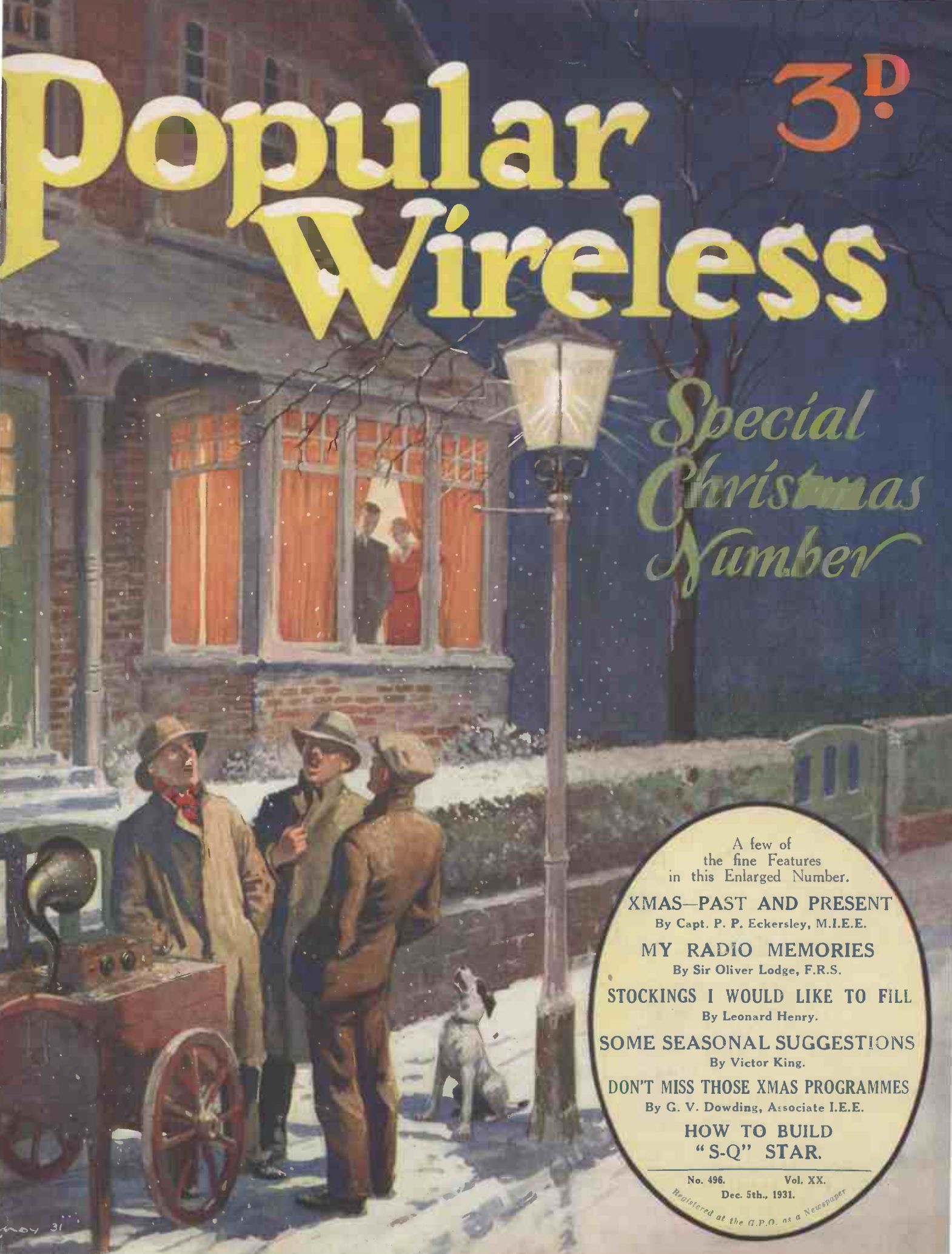
Popular Wireless

3D.

Special Christmas Number



A few of the fine Features in this Enlarged Number.

XMAS—PAST AND PRESENT
By Capt. P. P. Eckersley, M.I.E.E.

MY RADIO MEMORIES
By Sir Oliver Lodge, F.R.S.

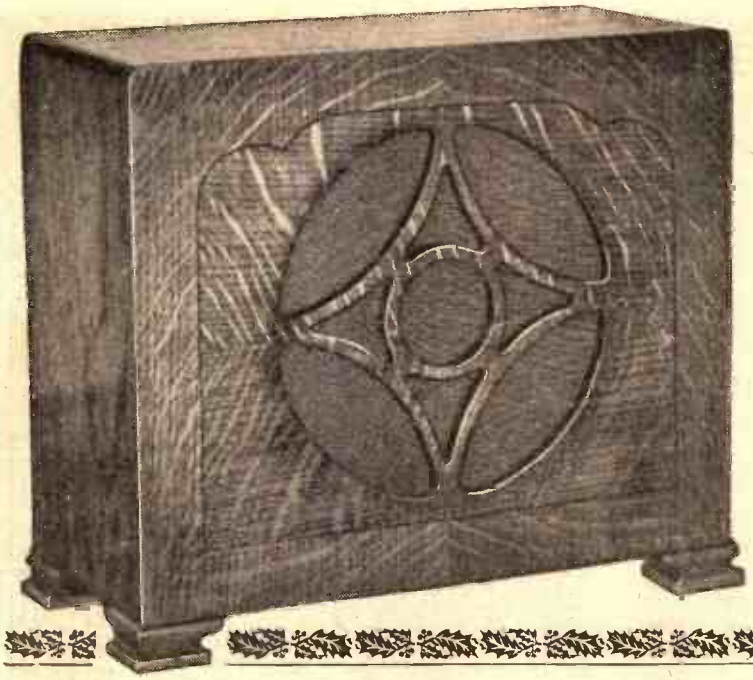
STOCKINGS I WOULD LIKE TO FILL
By Leonard Henry.

SOME SEASONAL SUGGESTIONS
By Victor King.

DON'T MISS THOSE XMAS PROGRAMMES
By G. V. Dowding, Associate I.E.E.

HOW TO BUILD "S-Q" STAR.

No. 496. Vol. XX.
Dec. 5th., 1931.
Registered at the G.P.O. as a Newspaper



BLUE SPOT 100D

A very attractively designed Inductor Type Speaker, housed in a beautiful cabinet of fine quality hand-polished oak.

Price complete - 63/-

Other Blue Spot models are available at prices from 52/6 to 110/-

BRITISH MADE

GIVE YOUR SET a new voice for Xmas

AMIDST all the giving and receiving of gifts, don't forget your wireless set. Its voice is probably a little tired by now, a trifle throaty, maybe. Perhaps it's become a shade too familiar and interrupts when other people (at the studio) are talking. Pension off the old voice and get a new one, a modern, youthful, BLUE SPOT voice. What a difference it will make! Every word sharp and clear, every musical note as crisp and true to tone as though it were played beside you. Volume without blare; no distortion; no muffling. A BLUE Speaker brings an old set up-to-date and puts a new one years ahead. And while on the subject of gifts, what better Xmas present could you give your friend?

Your dealer will help you by demonstrating the latest BLUE SPOT Loudspeakers.

Send for illustrated Catalogue P.W.19

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LONGER LIFE FOR LESS MONEY

guaranteed!

60 VOLT WAS ~~7/11~~
NOW **5/6**

100 VOLT WAS ~~12/11~~
NOW **9/3**

LONGER lasting power has been put into the Improved Lissen H.T. Battery—and a LIFE GUARANTEE is printed on the side of every Improved Lissen Battery you buy.
Prices, too, have been greatly reduced so that to-day when you buy a Lissen H.T. Battery you get a much longer lasting battery for much less money than before.

Look for the Lissen Longer Life Guarantee—buy only at the reduced prices. Ask for "the Improved Lissen H.T. Battery"—stocked by all good radio dealers.

The **IMPROVED LISSEN BATTERY**

MORE VOLUME

from any set WITHOUT ANY INCREASE IN H.T. CURRENT CONSUMPTION

P.T 225 12/6

If you would like your radio louder—if you would like to get the Continental stations at fuller loudspeaker strength—if you have a two-valve set and would like to have it perform like a three—if you have a three-valve set and would like it to perform as a four—**replace the last power valve with a Lissen Power Pentode.** Immediately you will notice a tremendous step-up in volume on all stations.

The valve to get is the Lissen P.T.225—the Economy Power Pentode—so-called because, although its magnification factor is over 90, its power consumption is only 7 m/A. That means you can work it off the same batteries as the power valve it replaces and get **immensely increased volume** without adding to its running costs.

P.T.225 - Price 12/6

OTHER TYPES	
H.210	5/6
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L.210	5/6
P.220	7/3
P.X.240	8/-
S.G.215	12/6

The **LISSEN ECONOMY POWER PENTODE**

LISSEN LIMITED, WORPLE ROAD, ISLEWORTH, MIDDLESEX

ECKERSLEY'S FIRST DESIGN for the HOME CONSTRUCTOR

GREAT NEWS FOR SET-BUILDERS!

CAPT. P. P. ECKERSLEY, M.I.E.E.,

The "founder" of British broadcasting and originator of Britain's Regional system of twin stations has prepared a home-constructor radio set design especially for readers of "Modern Wireless."

Capt. Eckersley's set embodies two entirely unique features, features evolved by his own fertile brain in a successful attempt to overcome certain fundamental obstacles that stood in the way of clear-cut reception.

Read all about this magnificent 3-valve receiver in the Christmas Double Number of "Modern Wireless," price 1/6d., with full-size blueprint, now on sale everywhere.

THE BIG CHANGE-OVER.

"By the middle of February the whole of the B.B.C. staff, except a few research engineers, will be housed in Portland Place.

"The change-over is being made the occasion of a general re-organisation of staff, partly to suit the new accommodation and partly to effect economy, through reduction and concentration. I hope the powers-that-be are not losing sight of the need of new blood here and there. More particularly on the creative side of programme work."

"M.W.'s" broadcasting correspondents are particularly well informed, and "My Broadcasting Diary" is admitted to be one of the most authoritative features of its class.

Some Selected Titles—

Why Batteries Wear Out
A Radio Reckoner
On the Test Bench
Have You a Radio Personality?
Radio Presents in Pictures
Questions Answered
From Our Readers

ON THE SHORT WAVES.

"While we are on the subject of amateur transmissions, it is nice to be able to record that the P.M.G. has just handed the 'hams' some real 'plums.' Plums worth having, too, in the form of an extension of the wave-bands allotted for amateur use."

W.L.S. writes regularly for "M.W."

THE S.O.S.

"Grey overcoat? Fawn-coloured soft felt hat?" Yes, the latter was on the rack. "Fair hair?" Yes, that also was plainly visible, and he felt certain that behind the concealing paper there was a set of "prominent teeth"! He noticed that Blazer, too, was covertly examining the fellow. Their eyes met, and the old detective answered Dare's questioning look with a significant nod. At this juncture the object of their interest lowered his newspaper and beamed disconcertingly at them.

"Might easily have been me, mightn't it?" he remarked pleasantly.

A "taster" from a thrilling short story which appears in the Xmas "M.W."

SIR JOHN REITH SAYS—

"Nine years is not necessarily by itself a long spell. But it is longer in some occupations than in others. It must, I imagine, be quite a long time in gaol for instance. In the B.B.C. it is a very long time.

"And for all this time I have gone up and down, to and from, that room. Up and down. Soon I shall be doing so no more, and I am proposing a little ceremony.

"I do not look for ceremonies in which to take part; in fact, I take considerable pains to avoid them; but in two or three months' time I propose to stage one, and to take a leading part in it. . . . It will be quite private, and there will be no reporters or press photographers present."

You should read about this and other intimate disclosures made by the Director-General of the B.B.C. in a long, exclusive article entitled "My Private Tyrant."

THE MYSTERY OF THE MAN ON THE MOOR.

"Then I saw, looming up like a battleship in a sea-fog, the outlines of a great house. I broke into a jog-trot and at last reached a mossy portico and a colossal door.

"I knocked. What a frightful row that knock made! It seemed to have a separate echo for every room! A footstep sounded lightly on the inner side of the door; there was a click, and then the great barrier slowly opened. . . ."

An extract from a special "Xmassy" "In Passing."

EVERY SET-BUILDER

should make sure of the

DECEMBER "M.W."

In addition to the free Blueprint and full details for making **The "Eckersley" Three** this magnificent issue contains a veritable feast of practical articles, including full details of

The "M.W." "ALPHA"

Lavishly illustrated, this set is particularly interesting because its construction is dealt with in detail step-by-step. The complete novice can tackle this really modern receiver with every confidence that the stations will simply roll in the very first time he switches it on!

"RELEASED BY LIGHT"

—one of the articles in the Christmas Double Number of "M.W."—contains a description of the photo-electric cell principles which may one day lead to the practical cold valve.

Read what R. W. Hallows, M.A., has to say about this modern miracle.

YOUR "SUPER QUAD"

is an interesting article on the most fascinating series of sets that have ever been described. It deals with many of the points raised by the home constructor as to the whys and wherefores of super-het construction and operation in helpful and practical fashion.

SOME SPEED!

"Their apparatus reminds one of a police trap, for they provided the electrons with a straight stretch of road to travel along, marked out a portion of this path, and then found the time it took to travel over this distance.

—From the Dec. "Modern Wireless"

On the Short Waves
Trouble Tracking
In Passing
My Broadcasting Diary
Your Super-Quad
Radio Gifts for Xmas
Round the Turntable
At Your Service

"The only difference was that instead of the speed being 30 miles per hour, it was something like 50,000 miles per hour; a speed which would surely defy the most ardent policeman!"

This is an extract from "A Radio Speed Trap," an article which explains how scientists measure the speed of electrons.

HAVE YOU A RADIO PERSONALITY?

"Some of the least successful broadcasts read well when reproduced in print in the pages of "The Listener," and sometimes a sparkling, amusing and entertaining broadcast seems to lose everything which made its hearing such a delight when reproduced in the same medium.

"The truth is that there is little or nothing in common between the written and the spoken word

A FULL-SIZE BLUE PRINT FREE!

A GREAT OPPORTUNITY FOR YOU

IN THE XMAS NUMBER OF "M.W."

That is why many of the literary gentlemen who rushed forward so confidently when broadcasting began failed so dismally in front of the microphone."

From an article in the "M.W." Christmas Number, which presents a new facet on one of the most perplexing problems of broadcasting.

WORTH NOTING.

"Though I have not yet come up against the phenomenon myself, the valve manufacturers state that the use of an output choke-filter scheme, especially if used with a pentode, is not an uncommon cause of hum. In such an event the solution is the use of an output transformer."

A tip culled from an article entitled "USING MAINS VALVES."

REALLY PRACTICAL PICTURES.

Radio is one of the youngest and most virile branches of electrical science. Growing slowly at first, it has made tremendous strides during the last few years, and "perfect" radio reception is rapidly becoming less and less of a dream, and more and more a reality.

But to attain perfection, or anything approaching thereto, one must have knowledge. The theory of radio must be understood, and as much practical experience as possible should also be gained.

It is with a view to helping readers to take a short-cut to perfection that "M.W.'s" special supplement, "Your Way to Perfect Radio," was prepared.

Not an ordinary Blue Print, either, but a Blueprint showing you exactly how to build a magnificent set that was

DESIGNED BY CAPT. ECKERSLEY HIMSELF!

Never before has there been such an opportunity as now presents itself to readers of the Xmas Number of MODERN WIRELESS. It was Capt. Eckersley who designed the B.B.C. stations, and now he has designed the set to receive them!

The "Eckersley" Three embodies an "Eckersley" Tuner, and is the first set in the world to do so. This tuner enables a higher degree of selectivity and a greater power to be obtained, than does any equivalent device hitherto invented.

AT LAST!—CLEAR AND EASY RECEPTION.

"A lot of sets, expensive ones at that, are not sufficiently selective to get even the local station without foreign station interference. My first object is to design a reasonably-priced selective set," says Captain Eckersley in introducing The "Eckersley" Three to readers of "Modern Wireless."

And he goes on to show how that selectivity can be combined with easy operation and low cost, using the newly-invented Eckersley Tuner.

This latter is of extraordinary interest to all set-builders. It uses resistance coupling between the tuned circuits preceding the detector valve in an entirely novel arrangement that gives astonishing freedom from the mush and howls so often associated with present-day selective reception.

Don't miss your chance of obtaining a free blueprint of this wonderful receiver.

Of unique form, it contains a wealth of information that will help you in all branches of radio.

Leading off with an entirely novel pictorial outline of radio theory, we follow on with practical articles of various types, and conclude with a detailed account of the construction of a really efficient modern three-valve receiver.

The supplement is profusely illustrated, and in the first and last sections it has been our aim to enable a complete grasp upon the subject dealt with to be obtained from the illustrations alone, the reading matter being an amplification rather than an inseparable part of the photographic scheme.

Thus you have two articles in one, as it were—the first conveyed solely by the illustrations, and the second running parallel with them telling the story in words.

By this means we feel we have done a great deal not only to make the subject more fascinating, but to give more lucidity to the subject and to render the maximum of aid to the seeker after the way to perfect radio.

GRAMOPHONE ENTHUSIASTS

will find their needs specially catered for in the Christmas Number of "M.W."—which contains a résumé of the latest records particularly suitable for gramophone reproduction, under the title of RECENT RECORD RELEASES.

ROUND THE TURNTABLE

is another feature of special interest to the radio-gram owner, and the subjects dealt with under this heading in the Christmas Double Number of "M.W." include the following: Testing the H.M.V. Pick-up—Controlling Tone—Shielded Input Leads—An Excellent Table Radio-Gram.

On the Long Waves
Programmes in Plenty
How Many Miles?
The Station You Cannot Hear
Station Information

On the "Outside" Waves
Broadcasting in Baltimore
Short-Wave Jottings
The City of Radio
Placing Your Programmes
A Visit to San Sebastian

Some of the subjects in a Special Supplement in the December "M.W." called

THE WORLD'S PROGRAMMES

This exclusive "M.W." feature

Helps you to know those Foreigners!

Here and There
Listen for Russia
Skying the Stations
Programmes from the U.S.A.

Down Below Fifty
Are American Stations Better Than Ours?
Radio Pictures
The Composers of Europe

YOUR WAY TO PERFECT RADIO

is the title of the Special 36-page supplement in "Modern Wireless" for December. It will assist **your** reception, and provide you with a fascinating and unique outline of the principles on which your set works.

Radio in Outline
Mains or Batteries?
Installing Your Set
Your Aerial and Earth

What Valves Shall I Use?
Choosing Your Power Supply
The Best Loudspeaker
The "M.W." Alpha

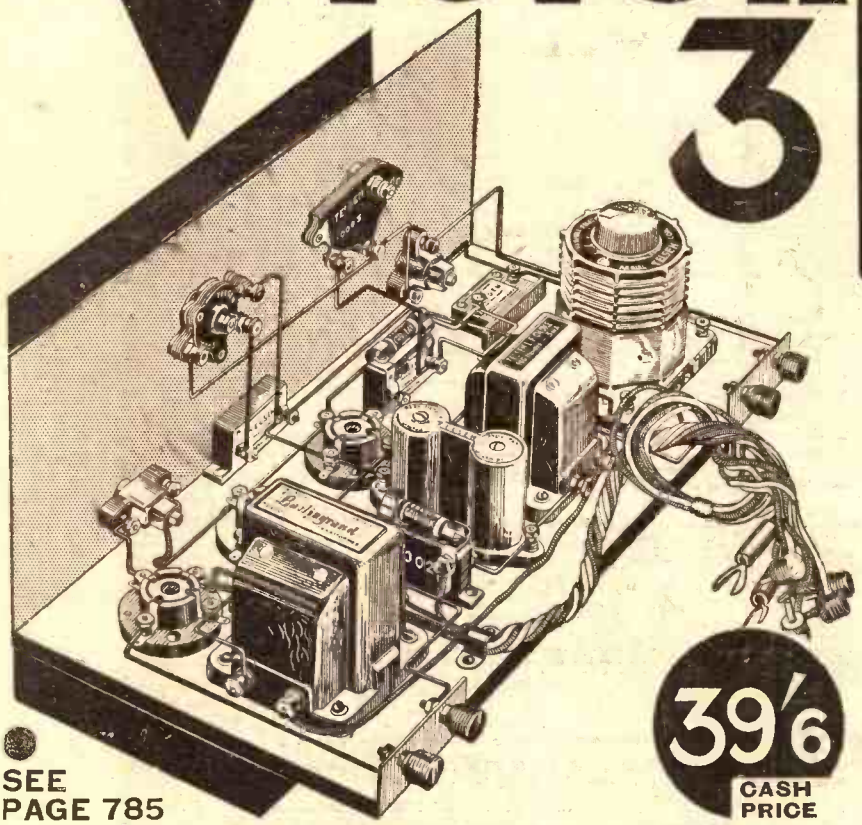
are among the features in this

SPECIAL 36-PAGE SUPPLEMENT

MODERN WIRELESS—XMAS NUMBER

BUILD THE TELSEN VICTOR 3

Buy it from the PIONEERS IN KITS OF PARTS –established 12 years



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AND 7 MONTHLY PAYMENTS OF **5/6**

39/6 CASH PRICE

SEE PAGE 785

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In hand French Polished Oak with accommodation for Telsen Speaker Unit and Chassis, as illustrated **21/-**

MAZDA VALVES
Type H.L.2 (Detector Stage)
Type L.2. (1st L.F. Stage)
Type P 220a (Super Power Output)
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Exide C.Z.3 2-v.30 (Actual) L.T. Accumulator **11.0**
Drydex (Orange Triangle) H.T. Battery 120-v. Triple Capacity **£1.4.0**
Drydex (Green Triangle) G.B. Battery 16-v. **2.6**

You are safe in dealing with Peto-Scott—the oldest established Mail Order House in the Country specialising in Radio.

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KIT "A" .....
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for which I enclose Cash/H.P. Deposit £ s. d.
Name .....
Address .....
.....
P.W. 5/12/31.

THE IDEAL 3-VALVE BATTERY COMBINATION

Here is a 3-valve combination for a battery-operated set, which for efficiency cannot be equalled. It is composed of three famous valves from the Mullard 2-volt range—the P.M.12, screened-grid high-frequency amplifier; the P.M.1 HL, detector; and the P.M.2A, power output valve.

The P.M.12 has recently been re-designed with greatly improved characteristics, while the P.M.1 HL and P.M.2A are among the latest introductions. Three valves as modern as this morning are united in a combination which is in the front line of radio development.

P.M.12

P.M.1 HL

P.M.2A

The P.M.12 costs **20/-**
P.M.1 HL ,, **8/6**
P.M.2A ,, **10/6**

Mullard

THE · MASTER · VALVE

MADE IN ENGLAND

Popular Wireless

LARGEST NET SALES

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

THREE WEEKS IN ADVANCE
ARIEL'S PROGRAMME
SAFER TREES!

SHORT REPLIES PARALYSED
TRY IT ON MILK
BUY BRITISH

RADIO NOTES & NEWS

In About Three Weeks.

THAT'S Christmas, of course! Hang it! It doesn't seem more than a few weeks since I got back from that wet, wet summer holiday. Howsomedever—as my mother says—time *will* keep ticking on and Christmas with its warp and woof of pleasure and pains (interior) will be upon us shortly. Which reminds me that the B.B.C. are preparing a real old-fashioned pantomime—Aladdin. This, Cinderella, D. Whittington and R. Crusoe seem to be immortal, don't they? We fly to Australia, we send pictures by radio, we weigh the sun—but we still love Al, Cin, Dick and Rob. That is probably our salvation!

"The Doings" In Advance.

ALTHOUGH I have been at this writing business for some time, I still think it rummy to have to pen my contribution to the Christmas Number about the middle of November. Not a bit of holly about! Puddings not made yet! Kids not yet getting excited! One has to project the imagination forward, the memory of previous Christmasses has to be conjured from the vasty deep, the whole being well-stirred. Do you know why we have our Christmas Number on December 5th? I'll bet you don't!

Ariel's Christmas Message.

TO our own, very own, private and particular readers, those of "M.W." and the "Constructor," those of our contemporaries (see how broadminded we are!), those of the Sunday papers ("How to scrape your earth-plate!"), and those of anything, anywhere (and even to Mr. Gandhi's goat!), we proffer our most cordial wishes that their Christmas may be a happy one and the great year 1932 happy, healthful and prosperous. I take this opportunity to send to all readers and to my numerous kindly correspondents a hearty handshake and my kind regards. We get a deal of fun out of each other, don't we? And no bones broken, either. Cheer-oh!

My Christmas Programme.

ELEVEN a.m.: A merry peal of bells and one hour of the good old carols, *with orchestra*. Noon: Bransby Williams in "Scrooge," that bit where Scrooge wakes up on Christmas morning. 3.0–4.30: Popular Concert, something like they give at Kingsway Hall; old songs, with choruses; Leo. Henry, Clapham and Dwyer, G. Potter, R. Gourlay, "Stainless," Jeanne de Casalis, dear little Aunt Sophy and Rex Palmer. 6.0 p.m.: Dance music till 7.30, when a panto. for the kids till nine. 9.30: Songs and dances of the past thirty years till 10.15, when a horror story by A. J. Alan till 10.45. Then dance music on one station and bits from "The Messiah" on the other, all till midnight, when "God rest ye merry, gentlemen," followed by "Auld Lang Syne" and some short, sweet theme by an orchestra. Dance music till 2 a.m.

TO OUR READERS

Once again the season of good will is upon us, and wherever you may be we wish you, one and all,

A HAPPY CHRISTMAS

Although the "P.W." Family grows and grows we can still feel that this wish is no mere formality, but an expression of real regard and good will to all our friends

FROM THE EDITOR
and Staff of "P.W."

Better and Safer Christmas Trees.

THOSE Christmas-tree candles! What footling things they were, with their precarious tin clips, dropped wax, stink, and general risk of fire to the ancestral bungalow! I never felt really comfortable till they were blown out. (More and better stink!) However, Osram's have come to our aid with a well-designed decoration lamp outfit, specially for use on Christmas trees. If we didn't have our Christmas Number thus early, you might not know this until too late. See?

A New Short-Wave Club.

MR. J. W. SWINNERTON, 3, Holmesdale Road, Coventry, is helping to form a short-wave club for Coventry and district, and asks me to broadcast the news, which I do gladly. He states that no applications for membership beyond the number of one thousand will be considered. (Note: An optimist is one who hopes for the best and prepares for something better!) Will those interested please write to him? Do not call; the bell is out of order! (See Sunday newspapers: "How to scrape your zincs.")

Wireless League Meeting.

WE are asked by Sir Arthur Stanley, Chairman of the Wireless League, to announce that members of the League are cordially invited to attend the Annual General Meeting of members, which will be held on Friday, December 4th, at 3.15 p.m., at 12, Grosvenor Crescent, Hyde Park Corner, London, S.W.1. Business: Annual Report and Accounts, and Election of Committee. Sir A. Stanley in the Chair.

Good-Bye to Burndepts.

AFTER some years of vicissitudes and reconstruction Burndept's have had to throw up the sponge and voluntarily wind up. Not much for the creditors and nothing for the shareholders! A great pity, for they made good stuff and put up a lengthy fight. Just why they failed to make adequate profits I am not in a position to say, but I well remember that when the young firm began to try to imitate Marconi's and formed overseas companies I remarked: "They are trying to run before they can walk."

A Tribute to a Great Amateur.

BURNDEPT'S sprang from the mind of Mr. W. W. Burnham, one of the men to whom Britain undoubtedly owes its broadcasting. A clever radio amateur, he led the way and showed us—and the authorities—what a delight broadcasting could be made. How vividly I recall his Sunday evening broadcasts of gramophone records interspersed with little chatty comments and descriptions! He was the forerunner of all the "uncles" and Mr. Christopher Stone! We wish the best of

(*Continued on next page.*)

"ARIEL'S" RUNNING COMMENTARY ON RADIO *(Continued)*

better luck to Mr. Burnham, a man whom the amateur radio movement should never forget.

An Aggravating Interruption.

PROF. EDDINGTON'S recent prophecy that the whole universal box of tricks, including this earth, is slowly disintegrating, and that at a certain point in time all that will be left of earth will be a microscopic pinch of dust, which will disappear the next moment, is very annoying. For consider! This cataclysm will not only interrupt a Bach cantata and interfere with the B.B.C.'s plans for the Empire station. It will "tie the can" on everything just about a week after the B.B.C. has begun giving real alternative programmes.

But there's one bright side to it—no more Christmas boxes in that happy day!

Short Replies.

G. W. B. (Coventry). Thanks for letter and appreciation of "P.W." For a radio club in your town, see note headed "A New Short-wave Club." G.W.C. (Fulham). *And* the same sort of reply to you; you do us proud. Glad you too are "Magic" and got the "Roxy" relay. Letter duly returned. M. E. M. (London, N.W.5). It *must* have been the printer, or "comp," because I assuredly wrote "Mercator." Did ever a man have to write for such a pack of bloodhounds as "P.W." readers? However, it's a pleasure to serve fellows with eyes and brains! Keeps us on our mettle!

Not Dead, but Paralysed!

THE "Christian Science Monitor," of Boston, U.S.A., publishes an article by R. Pape, of Holland, called "Preserving food by radio," in which the author is at pains to point out that his process is "nothing of the sort." We will leave the "C.S.M." to debate the headline with its unhappy sub-editor. Mr. Pape's ether wave, so he says, is created by the mingling of two air currents of different potentialities and different sign. And he calls it "the Life Wave." Cheer-oh!

Try It On Milk.

ALTHOUGH I do not see how Pape gets an *ether* wave by mixing potentials and signs, I will report him as saying that his "life wave," so far, has not destroyed germs; it only paralyses 'em. And he hopes that by the time that the germs have got used to the idea of being paralysed, the perishable matter, such as milk or eggs, will have acquired a resistance to decay. So do I; most cordially. Next summer I shall be glad to supply a pint of milk and both currents of air, if he will weigh in with the potentials and signs and paralysis.

De Forest and Television.

EVERYTHING points to a television "boom" in America in the not far distant future. The newspapers and radio magazines over there have television sections, and apparently even very young fans now talk a special jargon of scanning discs, cathode ray tubes, images, apertures, etc. Moreover, it is significant that Dr. Lee de Forest has left the De Forest Radio Company to become vice-president of the American Television Laboratories, Ltd., of Los Angeles, which company has applied for authority to erect a 10-kw. television transmitter there, using waves of 2,000 to 2,100 kilocycles.

SHORT WAVES.

Sir James Jeans asks us to realise that if Adam had had the use of wireless and had sent out an S.O.S., it would not yet have reached the more distant stars.

Another profound thought is that if Adam had broadcast a talk on gardening there would have been nobody but Eve to listen to him.—"Punch."

* * *

Paper that does not rustle is now used by the artistes in the B.B.C. studios.

Another long-felt want is silent soup.

* * *

"The greater the measure of communication, the greater the degree of civilisation," we read.

Not in our house, when Jimmie wants the wireless on and father wants to sleep.

* * *

A B.B.C. official states: "Subjects talked about on the radio, which at one time would never have entered some homes, are now so generally discussed that no one can escape them."

He seems to forget that it is always possible to switch off.

* * *

Host (offering cigars): "What would you like—Havana, old boy?"

Absent-minded Guest: "Please! I can only get Paris and Berlin on mine."

* * *

VERSE AND WORSE.

These dot-dash-dots on my wireless set
The programme nearly smothers;
We all suffer from this nuisance, yet
Some do morse-o than others.
—"Daily Mirror."

"Buy British."

IF you have any doubts as to the 100 per cent wisdom of buying British goods, some of them may be dispelled by consideration of the fact that even foreigners are glad to do it. In some countries we are undercut, and in others under-represented; again, in others we try to make the people buy what *we* like and not what *they* want. But they nearly always swear by British stuff for quality. For example, the majority of the condensers used in the new 200 k.w. Prague station were made in England by the T.C.C., which is a feather in our cap, surely.

Amateur Calls.

I HAVE safely received from Mr. F. T. Carter the book of the whole world's amateur call-letters—though our Mr. P. R. Bird had to be sand-bagged just by the emergency exit before I could lay hands on it. He is now cheepy and doing a premature moult!

Thanks, Mr. Carter! Send it in a plain van next time, please. It is a great and mighty work, almost as mighty as the "M.W." map and quite a cheery companion for it.

"Do You Know The Time!"

THE book is published quarterly, namely, March, June, September and December, and all the goodwill of the amateur radio fraternity is enlisted towards its compilation. For further details I suggest that you write to Mr. Carter, at Flat A, Gleneagle Mansions, Streatham, London, England. It is a *mine* of call-letters, and no radio explorer should be without it. Once possessed, this book will keep you up to unconscionable hours, referring to your old log-books with one hand and twiddling the dials with the other, what time the wife leans far over the bannister to inform you that it is —— o'clock. Of this book, more next time!

Personal Par.

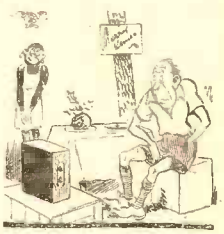
SO we have lost the little lady who so often delighted us when broadcasting in the name of Wish Wynne. Her "turns" were always highly pleasing, and I never missed them if I was "listening." I, and many of my friends, felt the sad loss almost as keenly as we should have done if we had known her personally. "P.W." offers its condolences to her relatives.

A Television Event.

ABANDONING television for a rose-coloured view, Mr. John L. Baird, the inventor, did something on November 13th in New York which shows me that he is not wedded to science. He got married. The lady was Miss Margaret Albu, the pianist. She is, or was, a member of Sir Dan Godfrey's orchestra in Bournemouth, and has given recitals at the Grotrian Hall. Congratulations and all good wishes!

P C J Takes a Holiday.

PHILIPS LAMPS, LTD., ask me to announce that their transmitting station, P C J, has been closed down for six months. This news will, I fear, cast a shadow on the radio lives of many folk overseas, and a gloom on many a Christmas spread in queer corners of the world. But no doubt a new and better P C J will take the air next May. So far as I am aware 5 S W is to carry on for the time being.



ARIEL.

MY RADIO MEMORIES

by SIR OLIVER LODGE F.R.S.

One of the most distinguished of modern scientists, Sir Oliver Lodge was First Professor of Physics at Liverpool and first Principal of the University of Birmingham. Among his many honours is the Rumford Medal of the Royal Society, one of the highest awards the society can bestow.

This week "P.W." is proud to be able to present to its readers the first of an intimate and exclusive series of articles from the pen of our Scientific Adviser.

From his armchair the great scientist looks back on a long life of singular interest, of great achievement and of stirring intellectual activity. And in these beautifully-written articles he will conjure up for "P.W." readers the great men and moments of the past—men whose names, with Sir Oliver's own, will never be forgotten whilst civilisation survives.

You cannot help enjoying this, the first article of the series, in which all the vivid directness and clear exposition for which Sir Oliver Lodge is famed is combined with extraordinarily interesting personal reminiscences.

AS one gets older people seem to think that one's duty is to be an historian of the times during which one has lived. Unfortunately, I have not been trained as an historian, and am, therefore, incompetent to do more than just trade upon my reminiscences, which are liable to be rather one-sided and not to satisfy the conditions for serious and reliable history without prejudice or favouritism.

"Transient Currents."

Looking back, then, over my lifetime, the first item to attract my attention was a paper on "Transient Currents," written by Lord Kelvin (as Sir William Thomson) in 1853, wherein he gave the theory of electric oscillations in a masterly manner considering that the idea of self-induction was not then born.

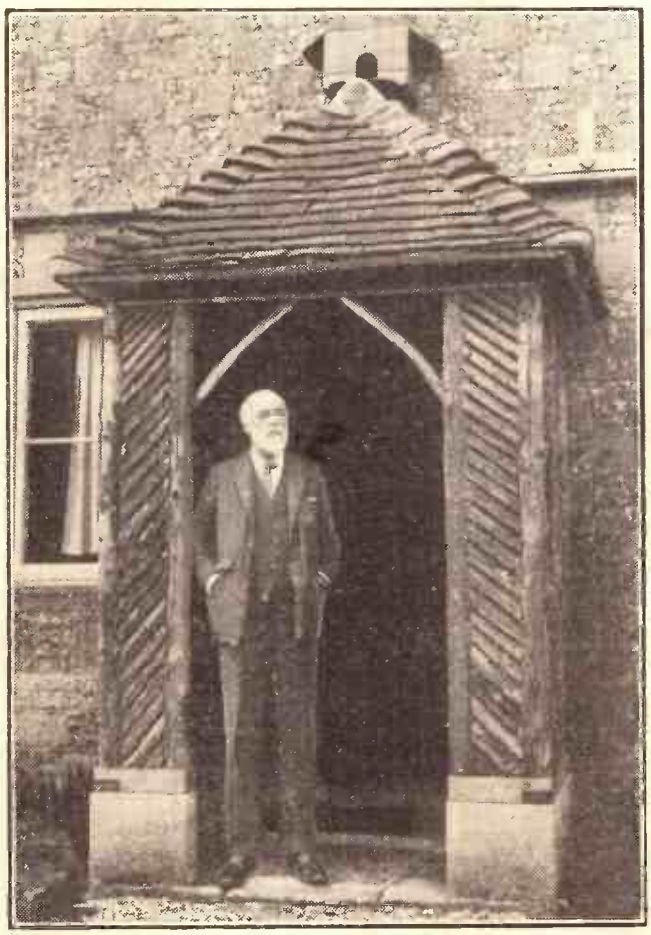
He knew, however, that an electric charge could be stored in a condenser, after the same fashion as energy is stored in a bent or coiled spring, so that the condenser received and stored up electric energy which it would subsequently give out when released.

An Important Discovery.

That was the first step. He knew, moreover, that the discharge would constitute an electric current, and that every electric current was surrounded by a magnetic field, which would confer upon it something akin to inertia or momentum; so that, like a loaded spring, it would not only recoil when released, but would overshoot the zero mark and reverse of itself; swinging like a loaded pendulum first on one side of the zero, then on the other; so that the discharge was not a flow in one direction only, but an oscillating or alternating flow, first in the positive, then in the negative direction.

The magnetic field would thus prolong the discharge until the energy was finally wiped out; and the spark if examined in a rotating mirror (as Feddersen examined it twenty years later) would be seen to be not a single luminosity, which would be drawn out into a uniform band, but would be a succession of luminosities or a beaded band, each band corresponding to a half-swing.

THE INVENTOR OF TUNING



This characteristic study shows "P.W.'s" Scientific Adviser at the porch of his home near Salisbury.

Kelvin did not attempt this experimental verification, but he went on with the theory.

The elastic recoil or strength of the spring varies inversely with the capacity of the condenser. The smaller the condenser, the stiffer the spring; so that with a large condenser the oscillations would be fairly slow; not really slow, but something comparable to a thousand or a hundred a second, something which could be made to give a musical note, if the capacity were very large.

A "Whistling Spark."

I exhibited this musical note at the Royal Institution many years afterwards in what I called a "whistling spark." The noise of such a spark, instead of being a crack, was a whistle; whose pitch could be brought down to reach the tones of the voice, and indeed lower still.

The rate of swing depends not only on the capacity of the condenser, it depends also on the load or inertia of the discharging circuit. It depends on what we now call self-induction, but which then Kelvin spoke of as "the electro-dynamic capacity of the discharger."

There was the electrostatic capacity of the charged condenser, and the electrodynamic capacity of its discharging circuit. The two co-operated so as to produce the swing, and the rate of swing depended on both equally, and could be calculated exactly.

Proving a Theory.

This theory Sir Richard Glazebrook and I subsequently verified, many years afterwards, in the Cavendish Laboratory, Cambridge, in the 'nineties of the last century, the result being published in the Stokes Memorial Volume.

The discharger not only had magnetic induction, it also had

(*Continued on next page.*)

MY RADIO MEMORIES

(*Continued from previous page.*)

resistance, and Kelvin's theory showed that if the resistance was above a certain amount, the oscillations would be quenched prematurely.

There was a critical resistance at which they would be wiped out, so that the recoil would be dead beat, just returning to zero and staying there. That was the quickest possible method of discharge. But there would then be no oscillations.,

If the resistance were still greater than that, then the discharge would take longer to reach zero; it would degenerate into a leak, or at first into a sort of intermittent current, returning towards zero spasmodically in jerks all in the same direction.

Discharging Condensers.

Now a flash of lightning is the discharge of a condenser; that is, the discharge of a store of electricity in the cloud; and Dr. Simpson, the eminent meteorologist, has shown that the resistance to a flash of lightning usually exceeds the critical value which would make the discharge dead beat, and still more exceeds the value which would permit it to be oscillatory, and, in fact, makes it intermittent; so that the lightning if photographed is seen to be a series of spits, succeeding one another very rapidly, and giving a jerky current all in one direction.

Lord Kelvin's theory of 1853 provided not only for the oscillatory discharge and its dead beat condition, but also for the leak likewise.

If the resistance was enormous then the charge of the condenser would simply leak away, the law of discharge being then exactly like that of a hot body cooling. For heat has no inertia, and therefore has no tendency to make oscillations.

Basis of Tuning.

The hotter the body the more rapid the leak, that is to say, the cooling process; and the return to zero is asymptotic; that is to say, the potential falls down an exponential or logarithmic curve, getting slower and slower as it comes nearer zero, and gradually approaching it, taking theoretically an infinite time to actually attain it.

That theory of Lord Kelvin's about electric oscillations, or what he called transient currents, dominated for me the 19th century, and was illustrated by innumerable experiments, at different times in the century.

In the year 1889 I lectured on the Leyden Jar at the Royal Institution, and showed many of these effects.

Lost by Radiation.

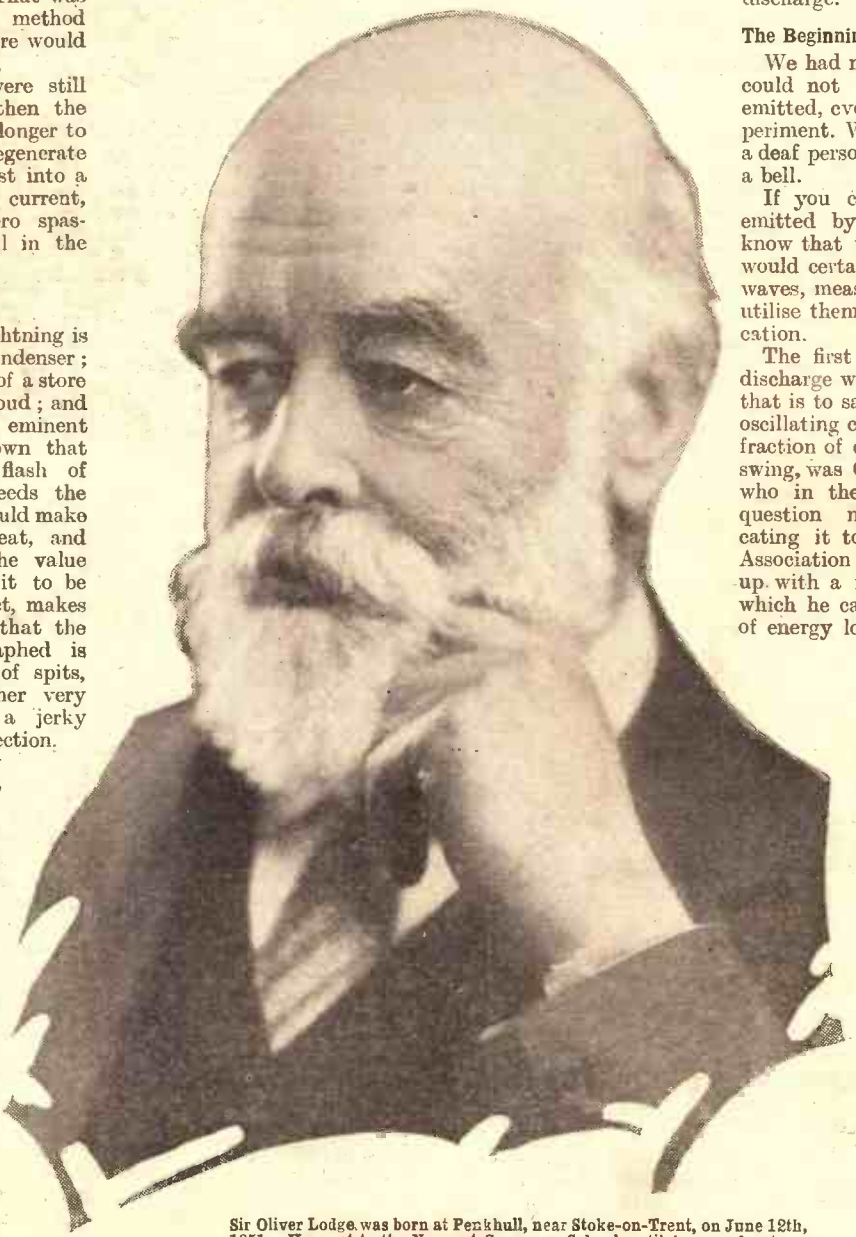
But we did not know then that there was another reason for reducing the time during which the charge continued to oscillate. It was killed not only by the resistance of the circuit, but by a certain proportion of energy radiated away into space.

We did not know that there was any such radiation, nor did Lord Kelvin. We knew or might have thought that such radiation was possible, by the analogy of a tuning-fork. A struck or excited tuning-fork gives vibrations which die out at a certain rate.

They die out partly because of the resistance of the steel of the fork, and partly, indeed chiefly if the fork is mounted on a soundboard, by reason of the radiation which is thrown out into the air.

A genius might have surmised that, as the tuning-fork vibrates in air, so the discharge of a Leyden jar or other condenser, being a vibration in the ether, might possibly carve the ether into waves and emit energy in that way.

That is what happens, but no one suspected it for a long time; they did not know that the conditions for ether waves would be satisfied by an electric discharge.



Sir Oliver Lodge was born at Penkhull, near Stoke-on-Trent, on June 12th, 1851. He went to the Newport Grammar School until he was fourteen, after which he assisted his father in business, and worked in the evenings for the intermediate examination in science at the University of London. Taking first-class honours in Physics, he thus laid the foundation for the brilliant and original studies by which he rose to fame and knighthood.

The Beginning of Radio.

We had no sense for such waves, and could not tell that they were being emitted, even when we made the experiment. We were in the condition of a deaf person striking a tuning-fork, or a bell.

If you could not hear the sound emitted by the fork you would not know that there was any; and you would certainly not experiment on the waves, measure their wave-length, and utilise them for purposes of communication.

The first to show that an electric discharge would generate such waves, that is to say, that an alternating or oscillating current would lose a certain fraction of energy to the ether at every swing, was George Francis FitzGerald, who in the year 1880 examined the question mathematically, communicating it to Section A of the British Association; and in 1883 followed it up with a further communication in which he calculated the actual amount of energy lost in a second by a given condenser and self-induction.

"A Great Feat."

This was a great feat, and I will write FitzGerald's result on the board, for it is used to this day. It showed that a short-wave oscillator radiated much more vigorously than one that vibrated slower, that the radiation power, in fact, depended on the fourth power of the frequency, other things being equal.

His theory shows why an ordinary alternating dynamo does not radiate appreciably; it does radiate, like every alternating current, but if its frequency is comparable to 100 a second the amount of energy lost is next to nothing.

To get at anything like efficient radiation you must have an alternating current of a million a second or more; and if you could only work up the oscillations till they were five hundred-million-million a second (which sounds preposterous), then you would have the means of detecting them.

(*Continued on page* 860.)

SOME SEASONAL SUGGESTIONS

Expert advice on the selection of value-for-money radio components and accessories.

By VICTOR KING.

I LIKE to feel that I am one of those "strong, silent men" able to present a "poker face" to all adversities and sneer at anything in the nature of sentimentality. But I must admit that this Christmas business gets me right under the skin.

The plaintive voices of small boys piping carols outside street doors, the snow-decorated Christmas card, the plum pudding and turkey, crackers and caps, and even the B.B.C. Christmas programmes, all combine to weaken my resistance.

"With a Difference."

The mere thought of them makes me go all "Dickens." Knowing that I cannot be unique in this, and that there must be many "P.W." readers who feel just the same way about it, I am deliberately going to turn my back on all sugary, heart-tugging emotions in this article.

I am determined that this shall be a Christmas article with a DIFFERENCE. It will be scientific rather than emotional, and I shall deal with economics and intrinsic values instead of sentimentalities.

There may be lonely souls, cut off from all their friends, whose burdens and lives you could lighten by presenting them with radio receivers. But I prefer, being of stern stuff, to look at the other side of the picture.

Think of the metamorphosis of an isolated maiden aunt after a full dose of eavesdropping on the radio.

Before Treatment.—A kindly, retiring, gentle creature who knits and reads George Eliot to a somnolent cat.

After Treatment.—An embittered hater of Bach who writes argumentative letters to the "Radio Times" and who grunts a sceptical "Oh, yeah?" every time James Agate is on the air.

No, I'll leave the sobstuff for autograph albums and try to pen some words that will be really useful.

Here goes!

What About Prices?

Christmas-time is spending time, and the whole world of trade concentrates itself on the task of luring coins out of purses. But the whole campaign would fail if prices weren't right.

Therefore, Christmas trade is essentially based on good value for money. And this year the principle is nowhere better applied than in radio. Costings have been cut to the bone in order to promote big sales. I know that, for I have made the closest possible investigations.

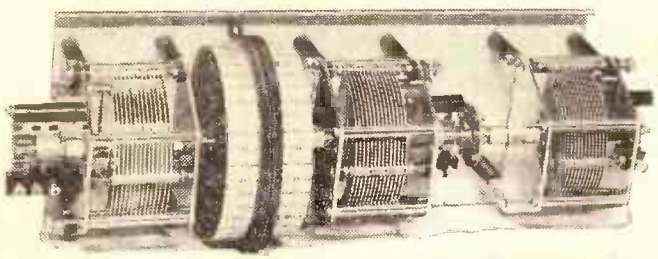
So if you want to buy radio gear as presents for yourself or anyone else, now is the time. Maybe the upward trend of prices for raw materials will find its reflection in the markets very shortly. But all the new season's goods have been listed and catalogued, and during this next month or so the buying public has a golden chance of getting in on a veritable rock-bottom level.

What to Buy.

But you will achieve little satisfaction of a lasting character in making purchases merely for the sake of buying bargains. You should make sure that the articles you spend your money on are in themselves worth buying.

And this is where I hope I can be of some little assistance—in pointing out where there have been sufficient improvements in apparatus to warrant the scrapping of old models in favour of new ones.

A MAGNIFICENT CONSTRUCTOR GIFT



One of the most acceptable gifts for a constructor would be an Extenser. Here is a Cyldon triple drum Extenser assembly, a magnificent basis for a modern de-luxe set.

First and foremost I would place loudspeakers. Here the advance in commercial popularly-priced models has been almost revolutionary.

You can now obtain really excellent moving-coil instruments at around the figures that were being asked for good "electro-magnetics" last year.

Those moving-coil units which are priced at a mere two or three pounds, and which into the bargain have permanent magnets and do not need mains actuation, are mostly first-class propositions.

It would be distinctly unfair to regard them as "cheap" and thin junior versions of an aristocratic class of article. They can hold their own in competition with similar instruments which cost three or four times as much a matter of twelve months ago.

You can indeed buy loudspeakers boldly to-day with the assurance that, providing you confine your attention to the better-known makes bearing names having established reputations, you will be lining yourself up with the march of progress.

And there are inductor and balanced armature loudspeakers now available as well which deserve the closest consideration.

If you have had valves in use in your set for a year or longer, or if you know anyone else in a smilar plight, there lies an immediate possibility for useful spending.

There are two reasons. In the first place, valves age. From the moment a valve is taken into service, it begins to wear out. But the process of decay is a gradual one, and so gradual that you do not often realise it.

Vet Your Valves.

There are many valves which will function efficiently for thousands of hours, but there are others that tend "to lose their emissions" badly subsequent to only a few hundreds of hours of use.

Generally, the first ones to depreciate are power and super-power valves, for the simple reason that they are the ones which have to supply the most electrons.

So you see the advisability of at least getting the local radio store to "vet" valves that have had a moderately long service. A large number of shops will gladly do this willingly and without levying a charge.

Secondly, the steady improvement in valves has been maintained during the

(*Continued on next page.*)

SOME SEASONAL SUGGESTIONS

(Continued from previous page.)

whole of this past twelve months, so there is a distinct probability that the replacement of an old team will result in a vast enlivenment of the set and dozens of more programmes and better quality.

This will be particularly the case with mains valves, for these are comparatively new and great advances in their design have recently been made.

By the way, it may so happen that you have in your possession and are using a mains unit which you bought some time ago. If so, is it as silent in its operation as a good, modern mains unit ought to be ?

I don't expect you all to be able to answer that question right away. But I suggest that it is a question which many should ask. The answer is to be found on the premises of your local radio retailer.

For Feeding the Filaments.

I cannot honestly say that it is my opinion the L.T. accumulator has advanced of late. But, then, first-class, dependable accumulators have been on the market for years. All that I can say is that I think there are fewer "sub-standard" varieties to be found nowadays.

Nevertheless, as with most other things, prices are drastically reduced this season, and it would be a poor man indeed who would tolerate a battered, corroded battery that could not hold a useful charge !

Well, that exhausts the majority of the accessories. What of radio sets themselves ? I think that it can quite safely be said that here there has been substantial progress both in commercial and home-constructor designs.

And, as always in the past, the home constructor is able to register an appreciable lead over the factory. In my view, this is strikingly exemplified by the "P.W." and "M.W." "Super-Quad" sets.

The "S.Q." Series.

For sheer efficiency and "classiness" in both operation and appearance there is no marketed receiver which can hold a candle to the "M.W." A.C. "Super-Quad," and yet the cost of this superlative outfit was only a third or so that of any equivalent commercial design—although I do not believe there is a full equivalent of this nature in existence.

And take the "S.Q. Star," which is to be described, I am told, in this very Christmas issue of "P.W.," I have had the privilege of being able to examine and handle that little outfit, and I must say I think it is, in the fullest sense of the term, a "star."

I have left the subject of components to the very last in the hope that I should have had much more space to deal with these than has proved the case. Two notable newcomers since last Christmas are the Extenser and the Eckersley Tuner.

In view of the fact that extensers can be fitted into practically any existing set design with real advantage, these must constitute the home-constructor's number one entry on every Christmas present list, whether the device is for his own outfit or for that of a friend.

The elimination of wave-change switches is an important factor in itself, but the extenser does much more than that. It makes dial readings simple and logical instead of arbitrary and intricate, and it cuts out wiring and shortens leads in the set, and so tends to increase its efficiency.

As a pretty little gadget, the extenser makes an immediate appeal, and the fact that it has definite merits gives it a solid foundation and renders it a proposition demanding the most serious consideration.

The introduction of the Eckersley Tuner is so recent an event that I need only say that this, too, is assured of immense popularity.

In other component quarters progress has taken the form of a maintenance of a good standard of quality together with enormous price reductions. These are the result of both keen competition and new manufacturing methods.

Purchase with Precision.

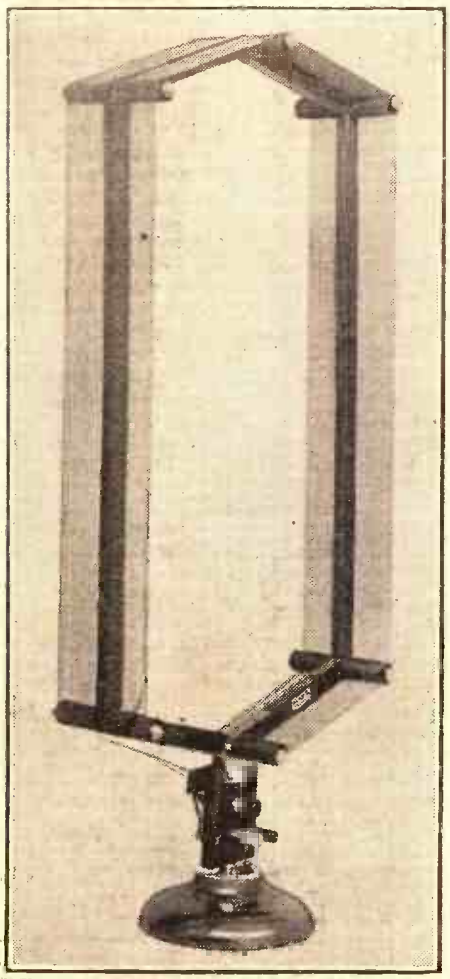
There is no need at all for me to urge you to Buy British, for the British radio industry is quite well able to look after itself, thank you ! It only asks you to make your purchases with care and discrimination, and is satisfied that your choice is bound to be to its own advantage. And that is not complacent optimism—it's just plain hoss-sense !

As a matter of fact, this Christmas finds Britain's radio still on the ascendant. The word "slump" holds no meaning for it—it seems to be boom, boom, boom, all the time. And why is that ? I think the answer is quite obvious, don't you ?

Christmas Carols.

And when you have completed all your Christmas shopping, and have connected up your new loudspeaker or new set, turn on a "carol" programme and allow yourself to go all sentimental. Someone must, or this Christmas business will suffer. And I'm not going to because, as I've said, I'm—but stop, I can hear waits outside. They are rendering that fine old joviality, "Good King Wot's-is-name"; must stop typing and listen to that !

DON'T FORGET THE FRAME



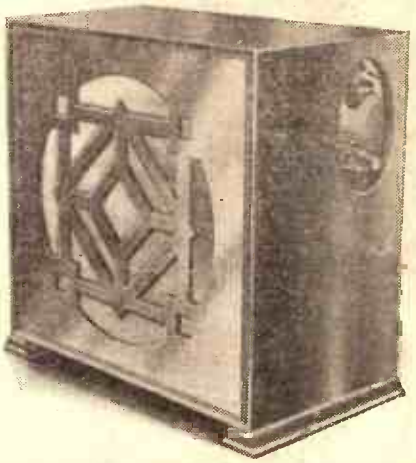
If you know anyone who is contemplating constructing a frame aerial super-het, don't forget the claims of the above inexpensive Wearite dual-range type.

AN ATTRACTIVE SET

THE idea of giving a complete radio outfit as a Christmas gift might be thought to be an impossible one for any except the very rich to conjure with.

But in actual fact it lies within the realm of practical politics even for those who have not got deep pockets, for the prices of sets are lower than ever this year.

"BRITAIN'S SUPER" TWO



The H.S.W. 1932 "Super" Two is "a concentration of simplicity and effectiveness."

And what a magnificent present ! Yet the new "Super" Two, due to Messrs. Hustler, Simpson & Webb, Ltd., costs only 84s. complete.

Entirely Self-contained.

It is of an entirely self-contained character, and in the one handsome Jacobean oak cabinet are housed the batteries and a four-pole balanced-armature loudspeaker.

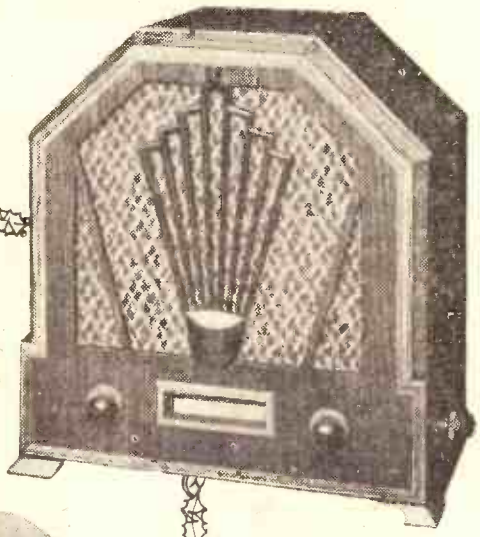
All the required accessories are included at the above very low price. There are two special valves, super-capacity H.T. battery, accumulator, and grid bias.

And, as you will be able to see from the accompanying photograph, the receiver is a very attractive affair in appearance, and could be accommodated in any room with real advantage.

Those contemplating buying a complete set should make a special point of hearing one of these "Super" Twos.

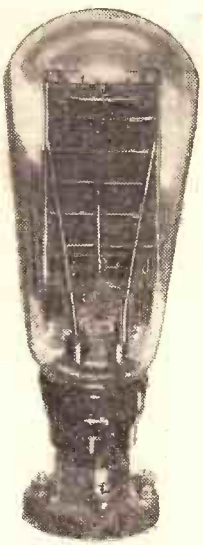
RADIO XMAS GIFTS

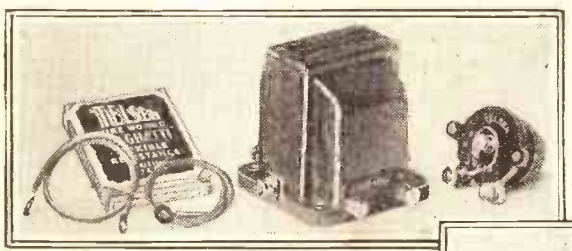
Three items of particular interest to present-givers, a W.B. Permanent Magnet Moving-Coil Speaker, a Varley Square Peak H.F. Coil, and one of those excellent value-for-money, high-class Gecophone All-Electric Screen-Grid receivers.



One of those Cossor Metallised S.G.'s will add programmes to an otherwise badly equipped set.

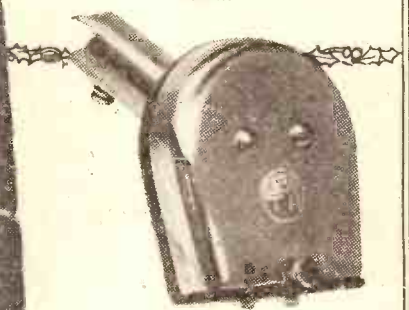
A good battery will always prove welcome, and so will a modern, high-efficiency valve of the nature of the Mazda P.P.5/400 (right).





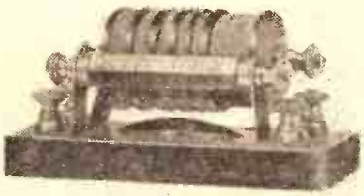
Constructor friends and relations would welcome a present of Telsen components with open arms—and in view of the low prices of Telsen parts impressive parcels of them can be made up at very reasonable costs.

One of the most popular sets of a very popular make is this Ecko 3-Valve Consolette

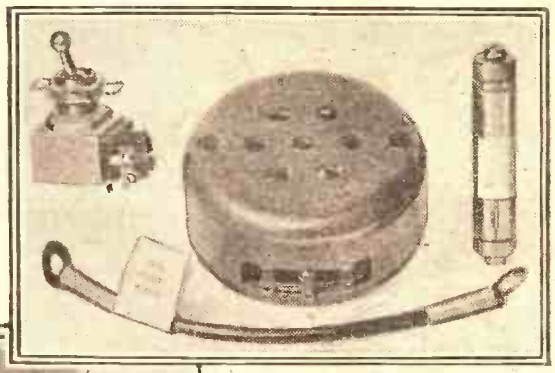


Gramophone enthusiasts appreciate the fine results given by the famous B.T.-H. pick-up.

Everyone who possesses a moving-coil loudspeaker can find a vital use for the Ready Radio "Instamat."

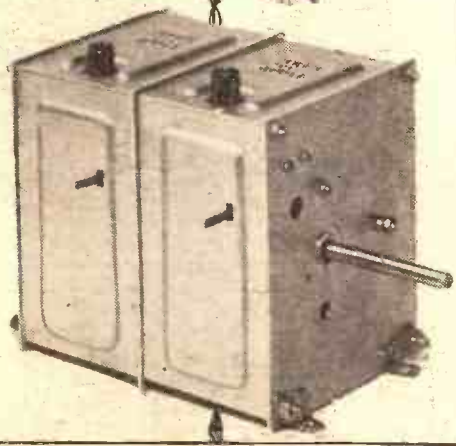


Some attractive Ferranti, Graham-Farish and Bulgin components which deserve the closest consideration.



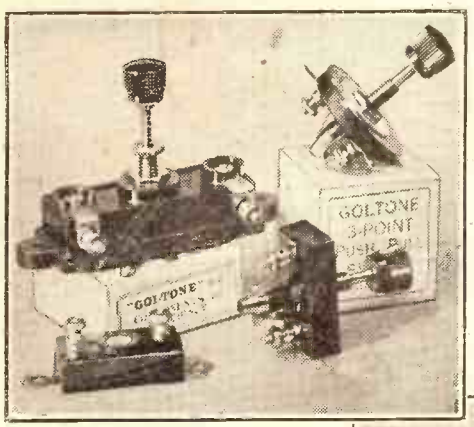
Inexpensive but vitally useful Peto-Scott Coil Quoits.

To the right is one of the Westinghouse Metal Rectifier units especially suitable for home-constructed mains sets.

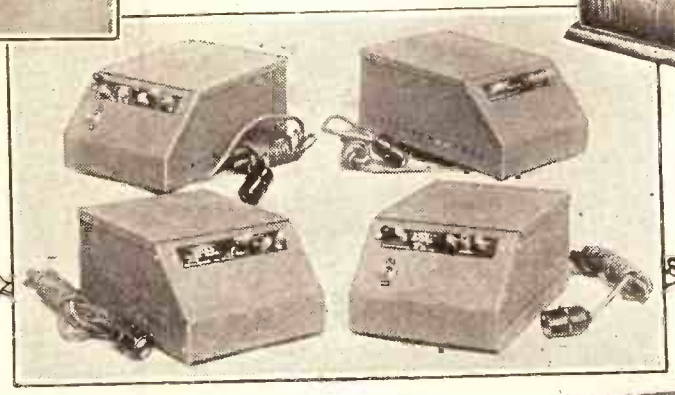


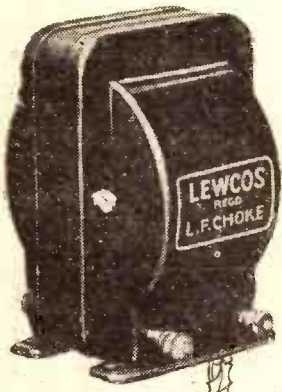
To the left you see a Lotus two-gang variable condenser. You will have no difficulty in identifying the notable apparatus which adjoins the various named components and accessories.

A Lissen valve and a Regentone mains unit are shown to the right. Readers should note that all these illustrations have been selected with very great care in an attempt to summarise pictorially, as it were, all that is best and most worth buying in the modern radio market.

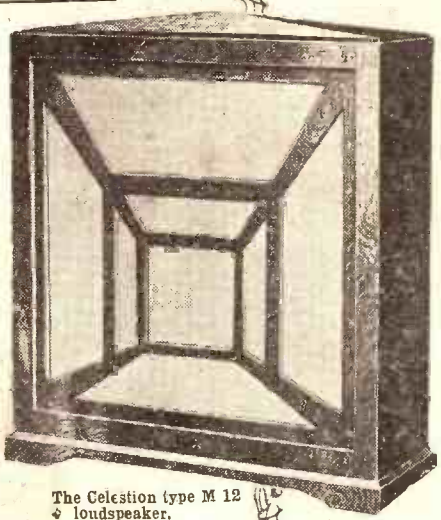


Above is one of those popular Amplion A.B.4 loudspeakers, and to the left a representative group of Atlas mains units for D.C. and A.C. mains.



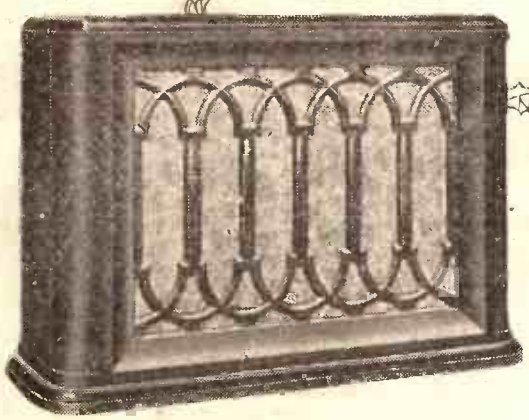


A well-known L.F. choke, a fixed condenser and the famous R.I. Parafeed L.F. transformer.



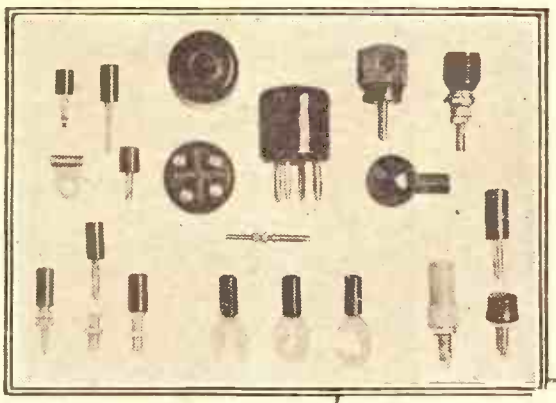
The Celestion type M 12 loudspeaker.

Now is the time to buy wireless apparatus; prices have never been lower or the all-round quality of goods so high.

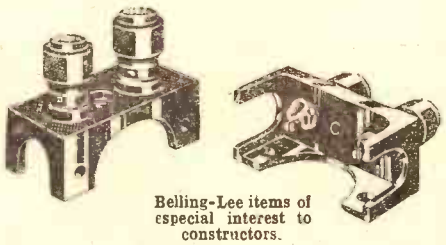


On the right is a fine example of variable condenser engineering in the form of a Polar triple-gang condenser, and on the left is an attractive representative of the fine Blue Spot range of loudspeakers.

Some further examples of Modern Radio Apparatus which should strongly appeal to compilers of Xmas Present Lists.



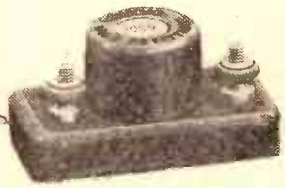
A group of those extremely useful Lectro Linx terminals, plugs, etc.



Belling-Lee items of especial interest to constructors.

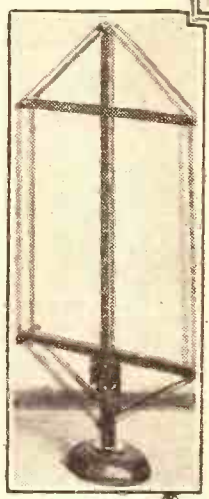
Above is a Dario S.G. valve, and on the left the Eastick dual-wave frame aerial.

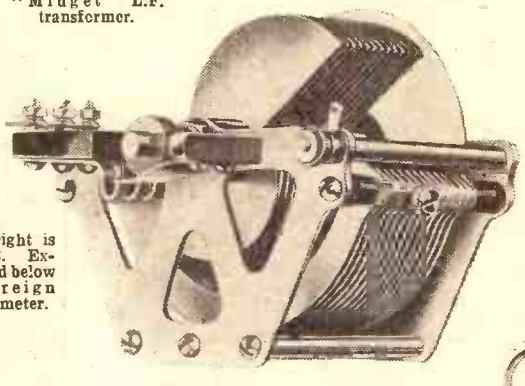
The popular Igranic "Midget" L.F. transformer.



The very neat Watmel wire-wound resistance.

An Epoch permanent magnet moving-coil chassis.



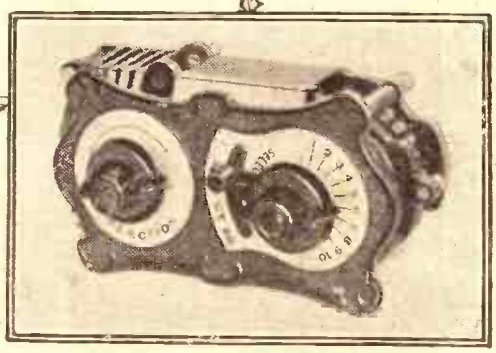


To the right is the J.B. Extenser and below a Sovereign potentiometer.

The Dubilier non-inductive fixed condenser which is an indispensable item in many band-pass sets.

Right, an instrument which measures and tests practically everything in a radio outfit.

A Heayberd A.C. Unit giving both H.T. and L.T.



The British General all-wave tuning unit.

THE CONCLUDING SECTION OF P.W.'s SPECIAL RADIO PRESENTS SECTION.

AFTER FIVE YEARS

"O.H.M." SURVEYS THE B.B.C.

Our broadcast critic, whose trenchant but constructive criticisms of B.B.C. activities constitute one of "P.W.'s" most popular weekly features, has written a special series of articles for "P.W." in which he describes and analyses the whole structure of British broadcasting. The first article appears below and this alone will suffice to show you that this new series is one of the most important—and most readable—ever published.

AFTER serving as a regular broadcast critic for POPULAR WIRELESS from 1923 to August, 1926, I went abroad for nearly five years, returning six months ago to resume my old job. I left when the country was still full of the memories of the General Strike and the decisive part of the B.B.C. in its defeat. I returned to find a vastly different state of affairs. Six months continuous listening gives me the data for comparisons and criticisms which I believe will be of some general interest.

Fascinating—At First!

I want to begin with what may be termed, tritely, no doubt, but none the less accurately, as my "first reactions." And the very first of these was an overpowering sense of maturity and smoothness. Here was at least an adolescent, if not a full-blown adult.

The former tentativeness, the shy endeavour, the whimsical amateurism—all this, and what is reflected seems to have been replaced by an unerring precision, a service so calm as to defy even ripples of uncertainty and heterodoxy.

I was at first fascinated by the transformation. It seemed to me, in its almost awesome efficiency and devastating impersonality, to embody the soul of super-rationalisation. Here was the real infallible robot at work, collecting, mixing, and radiating for countless millions, pabulum for their amusement and their instruction.

Mark you, it is easy to cast fun at this machine-made efficiency; it is in tune with the "vibratory" theory of modern existence. But the B.B.C. added in various ways to this impression of robotism; there was a confidence, a pervading calm, and a sense of intelligent leisure, all of which appealed to me.

On the Other Side.

On the other side of the account, my first sense of disappointment came when I had thoroughly examined the alternative programmes now being provided under a partial Regional Scheme. I recalled how, in 1925 and 1926 we were told of the marvellous changes which the Regional Scheme would effect in British Broadcasting.

The idea then was to satisfy at a minimum at least the two average modes of at least the average man or woman, if any. There was much talk about artistic and regional contrast. I was all the more interested, therefore, to see to what extent these abundant early promises had been fulfilled. For a part of the programme, and, I admit, an important one, I have encountered some excellent contrasts. But I have observed that in almost every case, one of the two programmes has originated outside London.

As for the rest of the programmes, I have been disappointed at the paucity of effective contrast. Frequently I found talks competing with talks; on other occasions, the music was indistinguishable in character. Then again, I have noticed the London National transmitter closes down long before the London Regional has finished its work.

I would not fail to pay tribute to what is really good in the programme-building of the B.B.C. at its London headquarters.

(*Continued on next page.*)

A HARD WORKER

Admiral Carpendale, a hard-worked member of the B.B.C.

R. H. ECKERSLEY

A brother of our own "P.P.E.", and Director of Programmes at Broadcasting House.

AFTER FIVE YEARS

(Continued from previous page.)

A B.B.C. GOVERNOR

Mr. Montague Rendall.

But, keeping in mind the stirring days at the beginning of British broadcasting, I am sorry to discover how comparatively unimportant have become the stations and regions outside London.

This is my main criticism of the B.B.C. as I find it to-day. This, in my opinion, is the real obstacle to the progress of alternative programme services. This deficiency was brought home to me the other night with a real sense of shock, when I heard the announcer of a Regional programme speaking from Birmingham meekly preface a concert with the words "this is the Regional programme from London."

I hope that this does not mean that Regionalism in the B.B.C. is being reduced to a farce. I shall live in the hope that after the present financial emergency we shall have the fine robust reflection of those areas and populations which constitute the real Britain in a much more fundamental way than is true of this vast unindividual uniform metropolis of London.

O.B.'s and Music.

Now let me turn to something which is infinitely better done now than it was five years ago. I mean the outside broadcasts, and in particular the running commentaries on sporting events and ceremonial occasions. These it seemed to me are the really bright spots in the firmament of British broadcasting.

Sir G. NAIRNE

Another Governor of the B.B.C.

There is nothing elsewhere which could compare with the description of a game, horse-race, or an event such as the Schneider Trophy Race, as done by the B.B.C. I am told that most of the credit for this admirable part of programme work should go to Mr. Gerald Cock, the "O.B. Director."

Music, of course, has been revolutionised. I think the B.B.C. Symphony Orchestra is better than any other orchestra of the same size and pretensions in the world. Here again, although the work is impersonal, the credit of most of it is due to the character and zeal of Dr. Adrian Boult.

Incidentally, I hope and pray that the B.B.C. will be wise enough to enable Dr. Boult and his orchestra to take a world tour either in 1934 or 1935. Such an enterprise would be of incalculable benefit to British prestige. And it need not cost a penny if properly handled.

I confess to considerable surprise to discover that Sunday programmes are very much in the state in which they were when I left in 1926. Indeed, the preaching I have heard in the past six months was distinctly of a lower standard than that which I remember five or six years ago.

It seems to me that the B.B.C. Sunday has fallen into a real rut. I was always one of the few to applaud the courage and public spirit of Sir John Reith when he set out to impose a disinterested and Christian idealism upon the nascent tradition of British broadcasting. This fundamental fact means a great deal and covers many sins, both of omission and commission.

But I had always entertained the idea that once Sir John had built the Christian Sunday into the permanent fabric of the structure of broadcasting he would wisely

THE MUSIC MAN!

Dr. Adrian Boult, the successful Musical Director of the B.B.C.

recognise that toleration might be an important factor in securing its permanency. I mean that I felt that the time would come when the B.B.C., having secured the fundamental Christian character of Sunday, would allow suitable alternatives to religious services and a reasonable extension of the kinds of entertainment which are in keeping with the sacred character of the day.

But nothing of this appears to have been done, and this is a great pity, if for no other reason that it is nourishing in a widespread way a feeling of revolt which, if it gets out of control, will endanger the altogether right fundamentals of Sir John's policy.

Programme Peaks.

I think it is a pity that the B.B.C. appears not to trouble any more about "Peaks" in programmes; I mean the sort of thing represented in the old days by the highly original and very creditable production of the then comparatively unknown Russian opera "Kitesh," which the B.B.C. undertook at Covent Garden about six years ago.

I would like to see a return to the policy of crescendo presentation, whereby excitement is stimulated over a period and then universal attention concentrated on a deserving creation. I have no doubt that the features are in the programmes now, but they are not lifted out of their environment and therefore lose a good deal of their potential value.

I know it is now the argument at Savoy Hill that the programmes are so good on the average that it would be invidious and is actually unnecessary to "spot light" features. I disagree entirely. The spot light is of the very essence of successful entertainment. To disregard it is equally unfair to the listener and the artiste.

It is only right that I should conclude these first reactions with a description of the real admiration I feel for the way in which the dramatic work of the B.B.C. has been developed during the past few years. In this department of activity the B.B.C. is easily first among broadcasters.

Plays for the microphone are admirably cast, and well executed There is just sufficient leaven of daring experiment and challenging novelty. The whole carries the finish of professional confidence.

SOMETHING NEW IN TERMINALS

By A. S. CLARK.

ROUND and round goes the wire as you tighten up the terminal until, with an "Oh, bother it!" or even worse, it breaks and you commence to make the refractory connection all over again.

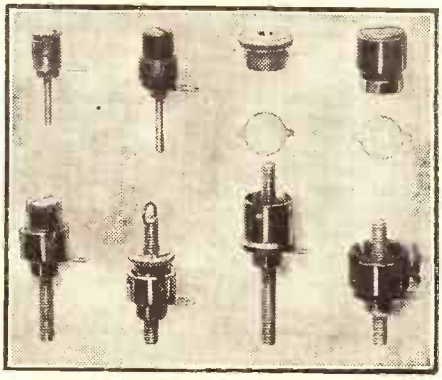
Who hasn't had that happen? And if one doesn't twist the wire round the bolt part of the terminal in a clockwise direction, how often the loop will open out and most likely finish up by slipping from under the terminal screw altogether!

To prevent this, terminals were exhibited by Mr. P. J. de Wet at the recent Inventions Exhibition, and were awarded the Monetary Prize. Well they deserved it, too.

Many types were shown, both insulated and otherwise, but they all work on the same principle, which is very simple. To start with, the bottom part of the terminal is like one of the old crystal cups with the shank coming up through it, and with two slots cut opposite one another.

A washer fits down into the cup, and on it are two projections that slide in the slots and so prevent the washer turning round. The wire is simply twisted round below this washer, in either direction, and brought out of one of the slots. Simplicity itself!

TEMPER SAVERS!



These handy terminals get a good grip of the wire or flex without "squeezing it out" over the edges.

A DOUBLE LIFE!

Wireless battery revives after long disuse

LONDONER RELATES REMARKABLE EXPERIENCE

If you have a wireless set, the letter below from a well-known wireless user will interest you.

Dear Sirs,

I am using a 5-valve, battery operated portable wireless set of a well-known make and last November I purchased a 99 volt EVER READY *'Winner' Battery and used it continuously daily until March (5 months), when it began to run down, and I thought it was about time to renew the battery.*

I purchased a 100 volt battery of another make and after only two months' use found that it was giving very poor service and as I had not thrown away the EVER READY *I again put it into use.*

After lying idle for nearly three months, it registered 65-70 volts and when I replaced it on the set the results were extremely satisfying, many foreign stations being obtained at full strength. It is now in constant use and giving good service after all this time, much better than the new battery which cost exactly the same as the 'Winner.'

Nothing else but EVER READY *for me in future.*

Yours faithfully,
L. N. C., London, W.C.1.

(*This letter may be inspected at the offices of the Company.*)

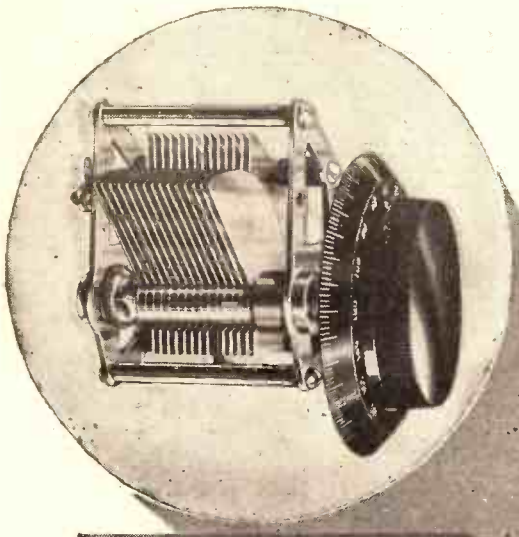
What Mr. C. has discovered is what regular users of EVER READY batteries have been saying for years past. EVER READY batteries not only provide the most perfect reception, they provide it for the longest time! That is why it will pay *you* to use the EVER READY battery; you will find an EVER READY battery made to power to perfection every kind of wireless set, portables included. Write to-day for the EVER READY list (free), and ask for the battery printed opposite your set. Every EVER READY battery is made by an exclusive process, and is guaranteed to give satisfaction by the firm which has been making batteries for over 29 years.

EVER READY

THE BATTERY THAT LASTS A LONG TIME

THE EVER READY CO. (GT. BRITAIN) LTD., HERCULES PLACE HOLLOWAY, LONDON, N.7.

A "POPULAR" MODEL AT A POPULAR PRICE



POPULAR. *Slow-motion Type, as illustrated, complete with 3-inch dial and knob.*
·0005 .. **8/6** ·0003 .. **8/3**
·00025 .. **8/-** ·00015 .. **8/-**
Plain Type, without dial, **5/6** *to* **6/-**.

J.B. UNIVERSAL LOG. *Can be ganged, mounted with either end next panel, or screwed to baseboard. Can be mounted left or right-hand.*
·0005 .. **9/6**
·0003 .. **9/-**
·00025 .. **8/9**
·00015 .. **8/9**
4-in. Bakelite Dials, Black **1/6** *extra. Mahogany* **2/-** *extra.*

BASEBOARD DRUM DIAL. *Height to match J. B. Gang Condensers. 4-inch Drum. Ratio 16—1. Oxidised silver or bronze panel plates,* **7/6**.

L.B. "R" TYPE GANG. *Trimmer (for adjustment once only) in each stage. Clip-on shields. Complete with Vernier Disc Drive and panel plate.*
Type "R" 1 .. .. **12/6**
Type "R" 2 (2 gang) **21/-**
Type "R" 3 (3 gang) **29/6**
Type "R" 4 (4 gang) **37/-**

Sound design, thorough finish, absolute precision and accuracy—these are the features of all J.B. Condensers and Dials, whatever their price. These are the reasons for the remarkable popularity of J.B. Precision Instruments.

The new J.B. "Popular" Model is an outstanding example of value for money. It is supplied in two models—Plain and Slow-Motion—fitted with rigid brass frames, vanes of extra heavy gauge brass, and end-plates highly finished in nickel plate. High-grade ebonite insulation is used and a very high electrical efficiency obtained.
Made in capacities of ·0005, ·0003, ·00025 and ·00015 mfd.

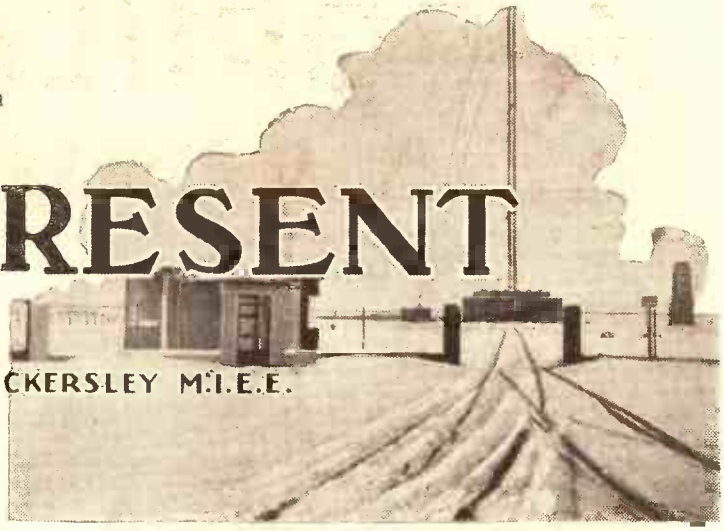
REG TRADE MARK

PRECISION INSTRUMENTS

Advertisement of Jackson Bros., 72, St. Thomas' Street, London, S.E.1. Telephone: Hop 1837.

XMAS—PAST AND PRESENT

by CAPT. P. P. ECKERSLEY M.I.E.E.



"Broadcasting has developed. How it *has* developed—and HOW it has developed . . ."

CHRISTMAS, 1918—what was peace to hold for us save lack of war? Christmas, 1919, vague talk of telephony transmissions for all and sundry—they called it broadcasting. Christmas, 1920, and they called it finished.

Christmas, 1922. Writtle! and we bought a pop-gun which failed to pop in imitation of a bottle of champagne we couldn't afford. Christmas, 1924, and relays from America. Christmas, 1926, and good-bye to all that. Le B.B.C. est mort, vive le B.B.C.!

"Long Live the Chief Engineer."

Christmas, 1929, and good-bye to much more. The Chief Engineer is gone, long live the Chief Engineer.

Christmas, 1931, a national government and a national B.B.C.—(or to the tune of Colonel Bogey, "Tariffs and the same to you——"). Where are the snows of yesteryear? What's real in the world? What's true? Or fine? Or new? "Toowoo," said the owl, "toowoo."

Broadcasting has developed. How it *has* developed — and *HOW* it has developed. Of course, people have different ideas, "some thinks one thing and some another," but I cannot help feeling that because the fresh, exciting, pioneering spirit has gone, we have all lost something vital.

Better Programmes.

I know it's impossible to expect something new and wonderful every day, and it's very easy to exaggerate the "good old days." I know well enough that the programmes of Christmas, 1925, were not as good as those of Christmas, 1931, but I know also that if the present complacent conceit, so manifest among the upper ranks of the broadcasters, continues, the programmes of Christmas, 1941, will be exactly as good (or as bad in spirit) as those of 1931.

You may feel differently about it. I know I am fighting for a lost cause, and very much to my own disadvantage. I know the B.B.C. thing is established, is consistently mediocre, and so generally acceptable. But it could be so fine ——!

Is the B.B.C. propagating the gospel of peace on earth and encouraging nation to speak peace unto nation this Christmas, or do we invoke the god of battles to look down and prosper *our* cause?—which is, of course, fine writing, fine thinking, and means just what you want it to.

But there is a side to it all where progress is not stifled, where complacency is not rewarded even by the acquiescence of the mediocre—the technical side. Where are we after nearly a decade of European broadcasting? In my opinion we are up against it!

If a man wants something to happen very badly he often bets against it. Or vice versa.

There is small satisfaction to me, therefore, that I was quite right in telling the world that the Prague plan ought to be a temporary expedient and not a final solution.

Represented Britain.

When I accepted, on behalf of Britain, a 9-kilocycle separation, I did so with many reservations. I was the last person to accept, because it was about the first time I hadn't proposed a new idea.

I remember the occasion so very well. It was in Berlin, and I had had to cut short my holiday to be there.

So I looked upon it all as a bit of a holiday and was only there to encourage the rest of our delegation. The German delegation was very keen to have this 9-kilocycle separation, and very pleased to see me. How vividly I remember the question being discussed.

People standing up and eagerly persuading me. And, like that, a flash, the whole matter decided, and people not looking at my reservations until I insisted upon writing them down.

But it was better to have a too tightly squeezed plan than no plan at all. But the plan *was to be* modified!

Not Kept Their Word.

Now the bureaucrats in the Union have frozen it solid and we're up against it because they have gone back upon their promise.

The reason I am against 9-kilocycle separation is that if we persist in it we shall have to deny ourselves reproduction of the higher frequencies.

It is obvious that if the receiver designer likes (or knows how to, which is perhaps more accurate), and if the plan still stays with a 9-kilocycle separation, he can get perfectly *clear* reproduction, but that quality must suffer because of "top" cut.

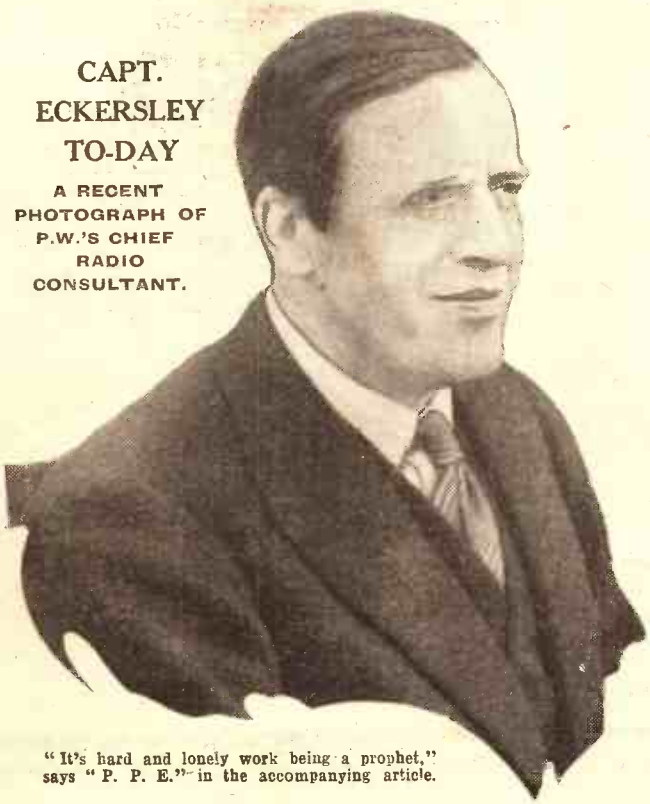
But the gramophone is a perfectly likeable instrument, and it misses frequencies above 5,000.

You've got to ask yourself this: Is it better to have more stations in Europe with less possibility of "perfect" quality (but nevertheless giving intelligible speech and

(*Continued on next page.*)

CAPT. ECKERSLEY TO-DAY

A RECENT PHOTOGRAPH OF P.W.'S CHIEF RADIO CONSULTANT.



"It's hard and lonely work being a prophet," says "P. P. E." in the accompanying article.

"VIA CRYSTAL"

Some Radio Recollections of Christmas Eve, 1920, inspired by an old log-book.

By C. G. GIBBONS.

SENSITIVE spots on the crystals seem elusive to-night. Try again. Got it! Just a *little* more pressure on the adjusting screw. Perfect! Nearly doubled the signal strength! A good station to tune-in by is Poldhu. Always fifteen or twenty minutes steady work at this time of night; and a perfect "spark" note.

There she goes, flashing out the nightly Atlantic shipping bulletin. Well, it's served my purpose for the present—but wait! Here's the weather forecast. I'll jot it down. Ah! that should give *some* people a comforting assurance of an undisturbed Christmas dinner on the ocean.

A Busy Band.

Now, what next? Croydon Aerodrome? Hardly likely to be anything from that quarter after dark. Still, I'll try it. 900 metres! Silence. Better go lower down on the 600-metre wave-length. A busy spot. Six hundred! What a medley. High notes; and some that beggar description. Looks like everyone trying to ensure a quiet Christmas Day!

That's G N F, North Foreland, stentoriously telling a persistent ship station to "wait"! I think my aerial must be directional with G N F, the signals come in so powerfully.

All the "regulars" are contributing to the general activity: OSTEND, BOULOGNE, LE HAVRE, SCHEVENINGEN. Yes, and there's NITON, I.O.W. "— . — — . —" That's her signal to somebody to start sending. A ship, probably. Wonder if I can pick it up? Lucky, first time.

Not so fast, Mr. Operator; that's more than *my* average speed. Missed one word completely, and part of another. I think I can guess it . . . a Christmas greeting! That's a happy remembrance for someone on shore. There'll be a good many of them wirelessed to-night.

What's this! "Navigation Warning" signal. Of course, it's the North Foreland's usual evening bulletin. A sudden quiet. All other transmissions cease while G N F gets busy. Surprising how quickly that special signal is heeded by all stations in the vicinity.

But I suspect that that alacrity is due to something more than obedience to International Regulations. To-night's message may yet be another to tell of a floating mine—unpleasant thought!—in latitude *this* and longitude *that* No. Just general navigation items. Nothing to stir some jaded ship's wireless operator into lively action.

G N F is repeating the "warning." And there's Boulogne and Ostend re-transmitting it, too!

Think I'd better leave this neighbourhood for a while and see what's happening elsewhere. The "amateur" transmitters! That's a good idea. Bit too early, perhaps. Anyway, I'll tune in and "stand-by."

This'll need the wave-meter, unless there *does* happen to be someone already working. I'll see. That's about the 200-metre mark. Very quiet except for the faint harmonic of a Morse station. Sounds rather like G. F. Ack, the Air Ministry transmitter.

Enthusiastic Amateurs.

Let's get the buzzer going. (Jove! that's enough to knock the crystals off their "spot.") Now let's see. Round about 200 metres should be best. Three hundred . . . two-fifty . . . dead two hundred. O.K. Hope I won't have to wait too long.

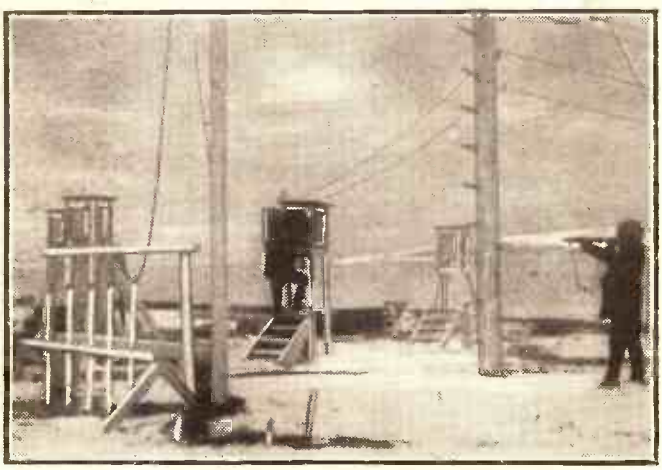
Pretty marvellous thing, this hearing voices and music by wireless. I wonder if any of the chaps of the old Signal Company remember George and his prophecy about wireless telephony. The blighter was right, too. And how he got the "bird"! Poor old George! I wonder if *he's* doing any experimenting?

Is that a harmonic, or is it someone speaking? *Sounds* like a voice . . . it *is*, too! Terribly faint, though. Haven't got him properly tuned. No; can't push him up at all. Now he's stopped. Believe I heard him say, "Changing over!" Wonder who it is? Anyway, it's almost certain that he'll come on again. I'll stand by.

Hullo! here's something better. A real, hot generator hum. Get going, whoever you are. I'm straining my ears off. Fine! That's as good as ever I heard. "How's my modulation to-night?" The usual question. *I'll* drop you a line about that, old man.

A report from this quarter might help your experiments. "Going to put on a gramophone record — something seasonable." Splendid! A chap with ideas, that. Here it comes! Can't quite recognise it . . . yes, of course! . . . "Good King Wenceslas!" Carols!

SURROUNDED BY SNOW



In the far, frozen north, at Nova Zembla, is one of the most important meteorological stations in Europe. It sends warnings by radio of important movements of Polar air masses. Last winter it successfully foretold that "cold snap." We wonder what it will spot THIS winter!

XMAS—PAST AND PRESENT

(*Continued from previous page.*)

pleasant music), or fewer stations and the possibility of reproduction up to 7,000, 9,000, or, in rare cases, 10,000.

Mark you, experiments have proved that people can tell the difference between reproductions with all frequencies up to 20,000, and reproductions with anything between 10,000 and 20,000 missing. Certainly, the former reproduction was more natural.

Then, again, there is an obvious difference between reproductions lacking all frequencies above 5,000 and those giving frequencies up to 10,000 cycles/sec. But the imperfect reproductions are quite pleasant, and indeed *some people prefer them!*

I am strongly of the opinion that a decision must be come to quickly, and that this decision should be *to separate stations by 10 kilocycles and set about designing receivers capable of making the best out of this.*

Insufficient Separation.

At the present moment, due to a complete lack of contact between transmission authorities and receiver designers, receivers are suffering—possibly owing to the high power of foreign stations and to the 9-kc. separation. Receiver designers have been caught napping because they were not warned that great selectivity would be demanded of their products.

This makes people give up listening and brings discredit to broadcasting. I have just designed a very cheap set to show that there is a cheap solution to the difficulties brought about by the Prague plan, but I do not pretend that my set gives enough top for anything like perfection of quality. But surely it's better to get little top but freedom from interference than all the 10,000's in the world plus heterodyne and side-band jamming.

Transmission people must not lose their heads because the Prague plan is teaching receiver designers their jobs. The receiver designer has every right to complain when the conditions of transmission are so onerous as to force him to sacrifice too much in an effort to get clear of jamming.

Limit the Power.

I have studied this problem quantitatively, and I know that 10 kc. is enough separation for commercial designs of receivers if power is limited to about 100 kw., and I know that cheap sets can be built to cope with average conditions, and that average-priced sets properly designed can cope with service area testing in 7·5 mv./meter, but that inevitably they must sacrifice a good deal of top to be free from interference.

Of course, looking to the 1940's, I believe that other solutions will present themselves, and that it may be possible to get a 15 k.c. separation, perfect quality, and so on, but the bulk of broadcasting will not rely upon wireless at all! That's all another story which you will hear about in good time.

It's hard and lonely work being a prophet, particularly as one fully realises it is possible to be completely and entirely wrong. All I can say is I've had a good run for my money up till now—Christmas, 1932. What then?

Don't Experiment!

(RI) have done that for you

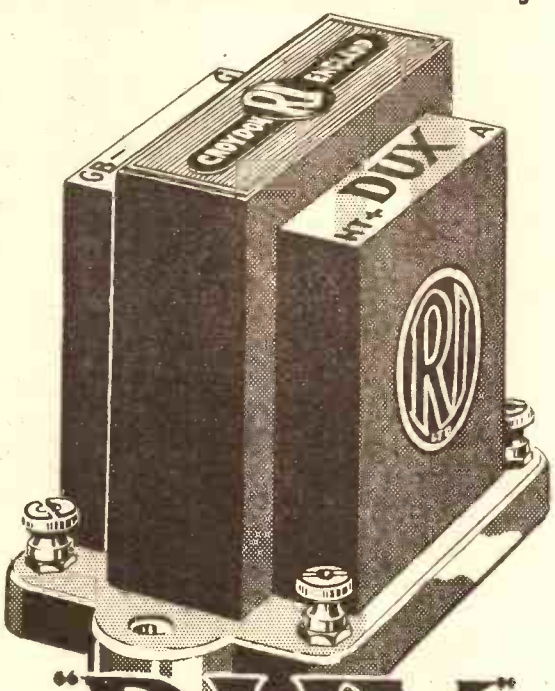
(RI) components are produced first and foremost to do their job —not to sell merely on price although they *are* low priced. Inevitably you will resort to them for reliability, therefore purchase them first to secure the satisfaction to which you are entitled.

The PARAFEED TRANSFORMER

For all parallel feed amplification circuits the Parafeed has been proved absolutely most efficient. It has been praised by every reputable journal in radio, and by test has produced astonishing Response curves of from **25 to 8,000 cycles,** whilst its inductance is actually **80 to 100 henries**—every radio veteran knows that such proven performance spells certain success in every circuit in which it is employed.

Patent No. 316449. *Size:* 2⅛ x 1⅜ x 1⅝. *Weight* 3½ *ozs.*

8/6



"DUX"

The Transformer for the Million

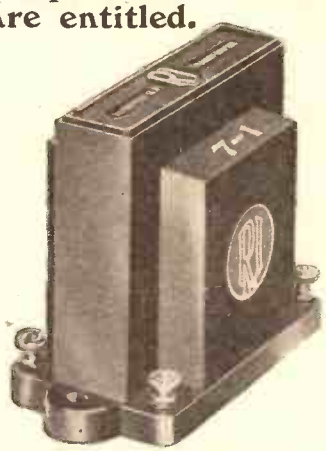
The "Dux" is the premier British transformer for paramount efficiency at lowest cost. Its performance has been enthusiastically described by the technical press as equal to transformers costing many times its price.

30 HENRIES

is its inductance—a truly wonderful qualification for a transformer of low cost.

6/9

Ratio 1 : 3½ *(standard) or* 1 : 4½ *(auto-connection). Weight,* 11½ *oz. Size,* 3¼ x 2 x 2½ *in. high. List No. DY29.*



The (RI) 7—1 TRANSFORMER

Builders of circuits employing high ratio Transformers have experienced amazingly good results by employing this component. It has a useful inductance of **15 henries** and is the centre-piece of the circuit upon which really good results are dependable. It is encased in black bakelite and constitutes the finest value at its extraordinarily low price. *List No. DY 21A. Size:* 3⅜ x 1⅝x2⅜ *high. Weight* 1 *lb.*

10/6

(RI) DUAL RANGE COIL

Laboratory tested on the most critical wavemeter and inductance bridge apparatus, each coil is **guaranteed to give utmost efficiency.** The bakelite mouldings and centreing arrangement ensure complete accuracy under all conditions of temperature. Note the clearly engraved identification marks of the easily accessible terminals, the easy fixing lugs and excellent finish. *List No. BY20*

12/6

Ask your dealer or us for a copy of our 1931-32 Catalogue

HYPERCORE CHOKE

The electrical design of this component, coupled with the use of nickel-iron for its core, assures that your loudspeaker will give its most brilliant reproduction. The added advantages of extremely small size and weight make the Hypercore ideal for modern compact set building. *Inductance* 30 *henries. Maximum D.C.,* 80 *milliamperes. Weight* 18 *ozs. List No.*—*DY22*

17/6

YOU MUST GIVE THE (RI) GHT GIFTS THIS XMAS

The Advertisement of Radio Instruments Ltd., Croydon, Surrey. Phone: Thornton Heath 3211.

NO MORE BATTERIES!

In three minutes you can change to trouble-free radio which will cost you only 1/- a year and finish with batteries for ever.

Just connect an EKCO Unit in place of your usual battery, then plug into the electric light supply and switch on—that's all. No alterations to your set or valves. No additions or replacements. No trouble—ever. Instead, a constant and reliable power supply of ample current and full voltage—always. You will be more than delighted by the wonderful improvement in your radio.

EKCO Units embody many exclusive features and combine highest efficiency with greatest simplicity. Made by the Pioneers and Leading Specialists in British All-Electric Radio, they are without equal in design and performance.

H.T. Units (A.C. and D.C.). Combined H.T. and L.T Charger Units (A.C.).

Prices From 39/6

Also obtainable on Easy Payments from **3/8** per month.

EKCO

ALL ELECTRIC POWER UNITS

To E. K. Cole, Ltd., Dept. A. 19. Ekco Works, Southend-on-Sea.

Please send me details of Ekco All-Electric Power Units.

Name .....

Address .....

.....

POST COUPON NOW FOR FULL DETAILS

Wobur

STOCKINGS I WOULD LIKE TO FILL

By Leonard Henry

The irrepressible "Uncle Leonard" is in his tip-top form in this breezy article—no wonder he gets the studio audience helplessly holding its aching sides every time he "takes the air."

GATHER ROUND, sweet pippins of my optic, while I craftily remove a penny from the money-box of my youngest boy, place the vulgar coin in the gas-meter and ignite the odoriferous result.

Revel in the roaring Bunsens while I plumb the lowest strata of a comedian's complex. (Required for this trick: Plumber, one, complete with plumbs; tools, assorted, to go back for.)

I shall not write to you of Love—that, which is known to the Bright Young Things as "Lerve," and to the *oi polloi* as "walkin' art." I am not qualified, I admit it. Well bred, maybe, but not as mustard as Ronald Colman. Q.E.D.

Do you realise that I married many, many years ago? I can't remember *how* many, but they feel like Einstein's Light-Years. Ah me! I live in a Council house, and my wife's name is L.C.—see?

I Cherish A Strange Urge.

Therefore, it's of merry Christmas that I write—happy halcyon days when Father meditates selling his body to the hospital to pay for the turkey and moist-nosed urchins tarnish one's letter-box by bleating through it:

"Goo' King Watercress looked out
On the Ink of Stephen."

or words to that effect.

And now shall I let you into a secret, said he boyishly? Oh! Do! Providing you will let us out again, says you. Drawing himself up to the full extent of his braces, the lad continued: I bring to you a comedian who cherishes the strange urge to be Father Christmas.

But Pardon Me, I Wander.

The sight of a pair of white whiskers near a red pillar-box fills me with envy, and many times I have remarked to my wife, "Do you think we shall have rain-deer?"

Ah me! How I should love to creep up to Savoy Hill at dead of night and drop presents down the aerial. (Would that I could drop a few pasts as well, but pardon me, I wander.) Yes, Oui and Oh Yeah! Useful presents—presents that Mean Something, weather and other circumstances permitting. Presents with a kick in them, such as a sawn-off shot-gun containing a pint of duck shot for wireless critics.

Presents of taste, such as a magnum of—but there I go again. None of your passionate ties that act as a painter's blow-lamp at two hundred yards. None of your futurist dressing gowns that stampede the inhabitants of Whipsnade. No, nein and nope! I would give them gifts that last as fragrant memories.

Sir John Reith should have an autographed copy of my Sunday Vaudeville and Advertising Programme Scheme, together with a packet of cigarettes to smoke in the studios. I should ask him to give me back

HOW HE REALLY LOOKS!

Most people picture Leonard Henry as a big, fat, chuckly man, and are surprised at his youthful appearance, his keen eyes, and his carefully groomed coiffure, as he calls it!

the coupons, for I am saving up for a chestnut roaster and hope to get one any year now.

Our chief engineer, Mr. Noel Ashbridge, who knows all about *pi r* squared, and, I suspect, crossed the ashes bridge in his youth, would be delighted with a gramophone with that charming Christmas carol which begins, "No-el, No-el."

Mr. Bertram Fryer, head of the vaudeville section, to whose discretion is left the number of engagements I shall have, throws salary cheques about like a man who has never opened an account.

At the same time, he is a Good Fryer of the Order of St. Juste, for he is principal nabob at the auditions for would-be broadcasters. To him I would proffer a pack of patience cards, chastely inscribed on the back with my vacant dates.

My First Thought.

The announcers would receive my special care and attention. My first thought was to give them each a pot of red currant jelly for the throat, but obviously, this might cause jamming.

Then I considered a framed copy of the election results, but I doubt if this would prove popular. No, I shall send them an incredibly clever invention of my own. It is a small attachment that they fit on to the microphone and lean their accents against.

The Talks department would be presented with a season ticket for the Distinguished Strangers' Gallery of the House of Lords, so that they could go and have a thoroughly hectic time when they were off duty.

There is a person known to the Correspondence department who seems to spend all his time writing letters to the B.B.C. telling them how he would do things if he were in their place. He should receive a tin of pork and beans so that in future he could spend his time looking for the pork.

A Token of My Esteam.

The Director of Programmes has caused me a lot of thought. He is such a worried man that a frivolous gift would be out of place. On the whole, I think, perhaps a book is indicated, say "The Pilgrim's Progress."

To Mr. Gordon McConnel of the revue section no invalid port or cigars (also invalid). Just a large portion of his native beverage, which, to be typical of the man, should be neat. And to his co-hatcher of melodious mixtures, Mr. John Watt, I think a small kettle, as a token of my esteam.

The aunts and uncles of the Children's Hour I would certainly place on the Birthday Honours List, for services rendered. And now for my brother and sister artistes. Gillie Potter would best be pleased with some fysche and chipes from Southend, or, failing that, a view of the sea at low tide.

Our Mabel—now here I am treading on dangerous ground. I should like to give her lots of presents, but my—er—better-half might start saying things and upset

(*Continued on page* 856.)

VERY ULTRA-SHORT WAVES

MARCONI'S SUCCESSFUL EXPERIMENTS.

IN the presence of representatives of the Italian Government, an official demonstration took place on November 20th in Italy between Santa Margherita Ligure and Levanto—a distance of 25 miles—of the new Marconi quasi-optical, ultra-short wave radio-telephone system. The wave-length used was only 50 centimetres, corresponding to the enormous frequency of *six hundred million cycles per second!*

A Huge Success.

The success of the demonstration was all the more complete because, although the range had been increased from 11 to 25 miles, the margin in the signal strength was such as clearly to indicate to all present that the apparatus used was capable of covering a considerably greater distance.

In an interview the Marchese Marconi remarked that:

"Since 1896, when I was already experimenting with wave-lengths of 20 centimetres, I had no doubt in my mind but that the short waves, which are called quasi-optical because they behave very much like the waves of visible light, would one day come into use for commercial communications. The results of those very early tests were confirmed by the more recent experiments I carried out at Leghorn during the world war, using a wave-length of 50 centimetres.

Remarkably Simple.

"However, nobody, myself included, had then succeeded in producing ultra-short wave apparatus sufficiently powerful, economical, and reliable to justify its immediate use for Public Telephone or Telegraph Services over suitable distances.

"During the last six months, my assistants, particularly Mr. G. A. Mathieu, and myself, have been concentrating our efforts towards a commercial solution of the problem and many unexpected and valuable discoveries have been made. I would, therefore, ask you not to consider this demonstration as a mere scientific experiment, but as a test of a new practical and commercial radio system which will very shortly be used for public services in Italy.

"Owing to its simplicity the new system is very moderate in price and in running costs; it will thus soon afford to the inhabitants of many small islands scattered in the Mediterranean a reliable telephone service which they could not, heretofore, enjoy in consequence of the high cost of the submarine cable telephone installation."

Useful Range.

Asked whether it was correct that the application of this "quasi-optical" wave was strictly limited to very short distance communications, Marchese Marconi added:

"Well, at the present stage of our knowledge I do not anticipate a reliable range of more than about 100 miles; but that is, of course, a very useful range in itself and could, of course, be very greatly increased by making use of relays or repeaters wherever possible."

* * *

Among the forthcoming features in the International relays programme in the present series are the following: December 17th, Belgium; January 14th, Yugo-Slavia; February 21st, Great Britain; and March 17th, Sweden.

During the last few months listeners will have no doubt noticed a big improvement in the quality of the relayed transmissions from the Continent. This was very noticeable in the case of the recent relay of the concert from Vienna, and the size of the "hook up" on that occasion can be realised from the fact that over 100 European stations broadcast the programme.

Improved Cables.

The vast improvement in the quality of relayed transmissions as compared with the old days is due to the rapid extension of special underground cables to connect up all the broadcasting centres. These land-lines are designed to carry the whole gamut of musical and speech frequencies.

According to the "Birmingham Post," a circuit has recently become available from Berlin to Stockholm, and it will be possible for this to be connected through to London as and when required. Copenhagen has just been linked with Hamburg and through this circuit the Danish broadcasting system can also be connected to London. Geneva is to be linked with Lausanne by means of a high quality circuit, and this being an extension of the Basle-Frankfurt-London line, it will provide a first-class medium for the transmission of the League of Nations talks from Geneva. Another important line in course of construction is that between Italy and Austria. This will be linked with the existing network and will enable transmissions of high quality to be relayed to this country from the Scala Theatre at Milan.

* * *

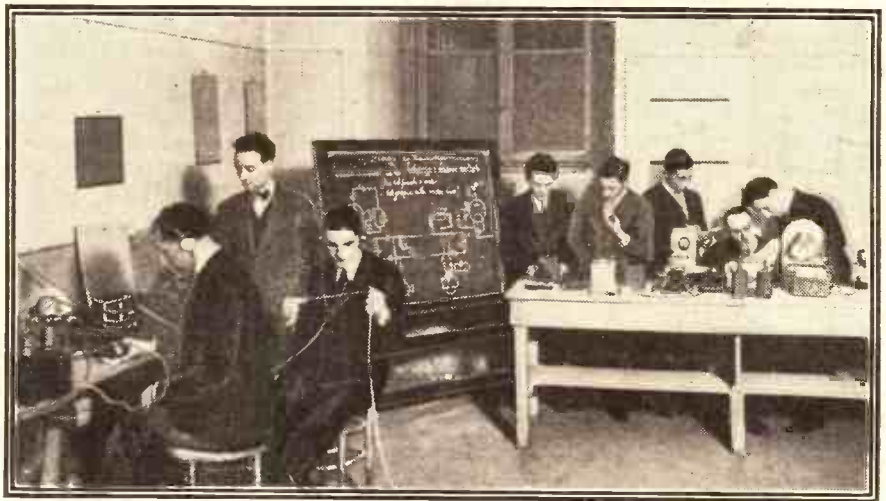
According to the published report of the Radio Research Board, remarkable results have been obtained from a rotating loop beacon to enable mariners to pick up their bearings. This was constructed by the Air Ministry in co-operation with the Board of Trade, at Orfordness, on the east coast.

A Radio "Lighthouse."

"This beacon," states the report, "was to be operated in the first place for six months, to ascertain the possibilities of this system of navigation by wireless when the observations were made by personnel of the mercantile marine. A large number of reports on the operation of the beacon have been received by the Board of Trade from various ships, and have been analysed at the National Physical Laboratory.

"In general, they show the average ship's master or navigator is very favourably impressed by the rotating beacon system, and that he is enabled to obtain wireless bearings from the beacon to an accuracy which is adequate for marine navigation. Although the Orfordness beacon was originally intended to have an over-sea range of about 100 miles, several ships have obtained good results at distances of 200 miles, partly over land, while one or two cases have been reported of approximate bearings having been obtained at ranges of the order of 500 miles."

A RADIO SCHOOL IN ITALY.



This is a scene in a Milan Radio Training College, where among other students are candidates for the Italian Naval Radio Service. The course covers practical Morse-reading and automatic telegraphy, and to the left of the picture one of the students can be seen reading a "tape" message.

1932 SUPER-TWO

10/- DOWN

COMPLETE WITH EVERYTHING READY TO PLAY

CASH PRICE 84/-

BRITAIN'S SUPER-TWO

STAGGERING OFFER BY BRITISH RADIO MANUFACTURERS

100,000 Radio Sets Complete to be sold at 84/- each.

This world-famous Super-Two Set is the most compact and trouble-free radio set ever invented. (Yet you can have it playing in your own home for 10/- down!)

There are no gadgets or fancy bits to worry you. Simplicity and perfect year-after-year performances are the keynotes of this wonder set. In three years time it will still be a modern up-to-date set.

A child can fix it up and work it easily.

The Super-Two is the Morris of the wireless world—efficient—utterly dependable—and inexpensive. Playing for you like clockwork when more elaborate and fancy-priced sets are "not working."

How different to sit by the fireside on winter nights—calling music to you from anywhere at a turn of a dial! Clear, pure-toned music of gramophone volume—you can tone it down quiet if baby's sleeping.

"What station shall we have?"

"Regional?" Push that plug in. You've got Regional, perfectly clear.

"National?" Plug in there. You've got National by itself—no "Back-stage" noises of any kind.

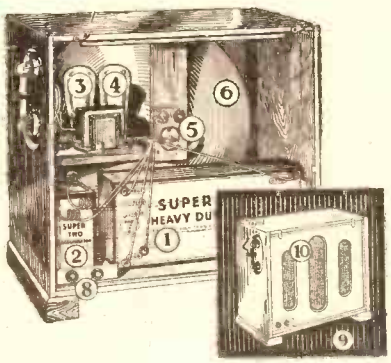
Maybe there is a special programme of Spanish music. Turn the dials according to the simple-to-follow instructions—and there is the blood-stirring Spanish music.

Dance music from Paris—even on a Sunday evening! There you are—clear as a bell—all other stations cut out automatically whilst you listen to the one you want.

Even with an indoor aerial you can listen to British stations, in full volume, and with an outdoor aerial foreign stations roll in as clear and pure as any standard 4-valve set.

TRADE ENQUIRIES INVITED.

The Super-Two has been specially tested in 148 centres in every corner of the British Isles, so no matter where you live your Super-Two will give you perfectly satisfactory reception.



Yet this Super-Two set is yours for 10/- down, absolutely complete. Then only 9 more monthly payments of 9/5. Everything self-contained in handsome Jacobean Oak Cabinet. 16¾ in. high.

Post special "Popular Wireless" order form below for return post delivery. Guaranteed to arrive in perfect condition and to fulfil every claim made by the manufacturers and thousands of present owners.

HOW THIS PRICE BECAME POSSIBLE

By eliminating all the frills and troublesome gadgets of the ordinary wireless set and concentrating upon utter simplicity and effectiveness, we have, by modern British mass-production methods, achieved what the wireless trade had thought impossible—WE HAVE PRODUCED A 10 GUINEA SET AT 84/-. But this was only made possible by making 100,000 sets at a time instead of 1,000, by cutting out intermediate profits, and by cutting our costs to the bone.

10 BIG POINTS

1. *The '1932 SUPER-TWO' 100-volt super-capacity High Tension and Grid Bias Battery.* 2. *The '1932 SUPER-TWO' 2-volt Low Tension Accumulator.* 3. *The '1932 SUPER-TWO' Detector Valve.* 4. *The '1932 SUPER-TWO' Amplifying Valve.* 5. *The '1932 SUPER-TWO' Four-Pole balanced-armature Loudspeaker unit.* 6. *Special large '1932 SUPER-TWO' cone gives natural reproduction of low and high notes.* 7. *Outline of Clamp holding Batteries in position—Accumulator cannot spill.* 8. *Terminals for Aerial and Earth—the only outside wires.* 9. *Back view of '1932 SUPER-TWO.'* 10. *Fine metal gill gauze prevents vibration and nasal tone giving loudspeaker reproduction back and front.*

ORDER FORM

Post to HUSTLER, SIMPSON & WEBB LTD., 317, HOE STREET, WALTHAMSTOW, E.17.

Dear Sirs,

Please send me by return carriage paid with full instructions :—

(1) One H.S.W. 1932 Super-Two Set complete with valves, batteries and loudspeaker in Oak cabinet at £4 . 4s.

(2) I enclose 10/- deposit for an H.S.W. 1932 Super-Two Set complete with valves, batteries and loudspeaker in Oak cabinet on hire purchase terms as advertised. I agree to pay 9 further monthly instalments of 9/5.

(Cross out paragraph 1 or 2 not required). I order only on the condition that my Super-Two Set will be delivered in perfect working order and exactly as advertised.

If you desire further information before buying cross out 1 & 2 and just fill in your name and address.

I enclose .....

Name .....

Address .....

W.T.I. ..... P.W. 5/12/31.

FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found—?

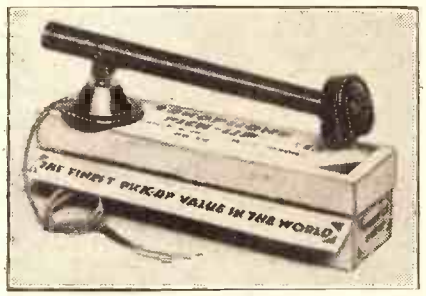
To begin with, I cannot recall any other pick-up and tone arm which retails at such a low price—but I have in mind quite a few selling at distinctly higher figures which are by no means as good! So it would not only seem possible, but highly probable that the above statement is quite conservative, instead of being the mere optimistic expression of enthusiastic faith you may have thought it when it first met your eyes!

During our tests of the Zonophone pick-up I checked its performance with great care, and I have no hesitation in saying that I consider it to be first-class from every point of view.

I am not going to say that it is the best pick-up we have examined, but I am of the opinion that you would have to pay three or four times as much if you wanted a pick-up that is markedly superior, using the average amplifier and speaker.

The Zonophone pick-up certainly is a most attractive article and, in the circumstances, its great popularity is assured.

THE ZONOPHONE PICK-UP



This device sells complete at 15/-.

MAKING YOUR OWN SPEAKER.

WHILE the actual unit is, of course, the most important item in any loudspeaker, its mounting and the diaphragm used directly determine the results it will give. The best of units will give bad results if these factors are not of good quality.

On the other hand a good "cone" will supplement the efforts of any unit. And it is true to say that there are no units now on the British market which will not give a pleasing performance if employed in conjunction with a first-class chassis.

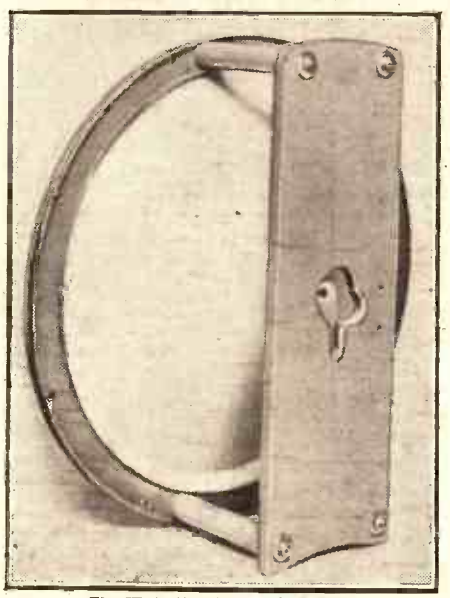
One such is the Wufa "Universal" Chassis, which has a 13-inch diameter cone and can accommodate any unit. The article is handled by Messrs. M. Lichtenberg, Ltd., of 4, Great Queen Street, London, and retails at 10/6.

We have tried this chassis in combination with two or three widely-different units, and in all cases it functioned excellently.

FIRST-CLASS RECORD RESULTS.

It is claimed by the makers, the British Zonophone Co., Ltd., that the Zonophone Pick-up is "the finest pick-up value in the world." Now the cost of the device for which such a sweeping claim is made is 15/-, and that is complete with arm.

TAKES ANY CONE



The Wufa "Universal" Chassis.

GOOD MOVING-COIL SPEAKER.

The progress of the moving-coil speaker is little short of amazing. Only two or three years ago you had to pay about ten pounds for anything at all in the way of such an instrument. And even then it would have been of the mains actuated variety.

There were very few having permanent magnets, and these were mostly expensive, highly specialised productions.

And now you can get a permanent magnet moving-coil unit complete with chassis, and all ready for mounting on a baffle board or in a cabinet for, how much?

Well, the R and A "100" Permanent Magnet Moving Coil Reproducer (Made by Reproducers and Amplifiers, Ltd.) costs but 45/-, and I am able to say, subsequent to testing it, that it does give full "moving coil" results.

It is very sensitive, and can be successfully operated by a quite small set, although, on the other hand, it will react creditably to the big inputs of really large amplifiers.

Which reminds me it is absolutely wrong to say that the modern moving-coil speaker will not work well unless it is coupled to a set having a powerful output. If the speaker itself is good, it should deal proportionately with *any* output. But if you change over to a good moving-coil from an indifferent electro-magnetic, it is highly probable that any faults in the set's output will be thrown into bold relief! In short, the response will be more faithful.

But to return to the R and A "100." This is a particularly well-made speaker and there are several points in its design which reveal thoughtful originality. And it appears to be carefully constructed on the soundest engineering lines. These qualities, together with a clean finish and, of course, its good response, make it an item deserving of the closest consideration on the part of all who wish to obtain the greatest return for the smallest financial outlay,

It should be noted, however, that R and A "100" has a low-resistance coil, so that it is essential that a proper output transformer should be used with it.

As it happens, there is an R and A Multi-Ratio Output Transformer at 12/6 which is suitable for the job. It gives you the choice of three ratios, thus enabling close matching to be achieved.

Manufacturers and traders are invited to submit radio apparatus of any kind for review purposes. All examinations and tests are carried out in the "P.W." Technical Department, with the strictest of impartiality, under the personal supervision of the Technical Editor.

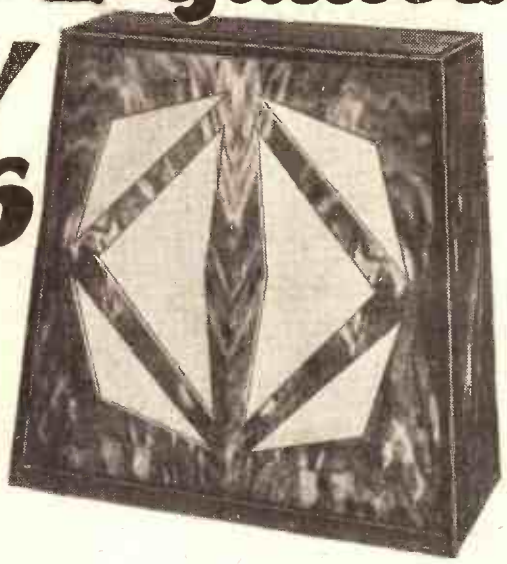
We should like to point out that we prefer to receive production samples picked from stock, and that we cannot in any circumstances undertake to return them, as it is our practice thoroughly to dissect much of the gear in the course of our investigations!

And readers should note that the subsequent reports appearing on this page are intended as guides to buyers, and are, therefore, framed up in a readily readable manner free from technicalities unnecessary for that immediate purpose.

AN "R AND A" SPEAKER

The Permanent Magnet R and A "100," and the R and A multi-ratio output transformer.

How to build a 2-guinea Loudspeaker for 5/6



Here is an intensely interesting development—the Home Constructor's Loudspeaker, which you can build for 5/6 and which for tone and volume compares with many 2-guinea speakers you may have heard. And from a distance of 2 feet away its handsome appearance closely resembles a solid walnut cabinet of fine finish.

A WONDERFUL FREE GIFT to every purchaser of the NEW LISSEN SOLENOID SPEAKER UNIT

That extra loudspeaker for the other room is now available to you at small cost. See the completed loudspeaker above. That is what the Lissen free gift enables you to build. You buy the new Lissen Solenoid Cone Unit for 5/6. With it you will get

1. Special Cone paper printed to exact size ready for cutting out and glueing up to make a 14-inch cone.
2. Full Instruction Sheet with complete diagrams showing each operation in the building.
3. Sheet, size 28 in. x 35 in. lithographed walnut grained panelling, printed on reverse exact shapes and sizes for cutting out, including front fret. You have only to stick this on to cardboard to build up cabinet shown above.
4. The postal tube in which these gifts are packed, and which is also used in the construction.

Anybody can easily build this speaker—the essential parts are all provided for you at an all-in cost of 5/6. The other sundries such as gum you probably have at home already.

LOOK WHAT YOU GET FREE!

Go to your radio dealer now—he will tell you anything more you may want to know about how to build this fine loudspeaker for 5/6 only.

NOW YOU CANNOT FAIL TO MAKE A SPLENDID SPEAKER

NEW LISSEN SOLENOID CONE UNIT 5/6

LISSEN LIMITED. WORPLE ROAD, ISLEWORTH, MIDDLESEX.

EUROPE'S BIGGEST BROADCASTER

Have you heard the new Prague station yet? He is now "on the air," and is easily received in most parts of this country after dark.

By A. S. CLARK.

SOMEWHERE in Czechoslovakia—that is, somewhere about twenty-two miles to the east of Prague and near a small town of the name of Cesky-Brod—a very modern-looking two-storey building has recently sprung up. A building that is destined to bring world-wide fame to the spot, for towering above it are two tall masts well-nigh 500 ft. high, and which carry the aerial of the most powerful broadcasting station in Europe.

Starting the Race!

When Rome first came along with its 50 or so kilowatt crystal-controlled transmitter, all the other stations seemed to fade into the background. But even this station was destined soon to be left behind by the powerful Germans, and later by that giant long-waver, Warsaw. Now they are all eclipsed by the new Prague station which has a rating of 200 kilowatts!

However, its colossal power is not the only outstanding thing about it, for it possesses many points of design that are of great interest even to those of us who are only concerned with the reception side of radio technique.

The whole of the transmitter, valve panels, switchboards, control desk and personnel are housed in a complete copper screen. There are valves that automatically switch themselves out of circuit if anything goes wrong, and—but perhaps I had better describe the general lay-out before going into the details.

The studios themselves are situated at Prague and are connected up to the transmitting station by underground cables. There are at present two of them, and some condenser microphones and some carbon microphones are used.

Of British Design.

Evidently the designers of the station, the International Telephone and Telegraph Laboratories, are hopeful of better separation of stations in the future, for the apparatus is capable of dealing with frequencies of from 30 to 10,000 cycles. Over this range the response curve is near enough a straight line.

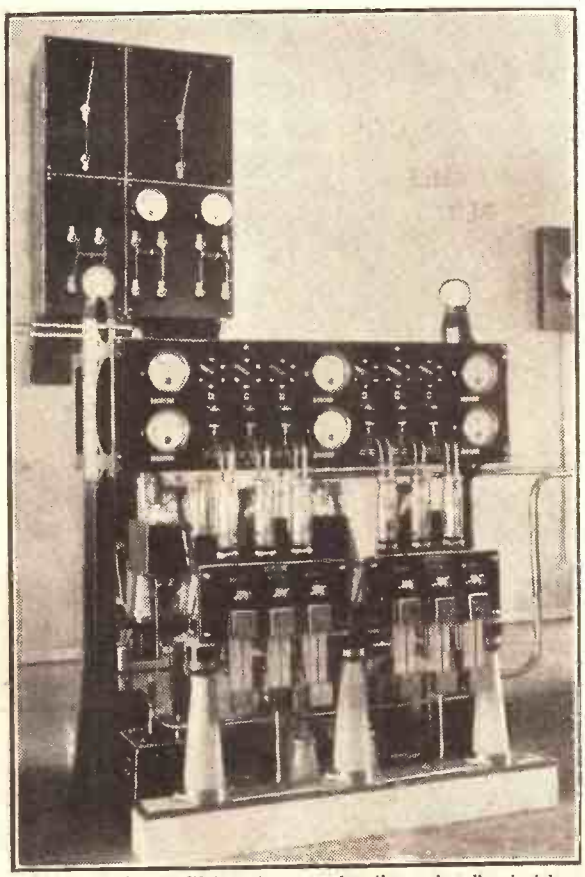
The transmitter itself we can divide definitely into two sections, the first of which is a complete transmitter capable of delivering 250 watts to an aerial if one were connected to it. The second part is a radio-frequency amplifier that amplifies the output from the first part and then passes the resulting power on to the aerial.

The first part is contained in a metal case which is divided into four sections that are also encased in metal. Any one of these four parts can be slid out of the frame without the others being disturbed in any way whatever.

In the first section, to start with, the carrier wave is called into being by a modest 1-watt valve that is crystal-controlled to keep the wave-length constant. The carrier is then amplified by a neutralised 50 watter, and after that by two more 50 watters working in push-pull.

The carrier is by this time strong enough to take the modulation, and so passes to the second box, where there is another amplifier modulated by the "speech" currents passed from the speech amplifier in the third box. This amplifier is joined up with the supply cable from the studios.

PUSH-PULL A BIG FEATURE



Nearly all the amplifying stages employ the push-pull principle, and here you see the "push" side of one of the powerful final sections.

The fourth box of this first section contains a straightforward push-pull radio-frequency amplifier consisting of two 50-watt valves. In the second part of the transmitter to which the currents now pass are two separate amplifiers, one with two valves and the other with twelve.

20,000 Volts!

All of these valves are water-cooled and each will handle a mixmum power of 40 kilowatts and 20,000 volts. Push-pull is used throughout, and by switching out six of the valves in the second of the two power amplifiers the station can be worked on half-power.

Capacity coupling is employed between the transmitter and the aerial feed lines, and careful grouping of the apparatus and machinery makes the whole outfit very easy to control. There is one main switchboard and one control desk.

The power is supplied by power mains from external sources and, once this is switched on, the whole control of the station is carried out from the switchboard mentioned.

While the station is working everything is watched from the control desk, where an eye can be kept on the working of every part of the transmitter.

Safety First.

And now for a few items of particular interest. To start with, it is impossible for an engineer to get a shock from either the power supply or an undischarged condenser. This is effected by elaborate combinations of mechanical doors with break-points in the circuits.

Two items that will seem very "homely" to readers are the use of all-metal rectifiers for the apparatus at the studio end, and the use of condensers with very large safety factors which are very well spaced. This is to ensure that the reliability of the station shall be as high as possible, and it is interesting in this connection to note that nearly 90 per cent of the condensers employed in this transmitter are of T.C.C. make.

TO-NIGHT

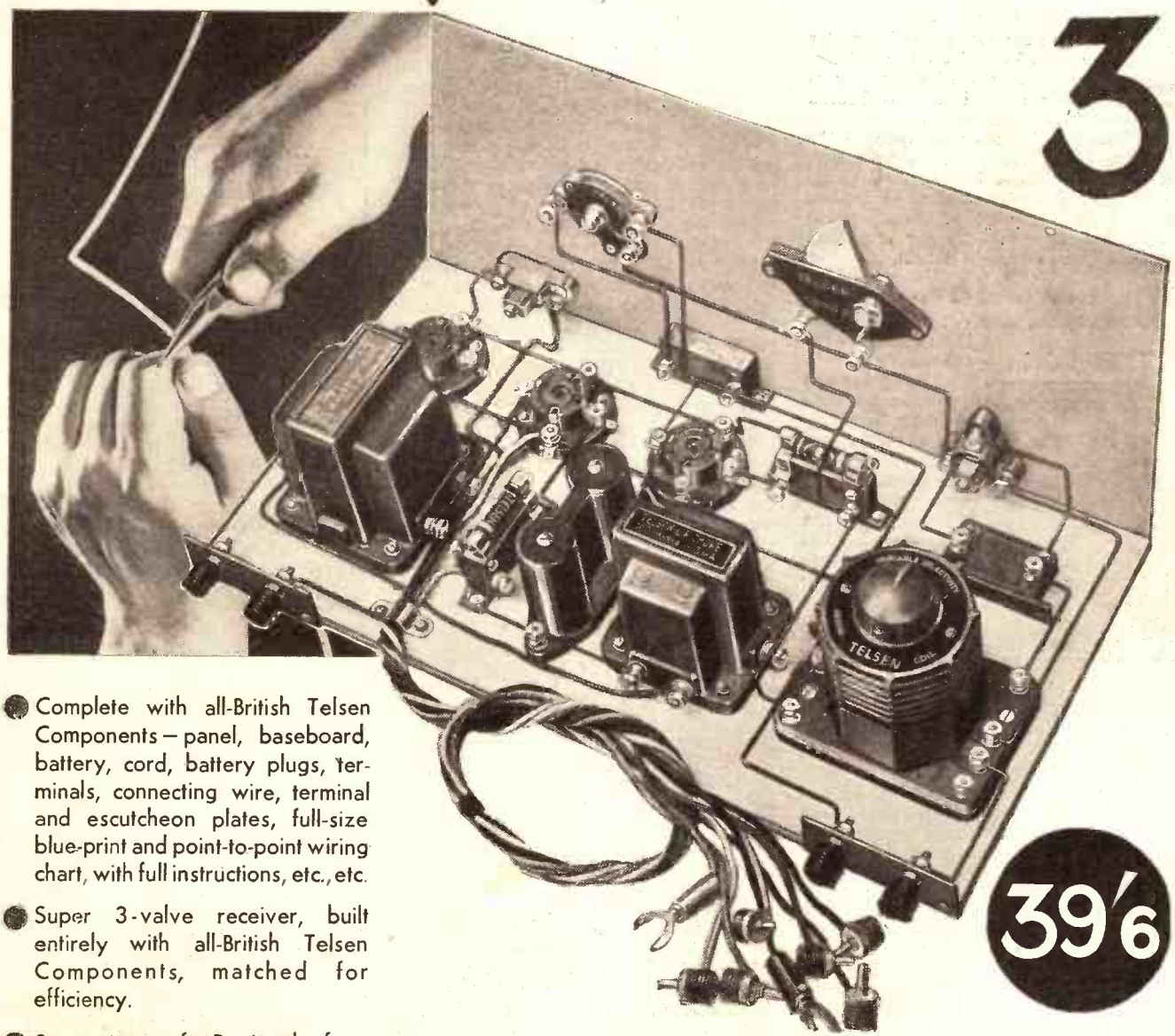
BUILD YOUR OWN XMAS PRESENT

Build the Telsen Victor 3—and whether you give it away or give it to yourself in either event you have the thrill of making a gift that will give pleasure for years to come. There is no possibility of failure—the Telsen Victor 3 is as easy to build as it is to operate. You can build it to-night, and to-morrow night you can tune in for the first time—its performance will delight and astonish you. And, remember, your Telsen Victor 3 is made entirely with all-British Telsen Components all matched for efficiency.

Consult your radio retailer to-day.

TELSEN VICTOR 3

GIVE THE TELSEN VICTOR 3



39/6

- Complete with all-British Telsen Components — panel, baseboard, battery, cord, battery plugs, terminals, connecting wire, terminal and escutcheon plates, full-size blue-print and point-to-point wiring chart, with full instructions, etc., etc.
- Super 3-valve receiver, built entirely with all-British Telsen Components, matched for efficiency.
- Separation of Regional from National programmes guaranteed by incorporation of Telsen Dual Range Aerial Coil.
- Very simply built and simply operated. Full constructional details with every kit.

The Telsen Victor 3 is the ideal Xmas gift—give it to another to build, build it yourself for yourself, build it yourself to give to another—in any event the result is complete satisfaction and the initial cost to you is in keeping with hard times and modest purses.

Advt. of The Telsen Electric Co., Ltd., Aston, Birmingham. CVS—110

THE MIRROR OF THE B.B.C. By O.H.M.

THE ECONOMY CAMPAIGN

LADY SNOWDEN AT COVENT GARDEN—NEW YEAR PROGRAMMES —BROADCASTING HOUSE.

ALTHOUGH money continues to flow into the Post Office for the ultimate use of the B.B.C. in unprecedented amounts, the economy campaign goes merrily on. Artists who have depended a good deal on the B.B.C. in the past tell me that their engagements are barely a tenth of what they used to be.

Also, I understand that all auditions for new talent are to be closed down shortly. Of course, the "Buy British" policy is being vigorously applied by the B.C.C., where foreigners now have no chance.

The "pooling" of resources between the Regionals has effected great saving, but, incidentally, it has robbed the Regional programmes of a good deal of their local character. The B.B.C. staff has suffered in emoluments by about 7½ per cent, and there will be no more increments.

Lady Snowden at Covent Garden.

Lady Snowden, now definitely installed in an office in Covent Garden, goes to work every day and handles a good deal of the administration of the Opera Syndicate of which she is one of the directors.

ROY FOX

They call him the "Whispering Cornetist," and his dance band is certainly one of the high spots for the lover of lively melodies.

I understand that Lady Snowden has by no means lost hope of being able to bring off a merger of all the operatic interests in the country, reconciling the Imperial League of Opera and the Covent Garden Syndicate.

New Year Programmes.

After Christmas, the New Year, and, as has long been customary, broadcasting will mark its coming as well as the passing of the old year with an appropriate feature programme.

Final details are not yet worked out, but the evening of December 31st will include a vaudeville entertainment from 9.35 until 10.30 at which time Jack Payne and the B.B.C. Dance Orchestra will hold the air until 11.15, when a New Year's Eve programme, seriously suitable to the occasion, will go on into the first ten minutes of 1932.

Five minutes' interval for reflection, and, if necessary, perhaps to revise some of our good resolutions, while Jack Payne and his "Boys" are finishing their coffee and sandwiches, and then more dance music until 12.45 a.m.: when we get the once a year Grand Good Night to which it is now necessary to allocate fifteen minutes of the programme.

Broadcasting House.

No one knows when Broadcasting House will take over the work of Savoy Hill. This uncertainty and the absence of any announcement by the B.B.C. in the delay of transferring its headquarters has already produced a feeling in some quarters that something is not working out according to plan, because up to the end of the first six months of this year everything pointed to the move being made before Christmas.

Next January, February and March have all been mentioned during the last few weeks as the time when Broadcasting House will be ready for occupation. But the truth of the matter is that nothing can be decided with any certainty until the studios are fitted and the control room equipped so that the functions of Savoy Hill can be taken over without any hitch.

It is only natural that the B.B.C. should want to be absolutely certain of a perfect change-over before any date is given of the move. Preliminary acoustic tests have been carried out, and the work of decorating and fitting them up is now proceeding as rapidly as possible.

Further tests will then be necessary to ensure that everything which can be done has been carried out so that listeners get the maximum benefit from the up-to-date methods incorporated in the new home of broadcasting.

Quite likely many little snags will crop up that will still further delay the change, but nothing is expected that will add more than a few weeks to the normal procedure of the work.

Meanwhile, I hear that the operetta, "Good Night, Vienna!" by Holt Marvell and George Posford which, as I have already mentioned in these notes, is the first of its kind to be specially written for broadcasting, and which it was intended should be the first production from Broadcasting House, will now be given from Savoy Hill in the first week of the New Year.

MAURICE WINNICK

To hear a dance programme by Maurice Winnick and his band is to feel a tingling at the toes. Very catchy stuff! Maurice himself hails from Manchester, and plays the fiddle.

Val Gielgud, the Productions Director, and John Watt will produce it, and I understand that the operetta includes some novel ventures in sound and speech.

A quintet as well as the Theatre Orchestra will be employed on the musical side, and listeners can expect the entertainment to be quite a feature of the January programmes.

Broadcasting will be rather on its trial in this production, because, as most people know, and as I have already mentioned, a talkie version of the work is to be done at the Elstree studios: in fact, by the time these notes appear, rehearsals will have started with Jack Buchanan (who recently turned down a big offer from America) and Anna Neagle in the chief rôles.

FOR THE LISTENER

By "PHILEMON."

Despite the Festive Season our contributor "has a grouch on" this week. Do you agree with him?

SOMETHING has been wrong with me lately. I have found myself switching off much more than usual. I have been easily disappointed, easily bored.

You will notice that I say that something has been wrong *with me*. I prefer to start like that. I would begin, at any rate, with finding the cause in myself, rather than in my set, or in the programmes. I offer to you this good example. Only when you have clearly decided that you yourself are not to blame can you rightly begin to lay the blame elsewhere.

I think that every programme should have a "peak" point; a point of highest interest; a climax, such as you get in a good play. You can put up with a good deal of inferior and less interesting stuff if you are looking forward to the big moment; the moment when Mr. Graham is going to pulverise Sir Herbert Samuel, or when the Prime Minister is going to pass Uncle Arthur through the mincing machine.

Harold Nicolson used to be a "peak" for me, when he was talking about "People and Things." The fact that he was coming on later threw a rosy tint over the previous part of the programme, and often made it more tolerable than it otherwise might have been.

The Vaudeville Hour may be pretty bad, but if Edgar Wallace is due after it is over you can hang on; just as you might not complain of inferior soup if there was roast turkey to follow.

"The Morning After."

Therefore, I may have been feeling a little dull after the exceptional excitements of election-time. The-morning-after-the-ball sort of feeling. Not really much interested in anything. Or it may have been because I have been listening too much. One can have too much of a good thing. One gets "blasé," as the French people have taught us to say.

(*Continued on page* 848.)

CAPT. ECKERSLEY'S QUERY CORNER

Under the above title, week by week, our Chief Radio Consultant comments upon radio queries submitted by "P.W." readers.

Don't address your questions direct to Capt. Eckersley; a selection of those received by the Query Department in the ordinary way will be answered by him.

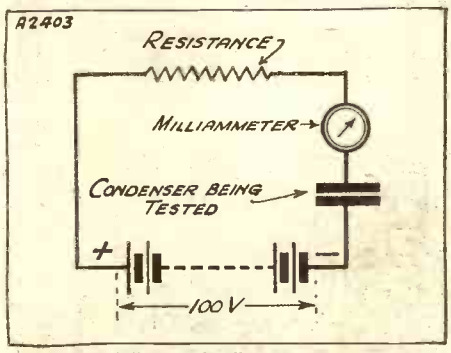
"They Fade Away."

E. R. (Exeter).—"My receiver is of the Det. and two resistance-coupled L.F. stages type, and has given excellent results in the past. I now find, however, that when I switch on no signals are heard for several minutes, and, even then, they sometimes fade away again. Can you tell me what is likely to be the cause of this mysterious behaviour?"

1. Check the H.T. battery and see if it gives full voltage *on load*. If possible, use a rather cheap voltmeter for this, as it imposes load itself!

2. Check values of all grid resistances and anode resistances. Perhaps you can take them to a dealer or get a sensitive milliammeter in series with a battery. (The current should be the voltage divided by the resistance, thus the resistance is the voltage divided by the current.)

TESTING A CONDENSER



Perfect insulation would allow no steady current through the milliammeter, but the resistance is used to limit any current through a faulty condenser.

3. Failing all this, it might be a condenser leaking badly. Get your local dealer to test this, or try the same milliammeter through a resistance and the condenser.

No steady current should flow.

A Curious Fault.

E. C. E. (Boscombe).—"My set has developed a rather curious fault, which seems to be connected in some way with the weather. I have an ordinary outside aerial and earth, and I find that of late the tuning varies from day to day.

After heavy rain the tuning returns to normal, and remains so for a day or possibly longer, and then it gradually varies until another shower of rain, when it again returns to normal. Do you think that my aerial insulators are faulty?"

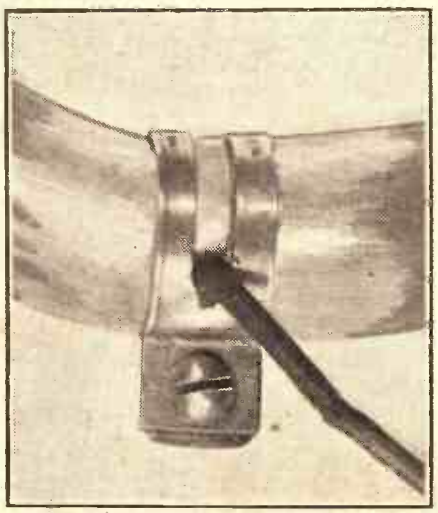
I wish you'd told me more about your aerial than that it was ordinary! It isn't behaving very ordinarily, is it? Had this been summer weather I should have suspected a "dry" earth connection. But that is hardly likely at this time of the year.

It *might* be insulators, of course, but insulators would be more conducting when they're wet and "normal" tuning cannot take place when the insulators are conducting. It seems to me more likely that the aerial has broken partially somewhere and the wet makes the joint more conducting. (Honestly though that's a bit far-fetched.)

I should go through the wire from aerial terminal through lead-in insulator to aerial and be sure that's perfectly sound. Then I should take the aerial down, examine it for frayed parts by giving it a good mechanical test.

I should take the opportunity of cleaning the insulators, and if I found nothing wrong I should put up a new aerial. By the way, when it's dry it doesn't by any chance sag, does it, and touch a gutter or a tree? I believe I've hit the explanation at long last!

KEEP YOUR "EARTH" CLEAN!



When earthing to a water-pipe, be sure you get a good, clean contact with the earth lead. (With some clips this can best be obtained as shown above, whilst in other cases the lead goes to a terminal on the earthing clip.)

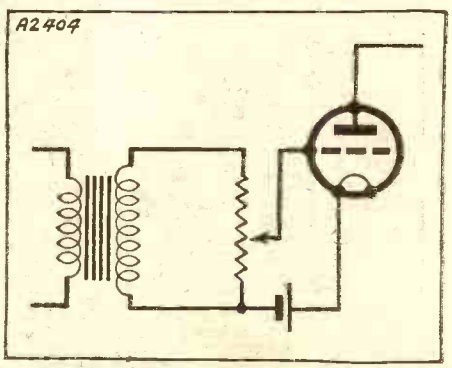
Controlling Volume.

H. B. J. (Edgware).—"In my four-valve receiver, S.G., leaky grid Detector, R.C. and transformer-coupled L.F. stages, the volume is controlled by adjustment of a variable resistance connected in parallel with the L.F. transformer primary.

"When reducing volume, which is necessary if reception of the local transmitters is to be at a comfortable strength, I notice that the high notes are considerably weakened. Can you advise me of a preferable method of volume control to adopt?"

Yes. A *better* method, but not an ideal one, is to use your variable resistance as a potentiometer, as in my diagram.

THE BETTER WAY



Try this method if you want to conserve those valuable high notes that give the "brightness."

You see, every transformer has what is called "leakage"—that is, some of the lines of force created by the currents do not link both windings, but wander outside. This makes the transformer work like a transformer and an inductance.

As you load the secondary with a resistance the current in both windings of the transformer increases. The inductance part of the transformer—the leakage inductance—carries current and, therefore, drops volts. The impedance of the leakage inductance increases with frequency, so more volts are dropped as the frequency is higher. Most intervalve transformers are designed to have their secondaries open-circuited.

HOW TO BUI

"S-Q" ST

By FRANK BRIGGS.

With the assistance of the following constructional detail difficulty in building this outstanding receiver. Indeed, almost absurdly simple job of assembly, particularly in selectivity and other qualities. Further, it is probably the "super" of any nature that has ever been de

IN a previous article, Mr. Dowding told you all about this latest "P.W." set, and now, no doubt, many of you are eager for full constructional details. In case there are some who did not see Mr. Dowding's introduction last week, perhaps it would be as well for me to tell you a little about the set first, even if I risk repeating a few things that have already been said.

The receiver as it stands is a development of the famous "P.W." "Super-Quad," and the design was evolved after many weeks of hard work in the "P.W." laboratories, and it was not until much midnight oil had been burnt that the present arrangement was decided upon.

Astounding Results.

The "foundation" set employs four valves only, and in an extremely simple manner it is possible to add an H.F. stage. The set is capable of the most astounding results. Being on the "Super-Heterodyne" principle, it combines station-getting powers and a simplicity of control which have to be experienced to be appreciated. And as to the construction, well—an evening's work at the outside, I should say.

Like the "Super-Quad," it uses an outside aerial, but I must impress on all would-be builders that it is so sensitive that a *small* outdoor aerial is all that is required. In fact, my own personal experience is that a good indoor wire is ample for all normal requirements. Don't go and make the mistake that I did the first time I tried the set out, and put it on the biggest aerial you can find. If you do, make sure you put some cotton-wool in your ears first of all!

Now getting down to constructional details, first of all get all the components together. Probably some of you will want to use some of your old components. This will be quite all right with parts like valve holders, terminals, and perhaps fixed condensers, provided they are the right size and in good condition. Old variable condensers would also do if they have nice slow-motion drives, but whatever you do, do stick to the specified dual-range aerial tuner, this is most important.

Another vital component is the H.F. choke, which is connected in the anode circuit of the second detector. This must be of the proper super-het. type, otherwise you will be troubled with H.F. currents getting through to the low-frequency part of the set.

If you want to be sure of success, however, you'll take my advice and build exactly to specification. The present layout was decided upon after much experimental work, and it may interest readers to know that during this period five different arrangements were tried out.

Commencing the Construction.

The great thing in designing a set of this nature is to keep grid leads, and in fact any wire carrying high-frequency current, as short as possible, at the same time guarding against the temptation to make the receiver *too* compact.

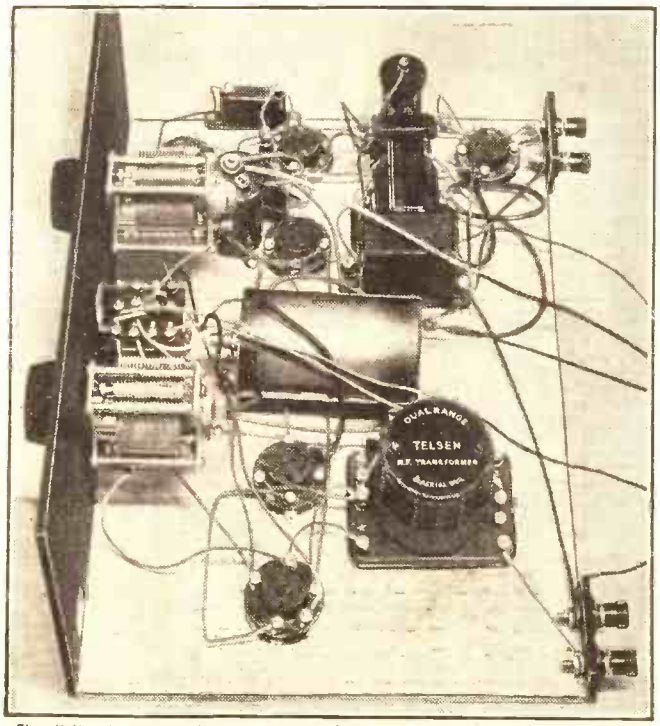
The next job is to drill the panel. This is not a very difficult problem as there are only three components to mount thereon. These are the two variable condensers, and the combined wave-change and on-off switch. These components require one hole apiece, then in addition there are three more holes to drill for the panel-securing screws. A total of six, not a great deal, is it?

Ebonite panels nowadays have a very nice highly polished surface, and to avoid scratching this always work on the back, and keep a piece of soft material between the polished surface and the table. Another tip is to always use a centre-punch to mark the positions for the holes, then you'll have no difficulty with the drill wandering from its proper point.

When you have drilled the panel you can mount the two variable condensers and the switch. And while you are doing this, but before you actually fix the dials, it is a good plan to make a little vertical scratch on the ebonite in line with the centre spindle to facilitate dial readings.

Now that the panel is ready you can tackle the mounting of the baseboard components. In doing this, follow the original arrangement as closely as possible, ample space has

SUPER SENSITIVITY



Simplicity of construction was one of the main aims in designing this latest "P.W." set, and you'll easily see from the above photo the tremendous degree of success that has been attained in this respect, and in addition it has proved one of the most sensitive sets that have passed through the "P.W." laboratories.

ALL YOU WANT FOR "P.W.'s" BES

1 Panel, 14 in. × 7 in. (Permcol, Becol, Peto-Scott, Wearite, Goltone, Parex).

1 Cabinet with baseboard, 10 in. deep (Peto-Scott, Camco, Ready Radio,

2 ·0005-mfd. tuning condensers (Polar Pickett, Osborn, Gilbert). Telsen, Dubilier, Lotus, Igranic, Ormond, J.B., Cyldon, Wavemaster, Astra).

1 4-pole double-throw switch with terminals (Wearite).

4 4-pin valve holders (Graham Farish, Lotus, Telsen, W.B., Igranic, Wearite, Clix, Bulgin, Formo, Dario).

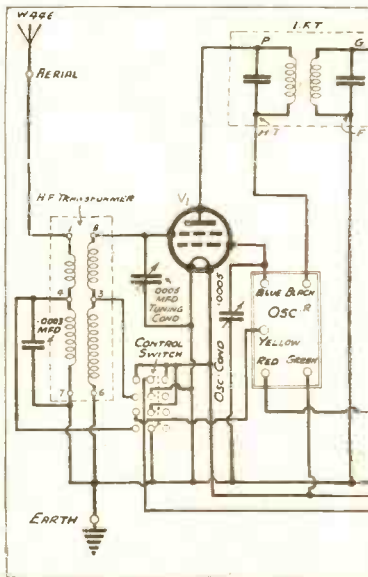
2 5-pin valve holders (Graham Farish, etc.).

1 1-meg. grid leak and holder (Dubilier, Telsen, Igranic, Graham Farish, Ready Radio, Peto-Scott, Ferranti, Ediswau, Loewe).

1 100,000-ohm spaghetti resistance (Lewcos, Varley, Telsen, Bulgin, Graham Farish, Igranic, Sovereign, Peto-Scott, Ready Radio, Goltone, Lissen).

1 25,000-ohm spaghetti resistance (Varley, etc.).

1 H.F. choke (Ready Radio Superhet, Lewcos, Telsen, Atlas, Climax, Igranic Graham Farish, Varley Parex Lotus, Sovereign, R.I., Wearite, Dubilire, Tunewell).



Many readers who remember the popular "
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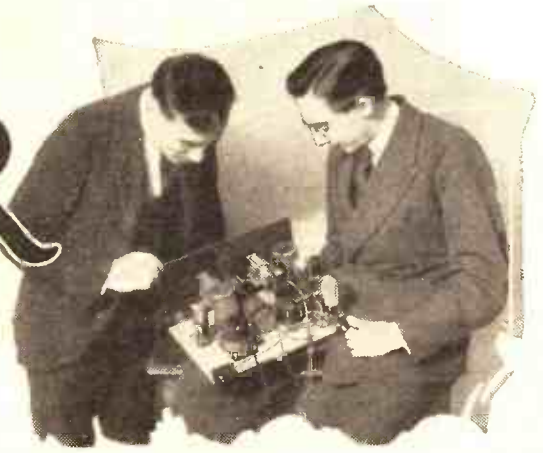


been allowed so even if the parts you use are a little larger than the original ones, you should have no difficulty.

You'll probably notice that this set, unlike most "P.W." designs, commences at the right-hand end of the panel. The reason for this is that in this particular case it makes for much shorter wiring.

Soldering Quite Unnecessary.

Another point to watch is to see that the dual-range coil is positioned correctly. The terminal marked 8 should be nearest the first valve-holder. It then comes within an inch or so of the grid terminal and a short lead only is necessitated.

Start the wiring by doing the filament connections and keep the leads well down on the panel. If you don't do this, you'll find that by the time you've finished some of the wires may tend to get in the way of the valves and intermediate transformers.

And, by the way, these H.F. transformers are designed to plug into ordinary valve sockets, and when you are testing the set out, mind you don't go and put a valve in a transformer holder. If you do, it will be good-bye to the valve, as I know from experience!

It is quite unnecessary to solder any of the connections, and all the components are supplied with either terminals or long flex leads. The original receiver was wired-up with Jiffilinx, this is really splendid stuff, and makes wiring-up a real pleasure. It is supplied in packets containing various lengths of wire from a couple of inches to pieces nearly a foot long.

They are insulated with systoflex, and are provided with neat little loops at the end all ready to slip over the terminals. They make an extremely neat job.

No battery terminals have been used in this receiver. The reason for this is partly to save expense and also because they were considered unnecessary. Instead, long flexible leads have been taken direct from the respective parts of the receiver and plugs fitted to their ends. The only place where terminals have been used is for connecting the aerial and earth, and also for the loudspeaker.

The Special Valve.

Perhaps a word or two concerning the special four-electrode valve would not be out of place here. It is the first one, that is the one nearest the aerial. It is known as a bi-grid valve because it has two grids, one inside the other. The function of this "tube" is to act as a combined first detector and oscillator. The inner grid being connected to the oscillator unit and the outer to the normal tuned-aerial circuit.

Different types of oscillator units vary slightly, and whereas the normal procedure is to connect the inner grid return lead (green) to positive low tension, if any difficulty is experienced in getting good, strong oscillations the trouble can be completely cured by connecting this lead, and also the wire which is connected to the second centre terminal on the control switch, counting from the back of the set to the negative L.T.

Colossal Amplification.

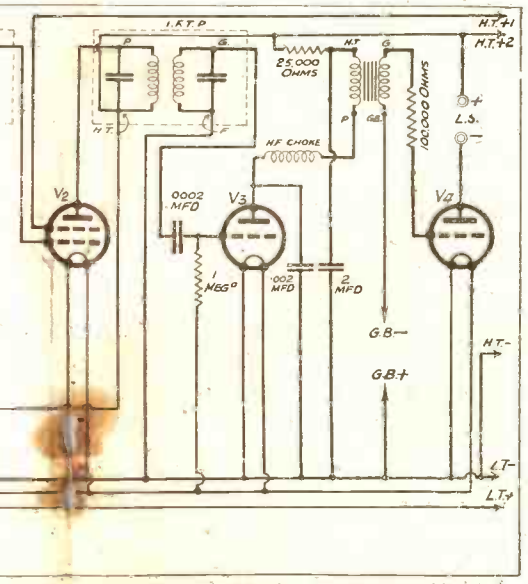
The aerial circuit is tuned by the variable condenser situated at the right-hand end of the panel looking at the front, and the oscillator or frequency changer is tuned with the left-hand dial. As many of you know, the principle of the super-het. is to change all received wireless waves, no matter their frequency, to a common wavelength of the order of 2,000 or 3,000 metres, and then pass them on for further amplification.

In the "S.Q. Star" this frequency-changing business is done by the double-grid valve, the transformed waves are then passed on through the first intermediate transformer (without pigtail) to the screened-grid valve, where they are amplified before being handed on to the second detector via the second intermediate transformer (with pigtail).

After rectification by the second detector the speech currents are magnified by the low-frequency stage before they are reproduced in the loudspeaker. So you see that, by the time the feeble oscillations picked up by the aerial have passed through all the

(Continued on next page.)

R THIS MAGNIFICENT "SUPER"
ST SET OF THE SEASON



P.W." "Super-Quad" will recognise a similarity in this latest famous "Four," but with the addition of greater sensitivity, ity and programme punch.

1 ·0002-mfd. grid condenser (T.C.C., Telsen, Mullard, Ediswan, Dubilier, Graham Farish, Ferranti, Lissen, Formo).

1 ·0003-mfd. fixed condenser (Lissen etc.).

1 ·002-mfd. fixed condenser (Dubilier type 670 etc.).

1 2-mfd. fixed condenser (Telsen, Igranic, T.C.C., Lissen, Dubilier, Helsby, Hydra, Ferranti).

1 L.F. transformer (Lotus, R.I., Telsen, Varley, Climax, Lissen, Formo, Ferranti, A.W., Graham Farish, Igranic).

1 H.F. transformer (Telsen).

1 Oscillator unit (Lewcos Ext. Osc. 126, Wearite, Colvern).

2 Intermediate frequency transformers (one with pigtail). (Lewcos, Wearite, Colvern.)

2 Ebonite strips, 2 in. × 2 in.

4 Termnals (Igranic, Eelex, Belling & Lee, Clix, Goltone).

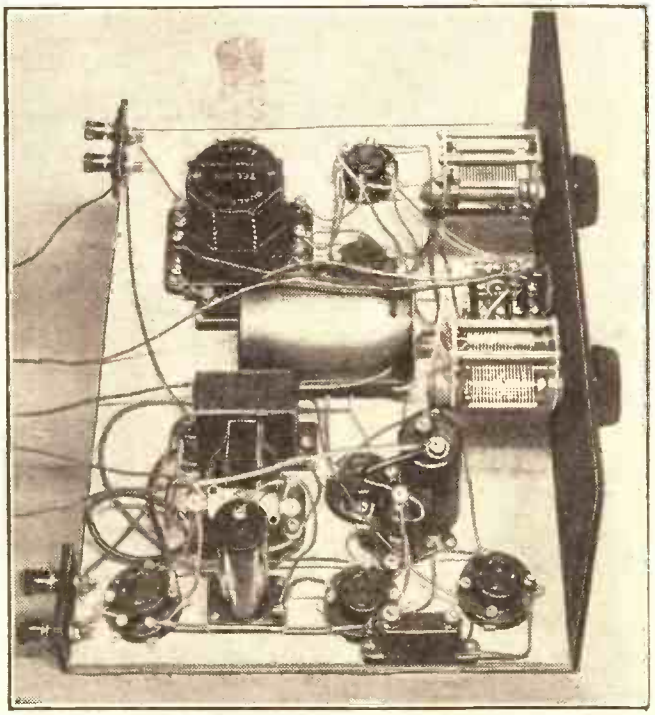
Battery plugs, etc. (Belling & Lee, Clix, Igranic, Eelex).

Flex, screws, wire (Jiffilinx, Glazite, Quickwire, etc.).

If standard Colvern intermediate are used, two of the four-pin valve holders will not be required.

UILD—A REAL WORLD BEATER!

SUPER SELECTIVITY



With this receiver your "local" will not occupy more than two or three degrees on the dial. And as for punch, well—the L.F. end of the set, which you see above, looks after that!

HOW TO BUILD "S-Q" STAR

(Continued from previous page.)

stages, they have been amplified many thousands of times.

You'll probably notice that the last valve-holder is of the five-pin variety. This is to provide for the use of a pentode in cases where really colossal volume is required. But this arrangement is not to be recommended except in special circumstances, as an ordinary power or super-power valve will give all the amplification that is required for all normal conditions.

The reason why a five-pin valve holder has been specified for the pentode output valve is because the tendency nowadays seems to be towards the provision of five-pin bases on these valves.

If a Pentode is Used.

On the other hand, if you already possess, or happen to get hold of one in which the auxiliary electrode is brought out to a small terminal on the side of the cap, it is an easy matter to connect this up to the correct terminal on the valve holder with the help of a short length of flex.

In the wiring diagram this "pentode" connection is shown as a dotted line, going from the fifth terminal on the last valve holder to the L.S. positive terminal at the back of the set.

In cases where a pentode output valve is employed it is advisable to use a tapped choke and condenser output filter, or better still a special pentode output transformer. The reason for this is that this type of valve otherwise tends to be high-pitched and is rather heavy on the H.T., and the large currents are liable to damage the loudspeaker windings.

The fitting of a pentode output filter is a very simple matter, and it consists of a tapped L.F. choke of high inductance but fairly low D.C. resistance (a few hundred ohms) joined in that part of the anode circuit of the last valve which is usually occupied by the loudspeaker

The other component you require is a fixed condenser of 2-mfd. capacity, and capable of withstanding a voltage at least 50 per cent above that of the H.T. supply, and which is connected between the tap on the choke and one of the new L.S. terminals. The second L.S. terminal is connected to earth.

If you follow this circuit out, you'll see that the normal H.T. current passes through the L.F. choke, but is kept from the loudspeaker windings by the large 2-mfd. fixed condenser.

Optional.

The speech currents, however, cannot pass through the choke owing to its high inductance, so they are diverted through the comparatively easy path (to L.F. currents) formed by the condenser and loudspeaker.

An addition of this nature is purely optional, and whereas it is not essential to the proper working of the set, it is one of those little additions that are worth while even when a pentode is not used. A loudspeaker filter is especially useful where loudspeaker leads are run to different rooms in the house, as it prevents the H.T. wandering round, too!

In this latest "P.W." set every effort has been made to present it in the most simple form possible, consistent with a good performance. So successful was the "P.W." research staff in this respect that they were ultimately able to eliminate many of the components which it was originally intended to include.

One of these, a small tubular fixed condenser, appears in the photograph shown on this page, and also in those on other pages. It can be seen to the right, and slightly above the vertically mounted grid leak.

I mention this little point so that you won't be wondering why it is shown in the photographs and not in the diagrams.

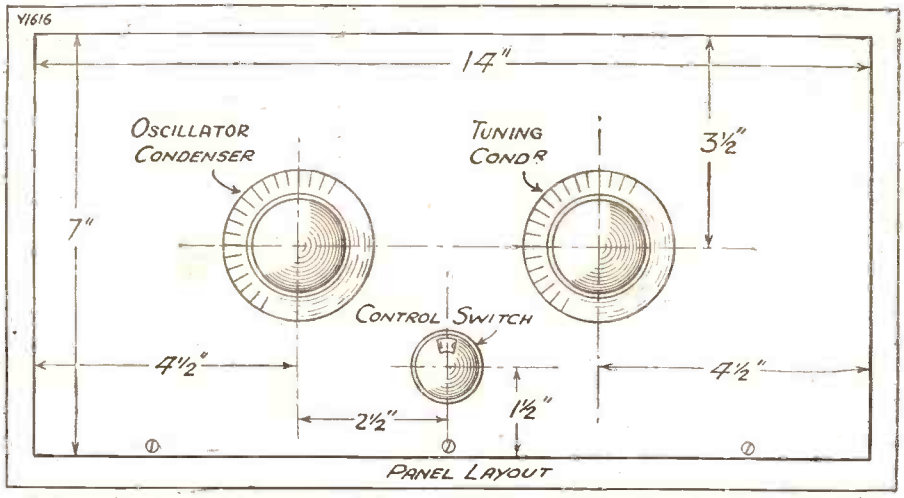
There is one other point I have not yet mentioned and that concerns the combined wave-change and on-off switch. When it is turned to the left medium waves come in; to the right long waves, and in the central position the set is switched off.

When I put the set through its paces I was astounded at the number of stations received; in fact, using a small indoor aerial about six feet long, after dark it was possible to get almost every station of note in Europe.

But here I must stop, for this really comes under operating details, and this will be dealt with in a further article which will be published at an early date.

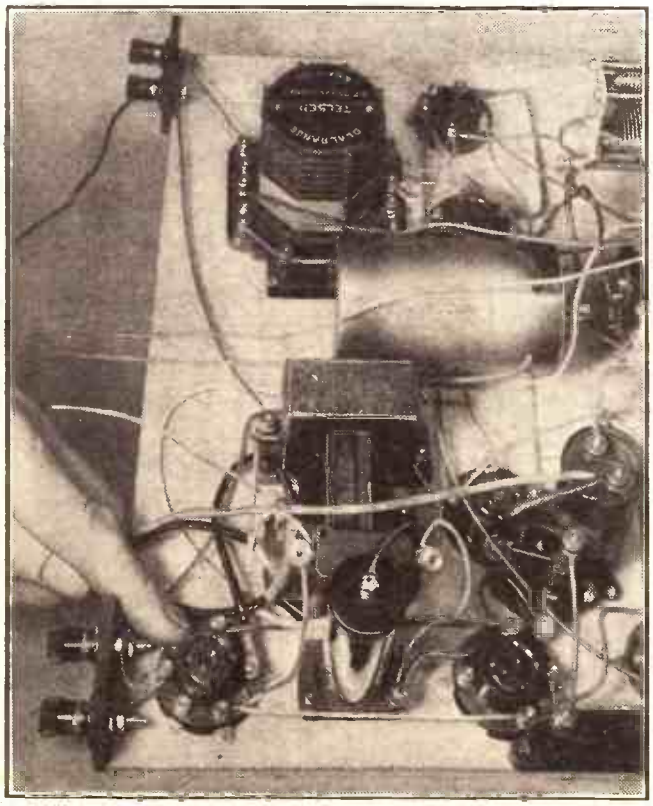
Next week there will be a further constructional article describing how to add the H.F. stage to the set.

A PLEASING PANEL APPEARANCE



Until recently super-hets. had rather a bad name as far as ease of tuning was concerned. If you still have any doubts on this score you need only look at this panel layout!

NO SNAGS WHATEVER!



A five-pin valveholder has been used in the set so that you can use a pentode in the output stage if you wish. A space has also been left at the far end of the baseboard for adding an H.F. stage.

NEXT WEEK

full details will be given for

ADDING ANOTHER VALVE

to

THE "S-Q" STAR

Make sure of your copy.

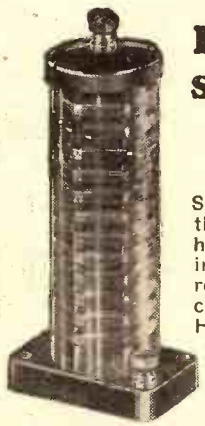
As easy to build and operate as a "straight" Set

APPROVED LIST

		£	s.	d.
1	Ebonite Panel, 14 × 7 in., drilled to specification		4	6
1	Polished oak cabinet, 14 × 7 in., with 10 in. baseboard		15	0
2	Lotus ·0005 variable condensers		7	0
2	ReadiRad slow motion dials		5	0
1	Wearite 4-pole double-throw switch		5	0
4	Junit 4-pin valve holders		2	8
2	Junit 5-pin valve holders		1	8
1	ReadiRad 1-meg. grid leak and holder		1	4
1	Lewcos 100,000-ohm spaghetti resistance		1	6
1	Lewcos 25,000-ohm spaghetti resistance		1	6
1	ReadiRad super-het. choke		5	6
1	T.C.C. ·0002-mfd. fixed condenser, type 34		1	6
1	T.C.C. ·0003-mfd. fixed condenser, type 34		1	6
1	T.C.C. ·001-mfd. fixed condenser, type S		1	6
1	T.C.C. 2-mfd. fixed condenser, type 50		3	10
1	Lotus L.F. transformer		5	6
1	Telsen H.F. transformer		5	6
1	Lewcos oscillator unit, type Ext. 126		12	6
2	Lewcos intermediate frequency transformers	1	1	0
2	Sovereign terminal blocks		1	0
4	Belling & Lee terminals, type R		1	0
1	packet Jiffilinx for wiring		2	6
4	Valves: Cossor 210D.G., Osram S.22, Mullard P.M.1H.L., Mullard P.M.2A.	2	19	0
5	Belling & Lee wander plugs			10
	Flex, screws, etc.			8

Any component can be purchased separately.

ESSENTIAL for the "S-Q ★"



READIRAD Super-Het Choke

PRICE 5/6

Specially designed for use in the modern type of super-heterodyne. Excludes the intermediate frequency currents from the low-frequency circuits. Will effectively block H.F. currents of wave-lengths even as high as 3,500 metres. Can be used wherever a choke of extra high inductance is required.

The "S-Q STAR"

KIT "A" (Less Valves and Cabinet) **£4.9.6**

OR BY EASY PAYMENTS

8/3 Down and 11 monthly payments of 8/3.

KIT "B" (With Valves Less Cabinet) **£7.8.6**

OR BY EASY PAYMENTS

13/6 Down and 11 monthly payments of 13/6.

KIT "C" (With Valves and Cabinet) **£8.3.6**

OR BY EASY PAYMENTS

15/- Down and 11 monthly payments of 15/-.

EVERY SET SIMPLIFIED

Always use Jiffilinx for wiring. They eliminate soldering, give perfect contact and are the most convenient, rapid and neat method of wiring a set. Forty Jiffilinx in various lengths, fitted with shock-proof connectors—price 2/6. Send for a packet to-day.

Be sure to read Kendall's book entitled "10 Hows for Modern Radio Constructors." Send four 1½d. stamps now.

A READY REFERENCE TO RADIO.

Our new 100-page fully illustrated Catalogue contains details of all modern radio products. You need a copy. Price 1/- post free.

TO INLAND CUSTOMERS.—Your goods are despatched Post Free or Carriage Paid. TO OVERSEAS CUSTOMERS.—Everything Radio can be supplied against cash. In case of doubt regarding the value of your order, a deposit of one-third of the approximate value will be accepted and the balance collected by our Agent upon the delivery of the goods. All goods are very carefully packed for export and insured. All charges forward.

Ready Radio

CASH or C.O.D ORDER FORM

To: READY RADIO LTD., Eastnor House, Blackheath, S.E.3.

Please dispatch to me at once the following goods

.....

for which (a) I enclose (b) I will pay on delivery (cross out line not applicable) £.....

Name.....

Address.....

P.W. 5/12/31. .....

EASY PAYMENT ORDER FORM

To: READY RADIO LTD., Eastnor House, Blackheath, S.E.3.

Please dispatch to me the following goods

.....

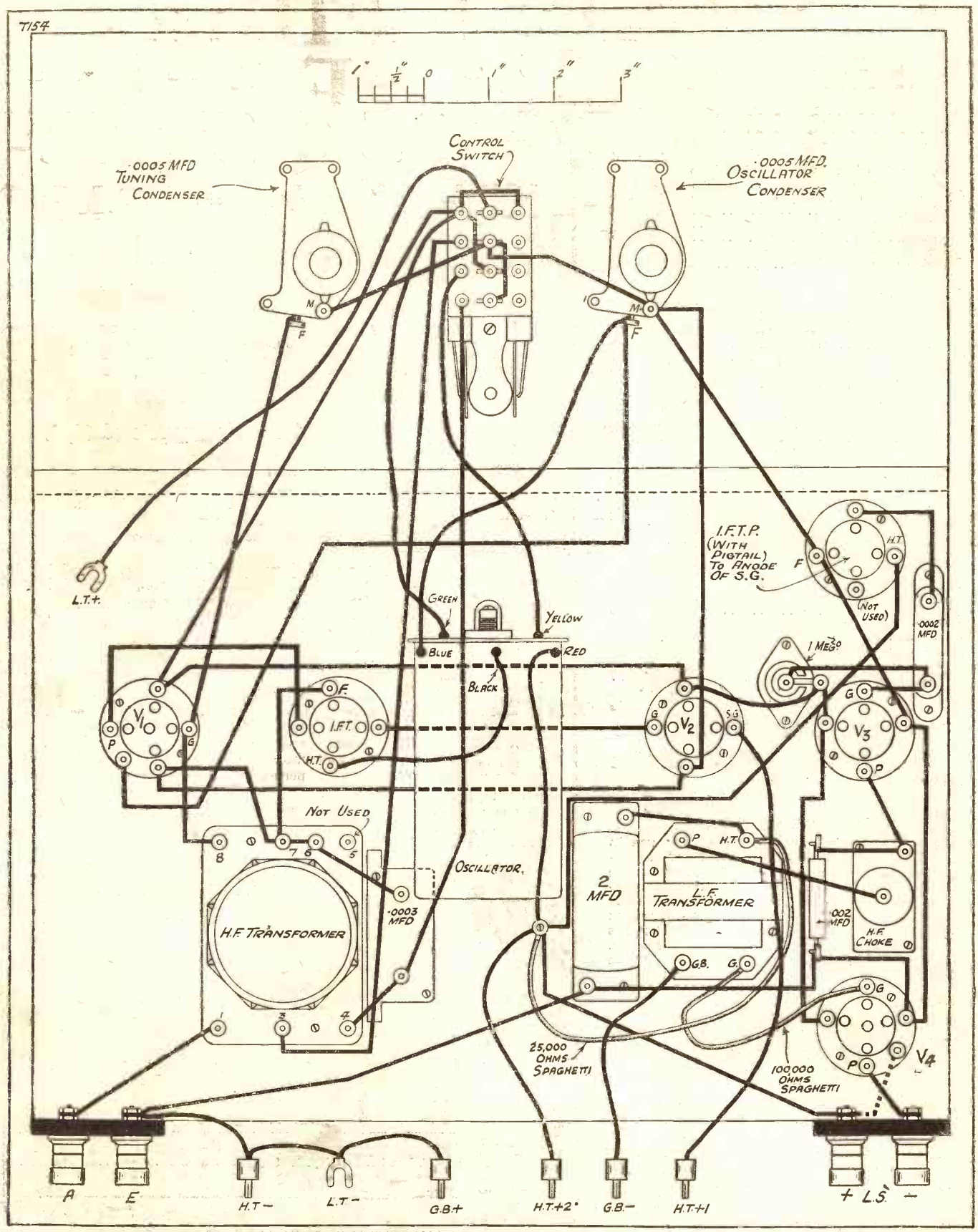
for which I enclose first deposit of £.....

Name.....

Address.....

..... P.W. 5/12/31.

NO WRESTLING WITH WIRES IN THIS "SUPER"



The job of wiring up this set is extremely simple, and all the components have been so spaced that the various wires are all as short as possible. There is one point you should bear in mind when fixing the parts on the baseboard, and that is to leave plenty of room between the Dual-Range coil and the end of the baseboard for the H.F. stage, which is added later on.

DON'T MISS THOSE XMAS PROGRAMMES

By G. V. DOWDING, Associate I.E.E., who gives you some hints on the subject of rapid fault-finding and some tips on keeping your set in good condition.

MY purpose is to lay before you a few hints and tips designed to assist you in keeping your set in good fettle during the Xmas festivities. Having done that, I can do no more. The rest is up to the B.B.C. But I must confess I should have felt happier about that part of it if they hadn't stuck a statue of the bewhiskered god of desert islands over their portals at Portland Place.

However, it must be admitted that our broadcasters do manage to please some of us some of the time; which reminds me of something.

Jack Payne was recently appearing at a London music hall. He had had a magnificent reception, but after giving three or four encores the "doomp! doomp! doomp!" caught him up in its ruthless toils and dragged him away in the direction of the broadcasting studio. Nevertheless, the music hall audience continued to scream and whistle.

"Payne! Payne! We want Payne!" shouted a standing man in the gallery.

"Anything to oblige," murmured a kindly gentleman behind, rising and smiting him hard on the ear with a boot.

You see the moral of that "touching" incident?

No? Well, it is just this. Good contacts are necessary for perfect reception. It's not one scrap of use expecting any wireless set to "stay put." We have the unimpeachable authority of the B.B.C. that this is a "Changing World." They have broadcast some hundreds of talks by the most eminent pundits to rub that fact in. They are even to-day broadcasting talks on the subject. They have hundreds more radio lectures on it planned for the future. In face of all this it must surely be obvious that it is indeed a "Changing World," and that positively the only thing in it which is not changing is the B.B.C. itself.

The Changing Set.

Right, then your radio set must change. Its terminals will work loose, its valves and batteries will wear out. But one thing at a time. Let us first of all dispose of the terminals. I don't mean that we should tear them out and throw them away, but on the contrary we should see that they are all screwed up so snugly that they almost become solid little chunks of metal. And—but wait a moment, I've just remembered my Radio Reminders idea and I must get that off my chest before I go any farther, as the monkey said when the steamroller pressed down on him.

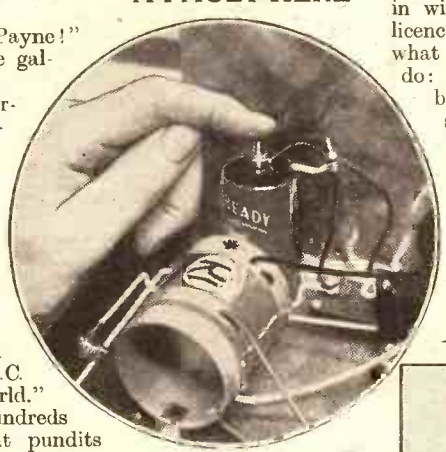
Radio Reminders.

With most humble apologies to the conveniently-named gentleman who is mentioned.

"The Announcer took Mr. Boult to the Leeds Waterworks to eat a salt and oyster pie."

Now if, during the entertaining and thrilling (or otherwise) Xmas broadcasts, your set suddenly assumes the traditional dumbness of an oyster, it is useless to rush to the local post office for help, for the P.M.G. does *not* throw free service in with wireless licences. This is what you should do: Take a deep breath and slowly repeat the above Radio Reminders. And linger at each noun as you come to it. It is a message of hope, so you should ask yourself what meaning it is supposed to convey to you, a listener in dire distress.

A FAULT HERE—



I'll supply the answers on this occasion, and I have the hope that they will always easily and immediately recur to mind in the future when you want them to. (It's a spot of psychology — mental suggestion.)

"The announcer took Mr. Boult to the Leeds Waterworks to eat a salt and oyster pie." "The Announcer——?" That should conjure up a vision of immaculacy at the microphone, and is an easy one. Is the broadcasting station still working? If there has been a breakdown at the transmitting end of the ether your set is only doing its duty to the B.B.C. if it keeps its mouth shut about it.

You therefore twizzle the dials. You still hear nothing. All the stations cannot have broken down, and what about those little scratchy, breathing sounds that ought to be in the background?

"The Announcer took Mr. Boult——" Why Mr. Boult? Why not Jack Payne or Mr. Val Gielgud? Boult? Bolt? Ah, that suggests a screw—a terminal. Are all the terminals terminising? Or has one or more ganged agley?

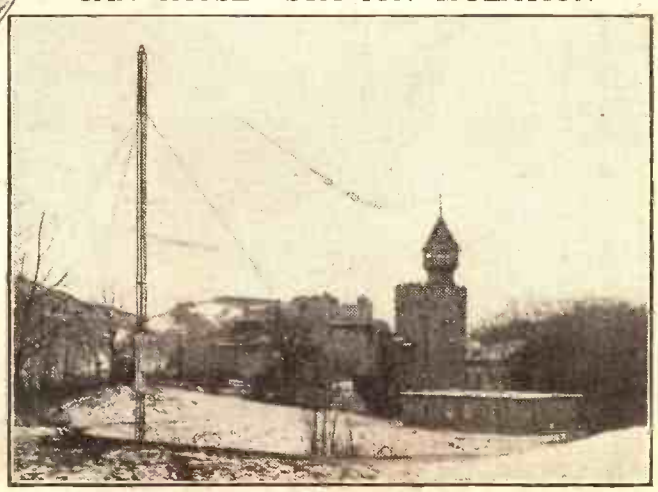
Not Wigan!

"——to the Leeds Waterworks——" Not Wigan or Hogsnorton mark you, but Leeds! An application of elementary deduction, my dear Watson, leads one to the leads. Are those leads O.K.? Or is there a mere thread of broken metal in a fabric tube trying to pass itself off as a perfectly good conductor?

"——Leeds Waterworks——" What a curious place for a pie-cnic? (I'm going all punny!) Waterworks? Wherein lies the connection between the B.B.C. and water-

(*Continued on next page.*)

—CAN CAUSE "STATION ISOLATION"



Don't forget to inspect that little G.B. battery which may be tucked away on the baseboard of your set. If it isn't looked after, it may put a brake on your getting in touch with such stations as the above—snow-sprinkled Salzburg.

DON'T MISS THOSE XMAS PROGRAMMES

(Continued from previous page.)

works? Answer, a waterpipe! And a waterpipe makes an excellent "earth" for a radio receiver. But is your earth an excellent earth? That, I suggest, is fluid for thought.

And it should not be necessary for me to advise you to put on macs and spats and sally forth into the night to examine the aerial as well.

"——to eat a salt——"

"A—salt and battery," of course! And not only the H.T. battery, but also the L.T. battery and the grid-bias battery.

"——and oyster——"

What is an oyster? Ask yourself that. Why, it's a bi-valve, of course. And if your set happens to be a tri-valver, that's not *my* fault. All my key-word asks of you is that you should very closely question the credentials of those little metal-based bottles that jauntily adorn the innards of your set.

Are they in fact *valves*, as the radio technician knows such things to be, or have they succumbed to the strain of "This Changing World," and become lifeless, inert tubes of vacua?

About That Pie!

"——oyster *pie*." Well, pies are baked in ovens, and an oven won't function without heat and, let us be electronic, ours is an electric oven. See the idea? What usually stops electricity flowing to electric ovens? Generally, a switch which is not switched, or a broken fuse. Battery set owners please note. Mains sets owners more so.

I claim a great deal for my Radio Reminders. Not only are they the "open sesame" of rapid radio fault-finding, but they constitute the best brain-developer since Cleopatra's riddle. (You mean needle, I suppose?—Ed.) (No, I don't; but, as a matter of fact, I think it really ought to be fiddle.—Tech. Ed.)

"The Announcer took Mr. Boult to the Leeds Waterworks to eat a salt and oyster pie."

I submit that that is a golden sentence, as the pawnbroker said when the judge fined him ten pounds. And I await the paens of praise it is bound to evoke from the great listening public, and in my mind I seem to hear the babble of excited comment it will arouse even in the talks and plays depts. of the B.B.C.

"Perfectly pectic, don't you think?" shrills the one permanent magnate.

"Clarence, old quantum, ai think it's too tellural for discourse," breathes another.

We will leave these delightful people and their gentle twitterings and press on, for we are rapidly descending the penultimate column and the printer has his eye on the clock.

Stitch In Time.

So far I have dealt rather with curative measures than with preventative expedients, and so, for the rest of this article, I will weave my words around the theme "a stitch in time saves programme time."

And in view of the magnificent Xmas radio fare the B.B.C. has prepared for you (for goodness' sake don't miss those harpsichord sonatina), you simply must see that your set is in the best possible trim.

It takes a stout H.T. battery to keep its pecker up through four or five days' solid Nat. and two Reg. A battery minus half of its electrons and sagging at the zincs is liable to pack up right in the middle of the choicest programme item. And there never was anything so brutally sulky as an L.T. accumulator who hasn't had a word with his pal 'Enry Ampere of the local (over-) charging station for three or four weeks.

And Watt of the valves once more?

Do you remember that touching little "Ode to a Triode" written by "Y.R." the Finn poet:

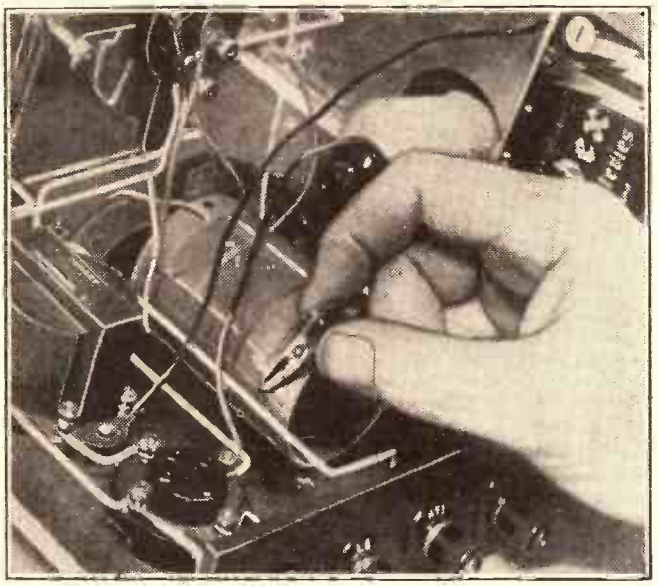
"I shot an electron at the plate,
Which stuck on the grid and that left eight.
If this goes on,
It won't be long,
Before my master will have to walk round to the shop and buy another valve."

It has been said that this masterpiece has one fault in its construction, and that is that the last line is much longer than it ought to be. The Editor of the Poet's Gazette once asked "Y.R." what he had to say to this.

"My dear sir," said the Finn sombrely, "it's an awful long way to the shop."

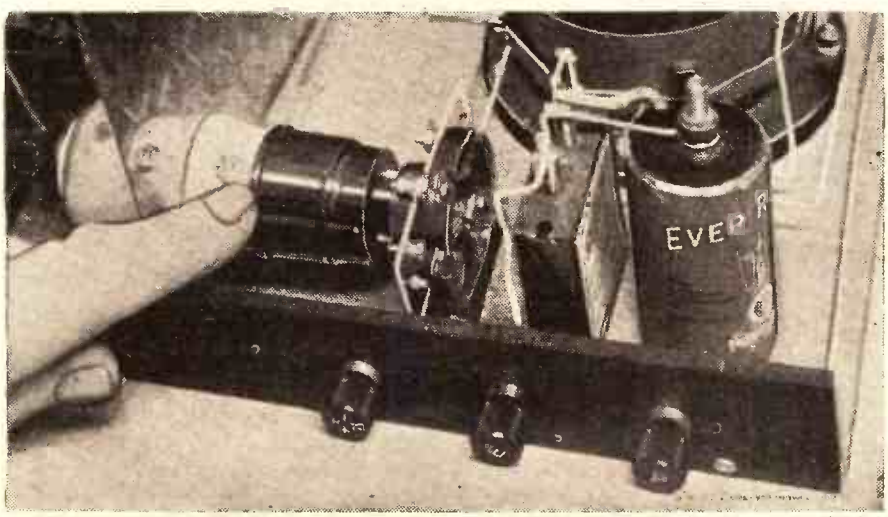
And it is, too—especially on a cold, wintry night!

LOOK AT THOSE LEADS



A run round the leads and all connections, clip and terminal, is advisable. Even though the set, hasn't been moved, such things will in time work loose.

A VITAL VALVE FOR DISTANT RECEPTION



See that your S.G. valve, if you use one, is comfortably rooted in its holder, and that its anode connection is in good order.

"This Amazing Set"

A reader's results with THE NEW "B.P." THREE

The Editor, POPULAR WIRELESS.

Sir,—I have built many sets, but the New "B.P." Three is absolutely "it." I can find no words to describe this amazing set. Stations roll in, and you can separate them with extraordinary ease without any overlapping of any kind. I have received stations that I have never yet heard before on any other receiver. Power is astonishing. I have to have the volume control practically right off when receiving London and several other foreign stations. I would advise anyone contemplating building a set to try the "B.P." Three. Wishing you and POPULAR WIRELESS every success.

Yours faithfully,
JAMES HELLENBRAND (Jun.).

Southend-on-Sea.

NEXT WEEK

"AFTER FIVE YEARS"

O.H.M. surveys the B.B.C.

BUILD THE TELSEN VICTOR 3

IMMEDIATE DELIVERY FROM BOYNTON'S 67-68 STAFFORD ST. BIRMINGHAM

Simple to build—simple to operate. A super 3-valve receiver built entirely with the world-famous all-British Telsen components, all matched for efficiency. Separation of Regional from National programmes is guaranteed, thanks to the incorporation of the Telsen Dual-Range Aerial Coil. The Victor 3 Kit is supplied with baseboard, metal panel, flex, and terminal connections, at the amazing price of 39s. 6d. complete.

KIT 1. 39/6

Exactly as supplied by Telsen, with baseboard, metal panel, flex, and terminal connections, in sealed carton, as advertised.

KIT 2. 70/-

As Kit 1 with Valves as specified (Mazda HL2, Mazda L2, Mazda P220A), less Cabinet.

KIT 3. 82/6

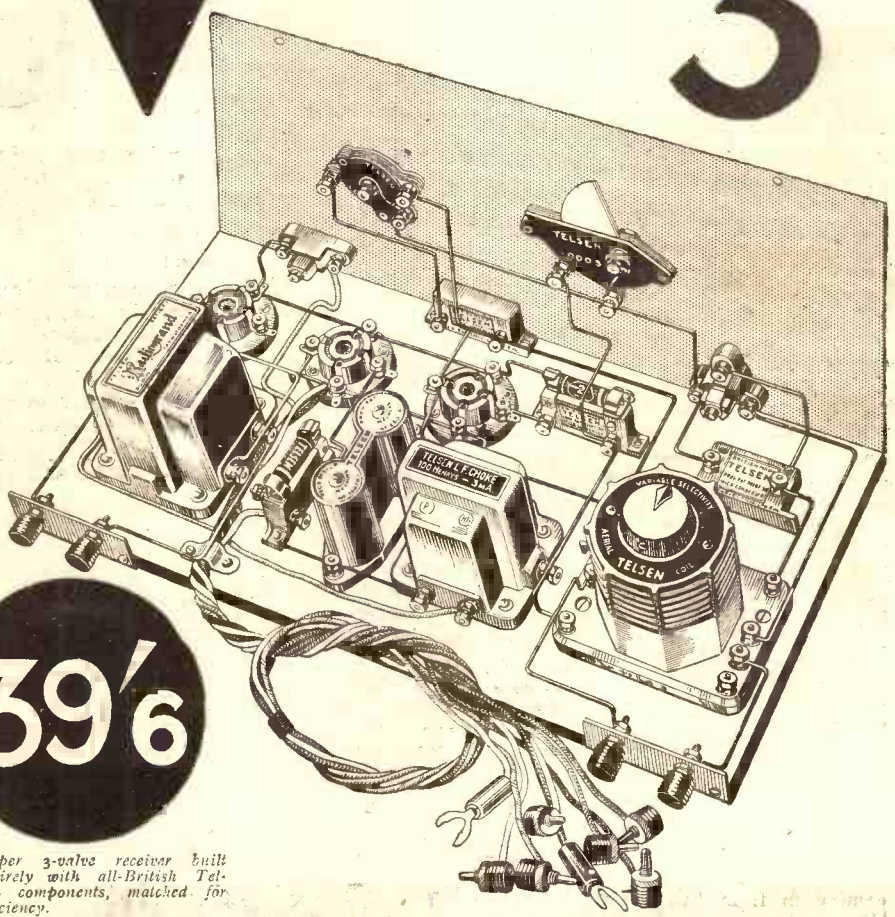
As Kit 2, with Valves as specified and Cabinet. Cash or C.O.D. or 12 monthly payments of 8s.

MONEY RETURNED IF NOT SATISFIED

Send to . . .

BOYNTON'S

FOR ALL RADIO COMPONENTS AND SETS



39/6

- *Super 3-valve receiver built entirely with all-British Telsen components, matched for efficiency.*
- *Complete with panel, baseboard, battery cord, battery plugs, terminals, connecting wire, terminal and escutcheon plates, full size blue print, and point to point wiring chart, with full instructions, etc., etc.*
- *Separation of Regional from National programmes guaranteed by incorporation of Telsen Dual-Range Aerial Coil.*
- *Very simply built and simply operated. Full constructional and operating details with every kit.*

BOYNTON'S 67-68 STAFFORD ST. BIRMINGHAM

ORDER FORM

***To* BOYNTON'S, 67-68 Stafford Street, Birmingham**

Please send: Kit 1.....(Cash or C.O.D.). Kit 2.....(Cash or C.O.D.). Kit 3.....(Cash, C.O.D. or H.P.)
(Place X against kit required). For which I enclose £ s. d.

Name..... Address.....

..... P.W. 5/12/31.

TUNING-IN BROOKMAN'S PARK

Listeners who have wondered what all the knobs and dials on a transmitter are for, and who have puzzled over the way in which the B.B.C. stations are tuned-in at the transmitting end, will be interested in this special visit to Brookman's Park.

By OUR SPECIAL CORRESPONDENT.

SEVERAL friends of mine have been complaining of fading and change of wave-lengths of Brookmans Park and Slaithwaite. I mentioned this to one of the Brookmans Park engineers when I was down at the transmitter recently.

"You know," he said, "it would be a jolly good thing if every Brookmans Park listener could come down here and see for themselves just how the gear works, and they would then know how impossible it is for the plant to fluctuate, as they say."

I looked around at the grey aluminium panels on both sides of the almost ghostly transmitter hall and although I have seen them many a time before, I was suddenly impressed with the number of meters and knobs.

Explaining the Knobs.

"Anyway," I said, "it would be a great help if you would give me an idea of how the whole thing works, so that I could explain it to readers."

"This desk," said the engineer, "has five knobs which control the field current of the high-tension generators, and these meters in front"—he pointed to large meters a foot in diameter—"give an idea of the voltage coming in from the generators. The batteries for the master oscillator and the grid-bias supplies are controlled from the panel at the end of the hall."

"Don't wax technical," I said. "I have never been over-friendly with master oscillators."

"Well, come and meet one," he said. "There are, you see, five mains panels in each Regional and National transmitter, and for reference we call them A, B, C (two of them) and between the two C panels is the D panel.

The Master-Oscillator.

"The A panel, you see, is in four sections. Meet Mr. Master Oscillator in the bottom-left compartment.

"It is just a large power valve which oscillates, just as you make a detector valve oscillate in your set if there is too much reaction. It is this oscillating valve which drives the whole transmitter.

No Wavelength Wanderings!

"Next to it is the separator valve, which keeps the station exactly on its wave-length, and which insulates the master drive valve from the rest of the gear. B.B.C. stations are not crystal controlled.

"In the top left-hand compartment you see there is one big valve and a smaller one behind it. The smaller valve is the last stage of the amplifiers in the control-room here, which are connected by landline to London. Whereas the master oscillator below is oscillating at high-frequency, this small modulator valve above is a low-frequency amplifier, and nothing more.

"The big valve in front modulates the transmission—that is, it puts the speech or music on to the high-frequency oscillations of the master oscillator, and the valve in this right-hand top compartment is a stage of amplification."

"These are ordinary air-cooled valves, aren't they?" I asked.

"Yes," said the engineer. "We don't get to the water-cooled valves until the next panel, B. This is just a two-valve push-pull amplifier, but working at high-frequency, instead of low-frequency.

"You don't have high-frequency push-pull valves in a receiver, of course, but these are coupled up in just the same way as L.F push-pull power valves. The two valves which are glowing are working now.

Spare Valves.

"The spare valves are in the left-front compartment and by turning these interlocking knobs I can bring in the spares. It is a matter of only a few minutes to change one of these water-cooled valves, complete with high-tension leads and water-pipes."

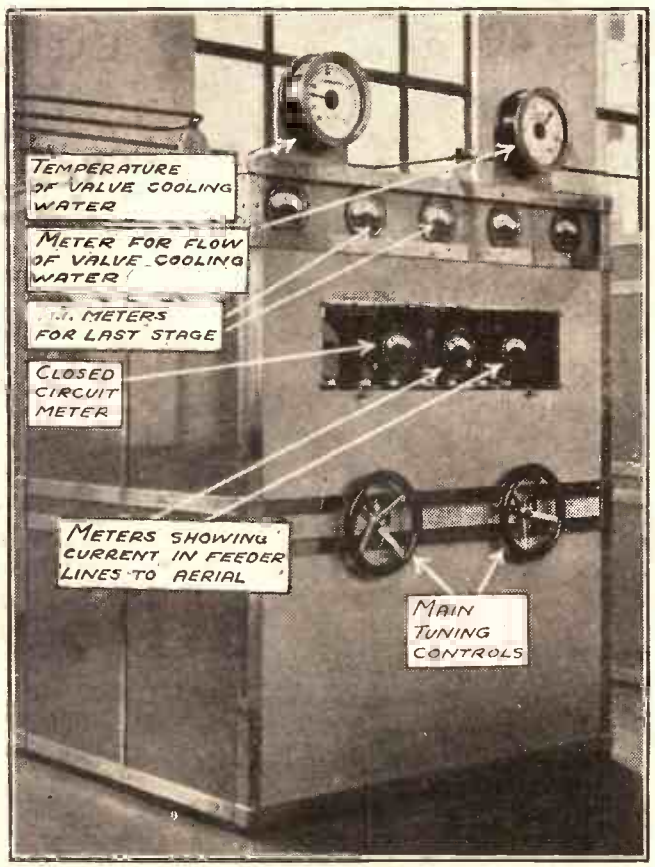
"The three meters at the top show high-tension and peak voltages," he said. "The high-tension is the normal steady H.T. and the peak meter varies according to the modulation.

"Above these meters you see the big insulators carrying copper rods running from one section to another. These are the H.T. feeder lines.

"There are two C panels and in the middle of them is the D panel. The C panels carry banks of five water-cooled valves in push-pull, the 'push' set of valves being

(*Continued on page* 828.)

THE LAST LINK IN THE CHAIN



This is the last unit and comes immediately before the aerial, the feeder lines to which can be seen running out from the top of it at the side of the water meters. It also shows the main tuning controls

TUNING-IN BROOKMAN S PARK

(*Continued from page 826.*)

on one side, and the 'pull' set on the other. if you see what I mean? Both C panels are exactly alike, and the D panel in the middle carries the tuning coils which couple them together.

Controlling the Grid-Bias.

"One of the knobs in front of the C panel varies the grid bias of the water-cooled valves, and the other is the filament change-over switch which is part of the switching operation needed to bring in the spare valves on the left. Only one of the valves is fitted with a quick change-over device, as it is hardly ever likely that more than one valve in the C panel will go at a time.

"The D panel is in the middle, and is the last link of the transmitters. At the top of it, you see, are the copper leads going out through the wall to the feeder lines. These feeders are really the lead-in (or lead-out, as you will) of Brookmans Park.

"The big meters at the top show the temperature and rate of flow in gallons per minute of the valve-cooling water, and are put up there merely for visibility. There are no valves actually in the B panel.

"The five meters below show the H.T. voltage and peak voltages respectively in the last stages of the transmitter. These are D.C. meters, of course. Looking through the window in the middle of the panel you can see three high-frequency meters, one of which shows the closed-circuit current (that is, the amount of current flowing in the coupling coils) and the other two the feeder current.

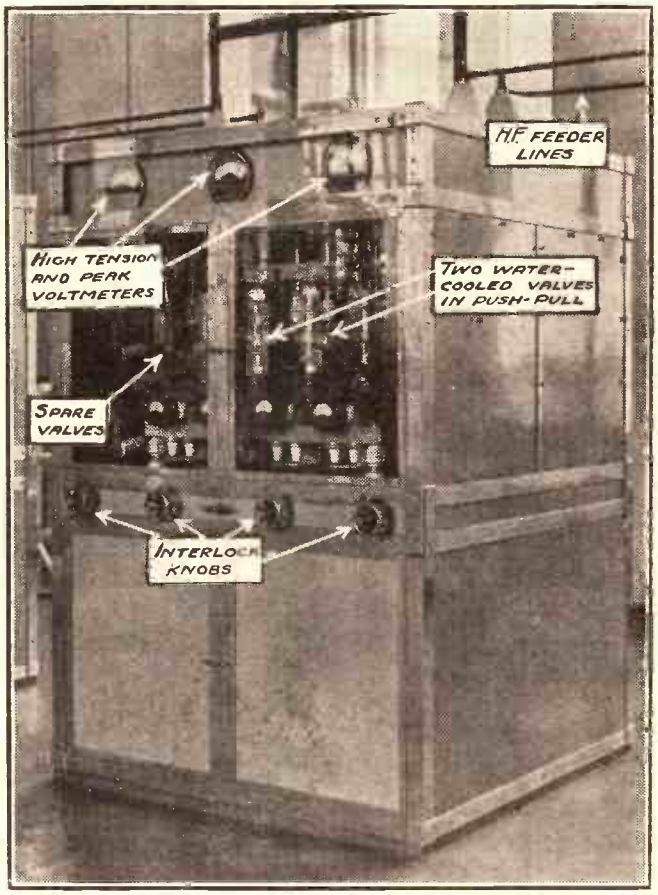
Aerial Current Meters.

"One meter is in each of the feeder lines and, by calculation from these, one can estimate the actual current flowing in the aerial. Out in the grounds, in the transformer hut immediately below the aerial, is an aerial ammeter which gives accurately the number of amperes of high-frequency current flowing up and down the aerial."

"And these two knobs," I ventured. "Are these the actual tuning-controls of Brookmans Park?"

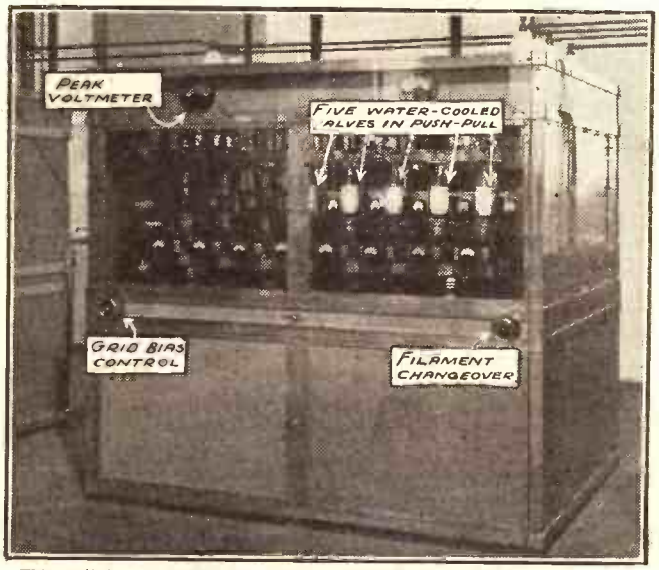
"Well," said the engineer. "Other circuits have to be tuned, too, but these knobs control the coupling of the final H.F. circuits and in ordinary amateur receiving parlance, are the Brookmans Park tuning knobs."

HIGH-FREQUENCY PUSH-PULL



Unusual though it may seem at first H.F. push-pull valves are quite common in transmitters. In this unit there are two working thus, with two spares that can be switched on in a few minutes.

ONE OF THE "C" PANELS



This unit is one half of the 10-valve push-pull stage. It contains five of the valves and is identical with the other "C" panel.

I confess to a momentary childish temptation to twiddle one of the knobs and see what would happen: but the thought of a million London National listeners losing their programme was too overbearing!

The engineer then took me out into the grounds, and showed me the masts and aerial equipment, the former rising nearly 200 ft. in the air. My time was running short by now however, so I thanked my guide for his kindness in showing me round, and set off homewards.

WHEN MAKING THAT CABINET

A Few Useful Tips.

CRYSTALLINED metal panelling as is used to-day by many manufacturers does not retain its beautiful characteristic for ever. Scratches and pieces chipped off, I find, cannot be titivated effectively.

Enamel, metallic paint, and colour wax, are inclined to crack and ridge when applied on the surface. The following however can be suited to all purposes, and retains the original lustre.

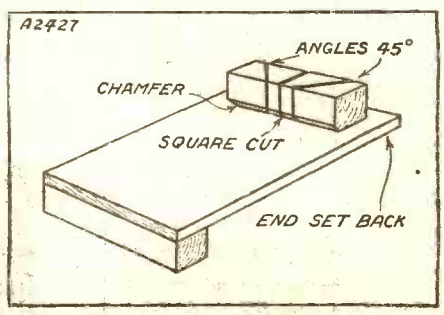
Put ½ ounce of colourless celluloid chippings into a bottle and add enough acetone to cover. Shake until celluloid has softened, then add its own weight of amyl-acetate, and a few drops of clear oil—castor is to be prefered. Leave for a day or so, then add colouring as required.

Aluminium powder mixed with bronze powder gives a burnished silver or copper tone according to mixture. A sprinkling of any dry colour pigment may be mixed in with metal dust.

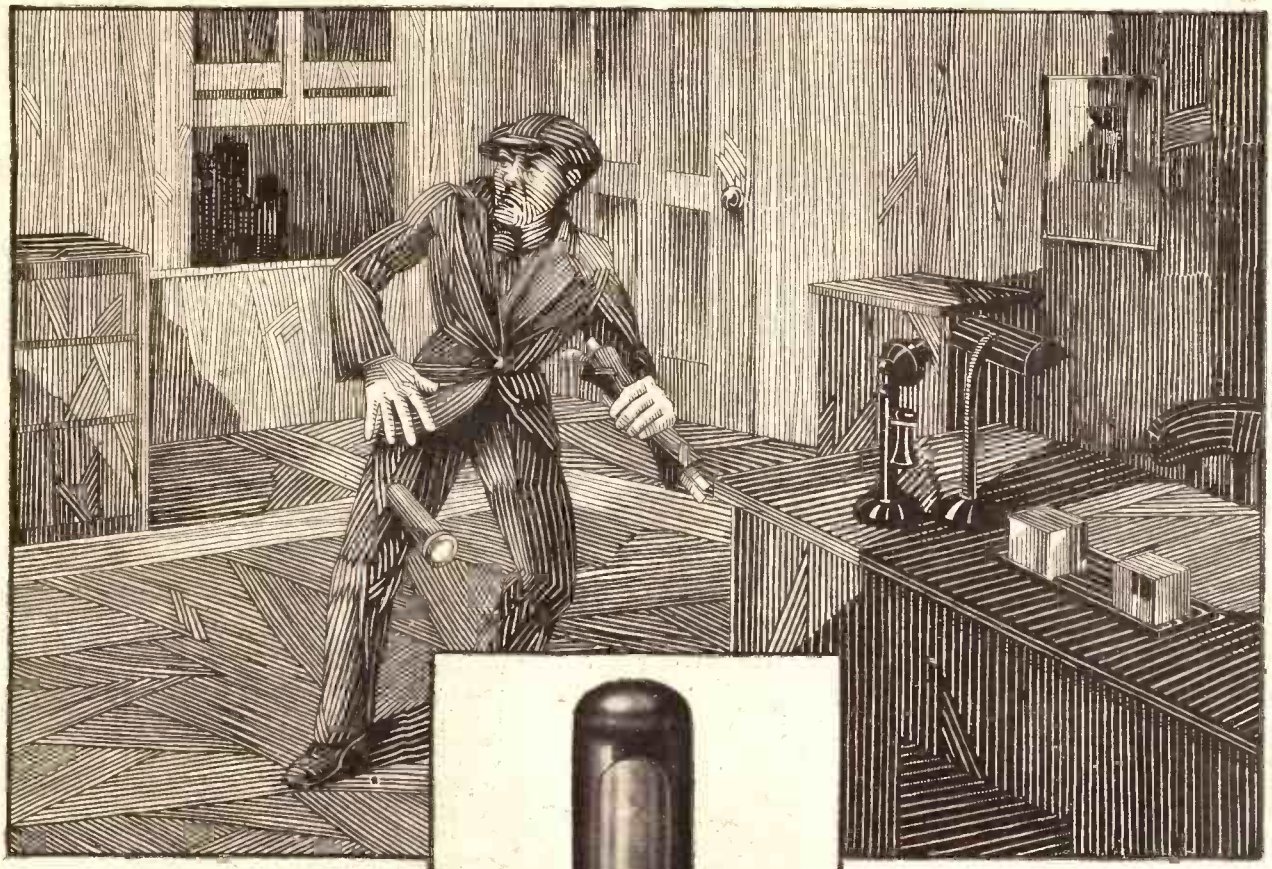
Another Tip.

Some amateur cabinet makers must think that a distinct decorative appeal is gained by mutilating the kitchen table with saw cuts. A bench cutting-board may save many "cutting" remarks, and is a useful asset when sawing rolls, dowels, or small pieces of hard wood. Don't forget to chamfer the stay,- and always let the length of this be set back to receive the saw.

SAVE YOUR TABLE!



The cutting block shown here, besides simplifying cutting will preserve your bench from saw cuts.



Trapped by Invisible Ray —By RAYCRAFT

HIS stealthy, shadowy form steals across the room. The window was easy—his tools had dealt with that. Nothing stands between him and the desk. Nothing except . . . From the room above sounds the continuous relentless ringing of an alarm. He does not know he started it. His hands have touched nothing. His quiet feet disturbed nothing. *What started that Alarm?* A small but penetrating beam of light, quite invisible in the darkness, shines across the desk. Shines upon the sensitive Raycraft Bridge. His body has interrupted that beam. That is enough. In an instant Raycraft has reacted · a circuit has been completed, the alarm has sounded throughout the house. Nothing he can do will stop it.

Raycraft offers the infallible trap for burglars. For Raycraft is a switch controlled by a beam of light, visible or invisible. If that beam is interrupted Raycraft instantly reacts.

There are a hundred and one uses for Raycraft. It will switch on lights as you approach, start the radio or gramophone as you open the door, light your garage lights as you drive up the approach. Anything, in fact, that a switch will do. Raycraft is offered as a kit, to be built up at home. It costs £3 17s. 6d. Construction is perfectly simple, and the Raycraft Book tells you of a number of experiments you can make.

Read about Raycraft in *"The Raycraft Book"*—Free from your local Radio Dealer or Electrician, or from the address below

PRICE OF THE RAYCRAFT KIT £3 . 17 . 6
(excluding Valve and Batteries)

PRICE OF THE RAYCRAFT PROJECTOR
Battery Model £1. 2.6
A.C. Mains 200-250 volts £1.15.0

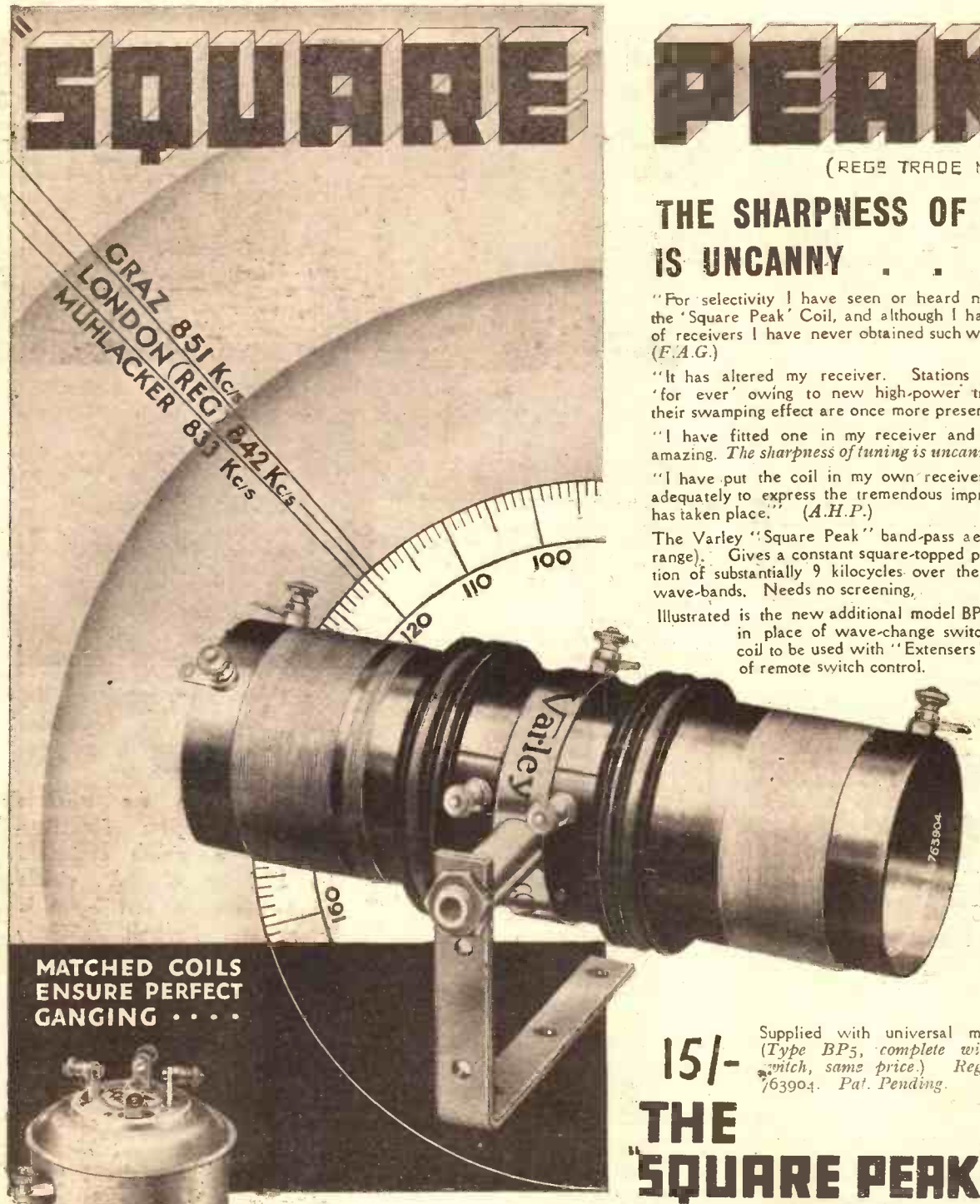
RAYCRAFT

AUDIOVISOR LTD.,
Domestic Division: Radiovisor Parent Co., Ltd.
28 Little Russell Street, London, W.C.2

Ayhs

SQUARE PEAK

(REGD TRADE MARK)



THE SHARPNESS OF TUNING IS UNCANNY . . . . .

"For selectivity I have seen or heard nothing to equal the 'Square Peak' Coil, and although I have built dozens of receivers I have never obtained such wonderful tone." (*F.A.G.*)

"It has altered my receiver. Stations apparently lost 'for ever' owing to new high-power transmitters and their swamping effect are once more present." (*T.E.D.L.*)

"I have fitted one in my receiver and the results are amazing. *The sharpness of tuning is uncanny.* (*Midlands.*)

"I have put the coil in my own receiver. I am unable adequately to express the tremendous improvement which has taken place." (*A.H.P.*)

The Varley "Square Peak" band-pass aerial Coil (dual-range). Gives a constant square-topped peak and separation of substantially 9 kilocycles over the whole of *both* wave-bands. Needs no screening.

Illustrated is the new additional model BP7 with terminal in place of wave-change switch, enabling the coil to be used with "Extensers" or any types of remote switch control.

15/-

Supplied with universal mounting bracket (*Type BP5, complete with wave-change switch, same price.*) *Regd. design No.* 763904. *Pat. Pending.*

THE "SQUARE PEAK" COIL

Varley

MATCHED COILS ENSURE PERFECT GANGING . . . .

NEW H.F. INTERVALVE COIL (Dual-range.) New Model without switch, for use with the "Square Peak" Coil, type BP7. Completely screened. Its inductance *inside the screen* is exactly matched to that of the "Square Peak" Coil to ensure perfect ganging.

List No. BP8. Price **8/6**

(Also supplied with wave-change switch. List No. BP6, same price.)

The Ideal Christmas Radio Programme

Some Famous Radio Stars attempt to choose the ideal combination, and to suggest improvements which the B.B.C. could carry out.

BRANSBY WILLIAMS

WOULD it do for me to give my own ideas as to what constitutes the ideal Christmas radio programme? I hardly think so, and here is the reason.

I am a showman, and this fact alone might give my choice a bias which would rob it of any value as an answer to the problem which faces those who have to entertain listeners at a time when they are perhaps more responsive and more critical than at any other.

Perhaps it would be better if I took the listener's side, and looked back a little——

EVER POPULAR

This is a recent portrait of Bransby Williams, who is well known to all British audiences.

One Christmas I gave "Scrooge" from Dickens' "Christmas Carol." As a result of that one broadcast, I had hundreds of letters of congratulation from all parts of the country. Quite evidently, that comparatively brief interlude at the microphone touched a responsive chord.

The letters left no room for doubt of that.

And then, the following year, when the B.B.C. did not include "Scrooge" in their Christmas programme, I had many more letters—asking why! That Dickens excerpt had not only amused them for the time being; they had remembered it sufficiently well to notice its absence twelve months later.

Which goes to prove? That at Christmas people want something seasonable in the way that Dickens is seasonable: something with character and comedy. Orchestral and dance music can be had every day at the touch of a switch.

At Christmastime, the loudspeaker should yield something seasonable and at the same time "different."

IRENE VANBRUGH

"—cheerful, happy ideas and Christmassy songs."

IRENE VANBRUGH

Although I do not think that I have myself listened-in actually at Christmastime, I nevertheless feel sure that those who do listen want cheerful, happy ideas, and Christmassy songs.

It is certainly no time for gloom, or for any very heavy item, demanding concentration from the listener! People are in high spirits and would probably welcome, more than at any other time of year, songs—rousing, jolly, seasonable, even silly—songs in which they could co-operate with the singer by joining in with the choruses.

My impression is, however, that the B.B.C. succeeds, to a very high degree, in pleasing listeners round about Christmas and the New Year.

On the last day of last year, I listened-in, with a number of my friends in the country, and thought the music, the address by the Archbishop of Canterbury, and the whole spirit of the programme, most beautiful.

STAINLESS STEPHEN

Should the B.B.C. Christmas Programmes be revised, sez you—semi-colon. Why not—question-mark—sez me, semi-conscious.

Voici or voila my ideal Xmas Day Programme:

12 noon.—Time signal.

12.5.—Topical talk from Aberdeen: "How long should Xmas waits be kept waiting?"

12.30.—"The evils of over-eating," by Gandhi.

1 p.m.—"Dangerous Living"; debate between Holt Marvell and S. P. B. Mais, wearing skates, on very thin ice, broadcast from the Serpentine.

1.30.—Inquest on Dangerous Livers.

2.8.—SILENCE, capital letters.

8.—Concert by Broadcast Critics' Circle. (No alternative.)

8.30.—Dance—Sir Roger de Coverley, by Mabel Constanduros and Gillie Potter—from Hogsnorton.

9.—Snoring Commentary on Chestnut Roasting Contest, from the B.B.C. Comedian's Club, Illkla' Moor.

9.30.—Chamber music from Covent Garden (Market) by Misere Solo Quintet. Sir Henry Wood—mouth organ. Sir Walford Davies—triangle. Albert Sandler—bagpipes. Jack Payne—sackbut. Stainless Stephen—Lyre.

10.30.—Ceremony of the Key (latch, lost), misplaced from Thos. Handley's shooting box, Blundellsands.

11.—Unexpected Surprise Item: Chancellor of the Exchequer tells us we needn't bother about the 75 per cent Seasonal Greeting.

12—Switch off and wake up.

YVETTE DARNAC

During the past few years I have had the pleasure of broadcasting fairly frequently, and as is the case with a good many of my broadcasting colleagues, listeners have written me letters expressing their likes and dislikes.

STAINLESS STEPHEN

You will enjoy reading through the items of Stainless Stephen's suggested Christmas programme.

These naturally vary. But certain definite preferences emerge, and I feel that if these were taken into consideration in the devising of Christmas programmes, the result would provide the most suitable and entertaining show.

On this basis, I think that the programme should consist mainly of the following:

1. Folk songs and carols of different countries These would prove generally

(*Continued on next page.*)

THE IDEAL CHRISTMAS RADIO PROGRAMME

(Continued from previous page.)

acceptable, besides being of particular interest to those away from their own home.

2. The ever-welcome ballad, and arias from the more popular and better-known operas. These never fail to earn a great measure of support.

3. Gramophone records of numbers from the most successful of the current musical shows.

Such a programme would, I think, succeed in pleasing most listeners.

PLENTY OF SONGS

Yvette Darnac thinks folk songs and carols would be very popular.

FRANK TITTERTON.

People who have not seen each other for long periods of time meet again at Christmas. Is it to be wondered at, therefore, that it is a great time for reviving memories of old-time happenings?

It is the time of year when people are most eager to be reminded of the past. This is one aspect of Christmas which the builders of Christmas programmes would do well to keep before them.

Furthermore, some effort must obviously be made to include something for every member of the family—Christmas being, for most people, essentially a family festival.

After dinner, there might be plenty of dance music for the young folk. Then, after they are tired out, a few carols—but not too many.

Later, the memory-stimulating part of the programme might very well follow—old-time songs and melodies for the not-quite-so-young folk, bringing back reminiscences of bygone Yuletides.

And, for my part, the programme could not do better than finish up with the story and song of the "Mistletoe Bough."

Without this, no boyhood Christmas of mine was complete!

FRANK TITTERTON

A great time for reviving memories of old-time happenings.

BRITISH PROGRAMMES

Albert Sammons would like to have British artistes only at Christmas.

ALBERT SAMMONS.

I don't know that I have any very decided views about the Christmas programmes—except perhaps for one thing.

At a time when there is dreadful unemployment in the musical profession, when foreign artistes come into the country to engagements at six times the fee which would ordinarily be offered, and when hardly any British artistes can obtain engagements on the Continent—would not the average listener enjoy his Christmas programme with a keener zest if he could be sure of one thing—that all the artistes taking part were British?

ELIZABETH POLLOCK.

I do not think the powers that be can go very far wrong in making music of all kinds the staple item in the Christmas programmes. With some carols, I suppose.

NO PLAYS!

Miss Elizabeth Pollock thinks plays should be omitted from Christmas fare.

But no plays, or pantomime—except possibly in the children's hour! It is a personal opinion, I know, and there is a great deal of quite violent controversy on the subject. But I do feel, generally speaking, that radio plays fail to "come over."

Wireless, with the absence of any visible spectacle, is so clearly a better medium for music and "the latest news" than for drama.

Or so it seems to me.

FOR RECORD RESULTS

This account concerns the H.M.V. people's new studio. It is illustrated in the large photograph.

GRAMOPHONE-RECORDING studios are very similar to those used for broadcasting, though I must admit I never fully realised this similarity until I saw the vast new studio built by H.M.V. at St. John's Wood.

It is one of three of the most up-to-date recording studios in the world, and all three are accommodated in the same building. The largest is easily larger than any other studio devoted to recording gramophone records.

The platform provides ample room for 250 performers, while 1,000 people can be accommodated in the auditorium. Indeed, it is very nearly as big as the Queen's Hall, and considerably larger than the Kingsway Hall.

Perfect Acoustics.

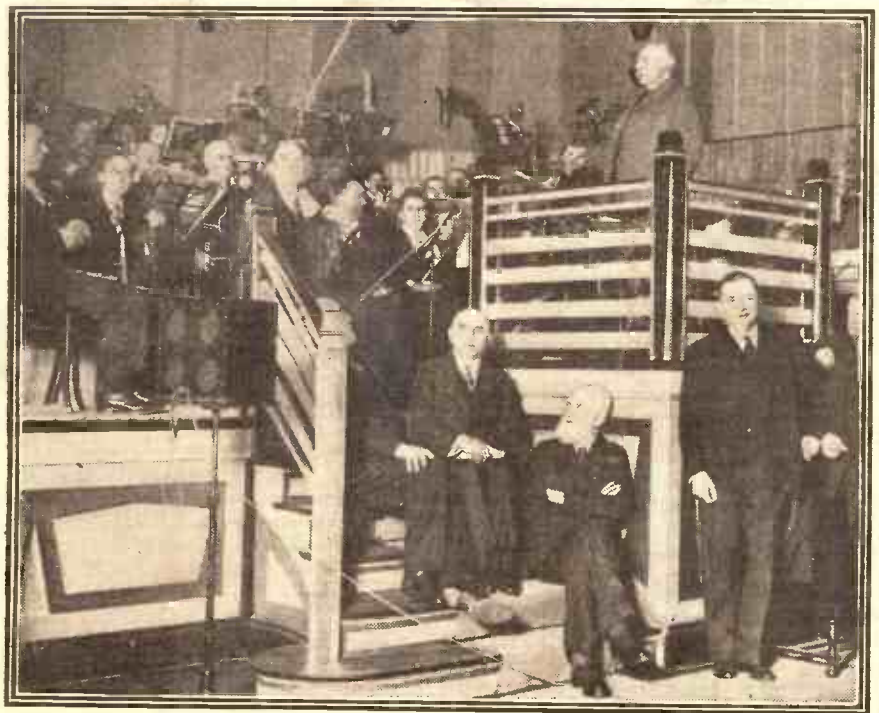
The most modern air-cleaning and ventilation and heating system has been installed, so that sessions can be taken in comfort at any time irrespective of external conditions.

The acoustics of this new giant studio are as perfect for the purpose as can be, and there are intricate instruments closely to check the exact characteristics.

During my visit Sir Edward Elgar was conducting the London Symphony Orchestra, and I was actually in the studio during the recording of a part of his famous "Falstaff" Suite. That was a thrill of a most pleasantly unexpected nature. I am now eagerly watching all the H.M.V. announcements for news of the issue of that record.

D. G.

LONDON'S LATEST RECORDING STUDIO



This colossal gramophone-recording studio will accommodate many hundreds of people, and is one of the best equipped in the world. It has taken several years to plan and build.

SEVEN GIANT T.C.C. CONDENSERS used by 200 K.W. PRAGUE

Here is illustrated one of the seven giant 5 mfd. condensers standing 6 ft. 6 ins. high.

T.C.C.
ALL-BRITISH
CONDENSERS

The Telegraph Condenser Co. Ltd., Wales Farm Rd., N. Acton, W.3.

WITH an output of 200 K.W. Prague becomes the world's most powerful medium-wave broadcaster—and it has come to Britain for its condenser equipment. Each of the 7 T.C.C. Smoothing Condensers has a capacity of 5 mfds. with a working load of 25,000 volts D.C. Other T.C.C. equipment supplied to this station includes H.F. Condensers—mica dielectric immersed in oil—which are called upon to work up to 50,000 volts peak load!

This order was secured in open competition and is a remarkable testimony to the efficiency and reliability of T.C.C. All-British Condensers.

♡ 9465

S·e·l·e·c·t·i·v·i·t·y

You can increase the Selectivity of your set with a "Selectanet" Super Selective Aerial.
For "Selectanet" is an entirely new and scientifically designed Aerial. In a ratio never before possible it gives a maximum collective surface area in a minimum overall length. There are more than 800 ft. of pure copper ribbon wire in the standard 9 ft. length, woven into a tubular net 2½ inches in diameter. It reduces interference, cuts out overlapping, and is particularly effective on short-wave reception.
Get a "Selectanet" Aerial from your dealer to-day, and get the best out of your set. Standard indoor model 2/6 each.

INDOOR MODEL 9 ft.

2/6

Complete with insulated suspension springs.

OUTDOOR MODEL 25 ft.

4/6

Coated with anti-corrosive compound.

TO THE TRADE:

All the best Wireless Factors have the "Selectanet" Aerial in stock. If you have any difficulty in getting supplies write to:

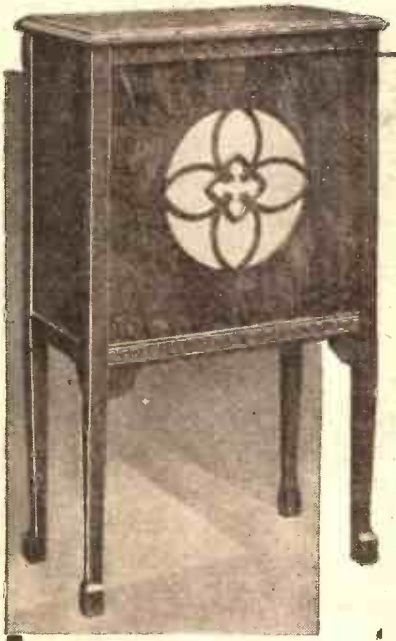
SPONG & Co. Ltd., Woodville Grove, S. Tottenham, London, N.15

"SELECTANET"

REC. Nº 520797 BRITISH MADE PATENT APPLIED FOR

THE SUPER-SELECTIVE AERIAL

A CABINET OF PRACTICAL DESIGN



The Camco "Regent" Pedestal Cabinet was built for PRACTICAL every-day use. It is solidly built—yet handsome and well-finished. Suitable for any make of speaker, and also accommodates batteries and eliminators. Inside dimensions 20" × 20" × 11" deep. Height 39". In Oak, £3.

Write for FREE copy of the new 24-page Camco Radio Cabinet Catalogue.

Name .....

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P.W. 22

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Showrooms: 24, Hatton Garden, London, E.C.1.
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THE IDEAL GIFT

For any speaker unit.

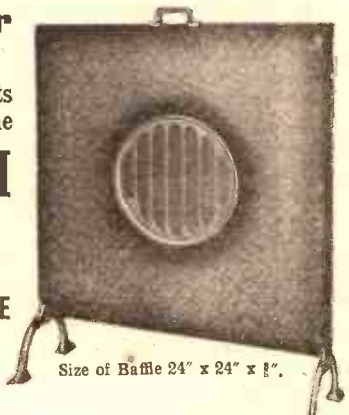
You will hear your unit at its very best if you fix it to the

VIBRANTI BAFFLE

(Patent one-piece construction)

THE PORTABLE SCREEN TYPE
(as illustrated)

Can be readily moved from ROOM to ROOM.



Size of Baffle 24" x 24" x ½".

PRICES:

Baffle Board only. Oak or Mahogany Finish .. .. Each	9/6
Oxidised Copper Finish .. .. .. Each	10/6
Oak or Mahogany Finish Baffle and Oxidised Copper Screen Fittings	14/9
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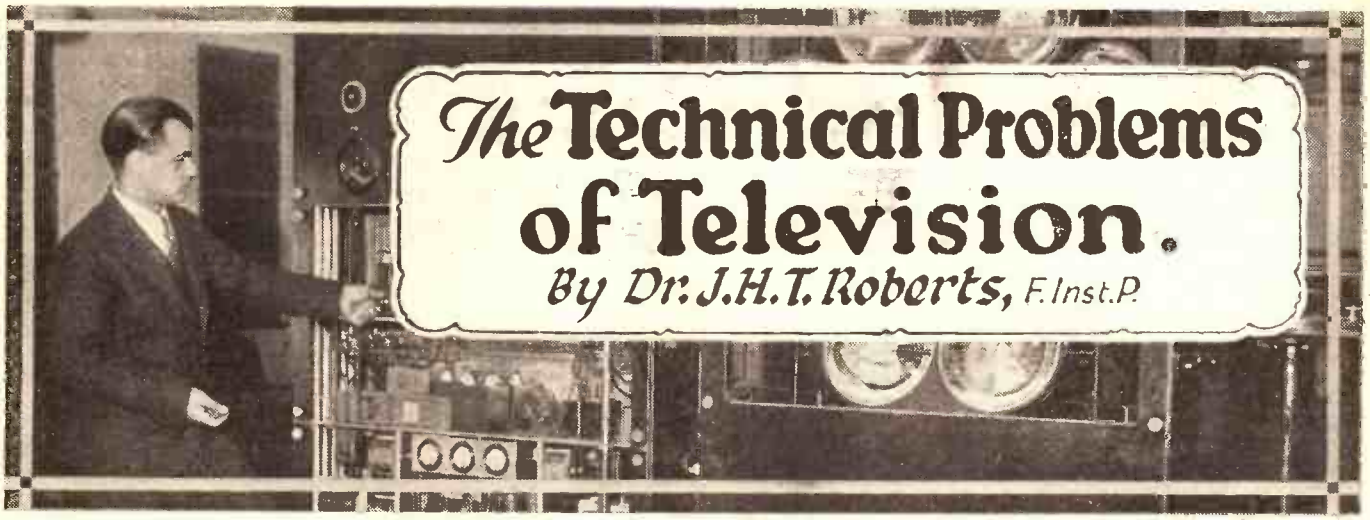
Size of centre opening—7", 9½" or 12" diameter.

Please state size required when ordering.

CHARLES BORST & SONS. 306-308, Euston Road, LONDON, N.W.1.



The Technical Problems of Television.

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

WHAT'S the latest news of Television? Is it now a practical proposition or have we to wait another five, ten or twenty years before the promises come true? Are we to see that "cricket match in Australia" next year, or the year after, or the year after that?

I ask these questions not with any intention of being carping or critical, but purely by way of directing your attention from what we may call the newspaper aspect of television, on the one hand, to the technical aspect on the other hand.

As readers well know, "P.W." has always maintained an open-minded attitude towards television, but at the same time has always felt that an ounce of performance would be worth a ton of promise.

Personally, I am frankly sceptical about television and whilst, as a scientific man, should not, I suppose, say that anything was *impossible*, at the same time I believe that it will be very many years before television will be comparable with even the crudest examples of early cinematography.

These problems are many — and they are extremely interesting, as this frank and incisive analysis of the present position clearly shows.

Long Way to Go.

I would go further, and say that I cannot conceive of television ever being perfected to such a stage as to give us a result comparable in any way in size and quality with a present-day cinematograph picture as seen upon the screen—unless, indeed, some totally new principle is discovered.

In case any of you may feel that these views—which, I should mention, are shared by a large number of other scientific men to-day—are unjustified or are not based upon careful consideration of the technical difficulties involved in television, you may be interested to consider the report of a discussion which was held recently at the Institution of Electrical Engineers upon this subject.

A Discussion.

At this meeting a paper was read by a well-known television expert dealing in detail with the various technical problems involved; this was followed by a discussion in which many other prominent experts took part.

Transmission Troubles.

It was pointed out that the two main problems confronting television were, first of all, the transmission to the receiver of signals corresponding to the picture elements, which necessarily embrace a very large band of frequencies, and second, the problem at the receiver of providing sufficient illumination upon the screen to enable a number of people to view the received image at the same time.

The received picture is the criterion by which any system of television must ultimately be judged. The amount of detail contained in the picture depends upon the number of picture elements per unit area, and it is considered that 15,000 picture points are necessary in order to show an average amount of detail.

Even with this number of picture elements the received pictures would be very crude compared with an average cinema reproduction, but might be satisfactory for the time being.

Wide Band of Frequencies.

Each picture point has both position and "magnitude" or quality (upon which depends the light-and-shade effect), and since it is impossible for the signals in the channel bearing the picture elements from the transmitter to the receiver to have more than one value at any instant, it follows that each of the picture elements must be treated individually.

If we consider the throwing of 12½ pictures per second (that is, each picture occupying 2/25ths of a second) and the picture composed of 15,000 elements, the highest frequency necessary when there is maximum detail will be 15,000 by ½ by 12½, or 93,750 cycles (say, approximately, 100,000 cycles) per second.

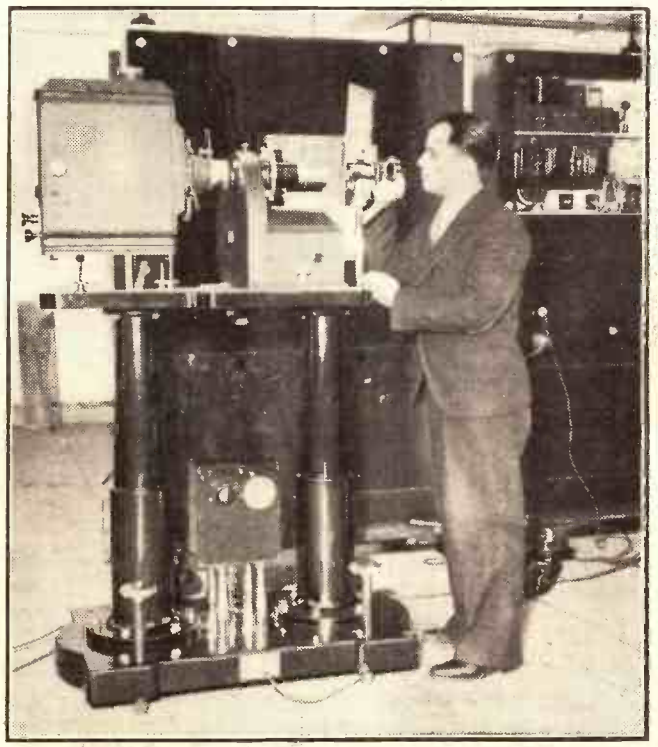
Scanning.

The next item is to disintegrate the picture into elements—the process known as "scanning"; but whilst there is room for great exercise of ingenuity in various scanning methods, it is not the question of scanning that is actually hindering further progress in television.

The stream of picture elements have now to be transformed into current elements by a light-sensitive cell, and there is little difficulty here; but when we come to the amplifiers which

(Continued on next page.)

THE LATEST FROM NEW YORK!



This is Mr. Sanabria giving a demonstration of his television camera in New York. His system has been the subject of much favourable comment.

THE TECHNICAL PROBLEMS OF TELEVISION

(Continued from previous page.)

magnify the signals of a sufficient degree before they are transmitted, we experience our next real difficulty.

The amplifiers must have frequency characteristics extending from about 20 cycles per second, and owing to stray capacitances of valves, components and wiring, attenuation at 100,000 cycles per second is introduced. Attempts to compensate for this with resonant networks of conductors introduce phase distortion which may produce fictitious positions of points upon the receiver screen.

Notwithstanding all this, reasonably satisfactory amplifiers have been made up to 50,000 cycles per second with sufficient gain, and further work will no doubt increase this range another octave.

Suitable Wavelengths.

As regards the carrier wavelengths to be used, it seems advisable to go down to the region of 5 metres in view of the extended modulating frequency and the fading which is particularly prominent at wave-lengths of 50 metres or so.

There are, of course, innumerable problems associated with the use of short waves of, say, 5 metres. A compromise may be effected by using a *number* of channels between the transmitter and receiver, each dealing with a portion of the total frequency-band.

Now let us turn to the receiver, where we meet with the next serious difficulty. It was considered by those who took part in the discussion that before we could regard the result as in any way practical, the dimensions of the received picture should compare at any rate with those of the pictures produced by a home cinematograph machine—say a picture 3 ft. by 2 ft. at the least.

The Receiver.

Since we are obliged to treat each picture element separately, we can only illuminate 1-15,000th of the area of the picture at the same time (assuming we receive a 15,000-point picture). We must, therefore, provide a scanning beam of very high average intensity.

The provision of such a beam is in itself a comparatively simple matter, the real difficulty being that of finding a method of modulating this beam in accordance with the signals corresponding to the picture elements.

Various methods of modulating light beams have been suggested, including the crater neon lamp, the Kerr cell, and the modulated arc. Each of these has its own peculiar difficulties, into which we cannot enter at the moment.

With the modulated arc there is a limitation, since when an amplitude of modulation, which is in the region of 25 per cent of the maintaining current, is exceeded the arc is extinguished. Nevertheless, the use of modulated arcs appears to be a promising line of investigation.

The Cathode Ray Method.

Much has been said of the possibilities of the cathode ray television receiver. This has the advantage that the cathode beam is virtually without mass, and can be controlled magnetically or electrostatically, its intensity being at the same time modulated in accordance with the received signal.

A large amount of work still remains to be done upon cathode ray television tubes, however, before they become a practical proposition, notwithstanding the fact that images measuring about 6-in. square have been obtained with these tubes with quite fair illumination.

In order to limit the frequencies transmitted along a particular channel it has long been suggested (as already mentioned) that a number of channels should be used, each dealing with a portion of the frequency band, including the picture signals. The advantages of this arrangement are threefold.

First, the frequency band is reduced; second, provided all the channels are working simultaneously, the amount of light available for illuminating the receiver screen is increased in proportion to the number of channels; and third, the synchronising accuracy necessary is reduced.

In order that sufficient light may be available for scanning purposes at the transmitter, it appears most practicable to photograph the subject to be transmitted on to cinema film, after which the image may be developed and illuminated by an arc, if necessary, during the scanning process.

This calls for work on a photo-chemical process capable of developing quickly an image which will be sufficiently "stable" to stand up to the illuminating arc for a small fraction of a second.

An American worker, Mr. P. T. Farnsworth, cuts up his picture into 200 strips, which is equivalent not to 15,000 but to 40,000 picture points, and the modulation occupies a frequency-band of 300 kilocycles.

With regard to the cathode ray tube, one well-known expert taking part in the discussion, said that this was becoming more and more complicated every day. "It is still a laboratory apparatus," he said, "and, in my opinion, is likely to remain so for a considerable time. I think the possibility that it will shortly be introduced as a home set is retiring into the distance.

"Every internal modification that has recently been suggested would tend to increase its price and reduce its life, so that not only would the equipment be expensive, but it would also employ a high-voltage control and would have a limited life. The technique of making cathode ray tubes has to show a considerable advance before they need be seriously considered for home use."

Multiple Channels.

With regard to the use of multiple channels, there are, said another contributor, two major difficulties, the first of which is met with in the alignment of the separate channels on the screen so as to avoid overlapping or "edge effects" between the channels, and the second in the variation which occurs in the various amplifiers associated with the different channels.

This seems to call for some system not only of controlling each channel but also of interlocking control, and the latter presents substantial difficulties. One large American concern which has been experimenting with the multi-channel system has now abandoned it for the time being, as the problems associated with the amplification and the control between the various channels are at the moment beyond their powers to overcome.

Another View.

Another expert contributor to the discussion said: "Whilst I appreciate the apparent advantages of the cathode ray system of reception, I am convinced that mechanical methods of "re-integrating" (scanning the receiving screen) will gradually become obsolete.

"On the other hand, I do not think the cathode ray has much to offer, as, in whatever way it is developed, it can only be used on a small screen and gives but a poor intensity of illumination."

The foregoing will give some slight notion why an ounce of real "results" would be worth a ton of newspaper talk.

TWO-WAY TELEVISION TESTS

Engineers of the Bell Telephone Laboratories engaged in control work during a big demonstration in America.

All Editorial communications should be addressed to the Editor, POPULAR WIRELESS, Tallis House, Tallis Street, London, E.C.4.

The Editor will be pleased to consider articles and photographs dealing with all subjects appertaining to wireless work. The Editor cannot accept responsibility for manuscripts or photos. Every care will be taken to return MSS. not accepted for publication. A stamped and addressed envelope must be sent with every article. All inquiries concerning advertising rates, etc., to be addressed to the Sole Agents, Messrs. John H. Lile, Ltd., 4, Ludgate Circus, 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 specialties described may be the subject of Letters Patent, and the amateur and the trader would be well advised to obtain permission of the patentees to use the patents before doing so.

QUESTIONS AND ANSWERS

THE "SUPER-QUAD" ON LONG WAVES.

"CHAS." (Fenton, Staffs).—"I could not understand why my 'Super-Quad' was a real super on the medium waves, beyond all expectations in fact, but on long waves was just like an ordinary set, with no trace of super-strength. What I suspected was the oscillator coil unit, this being a different make from the one I had seen in use in the first place.

"The makers have been written to, but don't seem to be very helpful, their only suggestion being to 'make the grid return via the negative instead of via the positive filament lead.' Would you think this worth trying, and, if so, what actual alterations does it mean in the wiring of the set itself?"

The suggestion is one that has in the past proved helpful in cases of unsatisfactory long-wave results, so we should certainly try it. The actual wiring alterations are very slight.

All you have to do is to disconnect the lead which runs from the moving vanes (or frame) of the single ·0005-mfd. condenser to the filament terminal of the V_1 valve holder, at its valve-holder end and join it, instead, to the *negative* filament terminal of the same valve holder.

You can either carry the connection to the filament terminal of the valve holder itself, or to one of the points already connected there, such as the one end of the G.B.+ lead, one side of the 1-mfd. condenser, or the appropriate L.T. switch contact that is joined to these points.

R.C. UNIT IN THE "DUAL-RANGER."

G. F. (St. Albans).—"Instead of the L.F transformer, I wish to use an R.C. unit for the V_2 V_3 coupling in the 'Dual-Ranger.' This unit was left over from a set that was never really finished, so the unit is new, and I think it is a pity to waste it if it will do for the purpose.

(*Continued on page* 842.)

WHAT'S WRONG WITH IT NOW?

Perhaps the switching doesn't work properly? Or some mysterious noise has appeared and is spoiling your radio reception? — or one of the batteries seems to run down much faster than formerly?

Whatever your radio problem may be, remember that the Technical Query Department is thoroughly equipped to assist our readers, and offers an unrivalled service.

Full details, including scale of charges, can be obtained direct from the Technical Query Dept., POPULAR WIRELESS, The Fleetway House, Farringdon Street, London, E.C.4.

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

LONDON READERS, PLEASE NOTE: Inquiries should **NOT** be made by 'phone or in person at Fleetway House or Tallis House.

RADIOTORIAL QUESTIONS AND ANSWERS

(*Continued from page* 840.)

"The markings on its terminals are the following: A., H.T.+, G., and G.B. If it will do, how should each terminal be connected?"

Usually the effect of R.C. coupling, as compared with that provided by an L.F. transformer, is two-fold; there is lower magnification and a loss of H.T. on the plate of the valve in question. Neither of these will be serious matters with the "Dual-Ranger," although both effects will be there to some extent. Much depends on the values of the R.C. coupling units but, in any case, the scheme would be well worth trying as the substitution involves no extra wiring at all, and you can easily slip in a transformer in place of R.C. at some future time if you wish.

The connections will be, in effect, exactly as shown on the blue print, but for clarity's sake are outlined below:

"G" on the unit to grid terminal of third value "G.B." on the unit to the flex lead and black plug for negative grid bias. "H.T.+" on the unit to one side of the 1-mfd. condenser and to one side of the 50,000-ohm resistance. "A" on the unit to one side of the H.F. choke.

"A BIT OF A LARK."

"TAM O' SHANTER" (Stirlingshire).—"Perhaps you could help me to have a bit of a lark with some friends who will be staying with me next month. I am going to rig up a loudspeaker so that it is absolutely concealed, arranging thin wires to it and working it from an amplifier in the next room.

"I can do the talking part perfectly—I tried it some years ago with a microphone button, and have since done it (first-class) with an old horn-type loudspeaker for microphone.

"But the present difficulty is the loudspeaker. I don't want an actual loudspeaker, although if the worst comes to the worst I can undo some of the soft furniture and conceal a unit and small cone in a big chair or settee.

"What I would greatly prefer, however, is to do as an article in 'P.W.' once suggested—namely, fix the loudspeaker unit to a panel of the piano, or to a similar piece of wood, using that as the 'diaphragm.'

"Do you think it would work on a thin oak panel measuring only 2 ft. by 2 ft. 6 in.?

"There is a panel this size on a sideboard, and I will try it if you think such a small 'sounding-board' would do. To conceal the nut on the outside of the sideboard I was thinking of faking a 'boss,' sticking this over the fixing nut so that even close examination of the outside would show nothing unusual.

"Inside I am not bothering about, as I am sure the unit can be concealed even if somebody suspects the cupboard and looks right inside it. Thin wire leads can be let into the seams, too, so I should like to try this if you think the wooden panel is not too small."

A thin panel of the size quoted will make an excellent "cone" or diaphragm, and speech would probably sound very natural indeed from it. Fix the "boss," tightly with seccotine or something, as such a "voice" is somewhat clearly localized, and the sideboard will certainly come in for close attention! The only part we should be doubtful of is the concealing of the unit inside, but apparently you can see your way to doing that, so it should be a great success.

TECHNICAL TWISTERS

No. 90. VOLTAGE DROP.

CAN YOU FILL IN THE MISSING LETTERS?

When the various parts of a circuit are to be considered separately it is often convenient to express the effect of a . . . . . as a voltage drop.

In a resistance-capacity coupled amplifier, for instance, the voltage of the supply will apparently be greatly reduced at the . . . . . of the valve because of the intervening coupling resistance.

Voltage-drop across a resistance is very easily calculated, it being equivalent to the . . . . multiplied by the . . . . . passing.

Thus a current of ·5 milliamps through a 100,000-ohm resistance indicates a voltage drop of . . . . .

Last week's missing words, in order, were: Electrodes, Triodes, Tetrode. Pentodes.

WHO WAS IT?

"EMME" (Paris).—"I have become very interested in a mysterious new long-wave station which I have picked up several times at different hours. Wavelength about 2,300 metres. Language unknown and certainly not one of the well-known ones. Man announcer, reading long passages. Can you give even a suggestion—no one I know here can do so?"

We haven't heard this, but expect it would be the new Yugo-Slavian station at Skoplje, which is supposed to be "taking the air" on 2,300 metres or thereabouts.

WHAT ARE LONG WAVES?

L. A. T. (Chester).—"I was surprised to see in an American radio book the statement that 'long waves' are those of three thousand metres or more, and 'medium' waves from 200 to 3,000 metres. Surely this is quite different from the European way of reckoning them?"

The American broadcasting services do not use stations like 5 X X, Radio Paris, and similar transmitters with wavelengths over 1,000 metres, but work on the wavelengths corresponding to our own 200–600-metre band.

(*Continued on page* 844.)

RADIOTORIAL QUESTIONS AND ANSWERS

(*Continued from page* 842.)

(We call this the "medium" wave-band to distinguish it from 1,000–2,000 metres, which we call the "long waves." There is no necessity for such distinction in the States.)

Officially the statement quoted was correct, as there are supposed to be five classes of wavelength:

Long	.. ..	3,000 metres or more.
Medium	.. ..	200–3,000 metres
Intermediate	..	50–200 ,,
Short	.. ..	10–50 ,,
Ultra-Short	..	Below 10 ,,

These distinctions, however, are of so little use to the ordinary European listener that he ignores them, and are so unsatisfactory to others that it is probable the waves will be re-classified soon.

THE "SUPER-QUAD."

E. S. (Bletchley).—"What date was the 'P.W.' about the construction of the 'Super-Quad,' and where can I get the back number?"

The "Super-Quad" was described in "P.W." Nos. 481 and 482 (dated August 22nd and August 29th respectively).

Back numbers of "P.W." which are still in print can be obtained from The Amalgamated Press, Back Number Department, Bear Alley, Farringdon Street, London, E.C.4. Price 4d. per copy, post free.

A SURPRISE FOR THE GUESTS.

N. W. W. (Macclesfield).—"I have been deputed to prepare a surprise for the guests, and the likeliest line I have been able to hit on in my mind is a ghostly 'voice' coming from a little gipsies' tent. Fortune-telling, and all that.

"The practical side of it, tent, leads, etc., should be easy enough, and I have a small-cone loudspeaker that will sound just right if I can get the electrical end of the business right.

"What I want is something like you described in an article in 'P.W.' last Christmas-time, using a loudspeaker in another room instead of a proper microphone. But the connections you gave there were for a different kind of set with L.F. transformer in the detector's plate circuit.

"I want to use the 'B.P.' Three, and the transformer there is between the last valve and the second, so I am afraid there will not be enough amplification. Can it be done with a set of the 'B.P.' type, which uses a resistance-coupled stage, with simple re-wiring like that described then for transformers?

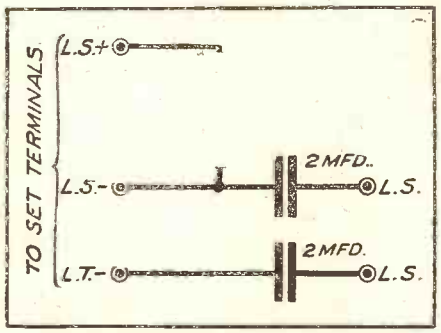
"If so, how should the wiring go, and are there any special points to watch besides being careful not to burn something out?"

The "B.P." Three is equipped for radio-gram work, and any set with that refinement is simply ideal for a stunt of the kind you have in mind. There is no re-wiring or altering of the connections at all, but the whole job can be carried out merely by disconnecting the pick-up leads from their terminals on the set, and inserting the leads from the second loudspeaker (the "mike") in their stead.

With reasonably short leads you will find that speech will come out quite well, so you should have no difficulty in surprising the guests, if the person who is speaking into the hidden loudspeaker can address them suitably.

MISSING LINKS, No. 23

AN OUTPUT FILTER.



Here is a very simple circuit—that of a filter for separating the steady plate current from the loudspeaker—with one of its "components" missing. Can you fill it in, and state the value required?

SEE THE ANSWERING DIAGRAM NEXT WEEK.

CAPACITY OF A DIFFERENTIAL.

B. D. (Dover Street, W.1).—"In the case of a differential condenser, is the capacity supposed to be like that of an ordinary ·0005 variable? I mean, if it is a ·0001, does that mean that there is a ·0001 capacity between the moving plate and only one of the fixed plates, or does it mean that the capacity of the whole arrangement—two fixed and one moving—is ·0001?"

The shape of a condenser of this type (differential) is such that the moving vanes are never turned out to a true minimum position. They move across from being fully opposite to one set of fixed plates (maximum) to the position where they are fully disengaged from that set; but in this position, which should have been the minimum, they are fully engaged with the second set of fixed plates.

In this way the moving plates are active all the time.

Therefore, the capacity of such a condenser is reckoned at the total capacity between the moving vanes and either one or other of the sets of fixed plates.

THE DETECTOR'S PLATE VOLTAGE.

W. C. E. (Doncaster).—"Using the 'Magic' (with a few ideas and alterations of my own of course!) I have hotted up the short-wave side, and then came across a queer thing with one of my valves.

"I have two of the same make and type, and I find that while one of them works best with about 50 volts H.T., the other is almost as good at that voltage, but definitely *better* if I drop down to about 18 volts.

(*Continued on page* 846.)

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 844.)

"Knowing this to be unusual I tried the voltmeter, etc., carefully, and I am sure that the actual plate-to-filament volts in one case are more than double that needed for the other for best results.

"Does that indicate a specially good valve, or what?"

It simply means that the valve in question is a little out of the ordinary and with a fairly low plate voltage it makes a better detector than most.

The voltage named is not really out of the way, and excellent rectification can be obtained with far lower voltages than this. So if 18 is the best working point for detection with that valve we should simply stick to that voltage and be grateful for finding a good detector.

The situation on short waves is exactly the same as for ordinary wavelengths, except that as weaker programmes are usually being dealt with, any detector peculiarities will be more apparent on short than on ordinary wavelengths.

LOW-FREQUENCY INSTABILITY.

D. F. (Hounslow).—"How does low-frequency instability in a 3-valve battery set show itself, and what are the cures for it?"

Here are some of the symptoms:

(1) A continuous howl, the howl taking the form of a musical note, which does not vary with the tuning adjustment.

(2) Very bad distortion, frequently accompanied by a rushing or noisy background, which, in many cases, indicates that the L.F. stages are oscillating at an inaudible frequency.

(3) "Motor-boating," which takes the form of a noise not unlike that of a single-cylinder petrol engine, that is, a steady pop, pop, pop.

In the majority of cases L.F. oscillation is due to a coupling effect in the H.T. supply circuit. It is, therefore, necessary first of all to make sure that the source of H.T. is "clean." If dry cell H.T. batteries are employed, the voltage should be taken with the aid of a high-resistance voltmeter, after the set has been working for some time.

The fact that the battery is a new one does not prove that it is in perfect condition, since dry cells deteriorate if they are kept in stock, even though they are not in use.

In addition, a single defective cell can in itself produce L.F. troubles.

H.T. accumulators can cause trouble if they are in a partly run-down condition, or if any of the cells are sulphated, or there are poor connections between the cells. All contacts on top of the batteries must be kept perfectly clean.

If the H.T. is found to be up to the standard, the following schemes should be tried:

(1) Reverse the leads to the secondary terminals of one of the L.F. transformers.

(2) Earth the cores of both transformers.

(3) Connect a ·25-meg. resistance across one of the secondary windings.

(4) In the case of R.C. coupling, try reducing the size of the coupling condenser or of reducing the value of the grid resistance.

(5) Insert a ·25-megohm resistance in series with the lead to the grid terminal of each L.F. valveholder.

It should be pointed out that an output filter unit with one side of the loudspeaker taken to L.T.— is a very useful method of improving the stability of the L.F. stages.

Perhaps one of the best schemes is to insert an "anti-motor-boating" device in series in the H.T. lead of the detector valve. The procedure is as follows:

The lead which goes from the detector valve H.T.+ terminal on the set to the primary of the L.F. transformer should be broken.

A resistance of 20,000 to 40,000 ohms is now inserted between this H.T.+ terminal and the L.F. transformer primary terminal.

A lead is taken from the side of the resistance which is joined to the primary terminal to a 4-mfd. condenser. The other side of the condenser is connected to H.T.—.

This scheme can be employed externally to the set by those who do not wish to interfere with the wiring of the receiver.

In this case the resistance would be inserted between the H.T.+ lead from the H.T. supply and the detector H.T.+ terminal on the terminal strip. The condenser would then be connected to the H.T.+ terminal on the strip and the H.T.—.

A MICROPHONIC HOWL.

In the case of receivers incorporating two L.F. stages the inclusion of another resistance and condenser connected in the H.T. feed to the first L.F. valve in the same manner as described for the detector is often beneficial. In this case the resistance should be 10,000 to 20,000 ohms, and the condenser 2 mfd.

Next, we have the case of a howl which gradually builds up to such a strength that finally it becomes necessary to switch off the set. When the set is again switched on, it will quite probably work satisfactorily for a short time, and then the howl will again start, gradually increasing in volume until it becomes unbearable. This is caused by a microphonic valve—usually the detector.

The remedy is to shield or insulate the troublesome valve from all external vibration.

A sprung valveholder is essential, and it is necessary to keep the loudspeaker well away from the set itself, since the sound waves produce the howl by impinging on the valve.

It is a good scheme to change the vibration period of the valve by placing a piece of plasticene on the bulb, and embedding in the plasticene a small piece of lead or a coin. Padding the valve with a layer of cotton wool is another remedy.

The R.C. type of valve is a very frequent offender, and it sometimes pays to make a complete change to one of a less sensitive nature, such as an "H.F." or general-purpose valve.

"P.W." PANEL. No. 48. Adjacent Aerials.

When two or more aerials are necessarily placed near together (as in the gardens of a row of adjoining houses), there is likely to be interaction between them.

* * *

This interaction will be especially noticeable if one or both sets use reaction; and will be more liable to occur in the absence of S.G. amplification preceding the detector.

* * *

Such interaction may distort, weaken, or sometimes strengthen the neighbour's reception, and will make sharp tuning difficult.

* * *

To minimise the effects keep the aerials as far apart as possible and do not share the earth-plate.

FOR THE LISTENER

(Continued from page 814.)

One loses the keen edge of appetite, and one's palate becomes less sensitive.

Most of you will have felt this at one time or another. You are surfeited. The ear is jaded. Imagination becomes dull by over-use. The remedy, obviously, is to stop listening for a while; to send your set down to the radio shop for overhaul, and cut yourself off from the talking, singing, fiddling universe.

It may therefore have been because I had been listening too much that I found myself constantly switching off. I even switched off in the middle of a vaudeville programme, at a sketch called "Who's Who," which, although Hulbert and Frankau were in it, seemed to me to be dreary stuff.

"What I Would Do."

You will have forgotten it by this, and I cannot offer you any reason why you should remember it. I switched off in the middle of the Ridgeway Parade, being irritated because everybody was so boisterous that I couldn't hear a word they said. And, unhappily, so on and so on.

But I really feel that I cannot take all the blame to myself. I think the programmes have latterly been duller than usual. I think, for example, that the series of Talks on "What I would do with the world" has outstayed its welcome. It should be summarily stopped.

It was interesting to begin with, but it has become redundant and futile. I found myself not caring two straws what Sir Basil Blackett would do with the world, for both he and I knew that he couldn't do it. The lack of the sense of humour in these prophetic gentlemen has been amazing.

Too Many "Series."

The first thing I would do with the world would be to let Harold Nicolson out of the strait-jacket into which the B.B.C. has clapped him, and which woefully cramps his style, and let him go mad again on his own lines. I think the Adult Education business is being overdone, and should be relegated to the dance music period, after closing-time, when I am in bed. The B.B.C. as a schoolmaster in cap and gown is an excellent fellow, but a trifle on the heavy side.

There are too many "series" in the programmes, too much routine; too much organisation, and too little fresh imagination, so that it tends to become like a magazine full of serial tales, disappointing to some because they don't like the tale, and to others because, when they dip into it they find the tale half-told.

It is, I feel, becoming increasingly evident that one of the dangers of the B.B.C., from the listener's point of view, is that, like other monopolies, it suffers from lack of competition.

ORGANISED MORSE FOR AMATEURS

By W.L.S.

THE Radio Society of Great Britain will have its latest scheme in full working order by the time this short note appears in print.

Would-be Morse enthusiasts have been clamouring for some time for a station to give them slow code transmissions for practice, and R.S.G.B. members all over the country have arranged a schedule by which this will be possible.

The transmissions will take place in all the various amateur bands on Sunday mornings, between 9 a.m. and 1 p.m. Generally speaking, the Midlands and North will be "on the air" on December 6th, 20th; January 3rd, 17th, 31st, etc., while London and Scotland will be transmitting on the alternate Sundays, December 13th, 27th; January 10th, 24th, and so on.

The Full Schedule.

The full schedule is not yet arranged, but it is certain that there will be at least one transmission on each wave-band, and that South London, and probably North as well, will use the 160-metre band between 10 and 10.30 a.m.

It is probable that announcements on telephony will precede each Morse practice transmission.

Reports sent to me, c/o "P.W.," will be appreciated, and will be forwarded to the proper quarter.

TECHNICAL NOTES.

Some diverse and informative jottings about interesting aspects of radio reception.

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

Tracing Faults by Touch.

IF anything goes wrong with the set, you can often find out a good deal by touching different parts of the circuit with your finger. Some people go on the plan of pulling all flexible leads and pushing everything else, but this is not scientific and is really very unwise.

You don't want to create a second fault in the process of curing the first one; that distinction is usually left to the plumber. If you tug about at the wires in the set you are more than likely to start a break somewhere and to make things worse than they were when you started. As regards the test by touching different parts with your finger, however, if this is done carefully it is often easy to form an opinion as to the seat of the trouble without any danger of doing further damage.

Looking for Trouble.

For instance, in a set which I was examining recently in which the fault proved to be a grid leak disconnection, this was almost immediately rendered evident by touching the two ends of the leak. When the end remote from the grid was touched (which was the end which was disconnected) there was an improvement in the signal strength, whilst when the opposite end of the leak was touched with the finger the improvement was much more marked.

The connections were put right and the set was then perfectly normal again. Now this particular fault was one which might have been not at all easy to discover without the use of this very simple test.

You can go a long way towards finding the cause of any trouble in the set and also make your survey very quickly by touching various parts in this way and particularly parts connected to the grids of the different valves. If the grid of the detector valve is touched you get a peculiar sound from the loudspeaker which you will very soon learn to recognise.

In fact, it is not a bad plan to go over the set in this way even when it is working normally and accustom yourself to the effects produced on touching different parts of the circuit. Then if anything goes wrong and you go over the set in the same way, you will find it comparatively easy to judge where the fault lies.

Use a Pencil.

But don't poke about inside the receiver with a naked metal object, such as a brass rod or a piece of copper wire. If you do this you are almost certain to cause a short-circuit and it may do all kinds of serious damage to the set and the batteries.

I am assuming that the batteries are "on," because it is only when the set is in operation that you can make tests of this kind. If you want to touch parts of the receiver which you cannot easily get at by hand, a lead pencil (of the ordinary kind with the wood covering) is very useful, because the wood forms an insulation and covers the whole of the lead except at the tip.

If you place your finger on the top end of the pencil, so as to touch the exposed part of the lead, then this makes a fairly high resistance connection between your finger and anything which is touched by the tip of the pencil at the other end. Although the resistance of the pencil is fairly high as compared with a metal conductor, it is quite suitable for tests such as those indicated above.

But don't use this method of testing for mains sets! It is only suitable for small receivers using a 100 or so volt battery for H.T.

Minimum Effect of Frame.

Now that high-frequency amplification is so easily available by means of efficient screened-grid valves, the popularity of frame aerials is increasing. A good many people use the loop aerial not only because of its convenience, but for the specific object of cutting out local stations in order to be free to receive distant ones.

The frame has, of course, a maximum response when "edge-on" to the waves and minimum when "broadside on." The

(*Continued on page 852.*)

TECHNICAL NOTES

(Continued from page 850.)

minimum, however, is not always so small as might be desired and clearly, if you are using the frame in a position to cut out a local station, the smaller the minimum the better your object will be achieved.

According to the simple theory of the frame aerial the frame relies entirely upon the *magnetic* component in the electro-magnetic radio waves, but if this were the case it ought to be possible to arrange matters so that the minimum should, in fact, be zero.

Unfortunately, however, the frame acts in addition as an ordinary line aerial and in that way picks up some of the *electric* component of the waves. It is due to this cause (amongst others) that the minimum position is never truly zero; in fact, in some cases it is very far from zero.

Live Aerial Effect.

It has been found in experiments upon frame aerials used for marine and aeronautical direction-finding work that the minimum response can be reduced very much further by shielding the frame, much after the manner in which components in the receiving set are shielded. Various experiments were tried in this direction; for one thing the frame was enclosed in a metal box from which the two broad sides were completely removed, leaving a sort of broad metal strip around the frame parallel to the windings of the frame itself.

This strip, by the way, was cut across (parallel to the axis of the frame) so that it was not a continuous electrical loop. Even in these circumstances, however, it was found that the shield absorbed a large part of the energy and, although it had the effect of reducing the minimum response, it lowered very greatly the whole efficiency of the aerial.

Other similar arrangements were tried, but the one which was finally discovered to be the best consisted of a series of wire loops, very similar to the actual windings of the frame, but only about one-third as many in number, supported outside the frame and parallel to the windings at a distance of about a couple of inches away from them.

Cutting Out Local Interference.

As before, these windings were all cut across and bridged together mechanically by the insertion of a small strip of insulating material. This arrangement was found to be very effective in that it cut down the minimum response almost to zero and did not appreciably lessen the maximum response of the aerial.

An arrangement of this kind has been found very useful for cutting out persistent and annoying interference from such local sources as electric trams and trains, flashing advertising signs and so on. It seems likely that with the great improvements in shielding we may expect in the near future to find the frame aerial correspondingly improved so that full use may be made of its remarkable directional properties.

Is a Rejector Necessary?

It often happens that an ordinary type of fairly simple receiver is quite all right as regards volume of reproduction and quality but it suffers from a good deal of background from the local station, and perhaps other fairly nearby stations, due to lack of selectivity. There are, of course, various remedies for this, one being the introduction of a suitable rejector into the aerial circuit, which will have the effect of reducing the strength of the local interfering stations.

Simpler Remedies.

It may be, however, that you do not want to go to the length of fitting in a rejector and sometimes a simpler dodge will be quite sufficient to get over the trouble. You may find, for instance, that if you connect the aerial to a selected point on the aerial tuning coil, generally fairly near to the earthed end of the same, this will give you good enough results and you will not need the rejector.

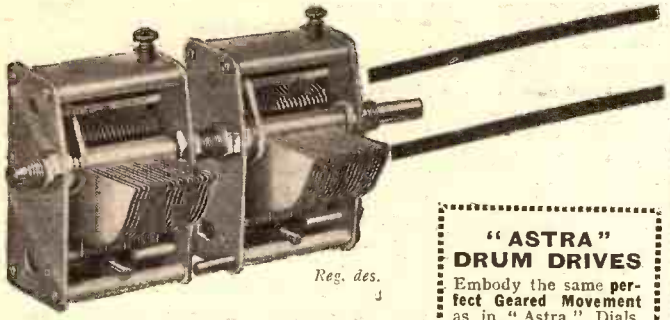
The actual point will need to be found by experiment and once the best position on the tuning coil has been found, you can solder a wire to the point.

Sometimes, again, you will find that you get all you want by introducing a fixed or semi-fixed condenser into the aerial circuit, the setting of this condenser being again a matter which must be determined by actual trial. I have known many cases where a simple dodge of this kind has proved remarkably effective in improving selectivity, or at any rate in cutting out the background of local stations.

Output Filter or Transformer?

I was talking recently about the question of output circuits and a number of readers want to know which it is better to use, a transformer or an output filter.

(Continued on page 854.)



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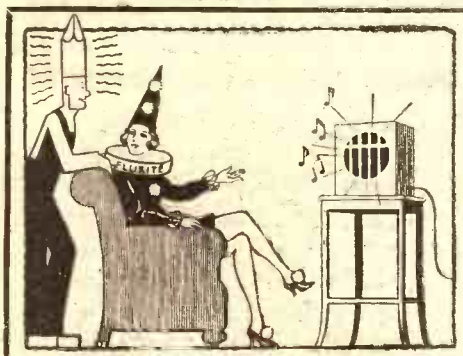

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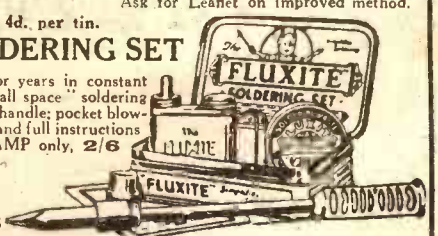

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TECHNICAL NOTES

(*Continued from page* 852.)

On this question it is not very easy to give a hard-and-fast decision; some people favour the one type of output circuit and some the other. Generally speaking, however, I think you may say that if you are using a low resistance speaker such as a moving-coil speaker (or for that matter any other speaker having a low resistance), the transformer output will be found most suitable.

In this case the secondary of the transformer should preferably match the impedance of the windings of the loudspeaker. For an ordinary type of speaker, such as a cone or horn type, or wherever the resistance is fairly high, it is probably simpler to use the choke-filter output circuit, because then it is not necessary to match the impedance of the output circuit with that of the loudspeaker.

Trouble with Components.

It is surprising how some of the simplest components in a set give the most trouble. For instance, you would hardly expect that an ordinary switch, such as a filament switch, would leave much room for trouble.

It seems to me a fairly simple matter to make a switch which will simply connect or disconnect the filament. Nevertheless, I know, from my own experience, and from what I am told by other people, that trouble with switches of this kind is very common indeed.

Usually the trouble takes the form of a bad or intermittent contact which, if anything, if more irritating than complete disconnection. If there is a bad contact, you get awful scratching and crackling noises, especially when the switch is touched, and with the type of switch in which the plunger can be rotated, you often get the same sort of thing if this is moved in any way.

If you have this kind of trouble in a set, much the best thing, when a plunger type switch is used, is to pull out the switch, remove the plunger, and then bend the springs slightly so as to make sure that they press firmly against the metal part of the plunger. If they are then carefully cleaned before being re-assembled, you should have no further trouble.

Switch with Coil.

If a switch of this kind is used in connection with a tuning coil it is even more aggravating, because you do not at once suspect the trouble as being due to the switch. For instance, when a long-wave section is short-circuited by a switch, you may get peculiarities in the control and broad tuning, owing to the fact that the switch is not acting as a short-circuit, but merely as a high-resistance across the coil.

I had a very irritating experience recently with the dynamo charging switch on the dashboard of a motor-car. In this case a charging current of about 15 amps. was being carried and the first hint of trouble I had was the smell of burning or scorching insulating fibre.

The switch is a very similar type to those used as filament switches in radio sets, and I found on examining the copper springs that they were almost completely oxidised. I expect the fact of the matter was that there had been a miniature arc every now and again inside the switch. Of course, you won't get anything as bad as this with a radio set, but it is equally annoying and, as I say, there is no excuse whatever for a simple thing like a switch not doing its job properly.

Astatic Coils.

In connection with a receiver having, say, two or three tuned circuits, a question which I am often asked is whether it is better to use astatic coils or ordinary plain coils. The advantage of the astatic coil, of course, is that the external field is reduced to small proportions, and as far as this goes it is all to the good.

At the same time the resistance of such a coil is naturally somewhat higher than that of the corresponding coil of the plain variety, but on the other hand the shielding which is, as a rule, necessary with the plain coil puts up its effective resistance, so that on balance it comes to pretty much the same thing.

Importance of Layout.

The arrangement of the long-wave and short-wave coils is naturally very important in the layout of the set. When using astatic coils you will generally find that you get a much greater freedom from instability, but whether this is due to the cutting-down of the external field or to the high resistance of the coils is a matter of opinion.

A good many people seem to be rather shy of astatic coils for some reason or other; personally I have found certain types of these coils very satisfactory in practice. I should mention, however, that in a good many such coils the external field is quite appreciable, much greater than you might be led to believe.

CUTTING DOWN HUM

By H. A. RAMPTON.

OF all the troubles that come to perplex the mains-set-builder, the most annoying is a persistent hum that resists all efforts to remove it.

To trace it to its source is by no means easy, and if there are three or four components, or combinations of components, all contributing to make listening a nightmare, one can juggle with the interior of the set till Doomsday without being any "forrader."

The only way to tackle a fault of this kind is by a stage by stage test, which simply means trying the detector stage by itself, then adding each L.F., and following with the H.F. stages.

Watch the Earth Lead.

This, however, assumes that aerial, earth, eliminator, and loudspeaker are O.K. Points to watch out for in connection with the aerial are: keep the lead-in well away from the ingoing mains connection to the eliminator, see that it does not run close to wires behind the wall, which is extremely likely if you use the power plug, and keep it away from the loudspeaker leads. If you use an energised model moving-coil, keep it away from the mains feed to this also.

You must watch out for these faults with regard to the earth lead as well. In addition a poor earth connection is quite a likely cause of hum. A dodge worth trying is a fixed condenser in the earth lead—keep it large or you may lose volume and acquire hand-capacity effects.

A friend of mine who bought an eliminator got a most appalling hum from it. A low, deep note. I cured this by the very simple process of laying a heavy book on the container. There was then only a tiny high-pitched sound from the inside, scarcely audible, which could not be heard when the programme was on.

However, if the noise is loud, then there is something wrong inside. Of course, this noise is mechanical and does not pass through the set at all, coming straight from the faulty component.

Loose Laminations.

It sometimes happens that, though it comes from the eliminator, the loudspeaker baffle gets hold of it with the result that the impression is received that it comes from the loudspeaker!

The hum is due to loose laminations in the mains transformer or in the smoothing choke. Often this is easily reduced (not necessarily removed altogether) by tightening them up.

While you have the metal case off, just make sure that the cores of the mains transformer and smoothing choke are at right angles. They are practically sure to be in a commercial unit (if they are not, write to the makers before altering them). In the case of a home-built eliminator, turn one of them round, or lay it on its side and see what difference it makes.

(Continued on next page.)

STOCKINGS I WOULD LIKE TO FILL

(Continued from page 805.)

the jolly old mistletoe. No, I think I had better make it a pair of uppers for Gran'ma.

Clapham and Dwyer would do doubt appreciate a dose of powdered glass for Cissie the cow. She would then deliver her milk already done up in sealed bottles.

And "Tommy" Handley, now what could I give him? He is such a popular chap that he has presents absolutely showered on him. Already he has nearly every blessed thing you can think of. The only way out seems to be to give him the coupons and let him do the choosing himself—if Mrs. "Tommy" will let him!

To the B.B.C. I should send some nice cards, not last year's or Woolworths,

NEXT WEEK

Among the articles in next week's "P.W." will be

ADDING A VALVE TO THE S.Q. STAR

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wishing a better and brighter Christmas. Finally, to myself I should give a little poem which I call:

"END PIECE."

(With utter apologies to "Pinafore.")

When I was a baby I howled so strong
People thought their wireless had gone wrong;
And though so young I could not walk
I'd do nothing else but talk, talk, talk.
I wouldn't put a sock in it; and, pa said he:
He'll either go to Borstal or the B.B.C.
I trained my voice to be quate nace,
And dotted my T's and crossed my I's,
And fat stock prices learned to state
And wish everybody "Good-nate—Good-nate."
I was so syrupy that ma, said she:
Sonny boy, I'll send you to the B.B.C.
I felt so nervous I must own
To find myself before a microphone,
In a nice clean collar and a brand new suit;
So I gave impersonations of a well-known fruit.
And the audience up there laughed with glee,
And I became a comic at the B.B.C. (Dance and Exit.).

CUTTING DOWN HUM

(Continued from previous page.)

In some cases hum has been traced to the mains transformer having inadequate insulation between the H.T. and L.T. windings, or to a high capacity between them. For "free grid bias" the biasing resistance must have a large condenser connected across it.

The Question of Position.

Two or 4 mfd. is about right. Other things to try are alteration to the grid decoupling if used; for instance, a higher resistance should be tried.

It is not enough merely to have the eliminator components in a metal case. It should be kept, as a rule, well away from the rest of the set, and the nearer to the set it is placed the more attention must be paid to adequate screening of the set components.

For instance, interaction can take place between any of the transformers and chokes in the set with those in the eliminator, or with the tuning coils or with the wiring.

Transformers and Wiring.

The transformers, etc., should have their cores earthed, or alternatively should be shrouded with an earthed shield, for not only are they liable to pick-up from this source, but there are also those wires behind the walls to be considered again.

The position of the tuning coils must be carefully chosen, while the general wiring of the set is absolutely the most important thing in the attainment of quiet reception. With a mains set you must either stick to a design or know what you are doing.

Filament wires for mains valves must be run close together from valve to valve, and if you use twin flex you cannot be anything else but close. A good idea here is to use a metal-covered baseboard, with a couple of pieces of wood underneath to hold it off ground level. Run the filament wires under this and pop up through the metal of the baseboard to each filament terminal, and then down again to the next one.

However much juggling you do with the circuit you won't need to alter this, unless, of course, you add a valve.

The connections between the detector grid leak, the grid condenser, and the valve holder are a common source of trouble, being readily responsive to stray fields from the eliminator apparatus. Keep these wires very short indeed.

Detector Hints.

The detector valve itself may be guilty of pick-up from the rectifier valve if the two are placed near each other, and the detector can either have a special valve shield, or better still, be enclosed in a metal box with its leak and condenser; or, if you have not yet bought your valves, you can forestall trouble by purchasing those metallised valves which already have a protective shield around them.

Incidentally, hum from the detector can often be cured by using a lower value of grid leak or by dosing the valve with a little extra positive bias on its grid.

Returning to the eliminator, do not try to obtain more current from it than it is rated to supply, for besides being bad for transformer and rectifier, the smoothing

(Continued on next page.)

CUTTING DOWN HUM.

(*Continued from previous page.*)

choke or chokes are probably being overloaded with the result that they do not smooth!

If you built up your own mains equipment, make sure that the choke or chokes are capable of handling the current they have to pass. It is not a question of whether they heat up or not, because their effectiveness depends on their inductance, which is often very great with no current, but directly you start to take current their inductance falls with a bump. If it falls too far the choke might as well not be there.

Output Stage Smoothing.

It is useful to remember, though, that the output stage needs considerably less smoothing than the other stages because no amplification follows it. If you want extra smoothing, therefore, you can get a comparatively cheap choke that will have only to handle the current from the detector (the greatest offender), or sometimes of the H.F. stage and first L.F.

The current of these three will then probably be less than the output valve by itself so that a high inductance choke can be used in the H.T. lead to these valves in the usual manner.

Trouble from the speaker is more likely in a moving-coil than any other type. In the first place, a 50 or 100 cycle hum may show up not because it was not there previously, but because when a balanced armature speaker was used this was not capable of producing the low notes. An output choke or transformer is a necessity with this kind of speaker, though it is undoubtedly of considerable service with other kinds.

If you are sure about these two points, the hum may be due to loose turns in the pot winding of the speaker or a loose joint somewhere. Unless you made the speaker yourself I should advise taking the matter up with the makers. But be sure about where the hum comes from first!

Points about Joints.

Hum in an M.C. speaker can often be cured by connecting the ubiquitous condenser across the windings. Values to use are 2- or 4-mfd. for a high voltage winding, and an electrolytic condenser of about 1,500 mfd. (that's *not* a misprint!) for a low-voltage winding.

I started off about systematic tests but undoubtedly the subject is more fascinating from this standpoint; and though dealing, as I said, with aerial, earth, eliminator, and speaker, I have had to encroach into the internals of the set to illustrate certain points, so that little seems to be left of the set to be dealt with.

A very important point is that any high-resistance connections may give rise to hum, so examine all your joints. I am always strongly suspicious of my own soldered joints.

Another thing is this: try a larger condenser across the H.F. biassing resistance if you use "free G.B."

Now there are four excellent cures for hum which I certainly must not leave out.

First, modulation hum which appears much louder when you have actually tuned

(*Continued on next page.*)

CUTTING DOWN HUM

(Continued from previous page.)

in a station. Mostly due to trouble in the grid circuit of the detector or H.F. valve, and it can be cured by increasing the value of the condenser across the biasing resistance up to 4 mfd.

By-Pass Condensers.

With a valve rectifier, this may generate oscillations on its own account. As you probably know, the anodes of the full-wave valve are connected to each end of the transformer H.T. winding—the centre-tap being the negative end. One cure I have found is a couple of ·01-mfd. condensers.

Connect one condenser between one of the anode and one of the rectifier valve's heater terminals. Do likewise with the other condenser and the other anode and heater terminals. To allow a safety margin, these condensers must be at least 500 volts working voltage.

Another good hum reducer is to connect two ·01-mfd. condensers in series across the mains supply, the join between the two being taken to earth.

H.F. currents in the mains can be cured by earthing one of the leads through a condenser. A value of ·01-mfd. is often used, but values right down to ·0005 may be found useful. The only condition is that the condenser must be able to stand double or treble the voltage of the mains, which is generally about 200 to 250 volts.

The Potentiometer Dodge.

Finally, a well-known little dodge. It is a fact that the centre-tapping on mains transformers is seldom dead exact, thus one does not get truly to the "bottom" of the circuit. By connecting a potentiometer resistance of about 40 ohms across the filament winding of the transformer, an artificial centre-tap can be obtained and the "centre-tapping" can be moved about till the quietest spot is found.

On manufactured eliminators the orthodox centre-tapping is marked C or Cathode, so, of course, all connections to this must be removed or transferred to the artificial tapping, otherwise things might happen!

It should be mentioned that with a set using trickle-charged accumulators for L.T. no hum is likely from this source if the trickle-charger is out of action when the set is working. Owners of such equipment should confine themselves to the H.T. part of the set, and interaction troubles, of which, in truth, there are quite enough for which to look.

MY RADIO MEMORIES.

(Continued from page 790.)

They would be sufficiently rapid then to excite our sense-organ the eye, and give us the sensation of a strong yellow light: for what we call light is just an etherial vibration excited by an electric oscillation of this extravagant frequency.

Still we didn't know how to produce these oscillations, and still less how to detect them. FitzGerald virtually said that the oscillations were there whenever a Leyden jar discharged.

A Great Pioneer.

On what ground was he able to make that assertion? How did he know that an electrical oscillation would generate ether waves just as a tuning-fork generates sound waves?

He only knew that on the strength of the work of a great genius, James Clerk Maxwell, who in 1865 communicated papers to the Royal Society, and to the British Association a year or two later, giving the result of his mathematical theory of Faraday's views on electromagnetic phenomena.

Maxwell's equations expressing electric and magnetic relations were, and still are, of the utmost importance. They are not expressed in the simplest possible form, but they are remarkably complete.

Simplification came later. But as a foundation for all the work that followed during the century, Maxwell's equations are the basis, and shine with undiminished brightness down to the present day.

This leads me to make a digression on the work and methods of mathematical physicists. Their plan in studying any phenomenon is to bethink themselves of what is the fundamental fact or process underlying it.

They express that process in what to them is the simple form of an equation, and having written down equations appropriate to each aspect of the phenomenon, they proceed to combine these equations according to certain rules, the rules of pure mathematics, and deduce the consequences.

Genius Required.

It is not a process that comes naturally to ordinary people; indeed, they find a difficulty in following it. When they do follow it, they are apt to be lost in admiration, first for the insight which enabled them to express the fundamental laws in that tractable form, and next for the skill with which the forms have been manipulated, so that results could be interpreted which might subsequently be put to the test of experiment and thus verified.

Verification is always necessary because, though the theory may be accurate as far as it goes, it never goes all the way, and it may fail in not going far enough.

A complete theory of any phenomenon would have to take all the universe into account, but no one aims at such a complete theory; they take the most essential features of what is happening and ignore the rest.

It takes some genius to perceive what the most essential features are, and to judge whether the other things may be ignored or not.

When the theory fails to be verified in practice, it means either that some error

(Continued on next page.)

MY RADIO MEMORIES

(Continued from previous page.)

has been made in the calculation, or, more probably, that something has been ignored which ought not to have been ignored. Thus, for instance, to take a trivial example:

Professor Tait, the great mathematician of Edinburgh, calculated the trajectory of a golf-ball, taking into account a good number of the causes governing it—the impact of the head of the club, the inertia and elasticity of the ball, the resistance of the air, the force of gravity, and so on.

Something Missing.

His first theory gave him a maximum range which no one, however skilled, could hope to exceed. Then, as is well known, his son, Lieutenant Tait, a skilled golfer, exceeded it. What did Tait do? He didn't abandon the theory; he perceived that something more must be taken into account.

What he had ignored as unimportant was the spin on the ball. A ball when struck except in a line exactly through its centre, will not only move forward but will be set spinning.

Everyone knows the effect of spin on a billiard ball. A skilled player purposely puts it on, by the way he strikes the ball; it will then rebound from the cushion or from another ball in a way different from what it would if it were not spinning.

A spinning ball might move in a curved line. But then a billiard ball is rolling on a table, a golf ball is not. Still it may be rolling on the air through which it is moving. Tait perceived that the spin must not be ignored, but must be fully taken into account.

He remodelled his theory, writing down some more equations to take the spin energy into consideration.

He thus made a more complete theory, which led to curious results, most of which have now been verified by experiment. The practice and the theory agreed to a sufficient approximation, and the theory is then said to be complete.

Just an Illustration.

I am only taking this as a typical instance of the way in which mathematics is applied to physics, to secure in this instance a trivial result. Of course, a mathematician might have taken the whole into account at first, and then the theory would have been complete from the beginning, and there would have been nothing to correct afterwards.

That was the kind of way in which Newton proceeded. When he gave his theory of astronomy based upon gravitation, he took the heavenly bodies first as particles, then as spheres, and thus arrived at a first approximation of the theory of their motions.

But he knew that the earth itself could not be a sphere, because it was spinning on its axis: it must be an oblate spheroid. That had never been observed, but Newton predicted that it was so, and proceeded to trace the remote consequences of the shape of the earth.

He found that it accounted for "the precession of the Equinoxes," which have been known as an empirical fact to the Ancients. Copernicus had said that pre-

(Continued on next page.)

MY RADIO MEMORIES

(Continued from previous page.)

cession must represent a conical motion of the earth's axis; but no one knew any cause for such a conical motion.

Newton with his extraordinary genius perceived that a conical motion, very slow and taking thousands of years for its revolution, would be the exact result following from the pull of gravitation as an oblate spheroid.

A spheroid would not act as if all its mass were concentrated at its centre, it would be more complicated than that. He was not deterred by the complications, but worked them out and completed his theory. This constituted the basis of the theory developed by Prof. H. A. Loventor for the spectroscopic phenomenon discovered by Prof. Zeeman of Amsterdam.

Explaining the Tides.

Another thing that had been ignored in the first view of astronomy was the size and plasticity of the bodies: they were treated as particles or rigid bodies, and this gave the first approximation.

But obviously the earth is not a particle, but a body of considerable size, so that some parts of it are appreciably nearer the sun or the moon than are the parts of the Antipodes.

Newton took the size into account, and thus was able to show that anything yielding or mobile on the surface of the earth, like the ocean, would have a motion distinct from the rest of the earth to a slight extent, and would go through an oscillation periodically.

This oscillation of the water on the earth he perceived would account for a phenomenon that had been known from antiquity, but had never been explained, namely the Tides.

He completed his theory by working out the tides in all their main detail, leaving it to others to show how great an effect tidal phenomena had had on the evolution of the universe.

This has been recently extended and applied by Sir James Jeans to the production of a solar system. He has shown mathematically that if a visiting sun entered our neighbourhood, coming within a reasonable distance of our sun, it would excite tides upon the sun, which might increase to such an extent as to throw out an explosion or protuberance.

Further Developments.

The history of this he followed up, and showed that it would presently aggregate into round bodies revolving round the earth, the bigger ones in the middle of the protuberance, the smaller ones at either end, and thus provide the sun with a system of planets, on one of which we happen to live.

Well, that is a further development of tidal theory, taking into account all the possibilities, or at any rate such of them as a genius is able to consider relative, and giving an idea which at present seems likely to hold against adverse criticism about the origin or creation of the earth and other planets.

This again is a digression, and I do not see how the theory is to be verified by experiment. All this development could not be done by one man: the genius who

(Continued on next page.)

MY RADIO MEMORIES.

(Continued from previous page.)

made it possible is Isaac Newton. The further developments of his theory were left to posterity.

In this work George Darwin, Albert Einstein, Arthur Eddington and James Jeans have distinguished themselves.

So it was also with Clerk Maxwell. He wrote down some equations which expressed what Faraday had long brooded over as the electrical field, regarding it as distinct from matter and existing in the ether of space around the charged body.

He also wrote down another set of equations expressing the magnetic field surrounding a current. And then he began to combine these, so as to see what an electromagnetic field would be like, that is to say a field which combined an electric displacement with a magnetic whirl.

A Difficult Problem.

Do not suppose that this was an easy thing to do, but Maxwell did it, and found (possibly to his surprise, possibly to a satisfaction of his instinct in that direction) that the equation he now got, a differential equation of the second order, was one that was familiar to him and to other mathematicians, namely, the equation to a wave—that is, a disturbance periodic in space and time, which advanced through space at a certain rate.

This rate was expressed by an electric and a magnetic constant of the ether, which were immeasurable; no one knows to this day how to measure them.

But the rate of propagation of the electromagnetic wave did not require the separate constants to be measured, nor need we know what each was; only their product entered into the expression.

Experiments made abroad, in Germany, had indicated a way of determining this product; Maxwell bethought himself of another method, and proceeded to put it into practice in the laboratory of King's College, London, where he was then a Professor.

He performed the experiment, worked out the result, and obtained a speed for the transmission of electromagnetic waves very close to the velocity of light.

It looked as if ether waves were just what we had been using all along for optical experiments and for arousing our sense of vision.

We had been discussing whether ether waves were possible; they were familiar; only we hadn't known they were electromagnetic.

Maxwell's Theory.

All manner of theories of light had been tried in the early part of the 19th century, very ingenious theories, depicting the ether as a kind of elastic solid or jelly, in which the vibrations travelled at an immense pace.

But none of these theories had been satisfactory. They covered the ground to a great extent, but they failed sooner or later. There were things we could not account for by any elastic solid theory.

But Maxwell's theory that light was not mechanical but was an electromagnetic phenomenon, that its laws were ascertainable by electric and magnetic experiments, was a tremendous eye-opener.

To be continued.

STATIONS WORTH HEARING

Some practical distant-programme notes compiled by a special contributor who nightly searches the ether in order to obtain really up-to-the-minute information for "P.W." readers.

LAST week I dealt mainly with the long waves and with the medium band down to a little below 300 metres. This week I want to call your attention to the numerous stations that are to be found below 300 metres when conditions are at all favourable.

The great bugbear down in those regions is spark interference and mush. At the time of writing, these two nuisances are not causing much trouble.

If you propose to devote an evening or part of an evening to the bottom of the medium band you can tell in a minute or two whether those wave-lengths are or are not adversely affected. Turn your tuning dials to zero or nearly so and advance reaction a little so that the set is sensitive but well away from oscillation.

Choosing a Good Chance.

Then make a slow sweep with the tuning dials up to about the thirtieth division, taking about a minute to reach this reading. Should your impression be one of a welter of sparks and heterodynes, put off the exploration until another evening; but if a good many stations, as you pass them, appear to be coming in clearly, then you can try with every hope of success for the interesting shorter wave-length stations.

One more tip. You may find that your set is distinctly unselective down in these regions. If your coils are of the plug-in variety put in a smaller set so that you can use more capacity in parallel. A similar use can be made of tappings, if these are present.

Starting at the minimum readings and working upwards, you may find Warsaw No. 2 at work on 214·2 metres. The next station worth attention is Konigsberg on 217 metres, and above that Fécamp on 219·9 metres is capable of providing good reception.

Nurnberg on 239 metres is generally a very powerful station and Stavanger on 240·6 metres will be picked up on a good night. On 247·7 metres is one of the most powerfully received European stations at the present time—Trieste.

Working upwards, Gleiwitz on 253 metres is almost always good, Toulouse P T T varies somewhat, but is generally worth hearing, and Horby can be relied upon for good reception. Leipzig on 259 metres is at most times too near the London National for any but the most selective sets, at any rate in the Midlands and South of England and the same applies to Moravska - Ostrava.

These stations, though, are always at work on Sunday evenings before the London National comes into operation, and then is the time to hear them. Lille on 265·4 metres is worth attention, and Rennes may also be added to the log. (272 metres).

Turin is now back on 274 metres, just below the immensely powerful Heilsberg. Heilsberg, by the way, is coming in so strongly that I have received him at three o'clock in the afternoon on a portable set. Just above Heilsberg is Bratislava on 279 metres.

Heilsberg and Hilversum.

This is a station which you are bound to hear if your selectivity is good enough to prevent Heilsberg from wiping it out. Copenhagen on 281 metres is seldom anything but a weak signal except in Scotland and the north of England.

On 293 metres is Kosice, whom I occasionally hear pretty well, and on 298·8 metres we have Hilversum, a daylight signal even with his present 8·5 kilowatts—and what he will be like when he goes up to 60 kilowatts, as he proposes to do, goodness only knows!

SHORT-WAVE NOTES

News and views regarding an exciting and fascinating wave-band. By W. L. S.

THIS "mystery station" business *never* comes to an end. It is a marvel to me that so many new stations can find the time and money to come out on the air for one or two days only!

Probably not in this category, but nevertheless interesting, is a station F V C N, reported by "D. P." of Chesterfield. This station works on 32 metres and transmits gramophone records.

"F V" was the prefix adopted by French amateurs who went into the Sahara with an expedition, so that possibly this "F V C N" hails from North Africa. Any definite particulars would be welcome.

And here is "N T," from Gillingham, with the news that the original 32-metre "mystery"—announcing Königswusterhausen—is *not* a relay from Zeesen at all. Can anyone explain *that* one?

Bagging Bandoeng.

"M. S.," of Harlow, who took up two paragraphs in these notes a few weeeks ago, is so bucked about it that he resents my congratulations to another reader! I finished off a comment on a log sent in by "A. E. B." (Leeds), by saying that he had also heard Bandoeng, and ended the paragraph with "Congrats."

"M. S." says: "Surely you don't congratulate anyone on receiving Bandoeng? Why, when I was *so* high . . ." and so on. No, as a matter of fact, the congratulations were on the "over-all" log. I quite agree that receiving Bandoeng may be regarded as child's play these days. But, even so, there are *some* that don't get him.

The first definite report on "My S.G. Four" has arrived from a reader in Kempston. He finds it O.K. on short waves, with the additional advantage that it receives 4,000-metre stuff if you take all the coils out and short the reaction plug!

"J. K." is troubled, however, with a violent hissing on short waves, which has been in evidence on all his receivers. It sounds rather like outside interference beyond your control, "J. K.," in which case you are unlucky.

"J. A.," of Bloemfontein, supplies us with some news "from the horse's mouth" about Johannesburg. The station, J B, works on 49·4 metres and relays Johannesburg's 450-metre programme. There is also a probability of the appearance of a transmission on 62 metres. Thanks, "J. A."

G 5 Z N would appreciate reports on his transmissions on 84 metres. These start at 23·15 G.M.T. on Saturdays, and detailed reports will be welcomed and acknowledged in the usual way. His full address is: P. Nicoll, Oak Hill, 167, Todmorden Road, Burnley, Lancs.

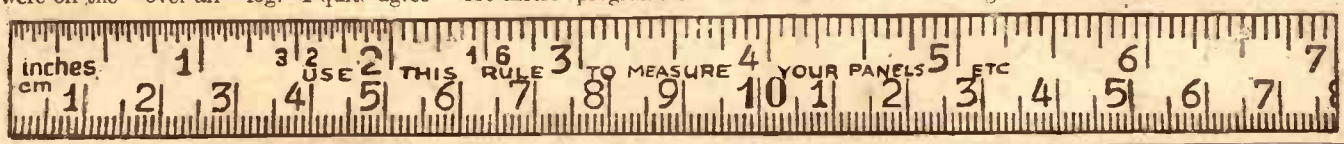
"J. M." (Bath) stirs things up a little with a report of the reception of Radio Chi-Hoa (Saigon, Indo-China). This station has been absent for a long time, but "J. M." received him between noon and 4 p.m. on 49·05 metres. General strength—good. Static—bad.

He finds V K 2 M E not so good since the winter schedule started. Receiver—needless to say—a "P.W." design.

A Bad Spell.

Having dealt with the batch of correspondence, I may as well say that I am not finding much of interest on the air nowadays. We undoubtedly have run into a bad spell of conditions, and we can't grumble after the excellent spring and summer. I only hope that DX will come back again before the holiday really arrives.

Finally, a very Happy Christmas to all my readers, be they "short-wavers," "medium-wavers" or "long-wavers." May their batteries never run down, their valves never burn out, and may their DX records be so good that no one will believe them!



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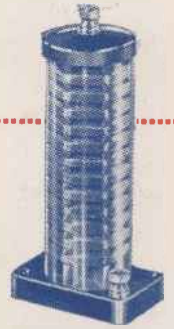

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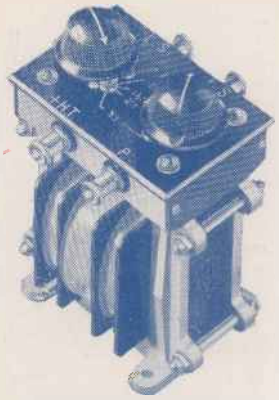

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