

# TELEVISION AND THE CORONATION

By LORD STRABOLGI

# Popular & Wireless TELEVISION TIMES

"OVER THERE"  
All About American  
Radio

EVERY  
WEDNESDAY  
PRICE

# 3<sup>D</sup>

No. 772.  
Vol. XXXI.  
March 20th, 1937.

# ULTRA- SHORT- MEDIUM- LONG WAVES



Without  
Coil  
Changing

Epics of  
Conquest  
in Story  
and  
Picture

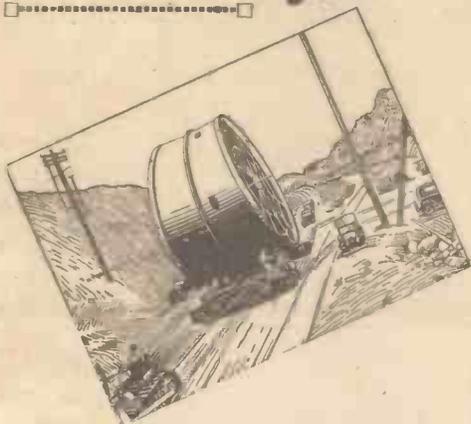
# WONDERS of WORLD ENGINEERING

A WORK  
OF  
AMAZING  
INTEREST

**7<sup>d</sup> Weekly**

**FIRST 3 PARTS  
NOW ON SALE**

*Complete in about  
50 Weekly Parts with  
2,000 Superb Pictures*



*There will be many beautiful  
PLATES IN FULL COLOUR*

*Superb Supplements in  
ART PHOTOGRAVURE*

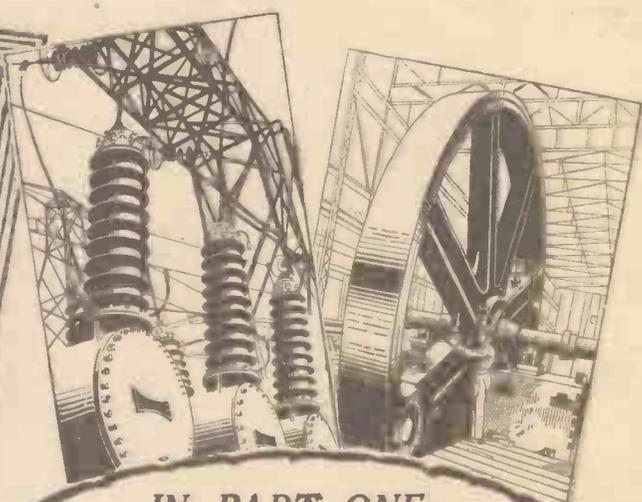
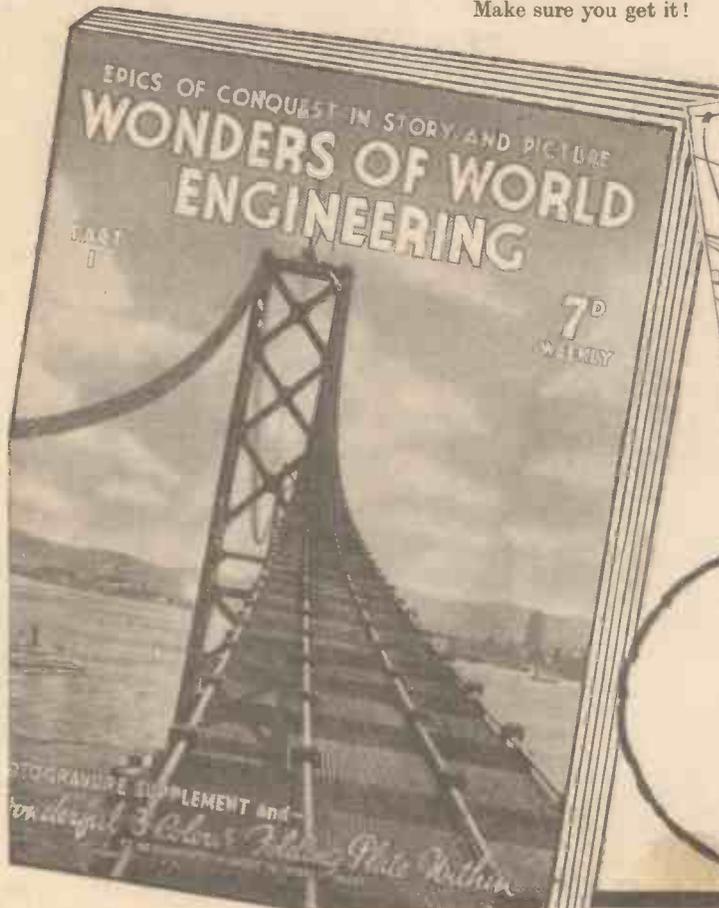
*Specially Drawn*

**MAPS & SECTIONAL DIAGRAMS**

Man's conquest over Nature is the thrilling theme of this inspiring, romantic and practical work, the greatest and most complete survey of the engineering marvels of all times and of all countries ever offered to the public. It is informative and stimulating, delving into the past, looking into the future, telling the imperishable story of engineering progress and the part it has played in building up the marvellous world in which we live today.

More interesting than a magazine, more thrilling than a novel, this wonderful new publication is the work of practical engineers and craftsmen, and is enlivened by the most remarkable collection of engineering photographs ever brought together.

The only way to make certain of a copy of each part as published is by placing a standing order with your newsagent. This magnificent work costs but 1d. per day. Make sure you get it!



**IN PART ONE**

MAGNIFICENT FOLDING PLATE IN 3 COLOURS OF THE NEW EMPIRE FLYING BOAT "CANOPUS," AND PHOTOGRAVURE SECTION SHOWING THE HARNESSING OF NIAGARA.

**IN PART TWO**

MAGNIFICENT FOLDING PLATE IN 3 COLOURS OF THE MERSEY TUNNEL, AND PHOTOGRAVURE SECTION OF THE BOULDER DAM.

**IN PART THREE**

SUPERB PHOTOGRAVURE SECTION SHOWING THE CONSTRUCTION OF THE FORTH BRIDGE.



Editor: G. V. Dowding

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

NEW STATIONS  
THE URSIGRAM  
GREAT SMOKERS

# RADIO NOTES & NEWS

THINGS TO COME  
MANY THANKS  
ECHO PHOTOS

### Transatlantic Tittle-Tattle

**A** NEW YORK friend who occasionally favours me with a frank and free expression of his reactions to radio sent me an amusing letter the other day. He tells me that one favourite U.S. orchestra, determined to be ahead of merely up-to-date rivals, is playing futuristic music, that will be heard by radio listeners in fifty years time. Among their unique swing fugues was "Swing, Swing, Mother-in-Law," and "The Tonsil's Cry to Its Mate."

Another high-spot is that "Personal Column of the Air," of which I have already told you. Half America listens with interest while run-away-with-the-till sons are invited to write to their old mothers, and erring daughters are assured that if they will return to the old home town all will be forgiven. The rapturous reception of these family misfortunes—my informant says—is unflattering testimony to the interest everybody feels in other people's family skeletons!

### Monumental Moment

**W**HAT part of Europe, would you say, had the honour of sending out the first short-wave broadcasting programme?

Eindhoven, Holland, is the correct answer, according to the great Philips concern which has just recently erected a monument there to commemorate the occasion.

The monument consists of a female exponent of beauty culture, poised with the whole world at her feet—a nice womanly touch which history can do nothing to contradict! and bearing an inscription to the effect that Europe here broke her short-wave broadcasting duck on March 11th, 1927.

### Station Information

**T**HE Assistant-Postmaster-General recently informed the House of Commons that the new broadcasting station at Stagshaw (near Newcastle-on-Tyne) would be opened in the autumn.

Negotiations for the purchase of a site for a broadcasting station in South Devon, he said, were approaching completion; and the tests for the proposed relay station

in the neighbourhood of the Bristol Channel were proceeding at several sites.

There is a good deal of chit-chat in P.O. Engineering circles about the possibilities of linking the Orkneys and the Hebrides with the mainland by radio. Ganavan Sands, near Oban, is one possible site that is mentioned with favour by gents who have seen radio seedlings sprout with considerable success.

### KEEPS STRICTLY TO DANCING TIME



A new photograph of Joe Loss, the well-known dance band leader. His slogan is "This is dancing time for dancers" and he always plays strict dance tempo.

### Enter the Ursigram

**A**FTER the telegram and the Marconigram comes the Ursigram, which is available to the owner of the all-wave set who can tune to 25.45 metres any week-day at 9.55 p.m., G.M.T.

"And what," says you, stung to curiosity, "is an Ursigram?"

Happy to oblige, I unfold the glad tidings that the "Ursi" part of the word comes

from the initials of the Union Radio Scientifique Internationale. The U.R.S.I. is a learned body whose members study sunspots, cosmic data and magnetic disturbances; and the Ursigram is a bulletin addressed to members, laboratories, etc., putting them wise to the latest solar pimples and other extra-terrestrial goings-on.

The average Ursigram is right above most people's heads, but high-brows who adhere at zero—or stick at nothing, if you prefer the older phrase—can find a simplified Ursigram on 49.67 metres at 1.30 a.m., G.M.T., every Tuesday.

### Snippetty Bits

**A** NEW underground telephone cable connecting Leeds, Middlesbrough and Newcastle, will embody the special features necessary to facilitate television broadcasts.

Nottingham, naturally piqued when the B.B.C. closed down the city's own broadcast station, is somewhat placated by the news that it has been decided to establish studio accommodation there. When convenient premises have been found, they will be wired so that from time to time programmes can emanate from Nottingham.

The Science Museum, South Kensington, is to hold a television exhibition for three months, opening early in June. The B.B.C., R.M.A. and leading manufacturers will co-operate in preparations.

### Great Smokers

**B**EFORE radio came along, the Australian bushmen were great "smokers," in the sense that smoke signals were used over great distances with good effect. Recently this ancient form of signalling was combined with radio in a remarkable rescue.

A man was reported missing, and the searchers, knowing that some of the out stations had radio receivers, broadcast an appeal for smoke signals which would indicate whether there was any news at the out-station.

In this way the area of search was narrowed down, as the various radio

(Continued overleaf.)

COMING SHORTLY : JOHN SCOTT-TAGGART'S ARMCHAIR NOTES

## GREETINGS TO READERS IN THE DISTANT FUTURE

receivers answered with their smoke "transmitters," and finally news that the missing man had been found was smoked into the sky; and so ended a curious link-up of ancient and ultra-modern means of communication.

### Things to Come

**D**ID I ever tell you that every week a copy of "P.W." goes into the archives of the British Museum?

They preserve all periodicals there for the benefit of posterity.



And while I think of it I will step aside from present-day affairs to salute any Man of the Dim Future who may read these lines in some century to come: "What ho, Brother Unborn,

May the Peace we crave for be yours—and your girl-friend's."

Returning to the twentieth century, I was going to say that our critics in years to come will think, with justice, that we were a queer crowd. Here is Great Britain, where radio began and the valve was born, caught by storms in the year 1937, and so ill-equipped with communications that the inhabitants of the Isle of Foula, in the Shetlands, were cut off from talking with their fellows for 45 days. Houses were in darkness, certain food supplies had been exhausted, and (in fear of exhausted batteries) wireless entertainment had been cut out and only the briefest news summaries could be received on the island.

(Bear witness, O Man of the Dim Future, that Ariel, the scribe, lifted a pen in protest.)

### He Died of Laughter

**A**MERICAN radio is mourning the loss of Dave Freedman, who was for years Radio Jokesmith No. 1. Dave made a fortune, estimated at

\$1,000,000 (roughly £200,000)

by providing comedians with their ideas and gags, but he died of the overwork demanded by his unique career.

Here are some typical examples of Dave's genius:

*First Chap:* "I went forty-eight miles on a gallon."  
*Second Chap:* "Huh. I went two months on a quart!"

*Negro Widow, after the service:* "I hope he's gone where I 'speck he ain't!"

*Passer-by, to swaying gentleman who had just bought a flask of Scotch:* "Hi, there. What's that running down your pants?"  
*Reply:* "Ah dunno, bo. But I hope it's blood!"

### Many Thanks

**I**F you have not yet been thinking about your holiday, the chances are that you will soon be receiving some broad hints from the family, and no doubt a good many plans will centre on the

Isle of Man. This year visitors to the island will have the benefit of directional wireless, for the Isle of Man Steam Packet Co. has decided to equip two of its new steamers for this. The vessels are the Fenella, which will go into service by Whit week, and the Tynwald, which will be running before July 1st.

The Harbour Commissioners of the island are doing their bit by providing the necessary equipment on shore, and the holiday-maker who appreciates this sort of attention thanks Manx foresight.

### Cool Work

**M**Y recent note regarding explorers and radio brings me a nice letter from C. S. J., of Newcastle, about the adventures of the Oxford Exploration

### "MIKE" SLIPS AND QUIPS

**Advertising powders in sponsored programmes.**  
Keep them handy—for pain is always an emergency.

**Commentator during final Test match:**  
That ball went over the middle stump and clean through the wicketkeeper—er—I mean clean to the wicketkeeper.

**During community singing programme:**  
We are shifting the piano, listeners, so we can get it into the microphone.

**Another gem from an Australian Test match commentary:**  
The Englishmen are disinclined to jump into the ball when it is floating in the air.

**Announcer:**  
During that number you may have noticed—, the crooner, was trying to sing like a man.

**Advertising men's clothing in a sponsored programme:**  
A suit with quality and tailoring written all over it.

**Club.** The members of the expedition wintered last year within 600 miles of the Pole, where no previous expedition had succeeded; and they explored not only the adjacent ice-cap, but with their radio instruments also kept a hitherto unequalled watch on the ionosphere.

Radio impulses returning from the ionised layers above the earth were photographed and recorded on a scale never before attempted so far north. The members of the expedition lived in a tent below the surface of the ice, reached by a 20-ft. tunnel. Somewhat unshaven but healthy, every member of the party returned in safety to England, home and beauty culture. An interesting article on the expedition appeared in the February 6th issue of "P.W."

### Canada's New Short-waves

**T**HE Empire station at Daventry is no longer to bear the whole brunt of Empire broadcasting, it seems, for news comes from Canada of a high-powered Empire station to be erected there.

The site has not yet been chosen—or, if so, it has not been publicly announced—but the Canadian Broadcasting Corporation has disclosed that the power will be no fewer than fifty kilowatts, which will put the newcomer right in the Big Noise class on short waves.

The establishment of this, and possibly of other short-wave stations within the Empire, will accelerate the interest now being taken in this class of reception, and the S.T.800 and other all-wave sets will add yet another string to their bow. It will be a long time before the general public fully appreciates the charm of short-wave working, but meanwhile, the snowball started by the S.W. amateurs is gathering mass and momentum, and is not likely to slow up until really big things are achieved by it.

### Trade Tidings

**W**HEN the Radio Manufacturers entertained Lord Swinton, Secretary for Air, recently, he told them that the Air Force required about twenty times as

many radio transmitting sets under the expansion scheme as were required for the normal Air Force. And he went on to say that expenditure on radio would be still higher next year.



Frank Murphy and his pipe have left the radio trade. Admirers of The Personal Touch in Advertising will probably cry their eyes out, for Frank's pipe had got Mr. Baldwin's where the jewelled and priceless hookah of the East has got the penny "clay."

I understand that Mr. Murphy still retains certain financial interests in his firm. So perhaps this is not a permanent "Pipe Down."

### Television Tit-Bits

**P**RAGUE hopes to have a television transmitter in action before the end of this year. The plans are prepared and some of the "Pra-ha" girl optimists are already experimenting with vivid make-up in the hope that they will be hits on the television screen.

The International Faculty of Sciences have awarded the Gold Medal to J. L. Baird for contributions to the advancement of television.

"Please do not think we are going high-brow; nothing could be farther from the truth," says Gerald Cock, B.B.C.'s Director of Television.

Striving to impress a supercilious neighbour, a man asked him in to see an outdoor television scene on the screen. The reception was so good that when sleet began to fall at Alexandra Palace this was clearly shown in the distant receiver. But all the neighbour said was, "I shall wait for the latest model receiver. I hear they are going to fit them with screen-wipers!"

ARIEL.

# TELEVISION AND THE CORONATION

By

LORD STRABOLGI

—who himself will be present in the Abbey during the ceremony

**T**HERE has been much discussion as to whether or not the B.B.C. will be allowed to televise the Coronation.

In a discussion in the House of Commons on the grant of £152,000 to defray the charge for expenses connected with His Majesty's Coronation, the Financial Secretary to the Treasury announced that he understood there would not be any television in the Abbey at the Abbey service.

It may be that a part of the Coronation procession will be televised, but that is not what we want. Why should the ancient ceremony itself not be brought into the homes of the people and into towns and villages near London by this wonderful new invention? The Government has, so far, given no reason for its decision, and many of us feel that we are entitled to know what lies behind it.

## A Solemn and Rare Spectacle

It is true that there are not many television sets in the possession of the public, and although the price has been reduced to sixty guineas it is still rather expensive. But if it had been known, in plenty of time, that this solemn and rare spectacle of the making of a King of the greatest Empire in the world could be seen on the television screen, a great impetus would have been given to the sale of instruments for clubs, village institutes and the like, and, of course, to private people.

I shall be present in person in the Abbey as a Peer of the Realm. I want to share this privilege of seeing the historic event with as many of my fellow-citizens as possible.

There will be a relay broadcast of the religious ceremony, a descriptive commentary as well, by radio, both of the ceremonies and the proceedings during the Royal Procession. Televising is no less reverent than broadcasting, though I have heard the objection that this is a solemn, religious sacrament—and certainly the element of sacrament does enter very largely into the Coronation service, which is very largely a dedication—and that to televise it would disturb the ecclesiastical atmosphere.

## The Apparatus Question

I cannot understand the force of this argument. The funeral of his late Majesty King George V was also a solemn religious rite; but it was cinematographed and reproduced in picture theatres all over the world. There were actual photographs taken of



This scene in the Abbey during the Coronation of King Edward VII will give you some idea of the form which the ceremony takes.

the interior of St. George's Chapel where the interment took place.

A third objection I have heard is that the apparatus is elaborate, will occupy space, and that it will appear to be incongruous. If a few notabilities are crowded out that is of no great importance compared with the possibility of many thousands of people—who cannot possibly get near Westminster Abbey, not to speak of being admitted—being able to see the actual ceremony throughout Greater London wherever receiving sets are available.

Yet another objection is that the equipment may not be available in time. A high official of the B.B.C. has thrown doubts on this point. If there is any supposed difficulty on this score I suggest that the sooner somebody takes strong action the better. There is plenty of time between now and May 12th, and if the equipment isn't ready now it had better be made, and made quickly.

We boast that our television system is ahead of any other in the world, and, if this is so, why risk a reflection on our prestige by allowing it to be said that the necessary talent and ingenuity are lacking?

If there are any other objections, they may come from the Earl Marshal himself, who appears to be the supreme dictator of these matters. What the young duke who holds this high office has in mind, I don't know; but whatever it may be, I suggest he should seriously reflect whether it is not possible to overcome such objections.

Let us see what is to be said on the other side in favour of televising.

It is true that the present range of television is limited and that, broadly speaking, only people in Greater London will be able to get a clear definition. Nevertheless, Greater London at that particular time will be accommodating a very large section of the British people, including scores of thousands of visitors from the overseas Dominions and Colonies.

## An Historic Occasion

The last Coronation took place twenty-six years ago, and it is to be hoped that the next Coronation will be very many years ahead. In other words, it will probably be the only Coronation ceremony to take place within the lives of most adults now living.

And the ceremony itself means something. It is not a mere piece of pageantry, like the Lord Mayor's procession. It is, as I have said, the dedication of the Monarch of the greatest Empire in the world, whose subjects number a quarter of the world's population, to the service of his people.

Also, it is the occasion for the representatives of the people, or as many of them as can get into Westminster Abbey (some six or seven thousand), including nearly all the more important notabilities in the Kingdom, to swear loyalty and fealty. The King himself takes solemn oaths to keep the laws, observe the Constitution,

(Please turn to page 46.)

# "OVER THERE"

A feature devoted to various aspects of American radio, giving interesting sidelights on the artists and microphone methods of that country.

## SHE PLAYS THE "UMPA"

"BILLIE" BLUE, tuba player, has only a five-pound edge on the giant horn she plays in Phil Spitalny's all-femme band on the General Electric programme, over the N.B.C.-Red Network. She weighs 115 pounds and toots a 110-pound tuba.

Although she lays claim to being the smallest tuba player in the world, it takes her more than two minutes to crawl in and out of the network of coils on the instrument. And small as she is she has developed a stubborn strength until she now can carry the great brass horn about her neck like a feather boa for one hour of stage appearances with the band.

## RADIO AIDS

THE devastating flood in the Mid-West provided radio with a truly magnificent opportunity to demonstrate how essential it can be in time of distress.

With all other types of communication smashed down by the rushing waters, radio became the only important medium for the issuance of appeals, financial and otherwise.

The stations in Louisville and Cincinnati immediately disrupted their daily broadcast schedules to turn themselves into vital information bureaux for rescue workers. They operated on 24-hour schedules. The only other public event on the air overnight was the Democratic National Convention in 1932.

Young America, the very young America, responded to Kate Smith's radio appeal for funds to aid flood refugees with their all. In the first day's mail, which reached a new height in the records of the CBS mail-room, there were five children's banks, rattling triumphantly with nickels and pennies.

## RUNNING COMMENTARY

"JESSE OWENS actually outran a racehorse in Cuba. Over a hundred-yard course, Owens outdistanced the horse, running the hundred in nine and nine-tenths seconds—remarkable time for the racecourse, which was muddy."—"The News of Youth."

## THE "KID" AGAIN!

JACKIE COOGAN, who as a child leaped to fame overnight as the wistful street urchin with Charlie Chaplin in "The Kid" many years ago, is being starred in his first regular radio series. As Billy the Kid, the former child prodigy of the movies appears in a serial dramatisation of the life of a notorious Western character.

Coogan is now twenty-two years old.

## NO GREY SKIES NOW!

AL JOLSON has two definite likes in life—radio and the California climate. Following his W A B C-Columbia network broadcast, recently he expressed views on both of these subjects that left no doubt in the hearers' minds that he is as keen about the air-waves as an entertainment medium as he ever was about the stage or moving pictures.

## HIGHEST PAID STAR

ONE of the highest paid radio stars is Hildegard, whose real name is Sell and whose home is in Milwaukee, Wis. Instead of being paid for each broadcast, as most artists are, she is on a straight salary with N. B. C. Executives are grooming her for important assignments when television finally is perfected.

## A SPARTAN

ALTHOUGH seriously ill, Joan Blaine, the popular American broadcaster, took her part in a radio drama the other evening—and fainted when the programme ended. Taken to a hospital, she said she could not remember anything about the broadcast. She will require several weeks of medical treatment, doctors say.

## SHORTEST RADIO WAVES

TWO physicists of the University of Michigan have reported the generation of the shortest radio waves known to scientists. They are only 6.4 millimetres, or about one-quarter inch in length. The valve which had to be developed to generate the waves is so small that the elements can be assembled only under a microscope.

## TO THE RESCUE!

A RADIO "bloodhound" was unleashed recently by the aviation industry to help prevent air disasters.

It hunts out planes lost in storm or fog, and leads them to earth in safety.

The mechanical "hound" operates generally like the radio beams which now guide transport ships across the country, but it has the added ability of roaming the skies.

## CAR AERIALS

MORE cars in 1937 will be equipped with car-top aerials, according to manufacturers, who report a swing in favour of this form of radio collector. One advantage

## WHAT THEY USE FOR 'EFFECTS' "OVER THERE"

For a black-jack on the human cranium they use a wood mallet on a billiard-ball wrapped in rags

You think you hear the villain get his man with a dagger, but it's only the sound-man thrusting a knife into a sweet potato.

You'd swear the crunch of two cartons of corn-tarch was the hero trudging over frozen drifts to a maid in distress.

Salt sprinkled on a sheet of paper and held close to the mike sounds for all the world like the pattering of an April shower.

Little wooden pegs, mounted on strings and supported in a framework, sounds very like an army on the march when joggled up and down to military rhythm.



DOROTHY DARE, who comes from Hollywood, as she appears in the new British Butcher-Hope Bell film, "Rose of Tralee." Dorothy is well known on the American radio and takes part in Al Jolson's weekly broadcast.

of the car-top aerial is its natural streamline shape which conforms nicely with the modern trend in car body design.

## TOSCANINI RETURNS

DAVID SARNOFF, president of R.C.A. and chairman of the board of the National Broadcasting Company, has announced the return of Arturo Toscanini to America for a series of broadcasts over N.B.C.

## MAYBE A DISEASE!

EVERY year seems to have something new—or old—depending upon how you look at it, and this year it's the musical mice.

There was the year not so long ago when practically every spider in the United States had decided that the time was ripe to entangle a snake in its web. Then there was the year when virtually all the male robins went haywire and tried to wear themselves out by pecking at their own images reflected in window panes.

But with the coming of 1937 the mice began to win the recognition they had so long been denied as singers. For a time it seemed like one mouse would be the only one in the money. That was Minnie, found several weeks ago in the Woodstock, Ill., Industrial Home for Children.

Since then musical mice have begun to sing in a chorus from the Eastern seaboard to the Mississippi.

Some authorities have not yet decided whether the mice are really musical or have some disease that makes them rival canaries.

# ON THE

# SHORT

## CLEARING THE AIR

By W. L. S.

# WAVES



**R**ADIO has never been notable for the property of standing still. The latest in receivers one year is hopelessly "dated" by the next year, and the brightest of ideas thought out during the summer holiday is dead by Christmas.

Short-wave radio is perhaps the worst branch of all, being one of the newest. The receiver, for instance, that will "furnish all we need to ask," when it is made, will just be an infernal nuisance two or three seasons later, unless we know enough about things to modernise it as the occasion arises.

Now you may think that all this sounds like an excuse for a change of opinion. Perhaps, in a way, you are right, although I don't regard it as that. I am just leading up to the statement that we need to change our whole outlook on short-wave reception, as time goes on, in view of the tremendous changes that are beyond our control.

### Better Conditions

Compare this year with, say, 1934. The general etheric conditions are vastly better, and we have a tremendously increased number of stations on the air. Particularly does this apply to the amateur bands—but as they are the bands in which the majority of my regular readers seem to be interested, I make no apology for referring to them right away.

I have always been an ardent advocate of the small receiver. For that matter, I still am. But I admit, freely, that a small receiver has got to be extremely good to be of much use to one in these days of overcrowding.

The one-valver with which I used to bag all sorts of DX is no longer with me; but I wouldn't mind betting that I should be pretty dissatisfied with it nowadays. If you use a small set, it has got to be so good that it doesn't have to rely upon tight aerial coupling to give you reasonable signal-strength. Tight aerial coupling means inselectivity, and that is just the one thing that we can't afford to tolerate on short waves to-day.

I have in my den a big commercial superhet which, a year ago, was the last word in efficiency for short-wave reception. I used to jib a bit at its background level, but then I philosophically accepted the ruling that one just couldn't expect such a good

signal/noise ratio on a big superhet as one had been used to with a small set.

Now, however, I find that this superhet is of little use unless I use one or two stages of pre-selection in front of it. This is partly due to the very good conditions prevailing, and partly due to the overcrowding of the ether. And when one adds, on top of all this, the enormous increase in electrification of rural areas and the consequent increase in the general level of "man-made static," one begins to see that things are not what they were.

The use of a noise-reducing aerial system is, in some places, also

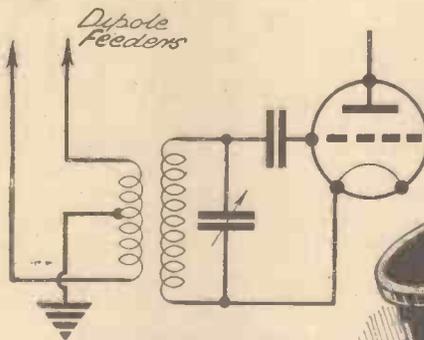


Fig. 1. How a di-pole aerial should be joined up to the aerial coil. Fig. 2 (right) illustrates the method of connecting the earth clip to the aerial winding.



lutely essential. I have at least three acquaintances who would never be able to hear any short-wave signals at all unless they used di-poles. I'm not going to talk in detail about di-pole aeriels here, because I take it that everyone is familiar with their principle. I think, however, that it is worth mentioning that several people are hopelessly ignorant about how they should be coupled to a receiver.

Time and time again I have letters from readers which imply that a di-pole feeder system has been connected across the existing "aerial" and "earth" terminals of a receiver. What benefit the user derives from this weird arrangement I don't pretend to understand.

### Correct Di-pole Coupling

A di-pole must be coupled symmetrically to the receiver. Each of the feeders may be taken to one side of the aerial coupling coil—provided that neither side is connected to earth or to negative L.T. The ideal arrangement is shown in Fig. 1—each end of the coupling coil goes to one feeder, and the centre is earthed.

Fig. 2 may give you an idea for an easy conversion of your own receiver. Take a tapping at the exact centre of the aerial coupling winding, and connect it to earth, either by using a crocodile clip or by fitting an extra pin connection to the coil former.

If your first stage is an H.F. amplifier, then your first coil will probably be of the four-pin variety. That makes it easy to fit a fifth pin in the centre of the coil for the earth connection, and the coil may be plugged into an ordinary five-pin valve-holder. If, on the other hand, you start straight off with the detector and happen to use a six-pin coil, then you will have to put up with a clip connection, unless you can slip a seventh pin on the former somehow.

But this is only one small point—although it has a great bearing on this knotty problem of man-made static. The main problem of to-day—and it will be infinitely more important in a year's time—is that of selectivity. The chief point I

want to make is that you are likely to find a good stage of H.F. worth far more to you than one of L.F.

If I were asked, to-day, to recommend an ideal two-valve receiver for headphone use, I should not give the reply (which I should have given a year ago) of "detector and L.F." Start with a detector as your first short-wave set, by all means; but when you want to add another valve I strongly recommend a stage of H.F.—and by that I do *not* mean an untuned buffer stage.

### History Repeating Itself

Short waves, rather late in their career, are experiencing the same problems as those that confronted the designers of ordinary broadcast receivers. The average factory-built broadcast receiver of to-day is an unbelievably complicated piece of apparatus compared with its counterpart of five years ago. What are the old ones like now? (And yet I bet the number of them still in use would give the editorial staff a dozen fits, if they could only find it out!)

As the need for selectivity increases still further, I think the future of the short-waver is going to lie more and more with the superhet—either the complete one of specialised design or the converter built to work with a really good and modern broadcast receiver, a scheme rapidly gaining in popularity.

ON THE SHORT WAVES—Page 2.

## POINTS from the POST BAG

W. L. S. Replies to Correspondents

THE postbag is still somewhat inflated; short replies are the order of the day.

A. M. S. (Birmingham) is a true representative of the modern trend. He says: "I have given up listening on a two-valver, and now have a commercial eight-valve all-wave superhet with a wave-range of 12½–2,000 metres." But the snag is that he wants to get below 12½ metres—and whereas, with a home-built receiver that would merely mean a little coil-shuffling, this means a good deal more!

A. M. S. and others similarly placed will have to build converters for the ultra-short waves. A single-valve autodyne arrangement is good enough for the ultra-shorts, but it would be better to precede it with a stage of H.F. It can be fed into the aerial circuit of the all-waver, which should be set to a frequency of about 6,000 kc. (50 metres) for the "intermediate" frequency. If, however, the arrangement works best with the all-waver set at about 465 kc.—well, use it like that.

### 2½ Metres.

I will try to give a wiring diagram of a suitable converter in the near future; but whether I can fill A. M. S.'s need for something to get down to 2½ metres I don't quite know.

(Echo of the QSL War. A. M. S. says: "I never send a report to a station unless I hear him definitely asking for one.)

L. E. S. (Camberwell) has rebuilt his receiver to cover 5–180 metres without any gaps. He wound the 5-metre coil on a former consisting of the bottom of a valve-base with six little ebonite strips fixed round it. He seems to have logged a lot of good stuff on this new set, including all continents in one day, and several West Coast Americans. He now wants two "lots of dope"—(1) some tips on how someone with not much spare time can learn Morse reasonably quickly; and (2) all the tips I can think of on using a short-waver with an eliminator. For the latter, watch the first page next week; for the Morse, I'll see what I can do.

### Ultra-Short-Wave Working

J. C. H. (Lewisham) has made my Midget ultra-short-waver and uses it with an all-wave receiver. He gets excellent results from Alexandra Palace, but complains that he hears nothing else on the ultra-shorts. Well, I don't think one is likely to hear much below the A.P. transmissions, unless one is blessed (I think that's the right word) with an amateur transmitter or two in the neighbourhood.

Higher up, however, there are innumerable experimental Americans (between 8 and 10 metres) as well as the famous "Calling All Cars" crazy gang and many other erratic transmissions.

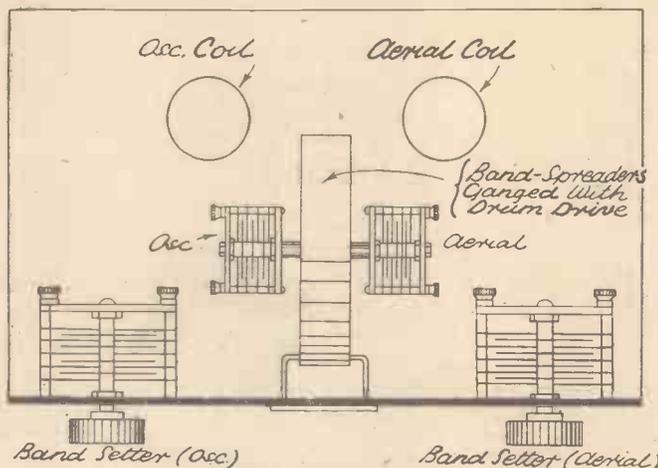
Amateur work on 5 metres is somewhat erratic, and one can never tell when the few live "hams" will be on; but J. C. H. and others should realise that the Alexandra Palace transmissions are tremendously powerful compared with the other things that one expects to hear below 10 metres. If one receives them without an aerial (as J. C. H. does) it doesn't follow that other things will come in. I am inclined to think that a good aerial on the Midget set would put things right. It should certainly tune up to 10 metres with eight-turn coils.

### The Split Colpitts Again

D. E. G. (Leicester) was taken by the recent diagrams of the Split Colpitts circuit, and wants a detailed layout of a set using that circuit. I can't promise it next week, as I've already committed myself (see previous column), but I will try and cover it the week after.

F. G. F. (Carlisle) is worried about the bias recommended by the makers of pentodes. Need he stick to these figures when he uses valves of this type as detectors? No, F. G. F. Take your gridleak

### SINGLE CONTROL TUNING



A good layout can be achieved with a drum-dial gang condenser by those who prefer a single tuning control.

to positive (or to a potentiometer) as usual. No harm will result.

Regarding your other queries, for the 10-metre band you will want three (or two) turns grid and two reaction; and for the 170-metre (trawler) band I recommend 36–40 turns grid and 15 turns reaction.

The sketch on this page shows yet another way of arranging controls when you want to have a single-dial receiver, but there are two circuits concerned. Although I have treated it as a superhet and labelled the controls "oscillator" and "aerial," the same scheme may be used for H.F. and detector. The band-setters are adjusted separately and the band-spreader is a double-gang arrangement. The drum drive lends itself, as you will see, to a particularly pretty layout which gives you about the shortest wiring possible.

J. S. (Lamlash) asks some queries about transmission and the equipment needed. I suggest that he would be well advised to get the "Guide to Amateur Radio," which will tell him more than I could get through in a 30-page letter or in several months of "P.W."

## Short-Wave NEWS

THE season of contests continues. The B.E.R.U. kept February very much alive, and the earlier part of March had a distinctly American flavour, owing to the A.R.R.L. Annual DX Contest. Listeners on the amateur bands who restrict themselves to 'phone reception (not being able to read Morse) must wonder what all the row is about when these events are being fought out.

I have spent a very interesting fortnight with a single-signal superhet of American commercial design, and have been comparing it with various other receivers—some home-constructed and some commercial.

I have come to the conclusion that the single-signal type of set (although it was primarily designed for C.W. reception) shows up to the best advantage on telephony. Certainly my log on the big American set shows a strong gain over the others where amateur 'phone is concerned, and I was able to identify some of those extremely weak 'phones that one just doesn't bother to listen to on a smaller set.

### A Quick Changeover

It also shows up well on short-wave broadcast from the weaker stations. I freely admit that for three or four days it was the only set in my den on which I could obtain really clear reproduction of W2XAF just after he had started up at 9 p.m. By 11.30 p.m. he appeared to be equally good on all the sets, but when he started his programme there was no question of the superiority of "the big Yank," as my friends call it.

I wonder how many readers can log W2XAD's closing down announcement at 8.45 p.m. and go straight over to 31.48 metres to hear W2XAF starting up? Perhaps they would like to tell me. But don't write in and say, "Pooh, anyone can do that!"—because I shan't believe you.

### 'Phone on Ten Metres

Funny how the 10-metre band seems to be completely full of 'phone these days. During a C.W. test on my own transmitter I was quite hard put to it to find a C.W. station on the other side. The 'phones certainly come over amazingly well, and many of the stations we hear regularly don't use the high power that we are apt to imagine. Many of the Yanks I heard last week-end said they were using 60 watts, 100 watts, or other quite modest figures in these days of the kilowatt amateur.

On this side, of course, many stations get out extraordinarily well with inputs of less than 25 watts; but the day of "Working All Continents" on 5 watts or less seems to have gone. There are far too many high-powered stations on the air for the really low-powered man to have much of a chance.

W. L. S.

FROM OUR READERS

# HOW ARE THEY GOING TO DO IT?

The Editor, POPULAR WIRELESS.

Dear Sir,—A few evenings ago I tuned-in, on the 7 m/c's band, one side of a duplex conversation between two British amateurs. I say "tuned-in," but, as a matter of fact, I stumbled on the most appalling conglomeration of "mush," and from this there presently emerged these words:

"Sorry, old man, but it's absolutely hopeless. I think we'd better QRT."

Well, as everyone knows, this sort of thing has been going on in the "ham" bands for ages; but now, it seems, the disease has spread to the broadcast bands.

Between eight in the morning and five in the afternoon the 31-metre band is practically empty—G S B and the Zeesen twins being the only worth-while transmissions. Then, from five onwards they begin coming on the air from all over Europe. Rome comes first with about a hundred kilowatts of distorted Arabic music; then the new super-transmitter at Eindhoven; a CW transmitter with a spread big enough for two ordinary BC stations; and last, but (unfortunately) by no means least, the "Wandering Jew," O L R.

With this crowd, what chance has W 2 X A F? Or W I X K?

My receiver is a T R F 1-v-2, and quite reasonably selective; but I cannot hope to cope with the terrific spread of these powerful stations; nothing but a superhet could!

On Saturday last, at 23.00 or thereabouts, I tuned round the 31-metre band. W 2 X A F was about R 8, with the most horrible whistle imaginable, something like a frantic express train. Listening was almost unbearable.

"A reader asks this question after describing how his experiences emphasise the need for a re-allotment of channels on the short waves.

Is this state of affairs going to get consistently worse until 1938? Have we got to put up with jamming and spreading and heterodyning until the Cairo conference is over?

That's rather what it looks like; but why must these powerful stations jam themselves in just where the band is crowded already? Prague, for instance, has leapt feet first into the 31-metre band, bang in between G S C and D J A. Why could not the Czechs have chosen a spot less crowded, such as the space between P M N and C S W? I suppose the answer is that the space is already taken up by a CW station which, although no one ever hears it, is nevertheless of great value to the community!

I may be a voice crying in the wilderness, but here is one listener who will welcome a re-shuffle of short-wavelengths with open arms; but what I want to know is—

*How are they going to do it?*

Yours faithfully,

R. C. SPENCE, B S W L 7.

1, Rosebery Road, Clapham Park, S.W.2.

**A BOUQUET**

The Editor, "Popular Wireless."

Dear Sir,—I have been a regular reader of "Popular Wireless" for many years now, and it has occurred to me that it was high time you received a few words of praise for the policy you have always followed in giving your readers the benefit of all that is good in wireless, and more recently in television.

You are to be congratulated also on your consistent efforts to keep "home construction" alive. I say "efforts" meaningly, as there seems to have been a considerable falling-off in the interest shown by manufacturers of radio components in supplying the necessary parts for the home experimenter.

In this connection you are particularly entitled to a bouquet for retaining the services of that highly skilful and

enthusiastic designer, Mr. John Scott-Taggart. Mr. Scott-Taggart has supplied the needs of thousands of home-constructors (and at the same time he has considered the depth of our pockets). His sets have always been up to the mark, and by the application of his brilliant radio technique in all his designs he has given experimenters something really worth while. (Incidentally, I have been listening to America on the loudspeaker on his latest S.T.800, which is sufficient evidence of his prowess as a designer.)

An important feature about "S.T." sets has been the fact that previous designs could easily be converted to the latest model without scrapping all the parts in the old set. This really is a great help to the experimenter with limited funds.

These two features alone make "P.W." jolly good value for money, and even if I do not win a guinea for this letter I shall have the satisfaction of knowing that

I have at last passed on to you the congratulations which I consider you rightly deserve.

Yours faithfully,

T. E. PRESTON.

6, Treaford Lane, Birmingham, 8.

**"PUT IT THERE."**

The Editor, POPULAR WIRELESS.

Dear Sir,—Although I have never seen a television set working, I imagine that the sound output, coming as it does from a speaker remote from the cathode-ray screen, gives hardly a satisfactory effect. As yet I have not heard of a design with the speaker mounted on the electrode end of the C.R. tube. At first you may say that the magnetic field from the speaker will have an adverse effect on the electronic beam, but why not use one of the tube's earthed electrodes as a screen, producing it out of the tube, or use an independent screen?

This design would not be practicable with the reflected vision type of sets, but even then, as this type of set costs rather more than the direct vision ones, the owners being probably more prosperous, could afford sets with speakers concealed behind the mirrors.

The results would be much more like the cinema pictures, with the speakers behind the screen. Probably the user of this type of set would prefer, for

**A GUINEA AWARD**

This page is open to all readers to express their opinions and ideas on any radio subject. Of course, only the most interesting of the letters can be published, and a prize of one guinea is awarded each week to the sender of the letter which is best in the opinion of the Editor. This week it goes to Mr. R. C. Spence.

possibly psychological reasons, to have a visible speaker, or the fret covering when listening on the normal broadcast bands. (Have you ever noticed, how, when a comedian is broadcasting and cracks an exceptionally good joke, the listener will laugh and look at the speaker?)

I believe, that with a carefully designed acoustical arrangement, this method would give a far more pleasing effect.

Television now arrived, it must develop, this development probably being on the lines of "blind broadcasting." Therefore it will be dependent upon the reaction of the public to this new form of home entertainment. This point has occurred to me as being rather important. The modern television set is built in a beautiful cabinet; now many people, when at home, do not live in the drawing-room where, in most cases, this beautiful cabinet will be placed. They only go into the best room on certain afternoons, but programmes will soon be broadcast for considerable lengths of time, therefore, people, instead of turning into a cold sitting-room will desire to "look in" in the living-room, where the television set would probably get knocked about somewhat. Here, then, I think, is a strong reason why, when television becomes more general, there will be an outcry for extension screens.

As a speaker is used as an extension it seems that it is only likely that a complete cathode-ray tube will be used for vision extension. Probably in time there will be on the market complete sound-and-vision extension units, at quite reasonable prices and in artistically designed cabinets. One problem to be solved, however, is a cheap cable containing wires along which the deflector currents must flow. This will necessitate a considerable amount of shielding, but this obstacle will be overcome, as will the problem of recording the present "high definition" television.

I look forward with interest to the time when, at the back of every television set there will be sockets marked "Extension Screen," and "Vision Pick-up."

Yours truly,

DENIS SLATER.

31, Uppermoor Road, Allenton, Derby.

**PERFECTLY TRUE.**

The Editor, "Popular Wireless."

Dear Sir,—The question of perfection is always cropping up in connection with radio matters. Now what is this perfection? The true meaning of the word is, the act of making or the state of being perfect; supreme excellence; complete development; faultlessness.

Radio manufacturers talk of their "perfect instruments," but we know they aren't perfect. Common sense will tell us that it is impossible to reproduce faithfully and perfectly by means of a radio receiver, housed in the average room, the powerful and inspiring music of a symphony or other orchestra played in a large and acoustically perfect hall.

(Please turn to page 41.)

**AL AND BOB—CANADIAN ENTERTAINERS**



A cheery photograph of Al and Bob Harvey, who have been heard on the air in this country in the Rocky Mountaineers and Stanelli's Bachelor Party.

Zeesen, next door, was bellowing away and drowning most of the interference around it. W I X K was R 7, with a slight heterodyne, but not enough to be uncomfortable; but—Rome contributed a background almost as loud as W I X K!

Rome, of course, was broadcasting opera—very nice for those who like it, but the most violent QRM-producer of the lot.

25 metres is as yet unspoilt, though D J D and W I X A L do sometimes annoy one another. 49 has been hopeless for a long time; so there remain only 25 and the three lower bands unspoilt by the butting-in of high-power Europeans.

# THE DIAL REVOLVES

Talks in English from Madrid :: Transatlantic Reception on the Ultra-Shorts :: In the Far East :: South America

By Leslie W. Orton

THE Spanish civil war has resulted in many interesting broadcasts, but few so dramatic as those recently transmitted from a secret Government station situated in Seville—a city held by the rebels. Information broadcast on short waves from this station resulted in two successful air raids being made against the rebels.

Although listeners have little opportunity of recognising such transmissions when heard (for, naturally, messages are in code), there are many other Spanish stations worth listening to.

## War News

Stations in Barcelona and Madrid transmit news bulletins in English at 8.50 p.m. daily. Barcelona uses a wavelength of roughly 40 metres and Madrid two wavelengths, 30.43 and 40.6 metres. The former is the wavelength of the well-known station E A Q, the latter of U G G.

## ★.....★ WORTH FOLLOWING

The Editor, "Popular Wireless."  
Dear Sir,

I am writing in appreciation of your new series "The Dial Revolves." Last night I had much pleasure in "trying out" three Spanish stations I had previously failed to find. Once again "P.W." is giving us a worth-while article, and I shall follow it with interest.

Wishing your paper every success.

Yours truly,

A. S. GRIFFITH.

"Astræa," Parksprings,  
Iver Heath, Bucks.

★.....★  
According to an announcement from E A Q, talks by leading journalists in war-racked Madrid are broadcast on most evenings—in English.

By the way, have you noticed how many new Spanish stations have commenced operation lately? New stations seem to spring into being daily. The other day I heard "Radio Toledo" and E A 9 J for the first time. The former operated on the 40-metre band, the latter on 20 metres.

## 20-Metre Work

Conditions on, and below, 10 metres are extremely good at the present time, and besides receiving several American police stations I have also heard many amateurs, including the following, on phone (or, as our American friends would say "fone"): W-3 B C, 9 O K U, 1 H U V, 2 J O H and 2 I M K.

Recently I asked for reports of reception of the Milwaukee Journal station W 9 X A Z, and before me I have a report just received from Birmingham. As I predicted, the station comes in at good volume. It operates from 6 p.m. daily on 11.37 metres.

Other ultra-short-wave stations worth searching for include W 3 X E S at

Baltimore, which relays W C A O from 2 to 4 p.m. G.M.T., and W 3 X E Philadelphia, which operates on 9.7 metres.

## Japan Roars In

The West is given a good chance of making the acquaintance of the East these days through the medium of J Z J and J Z I at Tokyo. I have heard these stations regularly of late at strength about equal to that of Zeesen. After listening to a university choir from J Z J the other evening, I was informed in English and Japanese (I only understood the former!) that both this station and J Z I operate from 7 p.m. G.M.T.—presumably nightly. The former station operates on 25.42 metres, the latter on 31.46 metres.

Two other Japanese stations worth attention are J V P on 39.95 metres and J V N on 28.14 metres—both stations are coming in at moderate strength at the present time.

Another Eastern station which I have heard well of late is H J 8 P J in Bangkok, Siam, on 15.77 metres.

## Dominican Republic Heard

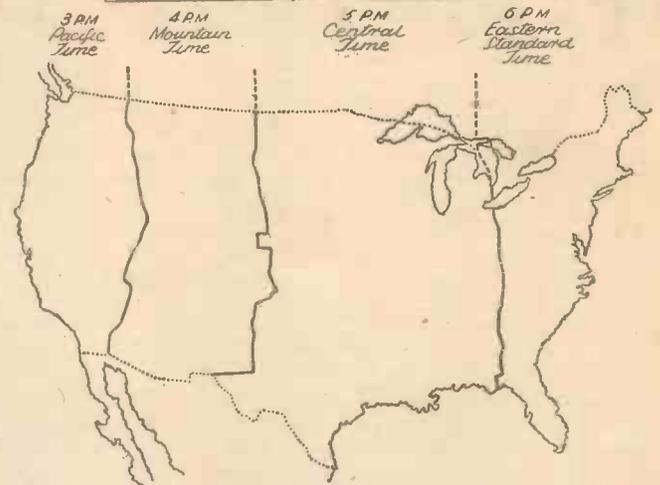
As short-wave listeners know only too well, the average Latin-American programme consists largely of tangos and rumbas. Consequently I was pleasantly surprised the other evening when I heard an excellent programme including "The Tales of Hoffmann" and "Sweet Mystery of Life" (yes, the programme was rather varied!) from a Latin-American station. My pleasure was intensified when, in English, I was informed that I was listening to H I N in the Dominican Republic! Incidentally, although this station is listed as being situated at Trujillo City, it announced as "H I N, San Domingo." This station operates on 48.05 metres, occasionally employing a lady announcer.

Two South American stations which are coming in well on the 30-metre band are H J 4 A B H at Armenia and H J 1 A B P at Cartago—both in Colombia. The former operates from 10 p.m. to 2 a.m. daily on 31.51 metres, the latter irregularly on 31.25 metres. C O C H, Havana, and T I P G, San Juan, Costa Rica, have also been coming in well, but for some reason I have failed to hear P R F 5, Rio de Janeiro, lately.

## Haiti

A station which has jumped into prominence during the last few weeks is H H 3 W at Port-au-Prince, Haiti. If you tune to 31.5 metres after midnight you stand a good chance of hearing him. His

## Time Zones Of The U.S.A



Here is a useful map showing the American Time Zones. At the times given it will be 11 p.m. G.M.T. over here.

schedule, I am informed, is from 6 to 7 p.m. and from midnight to 2 a.m. daily.

North American stations have been poor on the 16-metre band, indifferent on 19, 25 and 49 metres, but excellent on the 30-metre band. Almost every night W-2 X A F Schenectady; 1 X K, Millas; and 3 X A U, Philadelphia, can be relied upon to provide excellent loudspeaker signals.

## HERE'S HOW

A splendid souvenir of an Historic Occasion

CORONATION splendour is fleeting. You will want some souvenir of the occasion. Equally important, whether you are lucky enough to witness the Procession, or whether you intend to follow the historic ceremony through your radio—you will want a programme.

The OFFICIAL CORONATION PROGRAMME (issued by King George's Jubilee Trust, to which the whole of the profits will be devoted), will be on sale on Wednesday, April 28th, in two editions—Standard Edition, 1/-; De Luxe Edition, 2/6d.

The contents include special photographs of the King and Queen, photographs of Queen Mary, Princess Elizabeth, Princess Margaret, and the Duke of Gloucester; a short biography of King George VI; a description of the Coronation Procession, with a pictorial map of the route; the Coronation Service in Westminster Abbey, and an explanation of the Coronation ceremony by Sir Gerald Wollaston, Garter Principal King of Arms. Also, there is a genealogical table showing the descent of the Crown. The programme consists of thirty-two pages of text and illustrations, and is beautifully bound with a cover bearing the Royal Coat-of-Arms printed in full colours and gold.

Besides being invaluable to you on the actual day in enabling you to follow the ceremony word for word, this Programme will be full of interest for the kiddies afterwards, and will help them to appreciate the significance of the Coronation to the Empire.

Undoubtedly, THE OFFICIAL CORONATION PROGRAMME will be in great demand, so it will be advisable to order your copy in advance from your newsagent. Or you can send an application for one (post free), to The Official Coronation Programme Department, King George's Jubilee Trust, St. James's Palace, London, S.W.1, enclosing 1/3d. or 2/9d., according to which edition you want.

With this Programme you will be able more thoroughly to enjoy the full splendour of the Coronation, and have something tangible to remind you of this wonderfully spectacular ceremony.

# TELEVISION TOPICS—Collected by A. S. Clark

## “TELEFRAMES”

Items of general interest

A RECENT forecast of the progress of television in America suggests that 1940 will see the big change-over from individual stations in a large number of towns to a network system. The same forecast states that the end of this year or early in next year will see the commencement of a public service in New York.

Philadelphia, Chicago and Los Angeles are considered to be towns that will follow closely on the heels of New York. The price of receivers will probably start off at an equivalent to that first charged for them over here.

### PUNGENT ITEMS

Sir John Reith looks-in regularly, a television receiver having been installed at his home at Beaconsfield.

One firm has now installed television receivers in as many as ten different counties around London.

Television now serves an estimated area of 3,000 square miles, and in that area there are approximately two million homes which have a radio and are therefore possible future lookers.

### MORE TELEVISION CABLES

It is stated that the Post Office has budgeted for £170,000 to be spent on cables in the Middlesbrough area. The new cables now being laid have been designed with a view to their future use for television purposes. Thus the North-East of the country can look forward to following the Manchester and Birmingham districts with television in the future.

### HAVING THE BEST

There is one way in which those parts of the country which obtain a television service last will benefit. When they do get a service it will be of the very best with the latest ideas incorporated, and they will not be bored by a trying period of experimenting with the programme material.

All that will have been done previously in other centres. It will be the same as with ordinary broadcasting stations, each one that is erected is better than previous ones and reaps the benefit of improvements discovered during the life of those in other parts which they follow.

### TELEVISION AND THE THEATRE

It is the considered opinion of that great producer C. B. Cochran, that television will

most certainly not prove a menace to the theatre. Like the films, he considers all it can do is to weed out inferior shows.

Well, that is one in the eye for all the “outside” and “inexperienced” opinions we have had about theatres and cinemas being eventually put out of business by television.

### THE CORONATION

It is understood that the chance of an insufficiently quick blackout in the event of things not proceeding just so at the

### TELEVISION ON EASTER MONDAY

Swings, roundabouts and all the fun of the fair will be televised on Easter Monday when camera and microphones are taken to the Alexandra Park fair ground for the afternoon transmission. A large crowd is expected, so there should be no difficulty in building up the appropriate “atmosphere” on the television screen.

An Old-Time Music Hall show will also be presented on Easter Monday in the afternoon and evening transmissions. Harry Pringle, who produced a similar feature at Christmas, will be in charge, and the “bill” will include Harry Champion (famous for his songs “Boiled Beef and Carrots,” and “Any Old Iron”); Arthur Reece, who sings “Sons of the Sea”; Ada Cerita, the “Widow”; Fred Barnes, who sings “Swanee”; Tom Leamore, “Percy from Pimlico”; and Marie Kendall, who has melted many an audience with “Just Like the Ivy.” Fred Willett, an original “Chairman” of the old music-hall days, will preside just as he did in the ‘nineties, and from time to time the audience will be brought into the television picture.

To wind up the Bank Holiday festivities, it is hoped, technical conditions permitting, to televise a firework display in the Palace grounds.

Coronation Ceremony is the reason for the ban on television. Unlike the films it cannot be censored at leisure. Some would argue that the rapidity of the blackout would be sufficient safeguard. But perhaps

A weekly feature which will keep the reader au fait with all the latest news and developments in television science. It will appeal alike to the newcomer to television and the advanced experimenter.

## IMPROVING DEFINITION

THE television tests that are being carried out in New York have recently been changed over to the American standard of 441 lines, from their previous definition of 343 lines. It is stated that a three-fold effect is noticed in comparing the new pictures with the previous ones.

The pictures are generally clearer and better; the fact that the picture is made up of lines ceases to be noticed at distances of three feet upwards; detail is considerably better, so much so that it is thought that there will be no difficulty in following the passage of the ball in a scene of a football match.

### An Interesting Point

The engineers consider that 441 lines is just about the maximum that can be used with advantage. For various reasons no benefit seems to accrue from a greater number. However, they consider that the picture may yet be improved by increasing the definition in a horizontal direction.

This raises an interesting technical point—namely, that of vertical and horizontal definition in the picture. The vertical definition is always limited by the number of lines employed (assuming horizontal scanning), because the transmitter deals with the width of the line as a whole, taking the average light over it.

But in a horizontal direction, the definition is really only limited by the width of the spot and the frequencies with which the transmitter and receiver circuits are able to deal.

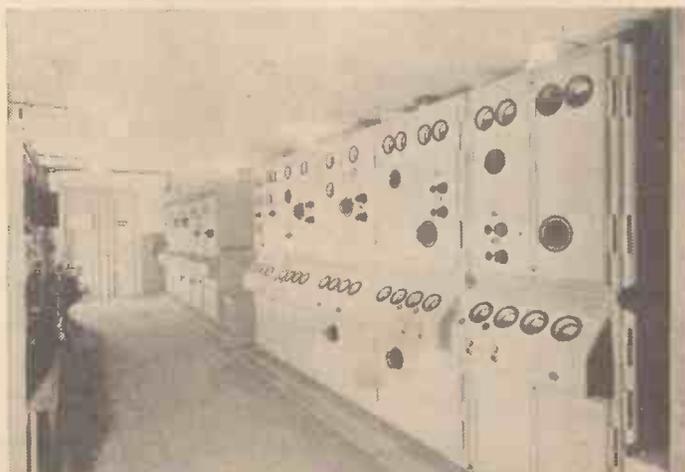
In working out the frequencies to be covered it is usual to assume that the scanning spot is square and that the picture is divided in a horizontal direction into a number of points proportional to the number of lines. Actually, however, it will be obvious that, as soon as the horizontal scanning comes across a change in the picture, the amount of light will vary.

### Frequency Response

Consequently, theoretically there is practically no limit to the detail which may be obtained in a horizontal direction without complicating the line-producing apparatus, by simply improving the frequency response of the receiver and transmitter, if necessary.

This is an effect which can be noticed immediately on the A.P. transmissions if a receiver with too narrow a response band is employed.

## BERLIN'S TELEVISION TRANSMITTERS



The ultra-short-wave sight-and-sound transmitters at Berlin. These two transmitters give a power output of the order of 1.5 kw. to the aerials at the top of a 400-ft. mast.

the authorities feel that the very existence of the need for a blackout might be unsettling and undesirable in itself.

## TELEVISION TOPICS—Continued

### MEASURING HIGH VOLTAGES

TELEVISION experimenters appreciate the necessity for having the voltages on the various parts of the apparatus correct. But when it comes to the question of measuring voltages of the order of a few thousand, the type of voltmeter likely to be available is of no use.

The current taken by a cathode-ray tube is so small that a meter which required current—however small—to operate it would be likely to produce false readings. For this reason a voltmeter known as the static type is required.

This takes no current and can therefore be relied on to give accurate readings in all cases. Unfortunately, meters of this type going up to several thousands of volts are very expensive.

#### Increasing the Range

It is possible, however, to make do with one reading up to, say, 500 volts, which could be bought for something in the neighbourhood of two or three pounds. The method of procedure would then be as follows:

Several matched one-megohm resistances

are required. Resistance makers will probably supply reasonably closely matched resistances for a small charge.

These are all joined in series, and the

#### IN AMERICA



Hildegard, well known to English listeners, is now in America where she has taken a prominent part in test television programmes.

meter is joined across the end one in the chain. If you wish to measure voltages up to the maximum of the meter, namely 500, the input is joined across this one resistance, which is too high for the current taken by it to count.

If you wish to read up to 1,000 volts, the meter is left connected as before, but the input is joined across the two end resistances at the end at which the meter is joined. The meter is then in effect across one half of the total voltage and will read exactly half of the actual voltage.

Similarly, if the input is across three of the resistances, the meter will read one-third of the actual voltage. If you wish to read up to 3,000 volts, the input would be joined across six resistances.

#### A Point to Note

It is not necessary that the meter should read to 500 volts; this is merely a convenient figure when one is dealing with thousands of volts. If the meter read up to, say, 400 volts and the input was across three of the resistances, the reading on the meter would still be equal to one-third of the actual voltage.

When measuring high voltages never hold the connecting wires of the meter in place, even if there are insulated handles to them. Connect the wires permanently in place before switching on. The resistances should be carefully mounted in such a way that there is no chance of their coming into contact with any parts with which they might cause a short.

## SEEN ON THE AIR

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

IT is a little disappointing to find that at the time of writing the B.B.C. television service is again marking time. Viewers and manufacturers alike are waiting for the extension of transmitting hours, which all agree must be the next forward step.

I was given to understand on the best authority some weeks ago that one of the greatest obstacles to an increase in programme time was the burden placed upon the producing staff by the complications of the double standard of definition.

#### The Studios are Too Small

Now the double standard has gone we are still waiting! The explanation of this further delay is that the adoption of a single standard has not relieved studio congestion as much as had been hoped. B.B.C. productions have grown more ambitious; it has become apparent, as readers of these Notes are already aware, that the studios as originally designed are far too small. Moreover, even now they are working at full pressure, occupied with rehearsals, transmissions and tests from 10 a.m. to 10 p.m.

I have already referred to several minor proposals for increasing the studio accommodation. A far bigger plan has now taken concrete form and only awaits official sanction. Some time ago the B.B.C. took over the Alexandra Palace Theatre. Here is a potential super-studio offering three to four times the floor space of either the

existing studios, which measure roughly 70 ft. by 30 ft. The floor has been cleared as a preliminary move; here at last is the shell of a television theatre which approaches a film studio in size.

But the position at the moment is that the cost of converting the theatre has been estimated and runs into many thousands of pounds. The B.B.C. is now pausing to count the cost and to assure itself that there are sufficient viewers to justify the expenditure. Thus we have another vicious circle waiting to be broken—the B.B.C. unwilling to spend until assured of a larger audience, the public hesitant until assured of longer programme hours.

However, I have every hope that this battle, like many another, will be soon fought and won. Television history is the story of a long series of apparently insurmountable obstacles overcome by dogged perseverance. Five years ago I was still a sceptic, now I count myself in the front rank of incurable television optimists and enthusiasts. Compared with the mountainous difficulties conquered in the past, the present ones are molehills.

#### Outside Television Vans

I cannot help thinking that the B.B.C. are cutting things fine in the matter of the outside television vans. Seeing no signs of them at the Alexandra Palace, I made judicious inquiries and discovered that

delivery is not expected until a week before the Coronation.

As their first job will be their biggest—the televising of the Coronation procession—this eleventh-hour business is dramatic but disconcerting. I well remember how the A.P. was rushed into action at the last minute in time for Radiolympia last year—the snags, the breakdowns, the hectic excitement. Then the subsequent revelation that the station had been working as a lash-up, that the aerial mast had been tied up with rope.

It is devoutly to be hoped that the B.B.C. will at least have time to get the first mobile television station in thorough working order before it tackles the big job of televising the Coronation procession.

After the disappointment in connection with the Abbey ceremony a second shock would be too much.

#### The Philco System

I have been reading with considerable interest reports from America on transmission by the Philco system in Philadelphia on the newly adopted standard of 441 lines.

A pure black and white picture, measuring 10 in. by 7½ in., was picked up at a distance of three miles. The second hand of the announcer's pocket watch was seen when it was held up to the camera. A dollar bill was televised so that the serial numbers could be read. Other advances noted are in the reduction of the number of valves required in the receiver from 33 to 26, and in the reduction of the number of controls from 14 to 10.

On this evidence I still claim equality and, in some respects, superiority for British television. I have at this moment in the room as I write one receiver with, on any (Please turn to page 46.)

ROUND THE B.B.C.—No. 3

# The GIANT CONCERT ORGAN

By K. D. ROGERS

AS you know, I have been on a tour of the B.B.C. Not the usual running round to various stations, seeing the technical apparatus, but a more or less indiscriminate digging around behind the scenes at Broadcasting House, at Alexandra Palace, at Nightingale Lane—in fact, any odd B.B.C. corner which has an interesting story to unfold.

My third visit took place right in the heart of Broadcasting House, in the great concert hall where is situated the concert organ which in the past has created so much discussion because of the fact that, whenever it is used, the sound of it is carried throughout the building to other studios by the ventilation system with consequent danger of interference with programmes from other studios.

### A Nightmare of Stops

The organ has been described before. The console is very much like the console of any other concert organ, with four manuals placed at the side of the concert hall well in advance of the platform on which the instrument is pitched. To the lay man this console is a perfect nightmare of stops and pistons, with all sorts of inter-linked gadgets which will do practically anything except enable the organ to play itself. In fact, so elaborate is this organ in the matter of its stops and terminations that many expert organists have been bewildered by the display set before them.

It is on record that one very well-known organist actually lost his temper with the thing during a choral broadcast, and, forgetting for the moment that all the stops are of the "touch" variety, needing just a light touch with the finger to operate them, he caught hold of a group with his hands and pulled hard, with the result that the stops came off. Nothing happened as regards the operation of the organ, nor was any harm done to it, but the organist had to finish his broadcast on a piano.

### Packing in the Pipes

The great concert hall itself is a combination of ultra-modern science and Heath Robinsonism. Triangular microphone stands, and wires slung across from wall to wall with microphones dangling from them, completely spoil any artistic effect that the designer of the hall may have had in mind when he built it. On the other hand the construction of the giant organ is an example of the finest organ-building technique as applied to the requirements of modern radio.

In all, there are 2,826 pipes and, with the exception of two great big bass pipes

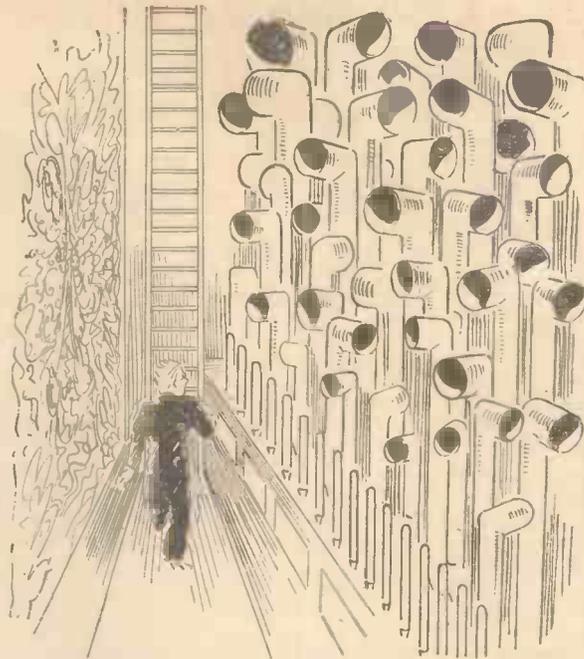
lying flat on the floor in a wooden box in front of the organ chambers, the whole lot are crammed into a space approximately 28 feet high, 30 feet wide, with an average depth from front to back of about four feet. It is an achievement of which any sardine manufacturer might be proud.

### Amongst the Works

In a weak moment I went into the organ chambers, or rather, I went into one of them—that containing the great organ with parts of the solo organ.

It is a perfect nightmare. You creep through a tiny door, first having looked through a little window to see if the two pilot lamps, indicating whether the wind is on or off, are definitely out, and at a great risk to one's skull one sidles away in amongst the pipes. How Comptons ever got the pipes in the right positions beats me.

Unlike a church organ, they are not nice, straight, vertical pipes, in orderly array. There's nothing the matter with the pipes themselves, but at first appearance they



"Unlike a church organ, they are not nice, straight, vertical pipes in orderly array."

appear to be scattered about in any odd corner, at any odd angle, of all sorts of funny lengths, and with bends all over the place. Many of the bigger pipes have had to be bent several times in order to get them all in.

Remove a small ladder which faces you as you enter the chamber, and you can get at another door, through which you can go to the choir organ. Scale the ladder, which is vertical, and another ladder above it, and you go up a box into the top portion of the great organ, climbing up the 28-ft. pipes, almost tight with pipes, wind-boxes, and all the electrical contact mechanism which go to make the modern organ.

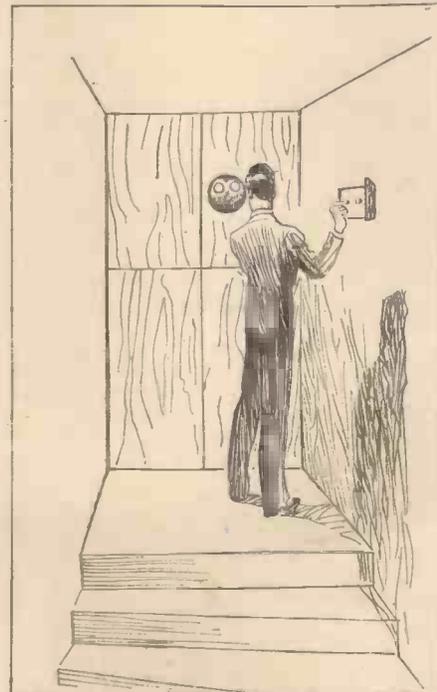
It may give you some idea, especially if you are an organist, of the way this organ has been packed, when I tell you that the "dulciana" (which is usually the quietest stop in the organ, and which actually, from the point of view of sound in the concert hall, is the quietest stop in this organ) is so tucked away in an odd corner behind everything else that it had to be made of small diapason scale, and is actually a very powerful stop.

### Kept at Summer Heat

The wind to this nightmare organ is supplied at a pressure of 25 inches, but each stop has its individual constant pressure, varying from 6 inches to 25 inches. As a general guide, the most powerful stops have the most wind pressure supplied to them. The position of this organ and the very cramped space for the pipes necessitated the most careful voicing and regulating, not only to ensure that every stop speaks in the hall in its correct balance in relation to the other stops, but also that a perfect balance of tone may be transmitted by the microphone.

Incidentally, in this cramped, box-like organ chamber the temperature is somewhere round the seventies. They say they can't keep it any less at Broadcasting House, so it's no joke crawling in and out of this modern Giant's Causeway of metal at that temperature.

(Please turn to page 45.)



"We opened a little panel in the wall, turned a switch and watched anxiously through a little hole covered in glass in the door giving access to the organ chamber."

## HARRY S. PEPPER

TELLS YOU ABOUT HIS

# "WHITE COONS"

Twenty-two shows over the air, a Children's Hour and a Television performance are no mean achievement. Yet this is the "White Coons" record to date.

**E**VEN Columbine, fleeing capriciously from her Pierrot, or singing with him some duet of their world of make-believe has had to acquire radio technique.

The funny man, the comedienne, the soubrette, and their kin of the seaside concert party have in the same way all become microphone-minded. And into the sullen dullness of winter they bring to the hearths of eight million homes a breath of summer. Listeners know them as The White Coons—Will C. Pepper's gay White Coons, produced, in the family tradition, since the death of his father, by Harry S. Pepper who, in an interview, had some interesting and amusing stories to tell of them.

### Started in 1896

"My father first started the White Coons party in Ireland, and they played every season from 1896 till 1925, first as one company, extending eventually to nine companies. When I was a very small lad I began to write songs quite naturally, and the first job my father gave me was the copying of all the music in the shows. Then I was sent away to 'manage'—and management in those days meant box-office work, running big carnivals (I remember one in which there were 400 decorated cars)—in fact, doing everything except actually scrub the concert hall. At that time we just had wooden chairs, and one of my early duties was to number them. This meant sticking on pieces of numbered paper. Often it was impossible to get the gum dry by the time the curtain went up, and—"

Harry Pepper slapped his knees and chuckled wickedly.

"—the dresses I must have ruined!"

After the death of Will C. Pepper the White Coons party was disbanded for a time. Then Harry decided to revive them, and brought some of the original members together. One day came the chance to broadcast.

### How the Series Began

"John Watt had been working hard," said Harry Pepper, "and had gone abroad for a holiday and rest. I was in the music publishing business at the time. I received a letter from the B.B.C. saying that they would be glad if I would begin a series of broadcasts with the White Coons as soon as possible. It was John Watt's idea, though that was the first I had heard of it! So, on August 31st, 1932—by a curious coincidence my father's birthday—we were 'on the air' for the first time. After three or four broadcasts the old company drifted apart, however, and the present one was formed—Denier Warren (who writes all the

scripts), Paul England, Tom ('Marches On') Handley, Jane Carr and Wynne Ajello, with Doris Arnold and me at the pianos." Incidentally, Harry Pepper is the producer too.

"Not long ago," he said, "the Variety Studio—BA—had been laid out for John Watt's 'Front Row' when we went to rehearse there. One mike was about a foot off the floor for a step-dancing act, and we couldn't very well move it. So Jane Carr, who had just come from a talk-film set and was wearing a red pyjama outfit, was lying flat on the stage near Denier Warren, their scripts on the floor; facing them, Paul England and Wynne Ajello were lying full length on the tap-dance mat. Tommy Handley, wearing a false nose and a heavy moustache, was sitting at the music desk. All were very seriously rehearsing.

"Afterwards I was told that some rather important persons were being shown round the building at the time and filed quite—ahem!—slowly along the balcony of our studio.

"Again, Denier Warren was playing at a West End theatre, but had enough time



This is Monte Rey who you have heard singing in Geraldo's "Music Shop" programme. He is also heard with Joe Loss in the late night dance music.

—as we thought—to dash to Broadcasting House and take his place in the White Coons show. But he just couldn't find a taxi, and, though still dressed as a knight in armour, he spent a lot of time rushing up and down the Strand trying to get one. Eventually he arrived—eight minutes late. John Watt, who had never seen the script, took his place till he arrived—perspiring and still in armour."

And the White Coons' record to date? Twenty-two shows, one Children's Hour, and one television performance. A wonderful achievement this!

## B.B.C. PLANS FOR CORONATION WEEK

ALL-STAR GALA REVUE :: CELEBRATION PARTY :: MUSICAL CAVALCADE

Mr. Eric Maschwitz is at present working out the details of his department's plans for Coronation Week programmes.

Already it has been decided that listeners shall have a series of elaborate and costly variety programmes.

These will include production on the nights of Sunday, May 9th, and Monday, May 10th, by Gordon McConnell, of Sir Edward German's "Merrie England" (book by Basil Hood). An all-star cast will take part in the performance, which will run for seventy-five minutes.

Never since broadcasting started has the opportunity presented itself of finding in the metropolis such richly varied material as will be available in Coronation Week for "In Town To-night" programmes. Hence the B.B.C. expects to be able to give, on the Monday, Tuesday, Thursday, Friday and Saturday, "In Town To-night" productions containing eminent personalities whose broadcasts should prove of exceptional interest and importance. A. W. Hanson will be in charge of these programmes.

There will also be two performances during

the week of a ninety-minute all-star gala revue produced by John Watt. It is hoped that between fifteen and twenty stars of the stage, screen and radio will take part.

On Coronation Night, May 12th, Charles Brewer will produce a Coronation Party which will follow closely the lines of the famous Christmas Parties of the past. Here again many well-known stars will take part and the show will run for seventy-five minutes.

Geraldo is compiling a special arrangement of his popular series, "Dancing Through." This in effect will be a cavalcade of the music of two reigns—a completely new arrangement—and it will be produced by John Burnaby. The performance will take one hour.

"Music Hall" on Saturday, May 15th, will, as usual, be produced by John Sharman. Its running time, however, will be extended by half an hour to an hour and a half.

Although details are not yet complete, Eric Maschwitz is tentatively planning special dance music for every night of the week. It will be broadcast from a studio in which, according to present plan, there will be actual dancing.

# THE EVERY-BAND TWO

ULTRA-SHORT-MEDIUM  
AND LONG WAVES  
WITHOUT COIL-CHANGING

A New "P.W." Research Dept. Design  
for the Battery User.



Wavechanging is carried out by rotating the disc which may be seen below the tuning knob.

THE time is now rapidly approaching when every broadcast receiver will have provision for the short and ultra-short waves in addition to the ordinary medium and long wavebands.

The home constructor is in a happy position in this respect, because he can keep well ahead of commercial practice by building a set of this type now, whereas the manufacturer is compelled to develop his designs more slowly, otherwise his factory output would quickly be put on an uneconomic basis, since he would be continually scrapping existing designs to make way for his newest developments.

**Need for All-band Sets**

The "P.W." Research Department foresaw some time ago the inevitable trend of general design brought about by the rapidly increasing use of ultra-short waves and the need for all-band receivers. At the moment it is true that the television sound transmissions

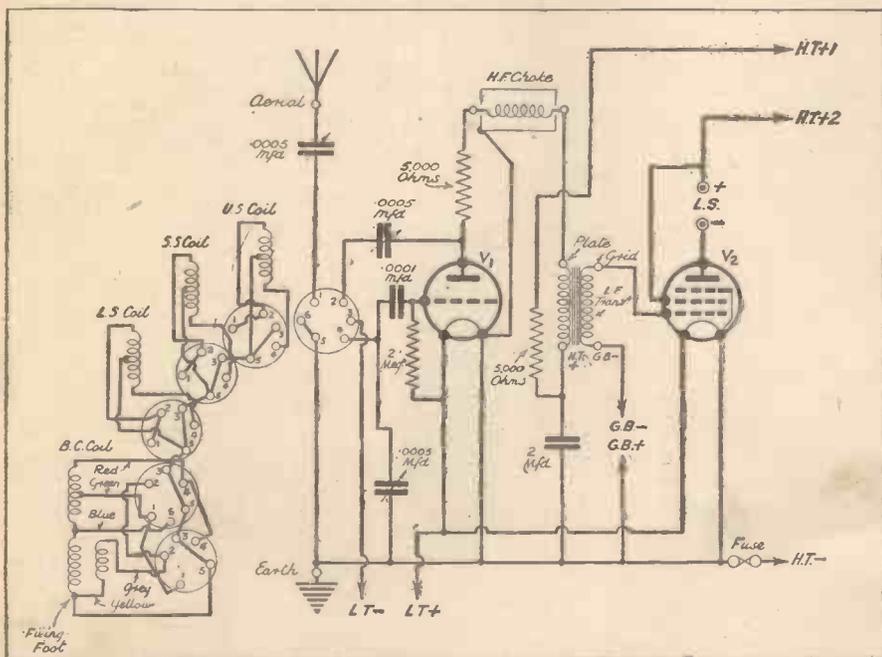
on the ultra-short waves are to some extent restricted to an area around London. The extent of this area is not known definitely, but the sound transmissions have certainly been received over distances far greater than the scheduled twenty-five miles, and the time is not far distant when other big centres in the Provinces will themselves possess television transmitters.

Therefore it behoves the constructor to see that his new set is suitably equipped for the reception of 7 metres in addition to the other wavebands. Recently "P.W." published a full description of a highly efficient three-valve receiver covering the long, medium short and ultra-short waves. This set was known as the "Every-Band Three."

It was a brilliant success, and many have been the requests from constructors for something slightly smaller, while yet giving the same wavelength coverage.

It has always been the policy of POPULAR WIRELESS to give the constructor what he asks for, provided the design is practicable. In the "Every-Band Two" we have made no attempt to use what might be termed a freakish circuit. It is a perfectly straightforward detector followed by a pentode output stage. But it is different from other two-valve designs inasmuch as its waveband coverage embraces the wavelengths of all the world's worth-while transmissions.

**COVERS ALL WORTH-WHILE WAVELENGTHS**



The Every-Band Two is a new departure in two-valve set design. In addition to the medium and long-wave broadcast bands the receiver embraces the television sound transmission on 7 metres together with the 14-35 and 30-80-metre short-wave bands.

**VALVES AND BATTERIES REQUIRED**

V1 Mazda L-2.	V2 Hivac Y.223.
H.T. 120 volts.	
L.T. 2 "	
G.B. 4 1/2 "	

The wavechange switching scheme is unusual, although basically it is similar to that which has been used in certain of our recent Research Department designs. Mainly it consists of a revolving disc upon which are mounted the four coils. When the disc is rotated, the wavelength range is automatically and instantaneously altered—and it may be mentioned that this same disc controls the switching on and off of the receiver.

One of the difficulties of arranging wavechange switching in a receiver  
(Continued overleaf.)

## THE EVERY-BAND TWO

(Continued from previous page.)

designed for ultra-short waves is that of capacity loss; the ordinary form of switch with leads to it of six inches or so in length may completely stop reception of the ultra-shorts, owing to the fact that the leads to the switch may themselves have a combined value of inductance and capacity equal to or greater than the ultra-short-wave coil.

The "P.W." method, in which the coils are actually mounted on the disc containing the wavechanging mechanism completely overcomes this trouble and eliminates all losses.

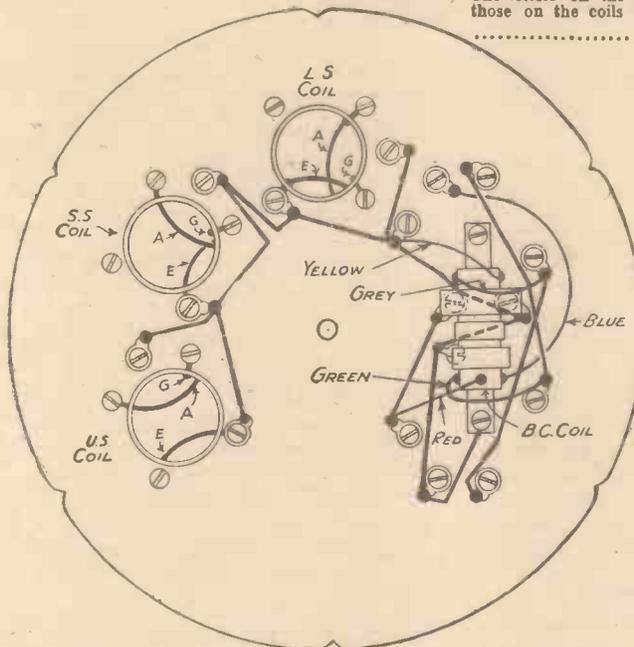
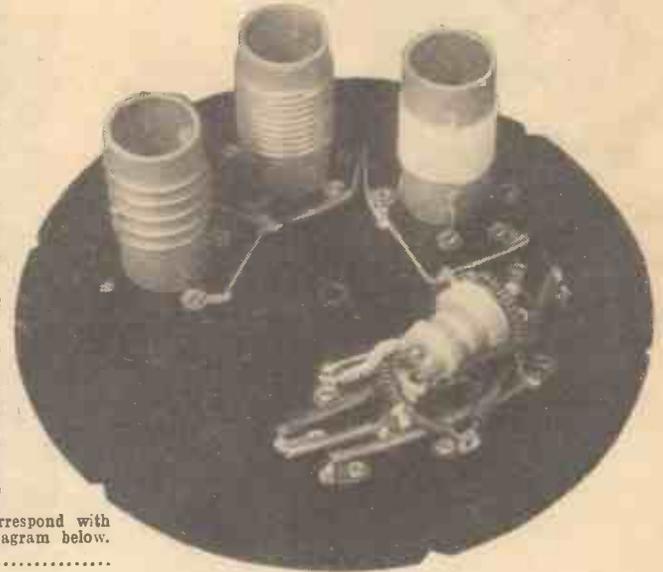
Three of the coils are home wound, and full details of the windings are given

rotating disc. The looped length of wire going to the centre tap on the U.S. coil should be soldered at the point marked on the diagram.

It is essential that this coil should be made exactly to the dimensions given.

The construction of

The photograph on the right illustrates the method of mounting the coils on the rotating disc. This disc is mounted on the underside of the baseboard. On the left is a plan giving the connections between the coils and the contact screws on the disc. The letters on the leads correspond with those on the coils in the diagram below.



in the diagram. The fourth coil on the disc carries the medium and long-wave windings and also the reaction coil for the ordinary broadcast wavebands. This is a commercial coil made by Messrs. A. F. Bulgin.

The method of winding the ultra-short wave, the short-short wave and the long-short wave coils is so clearly given in the diagram that no difficulties will arise.

### The 7-Metre Coil

The ultra-short coil, as will be seen, consists of 5 turns of 18-gauge tinned copper wire, wound on a former two inches long by one inch in diameter. This former is pierced at three points, and the two ends of the coil, together with a length of the 18-gauge wire which goes to the centre tap, are taken down to the base of the former, turned out at right angles, and then looped so as to form feet to support the coil and to provide the necessary contact with the switching assembly on the ebonite

the short-short wave coil is just the same, except that this coil is wound with ten turns of 18-gauge tinned copper wire. The long-short coil is somewhat different in construction because it has twenty-one turns of 22-gauge D.C.C. wire, and this wire, since it is insulated, is arranged so that the adjacent turns are touching. Moreover, owing to its thinner gauge and consequent lack of stiffness, it cannot be used to form the supporting feet. What we

do here, therefore, is to take three short lengths of the 18-gauge tinned copper wire and attach them, preferably with the aid of solder, to the two ends of the coil-winding and to a tapping point twelve turns from the end marked G.

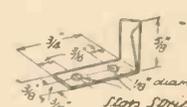
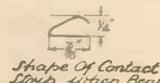
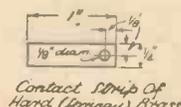
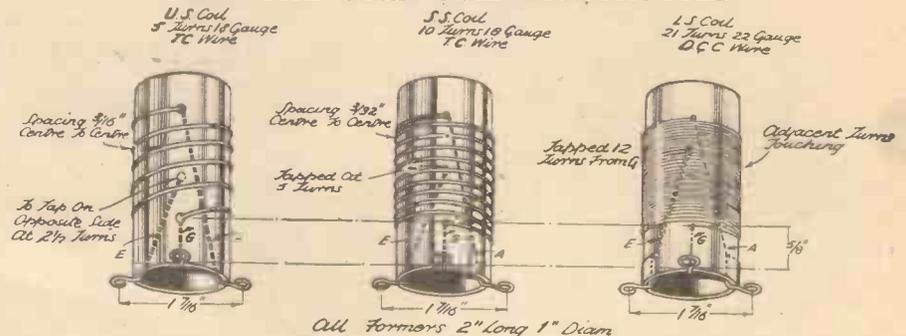
The supporting wires are passed through the holes in the former and doubled over to form a rigid mounting,

(To be concluded next week.)

## THE PARTS EMPLOYED

- 1 Polar .0005-mfd. tuning condenser, bar type.
- 1 Polar V.P. horizontal drive for above, with degree-marked scale.
- 1 Bulgin Midget coil, type C40.
- 1 B.T.S. .0005-mfd. reaction condenser, with insulated bush and spindle.
- 1 Polar .0005-mfd. Compax condenser.
- 1 Eddystone 4-pin short-wave valve holder, baseboard-mounting type.
- 1 Eddystone 5-pin short-wave valve holder, baseboard-mounting type.
- 1 Wearite H.F. choke, type H.F.J.
- 1 Varley Ni-Core II L.F. transformer.
- 1 T.C.C. 2-mfd. fixed condenser, type 50.
- 1 T.C.C. .0001-mfd. fixed condenser, type 34.
- 1 Erie 2-meg. 1-watt resistance.
- 2 Erie 5,000-ohm 1-watt resistances.
- 4 Belling & Lee terminals, type R.
- 1 Ebonite baseboard, 9" x 9" x 1/8" (Peto-Scott).
- 2 Wood runners for above, 9" x 3 1/2" x 1/2" (Peto-Scott).
- 1 piece of ebonite for coil-base, 7" x 7" x 1/8" (Peto-Scott).
- 1 Wood panel, 10" x 9" x 1/8" (Peto-Scott).
- 3 Paxolin formers, 2" x 1" diameter (Peto-Scott).
- 4 Clix Wander plugs.
- 1 Belling & Lee wander-fuse.
- 2 Clix accumulator spades.
- 20 ft. 18-gauge T.C. wire for wiring and U.S. and S.S. coils.
- 7 ft. 22-gauge D.C.C. wire for L.S. coil.
- 6 B.A. screws and nuts, wood screws, soldering tags, 2 B.A. rod and nuts, washers, flex, etc.

## HOW THE COILS ARE CONSTRUCTED



Here are full details of the home wound coils and particulars of the contact and stop strips used in the wavechanging operation.

QUESTIONS AND ANSWERS

By K. D. ROGERS

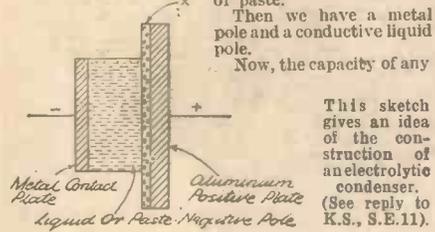
HOW AN ELECTROLYTIC CONDENSER WORKS

K. S. (S.E.11).—*What is an electrolytic condenser? Can it dry up and go wrong? What happens if it is connected the wrong way round?*

Oh, that's a nasty one. Wants pages of "P.W.", really; but I will do my best.

You know what an ordinary condenser is, I suppose. Two pieces of metal with insulating material between them.

Well, an electrolytic condenser is based on the same idea, but instead of two pieces of metal it consists of one sheet of metal (it's wound round and round like a tubular condenser), and the other electrode is a conductive solution or paste.



Then we have a metal pole and a conductive liquid pole. Now, the capacity of any condenser depends, among other things, on the thickness of the dielectric or insulating material between the plates. The thinner this is, the higher the capacity of the condenser.

In the electrolytic condenser someone has made use of the fact that a very thin layer of oxide, or similar material, will tend to allow current to pass in one direction and not in the other.

This means that in a condenser there will be a crowding together of electrons round the oxide when the electrical pressure is applied in one direction, but a flow of electrons when it is applied in the other.

And the best contact for compactness is a condenser using an oxidised plate as a conductive solution, for it can permeate through the condenser even though the condenser is rolled up.

In the electrolytic condenser we have an aluminium plate which is oxidised on its surface. Against this surface is a liquid in contact with another plate. That the aluminium is in spiral form does not matter here.

Now, when a current flows through the condenser in one direction, it meets with no obstacle. A dead short occurs and the liquid will rapidly boil away if the condenser is not disconnected from the circuit.

If the condenser is connected the other way, the aluminium plate being positive, the oxide will tend to prevent a flow of electrons through it. Thus due to the pressure, the electrons build up against the oxide coating and form a sort of space charge.

Similar to the space charge that develops round the filament of a valve, especially if the grid is made very negative, this space charge is the best possible insulator, for it prevents current flow while, at the same time, the thickness of the layer of electrons along the oxide is very, very minute, as you may imagine. An electron is not very thick.

Now, you see, we have a condenser which has two conductive materials separated by a very thin layer of electrons. Therefore, the electrons can be looked upon as a dielectric of extreme thinness. Or, in other words, the condenser has a very large capacity.

THE EFFECT OF THE OXIDE

The sketch shows roughly what happens, the electrons being denoted by "X." Connect the condenser the wrong way and the electrons can pass through the oxide to the plate, whence they are drawn off through the external connection of the condenser.

An electrolytic condenser always passes a little current, due to the imperfect effect of the oxide, and the current is always large for a second or two while the electron space charge is forming. After that the current is negligible.

An electrolytic condenser can dry up only if the liquid is boiled away by passing the current through the condenser the wrong way. Then the whole thing may burst. The gas given off in an electrolytic condenser is only a secondary effect. It occurs when the condenser has too heavy a load on it, or when it is wrongly connected. The gas escapes through a special vent valve, which will let the gas out without allowing the liquid to escape.

The liquid or paste in a condenser is useful for sealing purposes, too. The oxide is formed on the positive plate before the condenser is made. It is formed by long, slow passages of current from the plate to an electrolyte. But it can be formed in ordinary use, though slowly.

But if the condenser is wrongly connected, some of that oxide may be destroyed. That leaves tiny "holes" in the surface of the plate, holes that would upset the condenser were it not for the liquid. This gets into the holes, and under the action of the

current and the liquid oxide is again formed to fill up the holes, leaving the plate intact again.

It is not an easy thing to explain in a few words, but I have endeavoured to tell you briefly how the electrolytic condenser works, and you must excuse any slight looseness in the explanation of an electrical phenomenon which, even to-day, is imperfectly understood by the designers of the condensers themselves.

WHO MAKES IT?

H. H. H. (Bristol).—*Can you let me have the name and address of the makers of the "Ridco" Ranger Unit, described recently in POPULAR WIRELESS?*

The name of the firm is Radio Industries Development Co., and the address is Birch Street, Hanley, Stoke-on-Trent.

H.T. FROM L.T. AGAIN

There is so much correspondence coming in concerning the provision of H.T. from L.T. that I propose to go into the matter fairly fully in the near future, either in these columns or in the form of an article. There are some snags about the provision of H.T. from a 2-volt battery, owing to the fact that if more than about 5 milliamps. of H.T. are required, the power taken from the battery is going to be large, and the efficiency low.

It is exceedingly difficult, I understand, for a 2-volt transformer to be made with anything above about 50 per cent. efficiency, and even then it is not easy to get that efficiency if more than about 10 to 15 milliamps. are required and a voltage of more than 120.

As most people who want H.T. from L.T. units require something like 150 volts H.T., and up to 30 milliamps. to run bigish sets, the problems of the designers of the transformer are very serious. So far, the most satisfactory type of transformer on the market for the home constructor is the 6-volt type, requiring a 6-volt L.T. battery. There is a 4-volt type on the way, but at the time of writing I find that the 2-volt transformer is still under development. Transformers can be made, of course: there is nothing to prevent that; but it is the question of efficiency and waveform that is worrying the designers.

Still, more about this later, when I have gone into the matter more thoroughly.

Meanwhile, H. G. (Brixton), I should advise you to get in touch with A. F. Bulgin and Co., Abbey Road, Barking, and see what they say about it. They are hard at work on the design of transformers and will tell you all you want to know.

My same answer will do for P. R. (Liverpool), who wants a transformer for H.T. from L.T. Full kits of parts can be obtained from Bulgin, but note my remarks about the 2-volt transformer. The ratio of the transformer will depend on the voltage of H.T. you require, so I cannot tell you what ratio you will use.

Incidentally, T. K. (St. Helens), the above will also answer your question. You will see that it is at the moment impossible to give you the details you require. The results obtained by our correspondent, Mr. Storell, are regarded by the makers of these units to be remarkably good and quite unusual in their

efficiency. I have been told that they could not guarantee to repeat them with any apparatus that is on the market at the moment.

A GENEROUS OFFER

Mr. F. Harris, Zion Row, Lowertown, Helston, Cornwall, has copies of THE WIRELESS CONSTRUCTOR from January 1934, to the time of cessation of publication. He will lend any copy of the CONSTRUCTOR to a reader who will write to him—provided, of course, that the copy is sent back in good condition.

Incidentally, Mr. Harris is also interested in getting H.T. from L.T. and wants details of a converter. Will see what we can do, Mr. Harris, in the future. We have no details at the moment which we can publish.

We will see what we can do about the set designs, too.

Meanwhile, can any reader lend Mr. Harris a print of the circuit of the Lissen "Skyscraper" 7-valve superhet?

HOME CHARGING

Here is another letter regarding charging batteries in bedrooms. H. H. H. (Shotton) writes: I am at present charging my L.T. at home. I have the charger fitted up in the bedroom. Is there any danger from this?

As I told recently, I do not like the idea, though I cannot guarantee that there will be any actual catastrophe owing to the charging in the bedroom. But remember the acid fumes, which are not healthy, and certainly not good for furniture. And the gas that comes off is a mixture of hydrogen and oxygen, mostly the former, and is inflammable—in fact, it is explosive!

So, though the quantity of gas is not great, unless the cells are gassing vigorously, I should not relish the idea of a battery being charged in my bedroom. I can't get over the acid fume part of the thing: it does not seem too good to me.

MOTOR-BOATING

R. K. (Richmond) wants to know if he can use an eliminator with the S.T. Super-Centurion. Will there be danger of motor-boating?

This receiver was designed with its use on a mains unit in mind. Any eliminator of reputable make having suitable tapings should prove quite satisfactory. There should certainly be no danger of motor-boating.

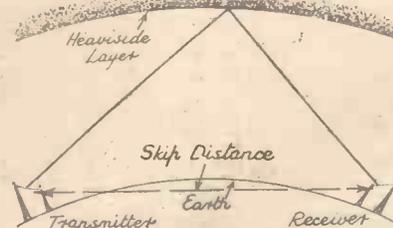
SUPERHET TROUBLE

K. M. (Sheffield) describes something of a peculiar fault. On long waves his superhet will not work except on Davenport, and then it requires a light to be switched on somewhere or some other electrical "shock" before it goes properly.

Try another oscillator valve, K. M. I won't promise that is the trouble—it might be something in the oscillator circuit; but I should certainly try the new valve first.

TECHNICALITIES EXPLAINED—No. 44

SKIP DISTANCE



The name given to the distance over which the signals from a short-wave station cannot be heard. It is the distance between the transmitter and the first distant receiving station that hears the transmission.

What happens is that the wave given off is of the usual composite type, composed of ground wave and sky wave. The ground wave which runs along close to the earth is very soon lost owing to absorption by the earth and objects on it.

The sky wave, however, is shot up into the sky and goes on up until it comes to the Heaviside Layer, a layer of ionised gas which surrounds the earth at a height of about 50 miles. Above that layer is another, but for the purposes of this description we can look upon it as one layer.

The sky wave strikes the layer and is reflected back to earth. But between the start from the transmitting station and the return to earth of the wave there may be some thousands of miles. These are called the skip distance and are shown diagrammatically in the sketch. Between the transmitter and the receiving station the signals cannot be heard except on freak occasions and except for close-up receivers which can hear the ground wave.

# RANDOM RADIO REFLECTIONS

By Victor King

NOW THEN, YOU FIFTH-FORM LADS :: WHAT THE  
GOSSIP-MONGERS SAY :: CHEAPER TELEVISION  
SETS? :: THOSE CRITICS

## EASY TO ANSWER?

HERE'S a question which some one asked me a little while ago. A balloon full of hydrogen will rise from the surface of the earth because hydrogen is lighter than air. But supposing the balloon could be kept distended and there was nothing at all in it. Would it still rise? If not, why not?

Another question was added.

"There is no such thing as a perfect vacuum. There will be a little air left behind in an electric light bulb after the pumping process. But why doesn't that little bit of air fall to the bottom of the bulb and leave the rest of it a perfect vacuum? What force is it that causes the air to expand and thinly fill the whole of the bulb?"

Ah! You say, Nature abhors a vacuum. Well, if that little bit of air in the bulb will, in effect, operate against the force of gravity and expand upwards through the whole of the bulb, why is it that all the air on the earth doesn't expand outwards into space in an endeavour to fill that vacuum?

Come on, you fifth-form fellows, do your stuff.

## RUMOURS

I HEAR rumours of forthcoming great changes at Alexandra Palace both in regard to staff and to technical matters. Also that the present state of comparative independence enjoyed by the televisionites, which almost amounts to isolation from Broadcasting House, is to be lost.

Apropos palaces, there is a rumour chasing round town that the secret service was responsible for the conflagration at the Crystal Palace. That giant glass building made too good a mark for invading airmen, it is said, and could be distinguished from the air on the darkest nights. Nice rumour that! Hope my house doesn't act as a guiding mark for aircraft!

It is rumoured that the Government is to try nationwide war-preparedness propaganda through the B.B.C., and that Sir John Reith is trying to edge the Big House a bit farther away from all such political manipulations.

It is whispered that the television cable laid by the P.O. between London and Birmingham hasn't tested out so good, and that experiments with short-wave links are being carried out in secret.

I give these rumours for what they are worth. You know, I often wonder what proportion of the rumours one hears is directly inspired by people with personal motives. Or how many are set in circulation by gossipers who simply must have

something to gossip about, and if their stock runs low make up "rumours" on the spot.

Yet, when all such are discounted, there still remains quite a number which are, as is often proved by subsequent events, based on facts. Leakages are apt to occur in the highest places. That, too, has been proved often enough.

## ANOTHER PROPHET

I DO dislike those people who campaign for the *status quo*. They are generally so darned sure of themselves. "Finality has been reached, my boy; science has gone as far as it can. There's nothing else to find out." That's the sort of thing they say in sepulchral tones.

Negative prophets, I call them. The radio and television correspondent of a London evening newspaper seems to be qualifying for this clan. He says:

"I predicted here last week that the price of television sets would come down. This has already happened."

That, you might think, reveals a good little prophet of the positive sort blithely plying his tricks and getting away with them.

But he adds: "Prices will not fall again for years," and thus blots his copybook and joins the inglorious army of the "stand-stills."

The cheapest television set at present on the market costs 55 guineas.

You know my prediction—that within a year, probably as early as the Radio Show in August, there'll be sets at fifty pounds or even less.

How potty to predict otherwise. This 'ere progress goes on, my brothers, and only those who are very old or very jaded (or both) refuse to believe it.

## IT BEATS ME

THE B.B.C. drama critic is still at it. Just read this: "There we are. The drama of the month. Two important plays quite dead, but making interesting corpses. One minor play alive and kicking. And one Devonshire diversion, alive all right, but a little weak at the knees."

Why on earth doesn't the B.B.C. get its critic to tell them this sort of thing *before* the plays are inflicted on the listening public?

Supposing, after you had been to your local cinema, the manager's assistant came



GRACIE FIELDS, whom you see here with her mother, is to receive the freedom of Rochdale during the Coronation celebrations in May. At the moment Gracie is in Hollywood, but expects to be back in April.

round to your house and told you that the pictures you had seen were "as dead as mutton." Either you'd think that he was mad or for some obscure reason the cinema didn't want your patronage.

If this B.B.C. drama critic is a good critic, then the Drama Department of the B.B.C. is incompetent, for, according to this B.B.C. drama critic, there are very few plays broadcast deserving of any real measure of praise. If this critic is not a good one, then why—? It's all too absurd; let's discuss reasonable things.

## EXIT WHISKERS

NOW that the sensational news has been published throughout the press of the world, I'll step in with my usual modesty to point out that it was I who, in these notes, first drew attention to the fact that Leslie Mitchell's moustache generally televised as an unattractive snudge. I suggested that it should be eliminated.

And that has duly been done, and now a whiskerless Mitchell coyly simpers in the fluorescence of our cathode-ray tubes.

Nice work, Leslie. But what about getting your young women associates (the Misses Bligh and Cowell) to trim a bit of the starch out of their voices?

## UNDERHAND!

I'M cursed by crackle; I've told you some of my experiences. Quite recently another packet descended on me and I spent hours trying to locate its cause. This crackle only came in on the National programme.

And do you know what it was? A faulty wavechange switch in *another* and disconnected set standing close to the six-valve super in use! Acting as a kind of intermittent absorber, I suppose.

FROM OUR READERS

(Continued from page 31.)

I admit that the reproduction of the majority of good receivers is really wonderful. But perfection, no!

I have built receivers for many years mainly from "P.W." designs, and I have always found them top of their class and quite able to compete with any other receiver, either amateur or commercially built. But I wouldn't claim for them perfection.

It would be a sorry day for manufacturers and constructors and everyone connected with radio, if perfection were ever attained.

Just imagine a set, perfect in every detail. No more tinkering and testing to be done. Nothing to go wrong. Nothing more to learn. Why, even "P.W." might just as well put up the shutters and take up knitting.

Personally, if ever I constructed a receiver that I considered perfect I should soon make it imperfect again with the coal hammer, or something equally effective.

Very often I am asked to give my opinion of a friend's new receiver, but it isn't an opinion they want, it's praise. They immediately go into raptures over their latest acquisition, and start talking about its "perfect tone" when they really mean "quality," which is never perfect. Of course, if one is quite candid and indiscreet enough to point out the faults which even the best receivers possess, one is received with a cold glare which causes shivers to chase themselves up and down one's spine, so it is best to agree with them and be tactful.

No, I think perfection is just around the corner and likely to stay there. I fervently hope it will do so.

Well, these are only my views—maybe I'm right, but maybe I'm all wrong. So back to a bit more tinkering and experimenting with new or rehashed circuits, and to what end? Perfection? Who knows?

Sincerely yours, PETER B. CREEGAN.

67, Powys Ave., Town Mill, Swansea, Glam.

IN DISAGREEMENT.

The Editor, POPULAR WIRELESS.

Dear Sir,—I wish to disagree most strongly with Mr. R. B. Webster's letter in "P.W." Feb. 20th, re QSL hunters. The "QSL business" is most certainly not being overdone and a proper detailed report to the lesser-heard station will still generally receive a QSL.

Re Mr. Webster's list of reports sent, I've sent out 32 W7 reports and got back 21; 70 W6's and got back 56; 52 W5's and got back 42; 9 to Argentine and got back 6; Brazil 12 and got back 9; Australia 27 and got back 20; Peru 6 and got back 2; Canal Zone 1 and got back 1.

Above only includes ham stations and all on phone and I, the "homo sapiens," did not include many reply coupons. Re Mr. Webster's list of countries, failing to acknowledge his reports, I've "veris" from Siam, and Bahamas (Zone). DX here is now 1,340. QSL-letter veris collected over a period of 3 years or so and from 84 colonies-countries, and all on phone music.

Some fine QSL-veris to hand in last month or two include from ZE1JR, ZS6A, ZS6AJ, ZS1B, W9PWU (Colo.), CE5AA (Chile), VV5AK (Venezuela), W8CUO (after only one year's wait!), VK2JU, VK4JX, W9XAZ, and many others. Also on broadcast side I sent 18 reports to Australia and got 18 veris, 10 to Colombia—a notably poor verifier—and got 5 veris, 8 to India and got 8 veris, 8 to Dutch Indies and got back 8, 4 to Venezuela and got back 4, 2 to Peru and got back 2, etc.

Very essentially there must have been something wrong with Mr. Webster's methods!

Wish you and "P.W." all success, Yours truly, BOB EVERARD.

(Winner B.L.D.L.C. DX Contest; Holder "P.W." V.A.C. Cert., 2 gold seals, etc.) "Oakdene," Lower Sheering Road, Sawbridgeworth, Herts.

MORE DISAGREEMENT.

The Editor, "Popular Wireless."

Dear Sir,—Having read Mr. R. B. Webster's very interesting letter on QSL's in "P.W." of February 20th, I thought I ought to write and tell you of my experiences in the same sphere. I cannot entirely agree with Mr. Webster as to the QSL business being "grossly overdone." I, personally, find the collection of QSL cards a fascinating hobby. I admit that I have not sent nearly as many reports as Mr. Webster, but I have indeed been a great deal luckier than he was.

The cost in postage did not come to a very large amount and I have never sent any international reply coupons with my reports. I have only been a short-wave listener for one year, but during that time I have experienced all the thrills of that much-discussed waveband. I did not start sending reports to stations until September, 1936, but since then I have sent quite a number of them and received QSL's and replies from almost all of the stations I sent them to.

The following details may be of interest to your readers:

Reports sent during the past six months, 24. Verifications and replies received, 19.

The following is a list of stations to which I sent reports and from which I received QSL's or replies of one kind or another: Boston, W1XAL; Radio Colonial (Paris); Zeesen, DJD (Germany); Reykjavik, T F J (Iceland); Lisbon, CS W, and Lisbon, CT1A A (Portugal); Stockholm, SM 5 8 X (Sweden); Tokio, J V M (Japan); Praha, O L R 3 A (Czechoslovakia); Rome, Z R O (Italy); Punta Arenas, T 18 W 8 (Costa Rica); Habana, C O C Q, and Habana, C O C X (Cuba); Cartagena, H J A B P (Colombia); Valencia, Y V 6 R V (Venezuela); Tenerife, E A J 4 3 (Canary Islands); Belgrade (Jugoslavia); Rio de Janeiro, P R F 5 (Brazil); Eindhoven, P C J (Holland).

The following is the list of stations to which I sent reports and from which I did not receive a reply:

New York, W 2 X E (U.S.A.); Georgetown, V P 3 M R (British Guiana); Buenos Aires, L R X (Argentina); Ciudad Trujillo, H I N (Dominican Rep.); Badoeng, P M N (Java), but I expect a reply from this station soon.

To none of the above 24 stations did I send a reply coupon, yet all, but 5 sent me replies. I think I have

been far luckier than Mr. Webster, to whom I wish better luck in the future. It cannot be that my reports were better than his, for I am only 18 years of age and know nothing of the technical side of radio and only send my reports in very simple, untechnical English, informing each station as to its clarity, power, and the amount of enjoyment received from its programmes.

I do not wish to make this letter too long, but I should like to mention that because of sending a report to C O C Q Habana (Cuba), I gained a pen-friend in that city who writes to me as regularly as I do to her. Who says it is a waste of time to send in reports? No, siree! I hope to send some more in the future and to receive more replies.

May I here mention that I have been a reader of "Popular Wireless" for the past four months and that I consider it the ideal magazine for anyone who is at all interested in radio.

Wishing your excellent paper the best of luck in the future.

I remain,

Yours faithfully,

DIARMUID DOYLE.

The Abbey, Ballaghaderen, Co. Roscommon, Ireland.

PETO-SCOTT PILOT AUTHOR KITS Exact to Specification

S.T.800 KIT "A" CASH or 70/- YOURS 7/- and 11 monthly payments of 6/4 C.O.D. FOR

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

IMMEDIATE DELIVERY-CASH-C.O.D. or H.P.

- KIT "B." As Kit "A" but with 4 FIRST specified valves only, less cabinet and speaker, etc. Cash or C.O.D. Carriage Paid £9/16/6, or 9/- down and 11 monthly payments of 8/10.
KIT "C.T." As Kit "A" but with valves and Peto-Scott S.T.800 Table Cabinet only, less speaker, etc. Cash or C.O.D. Carr. Paid £8/14/0, or 12 monthly payments of 10/6.
KIT "CQ." As Kit "A" but with valves and Peto-Scott S.T.800 Consolelette Cabinet only, with speaker, baffle and battery shelf, less speaker, etc. Cash or C.O.D. Carr. Paid £8/11/6, or 12/6 down and 11 monthly payments of 12/-.
KIT "CLL." As Kit "A" but with valves and Peto-Scott S.T.800 Consolelette Cabinet, Type "LL" only, with lift-up lid, and speaker baffle, less speaker, etc. Cash or C.O.D. Carr. Paid £6/14/0, or 12/3 down and 11 monthly payments of 12/3.

\* S.T.800 EXTRACTOR is available as a kit of parts or ready-built at the same price, £14/0, Cash or C.O.D., or add 2/3 to deposit and each monthly payment. Please state which is required when ordering.
\* If the above Kits are required complete with 8 wanders plugs and 2 accumulator connectors, as specified, ADD 1/9 to Cash or C.O.D. prices or 1/9 to the deposit.

S.T.800 FINISHED INSTRUMENTS IMMEDIATE DELIVERY
EXACT TO MR. JOHN SCOTT-TAGGART'S FIRST SPECIFICATION
TABLE MODEL
Battery Version. Built by Peto-Scott's expert technicians. Complete with FOUR FIRST SPECIFIED valves and Peto-Scott walnut table cabinet (illustrated on left), less batteries.
OVERALL DIMENSIONS: 13'3 DOWN
Width 18 1/2, Height 14 1/2, Depth 12 1/2. Cash or C.O.D. Carriage Paid £7/5/0, or 13/3 down and 11 monthly payments of 13/3.

£3:13:6 for your OLD SET In exchange for this BELMONT ALL-WAVE 6-VALVE ALL-MAINS SUPERHET
Wave range: 16.5-50, 190-560, 930-2,100. LIST PRICE £10:17:6 We allow you on your old set £3:13:6 YOU PAY ONLY £7:4:0 10/4 DOWN balance in 12 monthly payments of 12/6.
World-wide reception America, Australia, Africa—with wonderful purity of tone, adequate volume, outstanding sensitivity and selectivity.
A real family receiver. ★ 16.5-50, 190-500, 930-2,100 metres. ★ Illuminated station named wide vision dial. ★ Latest 6-valve All-wave Superhet circuit. ★ Separate tone and volume controls. ★ Automatic volume control. ★ Large moving-coil speaker. ★ Simple to tune. ★ Pleasing modern cabinet with walnut veneers, size: 15 1/2" high; 12 1/2" wide; 7 1/2" deep. ★ For A.C. or D.C. Mains 100-260 volts. ★ FULLY GUARANTEED.

NEW AND DIFFERENT! PETO-SCOTT 1937 SHORT-WAVE ADAPTOR-CONVERTER KIT
13-74 METRES
Convert your existing Battery or A.C. set for operation on the short waves with this up-to-the-minute unit. No alterations to your set whatsoever. Two hours to build—a lifetime of world-wide entertainment.
No coil changing
Drilled steel chassis.
Drilled steel panel.
KIT "A" Cash or C.O.D. 29/6 Carriage Paid 2/6 Or 2/6 down and 10 monthly payments of 3/-. All parts for building, with diagram, assembly, and operating instructions, less cabinet.

W.B. SPEAKERS
Model 375. Amazing reproduction provided by new magnet and exponential moulded cone. Microdole matching device. Cash or C.O.D. Carr. Paid £2/2/0, or 2/6 down and 11 monthly payments of 4/-.
Model 373. Cash or C.O.D. Carr. Paid £1/12/6, or 2/6 down and 11 monthly payments of 3/-.
All Postal Orders should be crossed and made payable to Peto-Scott Co., Ltd. All currency should be registered.

# NO FLICKER OR FLASHES

An explanation of a system of scanning in which both horizontal and vertical lines are combined to give a number of advantages

IN spite of the many advantages of "interlacing," it is not necessarily the last word in scanning.

For instance, there are certain advantages to be gained in using a system in which the direction of scanning is "crossed over" from one frame to the next. The idea is to run the lines horizontally across the first picture, until it has been completely explored from top to bottom, and then to run them vertically up and down the next picture, starting from the left and finishing at the right. The two successive frames, one scanned vertically and the next horizontally, are then superimposed on each as in interlaced scanning.

## Interference Effects Reduced

One result is to get rid of the so-called scanning "pattern" which is bound to appear on the received picture when the lines are always run in the same direction, especially when they overlap slightly, or are not accurately interleaved.

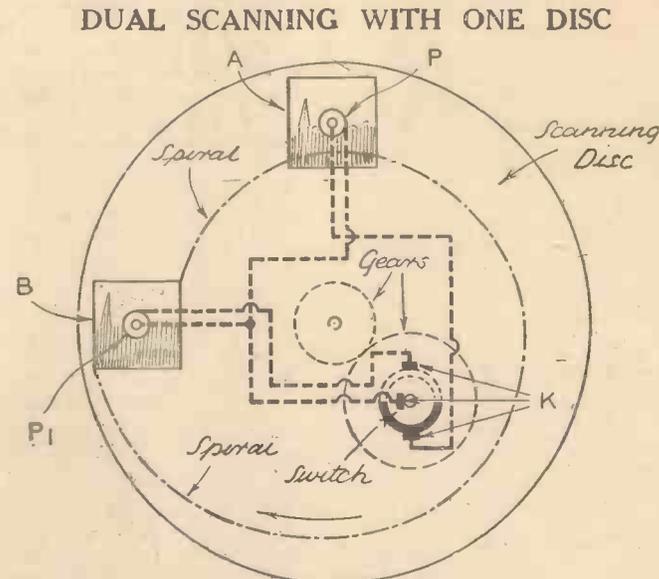
Cross-scanning also helps to break up the flashes produced by "static," so that the interference does not appear in localised "patches" but is distributed evenly over the whole picture, where it is much less noticeable. The same effect also occurs, to some extent, in interlaced scanning, but the interference is much more effectively dispersed when the two successive pictures are scanned crosswise.

There is also another advantage. It is well known that, owing to the shape of the scanning-aperture, picture definition can be improved only in the direction of movement of the aperture. In horizontal scanning, for instance, no matter how the speed is increased, the only gain in detail is in the horizontal direction. But by changing the direction of exploration from

one picture to the next, detail is improved over both the length and breadth of the picture.

In order to secure this result, the picture at the transmitter must, of course, be specially arranged. Actually it is focused by two lenses on to different mirrors, which are so inclined to each other that two separate images are formed simultaneously. One takes the position shown at A in the Figure, whilst the other is displaced by ninety degrees and appears at B.

Both A and B are scanned by the same rotating disc formed with a single set of



How a single spiral disc can be made to scan the same picture in both horizontal and vertical lines.

spiral holes. It will be seen that when the disc is rotating clockwise, as shown by the arrow, the spiral holes move from left to right across the image A to produce a horizontal scan. At B, however, the holes are moving vertically over the picture from bottom to top, and produce a vertical scan.

## Changing Over the Cells

Separate photo-electric cells P and P<sub>1</sub> are provided behind each of the images A and B, and it is, of course, necessary to see that only one of these at a time is able to feed picture signals to the transmitter. The cell P is active during the horizontal scan, and the cell P<sub>1</sub> is then out of operation. Immediately after, the cell P is thrown out of circuit and the cell P<sub>1</sub> gets to work to collect the results of the vertical scanning at B.

The necessary change-over is effected automatically by means of brushes K and a commutator switch. The switch is geared as shown to the shaft of the scanning disc so that it is driven at half the speed of the latter, the brushes K being connected up to the two cells P and P<sub>1</sub>, so that when one cell is in operation the other is short-circuited through the commutator, and vice versa.

Instead of using moving switch parts, both photo-electric cells P and P<sub>1</sub> may be left permanently coupled to separate amplifiers, and a "paralysing" grid-bias applied to cut first one amplifier and then the other out of operation during alternate scans.

## PRESENTATION

The B.B.C. might try something like this with advantage.

THE other evening I was listening to a dramatic little episode being broadcast by an American station.

It concerned the struggles of a young man endeavouring to obtain recognition as a singer. We heard him telling his fiancée that he was going to resign his position as a school-teacher and go to New York and try to obtain a hearing at the Metropolitan Opera House.

He was sure he could succeed. He had faith in himself.

He went to New York, and met with nothing but obstacles. The nearest he got to opera was to obtain a job posting bills.

Yet he didn't lose heart, and he continued unabatingly his struggle to get heard.

Then he met another young man who was also endeavouring to chisel in on the singing game. Together they practised and

together they fought to get out of the ranks of the unknown into those of the famous.

But without success. And now it was two of them to say, "If only they would hear us. If only we could get a chance!"

At this point the dramatisation ended.

"Well, ladies and gentlemen," said the announcer, and I expected him to tell the world that those young men were none other than Screech and Bawler, the renowned stars of international fame. But no, he went on: "They will get their chance. For we have them with us in the studio to-night. Come on boys, the microphone is yours and it is up to you to show what you can do."

## Real Life Drama

That, my brothers, is presentation with a big "P." Real-life drama with knobs on. I'd like to see the B.B.C. do a bit of that. You can often hear strong meat like that in the U.S. programmes.

The B.B.C. has copied Major Bowes famous "Amateur Hour" and found it good. They've also dished up a thin version of "The March of Time."

Here's two more things they might, with advantage, have a shot at:

1. Snappy dramatisations of current real-life stories having strong "human" interest.
2. Dramatised serials.

V. K.

## BEAUTIFUL NATURAL-COLOUR FLOWER STUDY FREE.

THE delightful salmon-pink Godetia, Double Sybil Sherwood, makes a natural colour illustration of considerable beauty. A Free post-card size colour reproduction of this exquisite bloom is given away with every copy of "POPULAR GARDENING" out to-day at all Newsagents, 2d.

This issue is an enlarged Grand Spring Planting Number, specially compiled as a guide to Spring Gardening. It will help you to attain a riot of colour in the summer. There are articles suggesting how you may best prune roses for quality and quantity, the most suitable flowers to grow for cutting, filling in gaps in the flower border and what to sow in the kitchen garden.

# MEET HUGHIE GREEN AND HIS FAMOUS "GANG"

Though only seventeen years old, this young star employs as many as sixty people. He and the "gang" are now busy making a film called "Melody and Romance."

IT came as a definite shock to me when I was introduced to Hughie Green, to see how young and unspoiled he looked.

Just think of it! Here is a young man who at seventeen has been a stage and radio star for quite a long time, and now he has signed a film contract. Isn't that enough to turn the head of any average young man?

I met Hughie and his Gang in the rehearsing theatre at the British Lion Studios, where they are working now. Sprawled about in chairs, in all sorts of comfortable attitudes, were about eighteen or twenty youngsters. Hughie Green himself came across and greeted me.

I tried hard to get him to talk about his radio work—but all he would discuss was

than £500; he owns three cars, and is now planning the conquest of the screen in addition to the stage and the wireless.

Talking of his cars, Hughie is very thrilled that he is now allowed to drive them himself. He signed a very pleasant film contract on his seventeenth birthday, and almost the next thing he did was to dash off to undergo his driving test. He passed with flying colours, too.

The film which Hughie is making now will be interesting to "P.W." readers, because some of the scenes show him undergoing a radio test at Broadcasting House. This part of the film, which is called *Melody and Romance*, parallels his own case very closely, and he and his gang become radio stars in the film just as they are in real life.

### Unspoiled By Success

The Gang are quite as thrilled about the whole business as Hughie himself. Their success hasn't spoiled them, and though they get through a lot of hard work they still retain the cheerful manners of a lot of jolly schoolchildren, and have quite a few larks among themselves.

Hughie Green's first experience of show work came as the result of a charitable impulse. When quite a youngster, he saw an appeal for funds for a hospital, so with his pals he rented a local church hall and gave a concert. The hospital funds benefited by the magnificent sum of £4 13s. 0d. Encouraged by this Hughie planned other concerts, and it was at one of these that he was spotted by someone from the B.B.C. and started on the road to fame.

Hughie has an amusing story of how, during his Canadian tour, he rashly agreed to take entire charge of the broadcasting station in Prince Albert, Saskatchewan, for a whole evening. He had no "Gang" to help him out, and was soon at his wits' end to know what to do. He had only a couple of days in which to plan his programme.

Then he had a brainwave, and sent out an announcement that he would run an evening of Amateur Talent. "I was afraid nobody would turn up for the preliminary audition," said Hughie, "but I needn't have worried, for a huge number of people came along, all firmly determined to play, sing, or recite 'on the air.' So the programme went off quite safely. I think I may say that that was an evening I shall never forget." M. B.

### Next Week's

"POPULAR WIRELESS" will contain a further article describing the construction of the **EVERY-BAND TWO**

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

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

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

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

his model railway! "I'm just crazy about trains," he said, "and I have an electrified line laid down at home and have lots of fun with it. I have, too, what I think is the only model locomotive in this country that will actually whistle. It came from America, and I'm terribly proud of it."

### Takes His Work Seriously

Although Hughie would say little about his work, I was able to see, reading between the lines, that he takes it very seriously—a guarantee that he's going to get on. I was down at the studios a whole afternoon, trying to talk to Hughie, but I had to snatch scraps of conversation with him in intervals between his work. He would say politely, "Will you excuse me now—I have a couple of kids coming to see me," and off he would dash to interview the children. Then he reappeared suddenly, grinning broadly, just like the Cheshire Cat, while I was having some tea in the studio restaurant. He cracked a few jokes, talked some more about his enthusiasm for trains and ships, bolted a jam tart and a glass of orangeade, and presently dashed off again.

I said Hughie was young and unspoiled, but that doesn't mean he doesn't know his job. This lad of seventeen employs sixty people with a weekly salary list of more



**HAVE** you ever wondered why "Popular Wireless" always specify **Stentorian**—why your friends, asking a set maker about using extension speakers, are nearly always given the same advice?

If you go to your dealer's and **HEAR** one, you'll quickly know; and nothing will stop you from having one yourself! Prices from 23/6.

# 1937 Stentorian

PERMANENT MAGNET MOVING COIL SPEAKERS

Write for booklet to WHITELEY ELECTRICAL RADIO CO., LTD. (Information Dept.), MANSFIELD, NOTTS.



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

**B**EFORE I commence with the new releases I want to reply to several readers who have written in to "P.W." asking whether there is a radiogram on the market, priced at about 30 guineas, which will cover the ultra-short waves in addition to the short, medium and long wavebands. I can say very definitely that there is such a model and it is the H.M.V. model 488 A.C. which costs 29½ guineas.

It is a beautifully finished radiogram, the cabinet being of attractively figured walnut, and it covers the following waveranges: 7-16; 16.7-53; 46-140; 185-560, and 750-2,200 metres.

The circuit is, of course, a superheterodyne and is equipped with delayed A.V.C. There are separate tone controls for bass and treble, and a two-speed tuning knob to give simple and accurate tuning. The undistorted output is three watts.

I am told that supplies of this fine instrument are available, so those "P.W."-ites who are looking for a five waveband radiogram should visit their local H.M.V. dealer, who will be pleased to give them further information.

**THREE NEW H.M.V. MODELS**

And now for this month's releases: there are three new H.M.V. models, and they are—

a battery receiver; a six valve all-wave table model superhet and an all-wave radiogram: both the latter sets are for A.C. mains.

The battery set, which is listed as the model 167, has a three-valve circuit, the output valve being a pentode. It is economical in upkeep, the H.T. consumption being only 8.5 milliamps and the L.T. current 4 amp.

The model 167 is designed for reception on the normal medium and long wavebands, and the dial is calibrated in wavelengths as well as having the names of the principal European stations on both bands clearly marked. Sockets are provided for an extra loudspeaker and for a gramophone pick-up.

The price of this set is 7½ guineas. An interesting feature of this receiver is the fact that it will operate satisfactorily without an earth connection.

The six-valve all-wave superhet (model 494) costs 12 guineas. It is fitted with A.V.C., and in addition to the medium and long-wave broadcast bands it also covers from 16.5 to 52 metres on the short waves.

The tuning scale is clearly marked with the names and wavelengths of 100 stations, and the short waveband is printed around the outside of the scale to obtain the greatest length of calibration. This enables very clear marking to be obtained.

The radiogram (model 495) has a similar chassis to the model 494. This receiver is somewhat of a departure, since the controls and tuning scale are placed on the front of the cabinet instead of underneath the lid. Hence the operation can be carried out from the armchair without the lid having to be raised, unless of course the gramophone side is required.

Women will like this set because they can place a vase of flowers or other ornament on top without the need for continually having to remove it when they wish to listen to radio programmes.

Another feature is the remarkable small floor space taken up by the set, and it will be particularly interesting to those who live in flats and small houses where floor space is an important consideration. The price of this model is 22 guineas.

**PHILCO DE-LUXE SETS**

Philco's announce two new models—a table model and a radiogram—and deliveries will be available on Saturday of this week.

The first is the Baby Grand "Empire Eight," and it costs 29 guineas. It is a table model housed in a handsome burr walnut and straight-grained walnut cabinet. It is, of course, an all-wave set covering four wavebands, and is provided with a glow-beam tuning indicator, two-speed tuning and A.V.C. The output stage consists of two pentodes in paraphase push-pull, giving specially good quality of reproduction, and an output of 5 watts.

The radiogram has the same specification and is equipped with automatic record changer. It costs 60 guineas.

Both of these "Empire Eight" models are designed for operation on A.C. mains.

**FERRANTI BATTERY RECEIVERS**

From Ferranti's comes news of four new models for the battery user. There is the model 637B which employs a triple pentode circuit and covers the medium and long-wave broadcast bands. It costs 6 guineas, or with a Droitwich Reflector £6 10s. 6d. This latter model is known as the 637BR.

Next there is the model 1137B, an all-wave receiver with A.V.C. and a seven-stage superhet circuit having Q.P.P. output. The well-known Ferranti "Magnascopic" dial is fitted and the price is 11 guineas.

Last, but by no means least, there is the model 1237B, an all-wave set having a similar

(Continued on next page.)

**Does a pipe of Navy Cut smoke SWEETER?**

In the opinion of many smokers, the small handy slices of Navy Cut best retain the sweetness and flavour of the tobacco. Taste alone must decide, and thousands of smokers find Airmen the most enjoyable Navy Cut at 10d. per oz.

**PLAYER'S AIRMAN NAVY CUT**

ALSO OBTAINABLE IN MIXTURE OR FLAKE

**10<sup>d</sup> PER OZ**

NAVY CUT DE LUXE 110

P.A. 52B

**HOW MANY MILES?**  
Distances from London of Foreign Stations You Have Heard

ZEESEN 588	RABAT 1,280	PÉCS 900
BERGEN 647	SUNDS-VALL 936	MALMÖ 650
ANTWERP 270		
ALGIERS 1,030		
SAN SEBASTIAN 569		
REYKJAVIK 1,175		
SCHENECTADY 3,000		
BOUND BROOK 3,000		
MARSEILLES 624	GRAZ 764	KIEV 1,300
SYDNEY 10,500	GLEIWITZ 820	HÖRBY 660

## THE RADIO BULLETIN

(Continued from previous page.)

specification to the 1137B, but giving superior reproduction, as well as being housed in an attractively finished walnut cabinet with macassar inlay and ebonised feet. This cabinet, incidentally, gives accommodation for larger batteries. The price is 12½ guineas.

These two all-wave models cover a wave-range on the short waves of from 19-51 metres.

Ferranti have just produced a new list describing these sets, and it is available on request to any "P.W." reader who cares to drop a line to Ferranti Limited, Moston, Manchester 10.

### A MURPHY ALL-WAVER

Two further Murphy 1937 models are the AD32 and the A 36.

The AD 32 is an A.C./D.C. superhet costing £8 5s. 0d. The circuit employs three valves, and the cabinet is of highly finished veneered walnut with black sides.

The circuit includes A.V.C. and operates on A.C. or D.C. mains of 200-250 volts.

The A36 is the first Murphy all-wave set and is designed for A.C. mains. This set covers a short-wave range of 13-50 metres and is provided with a cathode-ray tuning indicator, also the new Murphy alphabetical scale, a heterodyne filter and inter-station noise suppression. The price is £15 10s.

The A36 will be available in A.C. or D.C. mains form shortly: this model will be listed as the D36 and the price will be the same, namely £15 10s.

### A NOVEL SCHEME.

As this issue of "P.W." goes to press I learn of a novel way in which Philco's are calling attention to their Coronation "Empire" receivers. Between March 22nd and April 3rd 25,000 gaily painted balloons are to be released from the Perivale works. On each balloon will be printed the message "Philco Coronation 'Empire' receivers, all-wave Superhets for Royal Reception." If you find one of these balloons, send a postcard to Philco Radio, Wadsworth Road, Perivale, Middlesex, stating where you found the balloon, and in return you will receive a new and informative booklet entitled "A Guide to Reception of Short-wave Broadcasting Stations."

A. J. R.

## ROUND THE B.B.C.

(Continued from page 35.)

A peculiar place the concert hall. An orderly rank of seats at one end with the balcony above! At the other a jumble of music stands, piano, conductor's stand with its stark microphone hanging above on a tripod, the chalk marks on the floor showing where the soloists have to stand or sit.



The new Bush Radio All-Wave Console. Costing 15 guineas, it has a five-valve (including rectifier) circuit and covers from 17-53 metres on the short waves.

A microphone is slung here and there above the orchestra, then away back over the balcony, over towards one side, yet another microphone of the ribbon type hung at an angle.

"Whatever is that one doing there," I asked, "miles away from anything else?"

"Oh, that's the microphone for the organ," said my guide. "When we changed over from the moving coil to the ribbon microphone we had to shift everything, and we found that to be the best place. We tried it above the clock at first, but as the clock is a synchronised electric one it made such a row that we had to shift the 'mike.'

"The microphone is hung at that angle sideways on to the organ so that it can pick up any reflected sound from the walls.

"If we change the type of microphone again, I suppose we shall have to shift them all round once more. Let me give you a demonstration of the organ."

We went out of the little side door by the organ chamber, we opened a little panel in the wall, turned a switch and watched anxiously through a little hole covered in glass in the door giving access to the organ chamber. Gradually two lights came on and increased to full brilliancy. The wind was on. We went across the platform to the organ console. The organ burst into sound.

### Difficulty of Organ Broadcasts.

It's certainly a good organ, there's no doubt about that. It sounds vastly different in the concert hall from what it does on the radio. Radio has a long way to go before they are able to play with all the tone colours of that organ and get them over unchanged to the listener.

For half an hour stops were touched, pistons pressed, switches operated, and all sorts of tonal effects were played on the giant organ. Then, when the demonstration was over, we went back across the platform, out through the little door at the corner of the concert hall, to the panel in the wall. We switched off the motor providing the wind; gradually the two little bright eyes through the door dimmed, went out, and the organ chamber was in darkness. The wind was off, the demonstration was over. Creeping down the narrow stone steps we made our way back to the lift and down to the ground floor of Broadcasting House.

But I shall dream of that organ chamber—and I have a hunch the dream will not be pleasant—I don't like being a Gulliver in a sort of Brobdingnag.

"I've had no Radio trouble since they fitted EDDYSTONE Components"

**EDDYSTONE HIGH GRADE SHORT WAVE COMPONENTS**

*For complete Reliability and Outstanding Performance*

**SEND FOR ILLUSTRATED LIST.**

STRATTON & CO. LTD., Eddystone Works, Birmingham.  
London Service: WEBB'S RADIO, 14, Soho Street, W.1.

## Fault Tracing with Precision

Don't let faults stump you. Every cause of trouble is accurately revealed by the AvoMinor. 13 Meters in One. Provides unique testing facilities. Milliamperes sufficient for testing all valves and apparatus. Six voltage ranges for all radio voltage tests. Ohms ranges adequate for all resistance tests. In case, with leads, testing prods, crocodile clips, and Instruction Booklet.



BRITISH  
MADE

### 13 Meters in One

**Current**  
0-6 m/amps.  
0-30 "  
0-120 "  
**Voltage**  
0-6 volts  
0-12 volts  
0-120 volts  
0-240 volts  
0-300 volts  
0-600 volts  
**Resistance**  
0-10,000 ohms  
0-60,000 ohms  
0-1,200,000 "  
0-3 megohms

Price 45/-

Deferred Terms if desired.

The D.C.  
**AVOMINOR**  
REGD. TRADE MARK

Write for descriptive pamphlet and details of Easy Terms.

THE AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO., LTD., Winder House, Douglas St., London, S.W.1. Victoria 3404/7.

Said a wireless mechanic named White, "In a leg of pork 'crackling's' all right. If your radio set Also has it, you bet That you didn't wire up with Fluxite."



See that FLUXITE is always by you—in the house—garage—workshop—wherever speedy soldering is needed. Used for 30 years in government works and by leading engineers and manufacturers. Of Ironmongers—in tins, 4d., 8d., 1/4 and 2/8.

Ask to see the FLUXITE SMALL-SPACE SOLDERING SET—compact but substantial—complete with full instructions, 7/6.

Write for Free Book on the art of "soft" soldering and ask for Leaflet on CASE-HARDENING STEEL and TEMPERING TOOLS with FLUXITE.

**TO CYCLISTS!** Your wheels will NOT keep round and true unless the spokes are tied with fine wire at the crossings AND SOLDERED. This makes a much stronger wheel. It's simple—with FLUXITE—but IMPORTANT.

### The FLUXITE GUN

is always ready to put Fluxite on the soldering job instantly. A little pressure places the right quantity on the right spot, and one charging lasts for ages. Price 1/6.



ALL MECHANICS WILL HAVE

# FLUXITE

IT SIMPLIFIES ALL SOLDERING

FLUXITE LTD., DEPT. 324, DRAGON WORKS, HERMONDSEY STREET, S.E.1.

## TELEVISION AND THE CORONATION

(Continued from page 27.)

and see that justice is done; those of us who are present—Peers, Members of Parliament, the Judges, the Mayors and Lord Mayors, the representatives of the great public bodies of the country, all, on behalf of those they represent, swear to serve and support the King.

The Archbishop of Canterbury, as the senior ecclesiastic in the Kingdom, extends the blessings of the Church, and anoints the King in the following manner: The sacred oil is kept in a two-handed flask, which holds six ounces. Four Knights of the Garter hold the cloth-of-gold canopy over the King's head while oil is poured into a gold spoon said to have been used in the twelfth century. As the Archbishop pours the oil on the King's bare head, he says: "Be thy head anointed with Holy oil, as kings, priests and prophets were anointed." The Archbishop then pours oil on His Majesty's bare chest, saying: "Be thy breast anointed with Holy oil," then oil on the palms of both hands, using these words: "And as Solomon was anointed king by Zosok the priest and Nathan the prophet, so be you anointed, blessed, and consecrated King over this People, whom the Lord your God hath given you to rule and govern, in the Name of the Father, and of the Son, and of the Holy Ghost. Amen."

When this ceremony is completed, four specially chosen Peeresses, as nearly of the same height as possible, hold the canopy of cloth-of-gold over the Queen's head whilst the Archbishop pours oil on the crown of her head. He uses these words: "In the Name of the Father, and of the Son, and of the Holy Ghost: Let the anointing with this oil increase your honour, and the grace of God's Holy Spirit establish you for ever and ever. Amen."

### An Impressive Sight

The final act, and the most important of all, is the clothing of the King in the State robes of cloth-of-gold and the placing on his head of the ancient Crown of Britain. As he is crowned, so all the Peers simultaneously place their coronets on their heads; and as the Queen is crowned each Peeress dons her coronet—a most impressive sight.

The whole of this ancient ceremonial has a most solemn meaning. No verbal description, no picture drawn by human hands, can convey the solemnity and grandeur of the occasion. It must be seen. But owing to the limits of space, only a certain number of people can be present. Yet, thanks to the marvellous invention of television, it would have been possible for very many thousands more to have actually seen it. It is true that the art has not yet reached such perfection that the whole of the scene could have been reproduced; the assembling of high officials and officers of State, of foreign Princes and Rulers, and our own nobles and dignitaries, cannot be reproduced on the television screen.

But the King on his Throne, and the actual ceremony as performed by the ecclesiastics and high officials of State, could be reproduced perfectly well at the moment it takes place.

It seems a very great pity that the public

is to be deprived of this chance of participating, through their own eyes, in the Crowning of their King, His Majesty George the Sixth.

## SEEN ON THE AIR

(Continued from page 34.)

showing, only five controls. I have another with a screen measuring 12 in. by 9½ in. The number of valves is about the same as that of the American set in each case.

I have not seen the second hand of a watch on either set, but have no doubt that in a close-up it would be easily visible.

Speaking of America, Mr. Gerald Cock, Director of Television, has received a letter from Mr. V. Van der Linde, of the National Broadcasting Company, reporting reception of the B.B.C. "video" signal in New York. "If you could only guarantee to give us this service regularly," he says, "it would be fine." He reports that he picked up the signals "clearly and strongly," but it is not clear whether he received a recognisable picture or whether he picked up the sound only.

America seems to be using "video" widely as an alternative to "television."

By the way, the television sound signals have now been picked up in New York, Texas, Cape Town, and Johannesburg. Freak reception, of course, but once they said that when radio signals confounded the experts by skipping across the Atlantic.

### B.B.C. "Cooking Lessons"

Marcel Boulestin converted me during the week under review, and I bow my head in shame. I have spoken somewhat scornfully of the B.B.C. "cooking lessons." On this occasion I watched fascinated. But perhaps it was because M. Boulestin did not cook at all. He mixed two wonderful, almost unbelievable, salads.

It is tedious of me to choose, week after week, the same type of show for special mention, but again I think a floor-show, Maracas, wins the palm.

On Friday the Irish Players presented a play well suited to the medium, Lady Gregory's "The Rising of the Moon." Two or three picturesque characters, not too much infernal brogue, a short and simple plot. It made enjoyable television material.

Here may I mention that my visitors who look into my office to see television no longer fit in and out, but generally stay to see a whole item. A healthy sign.

But, alas! I cannot congratulate the B.B.C. on the Saturday programmes. Transmissions which should have been the most popular of the week tended in the reverse direction.

I could not bear the thought of the afternoon exhibition of railway engines and carriages, so I gave that a miss.

Russell Swann, the conjurer, was amusing and up to form. Evidently he reads these notes, for he stopped saying "Isn't that silly?" Thank you, Mr. Swann.

Lisa Minghetti, accomplished violinist that she is, played a Mozart concerto. Many, like myself, doubtless appreciated this performance very much, but I cannot think that a highbrow programme of the sort is the ideal fare for Saturday. And, having given it once, B.B.C., why repeat it in the evening?

## TECHNICAL JOTTINGS

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

### Mutual Inductance

**M**UTUAL INDUCTANCE is one of the most important characteristics of electrical circuits. It is by means of this property that power is transmitted from generator voltage to transmission-line voltage and back to the voltage suitable for motors and electric lights. Yet in spite of the importance of mutual inductance its actual measurement is generally considered to be of little importance as compared with the measurement of self-inductance, capacitance or resistance, for example.

### Perfection of Transformers

Perhaps the reason why we do not trouble very much in the ordinary way about measuring mutual inductance is because present-day iron-core transformers of any sort of size are so nearly perfect. The mutual conductance between the primary and secondary windings has an actual value so near to the theoretical maximum that no ordinary measurement can distinguish the difference. Such differences are, however, of importance in some connections and when they have to be measured the measurement is by some characteristic of the transformer itself, the voltage regulation of a power transformer or its leakage reactance, and the frequency characteristic of an audio transformer.

### Loose-coupled Circuits

The general theory of coupled circuits involves at one end the closely coupled iron-core type of transformer just mentioned, and at the other end the loosely coupled tuned circuits of radio-frequency amplifiers, of which the neutrodyne receiver of Hazeltine is a classic example. Such loosely coupled circuits are now used as bandpass filters at the intermediate-frequency of heterodyne receivers.

Mutual inductance can only exist in the presence of self-inductance. An important measure of mutual inductance is its ratio to the geometric mean of the two self-inductances which it involves, and this ratio is sometimes called the "co-efficient of coupling." If we call this co-efficient of coupling  $k$ , the co-efficient of mutual inductance  $M$ , and the two self-inductances respectively  $L_1$   $L_2$ , then  $k$  is equal to  $M$  divided by the square root of the product of  $L_1$  and  $L_2$ . We find that  $k$  may have any value from zero to unity.

### Resonance Curves

In loosely coupled tuned circuits the resonance curve has a single peak for all values of coupling co-efficient less than a certain critical value. A larger coupling co-efficient results in a flattened top to the curve with the steepness of the sides, however, maintained. The measurement of this small mutual inductance is of great importance in the adjustment of intermediate-frequency filters.

Mutual inductance may be measured by using as a standard of comparison a known mutual inductance, self-inductance or capacitance. When the standard mutual

inductance is continuously variable, and of such a range that it can be made equal to the unknown mutual inductance, then the latter can be easily determined by a simple balance method. The primaries of both mutual inductances, that is the standard and the unknown, are connected in series to a power source. Their secondaries are then connected in series to a suitable detector, headphones or other A.C.-operated instrument, in such direction that their induced voltages are in opposition. The standard is then varied until a balance is obtained, when the value of the standard is then equal to the value of the unknown inductance.

### Radio Circuits in Industry

I came across a very interesting little experiment the other day which, although not directly connected with radio, involves the use of radio apparatus, amplifier circuits and so on. The particular apparatus in question was a stroboscopic arrangement by which a periodic illumination could be obtained, the periodicity or frequency of the illumination being adjustable at will. I should mention in passing that apparatus of this kind is finding increasing uses in industry for the purpose of measuring revolution speeds in special cases where ordinary methods cannot be used. Suppose, for example, the speed of rotation of a gear wheel has to be measured, then all you have to do with this stroboscopic arrangement is to illuminate the gear wheel with the intermittent light and increase or decrease the frequency of the interruptions in the light until the gear wheel appears to come gradually to rest.

### Oscillating Circuits

When the interval between one illumination and the next is the same as the time taken for one tooth of the wheel and the next succeeding tooth to pass a given point, it will be obvious that the observer cannot distinguish one gear tooth from the next because every time he sees it there is a tooth standing at exactly the same spot. The frequency of the light interruptions can be easily read off from a dial on the instrument, and a very simple calculation will then give the speed of the wheel.

In the case in question it was desired to measure the friction losses in a very delicate shaft which was running in enclosed jewel bearings and was not accessible for speed measurement in the ordinary way at all. The power involved was also extremely small and everything was very delicate.

### Speed Counting

The way in which the friction losses were computed was as follows: The shaft was driven by a stream of compressed air until its speed was above that of the flashes, a marked point on the shaft being observed as it came round each time. The shaft was then allowed to run freely with its speed diminishing until it appeared to stand still, that is, until the successive passages of the marked spot coincided with the intermittent illuminations. This instant was noted with a stopwatch. The shaft then continued to lose speed until it again appeared to stand still, this situation corresponding with one revolution of the shaft corresponding with every two flashes. This instant was again noted by stopwatch and so on. In this way it was easy to determine

(Continued overleaf.)

# BARGAINS

## A.C. BANDPASS S.G.4

CHASSIS with 4 BRITISH VALVES  
LIST PRICE £6:6:0



**BARGAIN**  
£3:10:0

Cash or C.O.D. Carriage Paid.  
TESTED BEFORE DISPATCH.

Wonderful selectivity and sensitivity. Four matched British valves. Screened Bandpass Coils. Slow-motion Tuning, illuminated dial. Wavelength calibrated. Gramo. pick-up sockets, 21 watts output. Wave range 200-550, 1,000-2,000 metres. For A.C. Mains ONLY 200-250 volts 40/60 cycles. Bargain Price £3/10/0.

Also available in beautiful walnut-veneered cabinet complete with Celestion Field-energised Moving-coil Speaker and Airplane dial, ready to play. List price £3/8/0. Bargain Price £2/19/6, or £1/6 down and 12 monthly payments of 8/6.

5/-  
DOWN

## EXTENSION SPEAKERS

**BARGAIN**  
LIST PRICE 27/6

Walnut-veneered, hand French polished cabinet, as illustrated, strongly built to prevent vibration, fitted with 8" diam. Permanent Magnet Moving-coil Speaker with dust-proof cover, baffle-board and woven mêche covered speaker opening. Cash or C.O.D. 17/6, or 2/6 down and 7 monthly payments of 2/6.



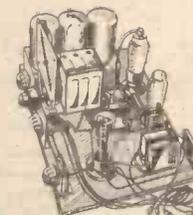
Dimensions: 12" high, 12" wide, 6" deep.

A truly magnificent extension speaker with multi-ratio Permanent Magnet Moving-coil Speaker, large diameter cone, mounted on baffle-board and housed in beautiful 2-tone walnut-veneered hand French polished cabinet, fitted with non-resonating, sound-proof boards on top and 2 sides, with volume control on side. Complete with detachable back. Overall dimensions: 13" wide, 12" high, 7" deep. Speaker tapped for Power, Super-power, and Pentode outputs. Cash or C.O.D. 27/6, or 2/6 down and 11 monthly payments of 2/6.

2/6  
DOWN

## SUPER ALL-WAVE S.G.3 KIT

LIST £4:4:0 **BARGAIN**  
£2:19:6



● 4 Wave Bands: 14-31, 28-62, 200-550, 900-2,100, metres.  
● No Coil changing. Screened Triple-gang Coil Unit.  
● Tested and Matched Components.

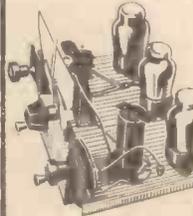
**KIT '1'** Complete Kit of tested and matched components. B.T.S. 4-Band Coil Unit. J.B. Screened 2-Gang Condenser. B.T.S. L.F. Transformer. B.T.S. and

B.R.G. H.F. chokes. Each Kit complete with drawing and instructions. Less valves and cabinet. Cash or C.O.D. Carriage Paid £2/19/6, or 2/6 down and 12 monthly payments of 5/3. If 3 British Tungram Valves required with above, Cash or C.O.D. £4/2/3, or 7/6 down and 11 monthly payments of 7/6.

2/6  
DOWN

## STRAIGHT 3 CHASSIS WITH VALVES

LIST PRICE 45/- **BARGAIN**  
29/6



Each chassis tested before dispatch. with Valves Circuit Comprises: latest detector reaction, followed by R.C.C. and triode super-power output stage. Metal chassis. Slow-motion tuning. Dial calibrated degrees. 200-2,000 metres. Low H.T. consumption. As illustrated, with 3 valves, knobs and escutcheon. Cash Price 29/6, or 2/6 down and 11 monthly payments of 2/9.

**COMPLETE RECEIVER.** Above chassis in horizontal console cabinet, with valves and speaker, less batteries. List Price £4/19/6. Bargain, £2/2/0 Cash or C.O.D., or 2/6 down and 11 monthly payments of 4/-.  
2/6  
DOWN

● SEND FOR BARGAIN CATALOGUE  
Postal Orders must be crossed and currency registered.

**New Times Sales Co.**  
56 (P.W.24), LUDGATE HILL, LONDON, E.C.4.  
EST. 1924

## HOME RECORDING!!

Electradix Radios' Wonderful Bargains. Electradix Home Recording with the all-g geared FEIGH Electric Recorder. Ball-bearing centre gear box and traverse rod; is the lowest-priced electric home recorder that will fit any gram.



set with tracking gear, pick-up and tone-arm with diamond. 37/6

Gear only, 21/6. **TELEPHONES** for House, Office, Garage and Field Sports. Table, wall, and waterproof portable from 10/-.

**HEADPHONES**, with cords, 2,000 and 4,000 ohms, 4/6. Single high res. earpieces, 2/6. Sullivan 120 ohms, 2/9.

**WHY NOT LEARN MORSE?** Cheap home learner's set, complete with battery and buzzer, on walnut base, 4/6. Large range of Keys, Buzzers, Sounders and Recorders.

**X-RAY TUBES**. As illus. previous issues. Brand new W.O. Hospital Surplus, 77 dia. bulb, big tungsten electrodes. Full emission. Cost £5. Sale 10/-. Packing 2/6.

**PHOTO CELLS**. R.C.A. UX867. Talkie model, 25/-; few Osram G.M.C. 35/-; Selenium Cells, 5/-, 7/6 & 10/-.

**BELL PUSHES** in porcelain and brass. Big stock, all types, from 6d. English Bells, 2/-.

**CRYSTAL SETS** (for crystal-pure reception) Table type "A", 7/6. Double circuit type "B", 10/6.

**SPARK COILS**. 1 in., 1/2 in. and 1 in. gap, with condensers, 10/6. Short wave spark transmitters for boat model control, 17/-.

**SPEAKERS and MIKES** cheap. **MICROPHONES**—Table Model "P.W.11." For home broadcasting. Bakelite square body on bronze base containing transformer, switch and plugs is a marvellous production at a low price. Worth 2 guineas. Only 15/-.

Ledix No. 10B Pedestal, 10 in. high, 12/6. Ledix Superior No. 12BB Ring, 14 in. pedestal, 18/6. Hand mikes, in 2 in. case, No. 11 at 5/6. Superior type, No. 11a, 7/6. Home microphone No. 11 is a solo general purpose, robust mike, with solid bakelite body, back terminals, front metal grille, hand or sling design, 5/6.

**OVERLOAD BREAKERS** replace fuses now. Magnetic Trip, 3 amps., 7/6; 6 amps., 10/-; 10 amps., 12/-; 15 amps., 14/-.

**TELEPHONES**, House and Portable Inter-comm. and Telephones of various types cheap. Wall Sets, 10/-, 120 ohm Sullivan Headphones, W.D. Aluminium body and bands, 2/9. Lissen Brown, Ericsson, etc., 2,000 and 4,000 ohms, 4/9.

**TIME SWITCHES, CLOCKDRIVE**.—Switch on-off any time, 6 amps., 35/-; 10 amps., 40/-.

**SWITCHGEAR, DIMMERS, CHARGERS, METERS**.—We carry large stocks of Meters, all ranges and sizes, from 2 1/2 in. dia. to 8 in. Laboratory apparatus a speciality.

Send for "Radio Electrical" Scientific Illus. List "P" Free.

**ELECTRADIX RADIOS** 218, Upper Thames Street, E.C.4.

Phone: Central 4611

218, Upper Thames Street, E.C.4.

Phone: Central 4611

## TECHNICAL JOTTINGS

(Continued from previous page.)

the rate of "deceleration" and, knowing the moment of inertia of the shaft, the frictional losses were easily calculated.

This is just one more example of the many applications which radio circuits, particularly amplifier, tuned and oscillating circuits, are finding in industry.

### Recording Television

The B.B.C. are only "feeling their feet" in regard to television, and will no doubt have to go on doing so for a long time to come. It is a huge undertaking and bristles with technical and manipulative difficulties of every kind. In spite of the many criticisms which have been made of the television pioneers for years past, I think it is rather wonderful that things have reached the stage they have in so comparatively short a time, having regard to the obstacles which have had to be overcome.

### How Many Television Receivers?

Now that the B.B.C. has got going at last, some people are complaining that the television transmissions are not "on" for a sufficient time each day. But this again seems to me to be an unreasonable complaint, because the number of television receivers in use must be very small, and there would be no proper reason for the B.B.C. to devote a large amount of time each day to radiating television programmes in the present state of affairs; in fact, it would be quite uneconomical and altogether wrong.

### What About the Dealer?

The question arises, or will arise very soon, however, as to the sending out of television programmes at special times of the day—for example, at lunch-time and in the early evening—so that radio dealers will have something to work on in demonstrating television receivers to prospective buyers. The same problem arose, if you remember, in the early days of broadcasting, when dealers complained that they had nothing suitable on the air for them to show off to their customers at lunch-time, which is the only time many people have to do their shopping. With ordinary sound broadcasting it was very soon arranged for them to have something, and the complaint was quickly met.

### "Potted" Programmes

But with television it is not nearly so simple, and this leads to the question whether the B.B.C. will go in for "potted" television programmes, corresponding with the broadcasting of gramophone records in the ordinary programmes. Many people seem to think that the B.B.C. will find it very convenient to use recorded television signals, so that the items can be used again, and also so that they can be sent out at any convenient time without having all the bother of the full studio arrangements.

### A Jumble of Sound

Technically it is not an impossible business to record the television signals—that is the radiated matter which is received via your television aerial—on to the magnetic tape which is used for recording ordinary sound broadcast items. After all, the television transmitter only sends out

radio signals, just the same as it does with sound broadcasts, and these signals can be and frequently are received as sounds by your sound receiver. They form an unintelligible jumble, it is true, when transformed into sound, but they are nothing more or less than signals of exactly the same type as those at present radiated by the ordinary transmitters, and therefore are susceptible to recording and reproduction in exactly the same way.

Whether the B.B.C. will take advantage of potted television items remains to be seen, but many people say that they do not see how some such system as this can well be avoided if television items are to be on tap at all necessary times.

### Television in Japan

Talking about television, Japan is now coming up to scratch in this direction and has instituted a visual broadcasting research department of its own. Quite recently the Japanese Government, through the Broadcasting Corporation of Japan, granted a large subsidy for television development. This, I understand, will be used mainly for the construction of a powerful transmitter for broadcasting the television images, using a Japanese system invented by Dr. K. Takayanagi of the Hamamatsu Polytechnical College. This Japanese gentleman has been working with a Nipkow disc method of scanning, and his aim has been to reduce the number of lines to a minimum so as to reduce the cost of the transmitting and receiving apparatus.

### Size of Screen

I am often asked what I consider to be the correct size of a television screen, I don't think there is any doubt that this should be at least a foot square; anything smaller than this becomes rather footling, and I think that everyone will agree that there can be no real permanent entertainment. (Continued on next page.)

## S.T.800 KITS

AS SPECIFIED BY THE DESIGNER!  
KIT "A" WITHOUT VALVES : KIT "B" WITH VALVES  
Cash Price or C.O.D. £3.10.0 6/3 : Cash Price or C.O.D. £4.16.0 8/-  
or 6/3 down and 11 monthly payments of 6/6. DOWN : or 8/- down and 11 monthly payments of 8/10. DOWN  
All "P.W." Kits supplied for Cash or EASY TERMS.

**W.B. STENTORIAN SPEAKERS**  
The Finest Permanent Magnet Loud-speakers on the market, supplied on lowest terms:—  
3/75. Cash or C.O.D. 42/-, or 2/6 2/6 down and 11 monthly payments of 4/-.  
**CASH OR C.O.D.**  
**ORDERS DEALT WITH BY RETURN OF POST**  
We pay all C.O.D. charges.  
ALL GOODS CARRIAGE PAID

THE LONDON RADIO SUPPLY CO., LTD., 11, Oat Lane Noble Street, London, E.C.2.

## SHORT WAVES

SLIP A

SLOT

AERIAL FILTER

IN YOUR AERIAL

Essential for all-wave sets. Makes your aerial adjustable at the turn of a knob. Complete with cut-out switch, from all dealers or post free from:

GRAHAM FARISH LIMITED, Masons Hill, Bromley, Kent.

Please be sure to mention "POPULAR WIRELESS" when communicating with Advertisers. Thanks!

**ENGINEERING OPPORTUNITIES**  
Free!  
268 PAGES  
This unique Handbook shows the easy way to secure A.M.I.C.E., A.M.I.Mech.E., A.M.I.E.E., A.M.I.A.E., A.M.I.W.T., A.M.I.R.E., and similar qualifications. WE GUARANTEE "NO PASS NO FEE." Details are given of over 150 Diploma Courses in all branches of Civil, Mech., Elec., Motor, Aero., Radio and Television Engineering, Building, Government Employment, etc. Write for this enlightening Handbook today FREE and post free.  
British Institute of Engineering Technology, 101, Shakespeare House, 17, 18, 19, Stratford Pl., W.1

**TECHNICAL JOTTINGS**

(Continued from previous page.)

ment value in a tiny screen much smaller than the size mentioned. It would be far better if the size of the screen could be increased to perhaps six feet square, but the technical difficulties involved in doing this are at present very great indeed, owing to the trouble in getting the necessary amount of light, or perhaps I should say the necessary brightness.

In the cinema we are accustomed to the dark, but when it comes to a home cinema most people regard the necessary darkening of the room as a great disadvantage. As things are at present the same kind of darkness or semi-darkness is necessary for television, and therefore the same objection will hold. To be really popular, television should be capable of doing its stuff effectively in an ordinarily lighted room.

**Simplicity of Control**

Simplicity of control is another very important point, and the successful television set should have not more than three controls.

**A GO-AHEAD FIRM**

Bulgin precision resistances and three-watt volume controls

ONE of the most energetic radio component factories in this country is that of Messrs. A. F. Bulgin at Barking, Essex. Scarcely a couple of weeks pass without my getting some sort of notice from them telling of developments.

For instance, there are the Precision Resistances which have been brought out for laboratory use and for use in connection with test meters. The range extends from 1 to 10 ohms at six shillings, and from 5,000 to 1-megohm in prices varying from 6s. to 24s.

These resistances are wire-wound with special nickel-alloy enamelled wire. They are non-inductive, and are made on specially slotted porcelain formers. Protective covers are fitted so that the resistances are not likely to be damaged, while the windings are treated to prevent atmospheric effects.

The resistances are guaranteed to have an accuracy at 15 degrees of better than 2 per cent. But special resistances, with accuracies of up to half of one per cent, can be picked if required at a small extra charge.

Remember that, you dealers and test engineers, and also you expert constructors. You will find the resistances not only useful for meter test work, but also in the construction of accurate apparatus.

And now—volume controls. Big ones, three-watters. A new range of low-resistance volume controls which will carry from 24 to 55 milliamperes has been brought out, again by Bulgin.

The retail price of these wire wound, linear law components is 2s. 6d. each. A silent disc quash plate is used for the moving contact, and soldering tags are fitted for connection. The accuracy of the resistance values, which range from 10 to 50 ohms in steps of 5 ohms, is 10 per cent. plus or minus.

The fixing bush is alive with the moving contact, so that insulated fixing washers are provided in addition to the indicating dial. There is one point that I like very much in addition to the very smooth motion of these resistances—that is the small diameter. The whole thing is wonderfully compact and the diameter is only 1 1/2 ins.

Messrs. A. F. Bulgin are certainly to be congratulated on their activity and on the good workmanship of these components. I have found each one of them to be well up to the standard one expects from this firm, and also to be within the ratings of current-carrying and resistance values stated.

The values of the components were carefully tested and found to be close to the stated value—certainly well within the advertised error allowed. As for operation in actual use, well, I need simply say that I had absolutely no fault to find.

By the way, I have not told you the type number of the volume controls. They are the VC series, and the numbers run up from VC80 for the 10-ohms resistance to VC88 for the 50-ohms control. The steps, as I said, are in 5 ohms. The current-carrying capacity drops in gradually decreasing ratio as the resistance value goes up. It starts with 55 mA for the 10-ohm resistances, drop to 45 for the 15-ohm, then we have the following figures in order: 38, 35, 31, 29, 27, 26, and 24. K. D. R.

**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.

The Proprietors have the right to refuse or withdraw advertisements at their discretion.

Postal orders in payment for advertisements should be made payable to The Amalgamated Press, Ltd., and crossed.

All communications should be addressed to Advertisement Department, "Popular Wireless," John Carpenter House, John Carpenter Street, London, E.C.4.

**RECEIVERS, COMPONENTS AND ACCESSORIES**

Surplus, Clearance, Second-hand, &c.

**SOUTHERN RADIOS WIRELESS BARGAINS.**

All Goods Guaranteed and sent Post Paid.

**RECEIVERS.—VIDOR.** 3-Valve Battery Sets. Model C.N.212. Complete in attractive Walnut Cabinet with three Mullard Valves, Moving-Coil Speaker, Batteries and Accumulator. New, in sealed cartons, £3 17s. 6d. (List, 6 1/2 gns.).

**LUCILLE.** 5-Valve American Midget Sets. Complete with 5 Valves. Moving-Coil Speaker. Ready for use on any mains 100/250 volts A.C./D.C. Long and Medium Waves, £3 15s. 0d. New in sealed cartons.

**RECORD CHANGERS.—Garrard Model R.C.4,** plays automatically and changes eight 10-in. or 12-in. Records of any kind. New, in sealed cartons, 66.

**GRAMOPHONE MOTORS.—COLLARO** Spring Gramophone Motors complete with all accessories, 11/-

**SPEAKERS.—CELESTION** Soundex permanent magnet, 10/- TELSEN permanent magnet, with 10-ratio Transformers to suit any Receiver, 12/6. Telsen Loud-Speaker Units, 2/6. All Brand New and Boxed.

**COILS.—Telsen Iron Core, W.349** (Midget size), 4/-, Type W.478 (Twin), 9/- pair. Type W.477 (triple), 16/- per set. Type W.476 (triple Superhet, Selector and Oscillator), 16/- per set. All ganged coils complete on base with switch. Telsen I.F. Transformer Coils. 110 kc., 5/- Telsen Dual Range Coils, with aerial series condenser incorporated, type W.76, 4/- Telsen Aerial condensers with shorting switch, 2/- All Telsen components Brand New in sealed cartons.

**AMERICAN VALVES.** A full range of valves for all American receivers, 6/- each.

**MISCELLANEOUS BARGAINS.—**All brand new in original sealed cartons: Telsen A.C./D.C. Multimeters test anything radio or electrical, 8/6. Telsen 2-range Voltmeters, 3/-; 3-range meters, including milliamperes, 4/- Ace (P.O.) Microphones, with transformer ready for use with any receiver, 4/6; 36 assorted Tru-ohm Resistances. 1 watt; colour-coded and marked, 36 on card, 6/- per card. Bell Transformers, 200/250 volts input, 3, 5 and 8 volts output, 3/6; Morse Signal Units, incorporating buzzer, tapper and flash with international code, complete with batteries and bulb. 3/9 each. Marconi V.24 and Q type valves (useful for short-wave experiments), 1/6; Lightweight headphones, double pole, 4,000 ohms each earpiece, 3/- pair.

**REGENTONE ELIMINATORS, A.C.,** 200/250 volts type W.5a, with trickle charger, 37/6.

**SOUTHERN RADIO.** Branches at 271-275, High Road, Willesden Green, N.W.10; 46, Lisle Street, London, W.C.2. All mail orders to 323, Euston Road, London, N.W.1.

**SOUTHERN RADIO, 323, Euston Road, London, N.W.1** (Near Warren St. Tube). Phone: Euston 3775.

**HEADPHONES.** Brown, G.E.C., B.T.H., Ericsson, Brandes, Siemens, etc., 2,000 ohms, 2/6. 4,000. 5/- Postage 6d. Guaranteed.

**SPECIAL.** Telefunken, adjustable. 7/6.

**CRYSTAL SETS.** Burne-Jones. Double circuit. Complete. Guaranteed, 8/- Sensitive permanent detectors, 1/6. Crystal detectors, complete parts, 1/- Crystals, 6d. Post Radio, 183, Caledonian Road, London, N.1.

**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.**

**RECEIVERS, COMPONENTS AND ACCESSORIES**

Surplus, Clearance, Second-hand, &c.  
(Continued)

**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.

**B.T.800,** Author specification, valves, W.B. senior chassis, 100/- Macbeth, 41, Mill Street, Ballymena, N. Ireland.

**PLEASE** be sure to mention "Popular Wireless" when communicating with Advertisers.

**VALVES**

3/- EACH. 6L6, 6K7, 6H6, 25Z6, 25A6. All other popular types American Tubes. Radiographic Ltd., 66, Osborne Street, Glasgow, C.1.

**MISCELLANEOUS**

**GRAMOPHONE Attachments** for Radio, electric motors, 25/-; Pick-ups, 9/6; Portable Gramophones 12/-; spring motors, 4/6, dozen, 36/-, 100, £12/10, 1,000, £100; walnut pedestal Anexagram, £5. Soundboxes, tonearms, horns, cabinets, needles, gears, springs, accessories cheapest. Lower prices for quantity buyers. Catalogues free.—Regentpop, 120, Old Street, London, E.C.1.

**A.C.—D.C.** New Motors all voltages from 14/9. Lists free. Repair Specialists. EASCO Electrical Service, 18, Brixton Road, S.W.9.

**WHEN** replying to Advertisers, please be sure to mention "Popular Wireless."

**SITUATIONS VACANT**

**POST OFFICE ENGINEERING.** Excellent openings for young men age 18-23. Start £3/13/0 weekly at age 18. No experience required. FREE details of exams. from N.I.E. (Dept. 606), Staple Inn Buildings, High Holborn, W.C.1.

**Another Beautiful  
NATURAL COLOUR**

*Flower Study*



**FREE  
TODAY**

This week **POPULAR GARDENING** presents its readers with the fourth delightful Flower Study in full colours; it is a glorious, post-card-size plate of the Godetia, Double Sybil Sherwood. Instructions are given for sowing.

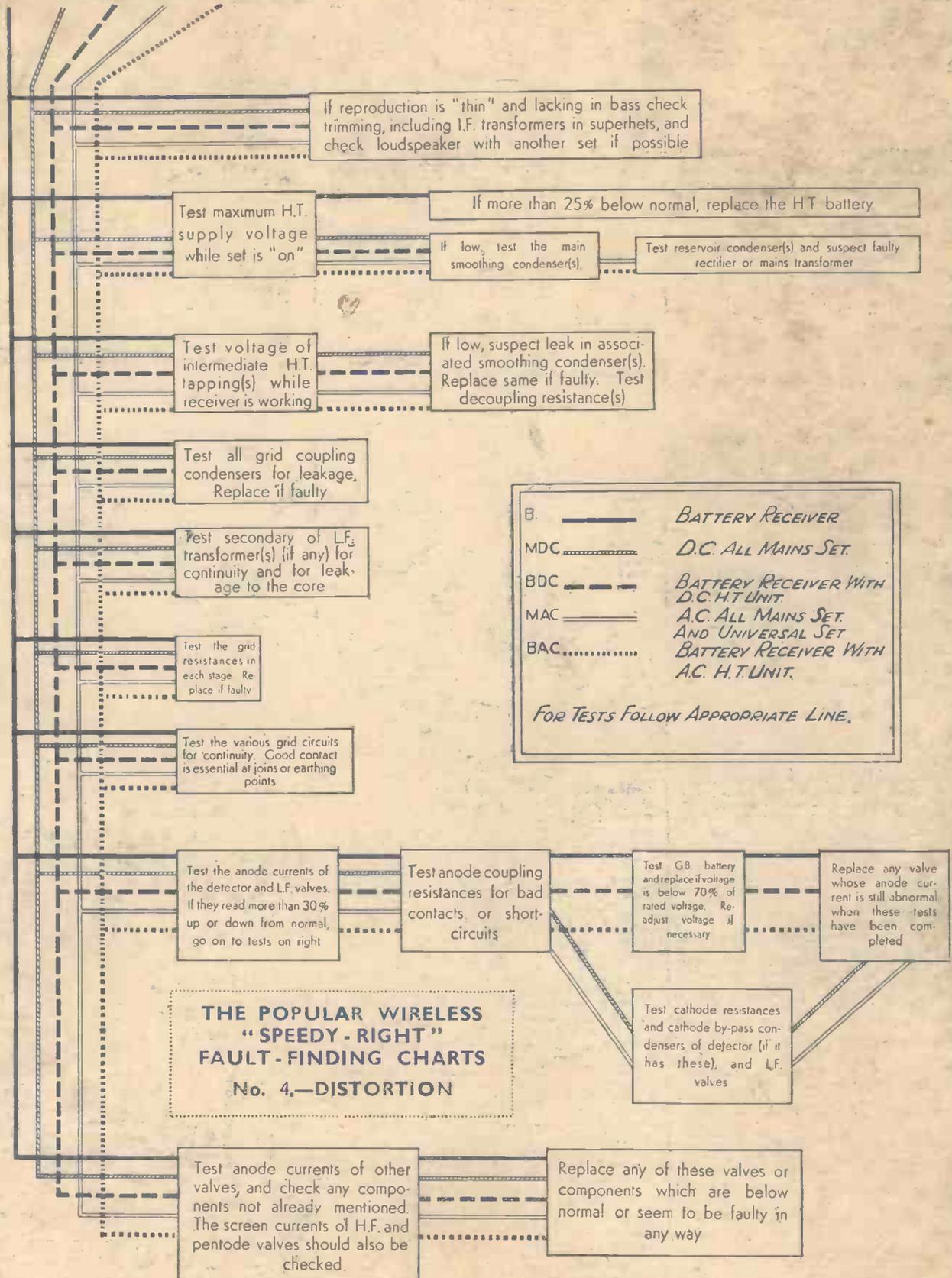
**GRAND SPRING PLANTING NUMBER** Buy your copy now.

**POPULAR GARDENING**

Of all Newsagents. Every Saturday 2d

# DISTORTION

B MDC BDC MAC BAC



B. ————— BATTERY RECEIVER  
 MDC ————— D.C. ALL MAINS SET.  
 BDC - - - - - BATTERY RECEIVER WITH D.C. HT UNIT.  
 MAC ————— A.C. ALL MAINS SET AND UNIVERSAL SET  
 BAC..... BATTERY RECEIVER WITH A.C. H.T. UNIT.  
 FOR TESTS FOLLOW APPROPRIATE LINE.

**THE POPULAR WIRELESS**  
**"SPEEDY-RIGHT"**  
**FAULT-FINDING CHARTS**  
**No. 4.—DISTORTION**