

S.T.900! S.T.900! S.T.900! S.T.900!

Popular Wireless & TELEVISION TIMES

200 STATIONS
AT BIRMINGHAM

EVERY
WEDNESDAY
PRICE

3^D

No. 805.
Vol. XXXII.
Nov. 6th, 1937.

S.T.900!

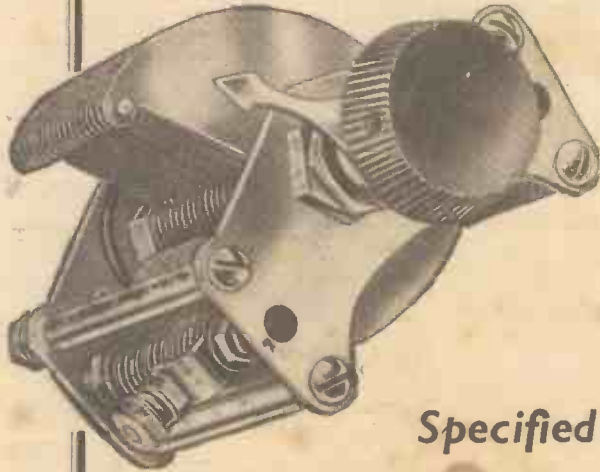
AN INSTANT SUCCESS!!
ALL RECORDS BROKEN!!!

POLAR



and

N.S.F.



Specified for

JOHN SCOTT-TAGGART'S

A.C.

S.T. 900

The POLAR SPECIAL "No. 2"

Made of Aluminium. Ball bearings throughout. Supplied with special knob and pointer (as S.-T. Specification). ONE 0005 required

Price **5/6**



POLAR-N.S.F. RESISTORS

Noiseless, constant in use. Supplied with wire ends. Standard colour code required.

- 2, 1 watt 1-meg.
- 2, 1 watt 50,000 ohms.
- 3, 1 watt 20,000 ohms.
- 4, 1 watt 15,000 ohms.
- 2, 1 watt 10,000 ohms.
- 1, 1 watt 500 ohms.
- 1, 1 watt 150 ohms.
- 1, 1 watt 100 ohms.

Price

1/-

Each

Send for illustrated Catalogue of Polar & Polar N.S.F. Components.

WINGROVE & ROGERS LTD.,
188-189, Strand, London, W.C.2

Phone: Temple Bar 2244.

Works: Old Swan, Liverpool.

B.I.

HIGH VOLTAGE

CONDENSERS

for

RADIO AND TELEVISION



We can offer a complete range of High Voltage Condensers in all capacities and for all working conditions met with in Radio and Television sets.

In accordance with our standard practice, these are impregnated with a special Petroleum jelly. The insulated terminals have ample creeping surface, and we recommend these condensers with the utmost confidence.

BRITISH INSULATED CABLES

LIMITED

Cablemakers and Electrical Engineers

PRESCOT-LANCS.

Tel. No. **PRESCOT 6571**

London Office: Surrey House, Embankment, W.C.2.

Tel. No. Temple Bar 7722.

POPULAR WIRELESS AND TELEVISION TIMES

Editor: G. V. Dowding

Asst. Editors: A. Johnson-Randall, A. S. Clark

GOING UP
INVENTOR'S FEAR
NOT APPROVED

RADIO NOTES & NEWS

POLICE RADIO
LEST WE FORGET
NOISES OFF

What a Week!

IT is only seven days since the details of John Scott-Taggart's most revolutionary receiver, the S.T.900, were exclusively published in "P.W.," but oh, what a week it's been!

Radio veterans, whose last signs of enthusiasm were letters to the papers about the proposed opening of 2 L O, have broken the silence of years to yell, and/or wowl, in delighted unison. Aged inventors, laying aside for a moment their experiments with Mars, have tottered into telephone booths to affirm that here is a set to make their dreams come true. And ordinary chaps, you-and-me-ish, have ordered the parts and await world-wide reception with the nonchalance of a lighted fuse.

In the middle of all that the derneDEST, yallerest, and most pestilentially-poisonous influenza germ that ever entered a tramcar crept into a crypt in the purlieus of my nasal passage, and sent my temperature up like a rocket. I write, as I breathe, with difficulty. What a week, boys! What a week!

Going Up

TO lighten our darkness the Post Office has paused for a moment in its hunt for radio pirates and Golden Voices, to announce the licence position as and from October 1st.

During September, 574,175 wireless licences were issued, representing a net increase in the month of 51,713. (This is after making allowances for expired licences, renewals, empties, l.b.w.'s, f.o.b., and all bad nuts exchanged!)

The total number of radio licences in force at the end of September last was 8,347,800, as compared with 7,789,805 on the same date last year. And unless my system of double-entry-and-check-twice has gone wrong, that means a solid gain in twelve months, of 557,995.

A Remarkable Claim

AN inventor who claims to have discovered a means of influencing people by wireless waves has just applied to have his invention patented in Jugo-slavia, says the *Daily Mail*. He intends to offer the

idea to the Defence Department of the Ministry of War.

He says, "The application of my idea to radio-transmitters would enable them to influence, in time of war, the thoughts of an opposing commander, depress troops on the eve of an offensive, and produce a peace complex in the civilian population."

"Pilots, on their way to bomb a hostile capital, might be influenced through their radio apparatus to unload their bombs over ploughland or drop them in the sea."

The Inventor's Fear

THE inventor, a 43-year-old grocer named Marko Tripovich, is concerned that his discovery does not fall into

hands that might misuse the power which he claims he can wield through it.

Explaining that the unexplored radio waves which influence the human mind and body have been his especial study, the inventor says that he does not wish to make a penny out of his discovery. He only desires that it should not fall into hands which might use it for attack or conquest.

"It is unfortunate," he says, "that Marconi's death has cut short a correspondence which I had started with him with the aim of preserving my idea for legitimate science."

No details of this very remarkable and revolutionary invention have been disclosed.

Not Approved

ANOTHER chapter in the remarkable record of Father Charles Coughlin, the American "radio priest," seems to have come to a close with his recent withdrawal from a radio broadcasting contract. This followed upon his failure to win approval for one of his statements from his ecclesiastical superior, Archbishop Mooney.

Archbishop Mooney recently succeeded Bishop Gallagher (who had supported Father Coughlin against strong criticism), and the new Archbishop reproved the radio

priest not long ago for saying that President Roosevelt had shown "personal stupidity" in appointing Senator Black to the U.S. Supreme Court. When the question of Father Coughlin's radio contract to give 26 talks over 35 stations came up the talks were not specifically disapproved. Archbishop Mooney merely did not approve. So Father Coughlin cancelled the contract.

News Spotlight

STAGSHAW, officially opened on October 19th, on 267.4 metres, uses 60 kilowatts. Its 485-ft. mast acts as aerial, in the manner so successfully tried at Lisnagarvey, Northern Ireland.

* * *

Sir Noel Ashbridge has been awarded the James Watt Gold Medal by the Institution of Civil Engineers for his Paper on

(Continued overleaf.)



He has done it again! Everything points to a success greater than that of any previous design. JOHN SCOTT-TAGGART, M.C., M.I.E.E., F.Inst.P., Fel.I.R.E.E., tells you more about the S.T.900 this week.

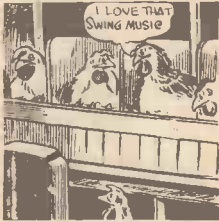
THE HENS THAT MISSED THE RADIO PROGRAMMES

Modern Development in Broadcast Transmission and Television.

Southampton is said to be favoured as the site for a trial by the Post Office of control of large-scale relay services, which might be extended into a gigantic scheme for supplying radio programmes by wire.

Wireless Helps Hens

A CONNECTICUT poultry farmer, checking over his weekly egg-returns to see whether his 500-odd hens were doing their laying with the requisite regularity, was dismayed to find that the output had dropped by a matter of nearly two dozen eggs a day.



After relieving his feelings with a few well-chosen words about his feathered frauds, he investigated to see what could be the cause of such a calamity. And he found that the only alteration on the farm which could possibly have any bearing on the egg output was the fact that the radio set, which normally was kept switched on almost continuously, had broken down and been silent during the fall-off period.

Without much faith in this coincidence he nevertheless had the set repaired; and as soon as it started off again, behold! the egg-return went up again to the normal figure, and stopped there.

He will not commit himself so far as to say "No radio, no regular laying." But he does say that anybody who interferes with that wireless set is going to get the toe of his boot in the spot where it is calculated to have the maximum effect.

Calling All Cars

THE latest story of police-radio efficiency is a striking tribute to the perfection and promptitude of this new method of combating crime. At 3.30 a.m. one day, while trying for long-distance stations, a listener heard a police message reporting that a car which had been stolen in Manchester two months before had just been reported at a certain point on the London road.



Within a few minutes a policeman who had picked up this message stopped the car, requested the occupant to accompany him, and took that surprised gentleman to a place where the dogs couldn't bite him.

In the ample leisure which later came to him the culprit became convinced that police radio can always beat the car thief, however smartly a car is stolen, hidden, and driven away by night when the road seems clear:

Radio Sets Absolutely Free

STEADY, boys, steady! No pushing, no shoving there, for the free radio sets are not, alas, for you!

There are two thousand of them, and they are to be installed in various selected villages in the Valley of the Nile. Why this partiality towards Egypt? says you, warmly. Well, the idea is that the free sets will aid the intellectual advancement of those villagers who—even though advanced in years and argumentative in disposition—are by no means qualified as senior wranglers.

This novel educational scheme is sponsored by the Egyptian Government and was devised to do the greatest good, to

BROADCASTING TOPICALITIES

The Armistice Day ceremony at the Cenotaph is again to be broadcast, and will this year be televised for the first time.

Howard Marshall, from a window in the Ministry of Labour overlooking the Cenotaph, will describe the scene as the various detachments march from the Horse Guards in Whitehall to the Cenotaph, to the music of the Bands of the Brigade of Guards.

Shortly before 11 o'clock viewers will see the King and members of the Royal Family placing wreaths on the Cenotaph. They will be followed by members of his Majesty's Governments in the United Kingdom and the Dominions, India, the Colonies and Protectorates, and service representatives on behalf of the Royal Navy, Army, the Royal Air Force, the Merchant Navy and Fishing Fleets.

The strike of Big Ben at 11 o'clock, ushering in the Two Minutes Silence, will be broadcast through the Cenotaph microphone direct from Whitehall.

At the conclusion of the Great Silence, the "Last Post" will be heard, followed by a short religious service conducted by the Bishop of London. At its conclusion Reveille is sounded and the ceremony ends with the singing of "God Save the King."

THE LORD MAYOR'S SHOW

The B.B.C. will again station its commentators on the roof of the Mansion House on the morning of November 9th, to describe the annual scene of the new Lord Mayor, escorted by a gaudy pageant, beginning his journey through the City to show himself to the people of London.

John Snagge will be responsible for the description, which will include the scenes at the Mansion House as the Lord Mayor steps into his gilt coach. The procession then sets off through the City to the Law Courts and thence down the Strand and along the Embankment to the Mansion House. The broadcast will be on the National wavelength.

The procession in the afternoon will be televised.

the largest number, in the shortest time, at the minimum of expense.

The talks will include advice on slicker sanitation, the suppression of common pests, higher hygiene, how to cure warts, and similar aids to that good time we all so richly deserve.

Lest We Forget

THE foundation of radio research prizes at British universities by Mr. J. W. O. Hamilton—to which I referred a week or so ago—has revealed Mr. Hamilton as not only a close associate and great admirer of Marconi, but also as a champion of Britain's claims to the laurels of radio invention.

The work of Sir William Preece in encouraging Marconi is well known, and was always gratefully acknowledged by the inventor himself. But Mr. Hamilton reminds us that radio waves were first discovered by Clerk Maxwell; that Sir Oliver Lodge's tuning patent was world-

wide; and that Sir Ambrose Fleming also was given a world-wide patent for his thermionic valve, which made broadcasting possible.

The more one thinks of how fundamental were these British contributions to wireless, the more one realises how right Mr. Hamilton is in encouraging our young scientists to make further radio researches.

Radio Gold-Digger

ALTHOUGH the good old days of gold rushes are gone for ever there is still plenty of excitement when a new and likely locality is thrown open to the gold prospector. In Western Australia the would-be miners have to wait for the official notice to be posted, and then they hit the trail enthusiastically, to be first in the new fields. But they recently got a nasty



jar from a radio-minded competitor.

He arranged with a pal who owned a radio transmitter that news of the all-important posting of the notice in Kalgoorlie should be wirelessed to him, while he waited on the spot ready to peg out his claim as soon as the news came through.

The other prospectors, arriving hot-foot from having seen the notice, found that their radio-informed competitor had pegged out his ground while they were only just getting under way to peg out theirs. After considerable bad language and a lawsuit in which accusations of taking an unfair advantage were made, they learned that there was nothing illegal about the procedure. And now they are wishing that they, too, had been more radio-minded.

Noises Off

THE Belgrade newspapers have been making a bit of a fuss about a recent incident during the broadcasting of a love-scene in a radio play for Yugo-Slav listeners.

In this play one of the characters asks his girl friend: "Did you hear the barking of that dog?" and the audience listens carefully and hears the faithful hound, bowing and wowing for his master.



A well-known animal imitator had been engaged to do the barking, but on this occasion he had been too well treated by a thirsty friend, and so fell asleep behind the scenes. Moreover, when vigorously prodded by the prompter, instead of barking he let out one of the loudest and most unmistakable snores ever heard in Belgrade, completely ruining the love-scene.

It has now been decided to use gramophone records for effects in future. A little hiss is better than a loud snore.

ANOTHER TRIUMPHANT SUCCESS

S.T.900 PROVES MOST POPULAR "S.T." DESIGN

THOUSANDS ALREADY BUILDING

By JOHN SCOTT-TAGGART

IT is no good pretending that I am not delighted, I am. The reception given to the S.T.900 has been overwhelmingly enthusiastic.

I am pleased for two reasons. The first is sheer personal vanity and the second is a real pleasure that my arguments in support of this kind of a set have been favourably received by constructors.

One knows how a set goes within twenty-four hours of publication. In fact, one knows the very same day. The orders received by manufacturers and kit people are an infallible guide—infallible because they show readers are backing their opinions by active steps.

When I speak of personal vanity perhaps I give the wrong impression. Someone once accused me of a delight in seeing my name in print. Well, I wrote my first constructional article in Vol. 1 of the *Wireless World* in 1914. Twenty-three years ago I published my first complete set design for the constructors in that journal.

Since then I have seen my name at the head of a thousand articles on the cover of a dozen books, and as the designer of 900 sets—or not far short! No, seeing my name in print makes me feel faintly nauseated, and seeing my photo (twiddling knobs of sets unconnected to batteries or loudspeakers, or just looking grimmer than I ever feel in real life) even more so.

But I cannot help feeling gratified that a set that has taken many months of hard design work and many sleepless nights should have scored a bull's-eye in the popular esteem. Every year I go through a few days of strain and apprehension just before that day at the end of October or the beginning of November when my annual set is launched.

Making Certain of Success

You constructors are an extremely critical and fickle collection of doubting Thomases. You have sent a dozen highly capable designers about their business for no superficially apparent reason. For some reason I have been spared. The reason is probably that I, long in advance, determine that your thumbs shall go up instead of down.

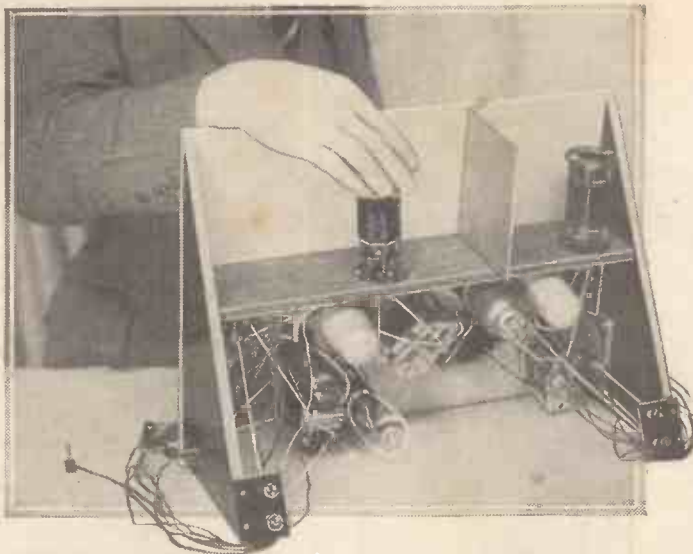
I am never complacent about these annual sets. I never rest on what some might kindly call my laurels. The preliminary work is done as if my whole life depended on the success of these national receivers. Herren Freud, Adler or Jung might say that I was so afraid of failure that I made certain of success.

There are four essentials to a successful Press design: a really good set, genuine and potent reasons for its features, a convincing explanation of these reasons, and an extremely detailed and accurate description of how to build it. There is also just the little point about the reputation

stupendous." Those days of ballyhoo and stunning adjectives are gone. Readers nowadays quietly ask: "What will it do, and how much does it cost?"

Well, the cost is 55s. 6d. for the set alone. Another half-crown for the wire, screws, etc. Last year I told you how much to pay locally for these, but this year the local price is no cheaper than that of the collection of these odds and ends by a kit firm. Do not use some thinner wire than 18 gauge, because the S.T.900 works down to 9½ metres (or 6 metres if you insert a 5,000 ohm ½ watt resistor in place of wire 41 in the blue-print). Then there are the valves which are the same as last year's S.T.800, with an additional valve (Hivac L210 metallised or Mazda L2 metallised). This will cost 3s. 9d. or 4s. 9d. according to your choice.

COIL-CHANGING TAKES 5 SECONDS



Easy to build, inexpensive and free from complications, the S.T.900 is a set with world-wide range. Plug-in coils enable all wavebands to be covered from 6-2,000 metres. Only a few seconds are needed to change the coils.

and experience of the designer. This is merely another way of saying that the reader must believe the designer.

Incidentally, how many readers noticed that last week I made no definite statements as to what the S.T.900 would do? For the last five years I have left amateurs who have heard my sets to describe their performance. You are going to get scores of reports from all over the country on how the S.T.900 will reach from the far ends of Britain to the far ends of the earth. No doubt—if you are an appreciative sort of person—you will write yourself.

It is no use saying: "It's amazing, terrific, gigantic, tremendous, dynamic, colossal,

Coil Alternatives

The coils vary in price. The special plug-in coils made (and named) by B.T.S. have advantages because of their easy fitting, but the alternative coils, even though they involve a little more trouble in fitting, are technically perfectly satisfactory. Since last week I have approved the Eddystone 6P coils for the medium waveband. These are standard coils, and when inserted in the S.T.900 the medium wave calibration reads a couple of stations too high up. But this can be at once rectified by altering the fitting of the pointer on its spindle; if you do not mind sloping junction lines on your dial, you need not do even this.

Alternatives for all the waveranges are not available, but should they become so the fact will be published at once. However sudden and large the demand for coils may be there can be no question of having a set without coils to work in it, when two or three firms are available.

The question of break-through on the long waves (especially by North Regional in the north of England) has received special attention and the B.T.S. coil is free from it. The primary winding is given a natural resonant frequency which prevents break-through, while the absence of a canned switched assembly removes a

(Continued overleaf.)

(Continued from previous page.)

common cause of break-through. The question of quick deliveries received my most earnest attention. The excellent position this year is proof that my efforts were not in vain. I have used only standard components which manufacturers have been turning out for at least 12 months, and I have specified only those manufacturers whom I believed could turn out rapidly just those components.

As regards coils, I do not quite know what to advise you to buy. You can, of course, build your set complete and then buy the coils, but even then you will have to decide what ranges to get.

If you want to spend as little as possible buy the medium-wave range first. This will cost 5s. 6d. for a pair of B.T.S. "inductors" 9/M.W. The next most popular range will be the long-wave B.T.S. type 9/L.W. costing 6s. 6d. the pair. The Medium and Long will thus cost you around 12s. The short-wave bands are three in number. There is the S.O. for the ultra-short band on which the Television sound programme comes (7.3 metres). This will interest constructors within say 75 miles of London, but some day I should not be surprised if broadcasting went "down there." The B.B.C. did not care twopence for manufacturers or listeners when they went so low in wavelength on the medium waves that ordinary sets would not tune low enough.

Ready For The Future

Some day there might be a surprise packet, and S.T.900 will be ready for it. I should not be surprised if we had ultra-short-wave broadcasting as well as M.W. and L.W. Wider side-bands giving better quality and less interference are two factors in favour of ordinary broadcasting coming over on these very low wavelengths.

The S.1 waveband 9½ to 27 metres comes next. These are the coils for the 10-metre stations and those in the 13-metre group. It will not be as popular as the next range which is S.2. This waveband will give you the 16-metre, 19-metre, 25-metre, and 31-metre groups of stations; 40-metre amateurs are also obtainable. These coils would be what I would advise you to purchase first if you already have the medium coils. The only group you will miss is the 49-metre one, which is often regarded as the least important one. This coil (S.2) is the one specially advised for the 16-metre and 19-metre groups.

Here I should explain that there is a very big overlap on the coil ranges, as you will have noticed. This is because the main tuning condenser (and likewise the aerial balancer) is of the .0005-mfd type. This capacity is actually advantageous because a small inductance and large capacity is beneficial as a means of avoiding certain interference. Also it gives you a wide coverage of wavelengths.

On the other hand, to work with a small coil and the condenser near its maximum gives less strong signals than a larger coil with a smaller value of condenser setting. Thus the S.3 will give louder signals on 25-metre and 31-metre stations than would the S.2, but nevertheless I still think that the S.2 is amply good enough for these stations, while it is necessary for the 16-metre and 19-metre groups.

To get the 49-metre group at all, and the 25-metre, 31-metre and 40-metre (amateurs) groups at their loudest, you will buy a pair of S.3 coils at 5s. the pair. You will notice from the dial that some of the groups appear twice, or in the case of 25 metres even three times, using different coils. It is a matter of trial to see on which coils the best all-round results are obtained, but you can take it that the loudest signals will always be heard on the larger coils and the lower condenser settings, i.e., pointer more to the left.

Those who live in busy parts of towns

canned unit used last year in the S.T.800; the cost will be 17s. Add the S.3. range and the price would be about the same. So do not imagine that all these coils are going to cost you a lot of money.

In the S.T.900 you see a finished product of wood, metal and insulating materials, and it produces results which I like to think are far ahead of those ordinarily obtained with other combinations of wood, metal and insulating materials.

But apart from producing one set which works well I am morally responsible for ten or twenty thousand other sets which must work equally well. In the first place I have had built up by other people a number of other S.T.900's from the Rapid Construction Guide and blue-print and Hi-Speed Wiring diagrams. This is a check on components being uniform and the drawings and guide being correct.

Likewise it is a check on the valves, because if several sets are built there is not the risk of the set's working on only a

particularly good sample of valve. These sets are then handed out for "field tests." That is to say, they are lent out to amateurs who try them out in their own homes on their own aerials and earths.

For Poor Earths

These tests, under conditions I know nothing about, are, of course, an extremely valuable check on how the set will work. In the case of the S.T.900 it was discovered in the case of one test that with a very poor earth system the set gave a threshold howl over about half an inch of the dial around 15 metres on the S.2 range. On the face of it this does not seem important because it would not arise in the average case. In fact, the case

where it did occur was where the earth was a steam-heated radiator which was situated on the third floor! Presumably it did get to earth ultimately, but it was more like an aerial than an earth. But because of this, I advise you after you have built the S.T.900 according to the Rapid Guide and blue print to connect a tubular condenser of .001 mfd. capacity (T.M.C. tubular type T.10, costing 9d.) across the G.B.—terminal of the Niclet and the terminal (shown in the sketch and the final Hi-Speed diagram) of the anode reaction condenser. This connection is not shown on the original blue print.

This completely cured the trouble, the tubular condenser acting as a by-pass and decoupling the grid-bias circuit of the last valve. The trouble itself did not affect the reception of any particular station, but the S.T.900 is so docile and free of any vicious habits (an extraordinary achievement, if I may say so on a set covering 6 to 2,000 metres) that even such a highly unlikely fault should be guarded against.

The fault lies not in the set but the earth system, but that is no consolation if some constructor gets a squawk every time the pointer passes over 15 metres.

COILS FOR S.T.900

NEW MEDIUM-WAVE COILS APPROVED

Since last week's list of approved coils the Eddystone coil type 6P has been approved for the medium waves. These coils, when inserted in the S.T.900, will result in the pointer indicating about two stations higher. If you do not mind the junction lines sloping to the right, this will not matter. But in any case, you can rectify the matter by moving the pointer round on its spindle until the pointer comes opposite the right station name.

The full list of approved coils appears below. No others have been approved, but if they are, details will be published.

DIAL REF.	S.T.900 RANGE	MAKE	TYPE No.
L.W.	800-2,000 metres.	B.T.S. "One-Shot"	9/L.W.
M.W.	170-580 metres.	B.T.S. "One-Shot"	9/M.W.
		Eddystone.	6P.
S.3.	24-70 metres.	B.T.S. "One-Shot"	9/S.3.
		Raymart.	C.X.6.
S.2.	15-43 metres.	B.T.S. "One-Shot"	9/S.2.
		Eddystone	6.L.B.
		Raymart.	C.A.6.
S.1.	9½-27 metres.	B.T.S. "One-Shot"	9/S.1.
S.O.	6½-8 metres.	B.T.S. "One-Shot"	9/S.O.

J. S.-T.

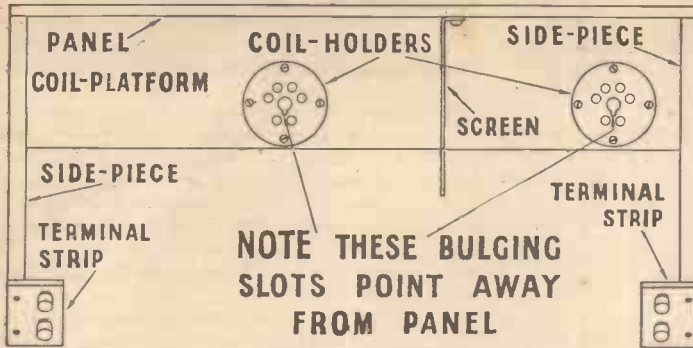
with all kinds of local electrical disturbances (lifts, electric signs, etc.) will find that the interference which affects all sets will be eliminated if a smaller coil and a larger condenser setting are chosen and the S.T.900 permits this to be done.

My own estimate of the order of popularity would be M.W., L.W., S.2, S.3, S.1, S.O. My own personal preference would be M.W., S.2, L.W., S.3, S.O., S.1. I would prefer the S.2, because it would give me excellent American programmes and far more fun than the better known long-wave band. I would put S.O. before S.1 because of Television, but would reverse this order if outside the range of Alexandra Palace.

The position briefly is that M.W., L.W. and S.2 (a pair of each) will give you nearly everything on earth, while the addition of the other three ranges will give you everything on earth. That's a slight exaggeration, but it is remarkable how very slight it is.

I am quite sure you will ultimately get all the coils and command the whole gamut of stations from 6 metres to 2,000 metres, while commercial operators will want to go even higher. But you need not hurry to get all the coils at once. The total cost of M.W., L.W. and S.2 coils will be cheaper than the

VIEW LOOKING IN TOP OF SET



This diagram shows the correct position of the slots in the two S.T.900 coil holders when looked at from above.

It is my aim all the time to make these national sets work well under every adverse circumstance.

Herein lies one of the secrets of successful designing for the constructor. It is not only necessary to produce one single set which works well. That set must be capable of being reproduced in thousands with the ordinary components and valves which are commercially supplied. These vary somewhat amongst themselves. For example, a 20,000-ohm resistance is never 20,000 ohms. It is for the component maker to fix his "tolerances" or limits which if a component falls outside it will be rejected. He may say that he will pass as 20,000-ohm resistors those whose resistance lies between 18,000 and 22,000. This would be regarded as a tolerance of "plus or minus 10 per cent."

If the set is so critically designed that it will only work on exactly 20,000 ohms the designer's set will work well, but practically all his followers' sets will be failures. There is another aspect of this matter. The designer knows the tolerances and reputation of the manufacturer of the component specified. If the constructor

ignores the designer's recommendation and uses another make it is possible that the tolerances will be wider and he may get a resistor of 15,000 ohms which might affect results. What happens to rejected resistors? Well, a good many get into the hands of constructors who decline to accept advice. Some makes of resistor tend to be noisy. One gets a rushing sound as a background. If the constructor thinks the choice of component (especially a cheap one) is unimportant he may experience this defect.

Concerning Fixed Condensers

Fixed condensers also receive my earnest consideration. These should be of the right capacity and should not be leaky. In designing my set I must allow for certain slight variations in capacity. But I know what variations to expect from a given manufacturer's product. For example, in the S.T.900 if the grid condensers of .00005 mfd. capacity are too small you will not get enough reaction and the set will be a failure.

A certain make of .00005-mfd. condenser I tested varied from .00001 mfd. to ten times that amount, viz., .0001 mfd. The type of constructor who knows better than I do may get one of those and then he'll have the audacity to blame the set.

Another point is the insulation of the condenser. The most critical condenser on any battery set is the coupling condenser

of—in the case of the S.T.900—.006 mfd. capacity. This is part of the resistance coupling system, and if the condenser leaks the H.T. voltage will be passed on to the grid of the first L.F. valve (the one next to the last). If you use a condenser of unreliable make your whole set will be a complete failure, and all because of a component costing only a few pence. The fact that you are using the principal components as specified will not save you.

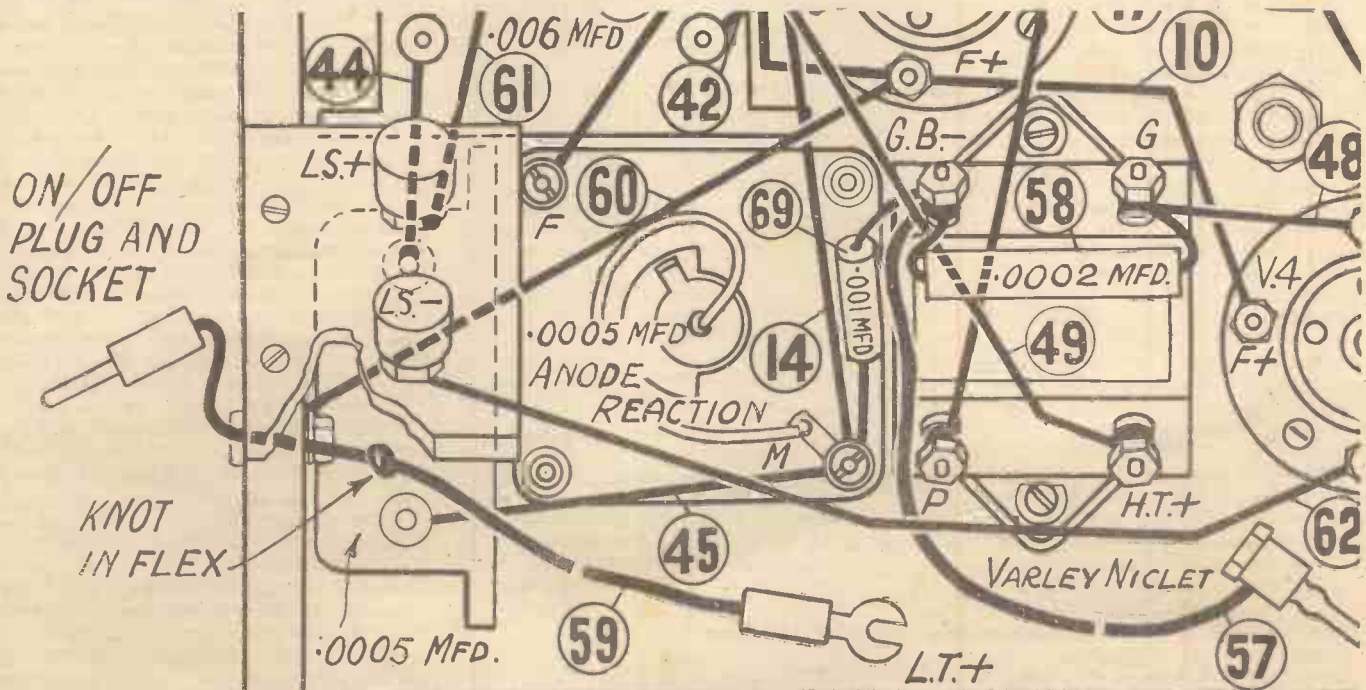
Even Size Matters

But quality of components is not the only factor. Sometimes size is nearly as important. A resistor of a certain type or rating may be the cause of instability because of big metal ends; or reaction on very short waves may be upset or even the tuning altered. Perhaps the resistor would not fit in the small space available and the constructor's efforts to use it might lead to shifting wires or components which ought not to be shifted. I have known sets to fail merely because a constructor has used a 1-watt instead of a 1/2-watt resistor, although in many cases such a change would make no difference.

I find readers are always fascinated by the choice of components and wonder why apparently trivial changes are frowned upon. Well, let me explain my choice of variable condensers in the S.T.900: The first requirement is capacity range. If you use a variable tuning condenser of a high minimum capacity you will be unable to tune low enough. This is not likely to arise on the medium waveband, but when you get down to the short wavelengths a high minimum capacity is a serious disadvantage.

Another feature is dielectric loss in the insulating material of the condenser. This produces inefficiency which increases rapidly as one goes down in wavelength. The losses at 10 metres may be very

(Continued overleaf.)



In one case during a test of the S.T.900 an unusually bad earth was used, and threshold howl was noticed over about half an inch of the dial around 15 metres. Although no trouble is likely to occur in the average set, it can be overcome once and for all by joining a .001-mfd. condenser from the G.B. - terminal of the Niclet to the terminal on the anode reaction condenser, as shown in this reproduction of a portion of the blue print.

(Continued from previous page.)

great indeed. In choosing any condenser, you have to keep an eye on this.

Another very important question is "noisiness." This does not arise on the ordinary medium and long waves, but as you get down to the short wavelengths a normally satisfactory condenser may reveal the inadequate connection to the moving vanes; the result is a scraping noise. The .0005 J.B. condenser as used in the S.T.700 was found unsuitable for the S.T.800 because on the short waves the bare metal pigtail connection to the moving vanes rubbed against another metal part causing the scraping noises. I therefore asked the manufacturer to fit an insulated pigtail to condenser supplied for the S.T.800, and this same condenser is specified for the S.T.900.

The Graham-Farish solid dielectric condensers, as used in earlier sets, e.g. the S.T.700 for aerial couplers and reaction, had bare metal spiral pigtails. These were altered at my request to short non-spiral insulated pigtails and these were supplied for the S.T.800 and are used again in the S.T.900. If you use the older type or another make you will get scratchy noises on the short wavelengths if the metal turns should touch, and so short-circuit as you adjust the condenser. This would not matter on the long and medium wavelengths, because the change in tuning would be too slight.

A further disadvantage of a spiral pigtail is that it is really a small varying inductance. As on 7 metres you use only two or three small turns of wire you can well imagine that the pigtail inductance might affect matters.

Points That Make a Difference.

Constructors have odd ideas sometimes and it is kindest to attribute them to technical ignorance. One idea is that a .0005 solid dielectric condenser is current coin and that any make will do. Well, I have explained some of the troubles that can arise. But there are others. If the reaction condenser of your (not my) choice has too high a minimum capacity when fully "out," it will still pass reaction currents and you may find your set oscillates all the time at certain parts of the dial. Some makes of solid dielectric condensers have a straight line capacity curve; this makes reaction sudden and fierce, whereas a log-law is much better.

There are at least another half dozen factors that enter into a particular choice of aerial coupler or reaction condenser, so you see it is really best to leave the designing to me and not to leave the re-designing to others or to yourself.

Coils. Well, here I have to think of waverange and matching the station name dial. The size of wire used is important, and on the shorter waves the dielectric losses in the former. I have to see that the pins are moulded in the bases. The soldering must be properly done. I do not care for coils when the wires are wound round the bases of pins loosely inset into the base of the former. Some coils have pins which are non-resilient and which make bad contact. Some coils are, due to bad spacing or design of pins, almost impossible to get into the holder. There are, here again, half a dozen reasons for approving or disapproving even when such

S.T.900

ADDITIONAL NOTES

The following notes are important and should be carefully read by builders of the S.T.900 and kept with last week's issue.

NOTE (1). Amongst the many tests carried out with duplicate S.T.900's in different parts of the country on all sorts of aerials and earths a curious defect occurred when the earth was particularly bad—in fact, it was a steam radiator on the third story. The set worked perfectly except that for a portion of about half an inch on the dial around 15 metres on the S.2 range there was a threshold howl. This was completely cured by connecting a .001-mfd. tubular condenser (T.M.C. type T.10, costing 9d.) across the G.B.—terminal of the Niclet and the nearest terminal on the anode reaction condenser. The effect technically is to decouple the grid-bias lead to the last valve.

This addition to the set is shown in the special sketch in this issue which, if desired, may be stuck on the blue print in the appropriate position. The tubular is also shown in position in the last of the Hi-Speed diagrams in this issue.

Although the chance of the effect being obtained is extremely remote and is a fault of the earth rather than the set, yet every constructor is advised to add this tubular condenser.

NOTE (2). Constructors within range of Alexandra Palace who desire to receive television sound programmes may do so by inserting a 5,000-ohm resistor (Dubilier $\frac{1}{2}$ -watt type, costing 6d.) in place of the wire No. 41 on the blue print. This is necessary to provide enough reaction on these ultra-short wavelengths and is left in permanently. It has no effect on the other wavebands. As the resistor has wire ends it is a very simple matter to remove the existing wire 41 (between the anode terminal of the valve holder and the top of the anode reaction choke), and to replace it by the 5,000-ohm $\frac{1}{2}$ -watt resistor. Only television listeners make this change.

The right coils are B.T.S. type 9/S.O. (2s. 9d. each). The aerial circuit does not work as effectively as on other bands, as the set is designed to work on all controls (double reaction, etc.) down to 9 $\frac{1}{2}$ metres. Nevertheless, full loudspeaker signals are obtained on the television sound programmes with excellent quality, as W.L.S. reported last week.

The S.T.900's ability to receive television sound is an unexpected windfall, as I originally designed the set for 9 $\frac{1}{2}$ to 2,000 metres only. I am naturally delighted that the S.T.900 will now get virtually everything that's "on the air."

J. S.-T.

important matters as waverange and reaction are satisfactory.

Valve holders. A simple, cheap component, but what troubles can arise from a poor choice! Here again as you go down in wavelength the losses increase, and with some makes of valve holder the set might not even oscillate when you want it to. There is the question of capacity to the metallising; this might alter tuning or stop reaction. Some valve holders, when you put the valve in, short-circuit on to metallising beneath the valve holder. Faulty contact with valve pins will cause serious trouble on the short waves.

Wire. Yes, even as regards the wire (No. 18 gauge) you can go wrong if you think you know better than I do. Remember all the time that the S.T.900 is an all-wave receiver which will go down to 7 metres, and that the technique of short-wave reception is quite different from that of receiving waves of "long" or "medium" length. Sometimes you can take risks on these longer wavelengths, but never on the short waves where all kinds of things go wrong if you depart from the path indicated by the designer.

Wire has resistance, inductance and capacity. While these are small relative to other resistances, inductances and capacities in the set, the size of the wire is not very important. For example, if you wind your inductance coil with No. 34 gauge wire, it can hardly matter whether you use No. 18 or No. 22 gauge wire for making connections to the coil. But if your inductance consists of, say, a few inches of very thick wire, you can defeat your whole object if you use thin connecting wire, or make the wires too long.

Keep To The Design.

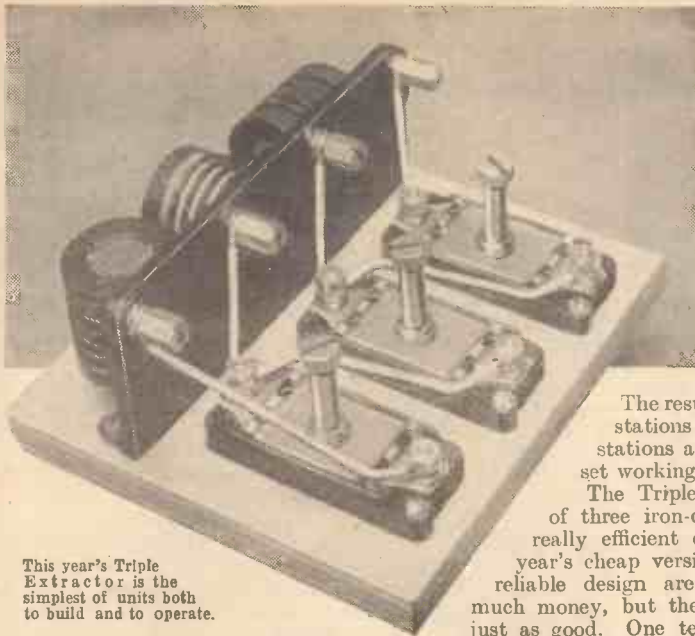
I have seen such odd examples of wiring that I am a little worried that you will think this is just another of those things that "do not matter." Everything in the S.T.900 matters, and I have given you sufficient information to show that after all there is something in this designing business. Remember all the time that nobody in the world knows all I know about the S.T.900, why I have done this or done that. Nor should I have to explain. Is it not much simpler merely to reproduce my set?

After all, if you are sufficiently competent to alter my design and specified parts and valves, you are sufficiently competent to design your own sets. Ninety per cent. of complaints are from constructors who feel they know better than I do. If you happen to belong to this group, believe me when I say that I would much rather you did not build the set at all than build it differently.

I have always felt and said this on the occasion of launching each of my national sets, but this year the fact that the S.T.900 is to work down to such short waves makes it even more important.

Do not alter the lay-out. Adhere to the position of wires. The exact shape of each is given. The Hi-Speed series of diagrams in this issue describes the shape and route followed by the few wires which do not go straight from point to point. It is so simple to build the S.T.900 if you put yourself entirely in my hands that I hope you will do so. I have untied all the knots, foreseen all the snags and paved your way.

J. S.-T.



This year's Triple Extractor is the simplest of units both to build and to operate.

THE Triple Extractor to be described is identical in principle with the one which has proved so extremely successful with the S.T.700 and S.T.800, so the same description will suffice. This year's model is simpler and cheaper but works as well.

It is true to say that a new lease of life was given to home construction when the principle was adopted of overcoming B.B.C. swamping as a separate problem. Hitherto it was usual to attempt to make a set sufficiently selective to cut out the B.B.C. Only with a most elaborate and expensive outfit was this possible, and it was often accompanied by a weakening of foreign stations.

In 1934 I introduced the single "extractor" circuit for cutting out one medium wave "local" or Droitwich. As the medium-wave nationals were not abolished (as had been expected), the Triple Extractor was introduced two years ago. Its success has been phenomenal. It definitely ends the B.B.C. swamping problem.

25 Times As Efficient!

It is 25 times as efficient as the 1934 S.T.600 extractor and simultaneously it will cut out a local National, a local Regional and Droitwich. In practice, of course, you allow enough of each to come through to give full loudspeaker results when the set is properly tuned. But you do not affect other stations. What the Triple Extractor does, in effect, is to transport you any distance you like from the B.B.C.

Actually foreign stations will come in as much as a hundred times louder if you live in the B.B.C. swamp area. The reason is this: The selectivity of a set is tied up with its sensitivity. To cut out your local you have to drain the life-blood out of all stations. On the S.T.400, by reducing the "couplers" you may cut out the local, but the set's ability to pick up foreign stations is gravely impaired. You throw out the baby with the bath-water!

When the Triple Extractor is used, there is no need to reduce sensitivity by reducing couplers or volume control. The swamping

TRIPLE EXTRACTION

How to cut out your local stations if you live in their "swamp" area.

B.B.C. stations are cut out or reduced to desirable strength by a separate little unit right outside the set.

The result is that all foreign stations or distant B.B.C. stations are received with the set working at its best.

The Triple Extractor consists of three iron-core coils and three really efficient condensers. In this year's cheap version, mica presets of reliable design are used. This saves much money, but the original model is just as good. One terminal goes to the aerial and the other to the set, the box being placed on the window-sill or on the left of the S.T.900. The three screw adjuster knobs tune the condensers. The two outside ones will tune out two medium-wave B.B.C. stations, while the middle one is for cutting out Droitwich.

Simple Adjustment

The adjustment is simplicity itself, and it can actually be carried out in half a minute. You tune to, say, the medium-wave National on the main set and then tune one of the outer Extractor knobs until the National disappears. Then tune the local Regional on the set and tune it out on the other outer knob of the Extractor. Then go over to the long waves, tune-in Droitwich, and cut it out again with the middle knob of the Extractor. That's all! You can allow as much as desired of any of these stations to come through by slightly readjusting the appropriate Extractor knob.

Having once adjusted the Triple Extractor you do not need to touch it again. It does not require adjustment for each foreign station, nor do you touch it when changing over to another waveband.

Amazing Results

As the device was fully described last year, there is no need to repeat all the details. Public demonstrations at only one mile from the two B.B.C. stations at Brookmans Park were given and 52 stations received on

the speaker. Full details and readers' enthusiastic reports were given last year. The Midlands were equally enthusiastic over the taming of Droitwich.

Build the S.T.900 First

So effective is the Triple Extractor that no change has been made in the design. But the average constructor, of course, will build the S.T.900 first and then consider whether the Triple Extractor is necessary. The natural selectivity of the set itself is high, and those who are well away from swamping will not need the additional device. The double reaction and other features of the S.T.900 make the Triple Extractor less necessary than with any previous set of mine, so you may confidently try the S.T.900 first as it is.

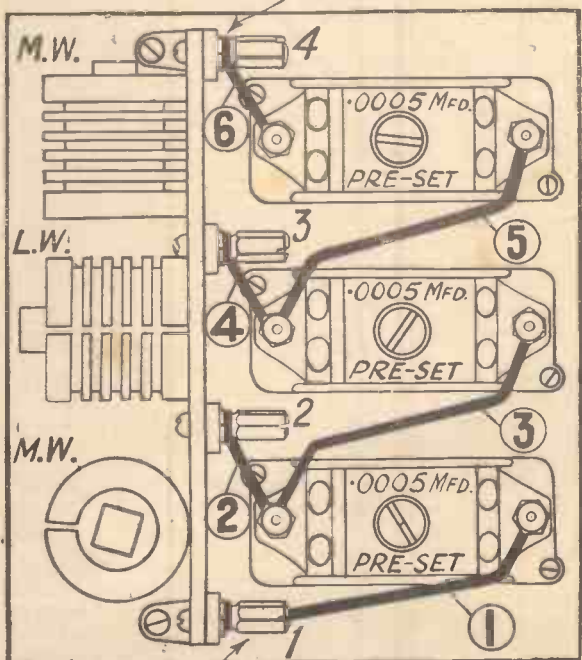
J. S.-T.

COMPONENTS FOR THE TRIPLE EXTRACTOR

- 1 Triple Extractor coil unit WEARITE (7/6)
- 3 .0005-mfd. pre-set condensers COLVERN (5/9)
- 1 Wood baseboard 4 1/2 x 4 x 3/8 in. PETO-SCOTT (6d.)
- 2 3/8-in. X No. 4 R.H. brass wood screws (3d.)
- 6 3/8-in. X No. 4 R.H. brass wood screws (3d.)

NOTE: Aerial lead goes to terminal 1 on Triple Extractor. Terminal 4 on Extractor is joined to Aerial terminal of set. If you need fuller operating details than are given here turn to pages 201 and 203 of last week's issue.

TO AERIAL TERMINAL OF SET



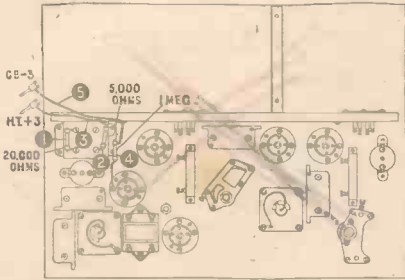
TO AERIAL

LAYOUT AND WIRING

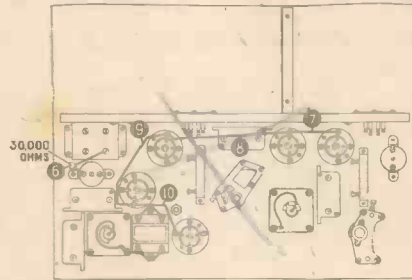
The diagram to the right shows the complete construction and wiring of the Triple Extractor, and also indicates how to connect it into circuit. It will be seen that there are only six wires to be connected up.

TRIPLE EXTRACTOR UNIT

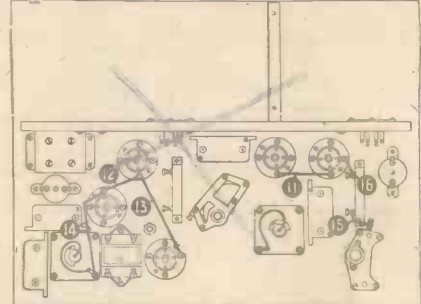
S.T.900 HI-SPEED WIRING DIAGRAMS



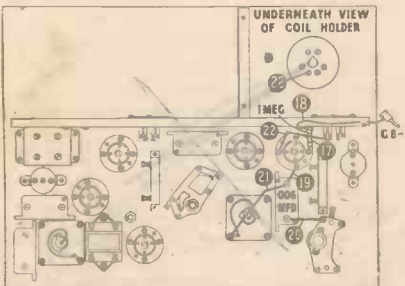
WIRES 1, 2, 3, 4, 5. Every wire in every diagram should go absolutely straight between terminals or by quickest route (no bending near terminals) unless otherwise stated. Check block condenser is right way round. Resistors (1), (2), (4) as shown; must not touch condenser case. Wires (3) (5) 18-in. flex; check correct wander-plugs.



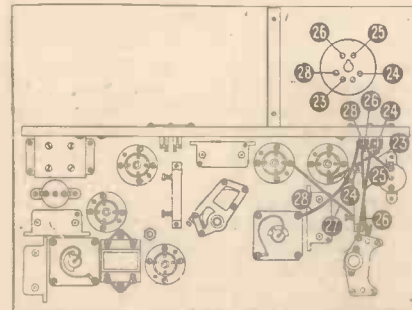
WIRES 6, 7, 8, 9, 10. Resistor (6) as shown; must not touch block condenser case. Wires (7) (9) (10) exactly as shown. Wire (8) straight between terminals (without kink).



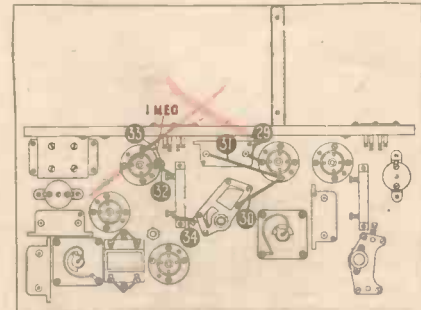
WIRES 11, 12, 13, 14, 15, 15. All wires exactly as shown



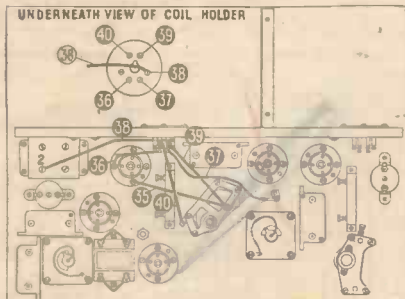
WIRES 17, 18, 19, 20, 21, 22. Resistor (17) and bared end of 18-in. flex lead (18) clamped under washer of anchoring screw on underneath of platform. Check wander-plug. Wires (19) (21) as shown; (21) clears pigtail. Wire (20) leaves '006, goes vertically 1 1/2 in., then horizontally to aerial balancer, (22) leaves coilholder terminal (shown 22 in coilholder sketch above), slopes down 2 in., clearing resistor by 1/4 in., then bends to valveholder. Check you have connected to right terminal of coilholder.



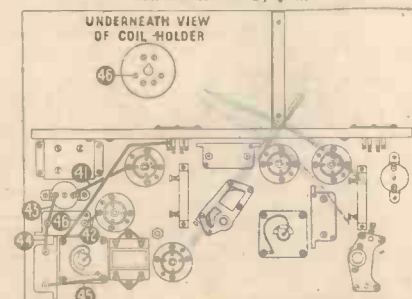
WIRES 23, 24, 25, 26, 27, 28. All coilholder wires connected first to coilholder. Wires (23) (25) (26) straight. Use coilholder sketch to check coilholder terminals. Wire (24) leaves coilholder terminal, passes outside (clearing by 1/4 in.) neighbouring coilholder terminal, then slopes straight to valveholder. Wire (27) straight, but clears (11) (19) by 1/4 in. Wire (28) leaves coilholder, passes round valve, clearing metallising and terminal of '006 by 1/4 in.



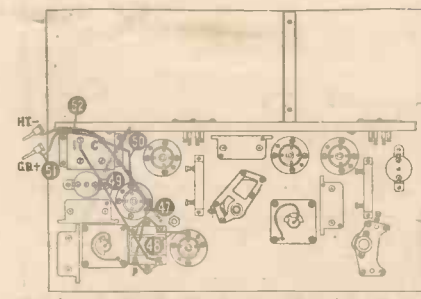
WIRES 29, 30, 31, 32, 33, 34. Wires (29) (31) (32) straight. Wire (30) leaves main tuning condenser horizontally for 1 in., then drops nearly vertically to valveholder. Resistor (33) as shown. Wire (34) by shortest path.



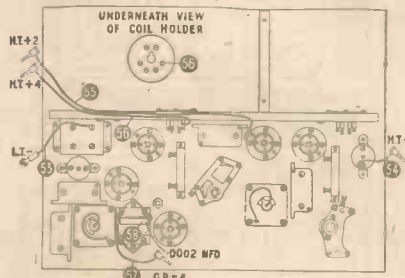
WIRES 35, 36, 37, 38, 39, 40. Wire (35) by shortest route. Wire (36) slopes down from coilholder for 1 1/2 ins., keeping 1/4 in. off platform, then bends sharply to valveholder; must clear wire (9) by 1/4 in. Wire (37) 6 in.-flex lead, with thimble attached. Wire (38) leaves coilholder terminal as in coilholder sketch; passes under 5,000-ohm resistor (2). Wires (39) (40) straight.



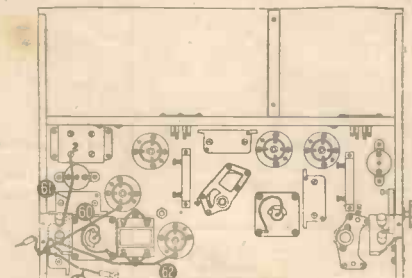
WIRES 41, 42, 43, 44, 45, 46. Wires (41) (42) (43) (44) (45) straight between terminals. Wire (46) leaves coilholder, runs parallel to platform for 1 1/2 ins., then straight to anode reaction.



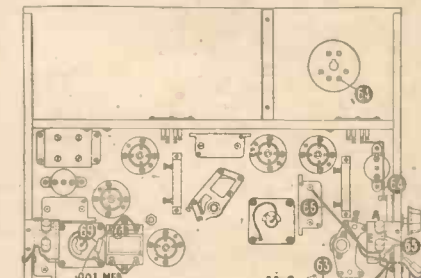
WIRES 47, 48, 49, 50, 51, 52. Wire (47) shortest route over Niclet to P. on Niclet. Wire (48) straight. Wire (49) as shown, but clears by 1/4 in. G.B. - terminal of Niclet. Wire (50) shortest route passing under 5,000-ohm resistor. Wires (51) (52) 18-in. flex leads. Check wander-plugs.



WIRES 53, 54, 55, 56, 57, 58. Wires (53) (54) (55) (56) (57) 18-in. flex leads. Make sure spade and wander-plugs are connected to correct leads. Tubular condenser (58) '0002-mfd. as shown.



WIRES 59, 60, 61, 62. Wire (59) 20-in. flex lead, passing through hole in sidepiece, and knotted as shown, 2 in. from plug. Wire (60) straight to socket as shown. Wire (61) straight between terminals. Wire (62) almost straight, but clearing Niclet by 1/4 in.



WIRES 63, 64, 65, 66, 67, 68, 69. Wire (63) 18-in. flex lead. Check wander-plug. Wire (64) as shown, clearing H.F. choke by 1/4 in. Wire (65) straight from A to aerial coupler. Wire (66) to shortest route. Wire (67) straight from E to socket. Wire (68) 6-in. flex lead passing through hole in sidepiece; knotted 2 in. from plug. (69) is '001-mfd. tubular (see article).

200 STATIONS AT BIRMINGHAM

90 Medium and 12 Long-Wave Stations Identified on S.T.900 in Three Hours' Test on Indoor Aerial

"Knife-edge selectivity 12 milliamps consumption Quality superb Finest all-waver I have ever handled The most perfect set ever."—Leslie A. Perrins.

Dear Sir,—I have once again been privileged to test one of Mr. Scott-Taggart's sets. This time the S.T.900. Upon examining same I was very pleased to see that six-pin plug-in coils were used, and no switching whatsoever. I was at first a bit dubious of the aerial reaction on the short waves, but upon trial I was astounded at the excellent way in which it worked. I first of all tried the 19-m. band, this being a favourite with me, and the first station to greet me was H V J Vatican. I then applied the aerial reaction, and how the signal was increased! Next came W 2 X A D Schenectady, at R 4, who were just opening with the sound of the "electric flash" from their laboratories. I applied the aerial reaction to this and immediately realised the full significance of this control. The signal was increased to a good R 7. I then went over the whole available wavebands from 10-2,000 m., tuning-in the stations as per the list attached, and received over 200 stations.

Time, unfortunately, did not permit me to log half the stations available on the 10 m., 20 m., 40 m. and 80-m. bands, and so I shall send a further list of stations heard on these bands, together with other broadcasters who were not on at the time of listening.

The operation of this receiver is far in advance of anything I have previously handled, including the S.T.800. The reaction, and particularly the aerial reaction, is delightfully smooth and searching on the short waves is simple despite the use of the large tuning condensers. The use of three separate short-wave coils should give a sufficient spread on the 20 m., 19 m., 16 m., 13 m., and 10-m. bands for easy separation of stations even to the inexperienced operator.

At 9 p.m. I started logging the medium waves, and I was immediately impressed by the knife-edge selectivity, and I obtained a total of 90 stations clear of one another after a three hours' sitting. All the stations as shown on my list I have identified either by call, signal, or some part of the programme. The long waves gave 10 stations after Droitwich had been extracted, and on the Sunday morning Deutschlandsender and Motala were added to this list, making 12 long-wave stations.

I found that the Mid. Reg. did not interfere with Poste Parisien and Bordeaux-Lafayette, the extractor only being necessary for the stations between these two. The Latin Americans were not up to standard on Saturday night, although C O C O, Havana, provided a good R 8. The Sunday morning 7.30 o'clock gave better results, and one of the first stations on 20 m.

was a submarine base station at Panama R 6. Also from the west came W 2 R F R 5, W 3 X A M R 9, W 9 C I R 8, working with amateurs. Although Tokio J Z J and J Z K had provided good signals the previous evening, Lyndhurst and Sydney provided only R 3, and V K 3 L R was doing a talk on foreign affairs.

The quality of the set is superb, even better than the S.T.800, and all the listening was done on the loudspeaker. The set was worked on an eliminator giving 130 volts max. H.T., with 12 volts on G.B.4 and the P X 230 provided a full undistorted signal. No trace of "motor-boating" at all even on 10 metres. This, I think, proves the stability of the set.

In conclusion I should like to say that the set is the finest all-waver I have ever handled. The use of plug-in coils ensures maximum sensitivity on all wavebands. It is therefore ideal for the keen enthusiast. The total consumption of the set is 12 m.a. full on. This set has been tested in a badly

Here is a report by a Birmingham amateur who has had experience of previous S.T. designs and is thus competent to make a comparison. A specially interesting feature of this report is the hour-to-hour identification of stations.

congested area, where local interference is prevalent. My aerial is very poor (indoor) and the H.F. valve does its work very efficiently. There is no background noise as with the majority of short-wave sets. If anyone would like further information on this I will be pleased to supply it. I feel I must congratulate Mr. Scott-Taggart on the most perfect set ever, thus adding another success to his numerous achievements.

LESLIE A. PERRINS.

101, Sycamore Road, Aston, Birmingham 6.

TEST REPORT OF S.T.900

Saturday, October 16th.

15.30 (19 m.) Zeesen D J Q (R 99). Songs from "Die Fledermaus." D J B, including "Drink My Beloved, Drink." Vatican H V J (R 99) Religious talk (Italian).

- 16.00 (19 m.) W 2 X A D, Schenectady, R 6 Opening call and "The Ranchers."
- 19.00 (19 m.) W 2 X A D, R 6. Ball game. G S I, R 9. Eileen Joyce (piano).
- 19.30 (16 m.) G S G Daventry, R 99. Pianoforte.
- 25 m., Tokio, J Z J, R 6. News (English).
- C T I C T, Lisbon, R 7. No call was heard from this station; they repeatedly played "Ramona."
- 20.00 Moscow, R N E, R 6. Tlkg. G S D, R 6. Variety. "I Love a Little Cuddle in the Dark." D J D, Zeesen, R 9. Orchestra and sketch. I 2 R O 4, Rome, R 99. Orchestra and soprano.
- (19 m.) Tokio, J Z K, R 7. News in English and talk on the Japanese International Policy.
- 21.00 (med.) Hilversum 415 m., Rome, Stockholm, Paris P T T, Belgrade, Sottens, North Reg., Cologne, Lyons, Prague, Trondelag, Brussels No. 1, Florence, Rabat, Vienna, Grenoble, Stuttgart, Athlone, Beromunster, Budapest, Wilno, Munich, Marseilles, Katowice, Scots Reg., Toulouse P T T, Leipzig, Lwow, Welsh Reg., Agen, Milan, Bucharest, Berlin, Strasbourg, Poznan, London Reg., Graz, Helsinki, Hamburg, Toulouse, Brno, Brussels No. 2, Goteborg, Breslau, Poste Parisien, Bordeaux, North Ireland, Bologna, Hilversum No. 2, Bratislava, National, Trieste, Hórby, Fécamp, Konigsberg 2.
- (LONG) Kaunas, Hilversum No. 1, Lahti, Moscow, Radio Paris, Leningrad No. 1, Oslo, Luxembourg, Kalundborg, Warsaw.
- (MED.) Heilsberg, Rennes, West Reg., Bari, Radio Cité, Bordeaux Lay., Kosice, Monte Ceneri, Copenhagen, Nice, Frankfurt, Lille, Gleiwitz, Saarbrucken, Rome 3, Nurnberg, Radio Mediterranee, Klagenfurt, Bremen, Bourn.-Plym., Pees, L'île de France, Eiffel Tower, Radio Lyons, Berne.
- 23.00 (25 m.) D J D, Zeesen. Sketch, R 7. G S D, R 8. Variety (Palace of). T P A 4, Paris, R 5. Concert.
- (19 m.) G S P, Daventry, R 8/9. Ann., D J Q R 6. Lady talking. D J R, Zeesen R 6. Lady.
- (31 m.) Latin station (30 m.) R. 7. Records D J N and D J A. Orchestra. R. 99.
- 23.45. O A X 4 T Lima R 7.: annee. G S B, R 6. Variety. P R F 5, Rio de Janeiro, R 5. Tango orchestra. R W 96, Moscow, R 8. Talk on Fascism. French station, R 7. Dance music and songs. (80 m.) P A O B B, Amsterdam, R 8. G 5 J O, Cambridge, R 6. E T 9, Dublin, R 5/6.

(Please turn to page 227.)

THE A.C. S.T.900

Further notes on the mains version of Mr. John Scott-Taggart's greatest receiver. Full constructional details will appear next week.



The power pack and loudspeaker are arranged as a separate unit below the receiver itself.

IN designing the A.C. version of my annual sets, I naturally embody the special features which distinguish the battery model. The exact circuit can rarely, if ever, be reproduced in a mains edition.

The reason is that we are dealing with valves which are far more sensitive or capable of a much greater output. Take the audio-frequency side. With an efficient A.C. valve as detector it is possible with resistance coupling to get a sufficient amplification to load fully a sensitive output pentode.

If a parallel-fed L.F. transformer is used,

as in my A.C. S.T.900, an even higher sensitivity is obtained, and there is no need to use two audio-frequency amplifying valves. Therefore we have only one valve as against two in the battery set.

The parallel-fed transformer is, of course, a circuit departure of its own. The Niclet is a thoroughly satisfactory transformer in the battery version, but when parallel-fed it ranks higher because the bass notes are then developed to the full, and the use of a high quality speaker and a 3½-watts output valve permits a full reproduction of this part of the musical scale.

Potentiometer Control

The radio-frequency amplifier is a pentode, and although a better amplifier than a battery valve it calls for little comment. The adjustable bias is obtained with a potentiometer control, whereas in the battery set the selectivity of the second tuned circuit is varied by means of the plug and socket arrangement fitted to the left-hand side-piece.

In the battery set the object of the adjustable grid bias is to vary selectivity, volume adjustments being made on the aerial coupler. But in the A.C. S.T.900 the aerial coupler alone would not give nearly enough control. The potentiometer will thus be used not merely for improving selectivity, but for cutting down what might be overloading.

You can vary volume of signals either by the aerial coupler or the volume control potentiometer. These two controls are side by side on the left side of the console cabinet, and the volume control will usually be the control to adjust signal strength. To obtain selectivity you will use both

knobs, the aerial coupler to improve the selectivity of the first circuit (tuned by the aerial balancer) and the volume control to increase the selectivity of the second tuned circuit tuned by the main tuning knob.

In both cases the knob should be turned anti-clockwise, thus reducing signal strength. The anode and aerial reaction controls would then be used to bring back the full signal strength, slight readjustments of the aerial balancer and main tuning condenser being desirable.

The high efficiency of the detector valve as a radio frequency amplifier affects the reaction situation. This valve amplifies so well that the reaction currents would normally be too strong for the simple method embodied in the battery set. I have used a differential condenser method of adjusting anode reaction. The simple .0005-mfd. condenser arrangement is not satisfactory. I found that it gave rise to instability, while the differential arrangement ultimately used and illustrated in the circuit diagram (see cover iii) was found to work admirably.

Maintaining a Negative Bias

There is a fixed resistance of 100 ohms in the cathode lead of the H.F. valve which serves as a means of preventing the input oscillations running into grid current. It ensures that even with the volume control full "up," there is still a small negative bias on the grid of the H.F. pentode. If this small bias is not left, then the input signals would produce grid current when the positive half-cycles affected the grid. In practice you would find that volume improved as you turned up the volume control, but that just as you reached maximum

(Please turn to cover iii.)

COMPONENTS FOR THE A.C. S.T.900

COMPONENT	MAKE USED BY DESIGNER	COMPONENT	MAKE USED BY DESIGNER
1 .0005-mfd. main tuning condenser with drive	J.B. (as S.T.800).	1 100,000-ohm resistor	Dubilier ½-watt
1 .0005-mfd. aerial balancer condenser	Polar slow-motion (as S.T.800)	1 10,000-ohm volume control potentiometer	Colvern S.T.5/C
1 .0005-mfd. aerial coupler condenser	Graham-Farish log-mid-line (as S.T.800)	2 H.F. chokes	B.T.S. (as S.T.800)
1 .0005-mfd. "X"-reaction condenser	Graham-Farish log-mid-line (as S.T.800).	1 L.F. transformer	Varley Niclet 3-5/1
1 .0003-mfd. differential anode reaction condenser	Graham-Farish solid dielectric	3 7-pin baseboard-mounting valve holders	W.B.
1 .00075-mfd. tone control condenser	Polar "Compax"	1 5-pin baseboard-mounting valve holder	W.B., small type
2 4-mfd. fixed condensers	Dubilier, type L.S.A.	2 6-pin coil holders	B.T.S., type O.
1 .05-mfd. tubular fixed condenser	Dubilier, type 4002/S.	1 Mains Transformer	Ferranti S.M. 3-4
1 2-mfd. fixed condenser	Dubilier, type B.B.	1 Metal rectifier	Westinghouse H.T.16
6 1-mfd. fixed condensers	T.C.C., type 50	1 Energised Loudspeaker	W.B., type E.M.S., 1,500 ohms field (as for S.T.800)
3 1-mfd. tubular fixed condensers	T.C.C., type 341	1 L.F. choke	Varley, type D.P.10
1 .006-mfd. mica fixed condenser	Lissen	1 Aluminium screen	Peto-Scott
1 .0005-mfd. mica fixed condenser	Lissen	1 Twin fuse holder	Bulgin, type F.19
2 .0005-mfd. mica fixed condensers	Lissen	1 Toggle on/off switch	Bulgin type, S.80
1 .0003-mfd. tubular fixed condenser	T.M.C., type T.5	1 Twin electrolytic condenser bracket with terminal	Peto-Scott
2 8-mfd. electrolytic condensers	T.C.C., type 802.	3 Extension spindles	Peto-Scott
1 50-mfd. electrolytic condenser 12-volt working	T.C.C., type F.W.	25 feet 18-gauge T.C. wire	Peto-Scott
2 1-meg. resistors	Polar N.S.F., 1-watt	6 Lengths 1½-mm. insulating sleeving	Peto-Scott
2 50,000-ohm resistors	Polar N.S.F., 1-watt	1 Piece screened flex 1 ft. long	Peto-Scott
3 20,000-ohm resistors	Polar N.S.F., 1-watt	Screws, flex, etc.	Peto-Scott
1 15,000-ohm resistor	Polar N.S.F., 1 watt	1 Polished panel (Metaplex reverse) 16 in. x 12 in. x ½ in.	Peto-Scott
2 10,000-ohm resistors	Polar N.S.F., 1-watt	2 Side pieces	Peto-Scott
1 500-ohm resistor	Polar N.S.F., 1 watt	1 Coil platform	Peto-Scott
1 150-ohm resistor	Polar N.S.F., 1 watt	2 Terminal strips, 2 in. x 1½ in. x ½ in.	Peto-Scott
1 100-ohm resistor	Polar N.S.F., 1-watt	4 Terminals marked A., E., L.S. +, L.S. -	Belling & Lee, type R.
		1 Console cabinet	Peto-Scott

VALVES

V "X"
Marconi/Osram
M.L. 4.

VI
Marconi/Osram
V.M.P. 4 G. (met.)

V2
Marconi/Osram
M.S.P. 4 (met.)

V3
Mazda
A.C.2/Pen.

The WEARITE

TRIPLE EXTRACTOR COIL UNIT



Specified for
S.T.900

PRICE
7/6

POST THIS
COUPON TO-DAY

To WRIGHT & WEARE LTD.,
740, High Road, Tottenham, London, N.17.

Send for the
latest book of
Wearite Com-
ponents.

Name.....

Address.....

P.W. 6-11-37

3289

THE TIMES THEY KEEP WHEN IT'S NOON G.M.T.

BARCELONA	PARIS	BUCHAREST	BERLIN	LISBON
Noon	Noon	2 p.m.	1 p.m.	Noon
NEW YORK				REYKJAVIK
7 a.m.				11 a.m.
SYDNEY				WARSAW
10 p.m.				1 p.m.
VIENNA				MADRID
1 p.m.				Noon
STOCKHOLM				PRAGUE
1 p.m.				1 p.m.
OSLO				ROME
1 p.m.				1 p.m.
LENINGRAD	ISTANBUL			
2 p.m.	2 p.m.			
TORONTO	HELSINKI			
7 a.m.	2 p.m.			

AVO PRECISION TESTING INSTRUMENTS

British Made

Read trade Mark



THE D.C. AVOMINOR

This accurate moving-coil instrument is 13 meters in one. It has 13 ranges: voltage ranges for measuring H.T., L.T., Grid Bias, Mains and Eliminator Voltages; Millamp ranges for testing receiving valve and apparatus; Resistance ranges for all resistance measuring. In case, complete with testing prods, crocodile clips, leads and instruction booklet. **45/-**

Only precision instruments enable you to test accurately and trace radio faults efficiently. "AVO" instruments are outstanding for precision. They are the outcome of a constant effort to provide amateur enthusiasts and radio engineers with instruments of high accuracy and maximum utility at a moderate cost.



UNIVERSAL AVOMINOR

This compact precision moving-coil instrument provides facilities for all A.C. and D.C. testing. It has 22 ranges covering A.C. volts, D.C. volts, current, and resistance. All readings are direct. Total resistance of meter, 200,000 ohms—ensuring accurate readings. Complete with testing prods, crocodile clips and instruction booklet. **£5.10s.** Leather Carrying Case, 10/-.

Deferred Terms if
desired.

Write for illustrated
literature giving full
details of all "AVO"
Testing Instruments

**AUTOMATIC COIL WINDER &
ELECTRICAL EQUIPMENT Co. Ltd.**
Winder House, Douglas St., London,
S.W.1. Telephone: Victoria 3404/7.

THE AVODAPTER

Simplifies valve testing. Enables all valves to be tested under actual working conditions without need for cutting connections and grovelling about inside the set. Instantly adaptable for 4-pin, 5-pin and 7-pin valves. Price **27/-**

9-PIN AVO-COUPLER

Attachment (not illustrated) renders AvoDapter suitable for 9-pin valves. Price **12/6**

New Edition! RADIO SERVICING SIMPLIFIED

A new and considerably enlarged edition of this popular text-book is now ready. It has been entirely re-written to conform with modern requirements and in the light of present-day standards of knowledge. It takes the reader by easy stages through the whole routine of testing modern radio receivers, and describes in a clear and interesting manner every test, and much other useful information of value to the radio enthusiast. 150 pages, 8½ in. X 5½ in. Numerous illustrations, diagrams and graphs.

2/6 Post Free
2/10

ON THE

SHORT WAVES



HOW TO LISTEN

By W. L. S.

THE S.T.900 has had the effect of introducing innumerable new listeners to the thrills and joys of short-wave reception, and I have been asked to devote a page or two to the task of telling them how to get the best of short-wave enjoyment out of their new receivers. Not that it is necessary to know *anything* about short waves to get a huge "kick" out of them—but if you *do* know a little more about their little ways than does the man next door, then you'll get more enjoyment than he does!

The vast collection of wavelengths that we so charmingly lump together under the title of "short waves" embrace several different wavebands used for different purposes, and all these wavebands have their own particular characteristics, which vary between one and the other and at different seasons of the year.

A little while ago I pointed out that the owner of the best short-wave receiver ever designed could easily listen for twenty-four hours without hearing anything of interest, simply by consistently choosing the wrong waveband for the particular time of day. I can't imagine anyone being so dumb (or so unlucky) as to do this—but it is possible.

Daylight Listening

So let us examine the various slices of the short-wave spectrum and see how they behave, and when. To start with, take the time of day. During the hours of daylight—especially in the winter—the most interesting long-distance transmissions are to be heard on the shortest bands. In other words, if you plan a bout of listening, beginning at 3 p.m. and going on till midnight, you should start down in the region of 10 metres, and as each band "fades out on you," you simply go up to the next one.

As a very rough guide, this sort of thing should be happening in November and December: Wavelengths between 9 and 16 metres should be "live" until 5 or 6 p.m., when they will probably fade out; waves between 16 and 25 metres should be good until 8 or 9 p.m.; between 25 and 36 metres up to 11 p.m.; and waves above 36 metres should be good all through the night.

And these remarks apply only to long-distance transmissions; "locals"—by which we short-wave fans mean anything up to 1,000 miles—come in at any old time, except, perhaps, on the 10-metre amateur band, which is more or less a law unto itself.

On your S.T.900 you will be able to listen in to all the following bands: 10, 20 and 40 metres (amateurs); 13, 16, 19, 25, 31 and 49 metres (broadcast); 16, 24 and 36 metres (shipping). All the spaces in between these bands are occupied by commercial stations, many of which put out telephony transmissions of considerable interest to listeners, and various odd stations which do not conform to international regulations appear from time to time. Broadcasting stations in countries which are at war may be heard outside the usual broadcast bands—for example, several Spanish stations have been broadcasting news in English in and near the 40-metre amateur band.

I suppose quite a lot of newcomers to the joys and sorrows of short waves will

matters simply because it is their hobby and not their business.

In the U.S.A. the amateurs are not compelled to be experimentally minded. They just run transmitters for the fun of communicating with each other, and (more or less, by the way) they have built up a terrific network of communications that sometimes has the chance of doing great work during national emergencies such as floods, tornados or earthquakes.

The amateur movement has come before the listening public this year more than ever, because fewer and fewer amateurs are using Morse code and the great majority are using telephony, which, of course, is understandable to everyone—even if they do use some queer jargon sometimes!

Enough of that, though—on your "900" you will be able to listen to some scores of thousands of amateurs and decide for yourself what it's all about.

The Broadcasters

The short-wave broadcasting stations are mostly run in the same way as our own Empire Station. They broadcast programmes especially intended for listeners in other parts of the world. Sometimes they are sponsored programmes (as in U.S.A.); sometimes they are made simply to enhance the prestige of the country from which they come; and sometimes they are strongly flavoured with political and propaganda matters. No names, no packdrill!

You can't fail to hear the great American stations at Schenectady New York—W 2 X A D on 19.56 metres and W 2 X A F on 31.48 metres. "X A D" is the one to go for early in the evening, or during the afternoon; "X A F" is just about coming up nicely by the time "X A D" fades out. Other famous Americans are W 8 X K at Pittsburgh (on 13, 19, 25 and 49 metres roughly); W 2 X E at Wayne, all bands; W 3 X A L at Bound Brook, New Jersey, on 16 and 49 metres; and heaps of others.

Australia is represented by some fine transmissions from Sydney, V K 2 M E, which may be heard on Sunday morning and afternoons on 31.28 metres, and by other stations which, at present, keep rather irregular hours on weekdays.

Plenty to choose from? I'll say there is—and next week I'll give you a further selection, as well as making a little announcement which will send you out after the "D X" post-haste.

HAVE YOU HEARD J1DM?



Selichiro Handa, a Japanese enthusiast, with his short-wave gear. It looks a very businesslike outfit.

want to know what all this amateur stuff is about! Having been tied up with the movement for nearly fifteen years myself, I know so much about its inner workings that I find it very difficult to explain it to someone meeting it for the first time.

Briefly, though, the amateur movement is this: it represents a great fraternity of radio enthusiasts, all over the world, who are allowed to communicate with one another in certain wavebands specially allotted to their use. In some countries, including Great Britain, their work is mostly experimental—they are constantly trying to improve the reliability of radio communication, and although they are called "amateurs," they are amateurs only in one sense—they don't experiment for pecuniary gain. They may be professional radio engineers, but they are amateur trans-

THE DIAL REVOLVES

By LESLIE W. ORTON

WHAT HAS HAPPENED TO PRF5? :: 20-METRE RECEPTION
FROM THE NORTH POLE :: ON THE ULTRA-SHORTS

CAN any of you DX-ers tell me which is the most powerfully received European short-wave broadcaster? It's a problem, isn't it? Reminds me of a crossword puzzle. True there are no squares, but at times the volume of the Europeans makes me cross!

Just listen to Zeesen, Rome, Daventry, and the rest of the bunch. What punch!

By the way, during the last few days I've been experimenting with a friend's commercial five-valve super-heterodyne. Though I am still in favour of the "straight" circuit, I admit that, from the entertainment point of view, the "Super" is hard to beat.

HVJ, Vatican City, and PCJ, Eindhoven, both on the 19-metre band, have fairly raised the roof, but the Americans, including W2XAD and W2XAF, Schenectady; W2XE, Wayne; W1XAL, Boston, and W1XK, Millis have come in at sufficient volume to make the neighbours complain!

Latin-American broadcasters have been surprisingly powerful and COCH and COCX at Havana, HJ1ABP, Cartagena, and YV5RF, Caracas, have been "stars" in their own little way. Incidentally, has anyone heard our old friend PRF5, Rio de Janeiro, lately? He has disappeared as completely as the flies in the winter time.

A Costly Game

I could give a thousand reasons why I seldom verify reception, but "cost" is probably the best excuse. Ever added up the expense of sending fifty cards? Gosh, it makes one's head spin, and the pocket feel light! Nevertheless, a batch of cards from L.L. (Leeds) makes me feel extremely envious. One, from OQ5AA, the popular Belgian Congo station, depicts an elephant ripping up a tree with its trunk. And that creature's feet! Well, I shouldn't like it to step on my pet corn!

Personally, I like to make my own verifications by recording the calls of stations heard. I have recorded an amazing number. By the way, it's an amusing game to get a hardened sceptic to tell you just why you couldn't have heard such and such a station, and then, when he is fully wound up, let him hear the recordings—his expression is worth all the QSL-cards in the world!

Excitement on 20 Metres

Blow, blow, thou wintry wind, but don't whisk away any more South American amateur stations, otherwise the 20-metre enthusiast will have a thin time for thrills. For well over a week now, I haven't heard so much as a sigh from south of the Equator, and so is it any wonder that consternation gnaws at my heart at the thought of this Houdini act? The Thin Man is bad enough, but these stations have him beaten to a frazzle.

Fortunately fate has been kind in other directions, and the band has abounded with thrills around 6 p.m. A recent evening's search resulted in my logging LY1G, Lithuania; SU-1SP, Egypt; CN8MA, French Morocco, and PK5PW, Java.

Between 9 p.m. and 2 a.m. I have heard W1LI, W1BLO, W2FBA, W2PIG, W3UL, W4DHL, W8OXF, W8OT, W9CP, W9FBT, and many others. Cuba has produced O6ME, and Great Britain, "G-8-Santiago-Boston"—a really noisy "guy"!

I'm not keen on early rising these wintry days, but conditions have been so fine between 6 and 8 a.m. that I've risked it on several occasions lately. When reception has been good I've pulled in many stations including VK3UR, VK2XU and K4SA. When they are bad—well, you should hear my language!

Who Was It?

Short-wave conditions have been astonishingly good, and all the leading stations have come in well. There have been one or two mysteries also! Listening-in on 28 metres the other morning, I picked up a recorded version of "Why stars come out at night" from a station who gave no call, merely announcing in the manner of an amateur. You know: "Hope test O.K., O.M. QRM bad," and so on. The operator had a broad "Scotch" accent—maybe the transmission originated in Aberdeen!

By the way, transmissions from the

Short-Wave Station Identification

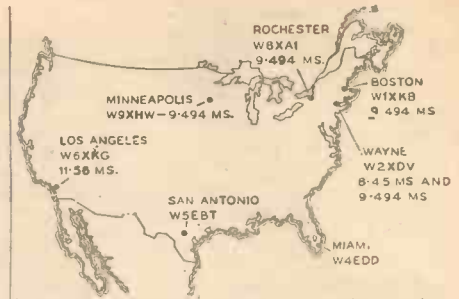
By F. A. Beane

SPAIN AND SOUTH AMERICA AGAIN

A CIVIL War station commanding great attention just now is EA1DD, which may be heard broadcasting in English daily at 21:30 to 21:45 and 00:30 to 00:45. At the beginning and conclusion of each broadcast in English we are greeted with the announcement, "Hallo, here is station EA1DD of the 26th Division of the Spanish Republican Army, operating in the Aragon Front on a wavelength of 40.4 m., at the service of the Spanish Popular Front Government." Reception reports are requested, and a promise that all will be answered both by post and over the ether.

Uruguay, Paraguay and Argentina

Only a comparatively insignificant number of short-wave enthusiasts can boast of reception of broadcasts from either Paraguay or Uruguay, but at the time of writing both countries may be heard operating transmitters in the 49-metre band. The former first appeared on about 49.7 m. some three weeks ago, and Paraguay a few days later on 50 m. Unfortunately I have not yet ascertained the slogan or call of the Paraguay station, but it may be heard regularly prior to 23.00 with excellent strength and fair quality, very reminiscent of an old acquaintance—PRA8. Buenos Aires



10-metre American amateur and broadcast stations that are coming in well.

North Pole are being heard irregularly on 21.28 metres—the main difficulty being to identify the station when heard. Occasionally, however, using the call REAM, the Soviet explorers may be heard calling "CQDX" on 20 metres—logged them yet?

On 10 Metres

Ten-metre reception has been excellent this week. Who could want more excitement than to receive W8ETS, W8KY W1COO and W1CCZ on the loud-speaker? Oh, you would, would you? Right then, how about VP1AJ? The call book gives his location as in the Gilbert and Ellis Isles.

I was rather amused to hear VE2KS complaining of the poor aerial he was using. It's a funny thing, but if anyone complains of their aerial I'm sure to hear him!

On 9.494 metres the broadcasters are coming in well, and I have logged W1XKB Boston; W8XKA, Pittsburgh, and W9XHW, Minneapolis at decent strengths.

But perhaps my most exciting moment was when I tuned-in a police station in the region of 9.7 metres. "Hurry to the next street!" commanded someone—the prelude, I imagine, to a car whizzing around the corner like a rocket and bringing misfortune to someone—for radio isn't everyone's friend.

is frequently mentioned and the station announcement given every five or six minutes as "Radio —, Villarica, Paraguay." At 23.00 transmissions are concluded with the striking of 7 by a studio clock, or occasionally the Sousa March "Stars and Stripes."

Easier to Identify

The Uruguay transmitter is much simpler to identify since it announces regularly in Spanish as CXA2, Montevideo, and at times favours its non-Spanish speaking audience with French or English announcements. No identification signals appear to be employed; it may be heard from 22:30, or earlier, and the broadcasts are evidently of an experimental nature only. Reception reports should be addressed to "Radiodifusora CXA2, Compania de Publicidad Continental, Rio Negro 1631, Montevideo, Uruguay."

From the Argentine can be recorded reception of yet another broadcaster using the title "Radio Belgrano" and operating in the region of 31.1m. shortly before midnight. Strength is fair, but the transmissions are somewhat inconsistent, while little information can be gleaned about this newcomer, apart from the location, which is Buenos Aires.

200 STATIONS AT BIRMINGHAM

(Continued from page 217.)

- 00.30 (31 m.) L R X, Buenos Aires, R 4/5. News and talk.
 (25 m.) W I X A L, Boston, R 6. Violin and songs for Latin America. D J D, Zeesen, R 9. Orchestra.
 (50 m.) 49 m. station R 4. Violin and orchestra. Y V 5 R C, Caracas, R 5. Sketch. T I G P H, San Jose, R 6. Rumba band. Y V 1 R B, Maracaibo, R 5. Rumbas. X E B T, Mexico, R 5. Rumba and solos. C O C O, Havana, R 8. Dance orchestra. H J 3 A B H, Bagota R 6. Tenor and orchestra. "Love's Last Word is Spoken." H J 4 A B L Columbia, R 4. Soprano. H J 4 A B B, Manizales, R 5. Annce. C O C D, Havana R 6. Annce. C J R O, Winnipeg, R 4. Orchestra.
 40 m. R 7. Talk on Spanish question, by lady.

Sunday, October 17th

- 07.30 (16 m.) Telephony station (16-9 m.) R 99. Italian. G S G R 9. Talk, "This is England."
 19 m. English telephony station. D J Q, Zeesen, R 6. Orchestra and annce. (19-7 m.) Telephony station. Lady, Italian. D J B, Zeesen, R 7. Orchestra. G S O, R 6. Talk.
 19 m., Moscow, R 7. Annce. in German.
 20 m. E S 5 D, R 6. W 2 R F. R 5. G 6 S W, R 6. Lady and records of orchestra. L A 5 N, R 8. Speaker saying that most of his gear is home-made owing to tariffs. G 6 W N, R 7. French amateur, R 8. Dutch R 7. S M 7 W R, R 9. Swedish amateur calling test. N Y R 6. Submarine base station at Panama. W 9 C I, R 8.
 08.30. W 3 X A M, R 9. F 8 H K, R 9. Calling in English. L A I G, R 9. Oslo, in English. French, R 7/8. Record of "Tiddle-om-Pom," with banjo. G 6 S R, Coventry, R 8, and numerous other amateurs, whose calls I missed.
 09.00. (25 m.) G S D, R 8. Service. S B P Motala, R 7. Orchestra.
 31 m. D J A. Zeesen, R 99. Talk. L K J 1, Jeloy, R 99. Orchestra. G S B, R 9. Service.
 11.00-12.00 (31 m.) V K 3 L R, Lyndhurst, R 3. Talk. 40 m. G 2 X Y. R 9.
 12.30 (13 m.) G S J, R 8, and G S H R 7 (with echo). Service.
 31 m. V K 2 M E, Sydney, R 3. Call and music. D J N, Zeesen, R 9 and D J A, R 9. Talk. L K J 1, Jeloy, R 8. Sports commentary.
 13.00 (16 m.) G S G, R 9. Football commentary. P H I, Huizen, R 6. Talks. D J E, Zeesen, R 99. Annce.
 40 m. French amateur, R 7. G 8 O G, R 8. "Tiger Rag." G 5 Y N, R 8. G 8 O G, R 9 at Leeds. G 5 P D, R 99. Bghm. G W 8 S O, R 6. on 5-watt battery transmitter. G 6 D R, R 6. G 8 D T, R 9. G 6 L C, R 8. G M 6 B B, R 7., G 8 L A, R 8 on 10 watts, G 2 K M, R 6. G 8 B L, R 7. G 6 A S, R 7.
 13.45 (13 m.) W 2 X E, Wayne (U.S.A.), R 8/9. "Radio Spotlight," and call in English, French, German, Italian, and Spanish. Concert and service.
 14.00 (19 m.) H A S 3, Budapest, R 7. Call and march.
 15.45 (10 m.) G 6 D L and G 5 B J, R 9, both Birmingham.

- 40 m. G M 8 T T, R 8. 40 m. L K J 1, Jeloy, R 9. Records. D J C, Zeesen, R 8. Orchestra.
 17.00 (19 m.) W 2 X A D, Scheffctady (U.S.A.), "Round-table talk." G S I R 99. Organ. "Love's-Old Sweet Song." T P A 2, Paris, R 5. Soprano.
 16 m. G S G, R 99. Organ. W 3 X A L Bound Brook (U.S.A.), R 7. Southern airs and concert.
 19 m. W 8 X K, Pittsburgh (U.S.A.), R 5 Service. D J L, Zeesen, R 9. Band marches. R K I, Moscow, R 9. "International" and call.

THERE WILL BE MORE ABOUT THE S.T.900 IN NEXT WEEK'S "POPULAR WIRELESS"

A FAVOURITE GIFT BOOK

FOR a considerable number of years CHUMS ANNUAL has been the favourite gift book with many manly boys. The latest edition, with its 412 pages of enthralling reading and four splendid colour plates, is as good as ever. The contents include over 40 fine short stories by popular authors, four book-length adventure stories, and interesting pictorial articles on all sorts of subjects that appeal to boys. It is superbly bound in cloth, and at 8s. 6d. this incomparable gift book is excellent value for the money.

THE PERFECT SPEAKER FOR THE S.T.900 OR ANY SET

—says Leslie Orton.



Mr. Leslie W. Orton.

WELL-KNOWN AMATEUR'S UNSOLICITED TRIBUTE

Never can it be said that the yearly improvement achieved by W.B. designers is unappreciated by the keen amateur. Mr. Orton's spontaneous tribute to the new order of reproduction the latest Stentorian brings, is supported by hundreds of other enthusiastic encomiums from amateurs, well-known designers, and organised bodies of radio fans.

Mr. Leslie Orton (President, Anglo-American Radio and Television Society), whose independent test of the S.T.900 appeared last week, sends the following entirely unprompted statement:—

"I tested the new Stentorian with the S.T.900, and am delighted in its performance. Clarity, reproduction and volume are amazing. It is an ideal speaker for the S.T.900 or any set."
 —(Signed) Leslie W. Orton.

However satisfied you are with your reproduction now, you owe it to yourself to hear the new Stentorian standard. Permanent magnet model 38S (42/-) is particularly worth your attention. Your dealer has one. Ask him to-day!

READ THESE, TOO.

"Listeners meeting this latest expression of W. B. quality will be thrilled by its clear, impressive bass and crystal clear top notes. The speaker (Senior, 42/-) gives a realism which must be heard to be believed."—Mr. G. V. Dowding, Associate I.E.E., Editor of "Popular Wireless."

"We shall certainly get one . . . It is the finest speaker at its price to-day."
 —Mr. R. Adams, Perth Radio Club.

"That I am delighted is the least I can say . . . undoubtedly an improvement on previous models. Several friends have W. B. speakers, but wait till they hear this one!"—Mr. F. C. L., Portsmouth.



Stentorian

PERMANENT MAGNET MOVING COIL SPEAKERS

WHITELEY ELECTRICAL RADIO CO., LTD. (Information Department), MANSFIELD, NOTTS.

FROM OUR READERS

DO TELEPHONE WIRES CAUSE SUNSPOTS?

The Editor, POPULAR WIRELESS.

Dear Sir,—Some good while ago a controversy raged, I think in "P.W.", as to what was the cause of the familiar humming of telephone wires. At the time, I thought, why the argument? Obviously these vibrations are caused by the wind. However, since then I have completely changed my mind about that.

Fifteen or sixteen months ago I had the phone fitted at this address, and it was not long before I began to associate this humming with electrical disturbance of the atmosphere. I noticed that it usually preceded stormy conditions, that was during the summer months, but the thing that most attracted my attention was that on occasions when the wires hummed badly, and almost invariably in the nature of very rapid fading. On numerous occasions since the same effect has been noticed, the latest being recently.

Wondering if the close proximity of my aerial to these wires was in any way to blame for the effect I erected another one at right angles and farther away. Since then still another has been put up at another angle, and I can say definitely that there was and is no interaction to cause the effect. Furthermore, by listening to "ham" stations I was soon able to find out if similar conditions prevailed elsewhere.

The conclusion I have drawn is that there is a definite connection between the humming of the wires and bad conditions on the short waves, particularly with rapid QSB, and no connection whatever with strength or direction of the wind. Now, I thought, sunspots acting on the Heaviseide Layer, or what layer have you, caused good or bad conditions on the short waves. Do these sunspots also cause our wires to hum, or is it the wires cause the sunspots? Kay someone please.

LEONARD J. CLEGGETT.

White Cottage, Detling Hill, Maidstone, Kent.

POWER FROM THE WIND

The Editor, "Popular Wireless."

Dear Sir,—I am rather touched by the want of some sort of electric supply on Pitcairn Island, as depicted in your issue of October 2nd.

I do not know what Pitcairn Island would be like as far as water power is concerned, but I am quite sure that they could get a wind-operated generator to supply quite a number of sets, and also work a short-wave transmitter which would be of great value to the people there.

I use water power here for charging hundreds of wireless batteries, besides supplying power for cooking and light. Previous to concocting this plant, which has an overhead line of half a mile in length and works automatically, I used wind power, which worked quite well when we had enough wind to keep us going. The voltage I used was 30, and charging a group of five 6-volt car batteries for storage at 3 to 10 amps did all right then. The wheel was an old four-blade propeller driving an old back-end gearing of a car with one shaft removed and the differential locked for step-up gearing direct to the dynamo, which was an old Dodge car starter, rewound for 30 volts.

The whole was mounted on the top of a tower made of wood. The ball-bearing head for it to turn was also a part of a car, and the electric power was carried off by a brush bearing on an insulated ring, the return through the ball bearings. The tail was fixed and it stood some very bad gales, so I am sure if there are any technically minded chaps out

A reader puts forward an interesting theory, based on his observations, concerning that old controversy of what makes telephone wires hum

in Pitcairn Island they could take a trip to New Zealand, pick up the necessary junk and build a generating station for themselves. There are lots of 6- or 12-volt car generators being driven with water and simple gearing throughout this country, the essential being a good generator and cut-out.

I trust that if anybody can understand all this it will be of some service to those who need it most.

J. H. COPELAND:
Myreside,
Bridge of Marnoch.

IT WORKED,
THANKS!
The Editor, POPULAR
WIRELESS.

Dear Sir,—Although I have been a reader of "P.W." for two or three years I haven't written before, for the simple reason that I did not have anything interesting enough to write about, as I got my first wireless set only two years ago. Well, on reading the readers' letters the other day, I came across one written by Nubar Sahagian, Egypt, in which he gave a tip on charging dry batteries. I was a bit dubious about it, but nevertheless I had a shot at it, using only plain water.

Imagine my surprise when I fixed up the battery, after the operation, and switched on—the battery which I was going to throw away was as good as new. May I, through your paper, thank Mr. Sahagian for his very useful tip.

Wishing POPULAR WIRELESS the best wishes and good luck.

JAMES MACAULAY.
Knockhouse Farm, Dunfermline, Fifeshire.

WHO WANTS A GUINEA

Most of you, probably! Well, you all stand an equal chance of winning the guinea awarded each week to the sender of the best letter, in the opinion of the Editor. Neither literary merit nor length is a criterion of success; no radio subject is barred. This week the prize goes to Mr. Cleggett.

"P.W." READERS RESPOND

The Editor, "Popular Wireless."

Dear Sir,—Many thanks for publishing my appeal for silver paper in aid of a crippled girl. The result has been very gratifying, and I would like to express my appreciation to all who have contributed. I have now extended the fund to a little boy, six years of age, who lost a hand in an accident. May I remind readers that foil from cigarette packages is also acceptable.

MAURICE L. HUNT.
18, Princess Street, Knutsford, Cheshire.

COMPARATIVE TESTS ON RADIO RECEIVERS

The Editor, POPULAR WIRELESS.

Dear Sir,—I am writing to draw attention to a method of comparative tests on radio receivers, which gives entirely incorrect results and which is one very commonly employed by radio dealers and wholesalers, and even by persons comparing receiver performances in their own homes.

I refer to the general practice of having receivers wired up to a common earth and aerial. The common earth is all right, but the common aerial causes the receiver with the lowest impedance aerial circuit to take nearly all the signal and, consequently, to give a much louder result by comparison with the other set than it would do if each set were

connected separately.

It is therefore vitally important when comparing receivers in this way that the aerial be connected only to the set under test, as in this way each receiver will give its maximum performance.

J. BAGGS.
Radio Works, Moston, Manchester, 10.

DX "PHONE VERIS"

The Editor "Popular Wireless."

Dear Sir,—I have recently received a phone veri from U.S.A. Police Phone, W6XKW, City of Alameda, California, on 30.1 metres, power 100 watts input, but they are soon moving to a better location and doubling their power. Also my second phone veri from Nevada.

Also a veri from VO1P, on 7 metres, phone.

The Nevada veri is W6FUO, with 65 watts, on 14,224 kc. I wonder how many other British SWL's have above veris.

Wishing your fine journal all success.

BOB EVERARD.
Sawbridgeworth, Herts.

THE CAPE TOWN S.W. STATION

The Editor, POPULAR WIRELESS.

Dear Sir,—Although I have devoured the columns of your excellent magazine for nearly six years, this is the first opportunity I have had (or, more correctly, the first excuse) for writing to you. My reason is that at last, after much agitation, etc., Cape Town now has a pukka S.W. transmitter, which goes under the name of Klipheuel, on 49 metres, from 7 p.m. (local time). During the day it operates on 31 metres, although it is unlikely that there will be anything approaching reliable reception on this band. As to power, of this I am not quite certain, although I believe it is 5 kw.

(Continued on next page.)

RESEARCH AT SOUTHEND



A corner of the Ekco research room at their works at Southend, where highly skilled engineers are constantly experimenting with new ideas and designs.

(Continued from previous page.)

There is another little matter which I should like to bring to your notice.

As a keen constructor my experience of local prices, quality, etc., of components is fairly wide; and it is with regret that I report a very poor demand for British tubes (pardon the "Yankee-ism"), mainly owing to high prices, but also to the high cost of transformers to match (in the case of A.C. tubes).

Surely something can be done to rectify this; Why should I pay 12s. 6d. to 18s. 6d. for an A.C. S.G., when an American 24-a. costs 3s. 6d.? Similarly, a Mullard 60 m/a. 300 v. capacity F.W. rectifier costs about 12s. 6d., whereas the American 80 (up to 550 v. at 120 m/a.) costs 2s. 6d.

And so I could continue *ad nauseam*. Well, time is scarce, and space is scarcer, so with a parting request of a report from someone of reception of Cape Town's signal.

N. A. DE VILLIERS.
"The Retreat," Higgo Road, Khoof Nek, Cape Town, South Africa.
P.S.—My age is 16½ years.

CLUB NEWS

FARADAY RADIO SOCIETY

MEMBERSHIP of the Faraday Radio Society is restricted to members of the Walworth Men's Institute, but membership of this Institute is open to all men over 18 years of age.

In addition to club activities, an Instructor in Radio is provided by the L.C.C. Education authorities, and a substantial grant is made towards the cost of equipment and tools. The club meets every Tuesday and Wednesday evening at the Nelson L.C.C. School, Trafalgar Street, London, S.E.17.

Full particulars, both of the classes and the club activities, may be obtained from Mr. J. Sykes, 9, Maltese Road, Chelmsford, Essex, or from the Hon. Secretary, Mr. John Payton, 39, Penton Place, London, S.E.17.

WELLINGBOROUGH AND DISTRICT RADIO AND TELEVISION SOCIETY

The new season's opening gathering of members of the above Society took place at the Exchange Hotel, Wellingborough, on Wednesday, October 13th, when a lecture was given by the Hon. Secretary of the Society, Mr. L. F. Parker, G5LP, entitled "Short-Wave Radio and the Amateur Bands."

Commencing with the lower frequency band, the 180 metre, Mr. Parker paid particular attention to the fact that of all the amateur bands, this was the most neglected, and that some effort would have to be made in the near future to prove occupancy of this band, or it would follow the usual precedent and would be confiscated for the use of the other services who were constantly clamouring for more wavelengths. This would be a very unfortunate thing for amateur radio in that the 180-metre band had quite a number of distinct advantages over other bands in that local contacts between amateurs could be carried on without undue interference, as was experienced on the higher frequency bands. One of the amusing things often heard on this band was the cross-talk between trawlers returning to port after a fishing trip, and the lurid terms in which some of the skippers described their catch or the lack of it to other skippers was often of great surprise to listeners who accidentally stumbled across these transmissions.

In describing conditions on the popular 40-metre band, Mr. Parker said that as a whole the standard of operating there and the quality of some of the transmissions heard from amateur stations in that band, was deplorably low, and was doing more than anything to bring the amateur fraternity into bad repute. He appealed for beginners to commence transmissions on the 180-metre band instead of adding to the welter of interference already experienced on 40 metres, and went on to criticise the craze for high power that was now the order of the day, and which was largely the

cause of the intolerable conditions of the 40-metre band. This craze for high power was a vicious circle that could only be broken by stern measures upon the part of the powers that be! and until some reduction in power could be enforced, the condition of the 40-metre band was not likely to improve. Mr. Parker gave instances of his own knowledge where English amateur stations using about 100 watts of heavily modulated telephony had carried out contacts of long duration with other English stations less than 100 miles away, and by so doing were swamping scores of other transmissions into oblivion, whereas the same contact could quite easily have been made with inputs below 25 watts.

The next band dealt with was the 20-metre band, and which from a listener's point of view was the most popular on account of the enormous amount of long-distance telephony that could be heard there. When conditions were good, said Mr. Parker, transmissions from all over the world could be easily heard at different times of the day, and he instanced the large number of American telephony transmissions which occupied a position in the centre of the 20-metre

band, and which could be heard on almost any evening during the summer at better strength than some of the broadcasting stations. The rapid development of the ten-metre band was also described.

GOLDERS GREEN AND HENDON RADIO SOCIETY

There will be a lecture at the Regal Cinema, Finchley Road, N.W., on Thursday, November 11th, on "Fault Finding and Correction in a Wireless Receiver," by D. N. Corfield, D.L.C., Grad.I.E.E.

The lecture will commence at 8.15 p.m., and "P. W." readers will receive a hearty welcome.

SOUTHALL RADIO SOCIETY

On November 9th a demonstration of the Hammerlund Super Pro Receiver will be given by Mr. Douglas Walters at the club headquarters, The Southall Public Library, Osterley Park Road. Meetings are held every Tuesday at 8.15 p.m., and further details can be obtained from Mr. H. F. Reeve, 26, Green Drive, Southall.

S.T.900 'DESIGNER' KITS

All components exactly as specified by Mr. Scott-Taggart. Carefully packed in strong cartons, and sent post free.

Note. Complete kit or any part supplied separately for Cash or C.O.D. (see below). We pay postage or C.O.D.

charges on orders of 10/- or over. Dispatched by return.

KIT 'A'
with screws, wire, etc., and 4 coils covering medium and long-wave bands, without valves. Cash £3/10/0, or **7/-**
WITH ORDER and 11 monthly payments of 6/6.

KIT 'B'
with screws, wire, etc., and 10 coils covering medium, long, and 3 short-wave bands, without valves. Cash £4/5/0, or **8/-**
WITH ORDER and 11 monthly payments of 7/10.

KIT 'C'
As KIT "B," but inclusive of all valves. Cash £5/15/3, or **10/-**
WITH ORDER and 11 monthly payments of 10/7.

Don't be kept waiting!



DELIVERY AT ONCE—
FROM STOCK As usual, L.R.S. customers will get their S.T.900 kits first, without any annoying delays. L.R.S. has supplied all "P.W." kits quickly and on lowest terms continuously since 1925.

KIT "A" LIST OF COMPONENTS

	s.	d.
1 J.B. .0005-mfd. main tuning condenser, with drive and 1½ in. knob	6	6
1 POLAR .0005-mfd. aerial balancer, with knob	5	6
2 B.T.S. 6-pin coil holders, Type "O" (self-locating)	2	0
1 GRAHAM-FARISH .0005-mfd. aerial coupler condenser with 1½ in. knob	2	0
1 GRAHAM-FARISH .0005-mfd. aerial reaction condenser with knob	2	0
1 GRAHAM-FARISH .0005-mfd. anode reaction condenser with 1½ in. knob	2	0
1 T.M.C. block condenser, Type B1007	4	0
3 Lissen .006 fixed condensers	3	0
2 LISSEN .0005 fixed condensers	1	0
1 T.M.C. .0002-mfd. tubular condenser	9	
3 DUBLIER 1-meg. ½-watt resistors	1	6
1 DUBLIER 20,000-ohm ½-watt resistor	6	
1 DUBLIER 5,000-ohm ½-watt resistor	6	
2 B.T.S. all-wave H.F. chokes	3	6
1 VARLEY "NICLET" 3-5/1	7	6
5 W.B. 4-pin valve holders with terminals	3	4
4 BELLING & LEE Type "E" terminals	1	2
3 CLIX parallel sockets, type No. 8	3	
2 CLIX master wander plugs, type No. 5	3	
1 PETO-SCOTT polished wood panel (Metaplex reverse), 16 in. x 12 in. x ½ in.	3	9
2 PETO-SCOTT polished side pieces	1	6
2 PETO-SCOTT terminal strips	4	
1 PETO-SCOTT wood platform, ready drilled, stained and polished	1	0
1 PETO-SCOTT aluminium screen	6	
B.T.S. ONE-SHOT INDUCTORS:		
Type 9M.W. (190 to 550 metres) per pair	5	6
Type 9L.W. (900 to 2,000 metres)	6	6
Complete Connecting Kit (screws, wires, etc.)	2	6

CASH PRICE, CARR. PAID £3 10 0

W.B. SENIOR STENTORIAN
Recommended as the Speaker to get the best out of the S.T.900 or any set. Microtone matching device. Other W.B. Models similar terms.
2/6
with order and 11 monthly payments of 4/- Cash price 42/-.

Go for the line with this 'L.R.S.' Sign!

- EVERY order carrying this symbol is:
- (1) Fully Guaranteed.
 - (2) Sent Carriage Paid.
 - (3) Available for Immediate Delivery.
 - (4) On the Best and Lowest Terms.

Whatever your needs—let us quote
EASY TERMS
CASH or C.O.D. ORDERS SENT BY RETURN

PHONE: NATIONAL 6828-9
3 Minutes from St. Pauls

LONDON RADIO SUPPLY COMPANY 1925
11 OAT LANE, NOBLE STREET, LONDON, E.C.2

You'll get it **QUICKER** and on **BETTER TERMS** from **L.R.S.**

Questions and Answers

By K. D. Rogers

"SELF-SWITCHING" SUPERHETS—A MYSTIFYING FAULT

I have had letters from two readers owning different sets but complaining of the same thing. They are superhets and in each case the set switches itself off as far as signals are concerned without warning. The reception can be brought back only by "waggling" the wavechange switch.

I cannot say exactly what the trouble is, but the first thing I should suspect is the oscillator valve. It looks to me as if that valve or its coil or its circuit somewhere is faulty. It seems to be "packing up" on occasion and only a sharp shock applied to its grid or anode will send it back into oscillation.

In each of your cases, R. E. (Stammore) and E. C. W. (Sheffield), I should get a service engineer to test the oscillator current and to see what happens when the set switches off as you describe. That is the only way to tell if it is the oscillator valve that is at fault, as I suspect it is.

With regard to your aerial, E. C. W., I should use a quite short "L" aerial, I think. About 35 to 40 feet will be enough to give you good results on broadcast wavelengths and will be quite good on short waves. The height you mention, of 30 feet, is perfectly good enough. In your case I don't think I should bother with a dipole, for you will have to have some sort of switching arrangement or a unit to convert it from a dipole to a normal type of aerial when you want to use it for normal broadcast reception.

S.O.S.

Has anybody a couple of perfectly good copies of "The Wireless Constructor" containing the operating details of the S.T.400? If so, please drop a line to N. Salkin, 21, Tillotson Street, Liverpool, 7.

Also, has anyone got copies of "P.W." for March 25th and April 1st, 1933? If so please get in touch with W. H. Vivash, 36, Russell Road, Palmers Green, London, N.13.

Being greedy, I am going to "sponge" on your generosity and patience once more. Is there anyone in possession of a nice, readable blue print for the S.T.300? Yes? Thanks. And incidentally have you got one for the S.T.400 as well? You have? Fine. And here's the snag. If you have one of either or both please could you write to Mr. R. C. G. Orford, 7, Maldon Road, Acton, London, W.3, and enclose a bill. He wants to buy TWO COPIES OF EACH. We haven't a single copy in the place or we should not be bothering you.

Ladies and gentlemen, I thank you for your kind attention.

IS IT EARTHED!

F. R. W. (Guildford).—The chassis or metallised panel of the short-wave set diagram shown on page 100 of your issue for October 9th does not seem to be earthed. Is that right?

It is earthed. If you follow the diagram round you will see that the connection to the earth marked E goes up to the point C, whence it goes down to the filament of V2, thence to filament of V3 and then along to the filament of V1. From that point it goes to the coil tapping, back to the connection to the under plate of the condenser sign and down to the "chassis," as you call it. So you see that the metallising IS earthed after all.

This will be clearer to you if you study the diagram on page 102, where you will see that the lead from the earth terminal goes along to the point C on the condenser block, on to F- of V2, and thence to the screw holding down the Niclet transformer.

PERMANENT NEEDLES?

"Interested" (Grimsby).—I read with interest the article by J. F. Stirling ("P.W." October 16th) concerning gramophone needles. But isn't he somewhat forgetful about the Chromic type of needle when he says that the tungsten type is the one that has "held the day"?

Possibly he does not consider the Chromic type of needle, like the Columbia "Chromic" and the H.M.V. "Hi-Fidelity," as really permanent needles. And, lest I should be misunderstood, let me qualify that term permanent at once. I mean that the Chromic needle is often regarded in the light of a demi-semi-permanent needle, whereas the Tungstyle is regarded as a semi-permanent type.

Rather a fine distinction perhaps, but you must remember that there is no such thing at present as a permanent needle—meaning one that will never have to be discarded.

Years ago there was a sapphire point which was used on the hill-and-dale recordings of the Pathé company. These never wore out, I believe, but they have gone off the

market since the side-to-side recording triumphed. The Tungstyle needle is usually useful, in my opinion, for about 30 to 35 playings, though it is stated on the box that it will last longer than that. But I am a tad where needles are concerned, and I change mine after about that number of playings.

The chromium-plated needles, however, I find usually require changing after about 20 to 25 playings, dependent of course on the pick-up being used and the "violence" of the recording.

I HAVE used chromiums for as many as 35 playings, but at the end of that time I have been able to notice a distinct harshness—especially on piano records—when using a piezo-electric pick-up. So, I should say that Mr. Stirling is somewhat of the same opinion—that the Tungstyles really last longer than the others, though officially they are both semi-permanent needles.

The matter of quality in reproduction is another matter altogether, and your question as to which of the so-called "permanent" types is the best is a difficult one to answer.

It depends on the pick-up and the radiogram to such an extent that I cannot give a definite answer.

I use the Columbia "Chromic." I have a piezo-electric pick-up working into a paraphase amplifier. I have tried Tungstyles and do not like them so well, and I have also tried the H.M.V. "Hi-Fidelity" needles, and I imagine that they are not quite so good as the Columbia. I say "imagine" because, although I religiously use the one and not the other, I cannot for the life of me see why the two should be any different.

However, that's how it goes in radio. We operate a very great deal on imagination. We decide on what sounds best to us and let it go at that. No doubt if there were a really scientific test of the needles in my particular set I should find that there was nothing to choose between them as regards their quality of reproduction.

MAINS AERIALS

T. D. W. H. (Teignmouth).—How does a mains aerial work?

Quite simply. The electric wiring of a house, let alone any outside wiring which is overhead—as in the grid system of power supply—must act to some extent as an aerial and pick up radio waves. That fact is obvious.

All that remains to be done, therefore, is to tap off these radio impulses which are induced in the wiring and to apply them to the aerial input of the set.

That is done by a coupling device that usually consists merely of a condenser in series with the wire from the aerial of the set and an adaptor which fits into the electric supply socket. The condenser is of good "strong" make, so that it will stand the voltage of the mains—for it would be disastrous to allow the mains to "break through" into the aerial section of the set, where the current would burn out the tuning coils and possibly set fire to the whole set.

The radio impulses, however, pass "through" the condenser from the electric wiring and go to the tuning coils of the receiver, just as they would were an ordinary outdoor aerial used.

That is all there is to it, I am afraid, except that in some sets special choking arrangements are made to prevent unwanted impulses which might cause noises in the set coming down the condenser path to the aerial terminal.

WHAT DO YOU THINK?

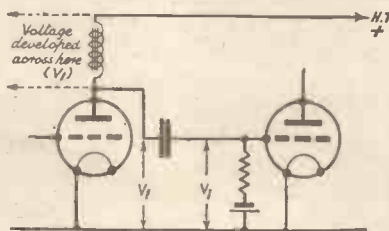
R. F. P. (Plymouth).—I read with interest your remarks to D. M. B. (Southampton) in the June 5th issue, in which he has trouble on his short-waver with the London Regional coming in all round the dial. I have the same trouble on my "Empire Short Wave Three," and have tried without result a new reaction choke, and a resistance instead of the choke. The coils tune quite O.K. except for the London Regional.

Very nasty. And I hesitate to hand it over to W. L. S.—he has enough queries of his own to answer. But I am going to draw his attention to it and also yours. Perhaps you have come across the same trouble and HAD CURED IT. I have come across it before, and cured it by alteration of the reaction choke, but apparently this time it does not work. So, at the risk of my reputation as a fault-finder, I am going to ask you to come and help. Honestly, I do not know what to recommend; it's not easy without actually handling the set, and I dare not suggest it should be sent up to me, as I should immediately be inundated with sets from all parts of the country. I have tried it, and I KNOW.

But the problem remains. What is the trouble? How would YOU cure it? No prizes for the correct answer, but you will have the satisfaction of knowing that you have perhaps saved a perfectly decent reader from tearing out his hair—or even worse.

TECHNICALITIES EXPLAINED—No. 70

Choke-Capacity Coupling



This is not a term which is used to denote that a choke has capacity. It is used to denote a form of coupling between valves, a coupling that consists of a choke and a condenser or capacity. Strictly speaking, it should be termed inductance capacity, to fall in line with resistance capacity, a form of coupling in which a resistance and a condenser are used.

The operation is one which is similar to resistance capacity coupling, except that in choke coupling the impedance of the choke increases with frequency, and so it is more effective at moderately high frequencies than at low frequencies. At very high frequencies, specially in audio frequency circuits, the self capacity of the choke itself comes into play and reduces its impedance. For very low frequencies it is essential to have a large choke if adequate impedance is to be obtained. In all inter-valve couplings resistance coupling is better—the only advantage the choke method holds over resistance is that it does not cut down the H. T. to any great extent.

A GOOD deal of distortion can be blamed upon the detector and high-frequency stages, especially the former, but it is a mistake to suppose, as some people do, that the low-frequency amplifier is always free from suspicion in this respect. Distortion in a low-frequency amplifier can be produced by various causes. As a rule it is due to too great an amplitude being developed at some point of the circuit. When the amplitude gets beyond a critical amount it means that the load which is being thrown upon the next following valve represents an input which is more than it can handle.

A Useful Rule

In passing, I may mention a kind of rule-of-thumb which is often very useful, and that is to arrange that the input voltage to any valve is not more than about half the grid-bias voltage. Apart from distortion due to excessive amplitude and consequent overloading of valves, there is a second kind of distortion, which arises from resonance in the circuit, the effect of this resonance being to magnify certain frequencies more than others. You will see that, in regard to these particular resonant frequencies, the effect becomes the same as that which we have just been discussing, namely, too great an amplitude is developed. The difference is that in the second case the excessive amplitude is developed only in regard to certain particular frequencies, whereas in the first case it is developed for pretty well all frequencies.

This picking-out or resonant effect is not generally noticeable much below about

TECHNICAL JOTTINGS

Items from an expert's notebook.

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

5,000 cycles, but above this frequency it sometimes becomes very pronounced.

Where there are two L.F. stages a well-known dodge is to change one to resistance-capacity coupling; this is commonly prescribed as a cure for frequency-distortion and in the majority of cases it certainly works quite well for the range of frequencies generally used.

With regard to resistance-capacity-coupled amplifiers, it is very important to use correct values for the coupling components, because if you do not you will lose the advantages of the resistance-capacity-coupling arrangements as regards freedom from frequency-distortion which we have just been talking about.

R.C.C. Coupling

In a resistance-capacity-coupled stage the anode of the valve should be supplied with the maximum rated voltage, and for this you have to be careful to arrange the total resistance included in the anode circuit accordingly. The impedance of the coupling condenser at the lower end of the required frequency range must not be too large. A good rule is to see that the impedance is not more than about ten per cent. of the resistance value of the grid leak.

A further point with regard to the coupling condenser is that it should have very good insulation, and for this reason a mica condenser is preferable to other types.

Short-Base Variable-mu Valves

Readers often seem to be a bit hazy as to what is meant by a short-base variable-mu valve. This valve was produced mainly for automatic volume control, and it derives its title from the fact that in its characteristic curve it has a short grid-voltage base.

The effect of this in practice—which is what we really want to know—is that, in order to produce a variation in its amplification from maximum to minimum, only a comparatively small variation in grid-bias voltage is necessary.

The Question of Aerials

Owing to the great increase in sensitivity due to improvements in high-frequency amplification during recent years, the use of a particularly efficient aerial seems to have become a thing of the past.

Notwithstanding this, there are still many people who like to get the last ounce of signal energy from the ether before they start to put their set to work to amplify it up and reproduce it. This is not a bad idea because, after all, the extra energy you get from the ether with a good aerial is just so much gained, free gratis and for nothing, and a sufficient increase in aerial efficiency may well amount to the equivalent of an extra valve, without any running or maintenance costs. Yes, an efficient aerial is definitely worth while.

N.T.S. LEAD THE FIELD WITH BARGAINS!
IMMEDIATE DELIVERY—CASH OR EASY TERMS

N.T.S. S.T.900 FINISHED INSTRUMENT
PERFORMANCE GUARANTEED
Ready-built S.T.900 with matched, tested and guaranteed parts all to specified values, complete with 5 matched valves, and set of 10 N.T.S. S.T.900 coils, housed in Peto-Scott walnut table cabinet. Rigidly aerial tested on all wavebands, less speaker and batteries. Carriage Paid **£6:6:0**
Or 12/6 down & 12 monthly payments 11/3.

PETO-SCOTT S.T.900 PILOT AUTHOR KITS
KIT "A" Cash Price 55/6 or Carriage Paid **5/-** DOWN
Pilot Author Kit of Components exactly as FIRST specified, with MR. JOHN SCOTT-TAGGART'S S.T.900 AUTO-DIAL CARD, but LESS coils, Konectakit, wander plugs, accumulator connectors, valves, extractor kit, cabinet and speaker. Cash Price, Carriage Paid, 55/6, or 5/- down and 11 monthly payments of 5/3.

KIT "A2" Exactly as Kit "A," but including Peto-Scott Konectakit and 2 B.T.S. Medium-wave One-Shot Inductors. CASH PRICE, Carriage Paid, £23/3/6, or 6/- down and 11 monthly payments of 6/-.

KIT "A4" Exactly as Kit "A," but including Konectakit and 4 B.T.S. One-Shot Inductors covering Medium and Long Waves. Cash Price, Carr. Paid, £37/10/0, or 7/- down and 11 monthly payments of 6/7.

KIT "A10" Exactly as for Kit "A," but including Peto-Scott Konectakit and 10 B.T.S. One-Shot Inductors covering Long, Medium, and three short-wave bands. Cash Price, Carriage Paid, £45/5/0, or 3/6 down and 11 monthly payments of 8/-.

S.T.900 SPECIFIED VALVES. If set of 5 first specified valves is required with any of the above kits, add £1/10/3 to cash price, or 3/6 to deposit and 2/9 to each of the 11 monthly payments.

Any Peto-Scott S.T.900 Pilot Author Kits, Cabinets, or Finished Instruments available for Cash or on Easiest of Easy Terms.

AMPLIFIERS
For Public Address or Home Broadcasting

7-watt A.C. MODEL. Efficient 4-valve push-pull circuit. High-fidelity reproduction. Undistorted output 7 watts. For microphone or pick-up. Circuit: triode, resistance transformer coupled to 2 power amplifier valves in push-pull, valve rectifier, consumption 60 watts. Steel chassis. Size: 7 1/2 in. high, 4 in. wide, 10 in. long. For A.C. Mains 200/250 volts, 40/80 cycles. Complete with 4 valves, ready for immediate use. **5/-** DOWN
List Value £4/19/6. BARGAIN, Cash or C.O.D. £3/10/0 or 5/- down and 12 monthly payments of 2/1.

4-watt BATTERY AMPLIFIER. Q.P.P. output, providing quality reproduction on gramophone and microphone. Dimensions: 7 in. long, 5 in. deep, 7 1/2 in. high. For use with ordinary H.T. battery 135-150 volts. With 3 valves, fully tested. List Value £4/4/0. BARGAIN, Cash or C.O.D. £2/15/0, or 4/6 down and 12 monthly payments of 4/9.

MICROPHONE. Transverse Current Carbon Type for use with above Amplifiers. Complete with transformer and grid bias battery. Cash or C.O.D., £1/1/0, or 2/6 down and 8 monthly payments of 2/9.

S.G.3 CHASSIS
with knobs & escutcheon, less valves
LIST VALUE 60/- BARGAIN **19/6** Cash or C.O.D.

● Latest Screened Grid. H.F. Detector and Pentode output circuit. ● Screened coils. ● Only 5 m.a. H.T. Consumption. ● Illuminated and Wavelength Calibrated Dial. ● Wave-range 200-2,100 metres.

Or Complete with 3 British Valves. List Value £4/4/0. Bargain £2/2/0, Cash or C.O.D., or 2/6 down and 12 monthly payments of 4/.

SHORT WAVE BARGAINS!
LESS THAN TWO-THIRDS LIST VALUES!
EVERY SHORT WAVE ENTHUSIAST NEEDS ONE OF THESE SETS FOR WORLD WIDE Loudspeaker or Headphone RECEPTION. **2/6** DOWN

EVERY KIT ABSOLUTELY COMPLETE with all coils and comprehensive building and operating instructions

1-Valve "3-in-1" Short-Wave Kit. Adapter converter or efficient one-valve receiver. 12.94 metres. List Value 37/6. Bargain 25/-, or 2/6 down and 10 monthly payments of 2/6. With valve, 28/9, or 2/6 down and 11 monthly payments of 2/9.

2-Valve Bandspread Short-Wave Kit. 12-94 metres. Will bring a lifetime of fascinating short-wave entertainment. Complete kit. List Value 59/6. Bargain 32/6, or 2/6 down and 11 monthly payments of 3/-, or 2/6 down and 11 monthly payments of 4/-.

3-Valve Bandspread Short-Wave Kit. 12-94 metres. As in all N.T.S. short-waves, slow-motion bandspreading simplifies WORLD-WIDE RECEPTION. Complete kit, less valves. List Value 60/-. Bargain 37/6, or 2/6 down and 11 monthly payments of 3/6. With 3 matched valves 55/-, or 5/- down and 11 monthly payments of 5/-.

Coils available for use with above sets up to 2,000 metres.

FREE! Every "P.W." reader should have to hand for reference the N.T.S. Short-Wave A.C. and Battery Kit Bargains Book and General Radio Bargain Lists. Post coupon for your free copies.

New Times Sales Co.
56 (P.W.45), Ludgate Hill, London, E.C.4.

Please send me.....
for which I enclose £..... Cash/H.P. Deposit, together with Free S.W. Bargain Book and General Bargain Lists.
NAME.....
ADDRESS.....
Please cross P.O.'s and register currency. Overseas orders post extra.

The RADIO Bulletin

Up-to-the-minute news concerning the radio industry

THE latest G.E.C. release is a battery all-wave superhet with Q.P.P. output. Selling at 11½ guineas, this set has iron-cored H.F. and I.F. coils, a standing H.T. consumption of approximately 9 milliamps, and an L.T. consumption of '85 amps. The tuning control is fitted with the new G.E.C. economy device in which the dial

MCCARTHY 5-VALVE ALL-WAVE SUPERHET



Price

£6:17:6

(Complete with B.V.A. Valves)

This moderately-priced 7-stage 5-valve all-wave receiver utilises a remarkably efficient superheterodyne circuit which provides exceptional sensitivity on all three wave-bands—18-50, 200-550, 1,000-2,000 metres.

Circuit includes: Latest type triode-hexode frequency changer, vari-mu pentode I.F. amplifier, double diode-triode operating as diode detector and I.F. amplifier, and providing full A.V.C. High-slope 3 watts output pentode. Wave-change and gram. switch. As illustrated, but with new type dial with principal station names.

All McCarthy receivers supplied complete with valves, knobs, pilot lamps, leads, mains cable, and plug. 12 months' guarantee.

Deferred terms on application, or through our City agents, London Radio Supply Co., 11, Oat Lane, E.C.2. Demonstrations daily.

Cash with order on 7 days' approval. Also write for illustrated catalogue of complete range of all McCarthy receivers.

MCCARTHY RADIO LTD

44, Westbourne Grove, London, W.2

Telephone: Bayswater 3201/2.

ENGINEERS! ARE YOU EARNING LESS THAN £10 PER WEEK?

If so, you cannot afford to carry on without reading our 268-page Handbook. The book explains clearly and definitely many ways of carving out a successful career. Among other things it explains the Services of our unique Appointments Department, outlines of our unique Courses in all branches of Civil, Mechanical, Electrical, Motor, Aero, Wireless, Television, "Talkie" Eng., Building, Govt. Employment, etc., and gives details of A.M.I.A.E., A.M.I.E.E., A.M.I.W.T., G.P.O., M.A.T.R.I.C., and all Exams. We alone Guarantee—"No Pass—No Fee."

Whether you be an old hand or a budding apprentice get this book to-day — FREE AND POST FREE.

**BRITISH INSTITUTE OF
ENGINEERING TECHNOLOGY,** 101, Shakespeare House, 17/19, Stratford Place, London, W.1.



remains lighted only during the process of tuning. This eliminates the drain on an L.T. battery which occurs while the dial lights remain on during the whole time a set is in operation.

The set is housed in a polished walnut cabinet, and there are only three controls.

Other features are a chromoscopic tuning dial tilted at an easy viewing angle at the top of the cabinet and an automatic two-speed tuning device. The two-speed tuning device is such that the rapid motion of the tuning pointer is automatically reduced to slow motion by a reversed rotation of the tuning knob. The wave-range of the set on the short waves is 16-50 metres.

NEW G.E.C. AERIAL

Another new G.E.C. product is an anti-interference all-wave aerial which, it is claimed, is efficient from 10 to 2,000 metres, while at the same time cutting out electrical interference of the type generated by lifts, neon signs, electric motors, etc.

A further claim by the makers is very low signal loss in the transformers and transmission lead. It is pointed out that although all all-wave aerials are directional, the directional properties of the G.E.C. aerial are less marked than some. This is an advantage in those cases where the aerial is required for general use, i.e. reception from all directions. The aerial is priced at 52s. 6d., complete with sixty feet of noise-reducing transmission lead.

FOR SHORT-WAVE SETS

A new type of valve is to be added to the Osram international range. This is a triode hexode which is to be known as the X65, and it is designed primarily with a view to efficient operation on the short waves. A particular feature of the X65 is high input impedance at 20 megacycles, and entire absence of pulling on short waves, and constant conversion gain over the whole band of wavelengths from short to long.

It is suggested that in most receivers the X65 will be preceded by a stage of H.F. amplification, using a valve such as, say, the W63, an arrangement giving a low noise-to-signal ratio.

The X65, in common with other valves of the international range, has a heater rating of 6.3 volts 0.3 amps, which permits it to be used in both A.C. and universal type sets. Also an octal base is fitted—a standard feature of this range. The list price is 15s.

PX4 RATING INCREASED

Designers of high quality receivers and amplifiers will be interested to learn of the increase in anode voltage and wattage rating of the well-known Osram PX4. This valve, hitherto rated at 250 volts 12 watts maximum dissipation, is now rated at 300 volts 15 watts dissipation, enabling the undistorted power output to be increased to the order of 3½ watts per valve. A common use of the PX4 is in push-pull circuits in which undistorted power output of 6-9 watts can be achieved. The price remains unchanged at 12s. 6d.

Of special interest to dealers is the new Osram architectural lamp stencil. This is a transparent stencil designed to clip over the standard Osram architectural lamp so as to provide a useful medium for the description and pricing of material in shop windows or show cases.

The stencils are 2s. 6d. each, and the clips for holding them in position 6d. per pair. The price, of course, includes lettering as required.

HIGH QUALITY FERRANTI MODELS

Extraordinarily high quality reproduction is claimed for the latest Ferranti Model 1737 all-waver, and the Model 2037 console. A triode power output valve is employed in-

stead of the more usual pentode, and this, together with a special Ferranti speaker and, of course, other circuit features, give, so the makers claim, nearly perfect reproduction from 3 octaves below middle C to 4½ octaves above.

An all-wave superhet circuit is employed in both these models, which also incorporate electron tuning and variable selectivity. A special device is used in these receivers which is referred to as follows by the makers: "Having tuned-in accurately by means of the visual tuning device to the desired station, the fidelity control may be adjusted as necessary by being turned in a clockwise direction as far as it will go without bringing in nearby stations. As soon, however, as the tuning control is turned to bring in another station the selectivity resetting device automatically returns the set to its highest selectivity condition, so enabling it to be tuned-in exactly to another transmission, after which the fidelity may again be adjusted to the highest degree permissible."

The well-known Ferranti magnascopic dial is fitted to both models. The Model 1737 costs 17 guineas, and Model 2037 20 guineas.

HEAR THE SET AT HOME FIRST

In a leaflet recently received from Philco, the firm stress the desirability of trying out a radio set in the room in which it will be used when purchased. The acoustics of the room have a big effect upon the apparent quality of a particular set, which may sound very different from what it does when heard in, say, a dealer's showroom. Philco point out that the sound absorbing qualities of the living-room are as important at the receiving end as they are in the studio at the broadcasting end. This, of course, is sound advice, and "P.W." has always advised its readers when purchasing commercial sets to try them out in their own homes before deciding.

BELLING-LEE Wander Plugs

For a good job well done



TOP SOCKET

Two tappings can be taken (e.g., for Q.P.P. and G.B. circuits). Modification of the wander plug described below, but has socket in insulated handle. No. 1075, ea., 4d.

"MIDGET"

Hexagon Bakelite top. No fear of stripped threads. Prongs of cold-drawn wire; 3-point contact. 12 indications, and six plain colours. No. 1276, ea., 2d.



"BOW-SPRING" The best wander plug in its class. 12 indications; 6 plain colours. No. 1299, ea., 1½d.

FREE: Post coupon for pocket size catalogue.

BELLING & LEE LTD
CAMBRIDGE ARTERIAL ROAD, ENFIELD, MIDDLESEX

Please send catalogue P263c.

Name.....
Address.....
Pop. W. 6-11-37.....

THE A.C. S.T.900

(Continued from page 218.)

signal strength fell off. This is due to the signals being damped by the establishment of grid current.

The H.T. supply comes from a Westing-house rectifier, the rectified current being smoothed by the usual system of condensers, an L.F. choke and the field winding which energises the magnet of the loudspeaker.

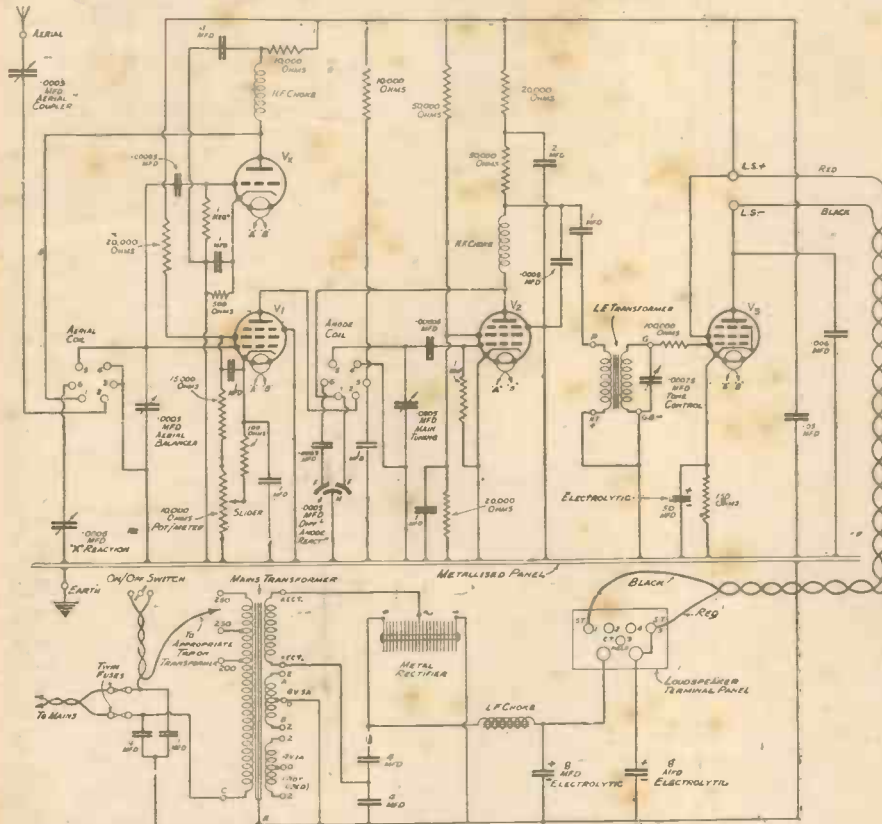
A condenser of .006-mfd. capacity will be noticed connected across the anode of the output pentode and the earth line. The object of this is to prevent threshold howl on the short waves, which it most effectively does.

The mains transformer has a primary which is tapped so as to work off 200, 230 or 250 volts. According to your mains vol-

working, although even then they probably will not suffer nearly as much as they ought to. In the ordinary course of events it is very difficult to see how you could receive a shock. Needless to say it is rather more important to check your connections before finally switching on. Many experimenters (usually professional radio engineers with years of experience) never get signals straight away. They switch on, hear nothing, say "Oh, yes, of course," put matters right and are then satisfied. They would be disappointed and frustrated if everything worked correctly first time.

The amateur is advised, however, to check everything most carefully. A short-circuit might be unfortunate and costly, but even then he would not receive a shock, except the shock of learning that he had a few new components to buy.

THE CIRCUIT OF THE A.C. S.T.900



Although different in many ways from the battery version, the A.C. S.T.900, nevertheless, retains those features which make the battery-model S.T.900 such an outstanding design.

tage you tap to the nearest point. Fuses are inserted in each lead to the primary, while a couple of 0.1-mfd. condensers are connected as shown for the elimination of interference from the mains. One of the windings on the transformer is not used.

The sight of the rectifying paraphernalia puts some constructors "off." They feel they may get a shock. Well, they probably will if they dabble inside the set while it is

The second fallacy is that an A.C. set is more difficult to build. There is certainly rather more to build, but it involves not more skill but more time. It is true that constructors with previous experience are the ones who build A.C. sets, but this is probably because the instructions for building are less comprehensive than in the case of the battery set.

J. S.-T.

MISCELLANEOUS ADVERTISEMENTS

3d. per Word

6d. per word for first words in heavy type
6.- per line for displayed lines (12 pt. type)

Minimum Charge 3/-

Remittance must accompany order.

Advertisements for these columns are accepted up to first post WEDNESDAY MORNING for the following week's issue.

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.

RECEIVERS, COMPONENTS AND ACCESSORIES

Surplus, Clearance, Second-hand, &c.

SOUTHERN RADIO'S Wireless Bargains—all guaranteed and sent post paid.

CELESTION Soundex Permanent Magnet Speakers, 10/-; Telsen Speaker units, 2/6; Telsen (1937) iron cored coils, W349; midget size, 3/6; W478 (twin ganged), 9/-; W477 (triple ganged), 14/6; W476 (triple ganged superhet), 14/6; I.F. transformer coils, W482, 4/-; Telsen dual range coils, 2/9, with aerial series condenser incorporated, W76, 3/9; Telsen A.C./D.C. multimeters, 5-range (tests anything radio or electrical), 8/6.

HEADPHONES, 4,000 ohms, 3/-; Ace (P.O.) microphones, ready for use with any receiver, 4/6.

GARRARD Record Changers, A.C. 200-250 volts, changes eight 10-inch or 42-inch records, £6; Garrard A.C. motors with pick-up, 42/-.

A FULL Range of Valves for all American Receivers, 6/- each; bargain parcels of radio components, including coils, chokes, condensers, circuits, etc., etc., to the value of 21/-, 5/ per parcel.

SOUTHERN RADIO, 323 Euston Rd., London, N.W.1; and 46, Lisle St., W.C.

All mail orders to Southern Radio, 323, Euston Rd., London, N.W.1 (near Warren St. Tube). Phone: Euston 3775.

RADIO TURNED RADIOGRAM. Electric motors, 25/-; Pick-ups, 9/6; Heads, 4/3; Pedestal Anexagrams, £5/5/0; Telegrams, £3/4/0; Portables, A.C. mains, £3/10/0; Battery, £2/10/0; Automatic record changers, £6; Acoustic Gramophones. Portables, pedestals, Spring Motors, turntables, tonearms, sound boxes, horns, cabinets, fittings, springs, wheels, musical instruments. Cheapest. Unique assortment. List Free. Gilt alarm clocks, 8/6. Approval—"Regentpop," 120 Old Street, London, E.C.1. Telephone, CLE 5770. Est. 34 years.

CONVERSION UNITS for operating D.C. Receivers from A.C. mains. Improved type, 120-watt output at £2/10/0. Send for our comprehensive list of Speakers, Resistances, and other components.

WARD, 46, Farringdon Street, London, E.C.4. Tele: HOLborn 9703.

S.T.800 complete with M.C. Speaker, 2 Eliminators A.C. and D.C., S.T.600 Coils, condensers, valves, etc. Lot £6. Sadler, 42, Northway, Northwich, Cheshire.

S.T.900 "FIFTY-FIFTY" Guaranteed Kit saves you twenty shillings. Write to-day for Free Lists. Parko, Terminus Road, Brighton.

A THOUSAND BARGAINS MAINS TRANSFORMERS, M.C. SPEAKERS, MAINS VALVES, SHORT-WAVE GEAR, CABINETS, ETC.

PREMIER SUPPLY STORES.

20-22, HIGH STREET, CLAPHAM, S.W.4.
SEND 3d. STAMP FOR CATALOGUE.

NEW RECEIVERS, COMPONENTS AND ACCESSORIES

CONDENSERS. British manufacture. Fixed paper in metal containers. 800-volt wkg., 4-mfd. 3/9; 2-mfd. 2/3; 1-mfd. 1/6; 500-volt wkg. 4-mfd. 2/6; 2-mfd. 1/6; 1-mfd. 1/-; 400-volt wkg. 4-mfd. 1/6; 2-mfd. 1/-; 1-mfd. 8d. Electrolytics, Dry, 500 p.v.w., 4-mfd. 1/6; 8-mfd. 1/9; 8+4-mfd. 2/6; 8+8-mfd. 3/-; 16-mfd. 3/-; 32-mfd. 5/-. Postage 6d., or C.O.D. Mentone Radio Stores, 364, Fulham Road, London, S.W.10.

INSTRUCTION

MAKE YOUR HOBBY your career, or increase its interest tenfold. Britain's Best College, approved by the Institute Radio Engineering and leading Radio firms, provides complete training in Radio Engineering by post or day classes. Full details from "P.O.W.," London Radio College, Grove Park Road, London, W.4. (Chiswick 3244.)

JOHN SCOTT-TAGGART WILL GIVE FURTHER DETAILS OF THE A.C. S.T.900 IN NEXT WEEK'S POPULAR WIRELESS

ALL THE THRILLS OF GOLF
IN YOUR OWN HOME



KARGO

OR CARD GOLF
The Grand New Card Game

Believe it or not—all the exciting situations of golf, the thrills of driving, the successful negotiating of hazards and the satisfaction of a keenly fought game really can be enjoyed in your own home . . . with KARGO, the new Card Game that everyone can play and everyone is playing.

Whether you know anything about golf or not, you'll enjoy KARGO from the very first. The golfer will find great fun in his favourite pastime, played away from the Links in the comfort of his own fireside; to others, KARGO brings an entirely new pleasure. Don't delay—buy KARGO today and get yourself in form for the greatest new indoor game.



Sold by all Stationers Stores, W. H. Smith & Son's, and Books Stationery Branches.

World Distributors: Castell Bros., Ltd., Manufacturers of Pepus Stationery.



2/6
PER PACK