors and discoverers. No boy who likes engineering and science should be without this big-value gift-book.

MYSTERY AND ADVENTURE

CHUMS ANNUAL (8s. 6d.) is too well known to need introduction. This new 416-page issue is as good as ever. It contains book-length stories of adventure and mystery, more than 35 short stories of all descriptions, pictorial articles, hundreds of illustrations and four magnificent colour plates. There are weeks of healthy entertainment in this book. It is the gift-book par excellence.

COULD YOU CROON?

By Suzanne Botterell

Suzanne Botterell is only twenty-three, but she has already made a name for herself on the air, and has sung with Al Collins, Lew Stone, Sydney Lipton, and Carroll Gibbons.

THE vocalist in a dance band probably gets more fan-mail than the leader and the rest of the band put together. But for all that he or she is regarded as quite an unimportant part of the musical unit.

In America the vocalist is catered for in the same way as the star instrumentalists, and is the centre of attraction while the vocal chorus is being taken. In this country, however, I don't think I am putting it too strongly when I say that the tendency is for the vocalist to be regarded by the band as a pleasant but rather unfortunate sort of a nuisance.

The Spirit of a Number

They take up the attitude that it's their instrumental music that makes the dance band what it is, and the vocalist, by attracting attention from the instruments, is only wasting so much valuable time. However, the public and the publishers want vocal choruses, so the musicians have to put up with them, but they go along in their own sweet way all the time the singer is doing his or her job.

What is that job exactly? Not only to sing the lyric and so explain what the song is all about, but to interpret the spirit of a number. I think that the vocal chorus should get over to listeners the mood and atmosphere of a song, as well as its "story." But how can you yourself correctly interpret the real essence of a number if you have only seen it for the first time a few minutes before you are supposed to broadcast it?

Oh, yes, it often happens that way. A rush orchestration is being prepared for a band of a piece which the leader happens to like. The arranger, working against time (as they always do in this hectic profession!), turns up with the parts just before the band is due to go on the air, and you are handed a vocal chorus that you have never seen or heard of in your life before. Well, it's all in the game; if the song isn't your type, or is written in an awkward key, there's no time to complain.

Reading the Music Direct

The band runs it through once or twice, and you get the hang of the tune, then the red light starts flickering to tell you that zero hour is here. With your heart palpitating you hear the leader announcing, "We have pleasure in introducing a new tune which will be sung for you by Suzanne Botterell," and you take a firm grip on yourself and hope for the best.

Of course, if you want to sing with a dance band, you have to know something about music, so most vocalists can read music as accurately as the instrumentalists

can. But how on earth can you give a sincere interpretation of a song when you're chiefly concerned with reading the notes? It's after you've learned a song that you can really interpret it, and, if you get no time to learn it, the public are getting an insincere version that can hardly be satisfactory.

You may be surprised to learn that the leaders choose the tunes for their vocalists. The vocalists have very little say in what they want to sing.

Ask any dance-band vocalist how much say he gets in choosing his numbers, and you would be surprised at the answer. Usually, the leader chooses, and chooses well, but, frankly, I think the vocalists could choose material more in keeping with their own individual styles if they were given a freer hand. I'd like to pay a compliment, by the way, to Al Collins and Lew Stone, who were both particularly thoughtful in this respect.

Vocal choruses were always matters of the greatest importance to Lew Stone, and while I was singing with his band at the Café de Paris he and I would have long conferences about the numbers I was to do, and the spirit in which I was to do them. Lew is that rare sort of leader—a really sensitive musician—and any interpretation that was out of the spirit of a number was anathema to him.

What is a Crooner?

And now for the question which has long been a vexed one. Are we dance vocalists really crooners? What is a crooner, anyway?

Personally, I don't think there's such a thing as a crooner, but the phrase isn't as uncomplimentary as is often made out to be the case. You see, when broadcasting with dance bands came in, Jack Smith, the Whispering Baritone, introduced a new style of singing to take full advantage of the peculiar qualities of the microphone. Instead of standing well back and singing in the good old ballad style, he came in close and whispered into the microphone. Well, that was the beginning of crooning. Nowadays it is even more difficult as the style has been improved upon a good deal, and there is a great technique to be learned before you can hope to be an expert at it.

Actually, I am what is known as a swing-singer. Swing-singing is my pet subject, but I don't want to talk much about it, because all the jazz-experts of England and America have recently been engaged in



Miss Botterell thinks there is no such thing as a crooner. She maintains that she herself is what is known as a swing-singer.

defining this extraordinary thing called "swing." As I don't pose as an expert, I don't want to cross swords with them.

I'll put it like this, though, that I understand "swing" as a free interpretation which is so sincere and in keeping with a number that it communicates the rhythm and feeling of that number to the listener. The Negroes have swing in their blood; that is why the raucous trumpet notes of Louis Armstrong produce such an inexplicable feeling of exhilaration in the heart of a listener, and why singers like Ethel Waters and Billie Holiday can produce such a wonderful effect by rhythmic improvisation round a melody.

Like all new catch-phrases, though, "swing" is becoming misapplied, and people think that if you shout "vo-de-do" and "hotcha-cha" long and loud enough, you are a swing singer. Take it from me that the essence of swing is restraint. The finest Negro swing-instrumentalists produce the maximum of effect with the minimum of notes, and there's no reason why a singer should clutter up a song with meaningless "scat."

What it all boils down to is that the vocalist in a dance band has a much bigger and more important job to do than people give him (or her) credit for.

Lots of people can sing, but can they sing through a microphone? Can they sing a whole chorus of maudlin words with sincerity and feeling? Can they express the rhythm of a tune without detracting from its spirit and meaning? Can they receive loads of fan-mail until they think that they are real big shots, and then find themselves treated as very small beer by the bands with which they sing? Could you do all that? If so, then band leaders are looking for you. Such people are hard to find.

FROM OUR READERS

IF IRON BECAME NON-MAGNETIC

The Editor, POPULAR WIRELESS.

Dear Sir,—It is perhaps unnecessary to remind readers of "P.W." that iron, whilst being one of the most plentiful and cheapest elements, plays a great part in modern electrical engineering, and is thus of vital importance to the industry to-day.

Indeed, during the Faraday Centenary celebrations a few years ago, some stress was laid on the fact that the whole structure of our modern civilisation depended upon the magnetisable qualities of iron. It was pointed out that if iron were suddenly to lose its power of becoming magnetised all the world's power stations, all its telephones and wireless sets, all its tramcars and electric railways, all apparatus in which iron played the rôle of a magnet, would become inoperative. In short, that this one quality of iron was necessary not only for the success of the electrical industry, but for civilisation itself.

I will admit that it is mighty convenient to be able to use iron so liberally and efficiently as we do to-day, but the only effect of the sudden failure of iron's capacity to be magnetised would be a period of inconvenience, hardly the collapse of the whole of civilisation. Such is the genius of man, that if this calamity did happen (not that there is any likelihood of it doing so, for so far as we know to-day the elements of which iron is one are absolutely permanent in all their characteristics, with the exception of the heaviest elements which are spontaneously breaking down) he would at once set about finding a substitute, with every prospect of success. There would spring into being new ways of building dynamos, new ways of intensifying the fields. After all, it is the wire carrying the current that does the work, the iron merely serves to concentrate the magnetic field.

Even to-day we have the moving coil loudspeaker, with its coil wound on an aluminium former from which iron is wholly absent.

But can you picture a world without any magnets? After all, we know little or nothing about what causes a metal like iron to become a magnet, and another metal like copper not. Nor do we know why two so-called non-magnetic elements like nickel and aluminium should become magnetic when combined. It lets us see, however, on what a thin thread our civilisation hangs at the present time—the more or less haphazard re-arrangement of molecules about which we are almost entirely ignorant.

Yours truly,

WM. NIMMONS.

7, Hazelfield Street, Belfast.

THAT BOW-BELLS RECORD

The Editor, "Popular Wireless."

Dear Sir,—And yet one more note respecting Bow Bells. Can your correspondent say if it is possible to

It is interesting to dwell on the possibilities of what might occur if this supposition, raised by a reader, took place

purchase the record referred to? (I do not, of course, mean the one recorded only a few months ago by a well-known firm of record manufacturers.)

Also, I am of the opinion that no second record is now used, as from my own observation of this appreciated interval signal, it seems to indicate the two records are now reproduced as, or moulded into, one.

Yours faithfully,

A. W. HARVEY.

7, Victory Road, Wendover, Aylesbury.

AND THE ANSWER

The Editor, POPULAR WIRELESS.

Dear Sir,—May I encroach on your space to have the final word about "Bow Bells"? Referring to the letter from Mr. A. H. Bartram in your November 14th issue, I would point out that the record(s) used as the present-day B.B.C. interval signal is not the original recording mentioned by your correspondent.

That disc was Columbia 4082, but the new recording made during March, 1936, is Columbia DB.1637 and is the one now in exclusive use. The record was made by a mobile recording van at, of course, St. Mary-le-Bow Church, Cheapside, and the chimes are the Whittington Chimes, i.e., the actual chimes Dick Whittington is reputed to have heard, according to tradition.

Your faithfully,

D. ALDOUS.

Horns Road, Ilford, Essex.

Talking of "S.T." sets reminds me of an incident which occurred only yesterday. I was discussing an order for a kit of parts for the latest S.T.800, and when I mentioned to the dealer that the complete kit with valves was only £4.14.0, it would have done Mr. Scott-Taggart good to see the look of complete disdain on the dealer's face. He looked at me as much as to say: "You poor fool, expecting to get a set with valves, four valves at that, for £4.14.0!"

Of course, this man lived in a wireless world made up of pieces of furniture beautifully polished from 12 guineas upwards. The innards mustn't be mentioned. He simply couldn't grasp the fact that it was possible to build a set which would tune in the ends of the earth for under £5. However, I was patient with the poor fellow and convinced him that £4.14.0 did include four valves!

There does seem to be a total lack of interest among most radio dealers to help constructors to obtain the necessary components. But this will not prevent enthusiasts—and the thousands of "Popular Wireless" readers are enthusiasts—from building their own sets, and so help them to carry on one of the finest hobbies in the world.

Yours faithfully,

T. E. PRESTON.

6, Treadford Lane, Birmingham 8.
P.S. Heartiest congratulations to Mr. Scott-Taggart on his great achievement in the S.T.800.

WHERE TO GO

The Editor, POPULAR WIRELESS.

Dear Sir,—I was surprised to read in "P.W." Oct. 17th issue, the article of "A Novice." It almost made me lose my temper and I write you to inform him where to obtain "service." However, in a later issue I saw Donald T. Kear was of the same opinion.

May I have the pleasure of informing them that there are 1,200 qualified service engineers in Great Britain. All you have to do to get first-class service and a fixed charge for each job is to call in a "Radio Manufacturers' Service Engineer." If you don't know of one in your district write to: Radio Manufacturers' Service Ltd., Perivale, Greenford, Middlesex, and the secretary will send you the name of the nearest engineer.

These men do not charge any price as the cost is made out on a sheet for them. Here are a few of them.

Repairing and cleaning switch contact, labour only, 5/-, executed on dealer's premises; 7/6 at customer's home. Rebalancing, labour only, 7/6, executed on dealer's premises; 10/- at customer's home.

On top of this every job is guaranteed for 90 days.

I agree with D. T. Kear that there are a lot of dealers who know nothing about wireless, but they are slowly being pushed out of the trade, also the "A.V.C. salesmen." However, to have a good job done, do as I say, it will only cost you a 1/6 stamp.

Yours faithfully,

J. R. CLEMENTSON.

Coulty Farm, Chirk, Wrexham.

THE OTHER SIDE

The Editor, "Popular Wireless."

Dear Sir,—With reference to the article on "Service," by Mr. D. T. Kear, in the Nov. 14th issue of "Popular Wireless." Mr. Kear states that he is able to explain why dealers do not give service. Maybe there are dealers who are incapable of servicing receivers, but the majority can and will give service if the customer will state what he wants and is willing to pay for the service.

I have been in this service business for nearly eleven years and find that the majority of our customers want their receivers servicing without the cost of new parts. This is the type of thing we have to deal with: "Please patch it up, we don't want to go to any expense," or "It only wants cleaning and adjusting, we have only had it two years."

We have even taken out faulty parts and shown them to customers and still they will not believe that a new part is required. What are we to do in cases like these? The other type of customer is the one who says, "It has been done by Mr. So and So, he is a very good man, but hasn't the time to do it this week." On taking the set down, we find a terrible mess nine times out of ten, wrong condensers, too small wattage resistances put in and even pieces of string to hold parts together, the soldering evidently having been done with a crowbar instead of a soldering iron.

(Please turn to page 388.)

VIENNA'S NEW RADIO HOUSE



A view of the new Radio House at Vienna, which is at present under construction. It is expected to be finished about the middle of next year.

TOO GOOD TO BELIEVE

The Editor, "Popular Wireless."

Dear Sir,—May I be allowed to give hearty support to your correspondent Mr. Donald T. Kear in his remarks regarding service-salesmen. It really is amazing to hear the rubbish which some of these people talk when you visit a wireless shop for an odd component. I am quite sure that most regular readers of "Popular Wireless" could simply floor these alleged technicians on radio matters.

They are always so anxious to put purchasers off with something other than what one really requires, assuring you that it is just as good as the article you originally asked for.

Of course, we know there are some components which have suitable alternatives, but in the case of the wonderful "S.T." sets which you have given us for some years now, I really think it is advisable to stick to the author's specified parts.

DON'T let "FIZZLE and CRACK" "THE OLD VALVE BROTHERS" spoil your CHRISTMAS entertainment



REJUVENATE
YOUR SET WITH

Osram Valves

MADE IN ENGLAND

DON'T let old valves ruin your Christmas programmes. Replace them with OSRAM VALVES—the Tonic to any set. If you will write stating the make and type of set you have, we shall be pleased to cure your radio troubles, and will advise you on the correct Osram Valves to use. You will be amazed at the difference that Osram Valves make.

The Christmas Tonic to any set!

Advt. of The General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.

FROM OUR READERS—Continued

When we meet with this kind of thing, can you wonder at the dealer not interesting himself in "service." In conclusion, if people requiring service would only pay more attention to the articles published in "Popular Wireless" they could manage without the service engineer and learn enough to do their own servicing.

Wishing you, your staff and the "Popular Wireless" every success,

Yours faithfully,
H. G. FROGGATT.

17, Spencer Street, Mansfield, Notts.

SUPERHET v.
STRAIGHT

The Editor,
POPULAR WIRELESS.
Dear Sir, It has always been a keen subject for arguments as to the merits of straight sets v. superhets, the latter being considered more powerful for the same number of valves.

This is a very unfair claim when the valve types are considered. Take the normal straight set, consisting of S.G., Det., L.F. and Power or Class B.

The four-valve super uses a mixer in place of two normal valves; S.G., D.D.T. instead of two valves, and Power or Pentode. Total equal to six valves in the straight, hence the extra power.

If a straight set was designed using an S.G. as first H.F., Pentagrid second H.F. and Det. and a Pentode or Q.P.P. valve, this would be a vast improvement on any normal three-valve straight and up to the standard of supers—but still of the better quality of straights.

"S.H." replies with the greater selectivity of Supers. True, but is it not this which helps to make inferior quality? Always an undesirable feature of any set.

In my experience I have found a well-designed straight set to be quite satisfactory when provided with a good aerial. When Droitwich started my straight four would separate it from Luxembourg without any modification to the circuit, which is more than I can say for a large number of pre-Droitwich supers when tested at a distance of 12 miles from the station.

The set employed band-pass with variable coupling to allow for improving the quality by decreasing the selectivity.

I consider aerials to be an important part of any set, although too frequently neglected. Most manufacturers recommend an aerial of about 45 ft. as being all that is necessary and as good as a longer one. The set will probably be all right on this length, but would surely be better with a 100-ft. aerial.

Testing a well-known commercial set on my own aerial (which is of the latter length and 35 ft. high), I was astonished at the poor selectivity although 9 kc. was specified and probably obtained with a short aerial.

My experience shows that a small selective set working on a good aerial is as good as the average high-power super on its usual short aerial. The latter always using a few parts to bring in the signals and the rest to cut out the unwanted whistles, hisses, etc., which also come in.

I shall always stick to straights, as they are in my opinion the best. But let us hear what the Superites have to say.

Yours truly,
M. WILD.

121, Middleton Park Road, Middleton, Leeds, 10.

READ, MARK, LEARN

The Editor, "Popular Wireless."

Dear Sir,—I am wondering how many of your readers have been passing their leisure hours during the past four weeks. Most of them are, no doubt, like myself, waiting patiently for delivery of their S.T. 800 kit. For myself, four of the longest weeks I've ever known.

I have read and re-read not once but a hundred times or more, not only reports on the set but wiring and operating data until I know them almost by heart. For four solid weeks I've built the set wire by wire in my mind's eye and followed them on the blue print, and each time have gained useful knowledge, which will help when the great day arrives.

Although the set has yet to be built, I have already entered it in competition with one of the latest commercial all-wave superhets, and the two sets are going to be tried out side by side, station for station, and I know which is going to come out on top.

For years I've waited for Mr. Scott-Taggart to bring out this set and as his previous designs have only been published after months of hard research work on his part I consider that the S.T. 800 is to be his real masterpiece, and the joy and pride of thousands of listeners. Having listened to several of the leading all-wave sets on the market I was beginning to doubt the entertainment value of short waves, but now I am convinced that Mr. Scott-Taggart has once again come to the rescue in his latest achieve-

ment, with a really simple, inexpensive and efficient set, and having followed his designs, I am positive that I am only one of thousands who are betting on the same winner.

Now all you enthusiasts, keep on studying your blueprints and instructions until you think you know them from memory, and then read them again and you'll learn just a little bit more. Shortly I hope to give you the result of my little competition with the superhet. Wishing "P.W." its continued success.

Yours sincerely,
W. J. L. L.
87, Glenwood Gardens,
Ilford, Essex.

AN INTERVAL-SIGNAL IDEA

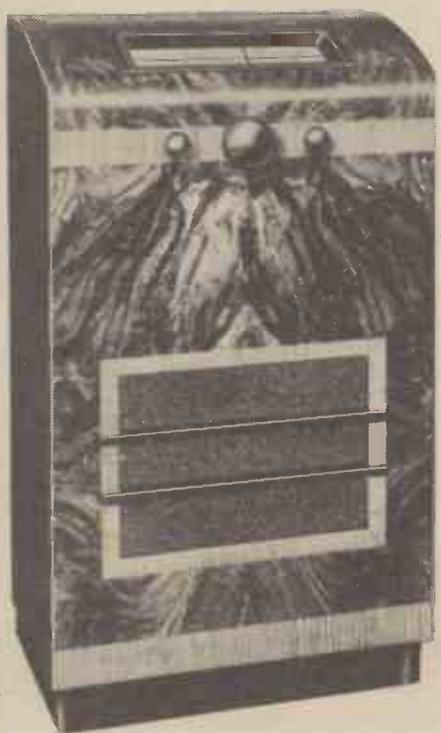
The Editor,
POPULAR WIRELESS.
Dear Sir,—There has been a lot of controversy about interval signals from time to time, but what most listeners seem to overlook is the fact that these signals are mainly for identification purposes. Of course, if it happens to be pleasant to hear as well as providing an easy means of identification, so much the better, but, personally, I think this is of secondary importance.

It is fairly simple to identify stations on the ordinary wavebands—i.e., long and medium wave stations—but when you get on the S.W.'s, especially from 46 to 50m., these signals are nearly always the only means of identifying the various stations. Thus we get to my positively "stunning" idea (I hope). But seriously, there is an international committee for the allocation of wavelengths so why shouldn't there be an international committee for the allocation of interval signals? Better still, why doesn't the committee that controls wavelengths give each station its own interval signal, each station being given a different signal?

This would make station identification simple. Of course, each station would have to be compelled to use its own signal and no other, but I don't think this would present any difficulty as each station would have a certain amount of latitude in its choice of a signal the same as it has in its choice of wavelength. Then again, I think most of the stations would be only too glad to have a signal that couldn't be duplicated by others.

If one doesn't think this scheme would be a success—at least from the listeners' point of view—

AN EKCO ALL-WAVER



This attractive instrument is the Ekco CTA 87, an all-wave console costing 15 guineas.

just tune from 46 to 50 m. any night when conditions are fairly good, and try to count how many stations use a Gong for a signal. Most of these stations aren't content with having, say, one stroke-on-a-gong, but they have one, two and sometimes three, using them one after the other with announcements sandwiched in between. This makes identification very difficult and sometimes impossible. Whereas if each station had a different signal identification would be easy, as any station couldn't use more than say one stroke or two strokes on a Gong, and would be unable to use them both together.

Although it seems unlikely that this scheme will be taken up it would be interesting to have other readers' views on the subject.

Yours faithfully,
HARRY LADNER.
10a, Mulgrave Street, Plymouth, Devon.

WHY? OH, WHY?

The Editor, "Popular Wireless."

Dear Sir,—I wonder if some, or one, of our technical friends will enlighten a poor, dumb Englishman, why it is possible to buy American valves (sorry, "toobs"), mains types, too, at five to six shillings, in this country? I know some of the answers beforehand, here goes. "They are no good." "Ah! ah! Have you ever tried them?" "They are rejects." (That's why the manufacturers put their name on them.) "They are inferior to ours." They should be, really, but curiously they are not.

Then we have American sets selling at £3. 10. 0 TRFs (mains) superhets, five or six valves; A.V.C., 16-50, 250-550, 1,000-2,000 metres, splendid jobs, too, £6. 10. 0 to £10.

For £10 you can get a real top-notch first-class set. Admitted we have one manufacturer who puts out a decent job at about £6. 10. 0, but it's not a five-valve, nor is it a three waveband, nor does he pay 20 per cent duty or carriage, etc., from U.S.A.

They are really Yanks (they make their own valves, too). What are our radio manufacturers doing about the invasion which has only just started?

Already one British firm is putting a £5 superhet short-wave job on the market, built round American valves!

Which, if any, British manufacturer will send me a box of cigars for the information that American exports are well up on last year to this country?

Come on, fellow "Popular Wireless" men, give us some answers.

Yours faithfully,
H. WILKINSON.

Plas Tara, 3, Nantygamar Rd., Craigydon, Llandudno.

"A BONNIE OLDE BATTERY."

The Editor, POPULAR WIRELESS.

Dear Sir,—As an assistant in a local radio store the following amusing experience happened to me a few seasons ago. One day the skipper of a Scottish drifter together with three of his crew, came to the shop carrying a huge triple capacity 120-volt H.T. battery (it must have weighed quite a bit), plunked it down on the counter with the remark "Can you test it, lad?"

I did and it was quite run down. When I told him, he complained, saying it was a dud, and should have run much longer, and he ended it all by saying, "And it's one of yours, we bought it from you." Enquiring when it was purchased he said, "The start of last fishing," which was about fourteen months previously. After explaining that he had had at least his money's worth from it, he reluctantly purchased another similar battery which I handed him, and lifting the old one from the counter I dumped it in our refuse box.

"An' what be y'r gonna do with that," he asked. "Throw it away, of course, it's of no further use." I replied; but he didn't or wouldn't believe what I said. "Give it back here, lad, we'll take it back to the ship with us." So one of the crew had to carry the heavy battery about three-quarters of a mile up the road to the ship because the skipper was afraid there were a few volts left in his battery and that we would use it for some purpose.

Yours faithfully,
J. A. BOTWRIGHT.
79a, Nelson Rd., Gorleston, Nr. Yarmouth.

INVERTED "BREAK-THROUGH"!

The Editor POPULAR WIRELESS.

Dear Sir,—I would be glad to know if any of your readers experienced the following trouble with their receivers and would appreciate a remedy through your columns.

When the set is tuned to any of the Regional stations the Droitwich programme comes in in the background, and could even be followed if there was an interval at the Regional transmitters. High power foreign stations close to Regionals are not affected.

The receiver in question is a modern 4-valve A.C. superhet, 2 wavebands; aerial about 35 feet high, length 45 feet. Location: by the south-east (Irish) coast, about 60 miles from the Welsh coast. Any information would be gratefully received.

CURIOUS, I.F.S.

ON THE SHORT WAVES

ABOUT DETECTOR CIRCUITS

By W. L. S.



JUST what started this particular itch for playing about with detector circuits I can't say. It has, however, attained the dimensions of a pretty bad "phobia," and readers clamour for more. I suppose its popularity is partly due to the fact that one can "re-hash" a detector circuit over and over again with the same components. It doesn't cost anything—until you put the H.T. across the L.T. terminals—and it doesn't mean a particularly heavy lot of constructional work.

There is always the fascination of comparing the results given by different arrangements. There is always the hope—and what a hope—that you will suddenly

A REACTION POINT

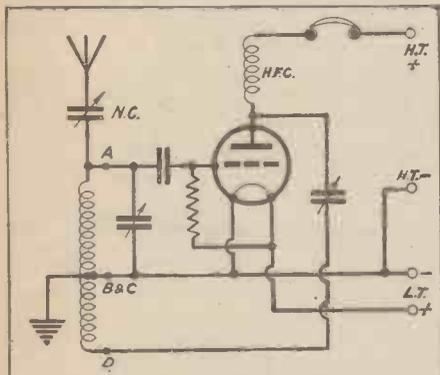


Fig. 1—The reaction condenser in this circuit is "live" on both sides, a serious disadvantage in practice.

hit upon a circuit that gives those results of which you have been dreaming for years.

In the days of the old two-pin plug-in coils this game was easy. Everyone used to chop his detector circuit about from time to time, and one heard of all the variations on a well-known theme. Nowadays the popularity of the four-pin coil seems to have cramped people's style somewhat.

Circuits Not Often Used

True, these four-pin-affairs seem to have been made for the common-or-garden grid-and-reaction circuit that we all fall back upon. But there is no difficulty whatever in using them for other purposes. The main reason why new and inexperienced readers don't do it is that they are not too sure of the connections, and probably they have a positive horror of the smell of burning rubber.

This week I am showing three circuits which, for some reason, are not often used. Before we go further, please look at Fig. 2 and get it clearly into your head that the

letters opposite the pins of the coil-holder are supposed to be against those pins as seen from underneath.

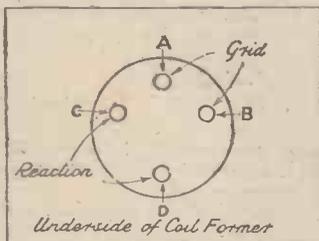
They do not represent the connections to the valveholder in which the coil former is placed, but the pins of the latter (by which I mean the former) as seen when you hold it up and look at the bottom. That should be clear enough for anyone, so we will proceed.

Fig. 1 represents, in my opinion, about the worst possible arrangement of the ordinary reaction circuit. I make no apology for reproducing it, however, because, for some reason which I have never fathomed, it is tremendously popular.

It was once called the "Reinartz" circuit; and back in 1924 the name "Reinartz," as applied to receivers, was mentioned with bated breath as if there were some association with black magic.

It works well (but no better than the split-coil arrangement more commonly used nowadays), but it has a serious disadvantage. The reaction condenser is "live" at both sides. No matter which way round you connect it, you will still have hand-capacity effects when you go to grab the spindle.

Further, the H.T. is parallel-fed, which means that the "goodness" of the H.F.



WIRING TO PINS

Fig. 2—The connections to the coil former pins looking at the underside of the coil base.

choke is a matter of considerable importance. Take this same circuit, use series feed, and put the reaction condenser between the "dead" end of the reaction coil and earth, and you will have the much better arrangement that is regarded as the orthodox detector circuit to-day.

It has been illustrated so often that I don't even reproduce it on this page.

Fig. 3 shows a circuit that has made itself a reputation for being an easy oscillator. It is usually known as the "Split-Colpitts" arrangement, although the Americans call it the "Hoffman."

I have not shown any means of controlling reaction, because opinions differ strongly on this subject. One thing is certain—you can't do it by varying the fixed condenser between "B" and "C." The coil must be treated as a single one from "A" to

"D," with this condenser inserted *en route*; and as the whole coil is tuned, variations in the capacity of this condenser will affect the tuning as well as the degree of oscillation.

The grid leak is in an unconventional position, and there is no grid condenser at all; but the circuit works beautifully, as anyone who has used it on 5 metres will confirm.

Reaction should preferably be controlled by a variable resistance in series with the positive H.T. between the 'phones and the H.T.+ terminal. The same circuit may also be rigged up with a screened-grid valve as detector, reaction then being controlled by varying the voltage on the screening electrode.

Avoiding Hand-Capacity Effects

Another very freely-oscillating circuit is the ordinary Hartley, shown in Fig. 4 (on the next page). Both this and the one just described suffer from the disadvantage that the tuning condenser is "live" on both sides. This may be overcome, however, by setting it back from the panel and using an extension coupling. There is an excuse for this in the basic form of the circuit, whereas the reaction circuit of Fig. 1 can be so easily improved that there is no excuse for that position of the reaction condenser.

OSCILLATES FREELY

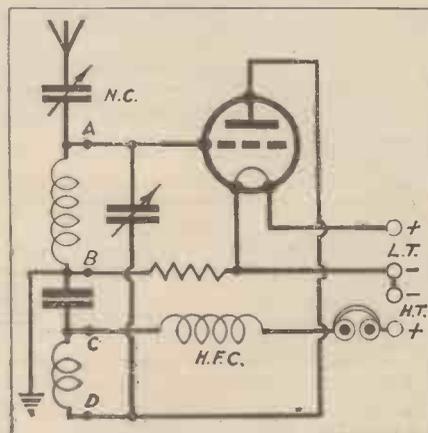


Fig. 3—The "Split-Colpitts" circuit which oscillates freely. It is a good short-wave circuit.

Fig. 4 is a very straightforward arrangement. The two coils are combined to form one, and the junction between them comes at just about the right place for the tapping. This circuit is series-fed and works extremely well.

ON THE SHORT WAVES—Page 2.

POINTS from the POST-BAG

W. L. S. Replies to Correspondents

J. D. (Belfast) reports good reception of some of the U.S. police-cars and fixed stations, but I must correct him when he says that they are working on 7 metres. They are mostly between 9 and 10 metres. At all events, his 7-metre receiver *does* work—he hears the Alexandra Palace transmissions at R7-8 on it. Who said “quasi-optical?”

Several readers want to know if the little single-valve super-regenerative circuit can be used for broadcast reception. I should say not, myself, although I've not tried it. Armstrongs and Flewellings were all very well once upon a time, but in those days Europe wasn't cram-full of powerful broadcast stations.

Hard on the Neighbours

I imagine that the inselectivity of these “supers” would put them right out of court nowadays. Anyhow, there's no harm in trying, although it will be pretty hard on the neighbours if you don't use a stage of H.F. in front; and even then it would be advisable to use a frame-aerial.

L. W. S. (Hendon) reports comparative failure with a short-wave circuit “culled from many sources,” and wonders whether he is to blame for substituting indirectly-heated valves for the battery variety. Personally, I have always found the mains valves far better than the others—so L. W. S. can rest assured that this isn't his trouble. The fact that I don't often show circuits of all-A.C. short-wavers doesn't imply that they're no good, but simply that the vast majority of readers are interested chiefly in battery sets.

Will P. K. (Irish Free State) and others please note that cards for British amateurs can be sent c/o the R.S.G.B., 53, Victoria Street, London, S.W.1, if the full addresses of the stations are not known? These cards will then reach them together with a batch of others. They are sent out at regular intervals.

“M. S. of Harlow,” who used to be a regular contributor to these columns, wants to get into touch with R. D. E. (Sawbridge-worth). As I haven't the latter's full address, perhaps he will write to M. S., who is Mr. B. M. R. Selby, Tye Cottage, Tye Green, Harlow, Essex.

For 20-Metre Amateurs Only

G. L. (Bridlington) wants to make a set for reception of 20-metre amateurs and nothing else. He remembered my statement that the commercial “22-47-metre” coils would cover the 20-metre band if tuned with a 000015 condenser. He has now forwarded a circuit for criticism, and it seems to me to be O.K.

Readers trying this should not be disappointed if the band required doesn't “locate” itself quite properly. It may cover 90°–180° on the condenser, or it may not come right in. A little wangling with the turns of the grid coil, or with a parallel condenser, should put things right.

C. R. G. (Bury) has a standard-baseboard

set that seems to be “getting progressively worse.” They don't get better, unfortunately! His worry is this: although he has logged stations like V K 2 M E, T I 4 N R H, C O C Q, H P 5 B and the rest of them, he can't log Australian amateurs or West Coast Americans.

In any event the latter are pretty difficult to get hold of (except on 10 metres), unless one chooses the time carefully and is used to deciphering weak stuff. I imagine, though, that his set needs a good clean out, new batteries, and possibly new valves, too.

C. R. G. also enquires whether two verifications from the same station, but concerned with different wavelengths, will do for the V.A.C. I'm afraid they won't—it makes things *too* easy.

THE HARTLEY SCHEME

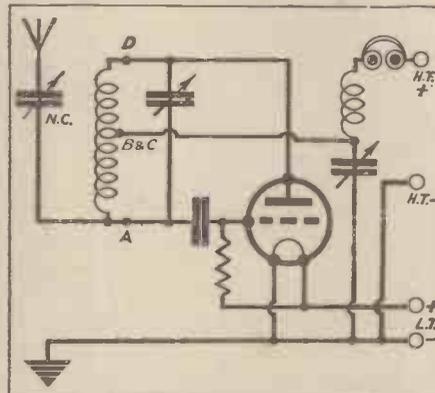


Fig. 4—The Hartley circuit. As in Fig. 3 the tuning condenser is “live” on both sides, but this difficulty can be overcome by fitting an extension rod so as to set the condenser well back from the panel.

A. E. R. (Swansea) is yet another reader who takes a “B.C.L.” Two to sea. He also uses medium- and long-wave coils with it, but doesn't find results “up there” as good as they might be. Probably the aerial coupling is not tight enough for the job. Perhaps it would be improved by taking the aerial, through a small condenser, to the top of the grid coil instead of to the third winding provided for the purpose.

Reaction for H.F. Stages

A. E. B. (Tooting) has noticed the tendency on the part of American designers to introduce regeneration into the H.F. stages, and wonders why we don't do more of it in this country.

Generally speaking, the short-wave fans that I know are more concerned with keeping it *out* than with putting it *in*! I'm writing very soon about a two-stage pre-selector unit, and we'll see what we can do about it in that.

B. C. (Garstang) had heard “the New Zealand luxury liner” Z M B J, working with Rugby, G B C, but doesn't know how to charm a “veri” from her. Perhaps D.C. (Balham), who actually has one, will give me the address to which he sent his QSL card.

A. G. (Rochdale) has a standard-baseboard set which does everything but work, and he is inclined to suspect his coils, which are of a make that I have not mentioned hitherto. Looking at the leaflet, however, I find that they use the same connections as those that I normally use. I imagine that he has made a bloomer with the connections.

Short Wave NEWS

THERE does not seem to be much point in giving regular “station news” these days, since so many readers have more time to keep watch on the short-wave broadcast bands than I do myself—and even they don't seem to hear anything startling! I suppose the truth of the matter is that nothing connected with short waves is startling now. The arrival of a new station in South America or Asia doesn't even cause the elevation of an eyebrow—it's just one more on the list.

5-Metre Band Gets Going

The fact of the matter is that short-wave listening (except on the amateur bands) is losing its old status. It is no longer one procession of thrills, as one new station after another is logged; it is more like a tour of the medium-wave broadcast band, except that its programme value is usually somewhat greater.

I hear that the 5-metre band is “open” at last. A British station has been received in Jugo-Slavia; and CN 8 M Q, in French Morocco, has heard several of the Finnish amateurs. Look at the map of Europe for this latter achievement, and you'll agree that 5 metres is “going places” at last.

Elsewhere on this page we have the news that the Alexandra Palace transmissions are being received in Belfast; and I'll wager that before many weeks are past, we shall have some more 5-metre news that really *will* make us sit up and take notice.

Look Out for the “Yankee”

In November the yacht *Yankee* sailed from Gloucester, Mass., on a cruise which will last for eighteen months. She carries W 8 I G Q as her wireless operator, and works on several “spot frequencies” on the short waves. She will be looking out for contacts on the amateur bands, and her own frequencies at such times will be 6,210, 8,280, 12,420 and 16,560 kc. The call-sign is W C F T, and she is liable to be heard from several interesting points.

The cruise takes in such places as Galapagos Is., Easter Is., Pitcairn Is., Samoa, New Hebrides, Papua, Bali and French Guiana. All amateurs hearing her are asked to report reception to the A.R.R.L., West Hartford, Conn., U.S.A.

Another expedition to be looked for, this time in the amateur bands, is the 1936 Jarvis Island Expedition. The call-sign is K 6 G N W. Once more reception should be reported to the A.R.R.L.

In this case the transmissions will take place in the amateur bands.

It is opportune to mention here that many interesting stations, mostly connected with expeditions, rely on amateurs for much of their communication. They often work outside the amateur bands, but receive on these bands when they wish to make contacts.

Don't neglect, therefore, to listen outside the 20- and 40-metre bands occasionally. You may hear something of outstanding interest—in which case I should be glad if you would let me know all about it.

W. L. S.

SEEN ON THE AIR

News and views on the Television Programmes by our special radio-screen correspondent,

L. MARSLAND GANDER

DISASTER overshadows television as I write. The fire which destroyed the Crystal Palace on the heights of Sydenham was a tragedy for the Baird Television Company, which occupied the South Tower and adjoining premises covering thousands of square feet.

At the moment it is impossible to assess the total extent of the damage, but report states that a great deal of the Baird Company's equipment was destroyed. This is indeed a blow to research. How serious cannot be determined until the company announce when and how they will resume operations.

World's Largest Cathode-ray Tubes

The Baird Company had at the Palace one of the finest, best-equipped and best-situated centres for television research in the world. It was about three years ago that the Baird Company first began its experiments at the Palace, having constructed a station there in record time. The South Tower, 280 ft. high on ground more than 300 ft. above sea level, gave the wheel-shaped television aerial a commanding position. The tower, incidentally, still stands.

Manufacture of the Baird cathode-ray tubes, including types claimed to be the largest in the world, was carried on at the Palace; hundreds of new television sets were stored there at the time of the fire. All the apparatus made for the B.B.C. television station at Alexandra Palace was assembled and tested on the premises. The extensive laboratories, which I have visited many times, carried on research in every branch of television, including big screen development. There was complete transmitting plant and a set of studios and offices.

Since the Alexandra Palace began broadcasting I have been able to make a personal test of three television receivers—the Baird, Cossor, and G.E.C. sets. In view of the circumstances surrounding the introduction of television—competition, secrecy, and the lack of facilities for manufacturers to test on regular B.B.C. transmissions—the uniform efficiency of these commercial models, all ready for immediate delivery, is truly remarkable.

No Eye-strain from Television

There are, of course, differences in the screen sizes and the number of controls. Two of the sets, the Cossor and G.E.C., give a direct view of the picture on the end of the cathode-ray tube; the Baird shows a reflected picture in a mirror on the underside of a raised lid. But any one of these sets can pick up in the home first-class pictures transmitted on either of the Baird or Marconi-E.M.I systems from Alexandra Palace.

By the way, a number of people have mentioned to me that they find television tiring to the eyes. I, too, had this experience at first, but I find that I have grown quite accustomed to televiewing and do not experience the slightest eye-strain.

There has also been some talk of danger from the high voltages used to actuate the cathode-ray tube. Fears on this account are needless. Receivers on installation are sealed at the back and must not be touched by any but experienced engineers. I have never heard anybody refuse to have a gas-fire installed because people occasionally commit suicide in this way.

Engineers do Not Worry

But, apart from all this, a number of television engineers have informed me that from time to time they have shocks, which are admittedly unpleasant but obviously not fatal. One man told me that the most serious thing that happened to him was a sensation of paralysis in his hand, which passed off in due course. Another offered, for demonstration purposes, to put his hand on the point where he would receive a shock of some thousands of volts. I refused his offer, and my advice to televiewers is: do not tamper with the inside with the current on; the outside is as safe as houses at all times.

I now have confirmation of the belief expressed last week that the staff at the Alexandra Palace is to be considerably increased in order to meet the universal demand for better programmes. After the campaign of criticism of the last few weeks some small improvements have been made in the programmes, but there is room for a great many more big ones.

More Cabaret and Vaudeville

Some of the "interest" films have been dropped and cabaret and vaudeville items substituted. Programme arrangers are growing more enterprising. A realistic air raid, with a bomber flying overhead caught in the searchlight beams and anti-aircraft guns shooting, is to be staged by Territorials and the R.A.F. on December 12th. All this will be seen on the television screen, by far the most difficult and ambitious "outside" television feature yet attempted.

Other coming events are an amateur hour, an all-coloured cabaret, and cooking lessons in the studio.

I think the man who infused most pep into the television programmes during the week I have under review was Bill White, the American banjoist; and the person who made the best picture was one of the Ormonde Sisters, a brunette. A close-up of the latter was not only the best reproduction of the week, but one of the most effective television pictures I have ever seen. Gentlemen may prefer blondes, but television needs brunettes. Van Dock, the cartoonist, was original and entertaining; so were the two New Yorkers. Television must have items like these to arrest the interest of its passing audience. Bill White, for example, galvanised an audience in my room. During other items incessant chatter showed that the majority took not the slightest interest in the programme material, but only marvelled at the newest invention.

PETO-SCOTT

S.T.800 BATTERY VERSION KIT "A" Carriage Paid 67/6

Complete Kit of Components exactly as FIRST specified and used by Mr. John Scott-Taggart, with Konectakit (Gratis with Complete Kit) but less wander plugs, accumulator connectors, valves, Extractor Kit, Cabinet and Speaker.

KIT "B" Carriage Paid £4:14:0

As for Kit "A," but including set of 4 FIRST specified valves only, less cabinet and speaker, etc.

KIT "CT" As for Kit "A," but with valves and Peto-Scott S.T.800 Table Cabinet only, less speaker, etc. Carriage Paid £5/11/6.

KIT "CC" As for Kit "A," but with valves and Peto-Scott Console Cabinet only, with speaker baffle and battery shelf, less speaker, etc. Carriage Paid £6/9/0.

KIT "CLL" As for Kit "A," but with valves and Peto-Scott Console Cabinet, Type "LL" only, with speaker baffle, less speaker, etc. Carriage Paid £6/11/6.

★ If Extractor Kit is required with any of the above Kits, add £1/4/0 to Cash Price.

★ If the above kits are required complete with 8 wander plugs and 2 accumulator connectors as specified, ADD 1/8 to Cash Price

S.T.800 (Battery) FINISHED INSTRUMENT DELIVERY FOR XMAS OR CASH REFUNDED



CONSOLETTA MODEL
Exact to specification. Complete with FIRST SPECIFIED valves, Peto-Scott Type 101 matched speaker and walnut console cabinet with Australian walnut veneered front and wings, dimensions 20 in. wide, 24 in. high, 12 in. deep (illustrated on left), less batteries.
CASH PRICE £8:19:6
CABINET ONLY, with speaker baffleboard, battery shelf and extension spindle, 35/-.
Carr. & pkg. 2/6 extra.

A.C. MAINS S.T.800

KIT "A" CASH PRICE £9:16:6 Carriage Paid

Comprises complete kit of components as FIRST SPECIFIED and used by Mr. J. Scott-Taggart, including Peto-Scott ready-drilled and polished walnut plywood panel, ready-drilled terminal strips, aluminium brackets, mains lead, nuts and bolts, less valves, cabinet, speaker and Extractor Kit.

| | |
|--|---|
| As for Kit "A," but including set of 3 specified valves, less cabinet and speaker. Carriage Paid £11/15/0. | As for Kit "C" but including valves and specified Peto-Scott A.C. S.T.800 Type "LL" cabinet, with speaker baffle, less speaker. Carriage Paid £13/12/6. |
|--|---|

1 WB specified speaker, type EMS £3 10 0

● FULL DETAILS AND ILLUSTRATIONS OF PETO-SCOTT S.T.800 STRUCTAKITS, CABINETS, ETC., FREE ON REQUEST.

Mr. J. Scott-Taggart's TELE-SOUNDER

KIT "A" Cash or C.O.D. Carriage Paid 38/6

Complete kit of parts, as first specified by Mr. J. Scott-Taggart, and shown in our advt. last week, including ready drilled aluminium screen, terminal strip, ready drilled and polished panel, and two sidepieces, less valve.

Balance in 8 monthly payments of 4/6.

KIT "B" As for Kit "A," but including specified valve. Cash or C.O.D. Carriage Paid £2/3/3, or 8 monthly payments of 6/-.

PETO-SCOTT Co., Ltd., 71 (P.W.9), City Road, London, E.C.1. Telephone: Glessold 9875.
West End: 62 (P.W.9), High Holborn, London, W.C.1. EST. 1919.



HOW TO REMOVE PENTODE HARSHNESS

F. U. S. (Surbiton).—*I was interested in your answer to S. C. C. F. in October 17th issue about tone controlling pentodes. I have a gramophone pick-up with pentode, and want to get rid of the harshness the valve seems to impart to all music. What can I do? Is it the speaker?*

It might be the speaker, or it might be because the valve and speaker are not properly matched. Make quite sure by getting in touch with the makers of your speaker that the right ratio on the input transformer is being used.

Apart from that, the best way to get rid of the harshness is to fit a condenser and resistance in series across the input terminals on the speaker transformer.

The value of the condenser should be about .01, and the resistance value should be about 1,500 ohms. A better plan is to use a variable resistance of, say, 25,000 ohms instead of a resistance.

You could use a potentiometer, employing two of the terminals, viz. the one going to the slider and one of those joined to the ends of the resistance element.

Join one terminal of the input transformer to one side of the .01 condenser. Connect the other terminal of the .01 condenser to the slider terminal of the potentiometer. Then connect one of the other potentiometer terminals to the remaining terminal of the input transformer.

The tone is adjusted by varying the value of the resistance.

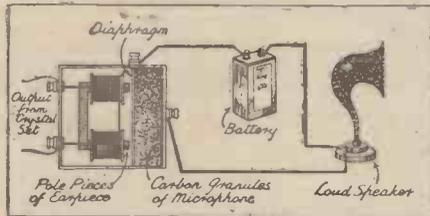
IT CAN'T BE DONE

G. H. S. (Maltby).—*I wonder if you could inform me how to amplify a gramophone pick-up without using a wireless set—that is by using a speaker and battery?*

I wish I could. I should make my fortune if I knew how to do that. Sorry, but I am afraid that you will have to use an amplifier incorporating valves, or else that almost pre-historic device known as the microphone amplifier.

This device was primarily brought into being for the amplification of Morse signals in the days when valves were few and far between, and it is not suitable for music and speech amplification.

MICROPHONE AMPLIFIER



This sketch shows the principle of a microphone amplifier working from a crystal set (see answer to G. H. S., Maltby).

It consisted of a scheme whereby the vibrations from an earpiece diaphragm or similar device were impinged on to a microphone diaphragm. This varied the current flowing through the microphone and enabled another earpiece to be operated at greater strength than the first. Sometimes the one diaphragm was used for earpiece and microphone as shown in sketch.

But it was a resonant affair and was prone to all sorts of distortion. I show in the sketch a schematic diagram of the device.

To-day, the only sane way is to use a valve amplifier, which I presume is what you refer to when you say a "wireless set." I am sorry, but that, as Martin Harvey used to say, is "the only way."

THANK YOU

I print here the letter I have received from Mr. W. H. Carter, of Hawkhurst, Kent, thanking readers who have come to his assistance in connection with an appeal recently for back copies of "P.W." containing blue-prints of the S.T.400 and S.T.500.

He writes: "I am writing to let you know of the numerous kind offers, also books and prints, sent to me by readers of 'P.W.' I have had offers from all over the British Isles. Would you please insert in your paper my thanks to all for their kindness. There are too many letters for me to answer. Thanking you and everyone most gratefully for the Service. Yours faithfully, "W. H. CARTER."

And on the behalf of "P.W." please accept our thanks for helping a fellow reader out of a jam.

EXTENSION SPEAKER ON PUSH-PULL

T. J. S. (Stoke-on-Trent).—*My set is an A.C. model with push-pull output valves. They are connected to a speaker with terminals marked P-H.T.-P. I want to fit an extension speaker, but how can this be done? Also, if I want to use the ordinary speaker with a single output valve, can I do so? The extension speaker is of the permanent magnet type.*

The extension speaker is easily fitted. Your best plan is to fit it to the secondary side of the speaker in the set. Just get one of those extension speakers (like the W.B.) with matching switching on it, and connect it to the secondary side of your speaker. That is, connect the two terminals on the extension speaker to the two wires going from your speaker transformer to the speaker itself. Then the switching on the extension speaker will enable you to match it.

Regarding the other point, you can use your existing speaker by using only half the primary of the transformer. Just connect the output of the single-valve output to one of the P terminals, and the other to the H.T. terminal. But you must be sure that your output valve will match the speaker if you do this. It is best again to get in touch with the makers of the speaker. It is possible that this method of connecting will not result in a good match, and it may be best to have an intermediate transformer between speaker and valve. Alternatively you may be able to have the transformer on the speaker changed from one of the push-pull type to a straight one.

TEMPERATURE OF A VACUUM

G. S. (Nuneaton).—*The boundless space situated between the heavenly bodies is thought to be airless and intensely cold. If this is so, am I right in assuming that the vacuum inside a valve is similar in temperature to that of space?*

Not really. A vacuum will allow radiant heat to pass through it, but will not allow heat passage by conduction. That is the principle of the vacuum flask. But if anybody were to be put in a vacuum—such as the anode and other electrodes of the valve—it would be found that they would take up the temperature of the surrounding bodies by conduction through the metal connections to them. They will also take up heat from anything like a fire that provides radiant heat, so you will find that there is no difference of temperature between the inside of the valve and the outside.

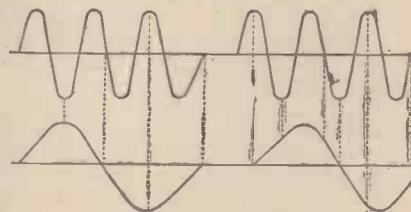
You must not assume that a vacuum such as that of the valve is heatless. It contains a certain proportion of gas, and that gas is of the same temperature as the air outside the vacuum.

What happens in the case of space is that it is assumed to be absolutely devoid of gas or air. The gas and air are held comparatively close to the various planets and stars by gravity. In doing that they prevent any sort of heat conduction away from the heavenly bodies, and that is why "it is cold up there."

Radiant heat is passing through the vacuum of space from stars and sun, but it has nothing which it can heat up until it reaches some gas or air surrounding the planets, and until it reaches the planets themselves. In reality there is very little heating of our atmosphere which is directly carried out by the radiant heat from the sun. It is done by conduction from the heat absorbed by the earth. And the rarer the atmosphere the less the conduction and so the colder the air becomes.

TECHNICALITIES EXPLAINED—No. 32 PHASE DISTORTION

A name that at first strikes rather coldly on the mind, perhaps, but it is not nearly so formidable as it sounds. Phase distortion is merely the distortion of any radio or L.F. signal or impulse in regard to time when compared with other frequencies.



Look at the sketch. You will see that along the top line I have drawn an L.F. impulse of certain frequency—say, 150 cycles. Underneath I have drawn an L.F. impulse of much slower type—say, for the sake of illustration, 50 cycles. The light dotted lines are to assist in comparing the right- and left-hand sections of the diagram.

Now, these impulses start off together. The beginning of each coincides in regard to time. The two have started out in phase with each other. Look at the right-hand side of the sketch. The lower impulse has lagged behind. No longer does its peak correspond with the first trough of the upper impulse. It comes after it. There has been phase distortion.

The effect of that is not very noticeable in a receiver which deals only with sound, but it is noticeable in a television viewer. If a high note or high frequency L.F. impulse (say 10,000 cycles) starts from the transmitter in certain time relation (or in step) with a low-frequency L.F. impulse (say 30 cycles) but arrives at the viewer out of step, there will be a flaw in the picture.

The phase distortion does not take place in the ether, it happens in the transmitter or receiver, or both. That is why television receivers have to be so carefully designed. If the capacity and inductance values are not right there will be a tendency for the impulses of highest frequency to get through more easily than the low, and the result will be that the low-frequency impulses will lag behind and cause phase distortion.

There must be no question of "time lag" in the television amplifier. If there is, then the picture will be distorted. If time lag were sufficient in a sound receiver for you to notice it the effect would be (exaggerated, of course) that a violin might play a note at the same time as a double bass, at the transmitting end. But on reception you would hear the violin note played slightly in advance of the double bass, owing to phase distortion, or lagging of the lower note.

That is an exaggerated case, but it illustrates what does actually happen in every set, only you cannot hear it because the lag is too small for the ear to notice. But the eye can spot it if time difference exists in a television set, and that is why phase distortion must be avoided in television viewers.



By G. T. KELSEY

"WANTED—50 White Ants, and a recipe for keeping them alive. Good prices paid."

BELIEVE it or not, that public SOS is the perfectly serious advertisement of one of Britain's leading radio manufacturers!

The Research Department of our old friends Messrs. E. K. Cole, Ltd., in common with almost all the other firms in this country who manufacture sets for export, have for years been grappling with the problem of producing instruments that are immune from "interference" in ant-infested tropical regions.

Apparently these insects are particularly partial to a repast of insulating materials, and when they really get busy they are capable in a very short time of eating sets right down to the bare wires, with, very naturally, dire consequences upon results.

The quest for ant-proof materials has been going on for years, but progress is slowed down very considerably by the months required to send them abroad for trial. So, with characteristic enterprise, the research folk of Ekco are determined to combat this menace "on their own ground," hence the reasons for their present endeavours to obtain the necessary white ants.

THE

"TELE-SOUNDER"

Next week we shall publish a full-size wiring print of

JOHN SCOTT-TAGGART'S

"TELE-SOUNDER"

—the wonderful unit which makes it possible to hear the television programmes on practically any set.

I am assured that a life of luxury awaits the fifty white ants if, and when, they arrive, and they will have a menu of various insulating materials with occasional treats in the way of waxed cardboard or rubberised tape!

My friends at Southend tell me that this public appeal is a last resort. White ants have been brought to this country by ship and plane—adult ants, baby ants, and even ants in embryo—yet despite the fact that they have been provided with board-residence in specially-built "tropical" rooms, none has survived to "do its stuff" under research department conditions.

So if any of you happen to possess the much coveted secret of how to obtain, and to keep, white ants in this country, here's a chance for you to become famous and to earn the gratitude not only of the Ekco Research Engineers but ultimately, we hope, of our listening fraternity in the tropics.

In view of the generous prices that are being offered by Messrs. E. K. Cole, I am seriously thinking of diverting my own research activities to the production of white ants. Who knows, possibly with a bottle of peroxide and some common or garden "brunette" ants I might produce some very good "blonds." I shall then only have to educate them up to a proper appreciation of food values, and the money's as good as mine!

W.B.'s Radio Robot

Those of you who follow my notes regularly will be aware of my enthusiasm for the extension speaker idea, and because I have rubbed in upon so many occasions the great advantages of radio in every room I may perhaps be forgiven for assuming that most of you will have followed my advice.

But there is a snag, and unless I am a very exceptional sort of individual, I cannot help thinking that most of you will have discovered it, too. When you are enjoying a "nice lazy listen" in front of a glowing fire and in a room remote from the one in which the set is installed, have you experienced that strong disinclination to go into the cold room in order to switch off when the programme that you

have been hearing is over? Don't you find it rather an effort to drag yourself away from the fireside? I do! I find it much easier just to leave the set on until I have to move myself, and the net result is that these odd half-hours here and there must make quite a difference to my running costs over a period.

I suppose some people would call it laziness. Perhaps it is. But I am afraid that I regard it just as human nature. There is nothing like a warm fire on a cold night for producing a condition of glorious inactivity, and I cannot bring myself to think that I am anything but typical of my friends, the "P.W." listening fraternity, as a whole. Am I right?

But even allowing for the shortcomings of human nature, there is no need really for this wanton waste, for there is a very simple and inexpensive solution for all who own one of the W.B. 1937 "Stentorian" speakers. Can this enterprising firm have sensed our shortcomings? Personally, I shouldn't be at all surprised knowing something of their traditions for being quick on the uptake.

The W.B. "Long Arm" unit, as it is appropriately called, enables the user to switch his set on and off and even to control the volume from the room in which he is listening. I think it's a grand idea, especially as the complete unit, providing it is purchased at the same time as the speaker, costs only 15s. 6d. But that's not the whole story. Supposing a listener's home is equipped with two or three extension speakers. If he switches the set on from one room, the speakers in the other rooms remain silent unless they are deliberately switched on from those rooms. Clever, isn't it?

I have no doubt that many of you would like further details of this ingenious unit, and so I propose to make the descriptive booklet available under our postcard literature service. It is quite free, and it contains details of the whole of the W.B. 1937 range of speakers. Please quote the reference number appearing at the end of this paragraph when sending your postcard. (No. 37/10.) (All applications for catalogues reviewed in "The Link Between" should be addressed to G. T. Kelsey, John Carpenter House, John Carpenter Street, London, E.C.4, and the number given in black type at the end of the review should always be quoted.)

PLAYER'S FOR CHRISTMAS

DAILY decorated Christmas packings are again a feature which the manufacturers of the famous Player's Navy Cut Cigarettes offer to smokers for the coming Christmas Season.

Printed with an appropriate greeting, these packings containing 50, 100 or 150 Player's Navy Cut Cigarettes supply the happiest of all solutions to the gift problem. They are available in tins of 150 for 7/3, 100 for 4/10, 50 for 2/6, and in card boxes of 100 for 4/8 and 50 for 2/5; having address space, they can be dropped straight into the post with just the addition of recipient's name and address.

For smokers who prefer the ordinary 20's packets there are postal cartons containing five packets of 20 for 4/9.

Player's "Weights" in Christmas cartons containing 4 packets of 15 for 2/- are an inexpensive, yet always welcome gift. Player's "Gold Leaf" decorated tins of 50 for 2/11 are just right where a higher grade cigarette is required.

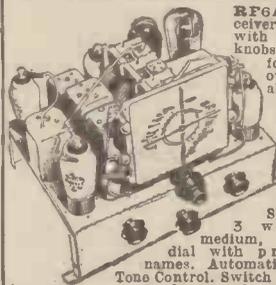
As for the ladies, Player's Cork Tipped "Bachelor" Cigarettes, in flat tins of 50 for 2/6, always make an acceptable gift. Then there are those generous size Player's No. 3 Virginias in flat pocket tins of 50 for 3/4 for smokers who appreciate a cigarette of extra quality.

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"RADIO CONTACT"

A constructor's magazine containing how-to-make details of four fine sets

WE have received for review from Messrs. Graham Farish Ltd., a copy of the latest edition of their popular magazine for constructors, "Radio Contact and Television."

Included in the general editorial contents of "Radio Contact" No. 4 are full constructional details, including wiring and circuit diagrams, of four fine receivers, for one of which a full-size blueprint is presented with the issue.

There is an attractive, well-designed two-valve battery short-waver—the "Quest" Short-Wave Two—which can be built for 47s. 6d.; an easy-to-assemble design for all-wave reception—the "International Multi-Wave Three"—which works out at 57s. 6d., and a battery and an all-electric (A.C.) version of that universally popular Graham Farish design, the "Sensity Super." The parts for the battery version cost 50s., while the kit for the all-mains model works out at £5 10s.

Graham Farish are deserving of every congratulation for the exceptionally clear and precise way in which the constructional articles in "Radio Contact" are presented, and absolutely nothing is left to the constructor's imagination. With the aid of the stage-by-stage wiring diagrams and the step-by-step instructions, it would appear to be impossible for anybody to go wrong. "Radio Contact" No. 4 is a worthy successor to the previous editions, and there is little doubt that it will enjoy widespread popularity. It is available, price one shilling, from dealers or direct from Messrs. Graham Farish, Masons Hill, Bromley, Kent.

SOVIET RADIO

MORE than 410,000 new loudspeakers were connected up with the Soviet broadcasting system during the first nine months of 1936. The number of loudspeakers installed in the villages so far this year is 83,000. The most remote corners of the Union, such as the Nenets Autonomous Area, the Buryat-Mongolian Republic, Yakutia, etc., are now linked up with the broadcasting stations of the U.S.S.R.

TRANSPOLAR RADIO-TELEPHONE LINE

Regular radio-telephone communications have been established between Krasnoyarsk, Igarka and Dudinka. The first conversation between Krasnoyarsk and Dudinka took place on November 16th, and between Krasnoyarsk and Igarka on November 17th. Audibility was said to be good.

TECHNICAL JOTTINGS

Items of interest to all

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

No Room in the Cabinet

IF you are going to use Class B amplification it is obvious that you have got to find room for the necessary additional components, and if the set is a very small, compact one, say a portable, there may be a difficulty because the cabinet is probably just about as full as it can be already.

This is a point which has more than once been raised in letters from readers, and it may be worth while to say something about it now.

If there is no room for the extra components inside the cabinet, the only thing to do is to use a separate unit which, of course, will be external to the cabinet. Such a unit is sometimes called a Class B "converter unit," and is very useful for making a change over in this way. In fact, a unit of this kind is so handy that it is sometimes worth while using it even if you are not driven to do so by lack of room inside the cabinet.

Converter Unit

Let us assume that you are going to use a converter unit and you want to find a suitable position for it. Generally the most convenient place will be at the back of the cabinet where it will be out of sight, and then all you need to do is to remove the last valve of the receiver and put in the adaptor plug supplied with the unit, then insert the valve in the socket which is provided in this adaptor plug. This is a very simple arrangement and avoids any interference with the wiring, the only difference now being that the loudspeaker is operated from the Class B converter unit.

The operation of this unit is very simple indeed, but if the set has, say, a couple of stages of low-frequency amplification, you will generally find it better to plug the adaptor mentioned above into the first L.F. socket rather than into the second. For connecting to the anode socket of the last valve which, of course, is ruled out by this arrangement, a wander-plug is provided.

Suitable Driver Valve

A point which I should mention before going farther is that the valve used in this first low-frequency stage may not prove to be suitable for use as a driver valve for the converter unit, in which case it is best to try the valve in the output stage, putting this into the next-to-last stage, and see if it works any better.

The grid bias applied to this valve is a point of considerable importance, and amongst other things it has a great influence on the high-tension current consumption.

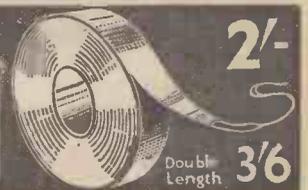
(Continued on next page.)

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TECHNICAL JOTTINGS

(Continued from previous page.)

H.T. Mains Units With Class B.

I would like to say something about the use of a high-tension mains unit in connection with Class B amplification. As you know, one of the objects, or at any rate one of the advantages, of Class B is to economise current. If you are using a mains unit this advantage is not very important unless, of course, there is already such a drain on the H.T. unit that it is being heavily overloaded. I will not pursue this last point except to say that a mains unit should *not* be operated in such circumstances, anyhow. If you are using a mains unit in more or less correct conditions the saving on H.T. current with Class B working will hardly make it worth while to change over to this system from ordinary working.

If the mains unit is able to supply plenty of H.T. current, it may pay you just as well to stick to an ordinary straight L.F. amplifier, with a good power valve output stage, or to try the push-pull arrangement which I described in these Jottings some little time ago.

Two-Electrode Detectors

The question of two-electrode valves often comes up in my correspondence and several readers have told me of the results which they get with these diode valves as detectors. I should, however, say that in most cases where the valves are described as diodes they are really triodes, in other words, ordinary three-electrode valves, and

are only being used as diodes, only the filament and one of the other two electrodes being used.

The Three-Electrode Detector Amplifies

You can make a number of interesting circuit experiments with a two-electrode detector, and this has the advantage that the characteristic curve which it gives is better than that of the ordinary three-electrode valve although, as you know, it does not amplify. I do not know whether I should mention that the ordinary three-electrode valve as used in the conventional way as a detector amplifies to quite an appreciable extent. In the conditions in which the three-electrode valve is generally used in conventional circuits as a detector, it should not be regarded merely in the same way as a two-electrode valve because, as I say, it amplifies quite an appreciable amount and this amplification is often taken into account by the designer in his calculations.

Stray Charge on the Anode

Those of you who want to try a three-electrode valve connected to operate as a two-electrode detector can easily do so by using either the anode or the grid as anode of the two-electrode arrangement. If you are only going to use one of these it is perhaps better to use the grid, leaving the anode "floating." In this case the regular anode of the valve is not used at all, the grid serving the purpose of the anode of the two-electrode arrangement. You will see that a certain proportion of the electron discharge from the filament will in such a case pass through the grid and impart an electrostatic charge to the now insulated anode proper; this will increase in potential and tend presently to repel the oncoming electron stream. To get over all this you can connect the grid and anode together, using them as a single electrode, in which case you do away with this stray electrification and you will probably find it more satisfactory although, strictly speaking, a three-electrode valve connected in this way does not function quite the same as a real two-electrode valve having only a filament and anode and without a grid.

Screen-Grid Valve as Detector

While on the subject of detectors, if you want to experiment in this direction, you will find it interesting to try a screen-grid valve for the detector. This can be used quite successfully with ordinary values of grid leak and condenser, but you must take certain precautions with regard to the anode circuit.

With this arrangement, resistance L.F. coupling is generally employed, and you must be very careful that the high-tension voltage used is sufficient. As a rule, you will find it better to use all the available voltage for the H.T., then adjust the voltage on the screen so as to get sensitivity and good quality.

Choke coupling may be used instead of resistance coupling, and has the advantage that the loss of voltage in the choke is generally much less than that in the resistance. I need hardly say that with choke coupling the inductance of the choke will need to be sufficiently high.

Using Screens for Coils

Screens of one kind or another are so very generally used nowadays that many

(Continued overleaf.)

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Cash or C.O.D. Carriage Paid 27/6, or 2/6 down and 11 monthly payments of 2/6.

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New Times Sales Co.

56 (P.W.17), LUDGATE HILL, LONDON, E.C.4.
EST. 1924

TECHNICAL JOTTINGS

(Continued from previous page.)

people do not recognise that a screen is not, so to speak, all beer and skittles; it has to be paid for in a way which may not at first strike-you. The great use of screening, incidentally, is what has made possible the compactness of modern receivers. If you are using screened coils, you should remember that the screen has a definite effect upon the characteristics of the coils, and also upon their efficiency. You will appreciate this if you bear in mind that the screen acts by *absorbing* energy sent out from the coil in the form of what is sometimes called the "stray field." Putting it in a somewhat loose but very popular way, the screen "mops up" anything which is straggling around.

The Effect of the Shield

In doing so, however, it creates what is scientifically called a *gradient of energy potential*, the screen acting as a "sink" of energy. You have, therefore, to think of the "attenuation" of the energy surrounding the coil as being rendered much more steep in consequence of the presence of the shield than it would be if the shield were absent. The result of all this, which perhaps sounds very complicated to you, is that the shield absorbs energy and thereby reduces the efficiency of the coil (or whatever the component may be). Moreover, the presence of the screen has the effect of reducing the inductance of the coil (this is really a consequence of the former), and so extra capacity has to be used in order to tune to a given wavelength. Another consequence of the presence of the screen is that the high-frequency resistance of the coil is changed.

Size of Coil Screen

In view of all this, it is obvious that the position of the screen in relation to the coil or other component is very important and should be carefully chosen. In the case of a coil, the screen cover should not be too small, as otherwise it will be in too close proximity to the coil and you will lose more in one direction than you gain in another. It may be useful, before leaving the point, to mention that if the diameter of the coil screen is about twice the diameter of the coil, this will generally be found to be a suitable ratio.

Reaction Gets the Blame

A set employing reaction, as most small sets do, is often liable to go into oscillation when the reaction is increased. As a rule, the reaction circuit gets the blame for all this, and, whilst in most cases it probably deserves it, there are some cases in which the fault is not due to the reaction at all. The trouble may, for example, be due to a screened-grid circuit not being properly stabilised, so that it is this circuit which oscillates when the reaction is increased. This again may be due to bad wiring or insufficient shielding of the high-frequency parts, or again it may be traced to using incorrect voltage values.

On the question of the voltage values, perhaps you will find that the voltage on the screen of the valve is too high, in which case the obvious thing to do is to try using a smaller value.

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All communications should be addressed to Advertisement Department, "Popular Wireless," John Carpenter House, John Carpenter Street, London, E.C.4.

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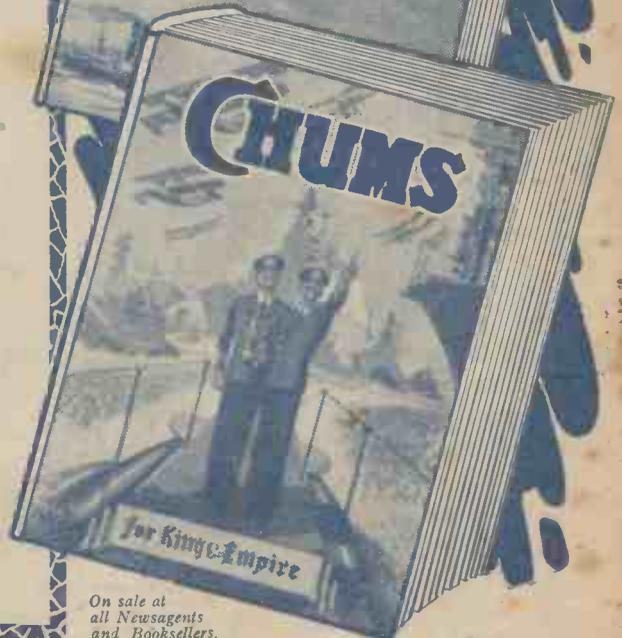
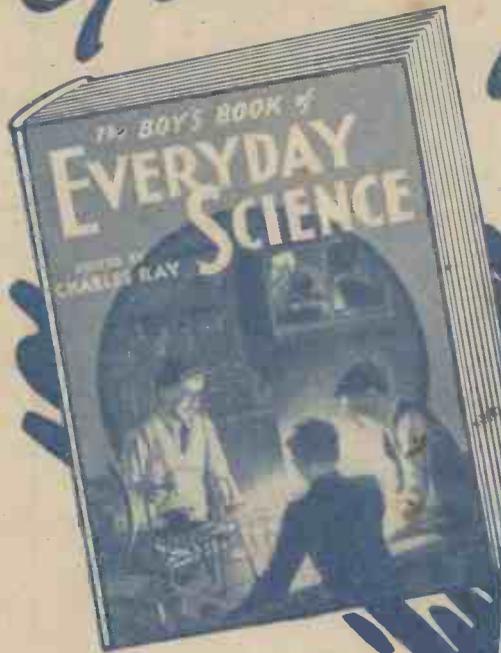
CHRISTMAS HOLIDAYS

Kindly note that all advertisements for our December 26th issue must be received by first post TUESDAY, December 15th, to ensure insertion.

Please be sure to mention "POPULAR WIRELESS" when communicating with Advertisers. Thanks!



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Popular Wireless & TELEVISION TIMES

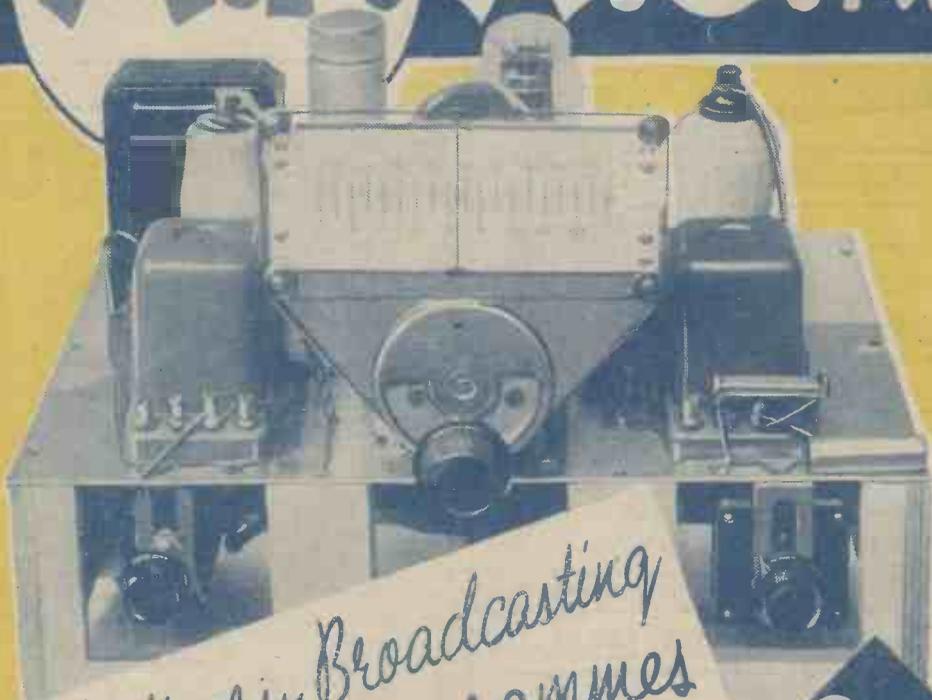
BUILDING A
7-METRE
OSCILLATOR

EVERY
WEDNESDAY
PRICE

3^D

No. 759.
Vol. XXX.
Dec. 19th, 1936.

The A.P.A.C. Three



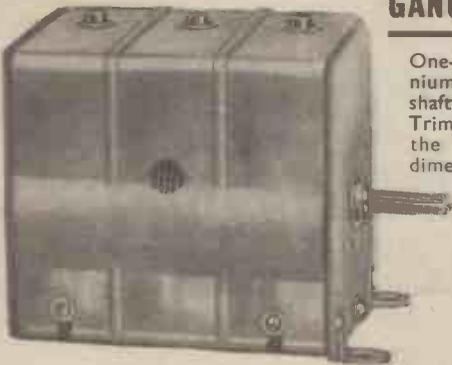
*For Ordinary Broadcasting
and the
Television Programmes*

*See
Inside*



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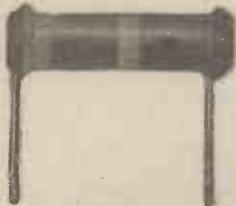
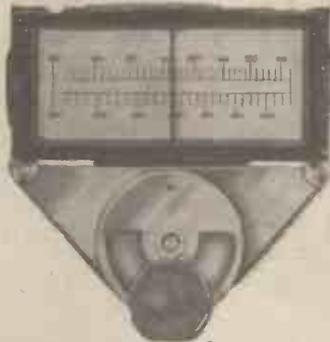
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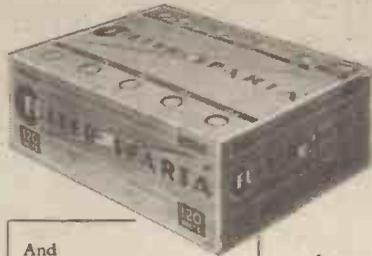
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BATTERIES BY



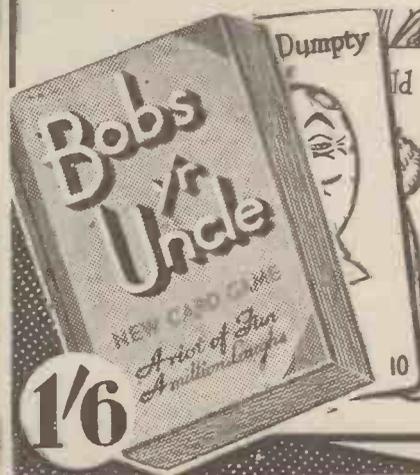
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THE FULL-OF-THRILLS CARD GAME

POPULAR WIRELESS AND TELEVISION TIMES

Editor: G. V. Dowding

Asst. Editors: A. Johnson Randall, A. S. Clark

RECORDING
DOCTOR RADIO
A CONTRAST

RADIO NOTES & NEWS

HEARING U.S.A.
RADIO PARADISE
A B.B.C. CAT

The Radio Marathon

IS Germany going to beat the record so long held by Britain, and take the lead in the number of licensed radio listeners in Europe?

For a long time she has been narrowing our margin, and the latest German total—7,757,265 on November 1st—suggests that she may reach the 8,000,000 mark before this country.

The latest British figure, for October 31st, was 7,853,131, and the Postmaster-General has stated that he hopes that the 8,000,000 mark will be reached in 1937.

Germany hopes to hit that total this year; but she may find that Britain's returning prosperity has exceeded present expectations, and "got there first."

A Sound Society

ALL who are interested in the recording of sound, whether in the home or professionally, will like to know that there is at least one live society catering for their needs. Known as the British Sound Recording Association, this body meets on alternate Thursdays at 44, Valley Road, Shortlands, Kent, at 8.30 p.m.

A scheme of Associate Membership has been arranged whereby those living too far away to attend the fortnightly meetings may derive benefit from joining the Association.

All communications to the Hon. Sec., 7, Ernest Close, Beckenham, Kent.

Is This a Record?

HOW many active transmitters does the average radio society include among its members? I ask because I have noticed that the Radio Society of Northern Ireland, just over fifty strong, has no fewer than twelve transmitting operators, holding call signs. Is this a record?

The Society meets in the City of Belfast Y.M.C.A. radio clubroom, Wellington Place,

Belfast, on the first Wednesday each month. Slow Morse practice classes are held there, and the club's new transmitter, G I 6 Y M will shortly be heard on the air. Reports of reception from "P.W." readers will be gratefully acknowledged. Full particulars of winter programme from Frank A. Robb, 46, Victoria Avenue, Sydenham, Belfast, N.I.

their effect on the tissues in the treatment of cancer.

Experiments now in progress point the way to a solution of the questions of therapeutic dosage, by which system encouraging results have been obtained in the destruction of tumours in rats and mice.

A Contrast

IN contrast to the work of healing is the increasing use of short-wave radio for warlike purposes. My recent reference to British methods of wireless control of aeroplanes prompts one reader to send me particulars of defence measures in which wireless would be useful. Regrettable as it is that our thoughts should be turned in such directions, one cannot help being struck by the manifold and important possibilities of radio in a national emergency.

In that connection I hear that there is a proposal to increase the fees paid by amateur radio transmitters; is this going to encourage a community whose skill and equipment would rank high among national assets in the event of emergency?

Europe to Eye America?

WHEN speaking from his yacht, the Elettra, to the President of the Radio Corporation of America, Marconi said recently, "We shall soon be able to see each other by television." Since it is well known that the great inventor weighs his words to accord with the facts we may expect to hear that long-distance regular television is not so impracticable as has been supposed.

A few days after the broadcast referred to above there was a scare of fire on board the Elettra. Fortunately, the outbreak was soon under control, and did not reach the laboratory where so much wonderful wireless work has been done.

(Continued overleaf.)

STARS AT THE ZOO



Will Hay, the popular schoolmaster comedian, and Miss Lili Palmer, the Gainsborough star, feeding the bears with milk at the London Zoo. Miss Palmer is noted for her unusual influence over animals, especially bears, with the result that she is able to fondle them like pets.

Doctor Radio

BECAUSE I believe it is a crime to encourage false hopes I seldom refer in these Notes to the use of ultra-short-wave wireless for the treatment of disease.

Much work, however, is being done to determine to what extent wireless healing can be used. The recently issued annual report of the British Empire Cancer Campaign states that research has been carried out on the biological action of short-wave wireless waves to discover

NEXT WEEK: S.T.'s ARMCHAIR NOTES WILL APPEAR

AMATEUR MAKES TRANSMITTER FROM CRASHED PLANE

What's That You Said ?

I SEE that the compilers of one of our great dictionaries have been complaining because wireless has added 531 new words to the language. That, however, is only half the story. Doubtless 531 new words have been causing a lot of trouble in the lexicographers' offices, but wireless has done much more than add new words to the language. In many a respectable



home a faulty wireless set has caused one or two of the very old-fashioned words to be brought out with such fervour that mother has had to send the children to bed!

Television's Growing Audience

PROBABLY nobody knows exactly how many television receivers are in use in this country, but it seems certain that the makers of the sets are more than satisfied with the present demand and indications.

The news that the B.B.C. has fitted two sets in the House of Commons caused a bit of a sensation, especially when it was realised that this might have repercussions in many other debating chambers and public assemblies.

America, too, is sitting up and taking notice of the progress made in Britain, and a considerable public service will be demanded in the U.S.A. in the coming year. This is all to the good, for it will encourage development, which in turn will bring down the prices. And then, hard-up comrades, you and I will get our look-in.

The Impatient U.S.A.

HAVING recently remarked that all you have to do to get American stations direct is to tune for one on ordinary wavelengths at any time from midnight till "milk-o." I thought I could dismiss the subject from my mind for a time. I was wrong, for the rascals have been impatiently arriving in Britain long before the B.B.C. stations have closed down.

Two correspondents report reception before 11 p.m., which staggers me because the European radio pack is then in full cry. I shall be very interested to hear from other readers who can definitely identify an American medium-wave station before midnight, for any cross-talking guy who can cross the Atlantic and insinuate his talk into Europe's nightly yowl deserves attention.

Radio Paradise

PARDON me a moment, lads, while I step aside to thank Mr. Pat Fahy of Fermoy for his courtesy in putting me in touch with Digger Sullivan of New Zealand, the world's champion DX-er.

Through Mr. Fahy I have received a letter from Mr. Sullivan in which he tells me of his almost incredibly good reception. No wonder they say that New Zealand is a radio paradise, when a chap can sit in New Zealand and report to me, "At the time of writing (16/10/36) I can hear quite easily—on the broadcast band—Breslau and other Germans, all the main Italians, and many French stations. I will not trouble to enumerate them all!"

Believe it or not, Mr. Sullivan has picked up and verified no fewer than sixty-four European broadcasting stations, on ordinary—not short-wave—programmes, which is a world's record.

BROADCASTING BREVITIES

With Percy Edgar, the Midland Regional Director, as compère, with stars from Birmingham pantomimes, and three well-known broadcasting duos among the artists, and with Reginald Burston conducting the Revue Orchestra, "Gala Variety" on December 22nd promises to be an hour of excellent entertainment. Barry Lupino and George Formby junior are two pantomime favourites who have already definitely accepted. It is hoped also that June and Gene Gerrard will be among the guest artists.

Clapham and Dwyer, Harley and Barker, and "Aerbut and Gaertie" are each to contribute characteristic turns; and there will also be two specially written sketches by Midland writers—Francis Durbridge and Edward Mason. As well as the Revue Orchestra there will be a dance band.

Do listeners prefer their dance music "sympathetic," "swing," or "sweet"? They will be able to choose on December 22nd, when, in the Northern programme, three popular broadcasting orchestras are to "compete" for their favour. The first of these combinations, Tommy Matthews and his Concert Orchestra (formerly the Revue Orchestra), is not strictly a dance band, although its programmes invariably include symphonic arrangements of jazz, and these it plays with the accent on "sympathy."

Henry Reed and his Orchestra present a genuine "swing" ensemble, while Richard Valery and his Orchestra, which includes string instruments only, to the total exclusion of brass, plays music of the "sweet" variety.

On Christmas Day Midland makes two contributions to the National programme. First, there is an hour's light music by the Coventry Hippodrome Orchestra, conducted by William Pethers, in the early afternoon; and then in the evening there will be something characteristic of the region in the Music Programme which Felix Felton has been arranging to represent the music of the regions.

World Record Beater an Invalid

AS a matter of fact, Mr. Sullivan holds three world records, against all comers. (1) Most European stations verified on broadcast band, in New Zealand; (2) Most countries verified on the broadcast band; and (3) The world's record for eleven months' DX work, namely, 253 stations logged and verified, excluding all New Zealand and Australian because they are too close to bother with!

Australian stations, 1,000 miles or so away, are ten-a-penny with Mr. Sullivan; he gets them in daylight!

His letter bristles with station names and so forth, but I must instead tell you of the little personal note where he says how much he appreciates "P.W.'s" interest, because "being gassed at the war and confined to my bed a lot I can make the radio do what I am unable to do myself—keep in touch with the outside world." Hats off, boys, and three cheers for Digger Sullivan,

B.B.C.'s New Scottish Official

AMONG recent B.B.C. appointments the most interesting is at Edinburgh, where a five-months-old cat has been given the job of Mice Controller. His salary is 1s. 3d. per week, of which 9d. goes on milk, 3d. on fish, and 3d. on liver.

The hours are a bit arduous, but the new official seems to be shaking down very well, and has already scored several smart captures.



His superiors report that he is a very conscientious worker, who takes great pride in maintaining a smart personal appearance. He is now engaged in sniff-testing every corner and cranny of the building, and has noted several attractive smells which he proposes to investigate further, as circumstances permit.

The Leaders in Radio

AT the beginning of this year the total number of wireless receiving sets in use all over the world was 56,000,000. Of these, 85 per cent are in the U.S.A. and Europe (excluding Russia).

As compared with four years ago, this total shows an increase in the world's wireless audience of about 65 per cent.

And which would you say are the four leading countries in wireless trade? First, the U.S.A., as might have been expected; next, little Holland, which is so bulb-conscious that it just had to spread itself on the valve and associated radio; the third country is Germany; and tailing along behind, with about one-tenth of the total trade, comes Britain.

Most of the British share of the trade is represented by the transmitting side.

He Crashed—and Used the Wreckage

A WORTHY reader sends me some interesting details of the first wireless set to communicate from Palestine to Australia, America and other lands. It was built by Mr. Rockall, now of Rustington and formerly of the R.A.F. He was stationed at Aman, near Jerusalem, and his record-breaking transmitter was mostly made from old petrol tins and the parts of a plane in which he had crashed!

Mr. Rockall had no components, so condensers and all had to be made out of scraps and grab-bits, the only exception being the valve. An old Ford car was made to cough up much of the metal required, and finally Palestine's first amateur-made set got on the air, and called up the world.

What's more, no fewer than thirty-five different countries answered the call, and few of them suspected that they were talking to a lot of petrol cans and old ignition parts!

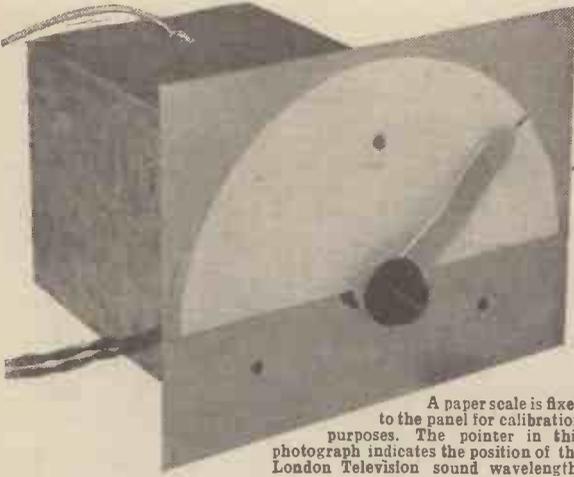
ARIEL.



BUILDING

A 7-METRE OSCILLATOR

A valuable ultra-short-wave device, which acts both as wave-meter and miniature transmitter. It will enable you to find the correct dial settings for tuning in the Alexandra Palace, and also permit ultra-short-wave experiments in receiver design to be carried on when no suitable transmissions can be picked up



A paper scale is fixed to the panel for calibration purposes. The pointer in this photograph indicates the position of the London Television sound wavelength.

WHEN experimenting with tuning circuits on the ultra-short wavelengths, it is impossible to calculate with any degree of accuracy the wavelength which the circuit will cover. An extra long lead here, or a few more stray micro-microfarads there, will have a comparatively big effect on the wavelength. Consequently an oscillator of some kind which can be used for checking the wavelength range is very useful. It is for this reason that the oscillator described here has been designed.

The necessity for such an oscillator was felt when experimenting with the reception of the television programmes

leak, and to a certain degree upon the H.T. voltage applied to the anode of the valve. The rate of charge and discharge decides the modulation note. So much for the theoretical design of the oscillator.

Now such an oscillator would be quite useless if it were not at least roughly calibrated, and for this reason the particular practical form of this oscillator has been chosen. Provided that it is copied exactly, it should be possible to make a reproduction, the calibration of which will be sufficiently near to the original for the main purpose for which it is intended. That purpose is to have available signals of the wavelength of the television sound and vision transmissions at such times as these transmissions are not available.

It will be seen that the wiring diagram is drawn in perspective, thus showing clearly the relative positions of the component parts and connecting wires (the few that there are!). It is essential that these relative positions should not be altered, otherwise the approximate calibration which is given will not hold good.

Portability Unnecessary

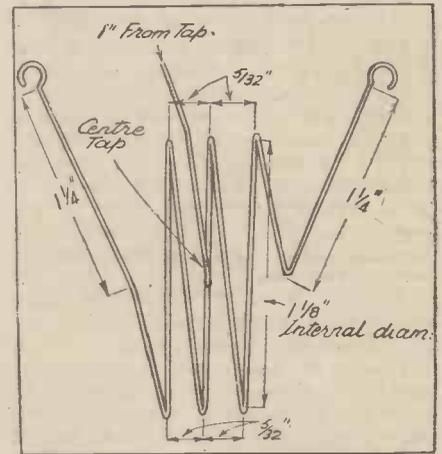
As the oscillator will be used for experimental purposes only, it was decided that portability was unnecessary, as it would always be used in the place used for such experimenting. Consequently the need for special batteries to keep the size down was obviated. However, it is not advisable to use the same batteries as are used for the receiver, as the coupling effect may be misleading.

Even although the whole oscillator is screened, it is possible to receive its signals on a receiver without any direct connections, such are the peculiarities of these very short wavelengths. However, the screening does diminish the radiation very greatly, and is certainly worth while. The signal received by the direct coupling, which is obtained by means of a screened lead connected to a coupling coil in the top of the screened container, is, of course, infinitely stronger than the incidental

radiation. Consequently the radiation signal is unimportant.

Such is the simplicity of the design that very little need be said regarding the construction. The warning has already been given that any deviation from the design will upset calibration more or less com-

MUST BE ACCURATE

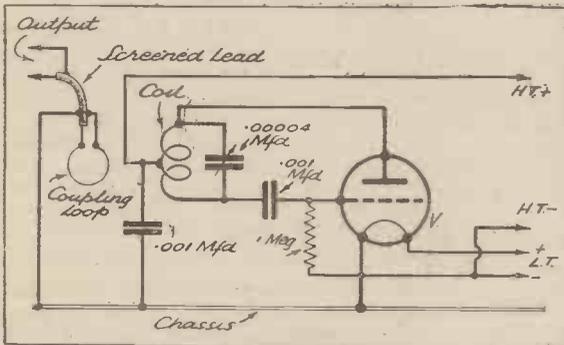


These are the dimensions for the coil, which is made with No. 18 gauge tinned copper wire. It should be borne in mind that the slightest variation from these dimensions may alter the wavelength coverage to a large extent.

pletely, so do stick to the original arrangement as near as is possible. This is very easy to do, as the components almost "fall" into their correct positions quite automatically, owing to the fact that they fit between the points of the other components to which they are connected.

(Continued overleaf.)

USES A "SQUEGGER" CIRCUIT



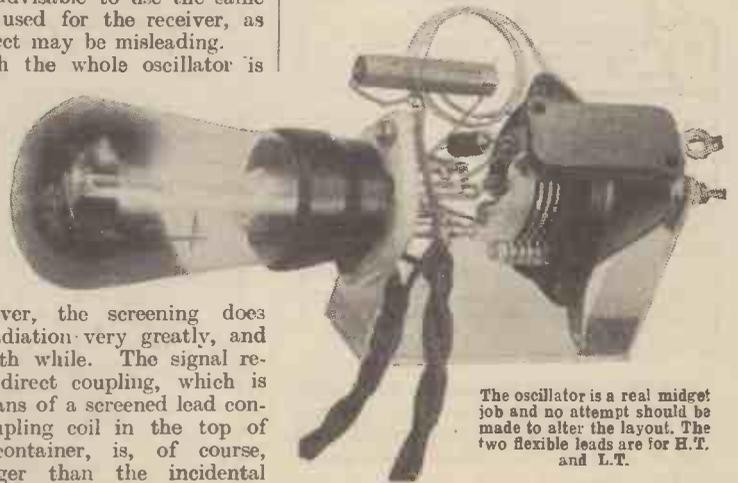
As in the case of the "Universal Oscillator" described in the November 28th issue of "P.W." a "squegger" circuit is used. The coupling loop is attached to the oscillator case and is shown in position in the photo on page 415. The pitch or note of the oscillation can be varied by adjusting the H.T.

from the Alexandra Palace. The fact that the transmissions were (and still are) of such a short duration limited the time that could be spent in circuit testing.

The Most Useful Form

Consequently the design of a simple "artificial transmitter" had to be considered. It was decided that a modulated oscillator would be the most useful form. With such oscillators it is unnecessary for the receiving apparatus to be in an oscillating condition to receive the signal. Furthermore, the modulated oscillator is no more complicated than an unmodulated oscillator, when modulation is obtained simply by the insertion of a resistance and condenser in the grid circuit.

This is usually known as a squegger circuit. The condenser charges and discharges at a rate dependent upon its capacity and the resistance of the grid



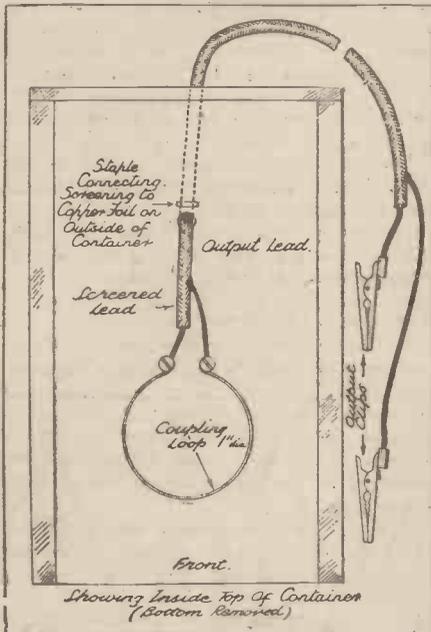
The oscillator is a real midget job and no attempt should be made to alter the layout. The two flexible leads are for H.T. and L.T.

A 7-METRE OSCILLATOR

(Continued from previous page.)

The most important point about the whole thing is, of course, the coil. The dimensions of this are given in a separate diagram. The 18-gauge tinned copper wire

THE COUPLING LOOP



How the coupling loop is arranged on the inside of the container. The end marked "front" is that to which the panel is fixed.

should be stretched to remove any kinks, and three and a quarter turns are wound tightly on a former 1 in. in diameter, with the turns touching. When released the wire will spring out to a certain extent and the diameter of the coil will increase to, approximately, 1 1/2 in. and the number of turns reduce to just about three.

The ends of the wire are bent up so that there are exactly three complete turns. It may be necessary to "shape" the coil so that the diameter is correct. This can

COMPONENTS FOR 7-METRE OSCILLATOR

- 1 B.T.S. micro-condenser, type M.C.
- 1 Dubilier .001-mfd. fixed condenser, type 670
- 1 T.C.C. .001-mfd. tubular fixed condenser, type 250.
- 1 Clix chassis-mounting S.W. 4-pin valve holder, with screw terminals.
- 1 Eric 1-meg. 1-watt resistance.
- 1 Piece 18-gauge aluminium, 8 in. x 6 in.
- 18-gauge tinned copper wire for coil and wiring (about 4 ft.).
- 16-gauge aluminium for bracket and pointer
- Wood for container (see text).
- Copper foil (see text).
- Screws, flex, etc.
- 2 Belling & Lee wander plugs.
- 2 Belling & Lee accumulator spades.

VALVE
Marconi or Osram, L.21.

BATTERIES
See text.

be done with the fingers, and is quite easy. The spacing must now be adjusted by stretching the coil so that the turns are 5/32 in. apart. The ends are now cut to the lengths indicated in the diagram and

looped for terminal connections. The next job is to solder the centre tap wire to the middle turn, on the opposite side from the ends, so that there are one and a half turns on either side of the tapping point. That completes the coil, and the most critical part of the whole of the construction.

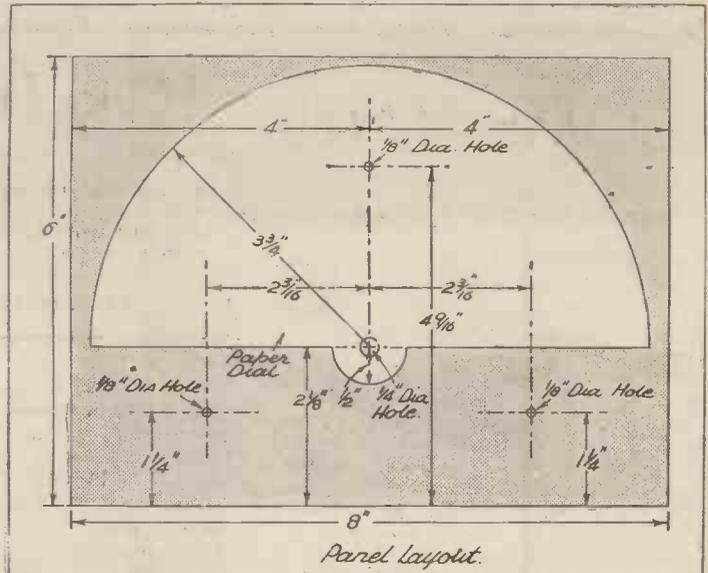
The Pointer

There are four other parts which have to be made, and they are the panel, supporting bracket, pointer, and container.

The panel, supporting bracket, and pointer need no comment. The fitting of the pointer to the knob and the construction of the container need some explanation, however.

The pointer is fitted to the underside of the knob by means of two 1/4 in. by 6 B.A. brass cheese-headed screws. The holes in the knob should preferably be tapped, but if they are drilled slightly under size it will be found that the screws will cut their own thread and hold quite firmly. The relative positions of these holes will be the same as those given in the pointer.

Before proceeding with the construction of the container, a few points on the wiring and construction of the oscillator itself will be given, as this can be completed before the container is made. The supporting bracket and panel are clamped together by means of the tuning condenser bush and fixing nut. The valve holder is fitted to



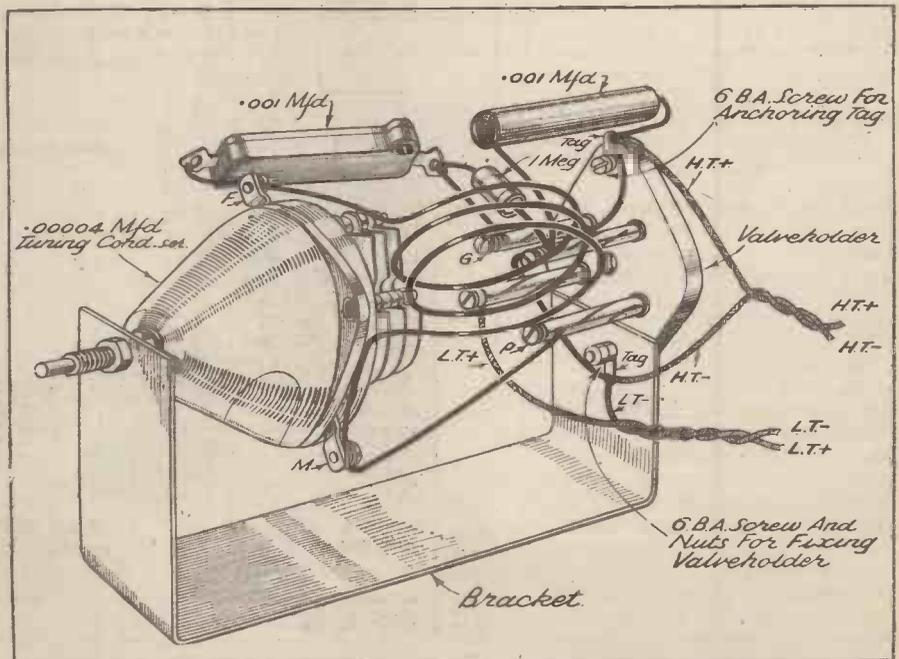
Here are the dimensions you will need for drilling the panel and cutting the paper scale.

the other end of the bracket by means of a 1/2 in. 6 B.A. screw and a 6 B.A. nut. To the other fixing hole of the valve holder is fitted a soldering tag, which serves to anchor the H.T. + flex lead. This tag is fitted by another 6 B.A. screw and nut. Although it is possible to wire up without soldering, it is advisable to solder if possible. Further comment on the construction of the oscillator itself is unnecessary, as the diagrams give all other details.

The Container for the Unit

Regarding the container, this is a wooden box covered with copper foil. The box consists of two pieces of 3/8 in. plywood 7 1/2 in. x 4 1/2 in. and two pieces 7 1/2 in. x 4 in. These pieces are for the top and bottom and the two sides respectively. The end piece is also of plywood, but only 1/4 in. (Please turn to page 415.)

YOUR GUIDE TO THE WIRING



The wiring is simple, but the form of layout shown should be carefully adhered to. Details of the bracket will be found on page 415.

SOME HINTS FOR THOSE ON THE MAINS

If you use the mains, especially A.C. supply, for your radio, you will find the various ideas described on this page of interest and value

By HANDEL REES

“UNIVERSAL,” A.C. and D.C. receivers present one or two unusual features which it will be useful to note when doing adjustments to this type of set.

Any universal set must essentially be a D.C. one. An A.C. receiver is generally fitted with a transformer, and without switching or some means of changing connections it is evident that the primary side cannot be connected to a D.C. supply.

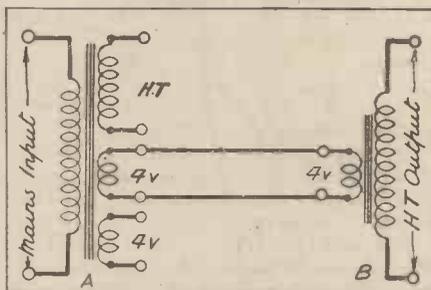
We find, therefore, that the universal receiver is usually coupled directly to the supply without a transformer, the same as an ordinary D.C. receiver. Valve heaters are also connected in series across the supply through a suitable dropping resistance, or barretter lamp.

This evidently brings us back to a D.C. arrangement where the usual precautions against earthing the supply, etc., must be carefully observed. It must not be forgotten that one of the A.C. mains is earthed exactly the same as D.C., except that there is no question of polarity.

On D.C. the rectifier simply acts as a resistance in the H.T. circuit. As current will only pass when the rectifier anode is positive with respect to cathode, the mains must be connected the right way round. With A.C., however, the direction of rectification being fixed, reversing the mains plug will not prevent the set working.

reads 2.5 volts across a test coil of 20 turns, the transformer is designed with $20/2.5 = 8$ Turns/Volt.

A SIMPLE SCHEME



How a step-up transformer is connected to the L.T. winding of an ordinary mains transformer.

Knowing this, it is easy to find the turns on any winding. For example, a 250-volt primary has $250 \times 8 = 2,000$ turns; a

180-volt secondary similarly consists of $180 \times 8 = 1,440$ turns; or, if we require a 4-volt heater winding, we must put on $4 \times 8 = 32$ turns—actually, one or two extra turns would be put on to compensate for voltage drop in the transformer.

Provided discrimination is used in the choice of a safe primary voltage, the method can be applied to find the turns on any transformer. The meter must be fairly accurate, but a good moving-iron instrument calibrated on A.C. will do.

“Inverted” Transformers

It is sometimes asked whether a mains transformer can be operated “upside-down”—i.e. use, say, an L.T. secondary as primary. Thus, if a 4-volt secondary is coupled to another secondary supplying 4 volts, as in Fig. 1, what voltage may be obtained off the mains primary of the first transformer?

Now, since the step-up, or step-down, ratio of a transformer is constant, the answer is that we would get a number of H.T. voltages across the various primary taps closely approximating the mains voltages for which they are marked—e.g. 200 v., 230 v., and 250 v.

The method can be useful for a separate H.T. supply, if an L.T. source for the new primary is available. Of course, it is a roundabout method which gives rather poor voltage regulation, owing to the several impedances in the circuit. It is interesting to note, though, that the primary L.T. current will now be in ampères, the current being in inverse proportion to the voltage.

“High Potential” Windings

A point which is apt to be overlooked in regard to L.T. heater windings is, that they can be at two different potentials at the same time.

The statement refers to valve rectifier windings. The heater winding provides, first, the 4 volts or so for the filament, but it is also the positive of the H.T. supply, being at the full H.T. potential with respect to earth.

The importance of this fact lies not only in the possibility of shocks but also in the necessity for well-insulated L.T. windings when they are intended for rectifiers. Many transformer breakdowns to earth can be traced to a rectifier heater winding insufficiently insulated from core, or adjacent L.T. windings which are themselves earthed at an external point.

While on the subject of mains transformers, a few words about the method of varying the secondary voltages by moving the primary tappings may be useful. (Please turn to page 420.)

BROADCASTING IN FRANCE



The reception-hall at the French station at Côte d'Azur. The modernistic design of this entrance-hall is typical of the present trend of broadcasting-station architecture.

Testing Transformer Turns

Is there an easy method of finding the turns on a transformer winding?

This question sometimes presents itself when it is desired to modify a transformer in some way. Thus, where space is available, an extra heater winding can often be added if it is certain the primary will carry the extra load.

Of course, it is not very difficult to find the turns required on such a winding by trial and error, but if the “Turns/Volt” factor is required for another purpose, it can be determined in a few minutes with an accurate A.C. voltmeter.

Finding the “Turns per Volt”

All that is necessary is to put on a temporary “test coil” of about 10 turns and measure the A.C. voltage across its ends with the primary switched on. The size of wire used is quite unimportant, and should the meter not be very sensitive, a further 10 turns may be added to give a good reading.

Dividing the known turns on the test coil by the voltmeter reading, we get the Turns per Volt figure, which is a constant for both primary and secondary of a given transformer. Thus, if the voltmeter

TELEVISION TOPICS—Collected by A. S. Clark

A weekly feature which will keep the reader au fait with all the latest news and developments in television science. It will appeal alike to the newcomer to television and the advanced experimenter

“TELEFRAMES”

Items of general interest

THE Performing Right Society, to whom the fee for permission to reproduce radio programmes in public places has to be paid, are requiring a further fee for similar public demonstrations of television programmes.

This is a great pity so early in the development of television. Where a fee is already paid for the reproduction of ordinary sound programmes, there should surely be no need for further payment because an artist is seen singing a copyright song. In any case, there appears to be no reason why the matter should not have been left in abeyance until television is a little more firmly established.

“ONE MAN’S MEAT—”

We hope those responsible for the television programmes are not letting the interesting nature of the technicalities run away with them. And in the following remarks the great shortage of money for television programmes has not been forgotten.

The interest of television to the constructor, experimenter and technically-minded at the present is almost entirely in the wonderful nature of its technical accomplishment. So long as something is transmitted to enable experimental work to proceed they are satisfied.

But not so the looker who is interested simply because of what he sees and does not care a hang about the romantic nature of how he sees it. To these the present programmes, with their constant exhibition and educational flavour, are not good. News actuality can make television the biggest thing in the country—without it, its appeal is lost.

Christmas Week at “A.P.”

The first television Christmas will be appropriately observed at Alexandra Palace. Throughout the week December 21st to 26th the television programmes will have a Christmas flavour, with many items of special interest to children. Harry Hemsley, famous child mimic, comes to the studio on Monday, December 21st, both afternoon and evening, with his “children” and other young visitors, to see a display of all the new toys. These will include a scale model of Gatwick Aerodrome, model trains, the latest in talking dolls, and such novelties as a wireless-equipped toy car and an electric-car race track.

A unique parade of “live” animals to be televised on December 22nd will include Claude Zola’s horse, Mary the ape, Gilmore’s white poodle, Tarzan the human ape, and Joe Arthur and his goose. It should perhaps be explained that all these animals are of the synthetic variety.

NOT SO BLACK

Those who have studied the technique of modern television transmission may be surprised to learn that in spite of the modulation during the frame fly-back

being “blacker than black” it is possible for this fly-back to be visible.

The reason for this is to be found in the time-base. What is often happening is that the fly-back is not coinciding properly with the cut off of modulation on the tube. Adjustment in value of the charging condenser and resistance will usually put matters right.

STAGE AND FILM EXPERIENCE

It is interesting to note that Mr. Leslie Mitchell, the television announcer, had both stage and film experience before he

Keith Prowse & Co. Ltd., 159, New Bond Street, W.1.

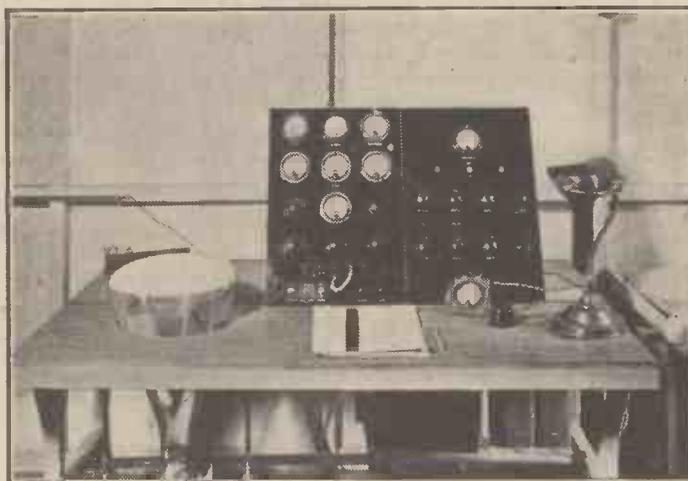
They also inform us that “Teleceivers” are on demonstration from time to time at the following stores:

- Bon Marche at Brixton.
- Holdrons of Peckham.
- John Barnes of Hampstead.
- Trewins of Watford.
- Jones Bros. of Holloway.
- Pratts of Streatham.
- Quin & Axtens of Brixton.

Finally, demonstrations can also be given at their London office at Africa House, where a special room has been set aside for this purpose.

We understand as well that the Marconi-phone television demonstration salon at Radio House, Tottenham Court Road, London, W.1, which has seating accommodation for 30 people and employs three television receivers, is open to the public.

A CATHODE-RAY TUBE TESTER



A close-up view of the Ediswan cathode-ray tube tester to which reference was made last week.

A G.E.C. SET ON TEST

The G.E.C. receiver which I have recently had installed for test purposes at my home in Barnes, about nine miles from Alexandra Palace, shows a picture 9 ins. by 7 ins. directly on the end of the tube and at an extremely

convenient height. The set works best on its own aerial, a di-pole consisting of two short lengths of copper tubing. These are supported on a wooden framework which has a short arm jutting out in the centre to carry a co-axial lead-in away from the aerial at the best angle. The total length of the aerial is about ten feet—half the wavelength.

At first glance the receiver appears to have as few controls as an ordinary sound receiver—only four. This is a remarkable achievement at such an early stage of television reception, though closer acquaintance reveals that two of the knobs are of the two-in-one variety and the master switch has three positions—“off,” Baird, and Marconi-E.M.I. Tuning is by sound, and as the condenser has been locked into position it can only be turned in a short arc. There are four subsidiary controls and a “brightness” knob under a panel at the side. These four controls can, if necessary, be manipulated with a screwdriver. The receiver costs 95 guineas.

I have found the set extremely simple to operate. The pictures are admirable, in black and white with a faintly greenish tinge which is restful to the eye. L. M. G.

WHERE TO SEE TELEVISION

MESSRS. Pye Radio Ltd., inform us that their “Teleceivers” are actually installed at the following addresses, and that the firms concerned will be only too happy to welcome any tele-viewers who may be interested.

The Teleradio Co., 497, High Road, Bruce Grove, N.

A. Imhof Ltd., Imhof House, New Oxford Street, W.C.1.

J. B. Cramer & Co. Ltd., 46, Moorgate, E.C.2.

Eric Rivers-Smith, Ltd., 21, Heath Street, Hampstead.

John Barker & Co. Ltd., Kensington High Street, W.8.

TELEVISION TOPICS—Continued

WHAT IS THE SPEED?

WHEN testing out a double time-base for television, or when experimenting with different circuits for scanning, one of the biggest difficulties is to get some idea of the speed at which the line side is scanning. The frame, or low speed time-base, does not present the same difficulty.

The following is an idea which I recently worked out and which I have already proved in practice up to about 6,000 deflections per second—the number of lines in the Baird system of transmissions. It opens up interesting experimental possibilities for those who have a cathode-ray tube and its associated apparatus.

Taking an Example

The scheme is best explained by taking a particular instance. Suppose the line scanning is drawing exactly 1,000 lines per second, and that we apply a sine wave of exactly 1,000 cycles per second to the grid of the tube, in other words modulate the beam.

While one line is taking place the grid will be made, say, more negative for one half and less negative the second. And assuming the voltages on the tube are properly adjusted to provide rectification, this will result in half the line being bright and half the line becoming

“black.” The size of the frame will thus, in effect, be halved as soon as the scanning is at the same speed as the frequency of the pulses applied to the grid or screen.

A suitable source of supply for the sine-wave modulations is a set of constant-frequency records. With these it is possible to work up step by step from some lowish frequency at which the effect can be most easily picked out.

In practice one meets a number of effects with this scheme which justify description. Assume the application of, say, our 1,000-cycle note to the grid, and that we start with the line scanning far too slow. It will

probably simply be breaking up the frame into some sort of pattern. But as we increase the number of lines the pattern changes into a number of horizontal black lines.

As line-speed is increased it will be noted that these lines quickly turn round into a vertical position, and then turn over, as it were, and become horizontal again. These vertical black lines will occur at intervals as the speed is increased, but there will be fewer of them each time.

Modulation Frequency Factor

When they occur, it means that the number of lines is some factor of the modulation frequency. With the latter at 1,000 we should get four vertical bands at 250 lines because there would be four modulation cycles per line.

At 500 lines we get two vertical black lines and then at 1,000 cycles one black line or half the picture black, as already described. The sudden lifting of the horizontal lines to vertical and then their going back to horizontal again in the opposite direction gives warning of the approach of the desired speed.

As there is no synchronisation being applied to the tube it is not easy to hold the half black and half white position. Also due to lack of synchronisation and because of variations in the scanning circuit or valves, the black vertical line may become curved. In such cases part of it will occur on the opposite of the frame, and “walnut veneer” patterns may result. This could be overcome by suitably applying a bit of the modulation cycle to act as fine input. A. S. C.



A happy, informal snap which well illustrates, with the aid of a Cossor television receiver, the attractions of “television for two” in the home.

TELEVISION FOR BEGINNERS

G. Stevens describes the nature of the television signal this week

HAVING settled the circuit for producing the scanning lines the next thing is the production of the picture. We have already seen that the television signal radiated is made up of two portions—the signal proper and the synchronising signal which is sent at the end of each line and each picture. For the time being we can consider the true picture signal which produces the variations in the screen brightness as it is scanned.

Tube “Characteristic”

This is applied to the grid of the tube and cuts the beam off or increases the current in the same way as the audio frequency signal applied to a valve alters the anode current. In fact, the “characteristic” of the tube is almost the same as that of a valve, except that we deal with screen brightness instead of anode current in the circuit. Within certain limits the brightness of the line is proportional to the current in the electron beam, which in turn is

proportional to the grid voltage applied to the tube.

This property of the tube is very important because it enables us to produce more realistic pictures than were formerly possible under the old definition. The reason is this. Suppose an outdoor scene is being televised in bright sunlight. To give this effect the screen should be brightly illuminated, while if the scene takes place in a shady room the brightness of the picture should be reduced to suit.

This means that quite apart from the ordinary modulation in brightness caused by the nature of the scene, there must be an overall variation in brightness of the screen to correspond with the subject. The overall variation is produced by a form of “automatic brightness control” (A.B.C. instead of A.V.C.!) which is supplied by the carrier wave in the following way: The amplitude of the carrier wave varies according to the degree of light in the picture—white parts corresponding to

full amplitude of the carrier, and black parts to about 40 per cent. of maximum value.

The transmission system is so designed that a definite degree of brightness is associated with a definite amplitude of carrier wave, and thus a bright scene means that the average value of carrier is higher than that for a normal scene. When the modulated carrier wave is applied through the receiver to the tube the grid receives a bias proportional to the average value of the carrier wave, and hence the brighter the scene the less the grid bias and the brighter the screen appears.

You will have noted that the carrier amplitude is 40 per cent. of the maximum for the black parts of the picture. So far as the tube is concerned we adjust the bias on the grid so that the line is blacked out at this value of incoming wave. Now if you look back at the notes on synchronising you will see that at the end of each line scanned the carrier wave drops down to zero.

“Blacker than Black”

This means that if 40 per cent. amplitude corresponds to black, then 0 amplitude must be “blacker than black,” and you will find this expression used sometimes to denote a value of carrier less than the 40 per cent. figure. In prac-

tice that part of the carrier amplitude between 40 per cent. and zero is used for the transmission of the synchronising impulse, as explained before. It is easy to keep the synchronising impulses separate from the picture because of this limit which is imposed on the amplitude of the carrier. Thus:

Amplitudes between 40 per cent. and 100 per cent. of maximum = picture signal.
Amplitudes below 40 per cent. = synchronising.
And if the circuit is arranged correctly they can never be muddled up.

A Point to Note

We might remember that the complete signal corresponding to each line scanned is made up of modulating signal plus synchronising signal, and the latter is obtained by lopping off a bit of the time which should be devoted to the scanning line.

This time actually takes 10 per cent. of the time of one line, so the complete cycle of signal is: Signal 9/60,000ths sec. synchronising pulse 1/60,000th sec., making 1/6,000th sec. for the complete line (Baird system).

For E.M.I. the figures are slightly different, but the principle is exactly the same.

"OVER THERE"

A feature devoted to various aspects of American broadcasting, giving interesting sidelights on the stars and microphone methods of that country

THE GIRL GAG-WRITER.

AN attractive young woman is Mabel Wilma Albertson, brown-haired, blue-eyed, pert, vivacious, full of fun. But has she any dates? No. Do handsome men buy her dinners, send her flowers, mash-notes? No. Does any one, in brief, make love to her? No.

What's the matter with Miss Albertson's gentlemanly friends? Are they blind? No. Are they deaf? No. Are they senile? No. Are they impervious to feminine charm? No. Are they, in brief, fireproof? No.

The trouble lies with Miss Albertson, or rather with her profession. Miss Albertson is a gag-writer, America's only smooth-faced, non-cigar-smoking gag-writer; in other words, our only girl gag-writer.

And in her day she has collected and concocted so many jests and gibes and cracks and comebacks on the inexhaustible theme of that little thing called love that it is impossible for her to listen, straight-faced, to men whispering sweet nothings into her jaded ears.

"It's the penalty a woman pays for being in this racket," she says at her cosy apartment, 315, Central Park West. "When a man pays you a pretty compliment, tells you that you are the answer to a bachelor's prayer, the hottest thing this side of the Mojave Desert, you can't get funny and expect to get away with it.

"Humour is death on amorous dalliance. It's bad form for a girl to keep her eyes open while she's being kissed, but if she giggles she's out. Take this business of compliments. When a fellow says to me, 'You've got a pretty foot,' I automatically come back with, 'Ah, a dog-fancier!'

"When he says, 'Your teeth are like pearls,' I ask, 'When were you out with Pearl?' If he likes my hair, wants a lock of it, I say, 'Take the whole darned wig.' If he admires my new, smart, daring evening gown, I say, 'It's a biblical dress—low and behold!' When he says, 'Mabel, I want you for my wife,' I ask him, 'What on earth would your wife do with me?'

"You see, I know all the answers, and it's a foul curse. All the cards in my joke-files keep turning over and over in my head. I've been banging out this kind of stuff so long, I'm so thoroughly trained as a gag-writer, that the miserable old puns, the tired tag-lines, just pop into my noodle. It's involuntary. I can't help myself. And do men like it? They detest it, and I don't blame them."

(The above is an extract from the "New York Post.")

BURNS' MANTLE.

GRACIE ALLEN BURNS has a spacious fireplace, and for months has been telling her two-year-old daughter, Sandra, about Santa Claus and his entrance into good children's homes via the chimney. The other day Gracie asked Sandra, in the presence of George, "And who is it, darling, that comes down the fireplace at midnight?"

To father George, Sandra replied: "THAT man!"

FROM THE "NEW YORK SUN."

THE dodo is extinct. So is last night's programme. So is nearly every programme once you hear the announcer say, "And now, until next week at this same time—" In

no other industry that we know of is the spoilage of skilfully created material so rapid and complete. An army of writers, production men and directors toil for a week or more at high tension to polish up a radio presentation, and after a brief period on the air the show is as extinct as the G. O. P. in Georgia. Unlike theatrical plays, there is not even a warehouse for radio features that have completed their usefulness. Once a radio show has ended it passes into an oblivion that is as black as the future of an amateur who gets the gong on his first bar of music.

This tremendous turnover is one of the peculiarities of radio. In the old vaudeville days, patrons returned to the theatre time after time to see their favourites run through the same routine. But you can count on one hand the number of radio sponsors who have dared bring back a successful script: "The Barker" is one exception; Lawrence Holcomb's "Sky-scraper" is another. Both plays lost nothing in their repetition and were eagerly followed by listeners who in the first instance appreciated a play cleverly adapted for the radio and in the second example applauded a script prepared especially for radio. Why then is it considered

second floor of a new building on Fourteenth Street between New York Avenue and H Street, will be made into a "show place" similar to the present N.B.C. quarters in Radio City, but on a smaller scale. It is expected that the studios will be ready in the early summer of 1937.

THE UNFINISHED SYMPHONY.

THERE probably isn't a music critic or programme annotator who hasn't heard the call to belittle the "Unfinished" Symphony. And many have heeded.

They have heard the popular piece so often they think it's time to be passing to greater symphonic accomplishments, and they'd like the crowd to follow. Yet in 100 years they have had little success. About the time they have noted progress in diverting interest to some other masterpiece, along comes a request programme—the votes pour in and the commentators dive into their Schubertiana volumes for something new to say about the symphony Schubert started and never completed.

After all that's been said and written about the symphony's lack of power and all-round orchestral merit, it is still possible to poll the concert audiences and find that the "Unfinished" is still well entrenched as a favourite.

(So says a writer in the "Washington Post.")

A DEVOTED LISTENER.

EDWARD McHUGH, N.B.C.'s Gospel Singer, believes that of all his thousands of fan followers, his most devoted listener is Rex, his three-year-old Belgian shepherd dog.

When the Gospel Singer is on the air, according to his wife, Rex curls up in front of the radio until the programme is over. If Mrs. McHugh should become so preoccupied with her household duties as to forget to turn on the radio at 11.45 a.m., E.S.T., when her husband goes on, Rex will whine. If the whine goes unnoticed, the dog tugs on Mrs. McHugh's apron and leads her to the loudspeaker.

Rex is also a discriminating listener. He can distinguish his master's voice from any other, the McHugh's say.

The McHugh's and Rex live in Newton, Mass., a suburb of Boston, but the Gospel Singer is in New York from Monday to Friday broadcasting from Radio City.

Rex seems to know when Friday comes around. When the door is opened for him in the morning, he dashes to the garage to remain until Mrs. McHugh takes the car out to meet her husband at the station. Rex takes no chances on being left behind.

FACSIMILE TRANSMISSION



An operator transmitting a message in facsimile over the new E.C.A. ultra-short-wave circuit between New York and Philadelphia.

unwise for Jack Benny to repeat his most successful half hours? If the fifteen hits of the week which have already been heard a hundred times in the preceding seven days can attract a large audience why can't the best Vallee Variety shows be broadcast again?

The reason undoubtedly is that every sponsor has a naive idea that all available listeners are tuned to his hour and that an entirely new entertainment must be offered the following week in order to hold the attention of these prospective buyers of his product.

Possibly the old vaudeville appeal will return with television. With the artists then able to turn on their stage personalities as aids to their stage ability the tendency to repeat outstanding successes may be revived. In the meantime, the headaches of the production men working at high pressure are countered by the glee of the script writers who care little whether the life of their weekly stunts is only fifteen minutes, as long as the checks are good.

NEW STUDIOS.

PLANS for new studios in Washington, D.C., which are to embody all engineering advances in recent years were announced last week by Lennox R. Lohr, president of the National Broadcasting Company. The entire

GIFT BOOKS FOR THE MODERN BOY

BOOKS make ideal presents for boys. Here are three volumes that are certain to please, and will be enjoyed and re-read long after other gifts are forgotten.

If you know a lad who is keen on model railways, aeroplanes or boats, or is interested in making things, EVERY BOY'S HOBBY ANNUAL (6/-), is his book! It is a mine of information on every sort of hobby, and will introduce its owner to a number of fascinating new interests.

Aeroplanes of every description, and the amazing story of the Conquest of the Air are exhaustively dealt with in the splendid MODERN BOY'S NEW BOOK OF AIR-CRAFT (6/-). In word and picture, the story of one of man's greatest achievements is unfolded to form a book of endless fascination.

The MODERN BOY'S ANNUAL (6/-) contains a wealth of good things. There is stirring fiction of mystery and adventure, articles that are guaranteed to enthrall, and powerful illustrations, including plates in colour. All these Annuals are obtainable wherever books are sold.

RANDOM RADIO REFLECTIONS

By Victor King

The Problem of Set Servicing—Television Scaremongers

SET SERVICING

I FIND the correspondence appearing in "P.W." on this subject mighty interesting, for I've had practical experience on both sides of the counter. As I think I once told you, for a period I ran a radio shop in London—near the Empire Cinema, to be exact.

It lived for about one year and cost me about £10 per week. But I consider it was money well spent, for I gained greatly in knowledge thereby. I received first-hand experience of retail marketing, and I met heaps of people. Maybe if I'd spent more time on the actual job itself, instead of keeping a well-paid manager in socks and cigars, I'd have made a financial profit as well.

Still, as usual, I had to do the thing in style, although in this case the style was rather bigger and more expensive than the proposition could wear.

Oh, yes, servicing! We did a lot of it. I had four men doing nothing else. That cost a good bit, but they were good men and carried out their tasks efficiently. In those days, five years ago, sets used to give heaps more trouble. I fancy it is in the fact that sets don't break down in such percentages to-day that is at the back of much of the present trouble.

A small shop selling perhaps three or four sets a week at most may have only one or two service calls per month. That isn't going to tempt them to hire a qualified engineer and pay him a good salary. No; the shop assistant must also take on the duties of servicing.

And good servicing in such conditions simply can't exist. Even if the assistant were quite a good technical man, he'd not be able to keep abreast with the practical side. You want continual and considerable experience to be able to be ready to tackle any old or new set.

Now for the other side of the counter. A friend of mine wrote and told me his set had broken down. Could I help him?

Being lazy, I 'phoned a nearby shop (I got the address from a directory) and asked 'em to send a man round. They did so at once, and their man had the set going within half an hour of my call. The charge was 3s. 6d. That's service.

Another friend of mine himself called in the aid of a local shop. They paid two visits, then took the set away for two days. When it was returned the original fault had disappeared and a new one was present. The charge was 25s. My friend protested. They had another go at the set, but it still has this new fault and is quite unusable. So I shall have to put the darn thing right myself!

ALL MY EYE!

THERE'S a lot of scaremongering going round about television, and I think it's inspired. Or lots of it is. In olden times, when men were men and machines the devil itself, antagonism against new things used to adopt a more direct course.

If someone invented something which upset the smooth course of life for somebody else, Mr. and Mrs. Somebody-else used to gather up their hammers and axes and try and smash that something to bits.

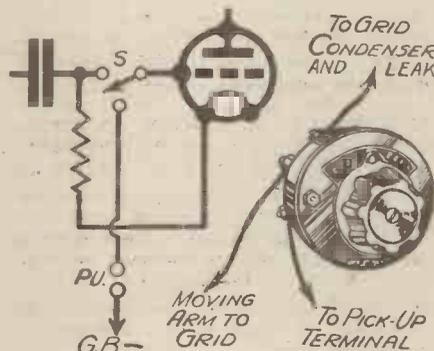
But these are craftier times. Whispered words have replaced weapons.

Television is going to upset a whole heap of apple-carts. Various devisers of obsolescent forms of entertainment are

WATCH YOUR WANDER PLUGS



Here is a hint for battery-set owners: When joining a flex lead to a grid bias or H.T. battery wander plug, make sure that the insulation reaches right down to the insulated portion of the plug. Whiskers of flex may come into contact with those on a neighbouring plug and so cause "shorts." Another fact worth remembering is that a loose wander plug can cause very irritating crackles in the loudspeaker. Always make sure that the plugs fit firmly into their sockets. The sketch below shows how a gramophone pick-up may be used in a simple set by inserting it in the grid circuit of the detector valve. A three-point change-over switch, S, is needed, the moving contact going direct to the grid of the valve. The diagrams will be found self-explanatory.



going to get some punches in their over-drafts, obsolescent engineers who know all about blind radio are already finding themselves dazzled by this vision which has been added to broadcasting.

Let's grab at these weeds that are being planted and pull them out before they begin to grow.

(1) It is said that television pictures are harmful to the eyes.

So are coloured ties and dictators, if you look at 'em for twenty-four hours at a stretch. A television picture does not emit any more harmful rays than a cinema.

(2) It is said that television pictures flicker and shiver and wobble.

Mine don't and yours needn't, if you've got a good set. On the E.M.I. transmission there is no noticeable flicker at all, and the pictures are rock steady.

(3) It is said that electrical interference is bad on television.

I don't get any at all, although I live in London and my house is in a fairly busy road. Even when and where interference exists it affects the picture much less than it does the sound, is generally at a lower level than is met with in normal wave-bands and can more easily be dealt with by means of such devices as are sold by Messrs. Belling & Lee (di-pole aerials, etc.).

(4) It is said that the picture is too small.

The size is relative. There is much loose thinking in this matter. Going to an extreme, you don't expect or want your television picture to be as large as a full-size cinema screen. You are close to it. In effect, it is as big as the cinema screen as seen from the back row of seats. When you have a television set going in your home, you don't feel conscious that the pictures are small. Their illusion and their entertainment value are complete.

(5) It is said that television sets use dangerously high voltages.

Television sets use thousands of volts and so do those shocking machines on piers. But there is very little current and it's the current that takes you over the Styx.

In any case, who's going to play about with the innards of a mains set of any kind while it is switched on?

(6) It is said cathode-ray tubes sometimes explode.

Wrong again. They implode. Now work that one out!

(7) It is said that the B.B.C. television programmes are dud.

This is correct. As a whole, they comprise poor material ineptly presented. However, even the B.B.C. televisionites can't go wrong with such items as the "Movietone News," and these alone make television a living, worth-while thing. And there are bound soon to be great improvements and extensions of the television programmes, particularly bearing in mind that one day (not in the very distant future) television will be broadcasting.

(8) It is said that pictures are unnecessary.

So are cinemas, football matches, boxing contests, shops, scenery, books and newspapers, and heaps of other things. But most of us like looking at 'em—or some of 'em. Boxing Fans, would you prefer merely to hear someone describe a Foord-Neusel fight to seeing the whole thing on a television screen, plus a running commentary? Dance Fans, would you rather just hear the shuffle of feet and the click of heels than to hear and see the dancers? Everybody! wouldn't you prefer to look and listen to the Lord Mayor's Show, rather than just hear, "It's a glorious day. Crowds of people. Here comes the detachment of Royal Marines. It's a simply glorious day. I can see the first coach. It's marvellous, a grand sight. The weather's perfect"?

LEARNING FRENCH THROUGH YOUR RADIO

Part 41 of our special language series

By S. C. Gillard, M.A.



High quality reproduction is one of the features of this value-for-money Cossor radiogram. It costs only 22 guineas.

WE have already dealt with -ER and -IR verbs. A third class of verbs—the -RE verbs—have to be tackled now. Though there are essential differences between this class and the others, there are, however, many points of resemblance. First of all let me give you a few of the commonest -RE verbs.

Romp (to break), attendre (to wait for), entendre (to hear), rendre (to give back), vendre (to sell), défendre (to forbid), pendre (to hang), suspendre (to suspend), etc.

Now, the STEM of all these verbs is obtained by cutting off the final -RE syllable. Thus, we are left with:

ROMP-, ATTEND-, ENTEND-, REND-, VEND-, DÉFEND-, PEND-, SUSPEND-.

From these STEMS the PRESENT PARTICIPLE is obtained by adding the usual syllable -ANT. Thus:

ROMPANT, ATTENDANT, ENTENDANT, RENDANT, VENDANT, DÉFENDANT, PENDANT, SUSPENDANT.

To get the PAST PARTICIPLE (and this is one of the main differences between -RE verbs and verbs of other conjugations) YOU ADD U TO THE STEM. Thus:

ROMPU (broken), ATTENDU (waited for), ENTENDU (heard), VENDU (sold), DÉFENDU (forbidden), PENDU (hanged), SUSPENDU (suspended), RENDU (given back).

It is important to remember how this PAST PARTICIPLE is formed, because knowing this enables you to write down the FOUR COMPOUND TENSES of these -RE verbs straightaway.

| | |
|----------------|--------------------------|
| J'ai ROMPU | I have broken, etc. |
| J'avais ROMPU | I had broken, etc. |
| J'aurai ROMPU | I will have broken, etc. |
| J'aurais ROMPU | I would have broken etc. |

But what of the other FIVE TENSES? Some of these should present no difficulty whatever, if you apply to them your knowledge of -ER and -IR verbs. Let me deal with them in their order of simplicity.

TENSE No. 8 (I will sell, Je vendrai) is the usual INFINITIVE plus THE ENDINGS -AI, -AS, -A, -ONS, -EZ, -ONT. Only, for obvious reasons, the FINAL E OF THE INFINITIVE IS CUT OFF. Thus: Vendrai, vendras, vendra, vendrons, vendrez, vendront. (See Part 21.)

Similarly with TENSE No. 9 (I would sell, Je vendrais): Vendrais, vendrais, vendrait, vendrais, vendriez, vendraient. (See Part 21.)

TENSE No. 2 is obtained in the ordinary way. Namely,

STEM plus the IMPERFECT ENDINGS -ais, -ais, -ait, -ions, -iez, -aient. (See Part 18.) Thus:

Vendais, vendais, vendait, vendions, vendiez, vendaient.

The TWO REMAINING TENSES must be studied with care. These are TENSES Nos. 1 and 3. I will give you them in full. TENSE No. 1 (I sell, I am selling):

| | | |
|-------------|--------|--------------|
| Je vends | I sell | vah(n) |
| tu vends | etc. | vah(n) |
| il vend | | vah(n) |
| n. vendons | | vah(n)-do(n) |
| v. vendez | | vah(n)-deh |
| ils vendent | | vah(n)d |

TENSE No. 3 (I sold):

| | | |
|---------------|--------|-------------|
| Je vendis | I sold | vah(n)-dee |
| tu vendis | etc. | vah(n)-dee |
| il vendit | | vah(n)-dee |
| n. vendimes | | vah(n)-deem |
| v. vendites | | vah(n)-deet |
| ils vendirent | | vah(n)-deer |

Now to add to your vocabulary. To the average Englishman "Prices ranged as follows" is the signal to switch London off. But to the Englishman "Learning French Through His Radio" "VOICI MAINTENANT LE BULLETIN COMMERCIAL," or "LES COURS COMMERCIAUX," or "LES PRIX DE CLÔTURE DE NEW YORK," etc., etc., is an opportunity for acquiring a bigger vocabulary that is not to be missed. These bulletins are read daily and at frequent intervals during the day. Consequently, the conscientious learner is able to master a big vocabulary in record time. And with a good accent, too!

These bulletins treat of a number of commodities which are, of course, classified. What excellent practice with your numerals they give you as well!

Here are some of the commodities whose prices are quoted in every bulletin:

Fruits et Légumes, Fromages, Oeufs, Beurres, Poissons, Volailles, Porc, Mouton, Viandes, Veau, Orges, Avoines, Blés, Far-

ines, Caoutchouc, Alcool, Sucres, Laines, Huile de lin.

This week I want to give you a detailed report of TWO of the above, say, POISSONS and FRUITS ET LÉGUMES. As a preamble to the former the report might mention the quantity of fish that was for sale in the market. This would be brief—in fact, a single sentence. Thus:

ARRIVAGES: 204,400 kilos DONT 180,300 DE MARÉE. (Arrivals: 204,400 kilogrammes, 180,300 of which are sea-water fish.)

Then follows the reading (rather rapid perhaps) of a variety of types of fish and the prices they fetched.

| | |
|--|------------------------|
| COLIN (Green Pollack) | 4.50 à 14 |
| HARENG (Herring) | 1 à 2 |
| HOMARD VIVANT (Live Lobster) | 12 à 24 |
| HOMARD ÉPINEUX (Cray-fish) | incoté |
| HOMARD MORT (Dead Lobster) | 8 à 10 |
| LANGOUSTE VIVANTE (Sea Cray-fish, alive) | 14 à 20 |
| LANGOUSTE MORTE (Sea Cray-fish, dead) | 10 à 13 |
| RAIE (Skate) | incoté |
| GROS MAQUEREAU (Large Mackerel) | 1 à 3.25 |
| PETIT MAQUEREAU (Small Mackerel) | incoté |
| MERLAN ORDINAIRE (Whiting) | 1.50 à 3.50 |
| SOLE FRANÇAISE (French Sole) | 8 à 20 |
| TURBOT (Turbot) | 8 à 14 |
| LIMANDE (Dab) | 3 à 4.50 |
| MOULES (Mussels) | 90 à 110 les 100 kilos |
| HÛITRES (Oysters) | 22 à 35 le 100 |
| ESCARGOTS PETITS GRIS (Winkles) | 3.50 à 4 le kilo |
| ANGUILLE VIVANTE (Live Eels) | 8 |
| ANGUILLE MORTE (Dead Eels) | 4 à 6 |

FRUITS ET LEGUMES Fruits and Vegetables.

| | |
|--|---------------------------|
| BANANES (Bananas) | 360 à 380 les cent kilos |
| POIRES (Pears) | 450 à 700 |
| FIGUES FRAICHES (Fresh Figs) | 250 à 700 |
| POMMES (Apples) | 100 à 250 |
| ORANGES DE BRÉSIL (Brazil Oranges) | 90 à 110 la caisse |
| PÊCHES (Peaches) | 700 à 900 |
| NOIX (Walnuts) | 400 à 500 |
| TOMATE (Tomato) | 70 à 110 |
| AIL (Garlic) | 300 à 400 |
| ARTICHAUT (Artichoke) | 20 à 80 le cent |
| CAROTTE (Carrot) | 50 à 80 les cent bottes |
| NAVET (Turnip) | 25 à 80 |
| OSEILLE (Sorrel) | 30 à 80 |
| ÉPINARD (Spinach) | 40 à 70 |
| POIREAUX COMMUNS (Leeks) | 100 à 150 les cent bottes |
| POMMES DE TERRE DE HOLLANDE (Dutch Potatoes) | 40 à 80 les cent kilos |
| LAITUE (Lettuce) | 5 à 40 le cent |
| HARICOTS VERTS (French Beans) | 80 à 280 |
| POIS VERTS (Green Peas) | 50 à 120 les cent kilos |
| MELONS (Melons) | 1 à 2.50 la pièce |

D'autres Fruits et Légumes sont:

| | |
|--------------------------|----------|
| LE CHOU (shoo) | Cabbage |
| LE SEIGLE (sehgl) | Rye |
| LA BETTERAVE (bet-trahv) | Beetroot |
| LE RADIS (rah-dee) | Radish |

(Please turn to page 419.)

BOOKS FOR THE RADIO MAN

Testing Radio Sets—Servicing Superheterodynes—
Accumulator Charging—A First Course in Wireless—
Modern Radio Communication

THOSE who are interested in radio in its many and varied aspects are well catered for these days by the wide selection of books that is available. During the last few months we have received a number of useful books, and this week we propose to deal with some of them.

The servicing of receivers is a very important branch of radio. Although the modern wireless set is on the whole a very reliable piece of machinery, faults are nevertheless liable to develop in exactly the same way as they do in other types of apparatus.

Consequently the service man must be well equipped with the knowledge necessary to enable him to carry out all the tests for localising and curing the fault. For those whose work lies in this direction there is a comprehensive book by J. H. Reyner, B.Sc., A.C.G.I., D.I.C., A.M.I.E.E., called "Testing Radio Sets." This book has now run to its third edition and it covers the field of fault finding in a very thorough manner.

In addition to chapters on H.F., L.F., tuning tests, etc., mains apparatus, short waves and superhets are also discussed at length.

The second section of the book is devoted to laboratory tests and the information given will appeal to those employed in radio factories as well as to the service man.

In this section there is a chapter on the cathode-ray oscillograph, a device of great value in laboratory test work.

"Testing Radio Sets" costs 10/6d., and is published by Chapman & Hall. It is written in a clear and practical manner, and this, the third and revised edition, should achieve even greater popularity than the two preceding ones.

ALL ABOUT SUPERHETS

While on the subject of servicing we would mention the revised edition of "Servicing Superheterodynes" by John F. Rider. This is an American book, but it can be obtained in this country from Holiday & Hemmerdinger of Manchester. The price is 5/-.

The author goes right into the whole basic principles of the superhet and deals with the various types of circuits used in superhet design. The book is specially valuable in view of the wide popularity of this class of receiver at the present time.

Those whose work calls for a specialised knowledge of the superhet will find much useful information in this book. It must be understood that American terms are used throughout and commercial circuits where referred to are also American, but this does not affect the principles upon which the operation of the superheterodyne receiver is based; which are, of course, the same all the world over.

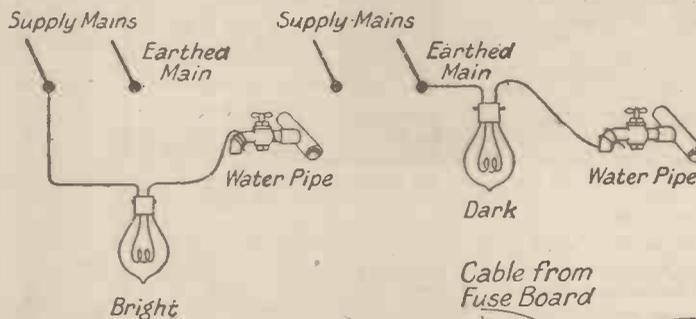
BATTERY CHARGING

There are in this country many thousands

of battery receivers: in fact, by far the greater percentage of sets in use to-day are of the battery type. This means that a big business is done in charging L.T. accumulators, but it is also a regrettable fact that in a number of cases batteries are badly charged through lack of knowledge on the part of some of those who undertake this work.

Obviously, the man who thoroughly understands this branch of electricity is

FINDING THE EARTHED MAIN



These two sketches are reproduced from W. S. Ibbetson's well illustrated book on "Accumulator Charging and Maintenance and Repair." The top one shows the method of finding the earthed main, and that on the right depicts an accumulator joined to the terminals of a lighting switch for charging purposes. The switch, of course, must be "off."

the one who is going to establish his business on a sound basis.

One of the best books we have met dealing with accumulator charging is that by W. S. Ibbetson, B.Sc., A.M.I.E.E., M.I.Mar.E., which has now reached its fifth edition ("Accumulator Charging Maintenance and Repair," published by Sir Isaac Pitman & Sons, Ltd., price 3/6d.).

It is essentially practical and includes numerous sketches and circuits. It covers the charging and upkeep of accumulators for wireless work, motor-cars and cycles, and also country house lighting and machinery plants.

We have taken the liberty of reproducing two of the sketches which appear in the book.

For the benefit of candidates taking the "Motor Vehicle Electrician's Course" of the City and Guilds of London Institute, parts of the syllabus relating to battery work, together with the questions set at the recent examination, have been included.

In addition to the maintenance and repair of standard types of batteries, there is a chapter on alkaline cells of the Edison and "Nife" types. Those who study this book will get a really good grounding in battery work.

WIRELESS SIMPLY EXPLAINED

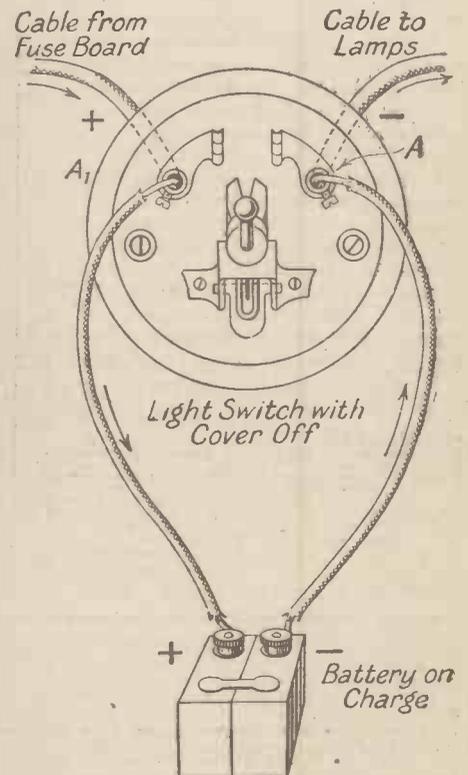
Turning now to text books dealing with the theory of radio, we would mention that simple book by "Decibel"—"A First

Course in Wireless." It costs 4/-, and is published by Sir Isaac Pitman & Sons, Ltd. Actually the book is a reprint of a series of articles which appeared in "World Radio" under the title of "The Radio Circle for Beginners Only." Written especially for those possessing no technical knowledge and avoiding mathematics, it forms an excellent introduction to more advanced text books on wireless. Many "P.W." readers will appreciate this book.

Then we have J. H. Reyner's "Modern Radio Communication," also published by Sir Isaac Pitman & Sons, Ltd., and priced at 5/-. This book is written so as to cover the requirements of the preliminary and intermediate grades of the City and Guilds of London Institute, and is also suitable for candidates for the P.M.G. certificate.

An elementary knowledge of electrical phenomena is assumed, but the author deals with the principles of alternating

currents and includes chapters on capacitance and inductance. There is also a very useful chapter on vectors, which students will find helpful in connection with A.C. work.



This is not a book for the absolute beginner who is only interested in the broadcast reception aspect of radio. It is intended to help the serious radio engineering student, and as such forms an excellent companion to the second and more advanced volume by the same author.

The A.P. A.C. Three

THESE first television programmes which are coming over the air are not, judged as programmes, particularly good. Their presentation is often crude and childlike, and the frequent bad timing is only one aspect of their generally poor production.

And yet they contain many first-class items. Stars of variety, extracts from current plays, British Movietone News and so on, which constitute immensely attractive entertainment.

It is a curious fact that for the most part they can be enjoyed by sound alone without the accompanying vision. Given any hour of the television programmes, there will be but a few minutes during which the pictures appear to be essential.

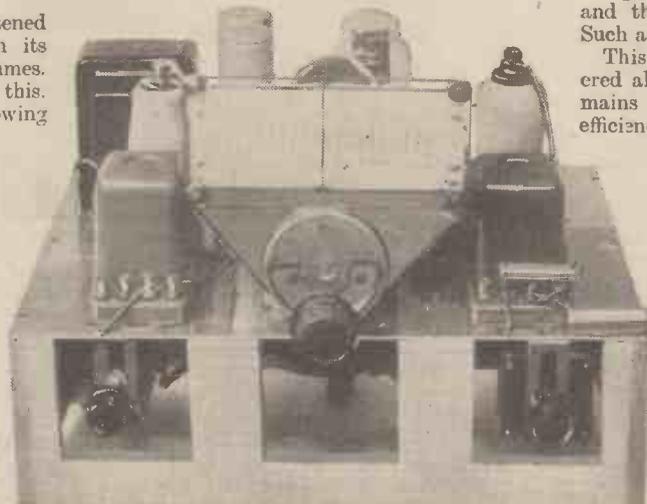
Why the Programmes Are Better

Much of the material merely listened to even seems to be better than its equivalent in the normal programmes. There are two possible reasons for this. The first is that the listener, knowing that there is in fact vision to be picked up out of the ether, if only he had the picture-receiving gear as well as the sound-receiving apparatus, has his imagination stimulated subconsciously and fits in his own imagined pictures of what is going on.

The second is that the artists, conscious that they have to get over visually as well as aurally, put more into their acts. And, of course, they are unable just to speak or sing with their mouths the while their eyes wander around the mike and its surroundings and to and from scripts held in their hands. Their acts must be one hundred per cent for the audience. No expounding of dramatic lines while they make faces and wink at the announcer!

A high-efficiency all-mains set for the television programmes and ordinary broadcasting—an entirely new receiver for everybody, which can be built and operated by anybody.

Anyway, whatever it is, those who are unable to listen to the television programmes as well as to the ordinary ones are missing a great deal of good stuff. We



Although providing an additional field of entertainment the "A.P." A.C. Three is in every way as simple to operate as an ordinary two-band receiver.

opened with twenty minutes of variety which was just like any normal variety show.

There were two singers, a cross-talk act, a mimic and a comedian. A fine little bill, this time well presented. At twenty minutes past nine the National programme came in with its Saturday evening variety, and so there was continuous variety from nine o'clock until twenty minutes past ten.

Other evenings it is very useful to be able to turn to the ultra-shorts as an alternative to the fare that is being offered on the mediums and longs.

A complete television outfit costs about one hundred pounds, but a set capable of giving you the sound part may not cost as many shillings.

Outstanding Performance

But better still is to have a set which will bring in both the ordinary broadcasting and the Alexandra Palace transmissions. Such a one is the "A.P." A.C. Three.

This is, as you will no doubt have gathered already from the illustrations, an all-mains three-valve set. And it is a high-efficiency set for the reception of the normal medium- and long-wave programmes. Indeed, in view of the fact that it is also an extremely effective receiver of the ultra-short waves, it naturally follows that it provides an outstanding performance on the lower frequencies.

No, it is no ordinary three-valve set. With its three pentodes and carefully devised layout, it provides a magnification of an exceptionally high order.

You may be wondering how it is possible to handle so widely diverse frequencies with the majority of the components serving for all the bands.

Well, it wouldn't be possible if an attempt were made merely to take in the ultra-shorts by adding suitable (Continued overleaf.)

YOUR "A.P." A.C. SHOPPING LIST

- | | | |
|---|---|---|
| 2 Wearite "Unigen" coils. | 1 Dubilier '01-mfd. fixed condenser, type 620. | 1 Bulgin toggle on/off switch, type S.80. |
| 1 Polar 2-gang Midget tuning condenser, each section .0005-mfd. | 1 Dubilier '001-mfd. fixed condenser, type 670. | 1 Bulgin twin fuse holder (with 1-amp. fuses), type F.16. |
| 1 Polar V.P. horizontal drive for above. | 2 T.C.C. '002-mfd. tubular fixed condensers, type 300. | 1 aluminium sheet, 14" x 10"—18 S.W.G. (Peto-Scott). |
| 2 Clix chassis-mounting 7-pin valve holders, type V2. | 1 Dubilier '0001-mfd. fixed condenser, type 665. | 1 yd. single screened flex (Peto-Scott). |
| 1 Clix chassis-mounting 7-pin valve holder, S.W. type. | 1 T.C.C. '00005-mfd. fixed condenser, type M. | 2 pieces 1/2" plywood 3 1/2" x 4 1/2" for side supports (Peto-Scott). |
| 1 Clix chassis-mounting 4-pin valve holder, type V1. | 1 J.B. '0003-mfd. solid dielectric differential reaction condenser. | 1 piece 3/4" plywood 13 1/2" x 4 1/2" for front support (Peto-Scott). |
| 1 Bulgin H.F. choke, type H.F.8. | 1 Erie '5-meg. resistance, 1-watt type. | 1 piece 1/2" plywood 14" x 4 1/2" for back support (Peto-Scott). |
| 1 B.T.S. H.F. choke, type U.H.F.1. | 1 Erie 100,000-ohm resistance, 1-watt type. | 1 piece 1/2" ebonite to make 3" diameter switch-disc (Peto-Scott). |
| 1 J.B. baseboard trimmer, '0001 mfd. | 1 Erie 8,000-ohm resistance, 1-watt type. | Brass for contact strips (see text). |
| 1 Varley pentode output choke, type D.P.9. | 1 Erie 1,000-ohm resistance, 1-watt type. | 6 B.A. screws and nuts, wood screws, flex, etc. (see text). |
| 1 Wearite smoothing choke, type H.T.12. | 1 Polar-N.S.F. '25-meg. resistance, 1-watt type. | 5 Belling and Lee terminals, type R. |
| 1 Varley mains transformer, type E.P.20. | 1 Polar-N.S.F. 1-meg. resistance, 1-watt type. | 6 yds. 1 1/2 m.m. insulating sleeving (Peto-Scott). |
| 1 Dubilier 4-mfd. fixed condenser, type L.S.A. | 1 Polar-N.S.F. 50,000 resistance, 1-watt type. | 30 ft. 18 S.W.G. tinned copper wire (Peto-Scott). |
| 2 T.C.C. 8-mfd. wet electrolytic condensers, type 802. | 1 Polar-N.S.F. 150-ohm resistance, 1-watt type. | |
| 1 T.C.C. 50-mfd. electrolytic condenser, 12-volt working, type F.W. | 1 Dubilier 50,000-ohm resistance, 1-watt type. | |
| 1 T.M.C. 2-mfd. fixed condenser, type 40. | 2 Dubilier 20,000-ohm resistances, 1-watt type. | |
| 2 Dubilier 1-mfd. fixed condensers, type B.B. | 1 Dubilier 5,000-ohm resistance, 1-watt type. | |
| 1 Dubilier 1-mfd. tubular fixed condenser, type 4503. | 1 Erie 10,000-ohm potentiometer (without switch). | |
| 3 T.C.C. '1-mfd. tubular fixed condensers, type 250. | 2 Peto-Scott 2 1/2" mounting brackets with long slot. | |

ON THE

SHORT

WAVES



MAKING THE MOST
OF YOUR SHORT-
WAVE SET
By W. L. S.

THE hardened short-wave fan is rather apt to regard this section as his own particular property and to give vent to moans when I periodically tell him that I must once more give up some space to the beginner. This can't be helped, since the short-wave clientele of "P.W." is not a static affair, so to speak; it is constantly changing.

Some of you who are reading these words reckon yourselves old hands by now; but you can doubtless remember when you wrote to me and asked me to remember the poor little novice and to stop writing "above your heads."

This section, in various forms, has had a non-stop run of nine years now. I know, quite definitely, of some scores of readers who started writing to me as the veriest novices, and who went through all the stages of the game, until they now hold transmitting licences and do much really useful work. Scores of the younger readers who are perusing this now will doubtless hold transmitting licences in nine years' time, or considerably less.

All this preamble is just my excuse for starting off once more from the beginning and trying to extend a helping hand to those who have just fallen for the short waves for the first time.

In "P.W." we have had the S.T.800—an all-wave set for the home-constructor which will be the means of introducing thousands of listeners to the short waves. In the radio trade we have the great boom of the "all-wave" cult. And all round us we hear broadcast listeners with old-fashioned sets lamenting the fact that they can't receive America because their set has no short-wave range.

Keep Abreast of the Times

A few years back they were talking about short-wave listening as though it were some crazy business, fit only for half-wits and scientists. It has taken some of them twelve years or more to realise that short waves mean something to every listener, and that the man who deprives himself of them is just incredibly behind the times.

But this is not all. Many of those who have, in their homes, the means of receiving short-wave transmissions, don't make use of them, simply because they won't take the trouble to find out how to. A close friend of mine, who ought to know better,

has an expensive all-wave set. He listens almost exclusively to the two local stations. I asked him the other night why he didn't use the short-wave side of the set, and he said, "Well, there never seems to be anything on except a lot of Morse and squeaks."

Don't Rush Your Tuning

I asked him to demonstrate, and he switched over to the 14-30 metre range and twiddled the knob. And did he twiddle? I'll say he did! He shot round that dial like a record-breaker doing a lap of Brooklands. He passed over his "Morse and squeaks" at such speed that he couldn't have hoped to identify even a strong transmission.

I took over the controls from him, and suggested that he should behave more as if he were in a built-up area. By ordinary

listening to is that they don't listen on the right parts of the range. Between 10 and 100 metres we have an expanse of 27,000 kilocycles; but only small slices of that vast range are populated by stations that the average man wants to listen to.

Between 10 and 20 metres, in actual practice, there is very little that the average broadcast listener will want to use, other than the 19-metre broadcast band. You will see from Fig. 1 what a very small slice of the range this actually occupies. If you had a 10-20-metre range on your set, you would find the dozen or so stations in the 19-metre band all packed within the top few degrees of your tuning scale.

Some of the 16-metre stations come over well during daylight, when it is too early for the 19-metre band to be really good; and Pittsburgh (W 8 X K), in the 13-metre band,

puts an amazingly strong transmission into this country when conditions are favourable for it. But the good old stand-by is the 19-metre band, which will nearly always produce something of interest.

For those who haven't acquired the latest fashion, which is to sniff at the amateur transmitter and to regard him as a

childish sort of pest, the 10-metre amateur band will produce some interesting things to listen to. Between 2 p.m. and 6 p.m., even on week-days, this band is pretty lively, and there are a number of good 'phone transmissions from America. Just below 10 metres one can hear the American police cars talking with their headquarters stations—the actual cars, mind you, can be clearly heard in this country.

An Always Active Band

Between 20 metres and 60 metres there is rather more activity. Note that Figs. 1 and 2 are drawn to the same scale in kilocycles, and that there is actually a lot more "space" between 10 and 20 metres than there is between 20 and 100 metres. If I were to draw a line representing the "space" between 5 and 10 metres, it would be exactly twice as long as the baseline of Fig. 1—but that is another story, which we must come to later. The ultra-short waves deserve a chapter on their own, and they shall have it.

Just above 20 metres we have the 20-metre amateur band, which is fairly well filled with transmissions at all hours of the

(Continued overleaf.)

WHERE TO LISTEN ON THE 10-20 METRE BAND

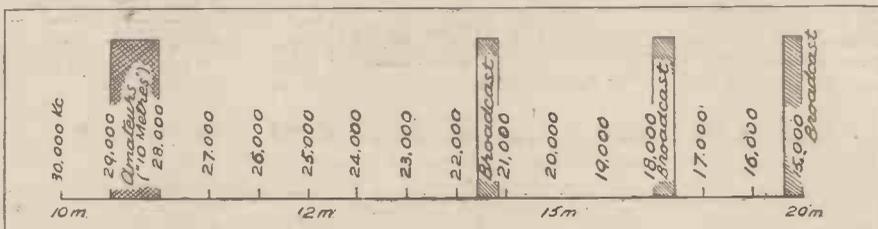


Fig. 1.—How the 10-20 metre waveband is divided up. It will be noticed that broadcasting is confined to what appear to be three narrow bands. Actually these bands occupy an appreciable kilocycle coverage and contain numerous stations.

slow, lazy turning of the single-knob control I tuned in, before his goggling eyes, seven-teen stations. Then I made him do the same. True, he could only find seven of them, but that was more than he had ever done before.

So there is the first lesson for you. You will never make anything of short waves if you don't use a little intelligence in handling your controls. Figs. 1 and 2 show roughly how the short-wave spectrum is divided up between the various services. It is intended for that; but it also shows you the vast number of kilocycles over which you have to travel.

The medium-wave range of your broadcast receiver probably covers a range of 1,000 kilocycles, at the most. Between 10 and 20 metres you have a "kilocyclage," if I may use the word, of 15,000. This means that if one of the ranges on your all-wave set happens to cover this band of 10-20 metres, you must handle the control exactly fifteen times as slowly as you do the control on the medium waves, if you want to tune in stations with the same degree of ease.

But half the trouble will those who complain that they never hear anything worth

ON THE SHORT WAVES—Continued

day and night. The latter part of the evening is probably the most interesting time for the casual listener, since he will find American amateur telephony coming over at a strength as great as—and sometimes greater than—that of the American broadcasting stations.

The 25-metre band, to my mind, is a disappointing affair. Here we have a band of about 500 kilocycles allocated to broadcasting, but although the published lists manage to fill it up very nicely, one never hears half the stations that are printed in them. One of the most regular transmissions in the band is Pittsburgh (W 8 X K), but he is usually much better on his 19-metre transmission.

The 31-metre broadcast band is among the high spots of the short waves. Between 30.43 metres and 31.88 metres there are at least twenty-two stations which really can be received—not all at once, thank goodness, but at the various times of day at which each one comes over best.

Sydney (VK2ME of Kookaburra fame) transmits at several times on Sundays, and may usually be heard on practically any short-wave set that works! The best times at present are between 7 and 9 a.m., and again during the afternoon, from 2.30 p.m. onwards.

His wavelength is 31.28 metres. Below him are Radio Nations, Moscow, Rome, Lisbon and Madrid; above him are Philadelphia, Buenos Aires, Millis, Schenectady and Rio de Janeiro (N. and S. America); two Daventry transmissions, two from Zeesen and one from Jeloy (Europe); Bombay (Asia); and Lyndhurst and Melbourne (Australia).

It is a pity that Africa has no representative in the 31-metre band. It is almost possible to obtain one's "Verified All Continents" Certificate in this band alone. Incidentally, I am anxiously awaiting the first claims for this Certificate by owners of the S.T.800.

The 40-Metre-Band Jumble

Above this we have the 40-metre amateur band, which, to put it bluntly, is a nasty mess. Telephony transmissions from this country on 40 metres are usually excellent; but in the other European countries we seem to have an appalling collection of pirates and nitwits who do nothing but make the ether foul with unpleasant noises. The mere fact of possessing a selective set doesn't help very much.

Listen to "40" and form your own opinion—but don't say that I recommended it.

The 49-metre broadcast band is a straggly outgrown affair. It used to extend roughly from 49.6 metres to 47.2 metres, but so great was the congestion that stations seem to have taken matters

into their own hands and spread themselves out all over the place.

The result of this is that the band now spreads from 51.5 metres down to the top edge of the amateur 40-metre band, and even into it! North, South and Central American stations come in very well on this band, but it is not at its best until late at night. From 11 p.m. onwards there is always something to listen to.

Up in the region of 80 metres there is another amateur band, but the average listener won't find this very interesting except on Sunday mornings, when it is well populated by transmissions from British amateurs, mostly using telephony.

If you look at Figs. 1 and 2 again you will realise that although the shaded portions contain a lot of transmissions that will interest and amuse you, they occupy only a very small percentage of the total "acre-

THE BANDS ABOVE 20 METRES

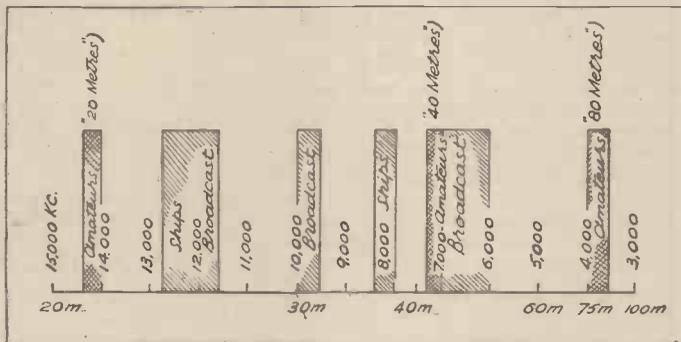


Fig. 2. Showing the allocation of the waves above 20 metres which will help you when tuning-in on the short-waves. Fig. 3 (right) has been drawn to guide you on the most suitable times to listen on the various wavelengths.

age" of the short waves. There are some bands set aside for telephony between some of the larger liners and the shore, but these transmissions are pretty infrequent nowadays, and you only hear them if you happen to be lucky enough to be on the right wave at the right time.

Don't waste time, therefore, listening off the recognised bands, unless you have some special reason for doing so. And now we come to the second part of the story.

Even if you do listen on these broadcast or amateur bands, you may choose the wrong ones. We use the term "short waves" for everything between 10 and 100 metres, but actually this part of the spectrum includes wavelengths of very widely differing character.

There is infinitely more difference between the performance of 19-metre and 31-metre waves than there is between those of, say, 200 and 2,000 metres. After all, there is only a difference of 1,350 kilocycles between the latter two; between 19 and 31 metres there is a difference of nearly 6,000 kilocycles.

I have tried to draw Fig. 3 so that it is a simple help in choosing your waveband for the various times of day or night. The shaded portion represents, in a very broad way, that part of the spectrum that will be

interesting at any particular time. This covers the winter season and should hold good for a month or so after the publication of this issue.

The heavy line covers the amateur bands only, and shows you which of them is the most active at each hour. One portion of it has had to be dotted, since between the hours of 8 a.m. and 2 p.m. there is little choice between 10 and 20 metres as a playground. From 2 p.m. until 6 p.m. there is little doubt that 10 metres is the more interesting of the two.

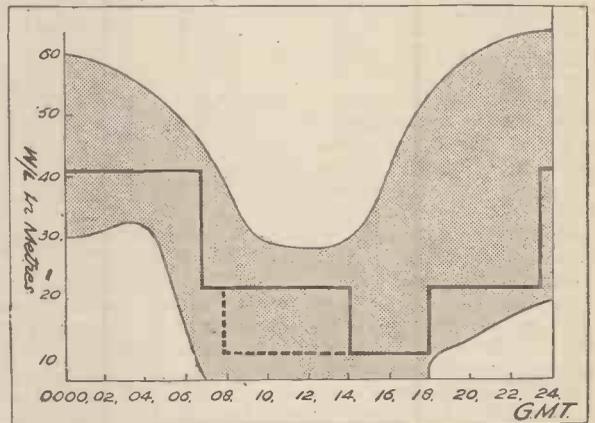
A Day with the Amateurs

Thus, if you are really keen on amateur work, you can spread up a period of twenty-four hours over the three lower bands, listening on 40 metres from 11.30 p.m. until about 7 a.m., changing over then to 20 metres. Some time before midday you can go down to 10 metres, and stop there till 6 p.m. Between that hour and 11.30 p.m. you will go back on 20 metres. And you should be hearing something all the time.

If you use the broadcast bands the hours of changing over are not nearly so clearly defined; but you certainly will be wasting your time if, for instance, you listen on 49 metres at midday, or on 13 metres at 8 p.m. Keep in the shaded area and you will be certain of coming across something or other.

Just now I don't intend to go into the technical aspects of short-wave listening. There are innumerable things that one can say about the choice of a set, about the type of aerial to use, and about the general method of handling the gear. But until you have found out for yourselves the im-

THE BEST TIMES



portant principles that I have been trying to explain, you won't derive much fun or satisfaction from the ownership of any kind of short-wave receiver.

This section exists for your benefit, whether you are a dyed-in-the-wood short-wave fanatic or just a casual listener. It is your section, and I want to run it so that you derive the most advantage from it. So tell me what you want in it, and I will try to keep it going on those lines. One thing, however, is certain: I can't be highly technical all the time, neither can I avoid being technical sometimes.

Everyone has to be catered for, and I think the usual section called "Points From the Postbag," in which I deal with as many readers' letters as possible, is an excellent means of serving up something to interest everybody.

FROM OUR READERS

HAVE YOU AN AMUSING RADIO STORY?

The Editor, POPULAR WIRELESS.

Dear Sir,—After reading Mr. Donald Kear's letter to your journal re "Salesman and Serviceman," dated Nov. 11th, I could not possibly refrain from telling your readers the story I heard of the fellow who, having bought himself a new 14-gn. set, thought that he knew everything that was to be known about servicing a receiver.

This fellow happened to be in the company of a bunch of wireless fiends one evening, and as usual was boasting of his ability. Some of his listeners took everything he had to say with a grain of salt, but one old chap who did not know any better, swallowed everything, hook, line and sinker sort of style, with the result a few nights later he invited the boastful chap to come up to his house and examine his set as it was always blowing the fuse bulb every time it was switched on.

WIN A GUINEA!

Every week we pay one guinea for the best letter, in the Editor's opinion, from a reader on any radio topic. There's no reason why you should not win one. So why not have a shot?

Radio experiences, faults you have found and remedied, programme opinions; these are all permissible topics. If you enjoy reading what others have to say, why shouldn't they find interest in some words of yours?

Anyway, give us the opportunity to decide whether or not that letter you have in mind merits printing. It may even earn a guinea!

The winner of the guinea this week is Mr. E. De Cottignies.

When the time came for Mr. Expert to examine the receiver he found that every time he switched on the set, bang went another fuse bulb. After a lot of wriggling of valves and scratching of head, not forgetting the half-dozen fuse bulbs he wasted for the owner of the set, he was asked if he had found out anything.

He remarked it was very funny that every time he switched on he saw a flash and could not understand it at all, but, said he to the old chap: "By the by, have you taken out your Wireless Licence?" Thereupon the old chap flushed and said: "No, I have not taken out a licence for two years, but never let on to anybody!"

With a smack on the old one's back our radio expert exclaimed: "I've got the trouble with your set. They have cut you off at the B.B.C. for not renewing your licence. That's why your set refuses to go!"

Yours faithfully,

JOHN G. DEACON.

17, Walker Street, Cowdenbeath,
Fife, Scotland.

FIRE-ENGINE FOR RADIO FAULT

The Editor, "Popular Wireless."

Dear Sir,—My biggest laugh over wireless was as follows:

I was living in rooms in the upper part of a house. Downstairs lived my landlord, who owned an A.C. mains set.

One day when I came home from work I was surprised to see a great crowd outside my home, including a large number of children, two fire engines and an ambulance.

When I asked what was wrong, my landlord told me he had been able to smell a strong scent

Two of the letters we publish this week contain humorous radio stories. We wonder how many other readers have had wireless experiences that raised a smile?

of burning all day, and as the house and shop was not insured he had sent for the fire brigade.

They had been there since 3 p.m., and although they had cleared all the furniture out they could not find anything. So they left at 9 p.m.

When they had gone I thought I would have a try to find out what was burning. The smell was still as strong as ever, and also the room was full of a thick haze of smoke. Then I noticed that it smelt like burning waxpaper; also I noticed that his set, which he had switched on, had slowly got quieter until you could hardly hear it. I knew it was still on by the humming noise, so I had a look at it. The cabinet was burning hot, and by standing in a certain position you could see smoke coming out of the back.

I then called my landlord and told him to have a look at it. I put my hand inside and the transformer was red hot. Then he told me that his set had gone wrong, so he had sent it to the local agents. They had sent a man to repair it. He repaired it, and he must have left something shorting. When my landlord sent to them they charged him for a new transformer.

I think this was the first time that the fire brigade has been called because the wireless had gone wrong!

One word about "Popular Wireless"—the older it gets the better it gets, as witness the S.T.800.

Yours faithfully,

J. F. MELVIN.

29, Gosport Road, Walthamstow, E.17.

IN SUPPORT OF AMATEURS

The Editor, POPULAR WIRELESS.

Dear Sir,—May I, as spokesman for many of my brethren, the much maligned Amateurs, be allowed to say a few words on the subject of Short Waves and the Amateur Organisation.

May I point out that the very first "Amateur" was Marconi himself, without whom Radio Science could not have developed so rapidly as it has.

May I point out that the Amateurs were the ones who, driven down to the shorter waves, did all the "donkey-work" and were the first to discover the properties of the shorter wavelengths. The Amateurs were ever the ones to discover new properties and phenomena occurring in the outer atmospheres, affecting high-frequency communication. The Amateurs were the ones to develop and experiment with new and unusual circuits. (May I here quote Frank H. Jones—C060M, of Cuba, who designed the most sensitive and powerful 5, 10, and 20-metre receiver in the world!)

Who was it did so much heroic work during the disastrous floods in the U.S.A.?

If short-wave broadcasting and reception have reached a high standard to-day, then, sir, I beg to state that the credit should go to the Amateurs.

If they were a lot of ham-handed fiddlers, ever vegetating and fooling about, would high-

frequency communication be what it is to-day? No, sir. May I say that we are not an occult society of "fanatics" with magic services and strange jargon. We are a brotherhood of men, working energetically on the subject of high-frequency communication; we use simplified terms to save time; we are, quite naturally, jealous of our accomplishments, though we do welcome to our organisation all those who are willing to work with us for the express purpose of increasing common knowledge.

The Backbone of Short Waves

May I say that the Amateur organisations of the world are the backbone of the short-wave world, and that it would take a good deal to even shake this solid skeleton.

On the subject of receivers, may I say that I have personally designed a special "straight receiver" that functions perfectly from 4 to 200 metres; it will cover the 200-2,500 metre band too, but I find that if one wishes to have 100 per cent. efficiency on the frequencies higher than 1.5 megacycles one cannot also have 100 per cent. efficiency on lower frequencies. Harking back to the subject of H.F. communication—this is not such a simple affair after all.

Why such things as Dellinger and partial fade-outs, skip-distances, various penetration powers of different frequencies? When one comes to frequencies higher than 3 megacycles, do waves behave in the same way as those lower in frequency? No, sir, they don't! And I repeat that it is only by the perseverance of Amateurs that their behaviour is discovered.

Finally, may I say that as the public intrudes into our "domain," so shall we keep our prestige by going down in wavelength to 5, 2½, 1½ metres, etc., and who knows what will be found there?

Yours sincerely,

E. DE COTTIGNIES,
B R S, 2562.

104, Fawnbrake Avenue, Herne Hill, S.E.24.

WELL-KNOWN N.B.C. STARS



Three American radio personalities. Left to right: Graham McNamee, ace N.B.C. announcer and reporter; Ed. Wynn, the greatest joker in American broadcasting; and Lennie Hayton, the well-known jazz singer.

AMERICA ON RUN-DOWN BATTERIES

The Editor, "Popular Wireless."

Dear Sir,—I am nearly 16 years old, which should excuse me from a lot. I have several interesting experiences to relate.

Having had an interest in electricity since about ten years old, last year I decided to try my hand at wireless; so I went round "hawking" for old sets and, as luck would have it, the first man I asked (a friend) very kindly gave me—with a little persuasion—an ancient two-valver,

(Please turn to page 415.)

AMERICAN VALVES AND BRITISH SETS

T. H. F. (Haywards Heath).—*I have a British all-mains set which works quite well. I have been told that American valves are exceptionally good, and I find that they are quite cheap. Could I convert my set to take these valves if I got hold of a suitable adaptor for the valve holders?*

No, I am afraid you would not. In the first place, the American valves are not so efficient as the British, and even if you could match up such things as heater currents, anode voltages, bias resistances and so forth, you would not get anything like the efficiency out of your set if you used American valves. Where American valves score—if it can be said to be scoring—is that they are carefully standardised by means of constructing them so that they are not so "touchy" in their characteristics. In other words, they are less efficient, and therefore can be more easily turned out to pattern.

But you would find that an American set with the power and range of yours would probably have at least half as many valves again as does yours. So even if you got hold of or made adaptors I would not advise you to tamper with the set to the extent of fitting American valves. It would be disastrous.

gives the better results. Personally, I rather favour the direct earth if it is well made. But don't neglect the water pipe, especially if it is one that goes direct to ground.

A SHOCKING AERIAL

L. G. D. (St. Albans).—*I disconnected the aerial from the lead-in tube the other day—outside the window, and got quite a nasty shock from the lead-in tube. Why was this? I find that the earth wire from the set does*

the same when disconnected from the earth lead-in tube if I happen to touch an earthed point. The set was switched off inside at the power plug on the skirting.

What you were getting was probably a minute amount of A.C. passed to the aerial and the earth statically. That is, the A.C. supply to the set is disconnected by the switch on one side only. The other main goes to the power pack of the set.

There is sufficient induction or capacitive transfer of energy to allow a minute amount of wattless current to flow to earth, and when you touch the earth or aerial while

you are standing on wet ground you are touching a slightly "alive" point, and are earthing the current through another path. The shock you receive is not sufficient to be harmful. In the case of the earth lead, you were probably touching the earth lead from the set and also the direct earth connection to the ground. In that case you were completing the earthing of the set through your body. The small current then went through you, and you felt the shock.

I have had exactly the same with my own set. It is by no means uncommon and does not indicate anything wrong. If the wall power plug is withdrawn the shocks cease, or if the switch has a double break point they cease. It is merely because the mains are not broken completely—being only broken on one side—that the phenomenon occurs.

If you hold the earth lead from the set and place it very close to the earth wire which goes to direct earth, you will find you get a series of tiny sparks. That is the induced or capacity-fed A.C. flowing from the mains through your set and to earth. The current is very small, however, and is quite wattless.

THAT BIAS FAULT

I make no apology for publishing the letter of E. A. R. (Martock, Somerset) here. It may be of interest and use to many readers

who have faults with their sets. Here is what he says:

"With reference to Radiotorial in 'P.W.' Nov. 21st, and the query raised by R. J. W. of Witney about trouble with grid bias, from details given it seems that your reader is probably trying to use a separate G.B. battery on a set designed for combined H.T. and G.B., but has omitted to join H.T. — to G.B. + on the external G.B. battery, and is thus not applying any bias to the valve or valves.

"I could not resist writing to you on this matter, as I have had a similar case myself. One of my friends found the special combined batteries a little expensive, so he purchased separate H.T. and G.B. batteries and duly connected them up, omitting to join H.T. — to G.B. +, and then asked me why he was unable to control the volume!! (the set used a var-mu H.F. pentode). Needless to say, when he told me what he had done, or rather tried to do, I was able to tell him where he had gone wrong.

"While on the subject of faults, perhaps you may be able to find space in your excellent journal for the following, which may be of some assistance to readers:

"My set, the S.T.600, suddenly developed a habit of spasmodic weak and strong reception, which I eventually traced to somewhere in the vicinity of the Extractor Coil.

"Cutting the Extractor out of working caused everything to be quite O.K. Broken winding I thought, tested—no, windings quite in order, and after much head scratching I traced the trouble to the terminals on the back of the coil unit, which, although fitted with insulated washers each side, had nothing to prevent them moving in the hole in the chassis, and thus shorting the aerial to earth.

"I removed the terminals and fitted a small piece of rubber tubing over the portion which passed through the hole, a job I consider should have been done by the manufacturers, and everything was quite O.K. Strangely enough the set had functioned perfectly for many months before the fault occurred.

"One further fault I would like to mention I discovered in a friend's S.T.500. It serves to show how important it is to search systematically.

"The set ceased to function, and after the usual battery tests, L.S. and valves, I tried the set without the Class B valve—nothing doing. H.F. valve then cut out—still complete silence. Driver valve cut out and set tried with 'phones as a one-valver—still complete silence.

"I had now narrowed down my field of inquiry, and it did not take long to locate—detector valve by-pass condenser had broken down and all signals were passing from the anode of the detector valve back to earth. Although rather an obscure fault, by tracing methodically it was found in a little less than an hour.

"I am now waiting for the parts to build the S.T.800, and will then give you my opinion on what I am sure is some set."

Well, in the words of Tommy Handley, there you are, folks. I am pretty sure that several of you will find food for thought if not direct assistance in that letter. I wish more readers would drop me a line and let me in to some of their secrets for finding peculiar faults. It would help me out sometimes, I can assure you—I get some sticky ones to answer every now and then.

A READER'S SOS

Nearly every week now I get one or more letters from readers asking for back numbers of "P.W." Sometimes I can oblige, and arrange for the numbers to be sent on, but occasionally I have to turn to you—our readers. Here is one request which I am bound to pass on—there are no copies of "P.W." dealing with the Simplex Two, July 6th, 1935, on hand. Has anyone of my readers got a copy he can lend? If so, please get in touch with J. P. Keene, of 57, Selly Park Road, Selly Park, Birmingham. Drop him a postcard, first, please. Thanks.

HERE IS ANOTHER

"Will any Good Samaritan come to my aid? I want a copy of 'P.W.' with the blue-print for the S.T.600. I will see that the copy is quickly returned."—A letter from F. D. Stephenson, 20, Kirkgate, Liberton, Edinburgh. One at a time, please readers. The usual procedure, just drop him a line and let him choose which of you shall be the G.S. And, on his behalf, many thanks.

A GOOD EARTH

T. L. (Acton).—*I want a good earth for my S.T.800. I am in a top flat (three storeys) and the shortest earth is at least twenty feet to a water pipe. I could get a direct earth to ground but it would be longer. Which shall I use?*

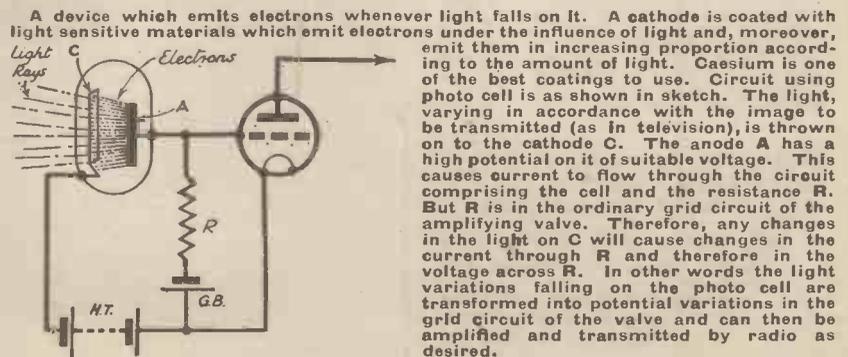
Can I make connection to the D.C. electric light metal conduit?

The last question first. You can, but I should not do so. It might bring in all sorts of noise troubles. Regarding the earths, I would seriously advise you to try both, one at a time. The water-pipe earth may be all right if it is taken to a cold water pipe which is a main pipe—coming direct up from the ground. If it is one of the "round the house" pipes it may prove very unsatisfactory.

The direct earth may not be so bad as it seems at first sight. I think I should try it. It is decidedly long, but you can hardly help that, can you? Try the water pipe and the direct earth, and see which

TECHNICALITIES EXPLAINED—No. 33

PHOTO CELL



BUILDING A 7-METRE OSCILLATOR

(Continued from page 400.)

thick, and is $4\frac{1}{2}$ in. square. Before putting together the container, the coupling coil and screened lead are fitted to the inside of the top as shown in diagram. The sides fit between the top and bottom and the end fits overall, thus making the overall dimensions $7\frac{1}{2}$ in. \times $4\frac{1}{2}$ in. \times $4\frac{1}{2}$ in.

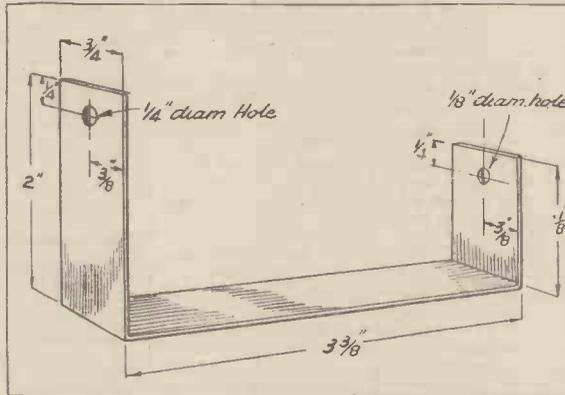
The copper foil covers the container completely, and should be carried round the front edges to which the panel is fitted. The foil should be fitted by means of small flat-headed brads about $\frac{1}{2}$ in. long. The amount of foil necessary is about 20 in. \times 12 in., and the thickness .004 in. Having drilled the holes for the battery leads and screened coupling lead, the container is complete. The hole for the battery leads in the side is $\frac{1}{4}$ in. diameter, and that for the screened lead in the top is $\frac{3}{8}$ in.

The panel is fitted by means of three screws. It is necessary to enter the battery leads in their hole in the side of the con-

voltage controls the strength of the signal.

The crocodile clip on the screened lead which goes to the core of the lead is connected to the aerial terminal of the receiver, and the other crocodile clip goes to earth terminal. If this gives too tight a coupling that is, if the signal is too strong even with

THE SUPPORTING BRACKET



The tuning condenser and valveholder are fixed to this bracket, and these two components support the remaining parts, as will be clearly seen by reference to the wiring diagram.

reduced H.T. voltage, the earth crocodile clip connection may be removed. If this does not reduce the signal enough, remove aerial crocodile clip from aerial terminal and just leave it near by.

The position of the vision and sound television signals are at approximately 110° and 140° respectively. A paper dial may be stuck on the panel, as shown on the photograph of panel. The positions given will help to find the transmissions on the receiver. When these are found the exact positions may be marked on the paper dial of oscillator.

FROM OUR READERS

(Continued from page 413.)

without valves, needless to say, and some parts for 2/6. Earphones I got for 1/6.

This collection lay idle for some time, then I tentatively made a one-valver. It actually got four B.B.C. medium-wave stations.

Now, after a year's experience, with a 30-foot earth wire, an indoor aerial of electric-bell wire, a home-made coil on a cardboard former (range 230 metres to 580 metres) and a saucepan for earth, I boast of having listened to 46 stations in the above range on the same one-valver.

The set has no choke and not one refinement. The H.T. consists of two throw-outs of the neighbours and another battery about four months old.

A long time ago you published a letter from a boy of my age telling how he heard two American stations on the medium-wave on his one-valver. On several summer nights when daylight was just appearing I heard in comfort by my bedside six Americans. They are unmistakable with their strong American accents.

I identify my stations by means of a graph. The set readings are plotted against the correct wavelengths of the stations. With the B.B.C. stations whose wavelengths are known a smooth curve is obtained.

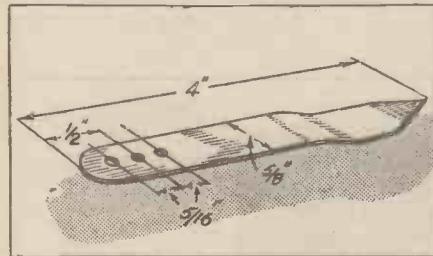
Then the unknown stations, with the graph and the help of language, are easily identified.

Best wishes to "P.W."

Yours truly,

P. A. YEATES.

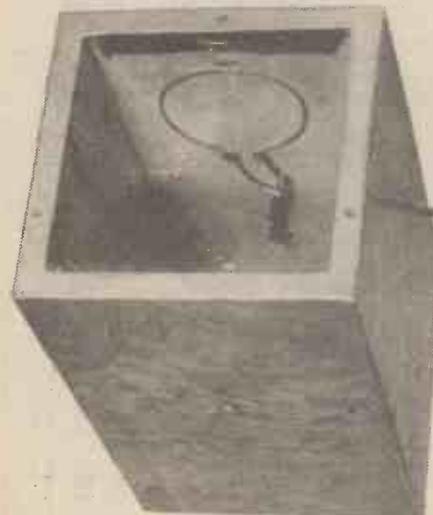
62, Hurst Grove, Bedford.



Dimensions for the scale indicating pointer.

tainer before fitting panel. When the panel has been fitted they can be pulled through.

The L.T. is, of course, a two-volt accumulator, while the H.T. may be as low as 66 volts. It is useful to use a 120-volt battery, and variation of the applied



The coupling coil which consists of a single turn of wire is secured to the top of the containing box.

PETO-SCOTT

S.T.800 BATTERY VERSION

KIT "A" Carriage Paid 67'6

Complete Kit of Components exactly as FIRST specified and used by Mr. John Scott-Taggart, with Konectakit (Gratis with Complete Kit) but less wander plugs, accumulator connectors, valves, Extractor Kit, Cabinet and Speaker.

KIT "B" Carriage Paid £4:14:0

As for Kit "A," but including set of 4 FIRST specified valves only, less cabinet and speaker, etc.

KIT "CT" As for Kit "A," but with valves and Peto-Scott S.T.800 Table Cabinet only, less speaker, etc. Carriage Paid £5/11/6.

KIT "CC" As for Kit "A," but with valves and Peto-Scott Console Cabinet only, with speaker baffle and battery shelf, less speaker, etc. Carriage Paid £6/9/0.

KIT "CLL" As for Kit "A," but with valves and Peto-Scott Console Cabinet, Type "LL" only, with speaker baffle, less speaker, etc. Carriage Paid £6/11/6.

S.T.800 (Battery) FINISHED INSTRUMENT

TABLE MODEL



Built exactly to Mr. J. Scott-Taggart's specification by Peto-Scott's expert technicians. Complete with FOUR FIRST SPECIFIED valves and Peto-Scott Walnut table cabinet (illustrated on left), less batteries. OVER-ALL DIMENSIONS: Width 18 1/2 in.; Height 14 1/2 in.; Depth 12 in.

CASH PRICE
£7 : 2 : 6

CABINET ONLY. Exquisitely designed walnut finished Cabinet, with sloping front and crossbanded moulding. Complete with extension spindle, 17/6. (Carriage and packing 2/6 extra.)

NEW AND DIFFERENT! PETO-SCOTT 1937 SHORT-WAVE ADAPTOR-CONVERTER KIT

13-74 METRES



Convert your battery or A.C. set for operation on short waves with this up-to-the-minute unit. No alterations to your set. Two hours to build—a lifetime of world-wide entertainment.

- No coil changing.
- Ready drilled enamelled steel chassis.
- Ready drilled black crystalline finish steel panel.

KIT "A" 29/6 Cash or C.O.D. Carr. Paid

Or 2/6 down and 10 monthly payments of 3/-. Comprises all parts for building, with diagram, assembly, and operating instructions, less cabinet.

2/6 DOWN

THE 'A.P.' A.C. THREE

KIT "A" Author's Kit of first specified parts, less valves. Cash or C.O.D. Carriage Paid £3/5/6, or 12 monthly payments of 15/3. With 4 specified valves, £10/14/6, or 12 monthly payments of 19/9.

W.B. 1937 SPEAKERS



MODEL 37S. Amazing reproduction provided by new magnet and exponential moulded cone. Microflood matching device. Cash or C.O.D. Carr. Paid £2/2/0. Or 2/6 down and 11 monthly payments of 4/-.

MODEL 37J. Perfectly matches any receiver as principal or extra speaker. Cash or C.O.D. Carriage Paid £1/12/6. Or 2/6 down and 11 monthly payments of 3/-.

Any other "W.B." Speaker on attractive Easy Terms.

2/6 DOWN

PETO-SCOTT Co., Ltd., 77 (P.W.10), City Road, London, E.C.1.

Telephone: Clissold 9875. West End: 62 (P.W.10), High Holborn, London, W.C.1. EST. 1919.

SEEN ON THE AIR

L. Marsland Gander, "P.W.'s" special radio-screen correspondent, gives his views on the B.B.C. television programmes.

I SAT in the dress circle of the Dominion Theatre on a Sunday morning recently. The curtains parted and revealed a huge close-up of Will Hay on a screen measuring eight feet by six feet six inches. "Good morning, everybody," he said and continued with some patter to which, I regret to say, I paid little attention, because I had been taken by surprise by the excellence of the latest super-screen television, demonstrated personally by Mr. J. L. Baird.

Will Hay could be easily recognised, although he was minus the familiar mortar board. I do not pretend that the picture had the brightness, sharpness and general clarity of the films that are shown daily in this same theatre. But they demonstrated that marked progress is being made with this problem.

"Public-Address Television"

As shown, the system was really a "public-address" television outfit. I do not think it would be suitable for any purpose at this stage. A Stalin, Hitler, or Mussolini could show his face (to one of the mighty concourses which gather for the modern dictator) enlarged to gigantic proportions. It would be the visual equivalent of loudspeaker magnification of his voice.

Mr. Baird produces his picture by a system which he calls "multi-mesh scanning." As demonstrated at the Dominion Theatre it is a mechanical system which, both at transmitting and receiving ends, makes use of a slotted disc in combination with a high-speed mirror drum. The final field gives 120-line definition, and pictures are transmitted at 33½ frames a second.

I noticed very little, if any, flicker. The definition, when it is realised that it is only half

that used in the Baird transmissions from the Alexandra Palace, does not sound specially impressive. Yet, as I have said, at a distance from the screen the results are altogether surprising. The lines are, by the way, vertical, as in the case of the old low-definition system adopted by the B.B.C. The divisions could be seen on the screen, sometimes much more prominently than at others.

It was a disappointment to the Baird Co. to be unable to transmit from the Crystal Palace for the purposes of this demonstration. Unfortunately the transmitter was destroyed in the fire, but the Company courageously decided to go ahead with its plans, and rigged up a studio at the Dominion Theatre in a room remote from the stage, in order to give the demonstration by line.

In this studio the subjects to be televised stood with their faces in front of a circular lens fourteen inches in diameter, eight photo-electric cells being grouped round the circumference of the lens. The remainder of the apparatus is behind the lens in an adjoining compartment.

The artists stood close up to a wooden framework, across which pieces of cotton were stretched indicating the correct position of the face for perfect focus. Mr. Hay objected that the cotton tickled his nose, but the objection was overruled.

Mr. Baird himself came before the transmitter and a greatly magnified likeness of him was simultaneously seen on the screen over the stage. He then submitted to cross examination by telephone from the dress circle, so that his interrogators, myself among them, could see and hear him answering their questions. He told me that he had been putting in a great deal of personal work on this system.

Incidentally, he mentioned that the Baird Co. has under consideration the question whether a new site will be found for their experimental station or whether they will carry on at the Crystal Palace.

I went to the Alexandra Palace recently to see a transmission from the studio end. By the courtesy of the B.B.C. I was present in the large Baird studio during an afternoon broadcast. It was an exciting, not to say disconcerting, experience.

I was able for the first time to see the problems of the producers in true perspective. I do not say that I came away with the impression that their methods were ideal, but I did carry away a wholesome respect for the tremendous effort which is being made, sometimes with disheartening results.

Baird's are using alternative methods at the moment, intermediate film and the electron camera. At this particular transmission of "Picture Page" two electron cameras were being used for the first time together, so that one picture could be dissolved directly into another as in the Marconi-E.M.I. transmissions.

Thirty People for One Broadcast

How much more complex this television business is than a sound broadcast may be judged when I say that there were at a conservative estimate thirty people in the studio. There were the B.B.C. engineers, distinguished by their smocks, Baird engineers in mufti. There were stage hands to manipulate the batteries of "searchlights," two announcers, numbers of other officials each with their special job, and all the persons who were taking part in "Picture Page." These last waited nervously on a row of chairs.

An atmosphere of great tension developed as zero hour approached. A whistle blew, the buzz died to a painful silence. "Sound on"—then "Vision On" flashed up in red on an electric indicator. Then a studio assistant began to turn over the pages of the "Picture Page" book in which the names of the editor

(Continued on next page.)

The GIFT that will be Valued for years!

Here's an idea for Xmas—an AvoMinor! It's the ideal gift for radio enthusiasts. With the aid of this accurate meter you can keep the performance of your set up to concert-pitch. It enables you to go straight to the cause of trouble in all receiving apparatus. Actually the D.C. AvoMinor is thirteen testing meters in one. It gives 13 different ranges of direct readings in milliamps, volts and ohms. You can put your finger quickly on every defect. No other instrument at the price enables you to test with such ease and accuracy.

In its handsome presentation case, complete with instruction booklet, the AvoMinor is the radio man's supreme gift. From all good dealers. But if you have any difficulty in obtaining, send to us.



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SEEN ON THE AIR

(Continued from previous page.)

and producer are given. Yes, there is a real book and it has to be "turned over" physically.

We then looked to another corner where Joan Miller sat at her model switchboard in the field of another camera. She did her telephonic announcing and so—on with the show. Prince Obolensky, the Oxford Rugby flyer, and Laborde, the Cambridge captain, were the stars in this particular bill. Prince Obolensky told me afterwards that he felt extremely nervous, but his companion, despite a prize black eye—his fifth sustained on the Rucker field this term—said he felt no qualms.

I have left little space to discuss programmes—a pity, because the boys at A.P. are striving desperately hard. I do not mean to sound patronising, but this happens to be the plain statement of honest fact.

There has been a marked improvement in material. My personal choice of the tit-bit of the week is Gillie Potter, whose illustrated lecture will obviously be a godsend to television and has always been a joy to me.

A Conspicuous Success

Mr. Stephen Thomas made a conspicuous success of the model parade when £2,000 worth of dresses—all British designed—ranging from skiing outfits to alluring evening gowns were shown.

There is, by the way, another reflection on my studio visit which I must make. A show which may seem marvellous in the studio, full of pep, wit, and everything desirable, may be agonising to the televiewer gazing at a small screen ten miles away. To me it seems a great drawback that the producer cannot see conveniently and immediately, at every stage, exactly what picture he is producing. He can nip into the next room; he can get somebody to tell him. But a check receiver under his nose seems to be the only real solution.

Other high spots of the week were the Two Leslies and George Scott-Wood and His Six Swingers. I must regret that I did not see "Hutch."

I notice that another improvement has been to alternate Gaumont-British News with British Movietone News, thus avoiding endless repetition of the same reel. Nice work.

TECHNICAL JOTTINGS

Items of interest to all

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

Smooth Reaction

TO get the best results with an ordinary "straight" type of receiver it is essential that the reaction comes into effect gradually instead of with a pop; also, it is very important that when you turn the reaction control in the opposite direction, the direction to reduce the reaction, the set should cease to oscillate at more or less the same position of the control as that at which it previously started to oscillate. Sometimes you will find that the set will start to oscillate when the reaction control goes past a certain position, but will not cease to oscillate until the reaction control is brought a good deal farther back than the position at which the set started to oscillate. Any difference between the position at which oscillation starts and that at which it stops is known as "backlash."

To get smooth reaction you will sometimes find it worth while to use a potentiometer connected across the low-tension supply, the slider connection being taken from a point on this potentiometer to the grid leak. Use a fairly high-resistance potentiometer, say about 500 ohms, so that

the drain on the L.T. battery is not too appreciable.

Aerial and Earth Efficiency

People do not realise how the aerial and earth may vary considerably in efficiency owing to weather conditions, and so on. It may be that the aerial insulators are covered with dirt and that the signal input energy is being by-passed in consequence. Again it may be that the earth connection has become inefficient owing to the ground being dry in the region of the buried earth plate.

All these points, however, are easily gone over, and it is always a good plan to check them in cases of any falling off in the strength of reception, especially if the cause is not apparent from an examination of the set itself.

Rival Methods of L.F. Coupling

Resistance-capacity coupling, transformer coupling and choke-capacity coupling vie with one another for the favour of constructors and each system has its own supporters. During the progress of broadcast reception in the past few years the changes have been rung pretty successfully on these different forms of coupling, first one then another. There is a good deal to be said for all of them, and it really depends, apart from personal preference, upon the actual conditions in any particular case. Choke-capacity coupling is considered to have certain advantages over resistance-capacity coupling. The connections, by the way, are the same, but the advantage is that the choke has a relatively low D.C. resistance

(Continued overleaf.)

OVER **50** TYPES

Every Battery and Mains Set can be vastly improved provided you replace all "tired" valves with their modern Hivac equivalents.

Why put up with distortion, lack of volume and sensitivity, when for a small sum you can modernise your receiver.



THE SIGN OF A GOOD VALVE

Have you had particulars of these special types?

HIVAC SHORT-WAVE VALVES
HIVAC HARRIES VALVES
HIVAC MIDGET VALVES

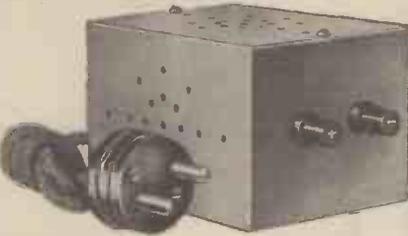
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**EDDYSTONE 1937
SHORT WAVE MANUAL**

TECHNICAL JOTTINGS

(Continued from previous page.)

and consequently only a comparatively small drop in the anode voltage is produced when a choke is used as coupler.

Voltage Drop

You can compare this with resistance-capacity coupling where, as is well known, there is often quite a large drop in voltage, so appreciable as to necessitate providing extra high-tension voltage in the H.T. supply so as to allow for the drop and make sure that the correct voltage is ultimately applied to the anode of the valve.

The fact that the D.C. resistance in the case of an L.F. choke is so comparatively small permits also of the choke being used in place of decoupling resistances, especially in positions where, for one reason or another, it is important to avoid any appreciable voltage drop in the component. But, of course, the question of expense has to be borne in mind. Choke coupling is not cheap.

Interference From Moving Coil

I have sometimes been asked whether the field winding of a moving-coil speaker is likely to interfere with neighbouring components. The answer, I think, is pretty obvious. If the field magnet is excited by direct current produced by rectifying alternating current, it will be evident that unless this is very carefully smoothed it will still be pulsating in character, and will be very liable to cause trouble if any of the more sensitive components of the circuit are too close to it. In modern all-electric sets the smoothing of the field supply is pretty carefully worked out, and, on top of all this, the inductance of the field itself helps greatly in the smoothing. Nevertheless, I advise you not to have any other components any nearer to the field magnet than can be helped, and in particular you should keep the detector stage and the H.F. stages quite clear.

Microphonic Effects Due to Speaker

Quite apart from stray electrical effects, however, there is always the danger of the mechanical effect on the valves, which used to be called a microphonic effect, due to the sound waves from the loud-speaker setting the valves into sympathetic vibration. Inasmuch as the frequency of these will be the same as the frequencies passing through the low-frequency amplifiers, you will see that there is danger of howling being set up. It is important, therefore, to take care that the detector and low-frequency stages are not subject to the direct impact of the sound waves from the loudspeaker.

Theory and Practice

When considering the amount of amplification per stage which can be obtained you don't want to be led away by the calculations which are sometimes given in textbooks as to the amplification which is theoretically possible. I dare say many of you are familiar with the rule of thumb by which you take the maximum grid swing of the detector and multiply this by the amplification factor of the valve and the ratio of the following transformer, so obtaining the volts delivered to the grid of the succeeding valve. All you have to do then

is to repeat the process for the next valve and you will find that a couple of stages will give you enough amplification to get about seven times round the world!

Avoid Overloading

This is all very fine and large, but the plain fact is that the amplification that can be obtained from a stage in *practical* conditions is altogether different from that indicated by *theoretical* examination as above. There is a very great discrepancy indeed between the amplification which you can work out on paper and that which you can expect to get. So you will need to modify your ideas quite a bit and to realise that to attempt to get anything approaching the theoretical amplification out of a single stage will only result in hopeless overloading.

NEXT WEEK

FROM MY ARMCHAIR

BY

JOHN SCOTT-TAGGART

M.I.E.E., F.Inst.P., Fel.I.R.E.

AND

More About the

"A.P." A.C. THREE

Voltage to Power Valve

The valve which generally gets the brunt of the overloading is the output stage, and here it is useful to remember that an ordinary small-power valve used in this stage cannot be expected to handle more than about 30 volts in the anode circuit. In passing, I may mention that according to the theoretical calculation you may quite easily prove to yourself on paper that you are going to deliver a voltage of several hundreds to the power valve.

ELECTRADIX BARGAINS

COILS.—Short-wave Coils, plug-in type, 1/6 each; Ribbed low-loss formers, 9d.; Long-wave 2-pin coils, 1/-; Reaction Tuners, 9d.; Mains interference, H.F. twin chokes, 2/-; Solenoids for model or relay operation, 6v. or 12v. with $\frac{1}{2}$ in. 1oz. iron travel, 2/6.

SPARK COILS, 1in., $\frac{3}{4}$ in. and 1in. gap, with condensers. Larger coils, 2in. to 7in. flaming spark, short-wave spark transmitters for boat model control, 17/-.

CONDENSERS.—Variable .0005-mf. Formo, 1/6; 1B, .0005-mf., 2/-; Reaction, .0005-mf., 1/3; Pyc. .0003-mf., with sundial, 5/-; Fixed Condensers, 2-mfd., 250-v., 1/- or 5/- for 6; 4,000-v. $\frac{1}{2}$ mfd., 6/-, and many other ranges.

COMPASSES.—Boat Binnacle Mariners' 6in. Boat Compass, floating, gimbal glass case, 35/-; Magnet Compass, 1 $\frac{1}{2}$ in. Brass Case, bevel glass, plain dial, unsealed, new, 9d.; War Office Prismatic, 25/-; Travellers' pocket, 15/-.

FRACTIONAL H.P. MOTORS.—300 in stock, A.C. and D.C., 1/50 h.p. to 1 h.p., 6-v. to 250-v. A.C. or D.C. from 12/6.

CRYSTAL SETS are popular for perfect, quiet reception, 4/11; All-wave Bakelite Brownie Set, 8/11.

TELEPHONES.—The cheapest is a pair of 2/9 Sullivan Headphones. Brown's "A" reed for short-wave sets, 1,500 ohms, 21/6; Western Elec., and others, 2,000 ohms, 4/3 pair.

PARCELS of experimental odd coils, magnets, wire, chokes, condensers, switches, terminals, etc. post free: 10 lbs., 7/-; 7 lbs., 5/-; 1,000 other Bargains in New Sale List "N."

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Telephone: Central 4611.



By G. T. KELSEY

THOSE of you who saw the description of my experiences with the S.T.800 in a recent issue of "P.W." will no doubt recall my references to the Crystal Palace and to the adverse effect it had upon results in certain cases of residents living close by.

Little did I think then that before many weeks had elapsed that notorious "radio blanket" would have gone for ever. And although it is perhaps a little out of place to introduce sentiment into these notes, as a Sydenham resident to whom the Palace has always been part of the furnishings, so to speak, its end, to me, is a tragedy. As I stood up on the Parade on that fateful evening and saw the roof of the mighty centre transept crash in with a roar that could be heard for miles, it was, I think, the most distressing sight I have ever seen.

That I am able now to obtain generally better results doesn't thrill me in the slightest degree, I'm afraid, for that is mighty poor compensation for the loss of such an old and familiar landmark. In any case, just as a matter of interest, the absorption caused by the Palace was much less than most of us had reason to imagine. Certainly I have been getting better results since the great fire, but it is difficult at this stage to assess the extent of the improvement, for there are so many other things to be taken into consideration. It may even be that the dear old Palace has been blamed all these years for something for which the hill on which it stands is directly responsible! However, time will tell, and I shall probably return to this subject when I have had a little longer in which to judge. In the meantime, I'm far more concerned with its loss.

Conversation Piece

Talking of the Palace catastrophe, hats off to the B.B.C. for the enterprising way in which they hooked up a "mike" at the scene of the fire in order to provide listeners with a running commentary. There's one other O.B. that I would like them to do if it were possible. I would like them surreptitiously to place a microphone in some out-of-the-way igloo up in the frozen North, and I'll bet the conversation when they took us over to it would be "Iggie oogle woggle S.T.800"—or what ever it is they say for "Have you built the S.T.800?"

Everywhere I go at the present time, the one topic of conversation is S.T.800. Not that I'm the least surprised. I felt certain from the start that the publication of our distinguished contributor's first all-waver would result in unprecedented constructor activity, and—by jingo—it has!

And despite the fact that the most elaborate arrangements were made prior to the publication of this remarkable set to ensure that adequate supplies of all the necessary parts would be instantly available, so phenomenal has been the demand that temporary hold-ups have been inevitable.

Naturally, we are sorry about that, but I do want to assure you that everything possible has been, and is being, done by the various manufacturers to keep pace with the situation, and some of them are working day and night and right through the weekends in order to cope with the demand with the minimum delay.

There is every indication that by the time these notes appear in print the situation will be normal, and in those cases where delays have occurred, the forbearance will be amply rewarded by the sterling performance of the set in question.

That Static Menace

If my correspondence is anything to go by, it would seem that there are still a great many listeners who are being tortured by "frying-pan music." And, unfortunately, until such times as legislation is introduced to deal with the situation, the menace of "man-made" static is likely to become even more formidable in the future.

But there is a ray of hope. I have good grounds for thinking that something is likely to be done about it officially before very much longer, in which case there is every prospect that the situation will be eased.

In the meantime, I am surprised that not more readers seek a way out on their own account. After all, even with legislative measures, it will probably be years before all forms of "man-made" static are completely eliminated, and in all normal cases it is so easy to tackle it yourself.

In this connection I have just received a booklet from Messrs. Belling & Lee, Ltd. (who are, of course, the pioneers of static suppression) which is of very great interest to all who are in trouble with artificially produced "atmospherics."

"Wireless Without Crackling" as it is called, gives a clear and concise description of the cause and

effect, and outlines simple ways in which the menace can be overcome. I'm quite convinced that if all those listeners who experience "frying-pan music" were to obtain a copy of this booklet, the majority of them would be able to solve their problems in about five minutes.

So I propose to make it available under our free literature scheme. Just send me a postcard in the usual way, and I shall be pleased to make the necessary arrangements for a copy to be forwarded to you. (No. 37/11.)

(All applications for catalogues reviewed in "The Link Between" should be addressed to G. T. Kelsey, John Carpenter House, John Carpenter Street, London, E.C.4, and the number given in black type at the end of the review should always be quoted.)

LEARNING FRENCH THROUGH YOUR RADIO

(Continued from page 407.)

| | |
|-------------------------------------|-----------|
| UNE ASPERGE (as-persh) | Asparagus |
| LA LENTILLE (lah(n)-lee'y) | Lentil |
| UN OIGNON (on-yo(n)g) | Onion |
| LA CITROUILLE (sil-roo-ee'y) | Pumpkin |
| LE CONCOMBRE (ko(n)g)-ko(n)g)br) | Cucumber |
| LE CHAMPIGNON (shah(m)-pee-nyo(n)g) | Mushroom |
| LA TRUFFE (traf) | Truffle |

I want you to listen for these words. I want you to catch the pronunciation. I want you to try to catch the numerals, too. As you read the above Bulletins read the numerals in French, not English. There are, perhaps, a few expressions which I ought to explain.

| | |
|-------------------------------------|-----------------|
| Les cent kilos (leh sah(n)-kee-loh) | per 100 kilos |
| La caisse (lah kehss) | per case or box |
| Les cent bottes (leh sah(n) bot) | per 100 bunches |
| La pièce (lah pee-ess) | each, apiece |

In a bulletin you will hear frequently such expressions as:

| | |
|--|---------------|
| Incoté (ah(n)-koh-leh) | not quoted |
| Courant (i.e. le mois courant) (koo-rah(n)t) | current month |

Marché suspendu (mar-sheh sîs-pah(n)-dî)
 Cote officielle (koh off-iss-e'el)
 Blé disponible (bleh dis-pou-eebl)
 La Physionomie de la Bourse (fir-e-on-ou-re d'lah boorss)
 Marché ferme (mar-sheh fairm)
 Le marché est nul (mar-sheh eh nu)
 Le début ((deh-bû)
 La clôture (kloh-lûr)

market suspended
 official quotation
 corn available
 features of the B.
 steady market
 nothing doing
 opening
 close

Now translate the following.

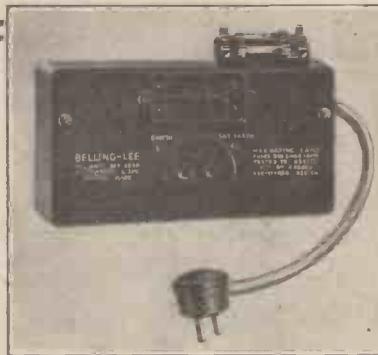
Après un début ferme, en reprise de 1.50 (on recovery of) sur la veille (day before), la majeure partie de l'avance se trouva reperdue en clôture par suite de la prédominance des offres.

Finally, a little PROGRESSIVE FRENCH. Say the following slowly at first. Then speed up.

Avez-vous entendu ?
 L'avez-vous entendu ?
 N'avez-vous pas entendu ?
 Ne l'avez-vous pas entendu ?
 Pourquoi ne l'avez-vous pas entendu ?
 Je ne sais pas pourquoi je ne l'ai pas entendu.
 Voulez-vous me dire pourquoi vous ne l'avez pas entendu ?
 Non ! Je ne veux pas vous dire pourquoi je ne l'ai pas entendu.

Have you heard ?
 Have you heard him ?
 Haven't you heard ?
 Haven't you heard him ?
 Why haven't you heard him ?
 I don't know why I haven't heard him.
 Will you tell me why you haven't heard him ?
 No ! I will not tell you why I haven't heard him.

A handsome celluloid dial for the S.T.800, similar to the card dial issued in "Popular Wireless" but revised up to a later date of printing, is obtainable for 2s. 6d. post free, from Celluloid Printers, Ltd., Kingston By-pass Road, Surbiton, Surrey. This is the only dial approved and checked by the designer of the S.T.800.



TELEVISION INTERFERENCE

Type No. 300, referred to below, is particularly useful for cutting out the residual snowstorm effect in television reception.

All-wave Set Lead Suppressors

No aerial system can protect a receiver from interference conducted to it via the mains. For complete suppression the mains must be filtered before they reach the receiver.

No. 300, All-Wave, 1-amp. type is effectual down to 10 metres .. 21/-
 Also available for 3-pin Plug and Socket fittings.

No. 1211, Medium and Long Waves, 3-amp. 17s. 6d.

No. 1256, Medium and Long Waves, 1-amp. 19s. 6d.

The suppressors listed here have been produced for conducted interference and consist of small 3-stage choke and condenser filters which are plugged into the mains at the point from which the receiver obtains its supply.

BELLING & LEE, LTD.,
 Cambridge Arterial Road, Enfield, Middlesex
STRIKE OUT ITEMS NOT REQUIRED.
 "Wireless Without Crackling" booklet, FREE.
 "Eliminoise" folder, FREE.
 "Interference Suppression" book, 1s. 2d. remittance enclosed.

Name.....
 Address.....
 Pop. W. 19.12.36.....



THE "A.P." A.C. THREE

(Continued from page 410.)

domestic set in the home of a technician! A member of the technical staff of POPULAR WIRELESS was so impressed by its performance that he advanced a personal claim on the original model while it was undergoing meter tests in the metal-lined set-testing cabinet which is installed in the "P.W." Research Department.

Here is his report, voluntarily submitted. "My Experiences With The 'A.P.' A.C. Three. By H. A. R. Baxter.

"I have been using this set in my house at Loughton for a period of some weeks. It has been used for ordinary listening and feeds up to four loudspeakers in various rooms.

"The performance on medium and long waves is exceptional, upwards of one hundred different stations having been received at full entertainment value. The smoothing is of a high standard of effectiveness and the quality is superb. No difficulties of any kind have been experienced. The wavechange switching has not given the slightest trouble and the set has been successfully handled by all kinds of people knowing nothing about the technical aspects of wireless.

"Reception on a di-pole aerial is excellent, but I do not find it essential and have now gone back to an ordinary indoor type. The Alexandra Palace television programme comes through at full loudspeaker strength on four loudspeakers."

The reference to feeding a number of loudspeakers is particularly interesting. As a matter of fact, the set was specifically designed with a view to its use in this way. That is why it is equipped with a choke-capacity outfit. Or largely the reason, anyway, for the type of output employed was also selected as a part of the general scheme of hum elimination, for this assumes vital importance on the high frequencies.

SOME HINTS FOR THOSE ON THE MAINS

(Continued from page 401.)

Suppose a transformer is working off a 250-volt supply, with one main coupled to the "O" or "Common" terminal, and the other to the terminal marked "250 v." We can increase the secondary volts by moving this main down, say, to the "230-v." terminal, because that is equivalent to applying a higher voltage across the normal "230-v." primary.

Whether it is desirable to do this kind of thing or not depends on the working conditions. The point to note is, that tapping down the primary pushes the secondary volts up, and vice versa. Thus, we could similarly reduce the secondary volts by moving a 230-volt main from its appro-

priate terminal to a "240-v." or "250-v." tapping, the effect being to reduce the normal voltage which should be on theseappings.

Now, although tapping up in this way can have no ill effects, tapping down, as seen, involves a rise in secondary volts, which may mean excessive filament voltages. Besides, in a badly designed transformer the magnetising current may rise to proportions sufficient to cause dangerous overheating.

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The Proprietors have the right to refuse or withdraw advertisements at their discretion.

Postal orders in payment for advertisements should be made payable to the Amalgamated Press, Ltd., and crossed.

All communications should be addressed to Advertisement Department, "Popular Wireless," John Carpenter House, John Carpenter Street, London, E.C.4.

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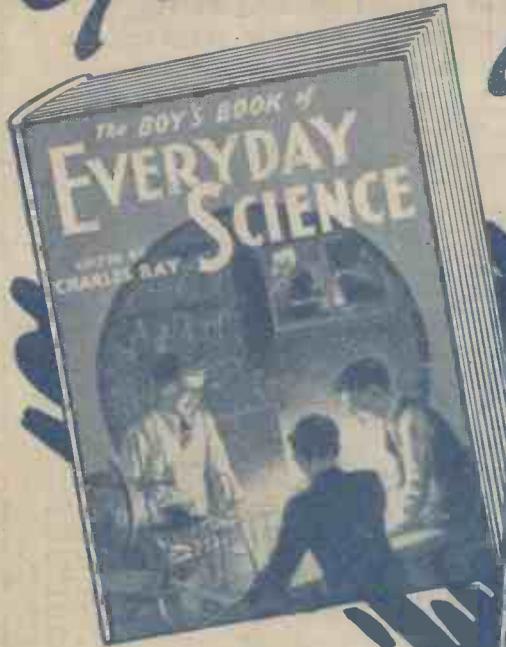
WOOLWICH 2345

"P.W." LIST OF EUROPEAN BROADCASTERS

This list contains the more important European medium and long-wave stations which are likely to be received in this country. There are some relay stations working on very low power and sharing common wavelengths. These have been omitted because their programmes are usually too weak or badly interfered with to be of value to British listeners.

| WAVE-LENGTH. | STATION. MEDIUM WAVEBAND. | COUNTRY. | POWER KW. | WAVE-LENGTH. | STATION. MEDIUM WAVEBAND. | COUNTRY. | POWER KW. |
|--------------|------------------------------------|------------------|--------------|--------------|------------------------------|------------------|--------------|
| 203.5 | Plymouth | Gt. Britain .. | 0.3 | 349.2 | Strasbourg | France | 100 |
| 203.5 | Bournemouth | " | 1 | 356.7 | Berlin | Germany | 100 |
| 206 | Eiffel Tower (Paris) .. | France | 5 | 360.6 | Moscow (No. 4) | U.S.S.R. | 100 |
| 215.4 | Radio-Lyons | " | 25 | 364.5 | Bucharest | Rumania | 12 |
| 233.5 | Aberdeen | Gt. Britain .. | 1 | 368.6 | Milan (No. 1) | Italy | 50 |
| 236.8 | Nürnberg | Germany | 2 | 373.1 | West Regional | Gt. Britain .. | 70 |
| 238.5 | Riga | Latvia | 10 | 377.4 | Lwów | Poland | 50 |
| 240.2 | Saarbrücken | Germany | 17 | 382.2 | Leipzig | Germany | 120 |
| 241.9 | Cork | Irish Free State | 1 | 386.6 | Toulouse (P T T) | France | 120 |
| 243.7 | Gleiwitz | Germany | 5 | 391.1 | Scottish Regional | Gt. Britain .. | 70 |
| 245.5 | Radio Marconi (Bologna) | Italy | 50 | 395.8 | Katowice | Poland | 12 |
| 247.3 | Lille (Radio P T T Nord) | France | 60 | 400.5 | Marseilles (P T T) | France | 90 |
| 249.2 | Prague (No. 2) | Czechoslovakia | 5 | 405.4 | Munich | Germany | 100 |
| 251 | Frankfurt | Germany | 25 | 410.4 | Tallinn | Estonia | 20 |
| 253.2 | Nice-Corse | France | 60 | 415.4 | Kiev | U.S.S.R. | 35 |
| 255.1 | Copenhagen | Denmark | 10 | 420.8 | Rome (No. 1) | Italy | 50 |
| 257.1 | Monte Ceneri | Switzerland .. | 15 | 426.1 | Stockholm | Sweden | 55 |
| 259.1 | Kosice | Czechoslovakia | 10 | 431.7 | Paris (P T T) | France | 120 |
| | West National | Gt. Britain .. | 20 | 443.1 | Sottens | Switzerland .. | 100 |
| 261.1 | North National | " | 20 | 449.1 | North Regional | Gt. Britain .. | 70 |
| | London National | " | 20 | 455.9 | Cologne | Germany | 100 |
| 263.2 | Trieste | Italy | 10 | 463 | Lyons (P T T) | France | 100 |
| 265.3 | Hörby | Sweden | 10 | 470.2 | Prague (No. 1) | Czechoslovakia | 120 |
| 267.4 | Newcastle | Gt. Britain .. | 1 | 476.9 | Lisbon | Portugal | 15 |
| 269.5 | Radio Normandie (Fécamp) | France | 10 | 476.9 | Trondelag | Norway | 20 |
| 269.5 | Moravska-Ostrava | Czechoslovakia | 11.2 | 483.9 | Brussels (No. 1) | Belgium | 15 |
| 271.7 | Kuldiga | Latvia | 50 | 491.8 | Florence | Italy | 20 |
| 274 | Vinnitsa | U.S.S.R. | 10 | 499.2 | Sundsvall | Sweden | 10 |
| 278.6 | Bordeaux-Lafayette | France | 12 | 499.2 | Rabat | Morocco | 25 |
| 283.3 | Bari (No. 1) | Italy | 20 | 506.8 | Vienna | Austria | 100 |
| 285.7 | Scottish National | Gt. Britain .. | 50 | 522.6 | Stuttgart | Germany | 100 |
| 288.5 | Rennes-Bretagne | France | 120 | 531 | Athlone | Irish Free State | 60 |
| 291 | Königsberg (No. 1) | Germany | 100 | 539.6 | Beromunster | Switzerland .. | 100 |
| 296.2 | Midland Regional | Gt. Britain .. | 70 | 549.5 | Budapest (No. 1) | Hungary | 120 |
| 298.8 | Bratislava | Czechoslovakia | 13.5 | 559.7 | Wilno | Poland | 16 |
| 301.5 | Hilversum (No. 2) | Holland | 60 | 559.7 | Bolzano | Italy | 10 |
| 304.3 | Torun | Poland | 24 | 569.3 | Viipuri | Finland | 10 |
| 304.3 | Genoa | Italy | 10 | | | | |
| 307.1 | Northern Ireland Regional | Northern Ireland | 100 | | LONG WAVE-BAND | | |
| 312.8 | Poste Parisien | France | 60 | 1107 | Moscow (No. 2) | U.S.S.R. | 100 |
| 315.8 | Breslau | Germany | 100 | 1153.8 | Oslo | Norway | 60 |
| 318.8 | Goteborg | Sweden | 10 | 1250 | Kalundborg | Denmark | 60 |
| 321.9 | Brussels (No. 2) | Belgium | 15 | 1293 | Luxembourg | Luxembourg .. | 150 |
| 325.4 | Brno | Czechoslovakia | 32 | 1339 | Warsaw (No. 1) | Poland | 120 |
| 328.6 | Toulouse | France | 60 | 1379 | Novosibirsk | U.S.S.R. | 100 |
| 331.9 | Hamburg | Germany | 100 | 1389 | Motala | Sweden | 150 |
| 335.2 | Helsinki | Finland | 10 | 1500 | Droitwich | Gt. Britain .. | 150 |
| 338.6 | Linz | Austria | 15 | 1571 | Deutschlandsender | Germany | 60 |
| 342.1 | London Regional | Gt. Britain .. | 70 | 1648 | Radio-Paris | France | 80 |
| 345.6 | Poznan | Poland | 16 | 1744 | Moscow (No. 1) | U.S.S.R. | 500 |
| | | | | 1807 | Lahti | Finland | 150 |
| | | | | 1875 | Radio-Romania (Brasov) | Roumania | 150 |
| | | | | 1875 | Hilversum (No. 1) | Holland | 100 |

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JOHN SCOTT-TAGGART WRITES THIS WEEK!

Popular & Wireless TELEVISION TIMES

**MY TELEVISION
ADVENTURES**

By **HELEN McKAY**

EVERY
WEDNESDAY
PRICE

3^D

No. 760.
Vol. XXX.
Dec. 26th, 1936.



Also Inside :

**HOW TO BUILD THE
"A.P." A.C. THREE**

Our cover photograph shows the Marconiphone Model 366, all-wave automatic radio-gramophone. It costs 36 guineas.

POPULAR WIRELESS AND TELEVISION TIMES

Editor: G. V. Dowding

Asst. Editors: A. Johnson Randall, A. S. Clark

MICRO-WAVES
UNDER-PAID PUSSY
NEW B.B.C. STATION

RADIO NOTES & NEWS

PLENTEE NOISEE
SOCIETY GOSSIP
HERE AND THERE

Christmas-time Signal

BEFORE the news, here is a peace message:

Will Mr. P. W. Reader, believed to be engaged in hanging up the holly and checking over the list of Christmas presents, go at once to the cellar and pour himself out a nice glass of whatever he fancies most?

His brother, Ariel, dressed in black type but with red blood in his veins, would feel seriously injured if the festive season were allowed to pass without the usual convivial salutation.

There is also a navigational warning. Mistletoe Light reported obscured; all b(u)ys, especially in the forties, should be approached with extreme caution!

So don't say I didn't warn you, ladies. And a Merry Christmas, one and all.

Marconi's Secret

IT has been known for a long time that Marconi has been carrying out some important experiments on his yacht, "Elettra," and now comes a tantalising scrap of news about what he is up to. It seems that when a newspaper man interviewed him on the yacht, the inventor picked up a microphone attached to a micro-wave transmitter and spoke the single word "No."

Immediately an adjacent loud-speaker said, "No.. No.. No.. No.. No.. No.. No.. —seven times in one second. That little word had gone round the world seven times—which is six times too many for convenience, but a marvellous demonstration of the capabilities of the new method of micro-wave communications.

Are B.B.C. Salaries Too High?

HARD-WORKING B.B.C. officials need not rub their unbelieving eyes at the above query, for it refers not to the announcers and other well-known servants of the public, but to the B.B.C. cat at Edinburgh, who gets 1s. 3d. a week for O-C-ing Mice.

You might not think anyone would be jealous of this, but that's because you don't know Peter, the ship's cat of H.M.S.

President. This vessel is moored in the Thames within a stone's throw of Tallis House.

Within a day of my having mentioned the Edinburgh cat, Peter of the President deliberately spat over the starboard quarter in the general direction of Tallis House and, after fluffing up his back hairs, suddenly shot up the mainmast and swore in a manner that no landsman could hope to emulate.

Inquiries show that Peter was signed on

It now appears that the various Berts, Alfs, Toms, Sams, Syds, Freds, Charlies and the boys have for a long time been dancing with tears in their eyes. While they sang of happy days, they say they were all wondering how to make ends meet on the slender pay envelopes received from the B.B.C. cashier.

They might never have disclosed this secret grief but for their conviction that "It's a Sin to Tell a Lie."

Start Point the Starting Point

THE day of miracles, my masters, is not over. For the B.B.C. has performed a complete *volt-amp.*—or whatever it is the French call it—and WE ARE to have a Regional station in the south-west.

Unblushingly, the B.B.C. has claimed that a start is shortly to be made on a high-power station to serve as much of the south-west as possible. "Such a site," they gravely affirm, "has been found near Plymouth and, subject to Government approval, the station will be undertaken, it is hoped, in a few months' time."

Well, well, well! All's well that ends well, but I would respectfully submit it's more than a few years that we have clamoured for this, and the site (near Start Point) has been there all the time.

Tokio Testing

AMBITIOUS owners of the S.T. 800 who yearn to stretch out and grab the Rising Sun with the case of a poet's phrase should make a note of Tuesdays and Fridays. Not for Shrove or Amami purposes, but because these are the days on which the new Japanese 50-kilowatt will be on parade.

Testing time is from 7 to 8 p.m. On the wavelength 31.48, the call sign will be JZI; on 19.8 metres JZK will be announced, and on 25.43 the call will be JZJ.

If you hear any of these stations, the International Wireless Telephone Co. (Japan), Osaka Building, Kojimachiku, Tokio, Japan, will be glad to hear from you.

(Continued overleaf.)

TWO STARS OF RADIO



Miss Esther Coleman, the well-known broadcasting star, at home with her Ekco set. It is the model A.C.97, a 9-stage A.C. superhet, finished in black and ivory.

at only 1s. a month for his food, and this Edinburgh business has apparently convinced him that he is under-paid by the Admiralty!

Oh, Happy Band . . .

WHAT a happy New Year we shall have if the negotiations now in progress between the B.B.C. and the dance bands fail to satisfy our melody makers.

Next Week: TELEVISION—IS IT HERE? By John Scott-Taggart

AIRCRAFT DIRECTION FINDER FOR I.O.M.

A Powerful Hum

DID you hear of the wily trader in Alaska who played a dirty trick on a visitor from 'the Arctic Circle? The visitor had sleighed, foot-slogged,



trekked and snow-shoed some hundreds of miles to reach a trading post with his furs, and there had been the usual bargaining for supplies and luxuries.

Finally, the man from the north brought out his veriest tit-bit—a rare skin of a Golden Watchamacofferee or something—and the trader was tempted too far; he offered the guileless trapper a radio set in exchange.

He did not explain to the Eskimo that it was a mains set, and that it hummed. The Eskimo, on the other hand, did not explain that the Golden Watchamacofferee skin which he left behind him had not been properly cured, and when that skin, in turn, started to hum, the trader had to close his store!

He Likee Plentee Noisee

WITH the idea of aiding American exporters to sell their radio sets in British Malaya, the U.S. Department of Commerce have been issuing advice about the kind of receivers wanted by the Chinese settlers there.



Whereas Europeans, the Department says, study tone, the Chinese preference is for noise. They always run their sets

with the **VOLUME FULL ON. YOU CAN'T HEAR YOURSELF SPEAK NEAR THE DARNED THING. THEIR FAVOURITE MUSIC IS ELGAR'S—YOU KNOW, THAT PIECE "LOUDER STILL, AND LOUDER—MAKE THEM MIGHTIER YET"!**

'Way, Down South

I HAVE just been looking over the annual report of Amalgamated Wireless, Ltd. (Australia), and, though I am not qualified to prepare a batting-and-bowling-analysis of the figures, it is clear to me that there has been some good teamwork. The number of receivers manufactured, for example, is a record; and a net profit of £109,701 is not a bad gate, is it?

Other high-lights are that the photo-telegram service has been extended via London to the U.S.A. and to Germany; that works extensions have been made and others will be necessary, and that the new 60-kw. broadcasting station for Wellington has been completed.

The submarine cables, however, are sunk deep (in gloom), for the beam radio service

continues to carry the greater part of the telegraph service between Australia and Great Britain.

Society Gossip

CROYDON calling. Surrey Radio Contact Club open to all interested in short-wave reception. Meets near West Croydon Station, where there is a car-park. Hon. Sec., Mr. E. C. Taylor (G-5-X W), 35, Grant Road, Addiscombe.

Greenwich. The Harco Club meets every Tuesday at 7.30 p.m. in the Canteen Lounge of G. A. Harvey & Co., Woolwich Road, Charlton. Own club room, free car

MUSIC FOR CHRISTMAS

Under this title will be broadcast a concert made up of contributions from the various Regions. Listening to music on Christmas night is an old tradition, and to-day the receiving set is the modern equivalent of the minstrel's gallery. Listeners who tune in on Christmas night will hear music of many different moods played to them from various parts of the country. Each of the Regions of the B.B.C. will contribute music suitable for Christmas listening, and music which in some way is a natural product of their own part of the British Isles.

From Northern Ireland, Wales and Scotland listeners will hear folk songs and folk tunes played in their natural form, and from the studios the B.B.C. Scottish, Northern Ireland and Welsh Orchestras will play works by composers of their countries based on these native themes.

The West of England will provide a programme of Christmas songs; carols from Cornwall or Dorsetshire, and perhaps a cathedral choir. The Midland Region will offer a selection of Christmas orchestral music played by the B.B.C. Midland Orchestra, conducted by Leslie Heward, from the Birmingham studios.

The North of England will provide a selection of Christmas choral music by the B.B.C. Northern Orchestra, conducted by T. H. Morrison, with Isobel Baillie and sixty members of the Hallé Chorus. "Music for Christmas" will thus give listeners a concert of music of every kind, from the chorale to the carol and from the folk tune to the symphony.

park. Trams 36, 38 and 40, and buses 53, 153 and 108 pass within a few yards. Inquiries to Mr. C. W. Kemp, 124, River Way, Greenwich.

Gravesend. Local branch of the Medway and Thames Amateur Transmitting Society meet fortnightly, and have planned a snappy session. Hon. Sec., Mr. Thwaites, "Tanfield," Cross Lane W., Gravesend.

Here and There

ISLE OF MAN. The Manx Legislature recently decided to establish a directional wireless station at Ronaldsway Airport. The Air Ministry is to provide most of the cost of erection and half the maintenance.

SHETLAND. The Commissioners of Northern Lighthouses have included in the 1937-8 estimates provision for a radio beacon station in Shetland.

BRUSSELS. The leader of the Rex party has announced that the voice of Rex will soon be on the air, the Rome radio station having offered a weekly broadcast to the Rexists. But diplomatic protest by the Government is likely.

Where it is Really Cold

GRUMBLERS at these occasional nippy mornings should spare a sympathetic thought for the radio men of Tikhaya Bay. Their desirable freehold residence is

situated on Hooker Island, which lies in the Arctic seas to the north of Franz Josef Land. Erected in 1929, when seven men spent the winter there, this northerly wireless station now supports a little settlement of twenty-two people, including five women.

Last year a baby was born there—the first native of Franz Josef Land since the Vikings left the locality as being much too nippy, even for their hardy constitutions. By means of Tikhaya Bay and the other wireless stations of the Northern Sea Route, ships have been able to use the north-of-Siberia passage during the summer. Tikhaya Bay is also of great potential importance as a half-way house for future air traffic between Europe and America via the Polar route.



Microphone of Horrors

MOST of us have a sneaking liking for the Chamber of Horrors, or similar means of making our flesh creep. And now some enterprising American programme director has decided to give sheer horror a place at the microphone.

He has engaged an announcer with a sepulchral voice and the effects department have been working on the clanking chain, the creaking stair, the grisly groan, and the drop, drop of blood.

Before the programme begins you are advised by the announcer to get the children out of the way, and on no account to listen in the dark. Invalids and old ladies are earnestly advised to switch off; and then come the twelve dreaded strokes from the old clock in the tower, the phantom footstep and the shriek that raises every hair. **BRRIIIIIIIIIII!**



Before Our Time

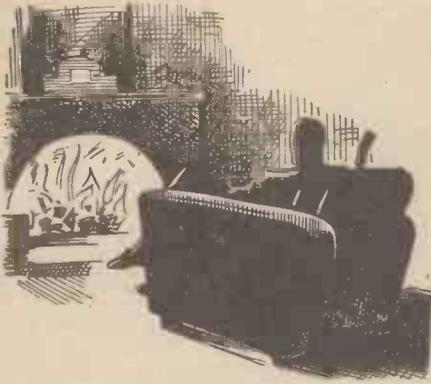
ONE of the most interesting forecasts of the coming of radio is that made by Joseph Glanville, who was rector of Bath Abbey in 1766. According to a letter written to the "Sunday Times," the rector penned the following words:

"To confer at the distance of the Indies by sympathetic contrivances may be as natural to future times as to us is a literary correspondence."

Sympathetic contrivance is an astonishingly apt description of a wireless set. Is there on record an earlier prophecy of the method by which the radio miracle is wrought? **ARIEL.**

FROM MY ARMCHAIR

This informal contribution by Mr. John Scott-Taggart has proved to be the most "looked-forward-to" feature in "Popular Wireless." Dealing with almost everything but the technicalities of Radio it has brought forth tributes from "P.W." readers in every part of the country.



PROFESSORS—at any rate those interested in radio—are anything but the crusty fossils they are supposed to be. The Institution of Electrical Engineers has a Wireless Section of prestige and importance. It has just elected a new Chairman, Dr. Mallett, who is Principal of the Woolwich Polytechnic—but better known as a professor at the City and Guilds Engineering College.

Again, A Happy Choice

This is a happy choice, especially following an equally happy one in Mr. Watson Watt—whom I recently described as Pickwickian in his bespectacled geniality. Mr. Watson Watt, like nearly all the committee of the Wireless Section, is a "government" man. He comes into the thousand a year class of Civil Servant—which is really the most you can earn in radio under a safe but stingy Civil Service.

If you possess a first-class honours degree in electrical engineering and have had a few years brilliant record in commercial radio and are clean and honest, you may pass muster for one or other of the very few radio jobs offered by the Civil Service, say, under the Admiralty, the Air Force or—very rarely—the Army. And for this you will be offered £5 per week or occasionally £6. Of course there are annual increments of, say, £18.

But don't imagine you will ultimately become an Admiral, an Air Marshal or a General. You will wear flannel bags all your life and may rise to the position of Mr. Watson Watt. But as there are only two or three of his eminence you will have to be very able—as he is—and, as he looks very well and full of energy, wait a long time.

These reflections are suggested by Dr. Mallett, who talked in his inaugural address about the right training for a radio engineer and gave us the idea that he thought the "Services" got the best men.

Radio engineers in commercial firms will dispute this. They will say that men who take £5 or £6 per week are really raw material—perhaps brilliant raw material but nevertheless without solid achievement. They will point out that men who have proved themselves are never desired as new entrants. They like them young and good and cheap.

By the way, if you apply for one of these posts you will probably be asked: "Why

do you wish to join the Civil Service?" Don't say: "Because I want a safe, cushy job with a pension at the end of it." This would be regarded as in very bad taste and the examining board would feel you would not be a credit to the taxpayer.

In the B.B.C. they ask you a similar question. I believe the correct orthodox reply is: "Because I wish to serve humanity."

Dr. Mallett has turned out, or assisted in turning out, more than half the young radio engineers of to-day. Ten years ago I took some off him. They did not know much about radio, but that wasn't his fault. The crux of his speech was that for an electrical engineering degree you spend very little time on electricity. The syllabus would certainly not qualify a man for wireless operator on the Ark. One also came away with rather the feeling that the Woolwich "Poly" was a good place in which to learn.

Dr. Mallett is certainly a "find." There is not a spark of pomposity about him. He is so diffident that he disarms one. His apparently easy-going manner is almost embarrassing. But his insight and shafts of criticism are no whit the less sharp. He is the ideal man for the Woolwich Polytechnic. He so obviously knows the needs of industry and obviously has little patience with academic narrowness. He is a rebel

Having a good lunch to-day it occurred to me: Why should dishes be named after celebrities who do not mean a thing to radio men? Why not have Pêche Fleming, Oysters à la Round, or Eggs à la Eckersley?

"I suppose you write because you like to see your name in print," suggests a reader to me.

No; after all these years—about twenty-three—it makes me feel slightly sick.

A baby stated to be found next to a live rail on an electrified railway system owed its life, a doctor stated, to the fact that it was wearing waterproof knickers.

This will interest timid would-be constructors of A.C. mains sets.

"The S.T.800," alleges F. R. of Inverness, "has achieved its success because of its name."

No; by any other name it would sound as sweet.

A Radio Marriage

Odd how nearly all the peculiar events occur in America. If a hen is born with ten heads its birth-place is sure to be Ohio. If a dog can work a radio set with its tail it is almost certain to hail from Connecticut.

I now read that a Miss Grid has married a Mr. Tube in New York and what's more they keep a radio shop. Mrs. Grid—the bride's mother—said on being told of the engagement: "Anode they would." How awful!

However, similar things happen in London, Eng. I knew of a Mr. Fish who married a Miss Bole, and now they sell ants' eggs in Wimbledon.

How many have noticed a "slip" which has often been perpetrated by the last thing said by the

B.B.C.? The announcer is: *We are closing down now till to-morrow.*

As to-morrow has the meaning of "next day after this," the announcement is wrong because it is already "to-morrow" when the announcement is made—immediately after Big Ben's turn.

A niggling pedantic quibble, but the B.B.C. are such sticklers themselves.

I heard these on the radio. I actually laughed.

A: I'm keeping hens as a hobby.

B: Do they lay many eggs?

A: They could do, but they don't need to in our position.

(Continued overleaf.)

PRAISE FROM "P.W." READERS

Your "Armchair" notes, which I enjoy very much.—E. J. HEWING, 245, Stone Road, Stafford.

I am a regular reader and enjoy "From My Armchair."—A. W. BROWNWELL, Fieldhead, Carleton, Penrith, Cumberland.

One final tribute. I thoroughly enjoy your "Armchair" articles. You might also add "Humorist" to your many accomplishments. You have brought me many a laugh which the B.B.C. "wisecrackers" have often failed to do. More power to your elbow!—W. PEARSON, 168, Eltham Road, West Bridgford, Nottingham.

I have followed your "Armchair" instal-

ments with great interest.—JAMES FORBES, 6, Iron Cliffe, Apethorne, Hyde, Cheshire.

Once again I have the pleasure of looking forward to reading "From My Armchair."—M. E. DENTER, 93, Robertson Street, Silverthorne Road, Battersea, S.W.8.

Have just finished reading with enjoyment my usual monthly "pick-me-up"—to wit, your "Armchair" Article.—H. J. DAVIES, 85, Main Street, Cadoxton, Barry, Glam.

You have a rare gift for writing and your "Armchair" Notes give me much pleasure.—W. POVER.

I must say your talks from "The Armchair" are "It."—V. R. TREADAWAY, 36, Ham Road, E. Worthing.

and rather enjoys the rôle of *enfant terrible*.

He is completely free of flies. The radio industry will do well to keep in very close touch with this new prophet or, rather, old prophet with new robes of office. He is the believer in knowledge for what it does rather than knowledge for its own sake. More power to his tongue and chalk.

Principal Mallett was and is immensely popular amongst his students, partly for his personality and partly because he is a brilliant teacher. He is sure of equal popularity at the I.E.E. While at the City and Guilds a student during the Rouse murder case pinned to his blackboard an *Evening News* poster which read: **HAIRS FOUND ON MALLET**. Needless to say, he enjoyed the grim joke with the rest of them.

* * *

FROM MY ARMCHAIR— *Continued*

A: The fire in London was so big it could be seen by the Beachy Head light-house keeper.

B: Go on?

C: Yes, he was in London on holiday.

He travelled a great deal and always took his wife with him so that he wouldn't have to kiss her good-bye.

"So Clean and Wholesome"

This last almost verges on sex and sex religion and politics are rightly banned in this journal. Which reminds me that recently I had a letter from a doting mother who, referring to the *Manual of Modern Radio*, wrote: "I am so pleased my boy enjoys your books. They are always so clean and wholesome."

Believe me, it is an art to keep a wireless textbook clean and wholesome. I pride myself that I do not have to resort to anything questionable to raise the sales of these books. You may recall the grave scandal over Professor Hesslig's "Textbook of Electrical Dynamics." I refer to that bit about applying Schnubber and Giebe's formula to the determination of the viscosity boundary conditions for piezo-electric strains along the third axis of polarization. Not at all wholesome, never mind clean. No one was surprised when the book was withdrawn as a result of action taken on information received.

Why "viewers"? This is what we are called when we watch, paralysed, the television programmes. "Good evening, viewers." Do you like it? I suppose it is very hard to find a proper word. But is it necessary for the charming young ladies to call us anything? On the common or garden radio we are not vocatively called "listeners." They don't say "Good evening, listeners." They probably feel like saying "youse guys," but they just call us nothing or "everyone."

What's wrong with the idea of ringing the changes while we watch enraptured by pictures of village signs or pieces of pottery. I suggest gazers, peerers, peepers, or gorps.

Critics at television demonstrations would be disarmed from the start if Miss Bligh said: "Good evening, you stiff-necked, mean-minded little carping gorps!" Salutary, but would it be genteel?

The Most Exciting Place

Readers of my notes will know that I regard East Grinstead as the most exciting place in England. It is only rivalled by Pontypridd—which is, or was, in Wales. Everything under the sun has happened or will happen in these two places. Open your newspaper casually at any time and you will find something about a man with staring eyes, an electrocution, a thrilling football match, a golfing scandal, a Cabinet Minister's visit, or a wireless licence drive occurring there.

The latest I read is that a man was fined ten shillings at East Grinstead for hitting his wife (alleged by him to be prone to nagging) on the head with a wireless book.

I only hope it was my *Book of Practical Radio*.

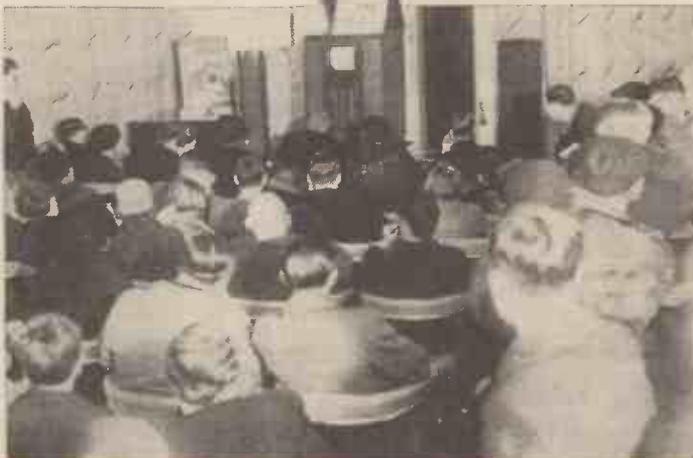
"Hertz gave us wireless waves but give me the S.T.800," says a reader. Thanks very much.

"I want," says A. L. B. of Bodmfn, "a set which will give me every wavelength from 30 centimetres to 20,000 metres—with television, of course. It should cost not more than £10."

Try the next counter.

"How much longer" (what memories of Cicero that conjures up!), writes Alfred Diggle Butterworth of Southend, "are we

"WHY CALL US VIEWERS?"



"Why 'viewers'?" This is what we are called when we watch, paralysed, the television programmes. . . . says John Scott-Taggart. Whatever name is given to those who look-in to television there is certainly no lack of enthusiasm at the demonstrations of commercial television sets in the London area. The set seen in this photograph is the Pye "Teleceiver."

to put up with your egotistical abuse and conceited megalomania?"

Well, certainly for another year.

"More Power to Your Vitriol!"

"What joy," says G. M. of Stockport, "to read your article lashing into the jargon-mouthing short-wave ham brigade whose puerile boasting with their silly radio cigarette cards, as you call them, has nauseated every sober citizen for years. No one minds the genuine short-wave experimenter, but the mean-minded little squirts who have crowded over the broadcast listener for so long deserve every word you say. More power to your vitriol. Pour it over them."

No, it's too near Christmas.

"When," asks F. L. of Durham, "will you give us a television design complete with 50 valves and 30 knobs? Your public needs it."

I shall discuss the matter with Jeff, my radio mongoose, who assists me in all television work.

J. S.-T.

RADIO'S ARCTIC AID

CANADA'S Signal Corps has been busy recently, not with war preparations, but with modernisation of the communication system along the Mackenzie River. Equipment is being rushed in and assembled to give growing airway services in the sub-Arctic and Arctic the latest in airplane to ground communication.

"The service to be given to aviation interests," says National Defence Deputy Minister, L. R. La Fleche, "is an extension of the present service in providing weather reports to pilots at all stations. The new equipment will enable these and other information to be given to radio-equipped aircraft in flight, by voice."

A start was made on the modernisation programme last year when Diesel engines were shipped to Mayo, Yukon, and Fort

Norman on the Mackenzie River, and Fort Smith on the Slave River, both in the North-west Territories. A more powerful transmitter was placed at Fort Smith to keep in contact with the new Signal Corps transmitting station at Edmonton, where the bulk of the traffic for the Far North leaves the telegraph lines to continue by radio.

New Stations

This year similar plants have been installed at McMurray at the end of the railway in northern Alberta, Chipwyan on Lake Athabasca, Fort Resolution on Great Slave Lake, Fort Rae at the top of Great Slave Lake, Cameron Bay on Great Bear Lake, and Goldfields on Lake Athabasca. All these points are on the airway to the mining regions east of the Mackenzie River which have been opened by airplane since 1930. Air traffic is heavy into these formerly remote areas, and new mines are going into production annually. The move to give modern communication is in line with other Government aids to new mining developments.

The stations being equipped all have Diesel engines as against petrol engines formerly used extensively. The latest in radiophone transmitters with facilities for changing to three or four frequencies are being installed.

Value Already Proved

While no radio-equipped aircraft fly as yet on the Arctic air services except during special searches for lost fliers, now that radiophone service is available, airplanes will be equipped, allowing the ships to remain in constant communication with their northern bases.

The radiophones at Rae and Goldfields have already proved of value, Deputy Minister La Fleche points out, in providing communication with outlying settlements. There are a few fishing stations and trading posts in the district as well as a growing number of new mines.

J. M.

TELEVISION TOPICS—Collected by A. S. Clark



The three announcers at the Berlin Television Station. From left to right they are Joachim Richert, Herr Junkers and Waldemar Bublitz.

“TELEFRAMES”

Items of General Interest

A MINIATURE dance band specially for television, has been formed by Mr. Wild, the trumpeter in the television orchestra. He and some of his colleagues have formed a small rhythm section called “Eric Wild and his Teatimers.”

It is certainly a bright idea because, due to their small number, the performers should come over well enough for interest to attach to watching them play at their various instruments.

MIRRORS FOR TELEVISION

It is most important that mirrors used in the lids of television receivers should be of excellent quality to avoid light loss and distortion. But even the best of plate-glass mirrors is liable to give a slight double image effect due to some reflection from the front surface of the glass. This can be most noticeable on captions to films and similar items.

One way to avoid this is to silver the glass on the front surface. This is the method adopted in a type of mirror which we understand the Ediswan Company will probably be handling as a standard line.

BATTERY HIGH-TENSION

The possibility of those without access to mains obtaining satisfactory television results is greatly enhanced by the new Bulgin Vibrator.

By interrupting current from an accumulator, this enables a voltage of two or three thousand to be obtained. This is rectified by a valve.

The list number of this high-voltage vibrator unit is H.T.V.2. It works with a D.C. input of six volts.

A weekly feature which will keep the reader au fait with all the latest news and developments in television science. It will appeal alike to the newcomer to television and the advanced experimenter

THE NUMBER OF PARTS

Illustration of the tremendous need for simplification in television apparatus is provided by figures to hand of the number of parts in one standard 23-valve receiver on the market.

The number is given as 3,980. And remember, each one will have at least two connections!

SPONTANEITY WELCOME

The difficulty of providing repeated rehearsals for television programmes is likely to show up in a good light those artists whose items are largely based on spontaneous acting and ideas. This is all to the good, for spontaneity is the real thing, and that is what television is going to thrive on.

Once again we can repeat that “actuality” is the salt of television.

HIGH-VOLTAGE INSULATION

Those who wish to make doubly sure about the safety of handling potentiometer controls and suchlike which deal with high voltages, should examine the Bulgin flexible shaft couplings.

These are obtainable with 1-inch and

2½-inch porcelain insulating shafts, and deal with any ¼ inch diameter spindles.

FIRST TRANSATLANTIC TELEVISION

Recent talk about receiving television across the Atlantic brings to mind that this was first accomplished in 1928.

On February 9th of that year the famous John Logie Baird succeeded in receiving television sent by one of his own engineers who specially went over there for the purpose.

IN AMERICA

Three hundred press representatives recently saw a demonstration of television in America. The latest developments of N.B.C. television were shown to them on a row of twenty television receivers which were operated by transmissions from the Empire State Building.

Pictures 6” by 8” and 16” by 8” were shown, and both reflected and direct viewing was utilised. The results were considered amply satisfactory to be accepted in the home as a television service.

TELEVISION DE LUXE

WE recently witnessed a demonstration of television at the Teddington premises of the new company of Bosch Hall, Ltd. We understand that this firm proposes to specialise in the de luxe television market and to aim at producing the Rolls Royce of television apparatus.

Even with the average price of television receivers at around £100 there are those prepared to pay considerably more to have the “best money can buy.” After all, there is quite a large trade done in ordinary radiograms costing £100 and up. We feel that this firm should be on quite a good line.

At the same time, we are informed, they will be producing television units and kits suitable for the home constructor. Although carrying their name, these are expected to be handled entirely by a separate organisation.

When these units are in full production we hope to be able to give a test report from personal experience.

TELEVISION AT CHRISTMAS

The chef of a famous Strand restaurant will inaugurate the Christmas afternoon festivities at the London Television Station by carving a prize turkey before the camera. The programme will also present the fourteenth and Christmas edition of “Picture Page,” Cecil Madden’s topical television magazine, and it is expected that many of those interesting people who come into the limelight only at Christmas-time will take part. During the afternoon Edward Shackleton, son of the famous Antarctic explorer, is to give his own account of a lonely Christmas spent on Ellesmere Land. Films actually taken amid the ice and snow will be transmitted during the talk, and Mr. Shackleton will show the fur clothes that he wore, his Christmas frying-pan, and an assortment of strange implements which gave the only touch of civilisation to the experience.

A Christmas party of celebrities enjoying themselves before the television camera will be a high spot in the evening transmission. Cecil Lewis will act as Master of the Ceremonies. The evening programme begins with carols by the Singing Boys from St. Mary-of-the-Angels Song School, the president of which is the Rev. Desmond Morse-Boycott. Then will follow a film programme, “Christmas Through the Empire,” which is being specially prepared for television. Film sequences have been secured dealing with Christmas in practically all parts of the Empire. There will be glimpses of football in Fiji, a Christmas dance in Basutoland, ski-ing in Canada, the Khyber Pass in winter, and “shots” from Australia, Gibraltar and the West Indies.

During the evening Commander A. B. Campbell, who is one of television’s first “causeurs,” or talkers, will describe some unusual Christmases.

TELEVISION TOPICS—Continued

MULTI-MESH SCANNING

LAST week, under the feature "Seen in the Air," some details of the Baird large-screen system of television were given. In view of the fact that—we understand—demonstrations of the system may soon be made to the public during programmes at the Dominion Theatre, an explanation of the unusual form of scanning employed will be of interest.

Although quite simple in itself, it is not exactly an easy one to describe. However, the following should make it quite clear, and if not indicating precisely all the details involved, it nevertheless explains the principle in general.

The First Point

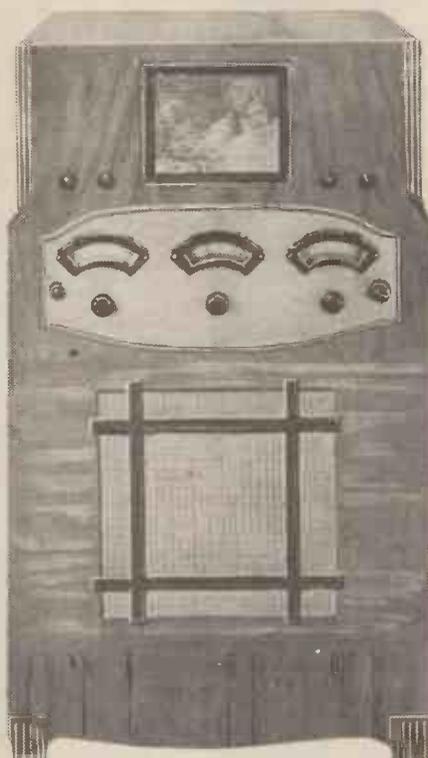
The sequence in which the lines making up the picture are scanned is the first point to consider. To get an idea of their order you are asked to make 18 dots in a row on a piece of paper and to number them 1 to 18 in order.

These represent the lines to be scanned and they are crossed through as we deal with them. Cross numbers 1, 7 and 13 through.

This could be carried on for the 120 lines which there are to each picture, but 18 suffice for illustrative purpose. Having crossed out every sixth line we have completed one frame (a frame of spaced lines with gaps in between): This is termed a primary scan.

We now carry out the second frame, which is an interlaced primary scan, and deals with lines 4, 10 and 16. Cross these

AN EARLY RECEIVER



One of the first complete high-definition television receivers ever made. It was built by the "P.W." Research Staff about two years ago.

out. We now have two frames and two primary scans interlaced.

Together these two primary scans form a secondary scan. The next step now is to perform another secondary scan slightly displaced to the side of the first. This deals with lines 2, 8, 14 (making three frames in all), and then with lines 5, 11 and 17 interlaced with 2, 8 and 14, as in the first case. We now have four frames.

A third secondary scan deals with lines 3, 9 and 15, following on with 6, 12 and 18. Making six frames in all with six primary scans and three secondary.

In the system demonstrated the other day there were $16\frac{2}{3}$ pictures per second. But since each picture contained six frames, there were 100 frames per second.

From this it will be appreciated why flicker due to scanning was absent. Another advantage of this is that the circuits concerned in the apparatus may have a much higher low-frequency cut off.

Increasing the Light

Reverting to our dots again, it will be seen that when the first secondary scan is complete (lines 1, 4, 7, 10, 13 and 16 crossed out) one-third of the picture is covered by lines equally distant. By widening out the spot at the receiving end so that line 4 just meets the edge of line 7 and so on, a great increase in light on the picture may be obtained with but little loss in definition.

This spreading, of course, applies to all secondary scans. By altering the number of interlacings per secondary scan, and the number of secondary scans, the number of lines and frames per picture can be varied.

The system is adaptable to both mechanical and electronic methods. Mechanical scanning by means of a mirror drum and slotted disc was used at the recent demonstration.

TELEVISION FOR BEGINNERS

G. Stevens explains how the signal is applied to the tube

THE first figure in this article shows the television signal corresponding to a single line of a Baird transmission. The line through the centre of the shaded area marked 0 is the zero line, and the line marked 100 per cent shows the maximum height that the carrier wave would reach if the brightest possible picture were being transmitted.

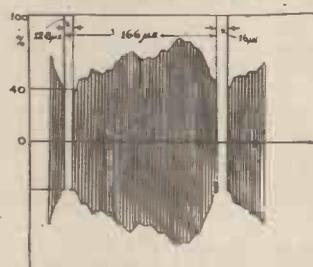
Never Below 40 Per Cent

You will note that the "hills and dales" of the modulation never drop below 40 per cent of the carrier amplitude, except at the beginning and end of the line, when the carrier itself drops to zero and there is a pause. The figures, by the way, give you an idea of the relative time taken for this pause and the time taken for one complete line. They are in millionths of a second!

In one complete picture there are 240 of these signals following each other with a break in between, and then comes a longer pause, corresponding to the picture synchronising pulse before the sequence starts again.

This "envelope," as it is called, is amplified by the first valves of the receiver and then rectified by the detector before being applied to the tube. For the moment we

THE WAVEFORM



ONE LINE IMPULSE

Fig. 1. Showing the signal for a single line of a Baird transmission.

can suppose that the receiver is a straight one, as a superhet is too complicated to consider at the present moment. After passing through the detector the signal appears as the sketch of Fig. 2, the carrier being removed and the

modulating wave having the same shape as the original envelope of the carrier.

The characteristic of the tube is the same as that of an ordinary valve, except that we plot the relation between brightness of the screen and voltage applied to the grid instead of anode current and voltage applied to the grid. This curve is like the one shown at the top of the diagram—as the bias of the grid is increased the brightness of the line diminishes until at the bend of the curve the spot goes out altogether.

Bias Adjustment

Having connected the output from the receiver to the grid circuit of the tube we adjust the bias until the screen is just dark—that is at the bend of the curve where the dotted line cuts it. Now if we consider the effect of the signal on the bias we see that any variation in voltage to the right of the dotted line alters the grid bias and increases the brightness of the tube to correspond.

The synchronising signals, on the other hand, are all to the left of the dotted line, and will only increase the bias in a negative direction. They will therefore only increase the "blackness" of the screen and will not affect the variations in the picture. You will also note that the quality of the

picture is altered by altering the point of bias at which the tube is operated. If we have too little bias the screen is bright even with the lowest value of modulating signal and there will be no black tones at all.

THE TUBE'S CURVE

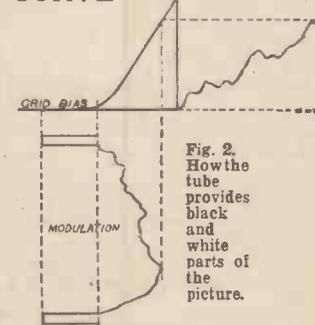


Fig. 2. How the tube provides black and white parts of the picture.

The effect will be rather like an under exposed print—greys and whites, but no contrast. On the other hand, if the bias is set too high an appreciable value of signal will be required to bring the curve up the bend, and the picture will suffer from an excess of black, giving heavy shadows.

MY TELEVISION ADVENTURES

By HELEN McKAY



The Authoress of this article.

SUPPOSE you were getting on quietly with your work when the 'phone rang and a voice said, "This is the B.B.C."—then went on to suggest that you should throw up work at almost an hour's notice and accept a B.B.C. contract for television.

What would you do?

That happened to me only a little while before the opening of public television tests in time for the last Radio Exhibition.

I was flabbergasted. Television meant almost nothing to me, apart from what I had read in the papers and magazines. Friends of mine at the B.B.C. had told me about the apparatus and new studios being fitted out at Alexandra Palace; but if ever I gave it a thought at all it was probably only just that maybe in later years I should be able to add television to my string of vocal conquests.

A Thrilling Opportunity

Well, I set the 'phone down with serious misgivings. The B.B.C. had offered me a wonderful chance—but I didn't know whether or not to take it.

It was a thrilling opportunity to be in at the start of a new thing—just as I was in at the start of colour films. In fact, I was in the very first colour picture made in this country.

Films I have shelved in the past two or three years as I am not yet satisfied that my features are filmic. I had a minor accident to the bridge of my nose, through an unfortunate fall in the studio a few years ago.

I keep meaning to go to a surgeon and have that bridge straightened out so that I look "photogenic" enough to satisfy the keenest film producer. But rather naturally I keep putting off the fatal date for what may be a painful process—and I have so much work to do that a film career must wait awhile.

But the B.B.C. said it didn't matter about my nose, or the fact that I have red hair (despite what I'd read somewhere about red heads being unsuited to the television camera); they just wanted me to sign the contract.

As you know, I did. I rehearsed with Henry Bronkhurst, the B.B.C. Television Orchestra, the "Three Admirals," and so on. Two hectic days were spent in final rehearsals, and then one morning, feeling very frightened about it all, I crept up to the television lens after Leslie Mitchell had announced me—and sang my first television song.

From the Broadcaster's End

You probably know all about the listeners' end of it—what sets cost, the special short waves on which the programmes are broadcast, the queer-looking cathode-ray tubes on which the image appears as though by magic.

So may I tell you about it all from the broadcaster's end? I've had years of experience in variety, cabaret, films and radio. But television has taught me some things I didn't know before. It's made me

realise that until the technical people can settle on just one television system, instead of broadcasting on two main systems in many different ways, it's going to be tough work for a television star.

Make-up, and even presentation of your act, has to take into account the system being used.

There was a clause in my contract specifying certain dresses I was to wear—not because the Corporation was fussy about my wearing low backs, but because of the make-up difficulty. White was the colour they wanted me to specialise in, and as my mother is a fashion designer I got her rapidly to scheme out some new dresses for my television début.

Then, when I met Mr. D. H. Munro (television production manager), Mr. Leslie Mitchell, the announcer, and other B.B.C., Baird, Marconi-E.M.I. officials, we started work.

Make-up tests came first—and I had a shock.

One of the first stars to be given a contract for television, Miss McKay describes in a vivid manner her impressions and experiences during her first broadcast at Alexandra Palace.

I knew all about film make-up (which is not the heavy ochre previously used in silent-film days), but when I first saw myself made up for the Baird spotlight system I nearly fell through the floor.

My face had to be slightly whitened, my lips made blue and my eyebrows touched up. They were a bit doubtful about my red hair for the spotlight system, but after a few tests and squinting at me through coloured lenses they were satisfied.

But, though O.K. on the television, I looked a sight in the Alexandra Palace studio, with blue lips, white face and red hair!

The first broadcast (on the opening Wednesday of Radiolympia) had to be done with this make-up, but I became used to it after a few days, and learned that people wouldn't scream and run at the sight of me in the corridors.

For the Baird film system the make-up is rather like present "talkie" make-up, but just a little more accentuated.

The Marconi-E.M.I. system, which was used on alternate days during my second week of televising, doesn't need any special make-up.

Friends who saw me televise tell me that I looked worst on the spotlight system, but they were all so thrilled at seeing television pictures for the first time that they didn't bother to be too critical.

Television taught me that the B.B.C. can be a very efficient place, and can knock spots off a film studio for production technique.

All the staff wear sand-colour coats, which give them a serious, technical air. I enjoyed every minute of those rush days just before television started, and knowing something of the slackness in production of many cabaret, stage and theatrical shows. I think Mr. Munro and his staff deserve full marks.

I have learned from televising that a "look-and-see" artist will have to get used to having every shade of his or her personality revealed when televising.

In the spotlight studio only head and shoulders (or three-quarter length, at the most) come into view.

You sit facing the flickering light, and you, in semi-darkness, are apt to forget that at the distant end thousands of people can see your every movement, just like a film close-up. In fact, it's much worse than a film close-up, because a producer can "shoot" you time and time again until you don't flicker an eyelid.

More Rehearsals are Necessary

But once televised—well, all mistakes have to go through. With the Baird film system there is a short time lag, and in a special programme they could, I suppose, rush the film through again. So there is an advantage here, so far as the television artist is concerned—and all that the listener and looker-in lose is about a minute's lag between the making of the film and the actual television projection.

I can see that television will revolutionise the way B.B.C. shows are produced, and much bigger studios will be needed.

There'll have to be many more rehearsals, too, and artists will have to work harder.

There'll be no more reading from scripts.

I had to stay up late rehearsing my special numbers. If I'd just been broadcasting without television I need not have had the lyrics word-perfect.

In the spotlight studio Leslie Mitchell put over his announcements at intervals and then slid sideways (there's hardly an inch to spare) so that I could squeeze in front of the lens. Rather like the early cinemas.

(Please turn to page 444.)

LEARNING FRENCH THROUGH YOUR RADIO

This week we present Part 42 of the popular language series contributed exclusively to "P.W."

By S. C. GILLARD, M.A.

THIS week I want to talk about the INDEFINITE ADJECTIVES AND PRONOUNS. Adjectives, you remember, MUST have a noun alongside. Pronouns stand INSTEAD of nouns. I must add a word of warning here, for English isn't very helpful in this respect. English contains a number of words which are both ADJECTIVE and PRONOUN. The only way to distinguish these is to understand the function of each in the sentence. Let me give you an illustration. Take the two sentences:

SOME BOYS LIKE MUSIC
SOME OF THE BOYS LIKE MUSIC.

It is the two words "some" that I want you to consider. They are spelt alike. Hence it is only reasonable to assume that they are one and the same word. This isn't so, however. The first "some" is an ADJECTIVE, because it has the noun "boys" immediately alongside. The second "some" is a PRONOUN because it HASN'T a noun alongside. In French these two "somes" are DIFFERENT WORDS.

As you learn the INDEFINITE ADJECTIVES AND PRONOUNS which I am going to give you now, do realise the need there is to distinguish ADJECTIVE from PRONOUN.

First of all, then, the adjective CHAQUE and the corresponding pronoun CHACUN. Both mean EACH, but with a difference.

CHAQUE (each, every), the adjective, MUST be used with a noun. It has no FEMININE or PLURAL form—e.g.:

Chaque jour Each day.
A chaque jour suffit sa peine
Sufficient unto the day is the evil thereof.
Chaque instrument est valable
Every instrument is valuable.
Chaque maison a cinq étages
Each house has five stories.

CHACUN (each one, every one) is a pronoun, and so requires no noun alongside. N.B.—CHACUN has no PLURAL, but it has a FEMININE form "CHACUNE."

Chacun de mes frères est un architecte
Each of my brothers is an architect.
Chacune de mes sœurs est une modiste
Each of my sisters is a milliner.
Chacun des ces programmes est long
Each of these programmes is long.
Chacune de ces lectures était intéressante
Each of these readings was interesting.

If you understand the difference between CHAQUE and CHACUN you ought to see a similar difference between:

QUELQUE and QUELQU'UN

QUELQUE (some, a few) is an adjective and is used with a noun. Its FEMININE form is the same, but it adds "s" for the PLURAL.

J'ai reçu quelques invitations
I have received some invitations.
Le braconnier a attrapé quelques lapins
The poacher has caught a few rabbits.

Il fait toujours quelque sottise
He always does something foolish.
Quelquefois je me couche à huit heures
Sometimes I go to bed at 8 p.m.

QUELQU'UN (some one) is a pronoun with both a FEMININE and PLURAL form.

| | |
|-----------|------------|
| Singular | |
| Masc. | Fem. |
| QUELQU'UN | QUELQU'UNE |
| Plural | |

| | | | |
|--------------|---------------|------|--|
| Masc. | | Fem. | |
| QUELQUES-UNS | QUELQUES-UNES | | |

Quelqu'un a frappé à la porte
Someone has knocked at the door.
Quelqu'une a déchiré le journal
Someone (f.) has torn the newspaper.
Quelques-uns de mes clients sont français.
Some of my clients are French.
Quelques-unes de ses aventures étaient remarquables.
Some of her adventures were remarkable.

Another important ADJECTIVE and PRONOUN is TOUT. Study the several phrases below so that you completely understand the use of this word.

When an ADJECTIVE, this word TOUT has the usual four forms—TOUT, TOUTE, TOUS, TOUTES. As a PRONOUN it has two forms only—namely, TOUT, TOUS. First as an ADJECTIVE.

Tout homme, toute femme Every man, every woman.
Tous les termes de ce problème
All the terms of this problem.
Sous tous ses aspects Under all its aspects.
Tout cabinet de coalition Every coalition cabinet.
Suspension de tout paiement des dettes
Suspension of all payment of the debts.
Toute sa force primitive All his primitive strength.
Par tous les moyens By every means.
Tous les jours Every day.
Tous les deux jours Every other day.
Tout le Reich The whole Reich.
A la grande surprise de tout le monde
To the great surprise of everyone.
Tout calcul, toute combinaison
Every calculation, every combination.

Then as a PRONOUN.
Le problème est par dessus tout un problème psychologique
The problem is, above all, a psychological problem.
Tout devient fluide et instable
Everything becomes fluid and unstable.
Tout est fini Everything is over.
Elle désire tout voir She wishes to see everything.
Ils mangeaient tous They were all eating.

One more INDEFINITE PRONOUN will complete the quota for this week. This is the important little word "ON." It is equivalent to the English "one," as in—
One gets terribly tired standing about. We tend to avoid this indefinite word "one," whereas the Frenchman works it to death. For instance, he much prefers it to the PASSIVE, and instead of saying "I was told last night that . . ." he will say "ONE told me last night . . ." "On me dit hier soir . . ."

Here are some phrases to study.
On sonne, On frappe
Some one is ringing, some one is knocking.
Madame, on vous demande
Madam, some one is asking for you.
On déclare que . . . They say that . . .
A-t-on fermé les fenêtres?
Have they closed the windows?



Stephen Williams, chief English announcer at Radio Luxembourg, in cheery mood before the "mike."

On vous a vu ce matin You were seen this morning.
On ne peut pas faire ça, n'est-ce pas?
You can't do that. Eh?

The portion of the BULLETIN COMMERCIAL for this week is a short one. It is:

| | |
|----------------------|--------------------------|
| VIANDES (meat) | Arrivages 360,000 kilos. |
| Bœuf | Beef |
| Quartier de derrière | Rump 6 à 9 |
| Quartier de devant | Fore-quarter 2.50 à 4.50 |
| Aloyau | Sirloin 7 à 14 |
| Paleron | Shoulder 3.50 à 6 |
| Bavette | Top of sirloin 3.50 à 6 |
| Plates-côtes | Rib of beef 2.50 à 5 |
| Collier | Neck 3 à 5 |

And this suggests that you ought to know the different Meat items of the menu card.

| | |
|------------------------------------|--------------------|
| Du Bouillon (boo-yo(ng)) | Broth |
| Du Potage (pot-ahsh) | Soup |
| De la Soupe (soop) | Soup |
| Du Consomme (ko(ng)-som-eh) | Gravy Soup |
| De la Soupe grasse (soop grahss) | Meat Soup |
| De la Soupe maigre (soop mehgr) | Vegetable Soup |
| Du Rôti (roh-lee) | Roast Meat |
| Du Bouilli (boo-yee) | Boiled Beef |
| Un Ragoût (rah-goo) | A Stew |
| Du Hachis (ah-shee) | Hash |
| Du Bœuf (bo-ayff) | Beef |
| Un Bifteck (bij-tek) | A Beef-steak |
| Une Culotte de Bœuf (kü-lof) | A Rump of Beef |
| Un Aloyau (al-wah-yoh) | A Sirloin of Beef |
| Du Veau (voh) | Veal |
| Une Tête de Veau (teht) | A Calf's Head |
| Une Longe de Veau (lo(ng)sh) | A Loin of Veal |
| Une Rouelle de Veau (roo-el) | A Fillet of Veal |
| Un Ris de Veau (ree) | Sweetbread |
| Un Jarret de Veau (shah-reh) | A Knuckle of Veal |
| Une Fricassée (frik-ah-seh) | A Fricassee |
| Un Fricandeau (frik-ah(n)-doh) | Stewed Larded Veal |
| Du Mouton (moo-to(ng)) | Mutton |
| Des Côtelettes (kol-let) | Mutton-chops |
| Un Gigot (she-goh) | A Leg of Mutton |
| De la Poitrine (pwah-treen) | Breast of Mutton |
| Un Collet (kol-let) | Neck of Mutton |
| Une Épaule (eh-pool) | Shoulder of Mutton |
| De l'Agneau (ah-yoh) | Lamb |
| Un Quartier de l'Agneau (kar-tyeh) | A Quarter of Lamb |
| Du Porc (por) | Pork |
| Du Lard (lar) | Bacon |
| Du Jambon (shah(m)-bo(ng)) | Ham |
| Des Saucisses (soh-seess) | Sausages |
| Un Cervelas (sar-ro-lah) | A Saveloy |
| Des Tripes (treep) | Tripe |
| De la Venaison (ven-eh-zo(ng)) | Venison |
| Du Gibier (she-byeh) | Game |
| Une Poularde (poo-lard) | A fat Pullet |
| Une Cuisse (kwess) | A Leg |
| Une Aile (eh) | A Wing |
| Le Foie (foah) | Liver |
| De la Volaille (vol-ai'ee) | Poultry |
| La Carcasse (kar-kass) | The Carcase |
| Du Jus (shü) | Gravy |
| Un Pâté (pah-leh) | A Pie |

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ON THE

SHORT

WAVES



"HULLO, LONDON."

A chat about commercial radio.

By W. L. S.

I AM occasionally taxed by readers with saying a lot about short-wave broadcasts and short-wave amateurs, but leaving the commercials out of the picture. Probably this is a just criticism. Admittedly the commercials deserve a little publicity sometimes—not that they want it!—but, from their very nature, they are less interesting to the ordinary listener than the other two classes of transmission.

A commercial station is one which handles traffic for business purposes. This traffic may be a series of confidential personal messages exchanged between London and Tokyo; it may be news from the Spanish correspondent of an American newspaper in Madrid; or it may be Press messages of a broadcast nature, which, however, are sent in Morse.

An increasing number of commercial stations are being equipped for telephony, however, and one may often hear, in the course of a casual "listen-round," some quite interesting transmissions.

"Scrambled" Telephony

As every short-wave listener knows, the Transatlantic telephone is "scrambled." It used to be broadcast in its normal form, so that anyone could overhear private conversations. Admittedly a beam was used at either end, but this did not stop a large number of people from "breaking in."

Then, with the progress of short-wave listening as a hobby, the authorities realised that something would have to be done, and they began to "scramble" the speech, rendering it unintelligible during its journey through the ether, at the end of which it was unscrambled and put into its right shape again.

Various listeners who were "in the know" then discovered that all that was necessary to enable them to turn the unintelligible noises into clear speech was a 3,000-cycle beat-note. The few people who owned stable short-wave receivers found that they only had to oscillate on the transmission, with their set so adjusted that a 3,000-cycle heterodyne beat was generated, and there was the speech, neatly unscrambled for them.

Shortly after this discovery became uncomfortably well known, most of the important transatlantic 'phone stations made things impossible for the casual

listener by introducing a new "hazard," in the form of a carrier-wave which was not constant in frequency. The modulation was still scrambled, but, in addition, the carrier was "wobbled," so that it became a matter of superhuman skill to wobble the dial of the receiver and to keep the beat at 3,000 cycles.

And that is the reason for the number of carrier-waves which make you think that the transmitting aerial is swinging in the worst gale that ever was! You will come

Most of the ships equipped for 'phone work do not carry "unscrambling" apparatus, and conversations between Rugby and the "Queen Mary," "Empress of Britain," "Monarch of Bermuda," "Bremen" and "Europa" may be picked up on one or other of the shipping channels, if you happen to be lucky. These transmissions are not made very frequently. Sometimes, I am told, there are only a few calls in a week. But the fact remains that I receive a lot of letters from readers who have been listening to conversations between ship and shore. They are not allowed, by the terms of their licences, to divulge the nature of such conversations, and, even if they transgress and tell me, I am absolutely forbidden from quoting them in print.

Test Transmissions

All these "Hullo, London" and "Hullo, Rugby" calls, however, are not of a private nature. One often hears an American station testing out under the instructions of its technical operators, and improving the strength and quality of transmissions, in much the same way as one amateur station does with the help of another.

Many a time have I chuckled at little scraps of informal conversation between operators at Rugby and their "opposite numbers" in America. It is impossible to

tell you where to listen if you want to hear this sort of thing going on, because, as far as I can see, you are liable to pick it up on any wavelength between 12 and 80 metres. On the shipping bands, in the regions of 24, 36 and 60 metres, you will sometimes hear the shore stations testing with one another or with the ships; but you will hear one of Rugby's vast array of transmitters on all sorts of wavelengths.

The transatlantic "ocean greyhounds" are never out of touch with either end of their route. The "Queen Mary" for instance, can work with New York and Canada while she is still in Southampton Water. Those fortunate short-wave listeners who can read Morse will find that they can pick up signals from ships in all sorts of queer spots. They need a list of call-signs, of course, unless something in the text of the message will help them to identify the ships they are listening to.

There are other commercial services that are interesting, but my space is gone, and I must leave them till another time.

A MODERN SHIP INSTALLATION



The Marconi wireless telegraphy apparatus on the "Empress of Britain."

across them all over the short-wave spectrum, and that wobble is just there to stop you from hearing things that you aren't meant to hear. In other words, you, as a short-wave listener, have cost the commercial concerns quite a lot of money. A cheering thought in a way; it makes us realise that we are people to be reckoned with!

Fortunately for the listener, however, many of the transatlantic 'phone transmitters handle "plain language" sometimes. On occasions when they are merely relaying from one continent to another something that is intended to be the subject of a general broadcast, there is no need for secrecy. You will often hear the Rocky Point (U.S.A.) stations testing ordinary speech on their various wavelengths, and sometimes they put out gramophone records, or relay a broadcast programme, just for test purposes.

Ship-to-shore telephony, too, is understandable by the ordinary listener, although he's not really supposed to listen to it.

ON THE SHORT WAVES—Page 2.

POINTS from the POST-BAG

W. L. S. Replies to Correspondents

SPACE will not permit of long answers to all the queries that have accumulated in the postbag this week, but I will try to get through them all by being as snappy as possible.

First, a whole packet of what I really must describe as very unintelligent queries about the "Adaptor" and its connection to various broadcast receivers. I have been re-reading what I wrote on the subject, and it seems to me that I covered it very fully and in the simplest possible language.

At least half-a-dozen readers ask "Must I connect my accumulator and H.T. to the Adaptor, or to the broadcast receiver, or both?" Now, I ask you! If you don't connect them to the Adaptor, how on earth do you imagine it's going to work? Similarly, if you don't connect them to the broadcast receiver, it just isn't a receiver, is it? "Both," is the answer, without further comment.

Tricky Questions

I. D. McD. (Renfrewshire) asks three questions which I will answer in public: (1) Can the performance of a short-wave receiver be affected in any way by the presence of metal screws in the wooden baseboard? The answer is "Yes; but not to a noticeable, or even measurable extent." Which is another way of saying "No"!

(2) Are there any wires or components in a simple type of short-wave receiver which should not be parallel to, or near, any other wires or components? Well, this answer isn't so easy. Generally speaking, the wiring of different H.F. circuits (i.e. grid circuit and reaction circuit) should not be mixed up too much; and obviously it is no good spacing components out well, if the wires leading to them are going to be all bunched up. Read my writings on the subject of "layouts" for the last eight years, and you'll see what I mean.

(3) Is it possible for wiring between the components to be *too short*, causing instability or other ailments on that account? Yes; if it means undue cramping together of the components in the set.

L. E. C. (Yelling) reports COCD, Havana, on 48.92 metres from 10 till 11 p.m. The station is asking for reports, which should be sent to Box 2294, Havana, Cuba. An interesting "veri" is returned. L. E. C. also mentions an interesting programme from L S X (Buenos Aires) on 28.98 metres every Monday evening, from 9.45 to 10.15 p.m.

A. S. T. (Rugby) is wondering whether to instal a short-wave set, on account of tales that he hears from other listeners concerning interference from the G.P.O. station and its many short-wave channels. I don't think he'll find things too bad,

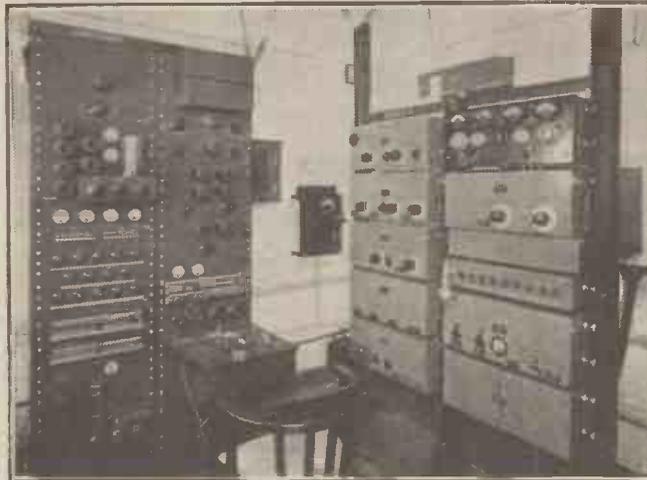
although certain wavelengths will be "blocked out" from time to time. Anyway, he'll get more with a short-wave set than he would without one!

K. T. (Leeds) sends in a beautiful log of stations heard on his 18-valve superhet. He also wants to join a club in the neighbourhood of Leeds, if there is one; and if anyone in the vicinity would like to look him up, he will be pleased to see them. Full address: Mr. K. Thompson, Dyneley Hall, Bramhope, Nr. Leeds.

Collin's Coupler and Reception

F. J. G. (Bridgend) has been reading about Collin's Coupler in the "Guide to Amateur Radio," and is anxious to know how to use it for reception purposes. I'm sorry to disappoint him, but he's barking up the wrong tree. Arrangements like the "Collin" are only suitable for transmission; they are just devices to give

THE TELEPHONY EQUIPMENT



Another view of the equipment of the "Empress of Britain." The apparatus shown here is for telephony only and was also supplied by Marconi's Wireless Telegraph Co.

more perfect matching between the output circuit and the aerial itself, and are pre-set for a fixed frequency on which the transmitter works.

A. P. J. (Hereford) has been in trouble with an L.F. stage added to various detector layouts. He has just found, however, that when he omits the choke-filter output and puts the 'phones directly in the anode circuit of the last valve, all is well. That's an easy one; there *must* be something wrong with either the L.F. choke or the 2-mfd. coupling condenser.

Morse Recording Too Difficult

Another query: I say in my notes that grid and reaction coils should be separated by one turn, but some of the sketches of coils show the windings about half-an-inch apart. Sorry, A. P. J.—you must blame my carelessness in doing the rough sketches, which are copied with scrupulous care by the draughtsman!

Will A. M. S. and others who still want particulars of morse-recording apparatus, please take note that I really can't deal with it, after all? The simplest form of morse-recorder is too complicated a job for the average home-constructor to tackle. In addition to that, one wants something far more "beefy" than the usual short-wave receiver before one can make use of it.

Short-Wave News

J. I. M. (Stellenbosch, South Africa) has written me a long and excited letter about his reception of the Alexandra Palace sound transmissions on 7 metres. His receiver is a straight detector and one L.F., made in accordance with the best "P.W." traditions. Far from being ashamed of it, J. I. M. says "I can receive the B.B.C. 7-metre transmission any afternoon I want to. Every time I have listened for it I have heard it." He proceeds to give full particulars of the programmes for several days.

He says that the percentage of modulation appears to be very low—the carrier-wave comes over at an extraordinary strength. He wants to try out a super-regenerator on the transmission, and I am very keen that he should do so and send me a full report. I have not yet heard of any really long-distance reception on a super-regen., and it would be more than usually interesting.

5-Metre DX

A friend of J. I. M.'s, by the way, has heard an American amateur using C.W. on 5 metres. I hope to hear more of this shortly.

The Wirral Amateur Transmitting and Short-Wave Club holds its next meeting on Wednesday, January 6th, at the King's Square Café, Birkenhead. At the last meeting there was a junk sale and a raffle. Full details may be obtained from

Mr. B. O'Brien, Caldby, Irby Road, Heswall.

According to the latest schedule, Moscow now broadcasts on 1,744 metres (Comintern), 25 and 50 metres (R N E), and 31.25 metres (R A N). Transmissions on 1,744 metres are always duplicated on 50 metres by R N E, and take place regularly between 9 p.m. and 10 p.m., except on Tuesdays and Thursdays. R A N on 31.25 metres comes on every midnight.

From Spain, both rebel and Government stations may be heard broadcasting on several different wavelengths and at irregular times. On closing down, however, these stations frequently announce the time of the next transmission.

News from the amateur bands is not particularly exciting. Conditions remain good on the whole, particularly on 20 metres, but 10 metres has been a little disappointing after the excellent promise that it gave a month or so back. By the time this appears in print, however, it will probably be in full swing once more.

Australians have been heard on the 80-metre amateur band already. The best month for them is usually January (or sometimes February), so readers who are keen on Morse reception will find it worth their while to keep an eye open on the 80-metre band at about 6 p.m. for a while.

W. L. S.

MEET THE BROADCASTING BACHELORS

And read all about their views on marriage

By SAM HEPPNER

THE examples of Austen Croom-Johnson, Fred Hartley, John Burnaby, Tolchard Evans and one or two others seem to have made little or no impression. During the last year or two, much confetti has been sprinkled in the direction of these personable young men who, saying farewell to the light-hearted frivolities of their single days, have now assumed the stern responsibilities of married life.

But the broadcasting world still teems with eligible young men who are reluctant to forsake the amiable pleasures of bachelorhood—young men who, for a variety of reasons, remain their own unattached property!

Not "Anti-Marriage"

At that little cocktail bar opposite the B.B.C. I recently sat and talked with one of these gentlemen who stayed chatting as long as he pleased, having no "better half"—wielding the proverbial rolling-pin in readiness—to whom he would have to account for his late arrival home. Patrick Waddington is his name.

"I'm not 'anti-marriage' by any means," confessed Pat, "but marriage isn't always such a simple business, however much one may want to go in for it. When I marry, which I hope will be fairly soon—before I'm thirty, anyway—the chief quality I'll look for in a wife will be companionship. My wife must be a grand companion; otherwise the marriage, as I see things at any rate, will be a failure.

BLONDE OR BRUNETTE



GORDON LITTLE likes blondes and brunettes equally well, but his wife must be a good sport and, above all, essentially feminine.

I can best describe my ideal conception of a happy marriage by using a word which will be familiar to all who are interested in wireless.

"The mind and personality of husband and wife must operate on the same wavelength; there must be a perfect unity of attitudes—no friction, no conflict—but sufficient sense of humour and intellectual activeness on the part of both to prevent the boredom that follows a

PUNCTUALITY FIRST!



"Punctuality" would be the first virtue I'd look for in a wife, says HARRY S. PEPPER.

complete tolerance of one another's ideas. I hate complacency. I hate smugness, and I believe that interest between two people can only be maintained by setting off their separate characters against each other; my idea of marriage is not a complete mutual absorption of personality.

"The girl I marry will have to like the things I like; we will both like the same books and music and agree on the general principles of life. As soon as I am able to escape from London I will. And my wife will want to come with me, away into the country where we will ride and sail and dance and keep a dog amid the simple comforts of the home.

The Right Basis for Marriage

"What sort of girl will she be? In appearance, brunette and petite, I should say—rather the Claudette Colbert type; yes, she's definitely my cup of tea. And I don't want to be wildly in love when I marry her. I consider that a state of desperate, frantic love is entirely the wrong basis for marriage; the sort of love from which happy marriages spring is



Expert cooking, attractiveness, and civility on the telephone are a few of the desirable qualities mentioned by RONALD HILL.

the steady, firm and enduring sort which lacks the feverish character of a summer night infatuation."

I next had a word with Harry S. Pepper on the question of his celibate existence. He was disposed to treat the subject in a light and rather frivolous manner, but I detected a gleam of sincere opinion beneath his banter. Harry's like that; you can seldom get him to be serious, yet his jokes usually lend an inkling of his real feelings.

Cooking Important says Pepper

"I think that Mrs. Harry Pepper," he said, "should there ever be such a person, would have a pretty rough time. There'd be steaks like leather and puddings burned to a cinder if she waited meals for me. You see, I'm always pottering about at the B.B.C., hunting after concert party talent, and rushing to and from theatre dressing rooms at all hours. It simply wouldn't be fair to her. As it is, I live in Putney with my mother and don't seem to get time to think about making a separate home even if it could be managed with a guarantee of domestic harmony—even if my punctual arrivals home were assured. And that's another thing. Punctuality! Punctuality is a virtue I hold so precious that I deliberately keep off marriage because, living as I do, I can make no guarantee to get home at the promised times. Therefore, if I did the sort of work that enabled me to catch the six-fifteen every evening and then desired to marry, punctuality would be the first virtue I'd look for in a wife. And when I say punctuality I mean that I would want her to keep dates within fifteen minutes of the appointed times—and not a half-hour and ten minutes!

"My wife would have to be a first-rate cook! That's an important item—and I'd prefer someone in the same profession as myself as, in a business like mine, one's work is such a vital part of existence that to carry the interest into the home and share it is part assurance of a full and happy life. I think I'd like to marry a blonde—and she must have a proper idea of the value of money. Another very important

(Please turn to page 443).

WHAT DO LISTENERS LIKE BEST?

This is what the B.B.C. wants to find out. Will they be successful?

By K. D. ROGERS

IF you see a nice, tall, well-dressed man walking up your garden path with a beautiful bright blue badge with the letters B.B.C. and an aerial rampant on it, don't be alarmed.

He may be coming to ask you a few questions about your radio listening. It has been announced in the press that the B.B.C. is going to send out "men and women with Oxford accents" to call on you and to discover what you like best in the way of radio programmes.

Don't you believe it. The B.B.C. has taken on its staff a Mr. R. J. E. Silvey, red-hot advertising expert, who is at work trying to formulate plans for finding out what you like—and perhaps what you don't like—in your radio programmes. But so far there has been no question of a house-to-house visitation by these super-educated men of the B.B.C.

As a matter of fact, if you do encounter a gentleman trying to get into your house on the pretext of finding out what you like about the programmes, deal with him harshly; he is more likely to be trying to find out what you like about your wife's jewellery or to get a good look at the family plate.

The fact of the matter is that the B.B.C.

is hard put to it to discover a method whereby it may find out listeners' likes and dislikes, but it does not contemplate any house-to-house visits. After all, with close on eight million homes it would take a few years to cover the ground adequately. And it is not much good going to "representative" homes as do the commercial firms when they want to find out if they can sell vacuum cleaners or tooth brushes in the district.

The Only Safe Way

If the B.B.C. is to find out what you and your neighbours like about the programmes it must ask each person individually. It's no good going to the man three doors away.

Certainly not in my case. I know only too well that he is a Foundations of Music fan; he is learning to "play" the saxophone, and his foundations are still pretty weak.

At the moment Mr. Silvey is sitting in Broadcasting House with a wet towel round his head, drinking green tea. In official words he is "quite unable to see anybody in regard to his work." I do not know whether non-work subjects such as darts would attract him, but on the matter is to find out what we like, Mr. Silvey is dumb. I don't blame him. It's a nasty problem and one that is going to take a deal of solving.

There are people who claim to know, however. It has been stated that the B.B.C. has made a surprising discovery—by dint of analysing the "fan" mail.

You'd Never Guess

And what do you think it is supposed to have discovered? That Leonard Henry is number one favourite? No. Henry Hall? No.

According to the information published in this marvellous report the B.B.C. has found that talkers come first, with commentators next. Just think that out, will you?

Some idea of the world-wide coverage of "P.W." is provided by this group of letters which arrived in a recent batch of applications for literature mentioned in the "Link Between." The countries included Australia, New Zealand, India, Ceylon, Manchuria, China, Palestine, Federated Malay States, South Africa, Northern and Southern Rhodesia and Portugal.



Leslie W. Orton, president of the Anglo-American Radio and Television Society, and his fiancée, Miss Eileen G. Harris, an official of the A.-A.R. and T.S. whose engagement was announced this month.

A "RECORD" CHRISTMAS

You will probably be buying some new gramophone records to-day or to-morrow. Here are some hints which will help you to choose them.

I AM going to start off this time with a serious note. We have had such a spate of dance numbers that I feel it is time to discuss one or two serious records. So, without any intention of punning, I am going to commence with Robert Speaight, who takes the part of Thomas à Becket in the play *Murder in the Cathedral*, which has been drawing full houses at the Duchess Theatre.

On H.M.V. B 8499 Robert Speaight has recorded one of the speeches of Becket—the last sermon. A moving scene, and the actor's words come over with intensity and powerful drama.

I am not as a rule enamoured of serious piano music on records. That statement will draw forth a howl of dismay and derision from some of you, no doubt. But I have a good reason. I like piano music. I am fond of many of the old masters. But I do not consider that the average piano recording, even when it is that of a maestro, does the composition or the execution justice.

There is a horrible flatness about many piano records that takes away from them the delicate transition from loudness to softness, and vice versa. You listen to any group of six piano records, and I warrant you will find at least two that are just "adequate" as interpretations of that instrument. I grant you that some well-known artists are comparatively soulless. But the recording seems to make them even more expressionless than they are in reality.

Whether it is the control of the modulation by the recording engineers that causes flatness of some of these records, or whether it is that the pianists deliberately level off their interpretations, I do not know. But the effect remains.

Two Good Piano Recordings

I am therefore more than glad to welcome the H.M.V. recordings of Rachmaninoff and Arthur Rubenstein on DA 1522 and DB 2450 respectively. Rachmaninoff plays one of his own pieces, *Serenade*, and also one of Borodin's *Scherzos*. Rubenstein has chosen a Debussy *Prelude* and the *Forlane* from "Le Tombeau de Couperin," one of Bavel's suites.

Do you want a novelty record for Christmas? Try the imitation disc of Freddy Dosh (Decca F 6103). Ducks, chickens, a howling dog, trainload of cattle, a baby, a London Underground train, sounds in an airport, and even Sir Malcolm Campbell's Bluebird are included in the record. Quite a lively and unusual one-and-sixpennyworth!

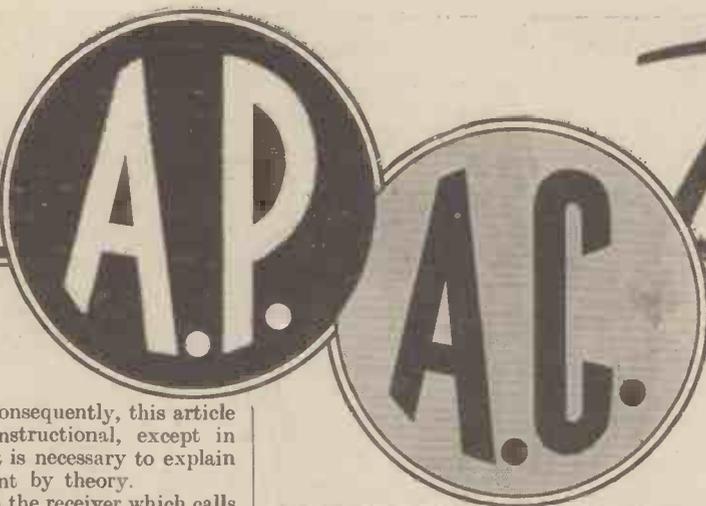
Hildegard is still hard at it. When she recorded the record I do not know, for I believe she is still in America, but Columbia FB 1523 holds a very good "likeness" of the popular cabaret and radio star. *When I'm With You* is the title and—well, it may make you wish she were.

(Please turn to page 443.)

"P.W.'s" WORLD FELLOWSHIP



The AP Three



THE theoretical circuit and full details of the design of this receiver were given last week. Consequently, this article will be purely constructional, except in such instances as it is necessary to explain some practical point by theory.

The only thing in the receiver which calls for any really careful constructing is the switch gear for wave-changing. Not that this is at all difficult, but it certainly must be made reasonably accurate in order to assure its operating consistently well. One of the most important things which assures this is clean contact points. This is very important. It will be mentioned at least once more later on so that you will not forget it!

As to the general form of the receiver, it consists of an aluminium baseboard supported by side, front, and back pieces of plywood. The sides and front are of $\frac{3}{8}$ -in. wood. The back is $\frac{1}{2}$ -in. wood. The back is thinner as it carries the terminals and on/off switch. The front is cut away in places, as will be seen in the photograph of the front view. (See last week's issue.)

A Component Warning

Before starting on the construction, make sure that all the components are of the correct type. Please do not substitute other makes or types. This may be fatal to proper results. You have heard this warning for years, but it still holds good! Indeed it is more necessary to-day than ever it was to use the specified components. Of course, such things as fixed condensers and fixed resistances may be substituted provided that they are similar electrically and physically and of a really reliable make. The more vital parts, however, must not be changed. Such things as coils, smoothing choke or mains transformer must certainly not be substituted, otherwise results will most certainly be affected.

The first job to tackle is the switch-gear. This consists simply of an ebonite disc, a 2 B.A. pivot screw, four 2 B.A. nuts, some 6 B.A. nuts and screws, some soldering tags, and some springy brass strip. This last may quite well be the contact strips from an old flash-lamp battery.

The ebonite disc is 3 in. in diameter, and $\frac{3}{8}$ in. thick. The positions of the contact screws (which are $\frac{1}{2}$ -in. \times 6 B.A. brass cheese-heads) are clearly shown in the diagram. The only comment necessary here is to state that the positions of these screws are most important, and reasonable

A full constructional description of the high-efficiency all-mains receiver for television sound and ordinary broadcasting, first details of which were given last week. This set provides a new and fascinating field of entertainment for those within range of Alexandra Palace.

accuracy is necessary in drilling the holes, as the screws have to register with the contact strips on the baseboard. When the switch disc has been drilled— $\frac{1}{8}$ -in. holes should

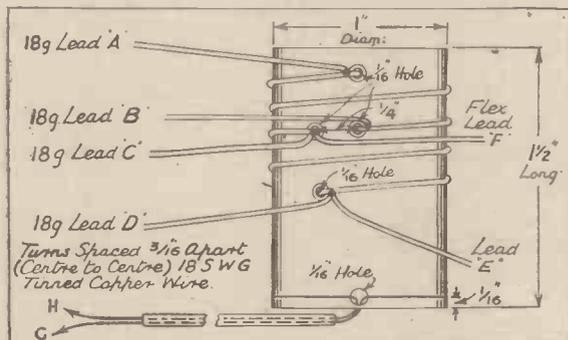
be drilled for the contact screws—the contact screws are mounted. Make sure that the nuts are tightened up well, and that the soldering tags are in the correct positions. Now clean contact screws with a fine file, and remove all brass filings with a brush. Cut stop "V" with three-cornered file. Cut finger control slot with $\frac{1}{4}$ in. rat-tail file. That completes the switch disc.

The next job is to prepare the aluminium baseboard. If you have not bought this already cut to size, it must be cut to measure 14 in. \times 10 in. Drill the holes for the valve-holders. A centre-cutter is really necessary for these holes, but they may be cut by drilling small holes—say $\frac{1}{8}$ in.—round the circumference close together, and then you will be able to tap out the centre.

The holes for V_1 , V_2 , and V_3 are $1\frac{1}{2}$ in. diameter.

The hole for the rectifier is 1 in. diameter. Next drill two $\frac{3}{8}$ in. holes for the two 8-mfd. electrolytic condensers. Now drill the holes for mounting the components. These should be $\frac{1}{8}$ in. in diameter. Their positions may be found by placing the components on the baseboard, and marking through the fixing holes of the components.

THE TELEVISION COIL



How the 7-metre coil is made. It is a very simple winding, but the dimensions given should be strictly adhered to.

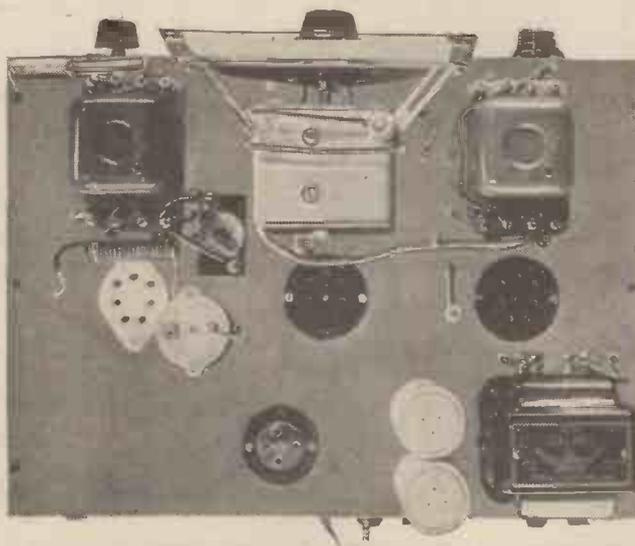
Fixing the Contact Strips

Now turn to the diagram showing the positions of the contact strips on the underside of the baseboard. The holes for these should next be drilled, together with the holes for the stop strip and the pivot screw. The holes for the contact strips and stop strip are $\frac{1}{8}$ in. diameter, whilst that for the pivot screw is $\frac{3}{16}$ in. diameter.

Now we come to the contact strips. These are made from thin springy brass. It has already been suggested that the contact strips from old flash-lamp batteries be used for this. The size and shape of these are shown in the separate diagram. They should be fitted to the baseboard and bent to shape afterwards. The fixing screws are counter-sunk 6 B.A. by $\frac{3}{16}$ in., and are sunk into the top side of the baseboard, the nuts being on the underside—the contact strip side.

It will be noted that two strips are bent to one shape, and two to another shape. Strips B and C are bent up to form stops, so make sure you have these the right way round, otherwise the switch will not function properly. The stop strip is easily bent to the shape shown in the diagram. There is nothing very critical about this, except its position on the baseboard.

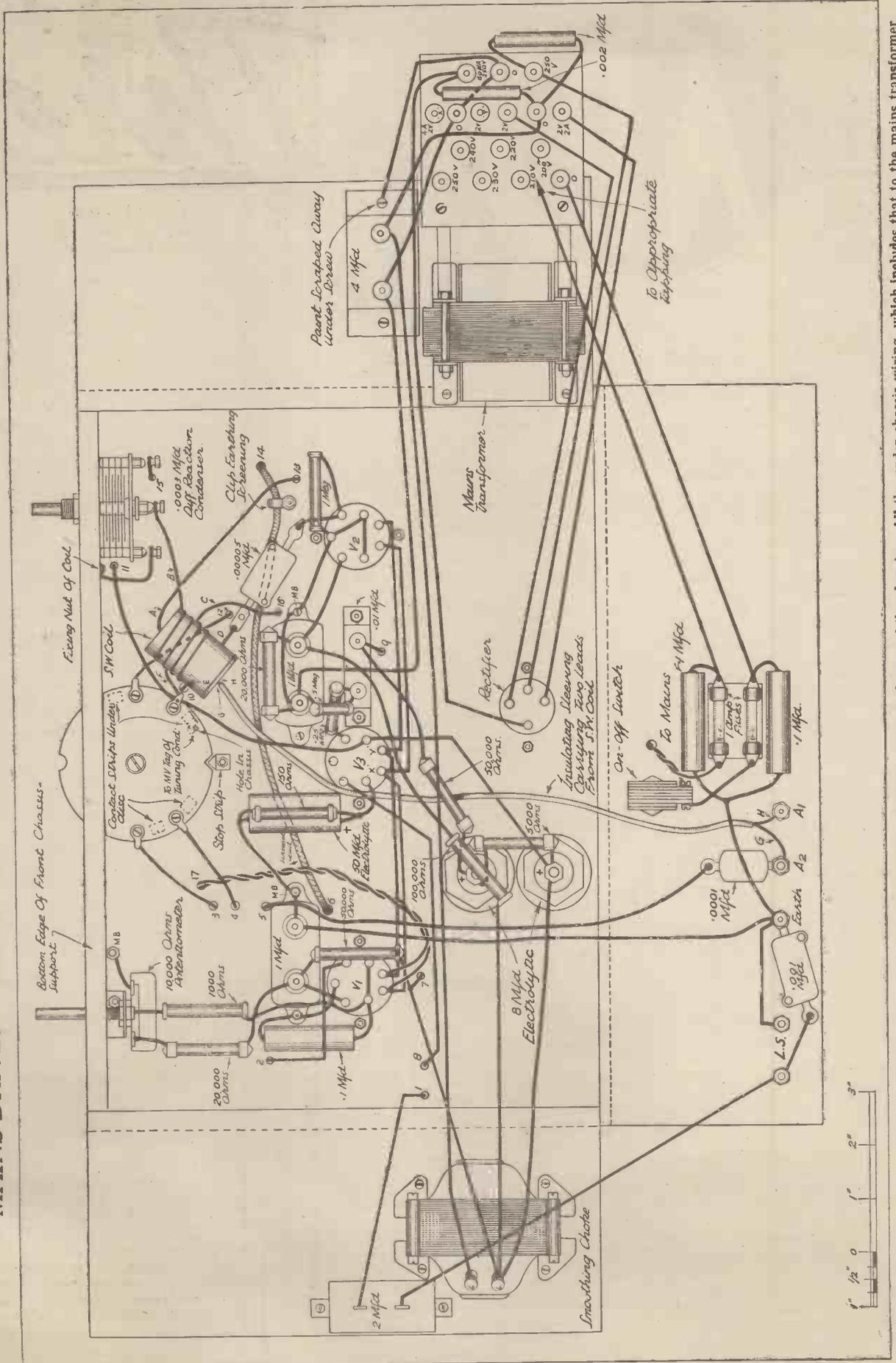
Next, mount the side supports. Fit wire to moving vanes tag of tuning condenser. This goes



This view looking down on the top of the chassis shows the clean, straight-forward layout. The rearmost valveholder is for the rectifier valve.

(Please turn to page 435.)

MAINS-DRIVEN RECEPTION OF BROADCAST AND ULTRA-SHORT WAVES



THE "A.P." A.C. THREE

(Continued from page 433.)

through the baseboard to contact strip on underside. This is shown in the wiring diagram. Mount tuning condenser.

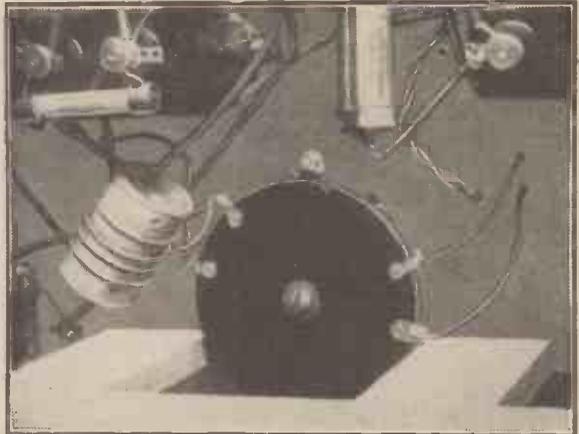
Concerning The "V" Stop

Now mount the switch disc on the underside of the baseboard. The method of mounting this is shown in a diagram. Make sure that the contacts "make" properly, and that the "V" stop functions as it should do—i.e. stops the disc at the appropriate positions. This is the long-

single length of sleeving is slipped over them. Leave about a foot. It can be cut to length when wiring is done.

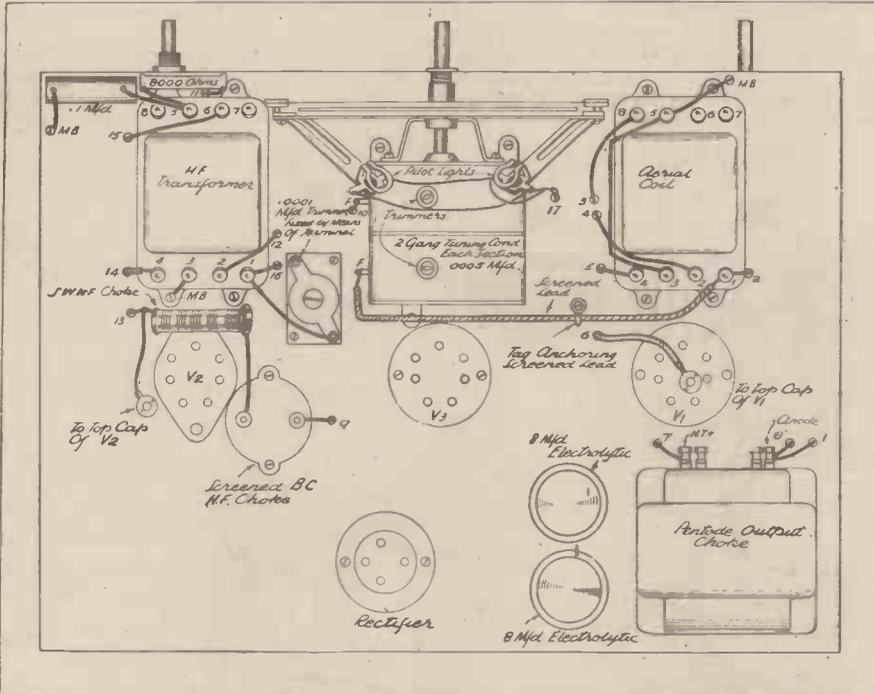
Baseboard Mounting

Now mount the remainder of the components of the baseboard. Those on the side pieces should not be mounted yet. Before mounting these components the wiring of the components on the baseboard should be done as far as possible. After this, fit back support, and mount remainder



This close-up shows clearly the method of arranging the 7-metre coil and the wave-change switch.

THE ABOVE-BASEBOARD WIRING



The above-baseboard wiring and layout. It should be noted that certain terminals on the coil units are not used. These are 6 and 7 on the aerial coil and 7 and 8 on the H.F. transformer. The sketch on the right gives the positions of the contact strips beneath the switch disc.

wave position, when all contact points are broken.

That completes the switching arrangement. The coil for the 7-metre reception should now be made. The method of making this is quite clear in the diagram. It should be pointed out, however, that the aerial coupling coil is a single turn of wire, the ends of which are left long, and a

of components. It is advisable to remove side supports in order to fit the components to them, and then refit them to baseboard. Now complete the wiring.

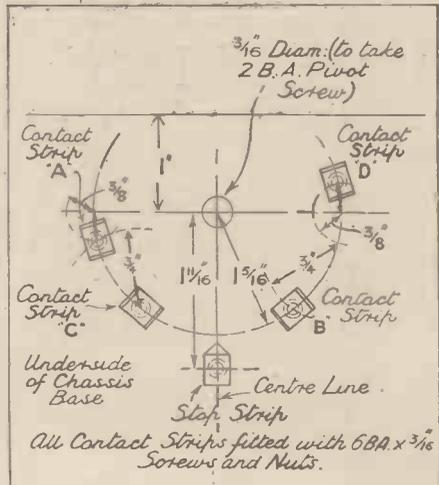
The positions of the controls on the front of the set are as follows. (It may not be possible to find these positions accurately from the diagrams). The reaction condenser should be mounted on

its bracket so that the centre of the spindle is $2\frac{1}{2}$ in. from the end of the baseboard. Similarly, the spindle of the volume control potentiometer is $2\frac{1}{2}$ in. from the other end of the baseboard. The tuning control knob is, of course, central.

The front support should be cut as shown in the photograph of front of set which appeared on page 409 last week. The three pieces cut away are all 3 in. wide and 3 in. deep. The distance between these cut-outs is $1\frac{1}{2}$ in., and the vertical end pieces are $\frac{5}{8}$ in. wide. The front support having been fitted to the baseboard, the set is complete. No panel is shown, as this is best left to the constructor to decide, its

(Continued overleaf)

HOW THEY ARE PLACED



YOUR "A.P." A.C. SHOPPING LIST

- 2 Wearite "Unigen" coils.
- 1 Polar 2-gang Midget tuning condenser, each section .0005-mfd.
- 1 Polar V.P. horizontal drive for above.
- 2 Clix chassis-mounting 7-pin valve holders, type V2.
- 1 Clix chassis-mounting 7-pin valve holder, S.W. type.
- 1 Clix chassis-mounting 4-pin valve holder, type V1.
- 1 Bulgin H.F. choke, type H.F.8.
- 1 B.T.S. H.F. choke, type U.H.F.1.
- 1 J.B. baseboard trimmer, .0001 mfd.
- 1 Varley pentode output choke, type D.P.9.
- 1 Wearite smoothing choke, type H.T.12.
- 1 Varley mains transformer, type E.P.20.
- 1 Dubilier 4-mfd. fixed condenser, type L.S.A.
- 2 T.C.C. 8-mfd. wet electrolytic condensers, type 802.
- 1 T.C.C. 50-mfd. electrolytic condenser, 12-volt working, type F.W.
- 1 T.M.C. 2-mfd. fixed condenser, type 40.
- 2 Dubilier 1-mfd. fixed condensers, type B.B.
- 1 Dubilier 1-mfd. tubular fixed condenser, type 4503.
- 3 T.C.C. 1-mfd. tubular fixed condensers, type 250.

- 1 Dubilier .01-mfd. fixed condenser, type 620.
- 1 Dubilier .001-mfd. fixed condenser, type 670.
- 2 T.C.C. .002-mfd. tubular fixed condensers, type 300.
- 1 Dubilier .0001-mfd. fixed condenser, type 695.
- 1 T.C.C. .00005-mfd. fixed condenser, type M.
- 1 J.B. .0003-mfd. solid dielectric differential reaction condenser.
- 1 Erie .5-meg. resistance, 1-watt type.
- 1 Erie 100,000-ohm resistance, 1-watt type.
- 1 Erie 8,000-ohm resistance, 1-watt type.
- 1 Erie 1,000-ohm resistance, 1-watt type.
- 1 Polar-N.S.F. .25-meg. resistance, 1-watt type.
- 1 Polar-N.S.F. 1-meg. resistance, 1-watt type.
- 1 Polar-N.S.F. 50,000-ohm resistance, 1-watt type.
- 1 Polar-N.S.F. 150-ohm resistance, 1-watt type.
- 1 Dubilier 50,000-ohm resistance, 1-watt type.
- 2 Dubilier 20,000-ohm resistances, 1-watt type.
- 1 Dubilier 5,000-ohm resistance, 1-watt type.
- 1 Erie 10,000-ohm potentiometer (without switch).
- 2 Peto-Scott $2\frac{1}{2}$ " mounting brackets with long slot.

- 1 Bulgin toggle on/off switch, type S.82.
- 1 Bulgin twin fuse holder (with 1-amp. fuses), type F.16.
- 1 aluminium sheet, 14" x 10"—18 S.W.G. (Peto-Scott).
- 1 yd. single screened flex (Peto-Scott).
- 2 pieces $\frac{3}{8}$ " plywood 9 $\frac{1}{2}$ " x 4 $\frac{1}{2}$ " for side supports (Peto-Scott).
- 1 piece $\frac{3}{8}$ " plywood 13 $\frac{1}{2}$ " x 4 $\frac{1}{2}$ " for front support (Peto-Scott).
- 1 piece $\frac{1}{2}$ " plywood 14" x 4 $\frac{1}{2}$ " for back support (Peto-Scott).
- 1 piece $\frac{1}{8}$ " ebonite to make 3" diameter switch-disc (Peto-Scott).
- Brass for contact strips (see text).
- 6 B.A. screws and nuts, wood screws, flex, etc.
- 5 Belling and Lee terminals, type R.
- 6 yds. $\frac{1}{2}$ m.m. insulating sleeving (Peto-Scott).
- 30 ft. 18 S.W.G. tinned copper wire (Peto-Scott).

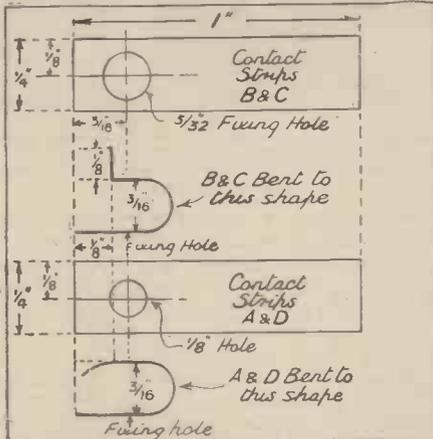
THE "A.P." A.C. THREE

(Continued from previous page.)

size depending on the cabinet to which the set is fitted.

In order to test the set the following instructions should be followed: Fit valves in appropriate holders. Connect aerial (to A2) and earth. Connect loudspeaker.

SWITCH CONTACTS



Details for making the switch contact strips are given here.

This should be adjusted for pentode if it has any adjustment. If it has not, the matching should be done by adjusting connections to output choke, as advised in leaflet supplied with same. Connect mains leads to mains socket. Make sure that you

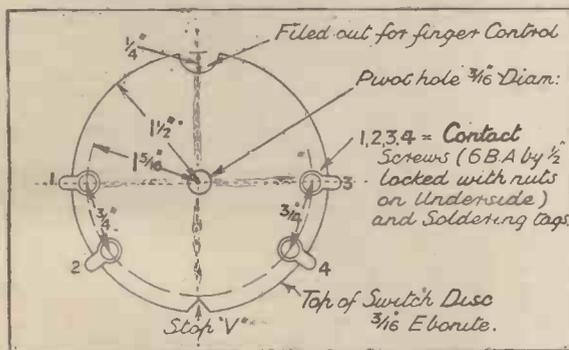
VALVES FOR THE "A.P." A.C. THREE

| | |
|--------------------------------|---------------------------------------|
| V.1. Mazda A.C./V.P.1. | V.2. Mazda A.C./S.2./Pen. |
| V.3. Marconi or Osram N.41. | Rectifier Marconi or Osram M.U.12. |

have connected the correct tapping on mains transformer before doing this.

Screw out slotted head front trimmer of tuning condenser until it is nearly free from screw. Screw down (clockwise) back trimmer as far as it will go, but do not force it. Now turn it back half a turn. Screw down .0001-mfd. baseboard trimmer as far as it will go, then turn it back two complete turns. Set wave-change switch

DETAILS OF REVOLVING DISC

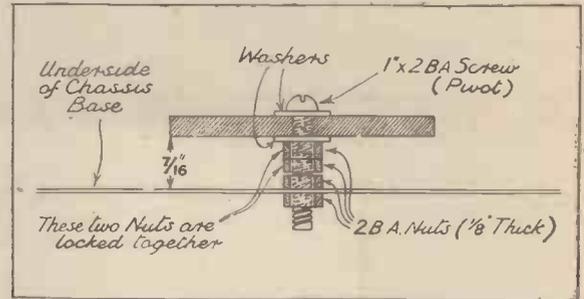


The ebonite disc, which is turned to change wave-ranges, is prepared in accordance with these dimensions.

to medium-wave position—i.e. to the left. Tune-in a local station and adjust trimmers for maximum signal strength. The signal should be kept at a fairly low level to do this. Now tune to a station at the lower end of the scale, say about 250 metres. Turn up reaction (anti-clockwise) until the set is on the verge of oscillating. Keep volume to fairly low level by means of volume control. Adjust rear trimmer of tuning condenser for maximum signal strength.

The receiver is now ganged correctly. Set wave-change switch to long-wave (central) position, and see if the long-wave section is functioning correctly.

Set wave-change switch for television signal (to the right). Connect aerial to A1. If a di-pole aerial is used, the two leads should be connected to terminals A1 and



The switch disc moves on the threaded-rod spindle, which is secured by nuts to the metal chassis.

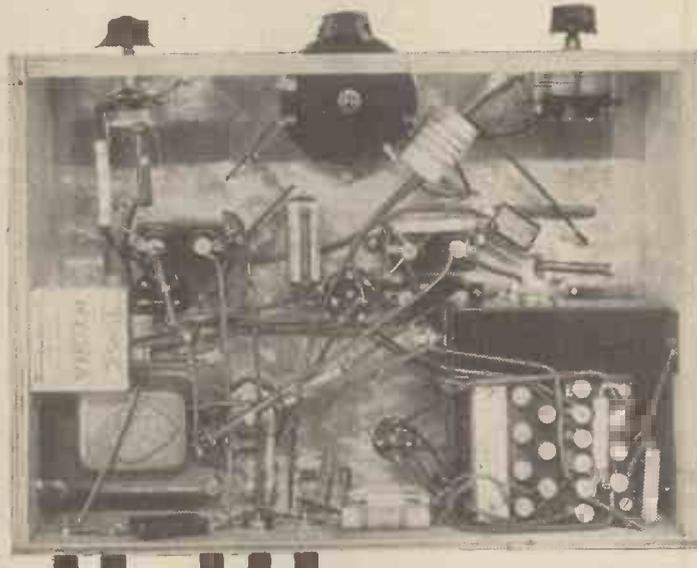
WATERPROOFING ROPE

ANY rope which is to be used for outdoor aerials, no matter whether it be new or old, can have its life enormously prolonged by giving it a simple creosote treatment.

Place into a bucket or basin a mixture of equal parts of creosote and paraffin oil, stirring the two liquids well together. Then immerse the rope in this liquid mixture for a minute or two, taking care to see that the liquid covers every portion of the rope.

The rope is now withdrawn from the creosote-paraffin mixture, shaken to remove surplus liquid, after which it is placed in position on the aerial mast, or in whatever situation it is

COMPACT ASSEMBLY IS ACHIEVED



How the receiver appears from below the chassis when in its completed form.

A2. The television sound signal is received at approximately 26 on the tuning dial, whilst the vision "sound" is received at about 18. The reaction condenser now works in the opposite direction—i.e. increases reaction when turned clockwise.

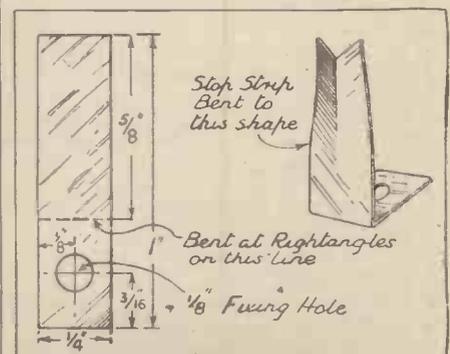
There is just one point in the wiring diagram which may not be quite clear:

The wires joining the 4-v. 4-amp. winding on the mains transformer to the heater terminals of V3 are not drawn. These leads have been omitted to prevent confusion in the drawing. It will be seen that these points are marked "X" and "Y" on both the transformer and V3. When wiring, "X" on the mains transformer should be connected to "X" on V3, and "Y" on transformer to "Y" on V3. These leads, of course, must not be omitted, or the receiver will not function, as the valves will receive no heater current.

intended to be used.

Such a rope will not only remain waterproof over a long period, but it will actually repel water. In the summer-time, too, it will not become dried up by the hot rays of the sun.—J. F. S.

THE LOCATING STOP



Details of the long-wave locating stop. The strip engages with a "V" cut in the wave-change switch disc.

FROM OUR READERS

A NEGLECTED WAVEBAND

An old follower of "P.W." gives some useful tips in describing some of his radio experiences.

The Editor, POPULAR WIRELESS.

Dear Sir,—I wonder how many radio "fans" listen on the upper short-wave band (80-180 metres)? It seems to be rather a neglected band nowadays, and I notice that the majority of "all-wave" sets do not cover it at all. (By the way, wouldn't "multiple waveband" be a more logical name for these receivers?) A few years ago there was literally "nothing doing" on this band, except for the amateur transmitters on 150-200 metres, who had just been pushed down from 440 metres out of the way on to a "useless" wavelength. Then, transatlantic working was achieved by them around 100 metres.

Well, now the band is a busy one, and I can promise those readers who are not familiar with the band, plenty of interest if they will beg, borrow, or make coils to tune between 80-180 metres.

I give below some typical extracts from my log, all round 9-10.30 p.m. (or a little earlier in the case of the "hams"):

173 metres.—A 100-watt broadcasting station, Liepraja (Latvia) giving a talk in English, on agriculture in Latvia. Interesting.

160 metres.—An amateur working duplex with another. The other was barely audible, but his remarks must have been amusing, judging from the hearty laughter of No. 1.

150 metres (approx.).—Several police headquarters calling patrol cars. I am not at liberty to repeat what I have heard (see back of Licence 1), but I can say that thrills are often obtained by listening to these stations.

130-140 metres (approx.).—Literally dozens of trawlers heard, and very entertaining, too! They are difficult to pick up and more so to identify, as they are on only a few moments at a time, as a rule. One old skipper was heard distinctly contravening Section 113 of the P.M.G.'s "Handbook for Wireless Telegraph Operators," i.e. "Operators are reminded that it is forbidden . . . to use offensive language"; that is, if the very hearty and frequent use of a word first introduced on to the stage by Mr. G. B. Shaw is considered "offensive language" by the P.M.G.!

100 metres (3,127.5 kcs., to be exact)—G B T T (R.M.S. "Queen Mary") speaking to the "Empress of Britain."

Finally on 80 metres, a large number of British, Dutch, French, and Belgian "hams."

The above represents a selection from my logs for several evenings, but I think I have said enough to show that it is well worth while "breaking-in" on this band. A warning! Because you are near the broadcast band, do not think any old "ham-handed" tuning will do. *It won't.* Just as much patience as on 20 metres is needed to get these weak telephony trans-

mitters (trawlers use only up to 100 watts). My receiver is the faithful old 0-v-1 standby, with an 80-foot indoor aerial and headphones. I use a very small "vernier" condenser for super bandspread, and it is invaluable on this as on the short wavebands.

Yours faithfully,
F. W. T. ATKIN:

25, Hayfield Crescent, Freeheville,
Sheffield.

IMPROVING SHORT WAVES

The Editor, "Popular Wireless."

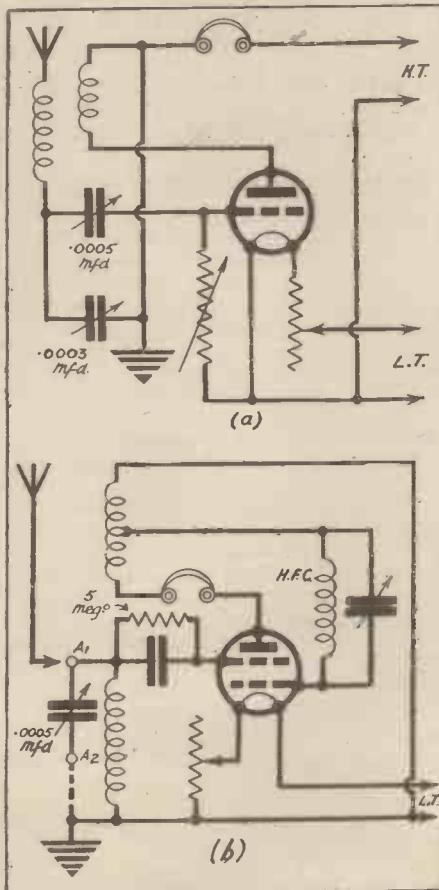
Dear Sir,—As an old follower of "P.W." and one who makes a point of reading your weekly correspondence, I have been wondering if a word or so on divers subjects from me might prove of interest.

Just to substantiate my claim of "old follower" and to revive memories of great and former days, I wonder how many could name the two following circuits? They were two high spots of yours years ago if I remember rightly, and performed great deeds. Here they are in all their glory! (Reproduced below.—E.D.)

I have several more of these grand old fellows, valve and/or crystal, in my notebook if anyone's interested.

To return to present times. I am, of course, exceedingly interested, and have been for years, in S.W. work. My receivers were all definite hook-ups, so after my marriage my special hook-up "retired" (!) to the loft and I had to cast about for an A.W. Disliking superhets, and with one and a half eyes on the coast, I bought an A.C. A.W. 3 (pentodes) of very well-known make, and endured indifferent reception on S.W.'s for some time until I hit upon the three following ideas. I am not given to exaggeration, but I would say improvement is at least 300 per cent.

DO YOU REMEMBER?



In his letter Mr. J. Royle wonders how many can name these two "P.W." circuits of many years ago.

YOU MIGHT

have something of great interest to other readers to tell, some experience, some idea or opinion connected with radio. Write us a letter on any radio subject. We like to hear from readers, and a guinea is awarded each week to the sender of the letter which, in the opinion of the Editor, is the best one. This week it goes to Mr. J. Royle. Length and literary ability are no criterion of success; everyone stands an equal chance.

WIN A GUINEA

My first discovery was the bad state of the aerial. It was of 7/22's non-insulated wire, and was brought to the set by cutting a groove in the window ledge and fastening the window on it. To insulate it I bound the lead-in with tape; never again, for after some five weeks of trouble tracking I found the tape, soaked by the rains, causing an H.F. leak. I replaced the offending lead by one of insulated wire, and all was well. I next cut the aerial to about 20 ft., inclined it from the chimney-stack down to the window, and things were even better!

My most important find was that with a condenser and plug-in S.W. coils connected across the aerial and earth terminals I could tune the H.F. valve. The set actually utilised the primary of the long wave H.F. input transformer as a S.W. choke, but it was evidently so inefficient that the coil and condenser was the easier path for H.F. Anyway, by tuning the aerial circuit, volume is increased enormously, likewise selectivity. Here, then, is an idea which is worth trying on any straight aperiodic three-valver.

My last idea is for all who, like myself, live in a top-floor flat; it concerns the earth. I am too high up for a decent earth in the garden, so, after exhaustive tests, I have installed two earths in this manner: very near the set is a large brick fireplace, protruding into the room; upon this I put a sheet of copper foil and take a lead from it to the set. This is used very successfully for 20 m.'s down; above that, the second earth is used. This is a wire connected to the telephone sheathing (around the cable) on the roof; thus only a short length of wire, about 10 ft., is used. I find this perfectly satisfactory.

I should be interested to know what others use in like circumstances.

In conclusion, I should like to say that here, in Kingsbury, at the moment I find reception very good, particularly from the Americans. Amateurs, too, are heard from all over the world, although I hear them say conditions are so bad!

Wishing you and "P.W." all the best!

Yours faithfully,
J. ROYLE.

2, The Triangle, Buck Lane,
Kingsbury, N.W.9.

A YOUNG ENTHUSIAST

The Editor, POPULAR WIRELESS.

Dear Sir,—Although only 13 I have got the radio bug firmly planted in me, and have at this tender age built six receivers, from crystals to three-valvers.

I first became interested in radio about three years ago. Soon after, I became the proud possessor of a crystal set, which after thoroughly testing I had to come to the sorrowful decision that the set was no good!

However, determined to possess a receiver of some sort, I built a plug-in coil one valve. (And what a job I had to get the coils!) Eventually I had to rewind them myself.

This set gave splendid results, working on a Pix aerial and a gas-pipe earth. I used to receive a German station tremendously loud using a 200-turn coil.

A year later I built a two-valve; the results obtained with this were very good indeed.

A month later two school friends asked me to make sets, one a one-valve and the other a crystal. I did this for them and sold them the sets, both to their pleasure and mine.

Then a great honour came my way. An old gentleman friend of mine asked me to make him either a two or three-valve set. I made him a two-valver. He wasn't satisfied with the results however, and when coming across an old "P.W." copy in which the "Skyhawk" was described, I promptly built him it, and he's very satisfied.

Wishing the best of luck to "P.W." from which I've derived much useful information,

Yours faithfully,
C. BETHENCOUNT.

Sunningdale House, Sunningdale Avenue,
Eastcote, Nr. Pinner, Middlesex.

RANDOM RADIO REFLECTIONS

By Victor King

B.B.C. News Service—A Haunted Television Receiver?—And They Haven't Got a Radio Set—Balance and Control at Alexandra Palace.

GREETINGS.

I CAN'T send you all an individual season's greetings, so please accept collectively and severally and altogether my best wishes for a Merry Christmas and a very Happy New Year. You know, I was invited to do this in the special Christmas number of "P.W.," but I craved permission to get my words nearer to the festive season itself. For I'd like to pop in and out of your parties—if you'd have me and it could be done.

However, I can at least speak to you—in these printed words, and so, once again, all the best and may you enjoy smooth and contented going in 1937.

RADIO NEWS BULLETINS.

IN my opinion the B.B.C. news service has not measured up well during the past few weeks. It has been tried and found wanting. It "scooped" the evening newspapers with the Crystal Palace fire, but such was the eager absence of restraint displayed in putting the news on the air that vast crowds, which severely hampered the firemen and police, were caused to assemble.

And then came the graver events of that week, and this time the brake was put on so hard that for a while the broadcast news concerning it was negligible and meaningless. Not a word appeared in the current issue of the "Radio Gazette," which is billed as a "Recorded Review of Events at Home and Abroad."

In fact, so strictly was the policy of "bulletinism" applied that no trimmings of any kind were supplied. The absence of comment could be forgiven, but not that of explanation.

I think it must now be quite obvious to all that broadcasting, as it is at present directed, will never prove a serious rival to the Press. For myself, I look to the radio to provide a few headlines (dispassionately and unenterprisingly composed) and my newspapers for the body of the news, together with expert explanation and commentary.

By the way, it was one of my most pleasant surprises when, a year or two ago, I learned that my two morning papers, the "Daily Telegraph" and the "Daily Sketch" were cousins of POPULAR WIRELESS.

HERE'S A MYSTERY.

I HAPPENED to be playing about with my television outfit at around about two o'clock in the morning a few days ago. As a matter of fact, I was trying a novel testing stunt due to A. S. Clark, "P.W.'s" chief "telengineer."

Suddenly, some bright flashes appeared on the blank screen. Then what appeared to be either a series of small round clouds or a bunch of magnified moth-balls swept

across. I at once sat up and took notice, for this was real stuff coming in from outside.

No sooner had the last cloud (or moth-ball) vanished than there were more very bright flashes like forked lightning, and for a fleeting moment a face appeared. It was hardly anything more than a smile wrapped in barely discernible features.

No, there were no sounds at all from the loudspeaker. No ghostly sighs or spectral mutterings. But it gave me a prickling round the back of the neck to see that vague face flutter into view and as quickly vanish.

The set was tuned off the B.B.C. frequency—to something like 47 megacycles, I should think. It may have been a B.B.C. test transmission, nevertheless, or Baird or M.-E.M.I. may have had something to do with it. Or it may have been a freak reception from the Continent.

I hope so.

I should hate to have a haunted television set!

Wraiths could throw all my testing right out.

THEY'RE VERY MUSICAL!

I THOUGHT that practically everybody owned a radio set these days, but I've just heard of a family that doesn't, never has done, and apparently never will.

I heard about them while discussing with friends a famous pianist whose son is the originator of some rather childish radio melodramatics (three guesses!).

"Mrs. Jones (that's not really the name) is a beautiful pianist; good enough for the Queen's Hall," said someone.

There were polite and uninterested little noises from the others.

"Mr. Jones plays the violin magnificently into the bargain," he went on.

More stifled yawns.

"In fact, they're a very musical family and have one of the largest libraries of gramophone records I've ever seen."

"Shouldn't think they get much time to listen to the radio," I suggested idly.

And then he sprang the surprising fact that the Jones haven't got one. Or is it surprising?

AT THE A.P.

THE control engineers at the Alexandra Palace have a pretty hectic time. Judging by what comes out of my television outfit in the way of sound, the television producers haven't yet mastered the balance and control of vision and sound together by a very long chalk.



Radio is part and parcel of family life, and children enjoy broadcasting as much as their parents. At any rate these kiddies are firmly of the opinion that they couldn't do without their Marconiphone Table-grand.

Voices fade right away, and background noises rise right up, as the man at the wheel tries to keep the modulation moderately even, and then, suddenly, he'll be caught napping and there's such a roar from the loudspeaker that you nearly get your hat blown off—if you're wearing one.

However, I'm not making a point of this, so breathe again you televisionites of the B.B.C.

B.B.C. THEATRE ORGAN.

I BELIEVE the B.B.C. are applying much less than their usual amount of control to their new theatre organ. That is to say, they are allowing a wider compass between minimum and maximum loudness, and yet I wonder if the majority of listeners want this?

For myself, I like a fairly narrow compass. I prefer the control engineer to do his stuff with a fairly heavy hand—but adroitly, of course. But then, I generally listen with the wick turned fairly well down. With a wide volume compass at the B.B.C. end this means that *pianissimos* vanish almost entirely—pp's become ppp's, in fact!

HALF CANADA NOW LISTENS

NEARLY one half of the population of Canada are now believed to be listeners on the radio, according to the Canadian Department of Trade and Commerce, which bases its estimate on nearly 800,000 radio licences sold during the first six months of the present fiscal year, which started April 1st. Based on last year's figures for the first six months, 627,000, and the total for the year, 862,000, the department believes a million licences at Two Dollars will be sold this fiscal year. With five members to a family, at least five million listen, half of Canada's entire population.

Other factors which indicate a growing Canadian listening public, the department point out, are the sale of 190,000 receivers last year, as well as the fact that free licences to the blind have jumped 400 during the first six months to a total of 2,314. There were 589 free licences in 1930.

J. M.

RADIOTORIAL QUESTIONS AND ANSWERS

By K. D. ROGERS

HOW TO REDUCE H.T. CONSUMPTION

C. H. (Malton, Yorks).—How can I reduce the H.T. consumption of my set which takes 22 milliamps at present? It is a straight set with ordinary triode output and has two L.F. stages.

You can use either Class B. or Q.P.P. output. I would recommend, in your case, the cutting out of the one L.F. stage and turning the output stage into a Q.P.P. stage, using one of the special double pentodes made for the purpose.

By this means you would cut out the current taken at the moment by the first L.F. stage, and you would only consume current in proportion to the strength of the signals in the last stage. As regards sensitivity and power, you would probably find that the use of the pentode as a last valve would compensate for the removal of the intermediate L.F. stage. You would be getting better amplification from the pentode than you are now getting from the triode output valve. Probably your average H.T. current consumption would fall to about half the figure you mention. The alteration of the circuit is easy, and the only other parts you would have to buy would be the input and output Q.P.P. transformers and the

should be able to do this scheme quite well, and to get a good "squawk" on your set whenever Miss C. A. R. wakes up.

The sketch will show what I mean. If you wanted a permanent connection you could connect straight to the G. terminal and do away with the adaptor, of course.

UP TO SHIPPING

J. E. (Leeds).—I have a three-valve set with plug-in coils of the six-pin variety. I want to get up to 600 metres with it, but although I have wound coils I can only get the North Regional with terrible shrieks. Can I use plug-in coils up there?

Without details of your circuit it is difficult to advise you. It may be that you have an H.F. stage that becomes unstable when you get to the longer medium waves, or in your case you may have wound the reaction winding, too large for the 600-metre coil. It should be possible, provided the set is not unstable, to go up to 600 metres if you use the correct coil. Your best plan would be to send details of your present coils, or even one of them, for our inspection, so that we may advise you as to the necessary windings. Also let us have details of your set. Please be absolutely frank about the question of stability. Try the set with your home-made 600-metre coil with the reaction winding disconnected or short-circuited so that there is no question of that causing the instability, and let us know if the set is then perfectly stable.

D.C. SET ON A.C. MAINS

J. W. C. B. (Weymouth).—I have an Ekco D.C. three-valve set, but unfortunately the supply in this district is A.C. Can I get a rectifier which will enable me to use the set on these mains? The rectifier I have in my possession will not pass sufficient current to enable me to run the set.

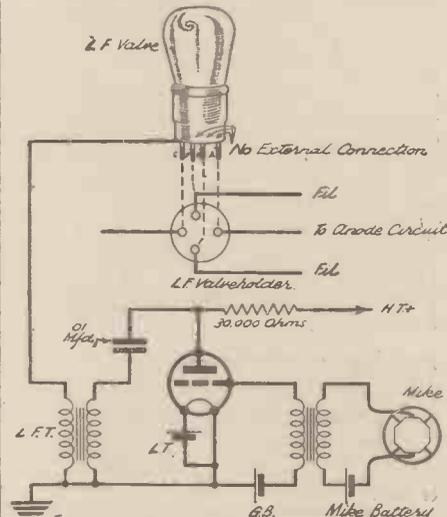
It is possible, but without details of the amount of current the set takes we cannot advise. You do not state the exact model you have. It would be best for you to write to the makers of rectifiers for details of what they can provide, but I think you will find it an expensive job. I really consider it would be cheaper to get your set changed, if you can, for you would have to pay something like £8 or £10 at a minimum for a rectifier which would deliver sufficient power for the operation of your set.

However, it would not be amiss to drop a line to the Ediswan Electric Co., Charing Cross Road, London, W.C.2, and ask what sort of rectifier they have available, and also the Electric Dynamic Construction Co., of St. Mary Cray, Kent, and ask what rotary converters they have for tackling the job. But I think you will find that these things are not to be obtained at less than the figures I have mentioned.

S.G., PENTODE AND VAR. MU.

A. P. J. (Hereford).—What is the difference in the functions of the S.G. valve, the H.F. pentode and the variable mu pentode? I have been told that you can use an H.F. pentode as a detector. Will that fact apply also to the other valves mentioned?

To answer your last question first. You can use a screened-grid valve quite well, but I do not recommend the variable mu valve as being such a good detector as the plain pentode or S.G.



The suggested connections for the scheme asked for by C. A. R. (Worcester Park).

The function of S.G., pentode and variable mu pentode is similar in each case. They are all amplifying valves, the pentode having greater stability and greater amplification as a rule than the S.G. But the variable-mu valve is so constructed that as the grid bias on it is varied so is the amount of amplification obtained from it.

Thus, if you use it for a leaky-grid detector, you will find that it will not give such straight line detection as the ordinary S.G. or pentode, owing to the fact that the grid will become more or less negative according to the strength of the signals.

It would work, of course, but it would not be so good a rectifier as the "straight" non-variable mu-valves.

The Editor cannot accept responsibility for manuscripts or photos. Every care will be taken to return MSS not accepted for publication. A stamped, addressed envelope must be sent with every article. All Editorial communications should be addressed to the Editor, "Popular Wireless," Tallis House, Tallis Street, London, E.C.4. All inquiries concerning advertising rates, etc., to be addressed to the Advertisement Offices, John Carpenter House, John Carpenter Street, London, E.C.4. The constructional articles which appear from time to time in this journal are the outcome of research and experimental work carried out with a view to improving the technique of wireless reception. As much of the information given in the columns of this paper concerns the most recent developments in the radio world, some of the arrangements and specialities described may be the subjects of Letters Patent, and the amateur and the Trader would be well advised to obtain permission of the patentees to use the patents before doing so.

Q.P.P. valve holder and the Q.P.P. valve. But, believe me, the alteration in the anode consumption would be well worth the cost of the materials.

LISTEN FOR THE BABY

Here is a query that will strike a sympathetic chord in the hearts of many of you. Incidentally, it may give rise to some interesting letters providing alternative solutions to the problem.

C. A. R. (Worcester Park) wants to know how to listen for the baby upstairs while he is also listening to the local station on his radiogram? This is what he says:

"Our Baby is a few months old and is put to bed on the top floor every night at 7 p.m.

"If she should awake during the evening, we are unable to hear her with the wireless going, unless we go to the bottom of the staircase, which, of course, is not always convenient.

"I have tried an arrangement with a speaker over her cot coupled with flex to the P.U. terminals of the wireless set (5 valve 'Philco' superhet).

"This arrangement would be quite satisfactory except for one disadvantage—the need to switch over to P.U. before we can hear if anything is doing.

"Therefore, I want to know, is it possible to couple a speaker or some similar device, from baby's room to our living room downstairs, which will cut into the programme we are taking without the need of constantly switching over to gramophone P.U.?"

Thinking caps on, please. What about it? How have you solved the problem at your house?

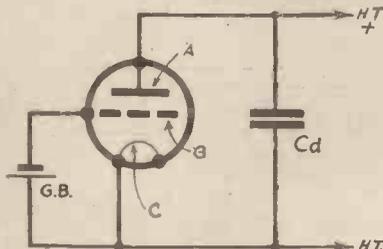
As far as I can see the best way is for C. A. R. to fit up an adaptor scheme that allows him to plug in the output from the baby's loudspeaker mike—or, better still, from a proper microphone (a cheap one will do) via a small amplifier into the L.F. side of his set. I think he could arrange this all right, so that the adaptor could be plugged in to the L.F. valve holder following the detector (it's safer than trying to do it on the detector stage), the valve being plugged in again on top of the adaptor.

What happens then is that you have two feeds to the grid of that valve. The first one comes from the detector of the set, and the other in parallel comes from the output of the one valve amplifier situated in baby's room, or else in the room downstairs, whichever is more satisfactory.

All you have to look out for is howling due to long microphone leads. If these are well shielded, you

TECHNICALITIES EXPLAINED—No. 34

GAS-FILLED DISCHARGE VALVE



This valve is used extensively for cathode-ray television time bases. It is a triode, filled usually with helium or mercury vapour. Helium is generally acknowledged to be the better as it gives a quicker and more certain action. There is a heater just as in an A.C. valve, but that is left out in the diagram for the sake of simplicity.

Across the valve is built up the scanning potential. This potential rises steadily while the spot on the cathode-ray tube is being pulled (by this very potential) across the screen.

Quite simple, that. Now a gas-filled valve will suddenly short-circuit internally due to the sudden ionisation of the gas, and the helium or mercury tube does this when the potential across the condenser Cd. (whose capacity naturally controls the rate of charge and therefore the rate of rise of potential) would only reach about 25 volts before the valve shorted and discharged the condenser.

That would not do for television. So the valve is kept back from discharging by the bias on the grid G. This bias is set to allow the potential across Cd. (that is, across anode A and cathode C of the valve) to reach any desired and predetermined voltage to drag the spot of the tube right across the full picture scan.

At the end of the scan the potential should have reached a value sufficient for the valve to flash-over and thus to remove the pull on the spot. To ensure that the flash-over takes place at the right moment a synchronising impulse is applied to the grid of the valve in such a way as suddenly to make it more positive (to reduce momentarily the static negative grid bias). This at once lowers the impedance of the valve and the flash-over takes place.

Immediately afterwards the synchronising impulse is removed, the bias is therefore fully applied again, and the condenser Cd. commences to charge once more—the next scan has commenced.

SEEN ON THE AIR

News and views on the Television Programmes by
our special radio-screen correspondent,

L. MARSLAND GANDER

I VISITED Alexandra Palace again the other night to see the Marconi-E.M.I. studio in action. Mr. Stuart Hibberd, the B.B.C.'s senior announcer, was taking part in the programme—"Picture Page"—and he confirmed my impression that the place was very like a smaller film studio.

Mr. Hibberd is by way of being an experienced film actor now because he has taken small parts in about five productions. The last was a film of Britain's defences called "The Gap," in which he is seen announcing a coming air raid. He told me that the only essential difference he could see between television and film technique was that there was no time for adequate rehearsal in the television studio.

The control room, reached by a vertical iron ladder, conveniently overlooks the whole studio from an upper corner. Engineers on the cameras are equipped with earphones connecting them to the heart of things in the control room.

Altogether A Busy Scene

Only half the great studio was in use when I was there. It was bathed in brilliant illumination from a battery of flood-lights above and around. The microphone, suspended from a long boom, hung just out of "sight" of the camera near the television subject's head.

One of the cameras in use was on a trolley, and was run backwards and forwards as it was necessary to vary the distance from the subject.

As in the Baird studio it was noticeable that there were twenty or thirty people about, mostly performers in "Picture Page" waiting their turn. Mr. D. H. Munro, the Productions manager, kept a stern eye on the flotsam and jetsam like myself to see that we did not trip over cables or impede the passage of the trolley backwards and forwards.

It was most interesting to be able to see the picture, as televised, on a receiver in the studio. I cannot help thinking, with due deference to the overworked producing staff, that there is need for a tightening up of the system of cues and other details which will tend to make for more finished production.

For instance, whenever Elizabeth Cowell came on the screen to announce, or Joan Miller, the telephone girl, was seen, there was an appreciable pause before either began to speak.

The camera-man has to give his subject the cue, and there is a lag here that must somehow be "taken up." The effect on the home screen is somewhat amateurish. Viewers see Miss Cowell or Miss Miller, or whoever it may be, staring at them and waiting for the starting signal.

Then the tops of artists' heads are occasionally cut off; the other day I noticed a caption alluding to "Gaumont-British" News, the second "i" having been omitted. Then there is the delay in getting plumb in the centre of the screen; the need for more rapid focusing. There must be a rigorous, searching examination of production methods—a tightening up, and a speeding up. Well, I suppose it is easy to write and not so easy to do. When I saw members of the B.B.C. staff haring about the studio with lines of care engraved on their faces I sympathised. Still, television must be served. It will not wait.

"Picture Page," for which I have often expressed my admiration, ran a little to seed on this occasion. There was a talk by Bertram Mills' circus master which could well have been cut by half. A number of the other turns would also have been much improved by severe cutting.

But Mr. Cecil Madden's nimble mind had devised several amusing features. There was, for example, the opening dialogue between two "schoolmasters," Will Hay and Ian Hay. Mr. Ian Hay was once a housemaster at Fettes, and his latest comedy, "Housemaster," is now running at the Apollo Theatre. Mr. Will Hay's efforts to educate his scholars, fractious and ancient, are too well-known to need any description of mine.

Armour With A Pocket!

I liked best, however, the effort of Mr. Samuel Rex, maker of pantomime swords and armour. Mr. Rex is in deadly earnest about his strange job—make no mistake about that! He claimed that his ancestors had made swords for Julius Caesar's army, but that things aren't what they were in his profession. True, a young woman did ask him to make her a suit of chain mail the other day, but she disgusted him by wanting a pocket for a cigarette case in it. Mr. Rex showed us a good many examples of his art. Cromwell's Ironsides and Arthur's Knights lived again in the studio. Don't think that these

pantomime swords are tin things that bend double if you cut and come again; they are really quite dangerous articles.

Periodical Changes Needed

One or two other points about my studio visit. Viewers may have seen a board with announcements on it slowly rotate revealing a further announcement on the other side. This rotation, like the turning of the pages of "Picture Page," is actually done by hand. One of these days there will be a mechanical device for it, I suppose.

There is talk of filming the permanent incidental features of "Picture Page," such as Joan Miller at the switchboard and the "Warspite" boy bugler. The trouble is, though, that such features should not be permanent but should be changed before the public tire, admirably as they have served the purpose up to the present.

I had an agreeable surprise when Mr. Stephen K. Thomas presented the Vic-Wells Ballet in "Facade." I am not a great advocate of ballet by television, as I contend that the screen is too small to do it full justice. But this particular transmission was an undeniable success.

Items of Ideal Length

William Walton, the composer, conducted, first appearing on the screen to conduct his work "Siesta," as an introduction. Members of the Vic-Wells ballet are great artists. The items are just about an appropriate length for television.

Afterwards Sophie Tucker came on the screen, an unusually important catch for television. She sang Eric Maschwitz's "These Foolish Things," but I heartily wish she had not turned it into a slow monologue. Thus rendered it was hard to credit that there is poetry in these lines.

Miss Moira Meign's cooking lesson was, to a mere male, slow. It was bad staff work to repeat it in the evening. The biggest effort of the week was Mr. Cecil Lewis's anti-aircraft programme. He was rewarded for a tremendous effort of organisation by success for the first outside television broadcast at night. A pity that the R.A.F. bomber which was to have added to the realism of the occasion could not take off owing to heavy rain and fog.

To the Saturday variety programme Harry Pepper and Doris Arnold with their two pianos act made a most entertaining contribution. I was a little bored with Tony Symphon's pretended struggles to express himself in a foreign tongue and disappointed that he should revive a song as ancient as the egg with which it dealt.

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Up-to-the-minute news concerning the radio industry

AN INEXPENSIVE S.G.3.

A BATTERY S.G.3, priced at 6 guineas complete with batteries, is being marketed by **Browning Wireless Manufacturers**. The set is fitted with an 8-inch permanent-magnet moving coil speaker, and the circuit used is of the all-pentode type.

Housed in a walnut cabinet, this "Browning" model is provided with gramophone pick-up sockets and sockets for an extra loudspeaker. An additional aerial socket is fitted in order to reduce interference from Droitwich, thus improving the reception of other long-wave stations. The price of the receiver without batteries is 5 guineas.

* * *

ALL-WAVE CONSOLE

The high performance of the McMichael Model 362 all-wave A.C. superhet has resulted in a large number of requests for an all-wave console of similar efficiency. In consequence McMichael have now released a console version of the Model 362, the price being 17½ guineas.

The console incorporates the 5-valve 8-stage chassis as used in the existing table model, the wavebands covered being 18.6-51 metres, together with the usual medium and long wavebands. The cabinet is solidly built from figured and inlaid walnut, with a speaker surround of oxidised copper and is polished to a high piano-finish, as in the case of all McMichael 1937 models.

* * *

NEW H.M.V. SET

The latest H.M.V. release is an all-wave superhet for battery users. Incorporating four valves, it is fitted with A.V.C., and on the short-wave range covers from 18-50 metres. The output is approximately 1½ watts undistorted, while the H.T. consumption is given as 7 milliamps. Other refinements are a three-position tone control and concentric fast and slow motion tuning controls. The price of the set, which is known as the Model 166, is 13 guineas.

* * *

G.E.C. GEAR FOR GOLD COAST

The Crown Agents for the Colonies have ordered a complete radio relay equipment from the G.E.C. This equipment is to be used for the extension of the Gold Coast Colony broadcast relay service to Koforidua. The apparatus comprises two special short-wave receivers with associated power amplifiers for direct operation on the 230 D.C. supply available.

This order is the fifth of its kind for the Gold Coast Colony and, in all, the G.E.C. have supplied complete equipment for some 3,000 subscribers in this Colony.

TECHNICAL JOTTINGS

Items of interest to all

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

THE voltage across the anode of a valve, when using a high-tension unit, is greater when the filament is cold than when the filament is heated, for the very simple reason that in the former case you get the full voltage on "open" circuits, whereas in the second case, when the filament is heated, you have current flowing and a drop in the voltage.

In a home-constructed receiver the difference between the high-tension voltage on open circuit and that on closed or operating circuit conditions is sometimes overlooked, with the result that the condensers are selected on the basis of the anode voltages to be dealt with under working conditions. In many sets, both high-tension and low-tension voltages are switched on by a single switch, and this means that the full H.T. voltage on open circuit is switched on to begin with, this voltage gradually falling as the filament heats up and the anode current begins to flow.

The Enemy Within

In spite of all the instructions which we read about keeping the components inside the receiver free from dust, I don't suppose one set in twenty ever receives any sort of attention in this direction. How many times have you examined a friend's set and found it absolutely covered with dust; how many times have you examined a set and found it all spick and span and as clean as it was when it was first made?

Well, it doesn't matter so much about the other sets, but what about *your* set? Do you go over your set regularly once a month and keep it absolutely clean? Many people who fully realise, for example, the importance of keeping the working parts of a motor-car or other machine regularly cleaned out, seem to think that the

"insides" of a radio receiver, because there are no working parts, can be left indefinitely without attention.

"Working" Parts

It is not even strictly true to say that there are no working parts because, of course, there are rheostats, potentiometers, variable condensers and so on, which are "working" parts in the true sense of the word, and although perhaps they do not need oiling, like other machines, they nevertheless suffer seriously from accumulations of dust and dirt.

Dust settling over the surfaces of even "stationary" components such as transformers, chokes, fixed condensers and so on, can cause serious trouble, owing to the absorption of moisture and to gradually increasing electrical leakage, whilst in the case of the "moving" components, such as variable condensers and the others mentioned above, the same trouble occurs to an even greater extent. All these bad effects are worse in the high-frequency part of the circuit than in the output end.

Dust-Proof Cabinets?

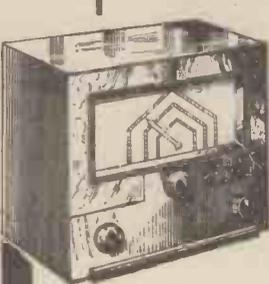
In general a manufacturer takes precautions to enclose as effectively as possible any apparatus which must be kept free from dust, and perhaps that is why many people imagine that the inside of a radio set needs no attention. But if you think about it for a moment you will see that it is practically impossible to make the inside of the set dust-tight, there are so many parts that have to be left open. For instance, a large space has to be left open for the sound to come out from the loudspeaker, and again ventilation has to be provided for so as to allow the heat generated in the valves, rectifiers, and so on to escape. This ventilation in itself is a fruitful source of dust because it draws in the dusty air from the room, the dust thus being deposited on everything inside the cabinet. In the case of a radiogram, you have the gramophone motor at the top, with lots of open spaces through which not only dust but actual dirt of all

(Continued overleaf.)

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This is the time when the home radio has a special appeal. If you want to get the best out of your set, then insist on Aerialite specialities—you'll be amazed at the improvement in the quality of the reception.

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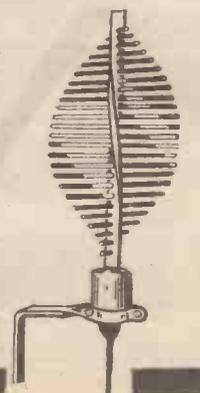
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1936

has seen a good deal of thought and care expended over circuits. Nine times out of ten the set-designer has specified a J.B. Condenser or Dial. More and more constructors are discovering that for superlative performance and reliability a J.B. Component cannot be bettered.

Our Service has always been at the disposal of constructors and we shall be pleased to assist you with any of your set problems, small or large, during

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IT SIMPLIFIES ALL SOLDERING

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BERMONDSEY STREET, S.E.1.

TECHNICAL JOTTINGS

(Continued from previous page.)

kinds can fall into the works (usually including a plentiful supply of gramophone needles). I came across a set the other day which was giving trouble due to oscillation, and on examining it found that not only was it absolutely choked with dirt and dust inside, but also there must have been scores of gramophone needles lying all over the place, between condensers and chokes and in contact with H.F. conductors. The surprising thing was there had not been an actual short circuit!

The Monthly "Once-over"

At least once a month you want to "go over" the inside of the set and make sure that everything of this kind is completely removed. You can't dust it with an ordinary duster, but a very soft camel-hair brush, or something of that kind, usually suits the purpose, and with this you should go carefully over the whole of the components and all the spaces between, making sure that nothing has been allowed to lodge between them. I need hardly say that before doing anything like this you should completely disconnect the set from the mains, or even the batteries if it is a battery set, so as to avoid any possibility of electrical trouble. Variable condensers should not be tampered with whilst in position, and it is usually quite impossible, with any sort of safety, to insert the proverbial pipe-cleaner between the vanes unless the condenser is removed from the set.

Mind Soldered Connections!

What you can do, however, is to blow air through the condenser and this can be done by means of a short length of rubber tube, one end held in the mouth, taking care not to blow any moisture into the condenser. When using the camel-hair brush for removing dust in other parts of the set, see that you don't dislodge any of the conductors from their terminals, or that you don't strike and break any soldered connections.

You will be surprised what a difference it makes to the functioning of a receiver when it is kept quite clean and free from any dust or foreign matter inside. A modern set is so highly efficient, and everything so accurately balanced electrically, that the presence of dirt in the set will make quite an appreciable difference to its operation, and I can assure you that I am not exaggerating when I advise you to give it the monthly once-over as described above.

Tone Correction

I have been asked a number of times whether a tone-correcting transformer can be used as well with anode-bend detection as with leaky-grid detection. If this transformer is used with anode-bend detection there is a tendency to increase the harmonic distortion. If it is used with a leaky-grid detector, however, provided the detector is operated under correct conditions, the tone-correcting transformer can be made to give excellent results.

With the anode-bend detector there is, as indicated, a certain amount of harmonic distortion, owing to the fact that the so-called "straight" part of the curve of the valve is not actually straight at all. This recalls the fact that, not so long ago,

anode-bend detection was regarded as superior in many ways to leaky-grid, but the introduction of the tone-correcting transformer, and certain other factors, has put leaky-grid detection back on the map.

Flat Tuning

When dealing with a set with "flat" tuning, you can "off-tune" to an appreciable extent on either side of the true tuning point without very much effect on the quality, or perhaps on the volume. If, however, the set is very selective, obviously as soon as you depart from the true tuning point, you will get not only a very considerable drop in volume, but also a greater or less amount of distortion. Consequently, there is no difficulty in knowing, with a sharply tuned set, when the set is accurately tuned to a particular desired station.

When the set uses automatic volume control, however, you get an effect which has sometimes been described as half-way between that of a flat-tuned set and that of a very selective one. The set behaves in some ways like a flat-tuned receiver, but, in addition, you get the distortion effect when moving away from the true tuning point as you do with a sharply tuned receiver. I should say, however, that this effect may not be so noticeable as where there is actually sharp selectivity.

Amplification Control

Automatic volume control has the essential purpose of maintaining the volume at a reasonably constant level, notwithstanding changes in the strength of the incoming signals, or perhaps, to be more accurate, notwithstanding changes in the strength of the signals as applied to the detector. What happens, as most people know, is that when the strength of the signals reaching the detector goes down, the variable- μ valve does its stuff and increases the amplification, and *vice versa*.

You will see now why it is that when operating a set in which automatic volume control is used you can get off the tuning point without the volume changing very greatly, and that is how it comes about that the set behaves in some ways like a broadly tuned or flat-tuned receiver, whilst the distortion which occurs when you go off the true tuning point is not of that awful kind you usually get with an ordinary sharply tuned receiver without automatic volume control.

Watch Condenser Specifications

When you are building a set, it is better to be over-cautious with the specification of fixed condensers, by which I mean that it is better to use a condenser specified to stand a *higher* voltage with safety than one with a specification on the low side. If you incorporate a condenser which has not a sufficiently high voltage specification, you are only asking for trouble. Remember that the condenser has to stand not only the peak voltage of any A.C. which comes along, but also "surges" of current which take place owing to accidental circumstances from time to time. I think it is not exaggerating to say that a condenser sometimes has a voltage momentarily applied to it perhaps two or three times the steady voltage for which it is ordinarily intended. A single surge is quite capable of puncturing the insulation.

A "RECORD" CHRISTMAS

(Continued from page 432.)

The music goes round and round, wrote some lyric writer. He was a prophet as well as a humorist. If there ever was a truer saying as applied to dance music I have yet to hear it.

Do you remember a certain mournful *Body and Soul*? Yes? Well, you can refresh your memory and your ears if you wish with Decca F 6143. Ambrose and his Orchestra have revived the old number. I wonder why? Incidentally *Bye, Bye, Baby* is to be heard 'on Regal Zono MR 2214, played by Charles Barnet's band.

Knock, Knock! Who's there? Sarah! Sarah Who? *Serenade in the Night*. Sorry for this intrusion into a more or less serious review. But that very "Knock, Knock" is one of Henry Hall's star wisecracks when he broadcasts the "Knock, Knock" number. And I have quoted it to remind you that in spite of all the broadcasts, the recording and even the office boy's whistling, the number *Serenade in the Night* is still being given hard wear and tear.

I have nothing against it as a number, but I wish they would give it less strenuous use. However, it has been recorded again, this time on Rex, and is sung really excellently by Jack Payne's vocalist, Ralph Silvester.

A Haunting Number

I said a few rude remarks about *Shoe-Shine Boy* the last time. I was criticising the lyric, and though I still do not like the scanning of the words I must take off my metaphorical hat to Nat Gonella for making a really fine record of the haunting number. Yes, it is haunting if you take no notice of the words, though Nat certainly does his best with them. The record is a Parlophone, and I advise everyone who wants a semi-hot recording of the number, yet a recording that does not go all gaga with trumpet breaks and what not, to hear it. Nat Gonella has put just the right interpretation into *Shoe-Shine Boy*, and I certainly consider his one of the best records of that number that I have heard.

By the time you read this, though at the time of writing there is a lull before the storm in the gramophone world, your record dealer will be inundated with all manner of Christmas records. H.M.V. alone are bringing out eighty.

For once there will be few carol records. There will, however, be a medley of Christmas Songs played by Alfredo Campoli. This year is a year of medleys. Peter Dawson is doing a medley of nursery rhymes called *Uncle Peter's Children's Party*. Should amuse the kiddies. *A Mother's Knee* is another medley of lullabies sung by Essie Ackland.

Six Mickey Mouse Records

Cicely Courtneidge and Jack Hulbert are providing a medley of *Our Greatest Successes*, and Roy Fox and his protégée Mary Lee will give us a 1936 *Hit Parade*.

That's not the end of it by a long chalk. There is to be a *Strauss Waltz Medley*, a re-recording of famous dance numbers played by famous bands to make a dance record medley. The bands include Jack Hylton, Ray Noble, Benny Goodman. And, don't forget Jack Hylton's Party. The number of this record is given beneath the photograph on this page.

The children will welcome the 10s. 6d. *Mickey Mouse Silly Symphony* album containing six records. Think of it, an hour's entertainment on record with Mickey Mouse! The album contains the three Mickey records that have already been published, and three new ones.

For the serious music-lover there is the re-recording of Caruso singing the *Flower Song* from "Carmen," and the *Farewell, Dear Mother* from "Cavalleria Rusticana." This is said to be the finest Caruso recording yet done.

For the first time for many years a full-length symphony has been recorded. It is the *Seventh*, by Beethoven, and is played by the New York Philharmonic under the baton of Toscanini. There are five records in all, and the playing of the last movement is superb.

Again we have a recording of Schubert's *Unfinished*. It is played by the Vienna Philharmonic under Bruno Walter—a Viennese orchestra playing a composition actually written in Vienna.

Make sure you have a merry record Christmas. Here's good health and happiness to all of you.
K. D. R.



Some of the guests who were present at Jack Hylton's party at the H.M.V. recording studios. Seen in the photograph are Jack Hylton's Swing Quartet, Tommy Handley, Tom Webster, Freddie Fox, Jack Barty, Nelson Keys, Peggy Dell, Hilda Mundy, Billy Caryll, and on the right Jack Hylton himself. The party was recorded on H.M.V. C2883.

MEET THE BROADCASTING BACHELORS

(Continued from page 431.)

attribute she must have is a sense of humour, particularly when things go wrong. I would want her to have simple tastes—the ability to be happy in an armchair with a good book—but, at the same time, there must be a strong practical side of her nature; she would have to be resourceful, drive a car, and do things like that.

"And I daresay if I found a girl with all those attributes she'd hate the sight of me!"

That gifted young man, Ronald Hill, shares one of Harry's objections.

"I have no intention of marrying just yet," he told me, "as my work keeps me away from home so much that it would be hardly fair—or safe!—to leave a wife alone for such long periods. If she got into mischief I would naturally grieve; if she didn't I should feel ashamed of being the object of such unmerited loyalty! When eventually I do marry, it will be someone entirely outside the business of radio or the theatre—a sharp critic, as a lot of home flattery is cruelly misleading. She would have to be a magnificent cook, civil and efficient on the telephone and, above all,

attractive to look at and pleasant company at breakfast.

"Up to the present," went on Ronnie, "I have had to forgo domesticity and have most of my meals out. I've made quite a study of it, too, getting a wonderful list of jolly good eating places. My favourite haunt is a little pub, only a few minutes from the B.B.C., where you can get the best home cooking in London. I think these things are important to a bachelor who, spending perhaps nearly a quarter of his life in restaurants and snack bars, should reduce the tracking down of such places to a fine art."

"So Generously Equipped"

Gordon Little has succeeded in resisting the perils of roughly twenty-eight springs. And for a young man so generously equipped as he is with looks, talent, charm of manner, a sports car, a cottage in the country and a half share of an aeroplane, this is indeed a feat!

"But if and when I do marry," avowed Gordon over lunch (at Ronnie Hill's pet pub previously alluded to), "I shan't care whether my wife is blonde or brunette so long as she possesses the supreme quality in a woman of being a good sport; also, she must be essentially feminine—not in

(Continued overleaf.)

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MEET THE BROADCASTING BACHELORS

(Continued from previous page.)

the submissive, narrow, prudish way, but feminine in the sense of possessing the most noble instincts, tenderness, maternal feeling, understanding, a quiet wisdom and the rest of all the fine qualities that make up the ideal woman whom idealists have visualised throughout history.

"I want her to be cheerfully informal but not agonisingly bright—particularly in the early mornings! And, as well as being thoroughly domesticated I would want her to be capable of looking after telephone calls and keeping me up to my appointments. She'd have to be rather a maid of all work and very keen on sport, but not so obviously sporty that her gentleness and femininity suffer as a result of her enthusiasm. Someone who resembles my sister as closely as possible!"

"And someone," interpolated Norman Long, who entered at this moment, "who resembles my sister for me, if you please. When I find someone who understands me as well as my sister does, I daresay I'll want to marry her. But if she *knows* me as well as my sister I shouldn't think she'd want to! I've managed without a wife for forty-two years and I've no doubt that I'll be able to survive the absence of such a partner as I grow older. I now live with my sister in a flat in Sydenham, and it's the perfect life."

Above I have presented the opinions on marriage of five typical bachelors in the broadcasting world of to-day. What do the other bachelors think? And when, if at all, will they cease to be bachelors? There's Brian Lawrence, Freddie Latham, Arthur Young, Bryan Michie, Len Bermon, and plenty of others.

MY TELEVISION ADVENTURES

(Continued from page 427.)

But I can see that television is going to make the "fade-out" a real art, and B.B.C. producers and compères will have to find a way of linking up a programme without the screen just going dark—or artists sidling out of the picture.

The whole thing's so experimental yet that it's not fair to be critical. But I can see what a terrific strain televising is going to be for many radio stars. I doubt if even film stars will stand up to the strain.

Not only does your voice have to be perfect, as it should be for radio, but your mannerisms must stand that crucial close-up test every minute of the time.

For years we've been saying that radio is harder and more exacting than making records or pictures, because your whole reputation depends on a broadcast, whereas you can always re-record or do a film re-take if things go wrong.

Now there'll be the anxiety of extra rehearsals, more study, necessity of being word-perfect, photogenic, and of not letting an intonation or a facial movement betray you when the television's on.

In spite of all this, I enjoyed every minute of my broadcasts, and for the time being I'm going back to radio and recording, feeling that I've learned something in nerve control, concentration and programme presentation.

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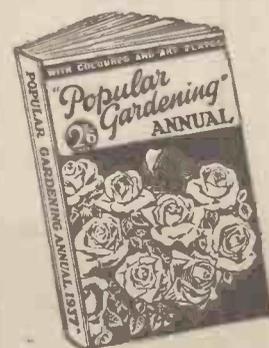
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| 16-89 | Zeesen | DJE | 5 | 31-32 | Buenos Aires | LRX | 5 |
| 16-89 | Wayne, New Jersey | W2XE | 1 | 31-35 | Millis, Mass. | W1XK | 10 |
| 19-52 | Budapest | HAS3 | 20 | 31-36 | Bombay | VUB | 4.5 |
| 19-57 | Schenectady | W2XAD | 18 | 31-38 | Zeesen | DJA | 5 |
| 19-60 | Daventry | GSP | 10 | 31-45 | Zeesen | DJN | 5 |
| 19-62 | Buenos Aires | LRU | 5 | 31-48 | Jeloy | LKJ1 | 1 |
| 19-63 | Zeesen | DJQ | 5 | 31-48 | Tokio | JZI | 50 |
| 19-65 | Wayne, New Jersey | W2XE | 1 | 31-48 | Schenectady, New York | W2XAF | 30 |
| 19-66 | Daventry | GSI | 10 | 31-55 | Melbourne, Australia | VK3ME | 1.5 |
| 19-68 | Radio Colonial, Paris | TPA2 | 12 | 31-55 | Daventry | GSB | 15 |
| 19-71 | Eindhoven | PCJ | 20 | 31-58 | Rio de Janeiro | PRF5 | 5 |
| 19-72 | Pittsburgh | W8XK | 40 | 32-88 | Budapest | HAT4 | 5 |
| 19-74 | Zeesen | DJB | 5 | 38-48 | Radio Nations | HBP | 20 |
| 19-76 | Daventry | GSO | 10 | 46-52 | Barranquilla | HJ1ABB | 1 |
| 19-8 | Tokio | JZK | 50 | 48-78 | Winnipeg | CJRO | 2 |
| 19-82 | Daventry | GSF | 10 | 48-86 | Pittsburgh | W8XK | 40 |
| 19-84 | Vatican City | HVJ | 10 | 49-02 | Wayne, New Jersey | W2XE | 1 |
| 22-00 | Warsaw | SPW | 10 | 49-10 | Medellin, Colombia | HJ4ABE | 1 |
| 22-94 | Suva, Fiji Islands | VPD | — | 49-10 | Daventry | GSL | 15 |
| 24-52 | Reykjavik | TFJ | 7.5 | 49-18 | Chicago, Ill. | W9XF | 10 |
| 25-00 | Moscow | RNE | 20 | 49-18 | Bound Brook | W3XAL | 35 |
| 25-23 | Radio Colonial, Paris | TPA3 | 12 | 49-20 | Johannesburg | ZTJ | 5 |
| 25-27 | Pittsburgh | W8XK | 40 | 49-26 | Hong Kong | ZBW2 | 2 |
| 25-29 | Daventry | GSE | 15 | 49-50 | Philadelphia, Pa. | W3XAU | 10 |
| 25-36 | Wayne, New Jersey | W2XE | 1 | 49-50 | Cincinnati | W8XAL | 10 |
| 25-36 | Lisbon | CT1AA | 2 | 49-59 | Daventry | GSA | 15 |
| 25-38 | Daventry | GSN | 15 | 49-67 | Pernambuco | PRA8 | 3 |
| 25-40 | Rome | 2RO | 25 | 49-67 | Miami | W4XB | 2.5 |
| 25-43 | Tokio | JZJ | 50 | 49-67 | Boston, Mass. | W1XAL | 10 |
| 25-45 | Boston, Mass. | W1XAL | 10 | 49-83 | Zeesen | DJC | 5 |
| 25-49 | Zeesen | DJD | 5 | 49-85 | Bogota, Colombia | HJ3ABH | 1.6 |
| 25-53 | Daventry | GSD | 15 | 50-00 | Mexico City | XEBT | 1 |
| 25-60 | Winnipeg | CJRX | 2 | 50-00 | Moscow | RW59 | 20 |
| 25-60 | Radio Colonial, Paris | TPA4 | 12 | 50-26 | Vatican City | HVJ | 10 |
| 29-04 | Ruyselede, Belgium | ORK | 9 | 51-28 | Maracaibo, Venezuela | YV5RMO | — |
| 29-24 | Bandoeng, Java | PMN | 3 | 51-72 | Caracas, Venezuela | YV2RC | 1 |
| 30-43 | Madrid | E'AQ | 20 | 70-20 | Kharbarovsk | RV15 | 20 |

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