The expert is the critic... hypercritical in his demands, insistent on accuracy in all he does. Accuracy, reliability and utility he must have. That is why he uses 'AVO' Instruments. In these AvoMinors those same essential qualities are available to you. With either of these instruments you will feel that same confidence in your testing and trouble-tracking which the expert derives from use of the world-famous "AVO" accurate Testing Instruments.

The D.C. AVOMINOR
ELECTRICAL MEASURING INSTRUMENT

A high-grade 13-range combination meter, this instrument incorporates a fully jewelled moving-coil movement which ensures accurate readings. Its 13 ranges are adequate for the majority of circuit, battery and resistance tests. The total resistance of the meter is 100,000 ohms; full scale deflection of 300v. or 600v. is obtained for a current consumption of only 3 mA. and 6 mA. respectively.

CURRENT
0 - 6 milliam
0 - 12 milliam

VOLTAGE
0 - 15 v
0 - 30 v
0 - 60 v
0 - 150 v
0 - 300 v
0 - 600 v

RESISTANCE
0 - 10,000 ohms
0 - 3 megohms

In reset, complete with instruction booklet, leads, interchangeable crocodile clips and testing prods. 45/- Deferred Terms if desired.

The UNIVERSAL AVOMINOR
ELECTRICAL MEASURING INSTRUMENT

This A.C./D.C. moving-coil precision meter covers all normal A.C. and D.C. testing. It has 22 ranges for the measurement of A.C. Voltage, D.C. Voltage, Current and Resistance. Direct readings are given with great accuracy on a sin. scale. The total resistance of the instrument is 200,000 ohms.

Complete with leads, interchangeable crocodile clips and testing prods, and instruction booklet. 85 10s

The AVODAPLTER Valve Testing Holder
Simplifies valve testing. Enables valves to be tested under working conditions outside the set. Eliminates the need for severing connections and groping about inside the set. Instantly adaptable for 4-pin, 5-pin, and 7-pin valves. 27/-

9-pin AvoCOUPLER
An attachment for rendering the Avoister suitable for 9-pin valves. 12/6

9 Write for fully descriptive leaflets
Visit

RADIOLYMPIA

Aug. 23rd—Sept. 2nd 1939

Special Attractions

for the technically minded amateur

This year's Radiolympia will have considerably more interest for the techni-fan

Model Factory

The model factory, working under actual practical conditions, will show almost every process of radio manufacture—such as coil winding, wire covering, wire joining, grid making, spring making, R.F. Coil adjusting, resonance test, impedance comparison, inductance comparison, ganged condenser testing, cutting and forming wires of tubular condensers, engraving, test and assembly and dry battery manufacture. Experts will be in attendance to explain these processes, and to deal with any difficulties, such as interference, "fading," etc., to the serious-minded amateur. In addition, there will be a revolving drum, showing the complete chassis of many of the leading manufacturers' sets.

Technical Conventions

Technical conventions are being held in the Convention Hall on the four days August 28th to August 31st, inclusive. The following subjects will be discussed by experts, and the meetings will be open for general discussion.

(a) Short-wave technique.
(b) High quality reproduction.
(c) Television.
(d) General technical topics.

Many distinguished visitors will attend and address these meetings.

Radio Theatre

The radio theatre at Olympia, specially built at a cost of over £5,000, is a replica of the famous "bowl" theatre at Hollywood, and is the first theatre in the world to be designed and constructed expressly for broadcasting AND TELEVISION.

Broadcasting and Televising Every Day

See the batteries of cameras and microphones at work in the hands of the full staff of B.B.C. experts.

TELEVISION

Television is the keynote of Radiolympia 1939. Apart from the 64 sets constantly working in "Television Avenue," literally HUNDREDS of sets will be receiving continuously throughout the exhibition... This is the greatest demonstration of television the world has ever seen.

Come and Be Televised Yourself

Special facilities for organised technical parties

Please apply to Secretary for particulars of reduced price tickets, Convention tickets, etc.

Radio Manufacturers' Association

59, Russell Square, London, W.C.1

Telegrams: OIDARION, Westcent, London
Phone: MUSEUM 4031
The New "Practical Wireless"

As announced last week, this issue marks the first of a new series of Practical Wireless. It will be noted that it appears in a new and more attractive cover, and that many new features are to be introduced. We have considerably augmented our staff of contributors, with the object of still further improving the service we provide for our readers. A large proportion of our space this week is devoted to that important event Radiolympia, and thus many of the new features are unavoidably held over.

The great success of this journal since it was introduced seven years ago is one of the romances of journalism. It entered a field in which there was fierce competition for the readership of keen and intelligent experimenters all over the country. We introduced the solus policy of specifying only those parts actually used in receivers described; we backed up our claims regarding our sets with a guarantee of those parts actually used in receivers; we undertook to answer readers' letters free of charge; we produced a series of practical volumes dealing with all aspects of wireless construction to make good the lamentable omission which existed prior to publication of this journal. In these and many other ways we leapt over the wayside, and for the last five years, we have backed up our claims to the the Berne Convention and the U.S.A.

AN increase in the number of licensed listeners in British India is reported. At the end of May the figures were 75,524, representing an increase of over 21,000 during the year.

High Efficiency Mark

The S.P.I.R. of France has announced a scheme to give purchasers an indication of the quality of wireless receivers on sale. Those which obtain a required standard of efficiency in selectivity, sensitivity, and power and good selectivity, will in future be given a special "quality" mark.

European Exchange

A EUROPEAN exchange of old airs and dances between Sweden and Scotland will be broadcast on August 30th. Scotland's contribution will be made by the Strings of the B.B.C. Scottish Orchestra, led by Paul Loudall. The Scottish part will be conducted by Kenlo Stephen. These European exchanges have become more and more a feature of current broadcasting. Only a month ago the Stockholm Y.M.C.A. Male Voice Choir broadcast from Edinburgh. As a rule, nationals and friends of nationals living in Edinburgh are invited to come to the studio to see and hear the broadcast. Such broadcasts have excellent entertainment value and cultural value, and in time, to develop friendliness between countries.

Jack Wilson and His Versatile Five

On Saturday evening, September 2nd, Jack Wilson and his Versatile Five will play light music. Solo parts will be taken by Jack Wilson (piano) and Fred Adeck (violin). Formed over four years ago, this combination has had many broadcasts for Midland, National and Empire; and several of its members are also well known on the air as solo broadcasters.

Limited Varieties at Home

David Porter is producing another "Variety at Home" programme for Northern listeners on August 28th. It will include songs written and rendered by Diana Morrison, the famous tenor, and piano by Norman Whiteley; Roy Davey, the boy xylophonist; Taylor and Sharp (songs in harmony); and Les Crewsley and his Harmonicas. Henry Reed's Miniature Variety Orchestra will, as usual, provide the incidental and linking music.

A Concert of Elizabethan Music

A CONCERT of Elizabethan Music will be broadcast on Saturday 1st (Regional) in which the B.B.C. Singers, under their conductor Leslie Woodgate, and Andrew Morton (harpsichord) will take part. The programme includes madrigals from "The Triumphs of Oriana," sung by the B.B.C. Singers, and harpsichord pieces by William Byrd and John Mundy.

Motor-Cycle Grand Prix

That legion of listeners who are motor-cycle enthusiasts will have an opportunity, on August 26th, to hear described the thrilling race for the motor-cycle Grand Prix, run over the road course at Donington Park. In this enclosed circuit, which possesses all the characteristics of a road, many of the most famous motor-cycle competitors will take part for the "blue riband" of the motor-cycling world.
ROUND THE WORLD
OF WIRELESS—Continued

Belgian Medium-waver on Two Channels

Radio Ardennes, a small privately-owned broadcasting station at Libramont, in the Ardennes, transmits programmes in the French language daily from B.S.T. 07.00-0900 on 267.4 m. (1,121.6 kc/s), and from B.S.T. 17.00-19.00 on 208.6 m. (1,438 kc/s).

Finnish Life-savers Use Radio

Of the seaside beaches in Finland the Government has installed loudspeakers for the broadcast of radio entertainments; they are also brought into action to warn bathers who may be seen venturing too closely to the breakwaters or, if non-swimmers, who are likely to get out of their depth.

An Interesting Tour

Mr. H. V. Kaltenborn, one of the foremost representatives of the Columbia Broadcasting System, is reported to have started out from New York on an aeroplane tour of the most important Western and Central European cities. He is due to be back in America on September 1st. In the meantime, he proposes to visit Western and Central European cities.

Lucerne Broadcasts to the World

On the occasion of the Lucerne (Switzerland) Music Festival the concerts will be rebroadcast by Great Britain, Belgium, Denmark, Estonia, Finland, Hungary, Lithunia, Luxembourg, Norway, Poland, Sweden and the National Broadcasting Company of America. Listen to them on August 23rd, 27th and 29th.

"Let the People Sing"

The speaker chosen to read the second and nine subsequent instalments of J. B. Priestley's specially commissioned novel, "Let the People Sing," is Kevin Fitzgerald. Mr. Fitzgerald has made frequent appearances at the microphone; in addition to giving readings, he has prepared and broadcast several amusing talks, including a series entitled "Domestic Dramas."

"Cabarette"

A "Variety at Home" programme for Northern listeners on August 28th. It will include songs written and rendered by Diana Morrison accompanied on the piano by Norman Whiteley, Ray Davey, the boy xylophonist, Taylor and Sharp (songs in harmony), and Les Crossley and his Harmonica Rascals. Henry Reed's Miniature Variety Orchestra will, as usual, provide the incidental and linking music.

Melodies from the Comedies

DAVID PORTER is producing another "Melodies from the Comedies" series in which he and Reginald Burston, who conducts the Midland Radio Orchestra, co-operate. The artists for this one are Marjorie Westbury, Ronald Bristol and one other vocalist.

The Tourist Trophy Race

This Tourist Trophy Race at Donington Park now annually attracts the greatest drivers in the world, and from a broadcasting point of view provides, owing to its restricted circuit, and admirable field for commentary.

In any one circuit there is seldom a time during which the listener cannot hear a competitor racing around this difficult track at very high speeds. The track has outstanding features, which have clear names, and by this means commentators keep listeners posted as to progress, approach and passage of competitors.
An Open Letter to Our Readers and the Trade

GENTLEMEN,

You have earned my congratulations, because of the efforts you have made collectively and individually to make Radiolympia not only the best of the series, but different. My knowledge of what you have done assures me that the Exhibition will be successful from every aspect. You will not deny that previous exhibitions have been waning in popularity. In the boom years you relied too much upon the novelty of radio to sell your sets, and too little upon encouraging public confidence. In those days your successes were of the same order in which a good horse makes a good jockey. Many firms flattered themselves that they were Big Business Men because the public would purchase almost anything. The Captains of many of these industries have, however, departed to the obscurity whence they came. The inevitable law of supply and demand and saturation point has purged your industry of the undesirable elements and cleansed the Augean stables. Your industry is largely dependent upon a replacement market, for most people by this time own a wireless set. It may not be so easy to persuade them to scrap a set which is a few months old; the public to-day will buy new sets purely on merit. I am quite satisfied that your industry is now running on sound, business-like lines, for only the fittest survive, and you have survived the vicissitudes of the past five years, largely brought about by the exploitation of adventurers who believed in anything for money instead of value for money.

You have, I understand, issued instructions that announce their annual visits to it about five years ago. I am glad to observe that you have not neglected the experimenter and constructor, for I am certain that you are not unmindful of the services these rendered to you when your industry was but a foundling laid at your doors by Providence. You wanted people with a knowledge of this new science, and it was from the ranks of experimenters that you found them. Most of your important positions are occupied by those who were originally keen amateurs. It was not right that as in previous years you should bite the hand which fed you. You have reinstituted the cabaret show. In previous years I have questioned the wisdom of this, because I have felt that it attracted the wrong type of visitor to the Show. It is one thing to attract a gate, and another to create sales. This year, however, I waive my objections because the new layout of the Show, the imminence of television throughout the country, and the many other innovations at Radiolympia, render it imperative for you to attract to Radiolympia the largest possible number of visitors. I believe that many will go to the Show to see the Cabaret and be so interested in the exhibits that they will see the Show. You are justified proud of the world-wide pre-eminence of television, and you want the public to see it. You are equaly proud of the high standard of merit which your wireless receivers have attained. I believe that you will attract to this Show all those who relinquished their annual visits to it this year on extremely sound and business-like lines.

You are not producing new sets just for the sake of producing them. Your policy is not to institute changes until such are necessary. Your customers will appreciate the fact that you take care of the wavelength changes which will occur in March, 1940, you have already instituted arrangements to supply dials which align with the new wavelength allocations.

I am glad to observe that you have not neglected the experimenter and constructor, for I am certain that you are not unmindful of the services these rendered to you when your industry was but a foundling laid at your doors by Providence. You wanted people with a knowledge of this new science, and it was from the ranks of experimenters that you found them. Most of your important positions are occupied by those who were originally keen amateurs. It was not right that as in previous years you should bite the hand which fed you. This year, I see, you have catered specially for the constructor, and I thank you for it. The new presentation in which this journal appears should convince you that the constructor market is not dead, for publishers, like wireless manufacturers, are business people who do not fan lost causes. I hope as a result of the interest which will undoubtedly be displayed in the technical section of Radiolympia, and also because of the confidence which the proprietors of this journal repose in the future of the constructor market, many of your members may be persuaded to return to a market which they have sadly neglected. You are making a special appeal to women to visit the Show. I think again that you are wise in your generation in doing this, for motor manufacturers realised years ago that man proposes and pays, but it is the woman who chooses.

I welcome the encouragement you are giving to dealers and others to form parties, and your formation of a Bureau operating from 59, Russell Square, London, to handle that. A good move! Your literature this year, including your posters, leaves no room for reproach. The success which you earned will be yours.

Yours faithfully,

F. J. CAMM
The 1940 Air-Hawk 9

Complete list of components appears on page 580.

R1 H.F. grid filter. 100,000 ohms.
R2 H.F. auto bias. 300 ohms.
R3 H.F. gain. 10,000 ohms var.
R4 H.F. anode filter. 5,000 ohms.
R5 1st Det. grid filter. 600,000 ohms.
R6 H.F. oscillator filter. 100,000 ohms.
R7 1st Det. auto bias. 600 ohms.
R8 1st Det. screen potr. 15,000 ohms.
R9 1st Detector anode filter. 2,500 ohms.
R10 I.F. grid filter. 100,000 ohms.
R11 H.F.-I.F. screen filter. 30,000 ohms.
R12 H.F.-I.F. screen filter. 20,000 ohms.
R13 I.F. auto bias. 300 ohms.
R14 I.F. anode filter. 1,000 ohms.
R15 5 meter bridge. 50,000 ohms.
R16 5 meter balancing. 1,000 ohms var.
R17 5 meter bridge. 1,000 ohms.
R18 5 meter bridge. 2,000 ohms.
R19 H.F. osc. grid leak. 100,000 ohms.
R20 H.F. osc. screen filter. 100,000 ohms.
R21 H.F. osc. anode filter. 10,000 ohms.
R22 B.F.O. grid leak. 50,000 ohms.
R23 B.F.O. screen filter. 100,000 ohms.
R24 B.F.O. anode. 15,000 ohms.
R25 B.F.O. anode filter. 50,000 ohms.
R26 Signal diode filter. 50,000 ohms.
R27 L.F. gain. 500,000 ohms pot.
R28 Signal diode load. 250,000 ohms.
R29 1st L.F. bias. 1,500 ohms.
R30 1st L.F. anode. 100,000,000 ohms.
R31 1st L.F. anode filter. 50,000 ohms.
R32 A.V.C. filter. 1 meg.
R33 A.V.C. load. 1 meg.
R34 Second L.F. grid leak. 250,000 ohms.
R35 Second L.F. bias. 800 ohms.
R36 Second L.F. anode. 50,000 ohms.
R37 Second L.F. anode filter. 10,000 ohms.
R38 Output auto bias. 500 ohms.
R39 Output stabiliser. 100 ohms.
R40 Tone control. 50,000 ohms.
R41 Series H.T. filter. 300 ohms.
R42 B.F.O. anode. 1,500 ohms.
C1 .00016 mfd. tuning.
C2 .000015 mfd. band spread.
C3 H.F. grid filter. .1 mfd.
C4 H.F. bias by-pass. .1 mfd.
C5 H.F. and I.F. screen by-pass. .1 mfd.
C6 H.F. anode by-pass. .1 mfd.
C7 1st Det. grid filter. .1 mfd.
C8 1st Det. bias by-pass. .1 mfd.
C9 1st Det. screen by-pass. .1 mfd.
C10 1st Det. anode by-pass. .1 mfd.
C11 I.F. grid filter. .1 mfd.
C12 I.F. bias by-pass. .1 mfd.
C13 I.F. anode by-pass. .1 mfd.
C14 H.F. osc. grid. .0001 mfd.
C15 H.F. osc. coupling. .0001 mfd.
C16 H.F. osc. screen by-pass. .1 mfd.
C17 B.F.O. grid. .0001 mfd.
C18 B.F.O. screen by-pass. .01 mfd.
C19 B.F.O. anode by-pass. .05 mfd.
C20 B.F.O coupling (see text).
C21 Signal diode filter. .0001 mfd.
C22 1st L.F. coupling. .01 mfd.
C23 A.V.C. diode coupling. .0005 mfd.
C24 Signal diode by-pass. .0001 mfd.
C25 1st L.F. bias by-pass. 25 mfd.
C26 1st L.F. anode by-pass. 8 mfd.
C27 2nd L.F. coupling. .01 mfd.
C28 2nd L.F. bias by-pass. 25 mfd.
C29 2nd L.F. anode by-pass. 1 mfd.
C31 Output bias by-pass. 25 mfd.
C32 H.T. mains filter. 8 mfd.
C33 H.T. mains filter. 8 mfd.
C34 Tone control. .04 mfd.
C35 B.F.O. padder. .0001 mfd.
C36 B.F.O. tuner. .65 mfd. var.
Sw. 1—Variable Selectivity.
Sw. 2—Meter on/off.
Sw. 3—A.V.C. on/off.
Sw. 4—B.F.O. on/off.
Sw. 5—Stand-by.
V1 H.F. amplifier.
V2 1st Det.
V3 H.F. oscillator.
V4 I.F. amplifier.
V5 2nd Det., A.V.C. and 1st L.F.
V6 B.F.O. oscillator.
V7 2nd L.F. amplifier.
V8 Output stage.
V9 Rectifier.

RESISTANCE AND CONDENSER LIST

The 1940 "Air-Hawk" 9
An Improved Version of the Communications-type Receiver
Which was Introduced Last Year - By W. J. DELANEY

Many visitors to Radiolympia last year showed considerable interest in the 9-valve amateur receiver which was on view on our stand, but from the remarks which were passed during the exhibition period, it proved that there was a demand for a still more elaborate type of circuit—especially among amateur transmitters. Accordingly, when the Air Hawk was described in November last year, we stated that the receiver would be "hotted up" at a later date, and the accompanying illustrations and circuit show the new version of this popular receiver.

As will be seen from the circuit, the main arrangement has been retained, but the improvements consist in the introduction of A.V.C., signal meter, variable B.F.O. adjustment and slight changes in the remaining circuit details. The introduction of A.V.C. was requested by many listeners, although on the higher frequencies a satisfactory A.V.C. circuit is not simple to find. On 20 and 40 metres the arrangement used does, however, compensate for normal QSB, but in the case of bad or high-speed fading, very little advantage is obtained. However, as A.V.C. has to be cut out when the B.F.O. circuit is in use, a switch has been provided, and it is a simple matter to cut out the A.V.C. circuit, with a slight gain on very weak stations.

Circuit Arrangement
The first valve is used as a straight R.F. amplifier, and is of the variable-mu type. The first detector is also of the variable-mu type, but the regenerative circuit previously employed has been dispensed with so that A.V.C. can be applied to this valve for improved results. The I.F. stage is also a variable mu, and these three valves are all in the B.F.O. stage by a 65-mfd midget variable, operated through an extension rod from the panel. This provides a very extensive variation in note—from below 1,000 c.p.s. to above 5,000 c.p.s., and is most effective in use. By using the numbered dial provided with the condenser pre-arranged settings may be obtained if desired for test purposes. The second detector is a double-diode-triode of the low-gain I.F. type, and the maker's recommendation for the use of this circuit is its ability to cope with a variety of conditions. It is possible to use manual control of the A.V.C. line. In addition, a separate gain control is provided on the panel. The I.F. oscillator remains as before, and is now controlled from the A.V.C. line. A variable mu is employed has been dispensable with so that A.V.C. can be applied to this valve for improved results. The I.F. stage is also a variable mu, and these three valves are all the B.F.O. stage by a 65-mfd midget variable, operated through an extension rod from the panel. This provides a very extensive variation in note—from below 1,000 c.p.s. to above 5,000 c.p.s., and is most effective in use. By using the numbered dial provided with the condenser pre-arranged settings may be obtained if desired for test purposes. The second detector is a double-diode-triode of the low-gain I.F. type, and the maker's recommendation for the use of this circuit is its ability to cope with a variety of conditions. It is possible to use manual control of the A.V.C. line. In addition, a separate gain control is provided on the panel. The I.F. oscillator remains as before, and is now controlled from the A.V.C. line. A variable mu is employed has been dispensable with so that A.V.C. can be applied to this valve for improved results. The I.F. stage is also a variable mu, and these three valves are all

controlled from the A.V.C. line. In addition, a separate gain control is joined in the cathode circuits of the R.F. and I.F. stages and thus it is possible to use manual control on these when required. The use of this control will be explained later on. The H.F. oscillator remains as before, as does the B.F.O. The original pre-set condenser has, however, now been replaced by a quality receiver. Some idea of the sensitivity of the receiver may be gained when it is stated that during one week when the receiver was in use in a North-west London suburb, every continent was covered, and VE's, VK's, all W divisions, and ZL's ('phone) were tuned in direct on the loudspeaker with the I.F. gain-control advanced only one-third. This was on the 20-metre band and between the hours of 6 p.m. and 3 a.m. As the 'phones are included after the first L.F. stage, they may be worn for searching purposes without risk of damage to your ear-drums should you strike a powerful station, but if a weak station is picked up, it may generally be put on the speaker merely by removing the 'phone plug. In most cases, provided the signal is audible in the 'phones, it may be put on the speaker for better readability.

The signal meter arrangement finally adopted is a bridge circuit with the meter fed from the I.F. anode. It will be found that powerful short-wave broadcast stations will send the needle right over and thus care is needed when scanning the band. As, however, the meter would be damaged if left on the circuit when the set is first switched on, due to the excessive current flowing through the bridge until the valves have heated up, a switch has to be included to open the meter circuit. Care should therefore be taken always to have this off unless a reading is required. The remaining switches are for the B.F.O., selectivity, A.V.C., on/off and stand-by.

Constructional Details
If you have the original model and wish to bring it up to date a new panel will have to be obtained, as the speaker has now been separated so that maximum output may be obtained without risk of microphonic feed-back. The connections to the 2nd detector valveholder must all be removed (with the exception of the heater) and new connections made to suit the D.D.T. valve. The connections to the 2nd detector valveholder must all be removed (with the exception of the heater) and new connections made to suit the D.D.T. valve. The top-cap lead from the I.F. transformer is not now needed and must be cut off, with a new hole drilled in the chassis to take the loudspeaker plug. In the case of powerful stations, it is possible to listen in perfect comfort to American amateur stations almost as well as locals on the air...
A CONSTRUCTOR TOURS RADIOLYMPIA

The Writer of this Article Conducts You to Those Stands of Special Interest to the Constructor, and Pleads for More Support from the Radio Industry. By L. O. SPARKS

The advance details of the exhibits at Radio-lympia are always awaited with the greatest interest and anticipation, but the general listening public, on the whole, more than a passing exhibition enthusiasm. Their interest each year is, no doubt, rekindled by the publicity given to Radio-lympia, and the rather intriguing, if not always technically perfect, descriptions given by some of the newspaper reporters and columnists as the outstanding features of the new season's programme.

It is left, however, to the constructor—by which I mean the listener who would rather construct his own equipment than buy a coddled commercial receiver—and his co-partner the amateur transmitter, to show the technical interest, and the keenest appreciation of even the most minute improvement in all apparatus and accessories associated with his hobby. Many would have us believe that this enthusiasm on the part of the amateur is no longer with us. The constructor movement is as dead as the dole, and that the introduction of the low-priced receiver, having in most instances a remarkable specification, has tolled the death knell over the constructor movement.

While admitting that there are quite a number who would not shed tears if such misconceptions were true, it becomes really amazing to think that anyone who has any acquaintance at all with the radio industry can blind himself to the most obvious signs that the constructor movement is very much alive. Fortunately this year the R.M.A. has taken steps to interest the constructor.

Licence Figures

According to the latest figures available, it is estimated that there are 9,000,750 licensed listeners in this country. This figure does not necessarily include all those who buy component parts. If one assumes that, say, only 10 per cent. of those people are constructors, and that they spend the very conservative sum of £5 per annum on their hobby, well, that amounts to £45,00 (000), which in the idea of the writer seems to represent a contribution to the radio industry worthy of, at least, some little consideration and trouble.

It will, no doubt, be stated most emphatically that this amount never reaches the pockets of the British manufacturers. That the figures look very well on paper, but beyond that they do not exist in hard cash so far as the industry is concerned. To such remarks I must agree, provided that the manufacturers will take off their dark glasses through which they appear to examine the constructor market, and admit that the reason why they don't get the business is simply due to the fact that the thousands of would-be buyers of British components have been forced to buy imported products, due absolutely to the short-sightedness of a few to whom the constructor looked to supply their wants.

Constructor Movement Activity

The progress of PRACTICAL WIRELESS is but one indication that sustained support is available from the constructor movement to those who offer, consistently, the right goods at the right price, and back them with a service worthy of the name in its truest sense. Many are now doing so.

The examination of the list of the exhibitors at this year's Radio-lympia is not, so far as enthusiasts are concerned, a very cheering proposition. One cannot help being struck by the number of absent ones when one compares the list with that of, say, 1937, or even last year.

Many names well known in the constructor world, no longer appear on the list, and I am sure that they will be missed by thousands who used to take the keenest interest in their products.

The fact that they are not exhibiting does not mean that all of them are no longer in business; but the fact that they are not there to meet us is due, no doubt, to individual reasons and, perhaps, being too busy with Government contracts.

Supposing we start from the stand which will be the meeting point of all enthusiasts, namely, No. 9.

All Constructors Should Visit

Us on Stand No 9, Ground Floor.

Turning right from here to Stand No. 10, Messrs. Antiference, Ltd., have quite a number of items of particular interest to those who are interested in the design, construction and erection of efficient dipole receiving aerials, suitable for television and ultra-short-wave reception.

Servicing Equipment

Servisol, Ltd., on No. 11, will attract the attention of all interested in servicing and associated equipment at most reasonable prices, while next door, on No. 12, the range of items produced and offered by Norman Rose (Electrical), Ltd., are really too numerous to mention, but many items of interest to the amateur and professional will tempt one to linger a while.

For all information about Eric resistors, fixed and variable, or all types and sizes, one need not go farther than to the next stand, namely, No. 13, before being attracted by the Admiralty stand, No. 15, on the other side of the gangway.

Doubling back in our tracks, we soon come to No. 17, which displays the products of Ferguson Radio Corporation, Ltd., and, speaking from past experience, a halt will have to be made here to examine all the items exhibited, before turning down the interesting gangway to pay a visit to the makers of the Westinghouse Rectifiers on Stand No. 30. Here will be found all the standard lines of this company and, of course, a quite a large percentage of them will appeal in particular to the constructor. By the way, don't forget to get a copy of their latest booklet before leaving to go over to No. 19, Messrs. Goodmans Industries, Ltd., to have a good look at their most interesting range of loudspeakers, baffles, and flares or horns.

Continuing down the main side gangway we shall come across No. 22 and, at the back of that, so to speak, we shall find No. 28, which will most certainly take up a goodly portion of our allotted time. On that stand will be found all the numerous items produced by those famous condenser people, Messrs. Dubilier, Ltd. It would be hopeless to try to enumerate all the various types, sizes, and ratings of their condensers, let alone the fixed and variable resistances. Some of the new types are particularly interesting, and the increase in operating voltages of certain kinds is really amazing.

Loudspeakers

The island forming Stands 23, 24, 25, and (Continued on page 539).
The Show Is Here!

The publication of this new PRACTICAL WIRELESS coincides with the first day of the Show. Radio-lympia is going to be a staggering affair, and attendances will be enormous. I hope that every reader of this journal will make a point of visiting the Show at least once, and taking at least one friend with him—or her! A suggestion has been made that readers should get together parties and visit the Show in groups. This is usually a more interesting method of visiting an exhibition than to go solus. There is pleasure in discussing the exhibits, talking about old times, and having a sort of annual lunch or dinner at the Show.

If you are one of those who last visited the Radio Show some years ago, you must come this year to note the vast difference.

The constructor this year has not been ignored, as he was in connection with previous shows. You will not have to delve amongst odd corners to find the components. The experimenter has been catered for in a special section, and this year for the first time Radio-lympia is to have a model factory showing various processes of manufacture being carried out under working conditions. You will be able to see coil winding, wire joining, grid making, helical coil spring making, R.F. coil adjusting, test and assembly of receivers, resonance tests, impedance comparison, inductance comparison, engraving, chassis wiring, gang condenser testing, wire covering, cutting and forming wires of tubular condensers, dry battery manufacture, and in addition there will be a battery of 16 revolving drums showing the complete chassis of many of the leading manufacturers' sets.

Make a Party of It

A SPECIAL Party Bureau to be run in conjunction with this year's Radiolympia has been inaugurated by the R.M.A. at their headquarters at 59, Russell Square, London, W.C.1, to help dealers and others to organise parties to the Exhibition. Considerably reduced fares by road and rail are obtainable for both large and small parties; catering and hotel accommodation are also obtainable at reduced rates, and special party tickets are being issued at half price. Also, wherever possible the Bureau is arranging seats in advance for suitable performances in Radiolympia's broadcast and television theatre.

The Radio Theatre

FOR the first time in the history of the world a theatre has been specially built for broadcasting and television. It has been designed and constructed as a replica of the famous Bowl Theatre in Hollywood at a cost of over £5,000, with a semi-circular revolving stage that will hold over 300 performers, and an auditorium to enable 2,500 visitors to hear perfectly and obtain a clear and uninterrupted view of every part of the stage. The auditorium partly encircles the stage.

The new Hammond Organ will be seen for the first time in this country at Radiolympia.

Come and be Tevised

YOUR one opportunity of being televised will be provided at Radiolympia. All you have to do is to go to the Television Studio between 11 a.m. and noon and ask them to televise you—and they will. Bring your friends too, and ask your friends at home, if they have a television receiver, to see how you "come over."

Miss Radiolympia

I AM certainly keenly looking forward to seeing Miss Radiolympia, just to satisfy myself that the judges have picked the right type of girl! Visitors at many leading coast resorts this year have been assisting the R.M.A. in selecting a girl with a perfect radio and television personality to be presented at the Exhibition. The finals will have been held in London, Birmingham, Folkestone and Nottingham before you read these notes.

Architect Designed

THE Exhibition itself differs from any of the preceding shows. It has been architect designed. One end of the Exhibition represents the television tower at Alexandra Palace, and the other Broadcasting House. There is ample room, adequate seating and catering accommodation, and most of the personalities of radio will be there. There will be television demonstrations on dozens of stands, and every reader who has not done so, if for no other reason, should visit Radiolympia to witness the high state of perfection which television has reached.

So you must go to the Radio Show!

Wireless Licences

THE Post Office issued 364,114 wireless receiving licences during July, 1939. This figure represents a net increase of 20,640 in the number of licence holders during the month after making allowance for expired licences and renewals.

The approximate total number of licences in force at the end of July, 1939, was 9,030,950, as compared with 8,857,100 at the end of July, 1938, an increase during the year of 77,850.

During the month there were 495 successful wireless prosecutions.

Poetic Piffle

ONE or two readers have written regarding my justifiable criticism of Tennyson's and Gray's tripe, suggesting that I should make due allowance for poetic licence. The only thing which I would do to all poets is to take their licences away. They are nearly always lazy individuals who explain their laziness away by stating that they are waiting for the divine afflatus. No man who does so little worthless work has a right to be considered famous. One reader thinks because I do not enjoy poetry and crooners (I put them in a class together) I can only enjoy something hard and cold such as calculus and geometry.
Another quotes a poem about the deep deep sea. Perhaps you can tell me how deep is a deep deep sea, and how it differs from a shallow deep sea, or a shallow shallow sea. The rhyming word in nearly every case provides the thought in poetry, and having composed some smi

---

**Notes from the Test Bench**

**Test-bench Layout**

*WHEN* a great deal of receiver servicing has to be carried out, various meters are called for. In most cases these are stacked on a shelf and taken down as required. Multi-range meters have to be adjusted according to the range required, and thus test work is not exactly simple and straightforward. A suggestion has been made to facilitate this work by mounting all meters permanently and using extension leads, external switches and sockets or flex leads attached to the bench top. A number of sockets could be wired in parallel and sunk flush with the bench top and lengths of flex lead provide with clips and/or plugs could then be connected to the appropriate sockets. Electrical leads, plugged into the sockets and the meter thereby introduced. The appropriate range selector could be placed on the bench, and where a large 0-1 milliammeter could be obtained and mounted on the back of the bench, the single dial would be suitably calibrated and testing simplified.

**Mounting Components**

*WHEN* mounting components on some types of receiver, nuts and bolts have to be employed, but difficulty is experienced in attaching the nuts to the bolts owing to the proximity of components. Box spanners are, of course, invaluable in such cases, and where these are not available, makeshift spanners may be made by taking a length of thin tubing and hammering it round a nut of the size required. The tubing may not remain very rigid, but if a shakeproof washer is placed over the screw the nut will not have to be turned very tight and the spanner may thus be used with satisfactory results.

**Leading in Devices**

*WHEN* leading the aerial lead into a room, the usual scheme is to drill the window frame. For transmitting purposes, however, greater insulation is required and the window glass itself is usually drilled and special lead-through insulators fitted. To avoid the trouble of drilling the glass, however, a good idea is to lower the window, where the ordinary sash type of window is fitted, and place a length of board along the upper part of the window. This may be drilled and the insulators mounted in the usual way. Where ordinary casement windows are found, however, the alternative is to remove the glass pane and replace with a shorter pane and a length of wood.

---

**The Flying Announcer**

MICHAEL HINN, WLW announcer, circled his 'plane over Watson Airport, Cincinnati, recently and waited for the arrival of an ambulance and the fire department. The landing gear on his machine was broken.

Hinn has been flying for three years and only last month purchased his own 'plane. The other night he took his 'plane for a trial spin before taking his friends aloft. Just as he left the ground there was a sharp report of snapping steel, and Mike felt the 'plane take a slight dip down. Safely off the ground he began to look around for the trouble and sickened at the sight of only one wheel on his landing gear.

Airport officials kept him aloft while they summoned the fire department and an ambulance, for Hinn's 'plane landed at high speed. But the service of neither was necessary. Hinn came down unhesitatingly, slowed his landing speed below normal, touched the good right wheel to the ground, cut the ignition switch, pushed up his goggles, covered his face with one arm and held the stick with the other hand. The 'plane came straight down the field, lost speed quickly, dipped to its injured side until the wing tip touched the ground, then nosed up slightly, stopped and settled back.

"The landing was distinctly to Hinn's credit as a flyer," declared airport officials. "I felt funny hanging up there for the ambulance," said Hinn.

**"Bon Voyage"**

BETWEEN eighteen and two years ago, while Stanford Robinson was touring the operatic centres of Europe to study technique and production methods, he heard a performance of Kunneke's "Glückliche Reise" and liked it so much that he decided to arrange a broadcast of the work, one day, to British listeners.

Now, as Music Productions Director of the B.B.C., he is to fulfil the promise he made to himself, for he has scheduled the work for production on September 5 (National) and September 6 (Regional). The title has been translated to "Bon Voyage," and the performance will be produced by Gordon Crier, who is being "lent" by the Variety Department to the Music Productions Section for the occasion.
By achieving perfect naturalness in the reproduction of every word, note and sound "His Master's Voice" technicians have provided radio enthusiasts with "advanced listening" for 1940...

Important "H.M.V." technical advances enable you to derive greater enjoyment from broadcast transmissions, and to elicit from your favourite records a tonal realism hitherto unrealised... Beautiful cabinets combine accurate acoustic matching with the appeal of good furniture.

In high definition television, too, "H.M.V." offer you at popular prices, more vivid and reliable reception. Ask for a demonstration at your dealer, and/or post the coupon.

POST THIS COUPON NOW
I should be pleased to receive a copy of your coloured booklet illustrating the complete new range of "His Master's Voice" radio instruments.

Television Receivers.

NAME
ADDRESS

* Cross out item not required.
Film Transmissions

In the original B.B.C. schemes for transmitting talking films by television, advantage was taken of the storage principle exhibited by the signal plate of the electron camera. That is to say, the pictures of each individual frame were projected on to the mosaic and the electrical potential acquired by each small element was then analysed by the scanning beam during the period when the optical picture was cut off. After a long period of trial and much adverse comment, this method has now been abandoned and Mecatv film projectors installed, so that by an ingenious cam-operated mirror mechanism the picture has continuous movement in lieu of a shutter device. The Americans realised quite early that the storage principle had drawbacks, and devoted a considerable time to research into non-intermittent motion systems. Rocking mirrors and other devices were tried, but serious optical and mechanical difficulties were encountered so that ultimately a return to intermittent motion was made by the R.C.A. A modified form of a standard projector was used, however, and in actual practice the film picture, focused on to the mosaic, is chopped sixty times per second by a rotating shutter in order to make the apparatus conform to the American television picture standard of 60 frames per second interlaced to give 30 pictures per second. In the case of the Columbia Company, however, a non-intermittent film scanner was developed, employing an image dissector tube together with electronic compensation, and the only moving component is a slotted shutter. A form of chasing motion is employed, and the prime difficulty seems to be associated with variable film shrinkage, but this is compensated by lens focus adjustment which is scaled in terms of shrinkage.

An International Conference

During the first two weeks in September an international physics conference is to be held in Zurich, when eminent physicists from all over the world are expected to be present. The work of organisation is being undertaken under the auspices of the Physical Society of Zurich, and the Swiss Ecole Polytechnique Fédérale, and everything will be sectionalised. Naturally, the subject of television is being given due prominence, and the arrangements so far concluded show that papers will be presented by Dr. Zworykin of R.C.A., A. D. Blumlein of E.M.I., Dr. Müller, of Fernseh Barthélémy of France, Dr. Okolicsanyi of Scopitone, Dr. Schroeter, of Telefunken, and Prof. Kapfmliller, of Siemens Halske. This international interchange of ideas and opinions on television is an admirable scheme, and it is a pity that some of the learned societies in this country do not adopt a similar policy.

High-voltage Precautions

The use of high voltages in cathode-ray tube receivers, especially those employed in big screen projection work, calls for certain precautions in order to obviate picture defects arising from corona discharges or scanning distortion due to an accumulative charge on the inner coating of the glass bulb. This, of course, is additional to the normal precautions undertaken to prevent any voltage shock due to mishandling of the equipment. For example, all sharp edges or points are reduced to the barest minimum to prevent any corona or spark discharge. In one case where there is an inner metallic or colloidal graphite coating, a perfectly smooth guard-ring is incorporated in close proximity to the sharp edges, and contact is maintained with the coating by springs. In this way corona discharge is eliminated. Any spark discharges evidence themselves on the picture screen as light splashes, bearing some resemblance to motor-car ignition interference. Any accumulation of charge on the tube's internal coatings will bow the scanning lines so that they take up a curved path instead of the required straight one. Deflection of the field so that it loses its resemblance to motor-car ignition interference. Any accumulation of charge on the tube's internal coatings will bow the scanning lines so that they take up a curved path instead of the required straight one. Deflection of the field so that it loses its resemblance to motor-car ignition interference. Any accumulation of charge on the tube's internal coatings will bow the scanning lines so that they take up a curved path instead of the required straight one.

SPECIAL NOTE.

Owing to pressure on our space many of our regular features are held over this week.
The 1940 All-wave Three
An Efficient 3-Valve Receiver designed for Four-wave-band Reception.
Built On Our New Transparent Chassis!

There is always a great demand for an efficient receiver which will receive a reasonable portion of the short-wave transmissions plus the usual medium- and long-wave programmes which are invariably required for home entertainment. To satisfy this demand would not be difficult were it not for the fact that many other requirements are always specified. For example, the receiver must be simple to construct and operate, low in price, free from complicated adjustments and, according to the majority, for battery operation.

To satisfy all the requests, therefore, it becomes necessary to produce a design which, while being quite simple, must have a reasonable degree of efficiency over the wavebands concerned. A superhet or H.F. type of circuit is ruled out of the question on account of controls and costs, so one is only left with a straight arrangement to secure satisfactory range and volume.

With the receiver about to be described, we have limited the valves to three, and followed a perfectly orthodox arrangement of detector followed by two stages of L.F. amplification. With the receiver about to be described, we have limited the valves to three, and followed a perfectly orthodox arrangement of detector followed by two stages of L.F. amplification.

The Circuit
An examination of the theoretical circuit on p. 566 will reveal the fact that the aerial circuit is formed by a single tuned grid coil, the aerial being connected to the top end. As many readers are no doubt aware, such an arrangement does not give one an exceptionally high degree of selectivity; therefore, to improve matters in this direction, alternative aerial sockets are provided, which enable the .002 mfd. variable condensers to be brought in series with the aerial if so desired. Under normal conditions, and providing an aerial of reasonable length is used, the degree of selectivity is quite satisfactory; in fact, it is surprising what separation can be obtained by judicious use of the aerial series condenser and reaction control.

Speaking of the reaction control brings into prominence the fact that the coil is so designed that the reaction winding is increased or decreased, by the same switch as that used for wave changing, according to the waveband being covered, thus allowing a very smooth reaction control to be obtained over the complete wave coverage of the circuit.

A standard leaky grid detector employing a triode valve is used as this, together with two stages of L.F. amplification, was found to provide ample volume and sensitivity.

In place of the usual H.F. choke in the anode circuit, a 10,000-ohm resistance has been used as an H.F. stopper, adequate by-passing of the H.F. currents being provided by one section of the differential reaction condenser.

The L.F. Side
The anode load for this valve is formed by the 50,000-ohm resistance which receives its H.T. via a further 20,000 ohms inserted to obtain, together with the 2 mfd. condenser, a satisfactory degree of decoupling to prevent undesirable feed-back through the H.T. supply. The output from the detector is fed to the grid circuit of the first L.F. via a coupling condenser of .01
THE 1940 ALL-WAVE THREE
(Continued from previous page.)

as it is not possible to fit a switch or coils of the types specified with terminals.

Cost
An item which is quite worthy of attention is the very low cost of the essential components of this receiver, and when it is realised that the complete kit of components, less chassis and valves, can be purchased for £2 7s. 3d., it will be appreciated that it is not a costly matter to obtain an efficient all-wave receiver.

RECORDS that will be eagerly sought after this month are two new recordings of this year's Aldershot Tattoo. The first record—H.M.V. C 3108—opens with the reception given to General Gamelin when he visited Aldershot. Other items that have been snapped in sound on this record is a stirring rendering of the "Marcellaise" and Schubert's "Serenade" played by the massed bands.

Other things that have been captured on this record are "The Lament Walk" and "The Chestnut Tree" and passes on to a recording of the re-creation of Queen Elizabeth's visit to Tilbury in 1588, part of the Queen being played by Miss Marry Vanne.

Peter Dawson's deep baritone voice is particularly well suited to an organ accompaniment and the ballads he has recorded this month, "Drink to me Only" and "Roses of Picardy," are really excellent—and H.M.V. B 8032.

On the lighter side attention must be drawn to the playing of Alfredo Campoli's Orchestra of an old American dance tune "Turkey in the Straw," and Ronald Gourley's "Dieky Bird Hop" on H.M.V. BD 724.

Louis Levy and his Orchestra play "Smilin' Through" and "Smoke Gets in Your Eyes" in most attractive arrangements which should give these melodies a new lease of popularity—H.M.V. BD 723.

Although the Bickershaw Colliery Band from Leigh, in Lancashire, was only formed a few years ago, they have won 330 prizes and broadcast many times. Last year they were runners-up in the National Brass Band Festival. They have chosen two popular marches, "Blaze Away" and "Washington Greys," for their latest recording on H.M.V. BD 725.

Reginald Foort is in great form on his Moller Concert Organ. He plays the well-known "Woe Macgregor Patrol," and concludes it with "Rattle of Spring" on H.M.V. BD 725.

Songs from the Films
Dorothy Lamour, who starred in "Hurricane" with great success, has followed it with a film called "Man About Town." The two hits from this film, " Strange Enchantment" and "That Sentimental Sandwich" have been recorded by her on H.M.V. B 8940.
All-British!

**TROPHY 6**

NEW

COMMUNICATION Receiver

You must see your Dealer about it NOW

A HIGH EFFICIENCY ALL FEATURE RECEIVER PRICED AT ONLY 9½ GUINEAS

**THIS** new All-British Junior Communication A.C. Receiver is of interest to the Amateur Transmitter and all Short-wave Listeners. The TROPHY “6” has a wave-range of 6.5 to 545 metres and incorporates all essential refinements for efficient operation. In its class, the TROPHY 6 is the finest receiver obtainable for general use and wherever dependable all-World reception on the high-frequency bands is desired.

Specification includes 6 Valves, Separate Dialectric Bandsreading, Directly Calibrated Frequency Scale, A.V.C. and Beat Frequency Oscillator On-off Switches, Send-Receive Switch, Single-wire or Doublet aerial inputs, Built-in Speaker and 'Phone Socket. A set which merits the complete confidence of every short-wave enthusiast.

GUARANTEE! All TROPHY instruments are covered by a special 12 months' guarantee, which includes all valves. All models available on Deferred Terms.

SEND NOW FOR LISTS.
To PETO-SCOT ELECTRICAL INSTRUMENTS (Holdings) LTD., Pilot House, Stoke Newington, Church Street, London, N.16.
Telephone - Clissold 5000

Please Post Me FREE TROPHY Details

NAME
ADDRESS
PR.W.56/8

PETO SCOT ELECRICAL INSTRUMENTS (HOLDINGS) LIMITED

ISSUED BY PETO-SCOT ELECRICAL INSTRUMENTS (HOLDINGS) LIMITED

TROPHYs are obtainable from all good Dealers

Scottish readers note:

All TROPHY Short-wave instruments are available from MESSRS. CLYDESDALE SUPPLIES—All branches

Manufacturers of Short-wave Receiving and Transmitting equipment to H.M. Government.
### Visitors' Guide to the Exhibitors

Arranged Alphabetically for Your Convenience. The Exhibits are Similarly Reviewed in this Order on pages 570—578. For List of Specialised Non-proprietary Exhibits, see page 573

<table>
<thead>
<tr>
<th>Name and Address</th>
<th>Stand No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerialite, Ltd., Castle Works, Stalybridge, Cheshire</td>
<td>60</td>
</tr>
<tr>
<td>Antifonance, Ltd., 176, Wardour Street, W.1</td>
<td>10</td>
</tr>
<tr>
<td>Armstrong Mfg. Co., Walters Road, Nags Head, N.7</td>
<td>69</td>
</tr>
<tr>
<td>Balcombe, A. J., Ltd., 52, Tabernacle Street, E.C.3</td>
<td>37</td>
</tr>
<tr>
<td>Baird Television, Ltd., Crystal Palace, Annerley Hill, S.E.19</td>
<td>27</td>
</tr>
<tr>
<td>Belling and Lee, Ltd., Cambridge Arterial Road, Enfield, Middx.</td>
<td>3, 26</td>
</tr>
<tr>
<td>Brit. Insulated Cables, Ltd., Prescott Lancs</td>
<td>20</td>
</tr>
<tr>
<td>Brit. Pix Co., Ltd., Pix Works, Lilieshall Road, S.W.4</td>
<td>64</td>
</tr>
<tr>
<td>A. F. Bulgin, and Co., Ltd., Abbey Road, Barking, Essex</td>
<td>62</td>
</tr>
<tr>
<td>Burnden Ltd., Light Gun Factory, Erith, Kent</td>
<td>54</td>
</tr>
<tr>
<td>Bush Radio, Ltd., Power Road, Chiswick, W.4</td>
<td>34</td>
</tr>
<tr>
<td>Car Fastener Co., Ltd., Nottingham Road, Stapefold, Notts</td>
<td>66</td>
</tr>
<tr>
<td>Celestion, Ltd., London Road, Kingston-on-Thames</td>
<td>25</td>
</tr>
<tr>
<td>Chloride Elect. Storage Co., Ltd., 231, Shaftesbury Avenue, W.C.2</td>
<td>2</td>
</tr>
<tr>
<td>E. K. Cole, Ltd., Ekco Works, Southend-on-Sea, Essex</td>
<td>47</td>
</tr>
<tr>
<td>Cosmocord, Ltd., Cambridge Arterial Road, Enfield, Middx.</td>
<td>72</td>
</tr>
<tr>
<td>A. C. Cossor, Ltd., Cassor House, Highbury Road, N.5</td>
<td>48</td>
</tr>
<tr>
<td>Deca Radio and Television, Ltd., 1-3, Brixton Road, S.W.9</td>
<td>44</td>
</tr>
<tr>
<td>Dublifier Condenser Co. (1925), Ducon Works, Victoria Road, North Acton, W.3</td>
<td>28</td>
</tr>
<tr>
<td>Dynatron Radio, Ltd., Perfecta Works, Rayleigh Road, Maidenhead</td>
<td>1, 39</td>
</tr>
<tr>
<td>W. G. Evaston and Sons, Ltd., Autoplayer Factory, Ashfield Road, N.4</td>
<td>73</td>
</tr>
<tr>
<td>Econsign Co., Ltd., 92 Victoria Street, S.W.1</td>
<td>92</td>
</tr>
<tr>
<td>Edison Swan Electric Co., Ltd., 55, Charing Cross Road, W.C.2</td>
<td>23</td>
</tr>
<tr>
<td>Gordon Elf, Ltd., 55, Rathbone Place, W.1</td>
<td>21</td>
</tr>
<tr>
<td>E. M. I. Service, Ltd., Sheraton Works, Hayes, Middx.</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name and Address</th>
<th>Stand No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erie Resistor, Ltd., Carlisle Road, The Hyde, N.W.9</td>
<td>13</td>
</tr>
<tr>
<td>Ferguson Radio Corp., 105-109, Judd Street, W.C.1</td>
<td>17</td>
</tr>
<tr>
<td>Ferranti, Ltd., Radio Works, Moston, Manchester, 10</td>
<td>41</td>
</tr>
<tr>
<td>Garrard Eng., and Mfg. Co., Ltd., Newcastle Street, Swindon, Wilts</td>
<td>56</td>
</tr>
<tr>
<td>General Electric Co., Ltd., Magnet House, Kingsway, W.C.2</td>
<td>34</td>
</tr>
<tr>
<td>Goodman's Industries, Ltd., Lancelot Road, Wembley, Middx.</td>
<td>19</td>
</tr>
<tr>
<td>Gramophone Co., Ltd., 108, Clerkkenwell Road, E.C.</td>
<td>46, 53</td>
</tr>
<tr>
<td>F. C. Hayberd and Co., 10, Finsbury Street, E.C.2</td>
<td>57</td>
</tr>
<tr>
<td>Holsun Batteries, Ltd., Neville House, Page Street, W.S.1</td>
<td>40</td>
</tr>
<tr>
<td>Invicta Radio, Ltd., St. Andrews Road, Cambridge, and at 203, Old Street, E.C.3</td>
<td>16</td>
</tr>
<tr>
<td>McMichael Radio, Ltd., Wexham Road, Slough, Bucks</td>
<td>38</td>
</tr>
<tr>
<td>Marconi-Eko Instruments, Ltd., Electra House, Victoria Embankment, W.C.2</td>
<td>109</td>
</tr>
<tr>
<td>Marconiphone Co., Ltd., 210 Tottenham Court Road, W.1</td>
<td>36</td>
</tr>
<tr>
<td>Mercantile Credit Co., Ltd., 39-45, Finsbury Square, E.C.2</td>
<td>67</td>
</tr>
<tr>
<td>Mullard Radio Valve Co., Ltd., Century House, Shaftesbury Avenue, W.C.2</td>
<td>55</td>
</tr>
<tr>
<td>Murphy Radio, Ltd., Broadwater Road, Welwyn Garden City, Herts</td>
<td>33</td>
</tr>
<tr>
<td>New London Electron Works, Ltd., East Ham, E.6</td>
<td>59</td>
</tr>
<tr>
<td>NEWNES, GEO., LTD., TOWER HOUSE, SOUTHAMPTON STREET, W.C.2</td>
<td>9</td>
</tr>
<tr>
<td>Philco Radio and Television Corp. of Gt. Britain, Ltd., Perivale, Greenford, Middx.</td>
<td>31</td>
</tr>
<tr>
<td>Pilot Radio, Ltd., 31-33, Park Royal Road, N.W.10</td>
<td>42</td>
</tr>
<tr>
<td>Philips Lamps, Ltd., Century House, Shaftesbury Avenue, W.C.2</td>
<td>45</td>
</tr>
<tr>
<td>Plessey and Co., Ltd., Vicarage Lane, Ilford, Essex</td>
<td>68</td>
</tr>
<tr>
<td>PRACTICAL WIRELESS</td>
<td>9</td>
</tr>
<tr>
<td>Pye, Ltd., Radio Works, Cambridge</td>
<td>32</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name and Address</th>
<th>Stand No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio Gramophone Development Co., Ltd., Globe Works, Newtown Road, Birmingham</td>
<td>29</td>
</tr>
<tr>
<td>Reproducers and Amplifiers, Ltd., Frederick Street, Wolverhampton</td>
<td>111</td>
</tr>
<tr>
<td>R. A. Rothermel, Ltd., Rotherham House, Canterbury Road, N.W.6</td>
<td>71</td>
</tr>
<tr>
<td>Scophony, Ltd., Thornwood Lodge, Campden Hill, N.W.8</td>
<td>49</td>
</tr>
<tr>
<td>Scott Insulated Wire Co., Ltd., Queensland Works, Westmorland Road, N.W.9</td>
<td>103</td>
</tr>
<tr>
<td>Henri Selmer and Co., Ltd., 1/4, Charing Cross Road, W.C.2</td>
<td>99</td>
</tr>
<tr>
<td>Servisol, Ltd., 74, Renshaw Street, Liverpool</td>
<td>11</td>
</tr>
<tr>
<td>Siemens Electric Lamps and Supplies, Ltd., 39, Upper Thames Street, E.C.4</td>
<td>52</td>
</tr>
<tr>
<td>Steatite and Porcelain Products, Ltd., Stourport-on-Severn, Worcs</td>
<td>61</td>
</tr>
<tr>
<td>Sterling Batteries, Ltd., Sterling Works, Dagenham, Essex</td>
<td>65</td>
</tr>
<tr>
<td>Taylor Electrical Instruments Ltd., 45, Fouberts Place, Regent Street, W.1</td>
<td>101</td>
</tr>
<tr>
<td>Telegraph Condenser Company, Wales Farm Road, Acton, W.3</td>
<td>63</td>
</tr>
<tr>
<td>Telegraph Construction and Maintenance Co., Ltd., 22, Old Broad Street, E.C.2</td>
<td>22</td>
</tr>
<tr>
<td>Ultra Electric, Ltd., Western Avenue, Acton, W.3</td>
<td>43</td>
</tr>
<tr>
<td>Vacuum Science Products, Ltd., 166, Weir Road, Balham, S.W.12</td>
<td>18</td>
</tr>
<tr>
<td>Varley (Oliver Pell Control), Cambridge Row, Burrage Road, S.E.18</td>
<td>108</td>
</tr>
<tr>
<td>Vidor, Ltd., West Street, Erith, Kent</td>
<td>51</td>
</tr>
<tr>
<td>Waverley Book Co., 96, Farringdon Street, E.C.4</td>
<td>8</td>
</tr>
<tr>
<td>Westhinghouse Brake and Signal Co., Ltd., 82, York Way, King's Cross, N.1</td>
<td>30</td>
</tr>
<tr>
<td>Wingrove and Rogers, Ltd., Mill Lane, Old Swan, Liverpool</td>
<td>110</td>
</tr>
<tr>
<td>Wright and Weaire, Ltd., 740, High Road, Tottenham, N.17</td>
<td>102</td>
</tr>
</tbody>
</table>
Complete Guide to Radiolympia

For Detailed Guide to Each Exhibit, See Pages 570 to 578

Make a Note of It!

"Practical Wireless," the Leading Wireless Journal with the Largest Net Sales, is on sale at Stand No. 9, Ground Floor, with its stable companions "Practical Mechanics" (6d. monthly), "Practical Motorist" (3d. every Friday), and "The Cyclist" (2d. every Wednesday). Full range of our standard works on Wireless, Blueprints, etc., are also on sale.

NEXT WEEK!

Complete Stand-to-Stand Report. All the Latest News and Notes of the Trade.

Order Your Copy NOW!
AERIALITE, LTD., Castle Works, Stalybridge, Cheshire. STAND No. 60.

THIS exhibit will consist of various types of aerial, aerial wire, and similar items. Special types of aerial of the dipole variety, developed to give improved results on the short waves, and for use with all-wave receivers, will be seen.

ANTIFERENCE, LTD., King's Yard, Bayham Place, N.W.1. STAND No. 10.

IN this stand there will be twelve different types of television aerial. These cover every conceivable type of mounting including one wall-mounting dipole for only 16s. 6d. These aerials are available with steel or aluminium rods, and with or without reflectors.

ARMSTRONG MFG. CO., Walters Road, Nag's Head, Holloway, N.7. STAND No. 69.

THIS firm specialises in receivers in chassis form and a representative selection will be seen on their stand. All-wave chassis in various valve combinations will be featured, including all the latest refinements.

BAIRD TELEVISION, LTD., Crystal Palace, Anerley Hill, S.E.19. STAND No. 27.

THE television receivers exhibited on this stand are of the cathode-ray type and are notable for the brilliance of the received picture. Among the popular models are T.25 at 47 guineas and T.26 at 40 guineas. The form r is a combined all-wave radio and television receiver, giving radio on three wavebands, 16 to 51, 198 to 560 and 850 to 2,000 metres. Model T.26 is for television only, and has only two controls. The most noticeable feature is the high quality of reproduction.


A WIDE range of receivers will be seen on this stand under the name Alba, and of these the 3-valve battery portable at 6 guineas is probably the most popular at the moment. At the other end of the range is an 8-valve "Presto-Tune" superhet radiogram, providing 16 watts undistorted output and costing 28 guineas. Among other models to be seen are a 4-valve A.C./D.C. superhet transportable, table models, and radiograms.

BELLING & LEE, LTD., Cambridge Arterial Road, Enfield, Middlesex. STANDS Nos. 3 and 26.

MANY small items, primarily for the manufacturer, but also of great use to the home-constructor, will be seen here, together with the special Sky-rod aerial. This is intended for use in restricted areas, and for districts where there is considerable interference. It is mounted on the chimney stack or roof.

Floor plan appears on page 569.
Complete Show Report Next Week.
Exhibited quality receivers will be seen, and should be inspected by all who are interested in signal lampes, bushes, etc., etc. A new catalogue will be introduced at Olympia, and including nearly 300 new articles, and every constructor should obtain a copy and inspect the wide range of components.

The range of Pix products to be seen on this stand includes resistors, paper and electrolytic condensers, the self-fitting Gripon aerial, the Pix aerial device and Pix valves. The Gripon aerial will be seen in a new and improved form, but the original Pix remains unchanged. A small holder is available for fixing the Pix to a receiver or window-ledge. Among other exhibits on this stand will be the Pix metallicised earth, Modula armchair control, a lightning arrester, and the well-known Pix aerial of the adhesive "tape" type.

The speakers will be of specialised design and possess many attractive features. The Gripon aerial will be seen for the first time on television aerials, pilot bulbs, anti-break-through choke, unit coils from 7 to 2,000 metres, turntables, new fuses, connector strips, and contains increased by a special tropical type condenser. The Gripon aerial is hermetically sealed in a moulded flux-cored framework, and contains the many new items which are being introduced and which will be seen for the first time on television aerials.

The range of Pix products to be seen on this stand includes resistors, paper and electrolytic condensers, the self-fitting Gripon aerial, the Pix aerial device and Pix valves. The Gripon aerial will be seen in a new and improved form, but the original Pix remains unchanged. A small holder is available for fixing the Pix to a receiver or window-ledge. Among other exhibits on this stand will be the Pix metallicised earth, Modula armchair control, a lightning arrester, and the well-known Pix aerial of the adhesive "tape" type.

A "Tropical" condenser designed and produced by Brit. Insulated Cables to avoid troubles in extreme climatic conditions.

The receivers to be shown on this stand will be of the all-wave type, with push-button tuning and other attractive modern features. Large open tuning scales and rapid tune devices will enable the operator to locate any desired channel. Among other exhibits on this stand will be the Pix metallicised earth, Modula armchair control, a lightning arrester, and the well-known Pix aerial of the adhesive "tape" type.

One of the Duco accumulators marketed by Brown Bros. and designed to operate satisfactorily in all types from the small celluloid models to large H.T. blocks for the most powerful receivers. Among the new lines are the special batteries used for portable receivers incorporating the dry-battery L.T. supply.
COSMOCORD, LTD., Cambridge Arterial Road, Enfield, Middlesex. STAND No. 72.

There will be seen pick-ups, pick-ups and tone-arm assemblies, and gramophone units for use with existing receivers. Full details of the range have not yet been released.

COSSOR A. C., LTD., Cossor House, Highbury Grove, N.5. STAND No. 48.

A large part of the Cossor exhibit consists of receivers of all types, and the rest of their exhibit consists of valves and C.R. tubes, together with various servicing test apparatus. In the receiver ranges are table models and console designs, ranging from a 3-valve battery to a 5-valve A.C. console. A new 4-valve battery portable is included, and push-button tuning is featured on several of the receivers. The new Cossor Car Radio receiver will also be seen, and in the television receivers the most interesting model is undoubtedly Model 1210 in which a picture size of 12in. by 10in. is provided direct on the end of a C.R. tube. This receiver provides a brilliant flickerless picture having an area of 130 sq. in. and incorporates also an all-wave de-luxe superhet radio chassis. At 53 guineas this will undoubtedly be one of the main attractions on the stand. The extensive range of valves will also attract considerable attention on the part of constructors.

DECCA RADIO & TELEVISION, LTD., 1-3, Brixton Road, S.W.9. STAND No. 44.

In the range of receivers to be seen here, a novelty is the simple-to-adjust push-button mechanism, whereby stations may be changed merely by manipulating the push button. A push-button portable will be seen, and the receivers include battery and mains models. Two television receivers will also be seen, one model providing television only and the other including the most comprehensive model on view is the 24er Emperior IV, a television radiogram utilising 45 valves and delivering 18 watts output. It includes an autochanger and costs 175 guineas.

DEPARTMENT OF OVERSEAS TRADE, 35, Old Queen Street, S.W.1. STAND No. 74.

A large part of the Cossor exhibit embraces really high-quality apparatus, in which Dynatron, Radio specialists, Performance is considered before price in these receivers and some of the interesting details are being kept secret until the show opens. A television receiver with a 12in. tube will be seen, and every receiver to be shown incorporates a whistle filter. The...
popularity as a receiving set for tapping into the brain activity. In addition to television there will also be seen here the B.T.H. R.K. speakers, headphones and pick-ups.

All the Ferguson models give a high standard of performance on the short waves.

FERRANTI, LTD., Radio Works, Moston, Manchester, 10. STAND No. 41.

On this stand will be featured broadcast receivers, car radio receivers and television apparatus. Several new models are to be seen in the receiver range, and included in these is a dry-battery model, in which the usual accumulator for L.T. has been dispensed with. The car radio is of the two-unit type, and requires no suppressors of similar apparatus. Two types of car aerial will be seen. In the television range the T.8 is probably the most interesting model, providing a picture 10 in. by 5 in. and using an 8 in. speaker with special arrangements to deliver the best quality obtainable on these high frequencies. Only three controls are provided, and the price is 40 guineas.

GARRARD ENG. & MFG. CO. LTD., 36, New Castle Street, Swindon, Wilts. STAND No. 56.

Here will be seen a comprehensive display of automatic record changers, radiogram units and motors (spring and electric), together with tuning motors and selector units designed for push-button tuning purposes. A particular feature will be the new record-changers R.C.10 and R.C.20, the former a popular-priced unit and the second a modified version of the original R.C.4 playing mixed records.

NON-PROPRIETARY EXHIBITORS

| Name        | Stand No. | Price
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Admiralty</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>B.B.C.</td>
<td>76, 78, 79, 96</td>
<td></td>
</tr>
<tr>
<td>Brit. Railways, Ltd., Euston</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>G.P.O.</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>R.A.F.</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>War Office</td>
<td>77</td>
<td></td>
</tr>
</tbody>
</table>

There are 59 of the latest television receivers in Television Avenue all working at once.

There are hundreds of others throughout the Exhibition. Don't just look in at the Exhibition. Go there to "look in."

The Royal Navy, the Army, the Royal Air Force, and the Post Office Exhibits will consist of actual working models showing the way these national institutions are making use of radio.

And you must be televised. You merely go to the television studio in Radiolympia between 11 a.m. and noon, and they will televise you free of charge. You must bring a few friends to be televised, too, and ask those at home to see how you "come over."

There are four performances daily in the theatre, providing you with an opportunity of seeing Mr. Middleton, the Kentucky Minstrels, Barrymore, pepper, Doris Arnould, C. Denier Warren, Leslie Mitchell and Joan Millar, Adelaide Hall, Murray and Moone, Hatice Hatch, Scott and Whelan, Nomo King and Hubert—to mention but a few of the celebrities who will be there.

Famous bands, too, are well represented in the Radio Theatre. Bobby Howell and his band of 11, Troise and his Mandoliers (playing banjos!), plus the Kentucky Minstrels.

The girls are peaches! The singing and dancing will be taken in hand by the Gordon Ray Radiolympia Eight, while Miss Radiolympia 1939 will give you an idea of what the people of this country and as well as the judges (well-known radio critics, artists and actresses), think is the perfect radio and television personality. All of these appear daily in the Radio Theatre.

The performances start at 2.30, 3.45, 6.15 and 8 o'clock; and full details of each individual performance will be found in the Programme which is on sale at the theatre at the price of 3d.

The four programmes are arranged each day into an all-in-one fashion parade, half-an-hour of the Television Programme Page, an hour of variety, including Charles Austin's version of the B.B.C. feature "I Want to be an Actor," an hour of the Kentucky Minstrels, with a repeat performance later in the day of either the Kentucky Minstrels or the Variety Programme. There may be slight variations from day to day.

Over 1,000 seats are available at 1s. 3d. each, there is comfortable standing room for over 500 visitors at 6d. each, while a few front stalls may be specially reserved at 2s. 6d. and 3s. 6d. each.

In addition to the wide range of receivers in table and console types to be seen here, the well-known Osram valves and the wide range of G.E.C. batteries will also be available at 31 guineas. A simple television receiver of the table type giving vision and having only two controls is available at 19½ guineas. This H.M.V. table model incorporates push-button tuning and wavechange, receiver of the table type giving vision and having only two controls is available at 19½ guineas. An outstanding feature on the Stand will be a range of A.R.P. Emergency Lighting sets, for lighting industrial and public shelters. The rectifying equipment displayed covers a wide field and illustrates the growing use of this means for A.C. to D.C. conversion. The transformers shown range from small models for kit construction and conversion of mains, up to models with a current carrying capacity of 7.5 kva.

Displayed. Full details of their exhibits have not yet been released.

GOODMANS INDUSTRIES, LTD., Lancelot Road, Wembley, Middlesex. STAND No. 19.

Here will be seen the extensive range of H.M.V. broadcast and television receivers. The broadcast models include popular-priced radiograms, table models, a battery portable, and at the other end of the scale elaborate auto-radiograms. In the television models the large screen console model at 45 guineas will no doubt prove an attraction. A simple television receiver of the table type giving vision and sound and having only two controls is available at 31 guineas.


On this stand is shown a comprehensive range of battery-chargers, rectifying equipment, and transformers. The battery-chargers, incorporating metal rectification range from the Tom Thumb battery-charger which charges a 2v. cell at ½ amp, price 12s. 6d., up to large multi-circuit models for installation in large service stations. An outstanding feature on the Stand will be a range of A.R.P. Emergency Lighting sets, for lighting industrial and public shelters. The rectifying equipment displayed covers a wide field and illustrates the growing use of this means for A.C. to D.C. conversion. The transformers shown range from small models for kit construction and conversion of mains, up to models with a current carrying capacity of 7.5 kva.

A MONG the many new receivers to be available on this stand are the two-circuit models manufactured by McMichael. The console model at £14 17s. 6d. in which a seven-stage all-wave radio chassis is incorporated will undoubtedly prove the most interesting. Full details of the remaining range have not yet been released.


This exhibit consists of specialised instruments developed for specific technical work.

MARCONPHONE CO., LTD., 210, Tottenham Court Road, W.1. STAND No. 36.

This exhibit consists of specialised instruments developed for specific technical work.


Here can be seen the extensive range of Marconiphone and cathode-ray tubes amongst which the specially developed E series of valves will no doubt create wide interest. The special "silent" H.F. valve is used in a number of commercial receivers for short-wave reception. In the cathode-ray tubes the small 3in. tube is now being extensively used for oscillographs and other similar test equipment.

MURPHY RADIO, LTD., Broadwater Road, Welwyn Garden City, Herts. STAND No. 53.

I., THIS main feature of the Murphy range of receivers is the particularly pleasing cabinet designs in both the broadcast and television ranges. A push-button unit is available, and one of the console receivers has a sliding loud-speaker "fret."


This is a trade exhibit.

HOLSLUN BATTERIES, LTD., Neville House, Page Street, S.W.1. STAND No. 40.

IMHOF, ALFRED, LTD., 112, New Oxford Street, W.C.1. STAND No. 70.

On this stand will be featured the special 1M. long-playing needle designed to prevent record wear. They are sold in boxes of 10 for 2s., and 10 needles play 500 records.

INVICTA RADIO, LTD., 203, Old Street, London, E.C. STAND No. 16.

A WIDE range of receivers will be seen here, and push-button tuning is featured on some of the models. An interesting point is the large open tuning scale, and model A.46/1B is a four-waveband model with a special trawler band indicated on the tuning scale, which is a six-colour glass assembly.

A distinctive cabinet design in the Murphy range of receivers.


This is a trade exhibit.

McMICHAEL RADIO, LTD., Wrexham Road, Slough, Bucks. STAND No. 38.

Among the many new receivers to be available on this stand is shown a comprehensive range of receivers, including battery, table, console, and radiograms, as well as specialised models and television receivers. Push-button tuning is featured together with a specially developed tuning circuit to ensure that accurate adjustments are made when the push buttons are manipulated. Another novel feature is the automatic dial selection for manual operation. A point of interest in the receivers is that the short-wave range tunes down below 15 metres on some of the models. The television receivers are available in several patterns, and these include the simple sound and vision unit as well as combined television and radioGram apparatus.

PRACTICAL WIRELESS

August 26th, 1939
NEW ERA PUBLISHING CO., LTD., 12, Newton Street, London, W.C.2. STAND No. 5.


A WIDE range of wire and specialized aerials may be seen here including a special dipole for use with all wave receivers which is both simple to erect and low in price.


W.12 shall be showing on this stand our complete range of technical and wireless books. In addition to the various books on sale, blueprints for almost any type of receiver may be obtained. PRÁCTICAL WIRELESS, Practical Mechanic, Practical Motorist and The Cyclist are a few of the leading journals which will be on view. Our comprehensive range of handbooks, including the Wireless Constructor’s Encyclopedia, “Everyman’s Wireless Book,” “Television and Short-wave Handbook,” “Sixty Tested Wireless Circuits,” “Wireless Coils, Chokes and Transformers,” “Practical Wireless Service Manual” and “Wireless Transmission for Amateurs” will be on sale, and models of the receivers described in this issue will be available for inspection. Mr. F. J. Camm and the technical staff will be available to answer readers’ queries free of charge. Call and see us.

PHILCO RADIO AND TELEVISION CORPORATION OF G.B., LTD., Private, Greenford, Middlesex. STAND No. 81.

ONE of the most interesting receivers on the Philco stand will be Model A7, a 15-guinea seven-valve all-wave unit for A.C. use. This incorporates a built-in wavetrap on long and medium waves, audio-degeneration with push-pull output, push-button tuning, corrugated cone speaker, and the usual refinements found in a “luxury instrument.” It delivers an output of 21 watts. Organ key “push-button” tuning and tone control is a feature of other models and a very novel curved push button tuning dial facilitates tuning on all wavebands.

PILOT RADIO, LTD., 31-33, Park Royal Road, London, N.W.10. STAND No. 42.

ON this stand Messrs. Pilot will be showing one of the British midget mains receivers of the type which has proved so popular in the U.S.A. Weighing only 4½ lb., the Little Maestro measures only 7½ in. high by 11½ in. wide and 5½ in. deep, and may be connected to A.C. or D.C. mains. It delivers an output of 22 watts. Organ key “push-button” tuning and tone control is a feature of other models and a very novel curved push button tuning dial facilitates tuning on all wavebands.

PHILIPS LAMPS, LTD., Century House, Shaftesbury Avenue, London, W.C.2. STAND No. 46.

SOME interesting developments have been made in the new Philips broadcast and television receivers. The push-button mechanism is very ingenious and operates in conjunction with the newly developed “push-in” spiral tuning condenser. A small tool is kept in an accessible position on the rear of the cabinet and it is only a moment’s work to change stations, and in the case of three of the buttons, to change the wave range (medium to long). The Philips MotoRadio will also be on view.

PLESSEY CO., LTD., Vilearage Lane, Ilford, Essex. STAND No. 68.

THIS exhibit will consist mainly of components and radio chassis designed for manufacturers, but will reveal a number of interesting points for the constructor.

DON’T forget to visit the Model Factory showing various processes of manufacture including coil winding, wire painting, and coil spring making, coil adjusting, test and assembly, resonance test, impedance and chasis wiring, coil testing, etc.

DON’T omit to visit Stand No. 9, which is our stand—same site as last year. On this stand we will show a full range of standard wireless books, current technical periodicals, also the new receiver built on the Catalin transparent chassis.

THERE will be a battery of sixteen radio drama groups showing the chassis of many of the leading manufacturers’ sets.

READERS and dealers wishing to organise a party may take advantage of the entering and hotel accommodation at reduced prices, the reduced fares by road and rail, and the special party tickets issued at half price. Full details from the R.M.A. Party Bureau, 30, Russell Square, London, W.C.1.

THE Herron will also undertaken to book seats for suitable performances in Radiolymphia’s Broadcasting and Television Theatre in advance.

THIS year, for the first time, the exhibition has a special export section. Overseas visitors should obtain one of the special export catalogues issued in connection with this section.

AN exhibit of special interest to listeners without mains supply is the vibrato, a small self-contained component which enables the user to step up a D.C. battery, supply of anything over 2 volts, to anything up to 250 volts A.C. It is not only intended for use for motor-car receivers, but also for battery users and those with private country-house lighting plants of 24 or 32 volts D.C.

THOSE troubled with interference from microwaves, refrigerators, etc., should examine the circuits made for the numerous noise suppressors and anti-interference aerials on show. Some of these will not only eliminate most of the interference, but will extend the range of the set very considerably.

THIS is the first time in the history of the world in which a theatre has been built specially for broadcasting and television. The Radio Theatre at Olympia is a replica of the famous Book Theatre in Hollywood. It has cost £5,000 to build, and has a semicircular revolving stage that will hold over 300 performers.

THE audience will enable each of the 2,500 visitors to hear perfectly, and obtain an uninterrupted view of every part of the stage.

F. in doubt on any problem, call at our Stand No. 9 and consult the Editor or a member of his staff.
PYE, LTD., Radio Works, Cambridge. STAND No. 32.

THIS new Baby Q portable will attract considerable attention here, and will have as a rival the Mite, which is a tiny A.C./D.C. receiver even smaller than the Baby Q. Push-button tuning is featured on some of the remaining Pye models and the international console which incorporates bandspread tuning in an eight wave-band circuit, will undoubtedly be a highlight of the stand. All the principal short-wave stations are actually named in their correct positions on the dial and can be tuned as quickly and accurately as the locals.

RADIO GRAMOPHONE DEVELOPMENT CO., LTD., Globe Works, Newtown Row, Birmingham. STAND No. 29.

The range of receivers here embraces six- and fourteen-valve models, priced from 16 guineas to 110 guineas. The latter is a fourteen-valve auto-radiogram with a fourteen-way motor-driven push-button tuning system. A cruising device facilitates manual tuning. All of the R.G.D. receivers are in the luxury class. An all-wave aerial at 3½s. will also be on view on this stand.

REPRODUCERS AND AMPLIFIERS, LTD., Frederick Street, Wolverhampton. STAND No. 111.

THIS stand will consist merely of an office and shop window as Reproducers and Amplifiers are now concerned solely with the manufacture of speakers, etc., for set makers.

ROSE, NORMAN (ELECTRICAL), LTD., 43, Lamb's Conduit Street, W.C.1. STAND No. 12.

THIS firm specialises in service equipment, and accordingly the exhibit will consist of service aids and test equipment. In the former class will be various replacement components.


At this stand will be an extensive range of small items such as Piezo-electric microphones, pick-ups, etc. Various types of volume controls and small items suitable for home constructors will also be seen, but full details of the exhibit have not yet been released.


SCOTT INSULATED WIRE CO., LTD., Queensland Works, Westminster Road, N.W.9. STAND No. 103.

VARIOUS types of wire will be seen on this stand, including a new material marketed under the name "Manganamron". This is a British drawn-wire embodying the essential characteristics of Manganin.

SELECTA, LTD., 51, Southwark Street, S.E.1. STAND T.2.

THIS is a trade exhibit.

SELMER, HENRI & CO., LTD., 114, Charter Cross Road, W.C.2. STAND No. 99.

In addition to certain electrically amplified musical instruments on this stand, some portable amplifiers, suitable for band-repeating or public address work, will also be seen.

SERVISOL, LTD., 74, Renshaw Street, Liverpool. STAND No. 11.

A SPECIAL servicing aid for cleaning switch contacts and similar moving parts will be prominently featured on this stand, together with other service aids.

SIEMENS ELECTRIC LAMPS & SUPPLIES, LTD., 29, Upper Thames Street, E.C.4. STAND No. 52.

FULL O' POWER radio batteries and Tungsram valves are the main items to be seen on this stand, and in the former range are types for all purposes, from an inexpensive 120-volt H.T. set at 6s. to super types for powerful multi-valves. The new all-dry combined L.T. and H.T. batteries will also be on view, together with torch and similar cells. Of outstanding interest in the valve range are the new 1.4 volt economy battery valves, which enable the L.T. accumulator to be dispensed with and dry batteries used for the L.T. supply. A new type of valve in the "E" range is the E.F.M.I which is a combined variable-mu L.F. pentode and Magic-Eye Tuning indicator. The E.L.L.1 is a combined push-pull double pentode for vibrator supply sets, and is also of interest.

STEATITE & PORCELAIN PRODUCTS, LTD., Stourport-on-Severn, Worcs. STAND No. 61.

HERE will be seen the many developments in steatite production, valve-holders, coil formers and the various other items used in modern H.F. apparatus.

STERLING BATTERIES, LTD., Sterling Works, Dagenham, Essex. STAND No. 85.

A WIDE range of batteries for all modern radio purposes may be seen on this stand.
TROPHY 6
- 6 VALVES.
- WAVE-RANGE 6.2 to 545 METRES.
- ELECTRICAL BANDSPREADING.
- AVC, BFO AND SEND RECEIVE SWITCHES.
- BUILT-IN SPEAKER.

A highly satisfactory receiver.
-K. JOWERS-G5Z.

TROPHY 8
- A.C. 8-valve communication receiver.
-自杀性 short-wave work. Range 7 to 550 metres.
- Separate Oscillator, A.C.V, BFO and Pitch control.
- Doublet or single wire aerial inputs.
- Speaker and 'phone sockets.

TROPHY 3
- 3 Valves.
- A.C. and Battery models.
- Wave-range 6.2 to 550 metres.
- Built-in speaker.
- Regenerative type 3-valve receiver.

TROPHY 9
- 2-STAGE PRESELECTOR
- Wave-range 7 to 550 metres.
- Band selector and Send/Receive switches.
- Self-powered for A.C. mains 200/250 volts.

Short-wave listening with a Trophy means satisfaction and thrills not to be missed. Trophy, at a great saving, gives World contact whenever you please. Trophy is always first choice. See about your model NOW.

IMMEDIATE DELIVERY

August 26th, 1939
PRACTICAL WIRELESS
577

IMMEDIATE DELIVERY

All-British Communication Receivers

Yes, here’s the most sensational value! A real Amateur’s junior A.C. communication model with all essential tuning refinements. The performance is amazing. Note the features: 6 valves, 4 bands, 6.5-550 metre continuous. Separate direct electrical band spreading. Frequency calibrated scale. AVC, BFO and Send/Receive switches. Pitch control. Built-in speaker, Phone jack. And remember—you choose an all-British receiver when you choose the TROPHY 6. For A.C. mains 200/250 volts.

GUARANTEED 12 MONTHS, including valves.

12 GNS.

TROPHY 9B: 12 ½-down and 15 monthly payments of 12 ½.

MIKES - All-Purpose

These highly sensitive transverse current microphones are ideally suitable for transmitting work, P.A. or for home broadcasting for use with any amplifier or existing radio. Supplied complete with separately housed transformer and 25ft. lead.

TABLE MODEL. Cash or C.O.D. 32/6 or 2/6 with order and 9 monthly payments of 3/9.

TELESCOPIC FLOORSTAND MODEL
As illustrated. Cash or C.O.D. 42/6 or 2/6 deposit and 11 monthly payments of 4/6.

2-STAGE PRESELECTOR

Worth its weight in gold when used with any type of receiver. Increases signal strength, selectivity, range. Reduces 2nd channel interference to a minimum. Wave-range 7 to 550 metres with spread tuning. Band selector and Send/Receive switches. Self-powered for A.C. mains 200/250v.

£6 15s. OR

and 12 monthly payments of 11/7.

USE COUPON to ORDER or FOR LISTS

To PETO-SCOTT CO., LTD., 77 (Prl), City Road, London, E.C.1.
Tel.: CLI 9875.

Please send me Cash/C.O.D./H.P.
Cash enclosed £
or Please send complete TROPHY and Mike lists.

NAME
ADDRESS

Tel.: 901 1111.
VARLEY (OLIVER PELL CONTROL), Cambridge Road, Cambridge, UK. STAND No. 108.

ALL the well-known Varley components will be on open for inspection on this stand and if you happen to press no details have received of any new lines for the home constructor. The Varley range includes tuning coils in all patterns, wire-wound resistances, power potentiometers, L.F. chokes, mains transformers, and thermal delay switches.

VIDOR, LTD., West Street, Erin, Kent. STAND No. 51.

THE "Good Companion" portable will be the high spot on this stand, and will, no doubt, vie for popularity with the Vidor Model 320, which is a portable employing the new Economy valves operating with dry battery L.T. supply. In addition to other receivers, Messrs. Vidor will be showing batteries for practically every type of receiver, as well as small cells for cycle lamps, etc., and a number of domestic electric appliances.


HERE will be seen a range of technical, educational, and standard publications.

WESTINGHOUSE BRAKE & SIGNAL CO., 22, Old Broad Street, London, E.C.2. STAND No. 22.


This is a trade exhibit.

ULTRA ELECTRIC LTD., Western Avenue, Acton, W.3. STAND No. 58.

Push-button tuning will be featured on the Ultra receivers to be seen on this stand, and all-wave tuning is a prominent point in certain models. Full details have not yet been released.

VACUUM SCIENCE PRODUCTS LTD., 186, Weir Road, Balsam, London, S.W.12. STAND No. 18.

HERE may be seen various types of apparatus used for television and associated equipment.

The Vidor self-contained all-battery portable, employing the latest 1.4 volt valves, condensers for power factor correction, condensers and special units for suppression of interference with radio reception, including special types for use in vacuum cleaners, refrigerators, electric sewing machines, hair dryers and similar apparatus. Suppression condensers for car radio work. Special ranges of condensers for use in high temperatures incurred in the tropics. Ignition condensers. Silvered mica precision condensers and in ceramic materials, and an air spaced trimmer having straight line adjustment and low temperature coefficient suitable for pre-set push-button sets.

The theatre auditorium is built in a semi-circle around the stage on the Bowl or Saucer principle. There is a "clinic" on the stand and you will be the high spot on this stand, and will, no doubt, vie for popularity with the Vidor Model 320, which is a portable employing the new Economy valves operating with dry battery L.T. supply. In addition to other receivers, Messrs. Vidor will be showing batteries for practically every type of receiver, as well as small cells for cycle lamps, etc., and a number of domestic electric appliances.


HERE will be seen a range of technical, educational, and standard publications.

WESTINGHOUSE BRAKE & SIGNAL CO., 22, Old Broad Street, London, E.C.2. STAND No. 22.

Add to this a staff of nearly 400 people including world famous radio stars, television camera and microphone operators, lighting engineers, stage and front-of-the-house staff, and a salary bill of over £15,000 a week. The lighting bill is larger than that of half of London's West End theatres put together.

If you are interested in "radio" novels, don't fail to visit Stand No. 29, see the Electromagnetsmith, who has spent many years in special study of the brain. There is a "clinic" to show you how their working models to tell you all about it.

WHAT happens when you ring up a friend in some part of our far-distant Empire? This and other secrets of the Post Office radio system will be revealed in their special exhibit. They will also show you how they trick down unlicensed transmitters and receivers.

A miniature U.H.F. condenser in the Polar range. Ideal for transmitters or receivers.

SHOW SNIPPETS

YOU must make a special visit to Television Avenue whether you live in the present television area or not. You will be astonished at the degree of perfection attained by modern television receivers.

THE theatre auditorium is built in a semi-circle around the stage on the Bowl or Saucer principle.

THERE is a special section of interest to constructors—a veritable knob-twiddlers' section.

THE new Hammond Organ will be seen for the first time in this country at the Radio Theatre. It is capable of producing 600 different effects, such as a motor turn on, the secrets of the Post Office radio system will be revealed in their special exhibit. They will also show you how they trick down unlicensed transmitters and receivers.

HOW is the picture obtained inside the cathode-ray tube? This is a mystery to many of our non-technical friends. Take them to Radiolympia and show them "how it works."

HAVE you tried to tune-in stations on some of the receivers fitted with very high-priced sets? All the tedious knob-turning has been done away with in some of the new receiver's models, and a motor turns the control for you. Just you stand by ready to push a switch and stop the dial when the station you want has been reached. This is not push button tuning, but "cruiser" tuning.

PRACTICAL WIRELESS

August 26th, 1939
A Simple Tapping Key

Recently I have become interested in the subject of amateur transmitting, and as I needed a key to practise the Morse code I made one as shown in the accompanying sketch.

I removed the magnet and coll from an old earphone case, and screwed a brass pillar on the chromium top, at one end, and an ebonite pillar at the other. Then I fastened a springy brass arm at one end into the ebonite pillar and soldered a wire to it. This went to one of the two terminals on the terminal strip. At the other end was fixed an ebonite knob. A wire was then soldered to the metal part of the case and taken to the second terminal on the strip. These were then connected up in series with a battery and buzzer.

An Adapted Slow-motion Driving Head with Extension Rod

Being in need of a low-ratio slow-motion head for driving the tuning condenser of a tuned high-frequency stage in my short-wave receiver, I pressed into service an old all-brass air-spaced Ormond variable condenser complete with integral slow-motion device, large degree-marked control knob and smaller slow-motion driving knob. The sketch shows how the adaptation was successfully accomplished. The condenser was first entirely dismantled, the fixed-vane assembly being removed complete, and the moving vanes wrecked out with pliers from the slots on the moving spindle. Only the front frame of the condenser with the bush, moving-spindle assembly and slow-motion device were retained for use. The necessary pressure of the steel balls in the large moving-vane spindle against the inside of the circular metal casing of the slow-motion device was achieved by holding the assembly in the left hand, exerting a firm inward tension of the moving spindle with the left thumb, and soldering two small blocks of solder on diametrically opposite surfaces of the main spindle in front, close to the front edge of the fixing bush. The tension was then further increased, and in the small space between the front edge of the bush and the blocks of solder ordinary black cotton thread was wound tightly several times round the main spindle, and knotted. This resulted in quite sufficient pressure to operate the slow-motion device. An extension-rod assembly was next attached to the large rear moving spindle by taking a short length of thin diameter dowel-rod and bending round it a short length of sheet tin, securing the latter to the rod by a bolt and nut through holes drilled in the tin and the rod, and to the moving spindle by soldering. The junction of the piece of sheet tin was soldered along its length as shown in the sketch. Finally, a length of tin, diameter dowel-rod was forced into a hole drilled in the back of the tin. diameter rod and secured with a trace of glue and two small screws. The extension-rod assembly was then painted with grey "Bakelite" enamel to give a finished appearance. The drive is connected to the tuning condenser by the usual insulated flexible coupler, and is working with complete satisfaction.

An Epicyclic Extension Drive

Requiring means for determining various adjustments of preset condensers employed in neutralising series aerial and padding circuits, etc., I devised the simple but effective arrangement illustrated. It will be seen that coupling to the ebonite screw adjuster on the condenser had to be made so that during the rotary action of the drive the screwing action, as indicated by the arrow under the spring, would be effective. To this end, then, I used a medium-tension spring, one end of which I bent in to engage in the slot "S" of the condenser adjusting screw, the other end of the spring being soldered to the short length of quarter-inch brass rod fitted into the end of the epicyclic drive. Aluminium of 16 S.W.G. is used throughout for the mounting, but to prevent the capacity of the condenser being exceeded, this mounting bracket, as depicted by the dotted lines, does not cover the back plate of the condenser. The rest of the details are, I think, self-explanatory.

R. L. Jefferson (Forest Gate).
Leaves from a Short-wave Log

New Uruguayan Stations

The Servicio Oficial Difusión Radial electra of Montevideo (Uruguay) announces that the construction of its 5-kilowatt short-wave stations is nearing completion, and that very shortly they will carry out their initial tests. They are CX4A, 48.98 m. (6.125 mc/s), which has already been reported to be working; CXA10, 29.22 m. (11.805 mc/s), and CXA18 on 19.61 m. (15.33 mc/s).

W6XBE Extends its Broadcasts

The 20-kilowatt transmitter W6XBE is now working to the following time schedule: B.S.T. 05.00-09.00; 13.00-16.00 with a transmission to Asia on 31.48 m. (9.53 mc/s), 19.74 m. (15.2 mc/s), and from B.S.T. 01.00-06.00 only. Address: Estaciones XEDP y XEFA, Departamento Autonome de Prensa y Publicidad, Mexico City.

Another Station for Manchukuo

According to reports from the Far East the Japanese are erecting a new 10-kilowatt transmitter near Shinkyo (Hsin-yang), the capital city of Manchukuo; it will work on 49.98 m. (6.125 mc/s); 31.73 m. (5.644 mc/s); 60.73 m. (11.66 mc/s), and 18.74 m. (16.2 mc/s).

Radio Signals from Newfoundland

GXY and GSX are the call-signs of a transatlantic short-wave station established by the Exposition of the Public Schools Exploring Society at the southern end of Grand Lake, Newfoundland. Communications will be made daily until September 6th on two channels, namely, 42.22 m. (7.104 mc/s) and 117.55 m. (2.562 mc/s), between B.S.T. 22.00-24.00.

No More League of Nations Broadcasts!

In view of the fact that the Schwarzenburg (Switzerland) short-wave transmitter was destroyed by fire, negotiations are taking place between the Federal Government and League of Nations to take over the latter's stations situated at Prangins. If, and when, the sale is carried into effect, it will be used for the radio broadcast of the special Berne, Zurich and Lausanne programmes destined to Swiss nationals overseas.

Another Mexican Station Logged

XEXA, Mexico City, on 48.92 m. (6.133 mc/s), 100 watts, was recently heard relaying a programme from the medium-wave station XEDP in that city. The station opens with a melody, The March of the Toys, and is on the air daily between B.S.T. 14.30-16.30; 20.30-22.30, and from 01.00-06.00 on weekdays, and on Sundays, from B.S.T. 01.00-06.00 only. Address: Estaciones XEDP y XEFA, Departamento Autonome de Prensa y Publicidad, Mexico City.

LIST OF COMPONENTS FOR 1940

AIR-HAWK 9

Three .00006 mfd. Triplote condensers, Type Tn. 160 (Premier).

Three .00003 mfd. ditto, Type Tn. 15 (Premier).

Two Epiylic Drives (Premier).

One Sacke Transformer, Type A.C.9 (Premier).

One Model 21, 0-1 milliammeter (Premier).

One full-ratio, Dual-speed drive, type 1070 (Eddystone).

Three couplers, Type No. 1099 (Eddystone).

Three sets of ferrites, Type No. 1098 (Eddystone).

One six-pole coil holder, Type 964 (Eddystone).

Two miniatures, Type 1099 (Eddystone).

Two sets of ferrites, Type 1028 (Eddystone).

One Midget condenser, Type 1013 (65 mfd. Eddystone).

Five single-end, four Type S122T and one Type S34 (Bulgin).

One pointer knob, Type K.58 and reducer to 3-16th in. (Bulgin).

One 1,500 ohm 1 watt resistor (Bulgin).

One 500 ohm 20 watt resistor, Type PR2 (Bulgin).

One 500 ohm 1 watt resistor (Bulgin).

One 100 ohm 1 watt resistor (Bulgin).

One B.F.O. coil, Type P. (Wearite).

One component mounting bracket (B.T.S.).

Two four-pin ceramic valve-holders (B.T.S.).

One B.F.O. coil, Type P. (Wearite).

One shaft-coupler, No. 906 (Bulgin).

One Mains connector, Type P.20 (Bulgin).

One black crackle panel, 17 in. by 91 in. (Peto-Scott).

One main connector, Type P.20 (Bulgin).

Five four-pin condensers, Type P. 96 (Bulgin).

One fan-coil condenser, No. 2005 (Bulgin).

One .002 mfd. Type 4601/S condenser (Bulgin).

One .04 mfd. Type 4603/S condenser (Bulgin).

One .01 mfd. Type 4603/S condenser (Bulgin).

One .001 mfd. Type 4603/S condenser (Bulgin).

Two .002 mfd. Type 4603/S condensers (Bulgin).

Three .02 mfd. Type 4603/S condensers (Bulgin).

Four .002 mfd. Type 690W. condenser (Dubilier).

Six .0005 mfd. Type 6600W. condenser (Dubilier).

One .002 mfd. Type 4602/S condenser (Dubilier).

One .05 mfd. Type 4602/S condenser (Dubilier).

One .1 mfd. Type 4602/S condenser (Dubilier).

One .01 mfd. Type 4601/S condenser (Bulgin).

One .0005 mfd. Type 6600W. condenser (Dubilier).

One .001 mfd. Type 6600W. condenser (Dubilier).

One .04 mfd. Type 4601/S condenser (Dubilier).

One .01 mfd. Type 4601/S condenser (Dubilier).

Three .01 mfd. Type M condenser (T.C.C.).

Twelve 1 mfd. Type 4601/S condensers (Bulgin).

Three 8 mfd. Electra. Condensers, Type 0281 (Bulgin).

Three 25 mfd. 25 +, Type F.T. (T.C.C.).

One D.130 variometer, Type X.128 (Clai).

One A1, A2, E Socket strip, Type X.382 (Clai).

One oil bath inductor, Type X.380 (Clai).

One filter coil, Type X.121 (Clai).

One minimum chassis, 16.5 W.G., 16 in. by 10in. by 8in. (Petro-Scott).

One black crackle panel, 17in. by 9 in. (Petro-Scott).

One metal cabinet, Type T.9 (Petro-Scott).

One metal cabinet, Type T.9 (Petro-Scott).

One four-pin ceramic-valve holder, Type X.63, two Z63, one DL63, one L63, one KT63 and one U20 (Osram).


One plug and jack (Izmer Electric Ltd.).

One four-pin ceramic-valve base, 1600 ohm field, Type A.C.9 (W.B.).

Sunday News Bulletin from Denmark

At B.S.T. 19.00, every Sunday, OZHZ, Skamalsbek (Denmark), broadcasts a news bulletin and talk in the English language; the channel is 19.58 m. (15.32 mc/s).

Will Italy Broadcast Outside the Band?

Listeners state that they have been hearing tests of musical broadcasts from IRW, Rome-Torrenova (Italy), a 30-kilowatt commercial transmitter usually operating on 15.37 m. (19.52 mc/s).

More 50-kilowatters for Japan

Reception of broadcasts from Dairen (Kwantung), China, has been made in the British Isles through the new 50-kilowatt Tokio transmitters JVZ and JVZ2 on 25.39 m. (11.815 mc/s) and 29.37 m. (11.825 mc/s) respectively.

CHILDREN'S HOUR

Midland provides the second part of Children's Hour for all regions on Friday, September 1st. The programme will consist of folk songs and country dances; and the contributors will be the Norris, Stanley Sextet, Bob Arnold, the Farmer's Boy from Oxfordshire, who was first heard on the 'Roving Reporter' series; and the Castle Bromwich School Bamboo Pipe Band, which, under its conductor, A. H. Bliewett, has given some twenty-five demonstrations in the Midlands.
For that little extra sensitivity—and that little extra top response—that slight extra 'forwardness'—that slight extra smoothness—which add so MUCH to your set's value,

FOLLOW MR. CAMM'S EXAMPLE AND USE A

Stentorian
The Universal Permanent Magnet Speaker

WHITELEY ELECTRICAL RADIO CO., LTD., MANSFIELD, NOTTS.

NEW: AUTHORITATIVE
TECHNICAL: PRACTICAL

THIS work provides in a convenient form a comprehensive and reliable source of reference to Aircraft-Construction, Production, Maintenance and Overhaul. The wide adoption of metal construction has rendered a work of this kind necessary even for those men who have been for many years associated with the aircraft industry. Never before has the whole aspect of Aircraft Production and Maintenance been covered within the confines of a single work.

Through the assistance of many of the larger manufacturers, "AERO ENGINEERING" is able to deal thoroughly, and in a practical manner, with some of the leading types of British aircraft, both from the production side and the point of view of the ground engineer.

VERY BRIEF OUTLINE OF "AERO ENGINEERING"


50 FREE DATA SHEETS
Prepared with the assistance of the Air Ministry and leading British Aircraft Manufacturers, these contain details of the most popular types of civil and military aircraft.

FREE
Handsomely Bound Case for filling your Data Sheets

Indispensable to all in the aircraft industry. Written by men with unsurpassed experience.
If there's something you want to know about resistances, perhaps we can help you. If there's nothing you don't know about them, you can certainly help us — because we're learning new things every day. In any case, we shall be very pleased to see you at Stand No. 28.

**STAND 28**
**GRAND HALL**

Metallised Volume Control  * Insulated Wire Wound Resistances
Motor Radio Interference Suppressors  * High-Frequency Power Resistances
Power Wire Wound Resistances  * High Voltage Resistances
Ultra-High Range Metallised Resistances  * Metallised Resistances

**DUBILIER**

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

You must visit Stand 30 and inspect the latest range of Westinghouse Metal Rectifiers and Westectors, but, if you are unable to visit the Radio Show, make sure you send 3d. in stamps to Dept. Pra.W., for a copy of the latest edition of "The All Metal Way"
An Efficient Short-wave Receiver Using a New Circuit

The advantages in short wiring, low admittance capacity and H.F. losses realised in the use of a triode-pentode valve for the combined functions of an untuned R.F. stage and detector circuit, prompted the writer to carry out the various improvements on the original triode-pentode short-wave receiver detailed in the November 12th and 19th, 1938, issues of Practical and Amateur Wireless in this new three-valve trio-pen circuit.

In the first place it was intended that the basis of the design should be such that more accurate tuning and logging should be possible, regardless of the number of panel controls.

The same circuit sequence is employed, but on referring to the circuit diagram in Fig. 1, it will be seen that an advantage is taken of the variable-mu characteristic in the pentode portion of the TP230 in the conventional manner; consequently, owing to the appreciable gain developed prior to the detector, quite a useful degree of sensitivity control is obtainable by the potentiometer P1.

Owing to the direct connection of the serial pillar to the top cap, which is the grid of the pentode, it will be apparent that an efficient aerial input is obtainable.

Variable capacity coupling is provided in the earth end of the aperiodic winding of the coil, instead of the anode feed end, the 100 mmfd. condenser control being brought out to the front panel. This method provides a greater degree of H.F. stability and more effective control.

Leaky grid detection is employed, and freedom from aerial resonance and the silky reaction obtainable is quite marked.

Owing to the use of a copper bus-bar for all earth returns, and due to all moving vanes of the variable condensers being at earth potential, the operation of the receiver is completely free from noises and band capacity effects.

Bandspreading

For bandspreading, a precision Eddystone instrument dial and drive was chosen, the provision of vernier adjustment with this dial facilitating vernier setting and with the correct use of this vernier movement will be dealt with later.

For band-setting an 18 mmfd. condenser was decided upon, a reduction drive of the 6:1 ratio epicyclic type, and a modified Eddystone dial providing absolute ease of adjustment. Owing to the complete freedom from backlash and slip in the bandspread control, it will be found possible, after a little experience, to tune in accurately otherwise difficult signals without at times resorting to the use of the bandsetter, but on the higher-frequency bands this condenser will be found essential for logging.

Resistance capacity coupling is employed between the detector and the first L.F. stage, volume control, necessary when using the phones, being effected in the normal manner.

A further stage of L.F. amplification was desirable for both speaker reproduction and as a means for extending DX. logs. Filter-feed coupling is again used between the two L.F. stages, and owing to the by-pass capacity being provided between the first L.F. anode and earth through the transformer winding and G.B., it was found unnecessary to include a further resistance or choke for grid stopping in the output stage.

The complete freedom from any H.F. component straying into the L.F. circuits results in the stability of operation previously referred to, and it was found unnecessary to include a further by-pass condenser in the output stage, the anode choke HFC2 sufficing in this respect.

Again, for logging purposes, another modified Eddystone dial and epicyclic drive is used for the reaction condenser control, whilst the variable-mu bias potentiometer P1 and the aperiodic coupling condenser C6 provide both extra fine adjustment and appreciable gain control.

Chassis Layout

It will be apparent that very short wiring is facilitated by the two functions in the TP230 (VI), a comparatively simple component layout being achieved.

The coupling condenser C6 only is fitted with a flexible coupling and a 1in. x 1in. diameter brass rod, this rod protruding through a large diameter clearance hole in the front panel and being fitted with an Eddystone fluted control knob of the miniature pattern.

Both bandset and variable coupling condensers C4 and C6, respectively, are fitted to an aluminium mount; this was necessitated by the relationship of the condensers on the front panel, and extra rigidity is provided by fixing this mounting bracket to both chassis and front panel.

The 6BA. countersunk bolt securing the mounting plate to the front panel is hidden from view by the bandset condenser dial. Both potentiometers are furnished with 2in. shafts, and these lengths were retained in order that the wiring could be kept reasonably short.

Bulgin universal brackets of the E.H.9 type were employed for fixing the potentiometers, but they required cutting down to 1in., so that they could be accommodated under the chasis. The shafts in each case pass through 3in. brass bushes which also serve to clamp the front panel to the front chassis runner.

The key-switch likewise clamps the front panel and runner, and a point can be waived here with regard to the type of on-off switch desired, the drilling being the
**ElectroDix**

**The Trio-Pen Three**

(Concluded from previous page)

same for the more usual toggle-type Bulgin switch.

The copper bus-bar comprises simply a jin, strip of thin copper foil folded over once or twice, and £ipm in length; the ends being held in place by a bolt securing the reaction condenser mounting bracket and one of the bandspade condenser mounting bracket-fixing bolts.

**Full-size blueprints of all our receivers are available**

A. and E. Connections

For aerial and earth connections, insulating pillars of the fin. type S.S. (Raymart) are used, a hole being necessary in the chassis and located later on in the centre of the earth pillar for connection through the chassi to one side of the chassis, the one being insulating CS, and the other connection is taken immediately from under the nut of the pillar to the grid end of the H.F. choke (HFCH)—this is the top cap of V1.

Ceramic valveholders are used throughout, and particular care should be taken with drilling and filing the hole later on to see that the diameter, in relation to the two fixing holes, is consistently 1iman, otherwise the sockets of this valveholder may short-circuit with the periphery of the hole.

The coil base is of the bakelite type, and here again the same care should be exercised.

The leads from the 'phone or L.S. jack which pass through hole No. 4 should comprise twisted flex, the H.T. side passing through the HFCPos to the H.T. positive. These leads should be pressed well to the chassis.

Chassis

Construction

18 S.W.G. aluminium is used throughout, but to obtain rigidity the front panel as well as the chassis is flanged. This gauge will be found D/article or a little easier to "work" than 16 S.W.G. and full construction and operating details showing the layout of the components above the type, and here again the same care should be exercised.

The leads from the 'phone or L.S. jack which pass through hole No. 4 should comprise twisted flex, the H.T. side passing through the HFCPs to the H.T. positive. These leads should be pressed well to the chassis.

**LIST OF COMPONENTS**

<table>
<thead>
<tr>
<th>COMPONENTS</th>
<th>DESCRIPTION</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESISTORS (Fixed)</td>
<td>A. F. Bulgin &amp; Co., Ltd.</td>
<td>One type HW7, 15,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>CONDENSERS (Fixed)</td>
<td>A. F. Bulgin &amp; Co., Ltd.</td>
<td>One type HW10, 20,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>CONDENSERS (Fixed)</td>
<td>A. F. Bulgin &amp; Co., Ltd.</td>
<td>One type HW25, 100,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>POTENTIOMETERS</td>
<td>( variable )</td>
<td>Twotype M1 and M2, 25 megohms. (Erie Resistor Co.)</td>
</tr>
<tr>
<td>CONDENSERS (Variable)</td>
<td>( variable )</td>
<td>One type CM4, 5000 mfd. (max.) (A. F. Bulgin &amp; Co., Ltd.).</td>
</tr>
<tr>
<td>VALVEHOLDERS (B.M.P. &amp; &quot;Clips&quot;)</td>
<td>( variable )</td>
<td>One type HW4, 18 mfd. (max.).</td>
</tr>
<tr>
<td>REDUCTION DRIVES</td>
<td>( variable )</td>
<td>One type HW5, 1 megohms, 1 watt.</td>
</tr>
<tr>
<td>TRANSMITTER</td>
<td>( variable )</td>
<td>Two type C4, 4 to 75 metres.</td>
</tr>
<tr>
<td>VARIOUS COMPONENTS</td>
<td>( variable )</td>
<td>One type CD, 80 to 180 metres.</td>
</tr>
<tr>
<td>TRANSFORMERS</td>
<td>( variable )</td>
<td>A.F. Bulgin &amp; Co., Ltd.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW6, 1 megohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW7, 15,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW10, 20,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW25, 100,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW30, 150,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW40, 200,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW50, 500,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW60, 1,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW70, 2,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW80, 5,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW90, 10,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW100, 20,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW110, 50,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW120, 100,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW130, 200,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW140, 500,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW150, 1,000,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW160, 2,000,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW170, 5,000,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW180, 10,000,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW190, 20,000,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW200, 50,000,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW210, 100,000,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW220, 200,000,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW230, 500,000,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW240, 1,000,000,000,000 ohms, 1 watt.</td>
</tr>
<tr>
<td>BATTERY CABLE AND WIRING</td>
<td>( variable )</td>
<td>One type HW250, 2,000,000,000,000 ohms, 1 watt.</td>
</tr>
</tbody>
</table>
PREMIER 1939/40 RADIO

PREMIER 1939 "5. V. 5" COMMUNICATION RECEIVER

5-valve Superhet covering 12,200 metres in 9 wavebands.
- Beat Frequency
- Send-Receive Switch
- Oscillator
- Self-speed Spool
- Spread Control
- A.V.C. Switch
- Illuminated Band Spread Dial.

Provision for single wire or Di-pole Aerial. International Octal Valves for 200-250 v. mains (A.C.). Built into black cradle case providing complete screening. 10 in. Moving Coil Speaker in separate steel cabinet to match.

Receiver, complete with all tubes and Speaker £8-8-0


ALL POST ORDERS to:

PREMIER RADIO

INDOORS on MAINS! OUTDOORS on BATTERIES!

★ Switch off at the Mains—it still plays on!
★ Change over entirely automatic—programme goes on without a break!
★ One unit battery—ALL-Dry!

Never before has there been anything like the Pilot "Twin Miracle". Just imagine—a 5-Valve A.C./D.C. Superhet that operates on mains or batteries, that changes from one to the other as required automatically! The programme goes on without a break! Comfortably designed, with carrying handles, it can be taken outdoors, indoors—upstairs, downstairs—whether electric supply is available or not. You must hear it! Go to your Pilot dealer for free demonstration. And while you think of it—post coupon for full particulars.

A.R.P. Just imagine—lighting may go out, power may fail, but the "Twin-Miracle" carries on without a break!

SEE IT AT STAND 42, RADIOLYMPIA

TWIN MIRACLE

5 VALVE AC/DC COMBINED MAINS—BATTERY PORTABLE SUPERHET

SHORT-WAVE CONDENSERS

Guaranteed Accuracy within +2 per cent. Model No. 21
- Cracked Sleeve 50, 100, 200, 500, 1,000 µfd.
- Vacuum Type 50, 100, 250, 500, 1,000 µfd.
- New Trolitul Split-Stator Condenser 50 x 50 mmfd.

PREMIER MOVING COIL METERS

Guaranteed Accuracy within +2 per cent. Model No. 311
- 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50, 100, 200, 500, 1,000 Ohms.
- Guaranteed Accuracy within +2 per cent.

SPECIFICATION:
5 latest type high-efficiency Octal base valves. Dial calibrated station names and wave-lengths. Wave coverage 200-3,500 metres. 5,000-2,000,000 metres. 200/250 volts A.C. or D.C. or self-contained dry battery. No earth required. Self-contained aerial. Size 13 ins. long, 17 ins. high, 8 ins. deep.

GUINEAS INCLUSIVE OF BATTERIES
or by easy H.P. Terms. Prices do not apply in Eire.

FREE! Transatlantic Wave-length Chart!

CALLERS to: Jubilee Works, or 165 Fleet St., E.C.4. Central 2833 or 50 High St., Clapham, S.W.4. Macaulay 2381.

PILOT RADIO LTD., 31-33, Park Royal Road, N.W.10. Tel.: WILlesden 7353/4/5.
A Reader's Den

SIR,—I enclose two photographs and a short-wave set of my own, which may prove interesting to other readers. The receiver on the left-hand side of the window, being an H.F. stage, is built in three units. The first is a two-stage pre-selector, consisting of two fully tuned H.F. stages, using Hariv SG220 S.W. valves. The centre unit is the detector stage, using a PMD12. The L.F. amplifier is on the right, the valve being an H.L2, biased at 4.5 volts. Four and six pin S.W. valves (Eddystone) can also be seen in this photograph.

The other photograph shows the apparatus on the right-hand side of the window. The original "Simplex Three" is on the left, with the log-book, mike, key, and 'phones by the side of it. The transmitter in the rack is just a C.O.-P.A. wave transmitter, using battery valves at the moment (with a mains unit), but I've got an APP4 and an 0.1/400, so I'm hoping to get a mains set going very shortly. My power now is only about 1 watt, so there's room for improvement.—S. E. Jozza (Croydon).

An Efficient S.W. Set for the Beginner SIR,—I am a new reader of your excellent journal and I have made many of the smaller articles described in its pages. I am only a beginner and I am not yet far advanced in the science of radio. I have always been interested in short-wave work and I should like to build a small short-wave set. I am one of many other readers I know, be very grateful if you could start us on short-wave reception with a one- or two-valver. Being unable to get much elaborate apparatus, the simpler the set the better, and it should employ home-made coils of the plug-in type. I would also like to add that I have just finished making my S.S. one-valver, and I am very proud of its performance.

J. K. SMITH (Droitwich).

Solution to Problem No. 361

When Hink's made his circuit modifications he completed the cathode circuit of his detector stage, thus preserving this valve from functioning. A current of 50 mA was the best DX heard here during the past month.

CM2WD: K4DUI, Z5G, 6BZ, CGK, LKN, NYD, PH4, P2Z, OQ5KU, AT9, 9TV, P1KOG; UK5HA; VE4GK, 5AAD, AHP, AZ, GI, GC, HR, VO; VK2ACX, IR, UD, 3BC, DF, VJ, XB, QC, CR, CZ, VU, WL, H8V, WHW, BAC11; YQAC;

VU3FO: 70 W's, including QQL(Nevada), PFL and QAP (Arizona); 18 W's; ZEBJ; ZGC; QVY; YRA.

At present I find the best times for DX listening to be between 07.00 and 09.00 E.S.T. during the following three hours, and 18.00-20.00 B.S.T. in the evening.

QSL cards have recently been received from TG5JG, WP1WB, VK7CL, ZS8F, (for reception in December, 1937), VE3DD, TI2LR, all 20-m. phones, and from DF4N WD7GTP, TF5M for 20-m. C.W. Also from W3GZZ, CW on 40 m.

The serial in use here is a very ordinary inverted L, 40ft. long, 20ft. high, E.W., but I hope to put up something a little more efficient in the near future, probably a directional beam, thanks to your article! The receiver is a battery-operated 0-2 with headphones, and has brought in a total of 107 countries on the amateur bands, with 90 on telephony. Every band is covered from 1.7 m/c/28 m/c.

Any S.W.Ls. who might care to correspond with me can be sure of an early reply.

L. Stingley (6, Verdon Road, Wisbech, Cambs).
**Promenade Concerts**

Our Music Critic, Maurice Reeve, Discusses the Week's Concerts

*Monday.*

Good Friday Music (Parsifal) and Siegfried's Journey to the Rhine ("Twilight of the Gods"): Wagner.

**Tuesday.**

Two Pianoforte Concertos, Mozart in C minor, and Schumann; Pianist: Solomon.

**Thursday.**

Richard Strauss's Symphonic Poem, "Ein Heldenleben" ("The Life of a Hero").

**Friday.**

Beethoven's sixth (Pastoral) Symphony and Coriolan Overture.

**Saturday.**

Beethoven's fourth Pianoforte Concerto, pianist, Myra Hess. Another of Strauss's Symphonic Poems, "Till Eulenspiegel's Merry Pranks": Elring; Concerto in E and the church cantata, "All Praises to the Lord," are also among the week's most significant concerts. Myra Hess is sure to give it its due. Beethoven's Symphony the week. The Pastoral Symphony of Beethoven, his fifth. Strauss's Symphonic Poem, "Ein Heldenleben" ("The Life of a Hero").

**R.S.G.B. EXHIBITION**

The following companies have accepted an invitation to take part in the Sunday exhibition to be held at the Royal Hotel, Woburn Place, London, S.W.1, during the period fixed for the 14th Annual Convention (September 21st-23rd). Stand 1. Webb's Radio. 2. Stratton and Co., Ltd. 3. Peto-Scott Co., Ltd. 4. Radionart GSN1 (Birmingham), Ltd. 5. Taylor Electrical Instruments, Ltd. 6. Wingrove and Rogers, Ltd. 7. Hamrad Wholesale, Ltd. 8. N. E. Read. 9. The General Electric Co., Ltd. 10. Voigt Patent, Ltd. 11. Denco. 12. The Quartz Crystal Co., Ltd.

**Peter Creswell, who will produce this first broadcast version of A. E. W. Mason's famous thriller, has been busy adapting the book as a radio serial, the first instalment of which will be broadcast on September 3rd.**

Peter Creswell will be moderately sure, however, that he has the right story and that, in the thunderstorm, the thunder sometimes précéded by lightning, another prominence was not meant to be other than impressive, and, as the two passages in the thunderstorm are very prominent in their musical and constructional significance, those who expect Beethoven to give them a sixth-form natural history lesson are rather exceeding their commissions. We set up to listen to this great symphony better and refreshed, and entertained. I wouldn't recommend anything that didn't entertain, at least, not without specifying it.

**THE FOUR FEATHERS**

*Peter Creswell, who will produce this first broadcast version of A. E. W. Mason's famous thriller, has been busy adapting the book as a radio serial, the first instalment of which will be broadcast on September 3rd.**

Peter Creswell will be moderately sure, however, that he has the right story and that, in the thunderstorm, the thunder sometimes précéded by lightning, another prominence was not meant to be other than impressive, and, as the two passages in the thunderstorm are very prominent in their musical and constructional significance, those who expect Beethoven to give them a sixth-form natural history lesson are rather exceeding their commissions. We set up to listen to this great symphony better and refreshed, and entertained. I wouldn't recommend anything that didn't entertain, at least, not without specifying it.

**THE FOUR FEATHERS**

*Peter Creswell, who will produce this first broadcast version of A. E. W. Mason's famous thriller, has been busy adapting the book as a radio serial, the first instalment of which will be broadcast on September 3rd.**

Peter Creswell will be moderately sure, however, that he has the right story and that, in the thunderstorm, the thunder sometimes précéded by lightning, another prominence was not meant to be other than impressive, and, as the two passages in the thunderstorm are very prominent in their musical and constructional significance, those who expect Beethoven to give them a sixth-form natural history lesson are rather exceeding their commissions. We set up to listen to this great symphony better and refreshed, and entertained. I wouldn't recommend anything that didn't entertain, at least, not without specifying it.

**THE FOUR FEATHERS**

*Peter Creswell, who will produce this first broadcast version of A. E. W. Mason's famous thriller, has been busy adapting the book as a radio serial, the first instalment of which will be broadcast on September 3rd.**

Peter Creswell will be moderately sure, however, that he has the right story and that, in the thunderstorm, the thunder sometimes précéded by lightning, another prominence was not meant to be other than impressive, and, as the two passages in the thunderstorm are very prominent in their musical and constructional significance, those who expect Beethoven to give them a sixth-form natural history lesson are rather exceeding their commissions. We set up to listen to this great symphony better and refreshed, and entertained. I wouldn't recommend anything that didn't entertain, at least, not without specifying it.
ARMSTRONG QUALITY YEAR

Our 1940 range of chassis has been designed with one aim in view—Quality. We appreciate the days of "gadgets" are over, high fidelity being the real thing that matters and the only vital reason for purchasing a new receiver.

Our 1940 chassis include the following:

**MODEL SS10**

"SUPERHET-STRAIGHT" 10-valve High Fidelity Radiogram chassis, All-wave, incorporating 2 independent circuits, Superhet. and Straight, having R.F. preamplifier, R.C. coupled push-pull Triode output capable of handling 8 watts.

**PRICE £12 : 12 : 0**

The circuit of the SS10 is unique. When used as a Straight receiver two H.F. stages are operating in A.V.C. Diode Detector is used for distortionless detection together with Triode Push-pull output. A turn of only one knob is necessary to switch from "Superhet" to "Straight". The Gramophone Amplifier has been specially studied and records can be reproduced with excellent quality.

SEE AND HEAR THEM AT STAND 69 RADIOLYMPIA

**MODEL SS2B** 10-valve "SUPERHET-STRAIGHT" 2-waveband High Fidelity Radiogram chassis. This model has all the outstanding features of the SS10, the circuit being identical in every respect, except that the chassis is designed for broadcast bands only, no provision being made for short waves. It has the same extremely lively performance on "Superhet" and high quality reproduction on "Straight". Price £11 gns.

**MODEL AW38** 8-valve All-wave Superheterodyne chassis. This All-wave Radiogram chassis has resistance capacity coupled push-pull output capable of handling 6 watts, and gives good quality reproduction on both radio and gramophone, for an economical price of 8 gns.

**MODEL AW12SSP** 12-valve 5 Waveband Radiogram chassis; two I.F. stages with variable selectivity. Continuous waveband coverage from 1250 metres and 1,000-2,000 metres.

This popular model introduced earlier in the year has been slightly modified to give still higher performance with increased frequency response. Price 17 gns.

ILLUSTRATED CATALOGUE ON REQUEST ALL CHASSIS SENT ON 7 DAYS APPROVAL

ARMSTRONG MANFG. CO.

WARTERS ROAD, HOLLOWAY, LONDON, N.7.

(Adjoining Holloway Arcade)

Phone: NO66 2133

---

**SLOUGH AND DISTRICT SHORT-WAVE CLUB**

Secretary: 16, Bockland Avenue, Stokenchurch, Berks.

Meeting: Alternate Thursday at 7:30 p.m.

A.T. The last meeting held on Thursday, August 3rd, was a most interesting talk by Mr. F. F. Stobro (2FXW) on "Building and Operating a Station for National Field Day." It was decided that a series of lectures should be given on "Meaning Instruments and Tests for the Amateur." We are still waiting for a new QRA for the Club due to the continuous growth in membership.

The agenda for the next meeting includes a demonstration of a super-regenerative receiver designed and operated by Mr. E. White (GPRD). A look-see will be held in addition to all the usual features.

---

**ASHTON-UNDER-LYNE AND DISTRICT AMATEUR RADIO SOCIETY**

Headquarters: 17a, Oldham Road, Ashton-under-Lyne.

Hon. Sec.: K. Gooding (GSPR).

The above society this year is again having a stand at the Manchester Radio Exhibition, to be held in the City Hall, Manchester, from September 26th to October 1st. Much short-wave gear and amateur constructed receivers and transmitters, etc., will be displayed on the stand. Also, the society is encouraging to make a display of as many photos as possible of amateur transmitters, and including corners, shops, etc., anyone who has a photo of their receiving corner, or transmitter, etc., they would like included in the display, should send it at once direct to the secretary. Although it is yet too early to make any definite statements, the society hopes to be able to arrange two or more lectures, etc., on amateur radio and short-wave radio, etc., to be given either in or near the Exhibition Hall during the exhibition.

Further details will be given at a later date in the next issue of this journal. Up-to-the-minute details will also be available from the secretary of the society after September 1st.

---

**GLOSSOP AND DISTRICT RADIO SOCIETY**

The last meeting of the above society was held at the new headquarters, 152, Station Road, Hadfield, Glossop. There was a good attendance of members of the society, which has been in existence two years. At present there are 20 members, and the society—2EJF, 2BZ, 2FJL, 2FXV and 2EJK. Regular meetings are held to discuss the features of the society, and is given weekly by 2JEF. A lecture was given at this meeting by 2JEF on the subject of "Artificial Aerials, Their Purpose and Methods of Coupling." A social meeting has been arranged for the winter months. The society would welcome visits from any-member of the B.B.C. Aerials, Their Purpose and Methods of Coupling. A social meeting has been arranged for the winter months. The society would welcome visits from any member of the B.B.C. Aerials, Their Purpose and Methods of Coupling. A social meeting has been arranged for the winter months. The society would welcome visits from any
A CONSTRUCTOR TOURS RADIOLYMPIA
(Continued from page 560).

27, cover at one sweep, Messrs. Edison Swan, who have an exhibit well worth seeing—if you can get near it; Messrs. Baird, of television fame; Messrs. Rola and Celestron, both of which will be templing all of us with their new loudspeakers. Personally, I never go to a show without wanting far more speakers than, apparently, I shall ever be able to secure. When you hear about the characteristics of the latest models, it always makes one doubt if the quality of reproduction of one’s own speaker is as perfect as it might be.

When you have been able to get around or away from No. 26, the Alexandra Palace stand, pop over to No. 2 and see what Exide have to offer you—and they have some new lines—before working your way round to No. 41, which houses all the Ferranti temptations, ranging from tele-

New black bakelite highly polished ‘engraved’ instrument knobs by Bulgin.

vision and ordinary receivers, to a most extensive range of meters, which, I think, are items dear to the heart of every constructor. Opposite this stand will be found Heyvaders, No. 57, and their display of charging and mains equipment certainly warrants a stop to examine the sound construction of all of their products, which are obviously built to give service without sacrificing finish and appearance. Continuing along the same aisle, as fast as the attractions and crowds will allow, Mullard’s, No. 55, and Cossors, No. 48, at the other end, so to speak, will supply you with all the information and leaflets you require concerning their valves. With the numerous types now available, it behoves all constructors to keep their valve literature right up to date, so don’t miss this opportunity.

Bulgin Components

When you have rested awhile, pass into the next gangway, that is the one nearest the side of the hall, and make your way to No. 52, where you will find a very old supporter of the constructors’ movement, namely, Messrs. Bulgin. I am not going to try to mention their items as, for one thing, they are too well known and, secondly, they are far too many to talk about; besides, they can supply such a wonderful catalogue that there is no need for you to forget what you see on their stand when you get back home.

In this same gangway will also be found Messrs. T.C.C.C. stand, No. 63, so once again you can settle any queries you have about condensers of every size and type.

Important Technical Features of CLIX OCTAL VALVEHOLDERS

Flooding contact registration giving proper alignment of pins and contacts.

Anti-microphonic owing to valve being supported by spring contacts.

Line-pressure contact in line with latest Research results on Radio Frequency Contacts.

Tests up to 5,000 insertions and withdrawals of valve show no loss of resilience under valve testing conditions.

Low-loss characteristics are ensured because the contacts are generously spaced and each one is secured by only one pin through the solid dielectric.

Self-cleaning action between contacts and valve pins.

TYPE X 128 . . . 6d. EACH.

Specified for the “1940 AIR-HAWK 9”

Once again the designers of outstanding Exhibition receivers rely upon CLIX components.

CLIX.

BRITISH MECHANICAL PRODUCTIONS LTD.,

ST AND FOREMOST

NEW 128 PAGE ILLUSTRATED CATALOGUE

FULLY REVISED AND REVISED AND

DEMONSTRATIONS DAILY

IN OUR STANDS 51 AND 109.

WE ALSO SUPPLY ON EASY TERMS L.B., Loud-speakers. Armstrong Test Meter and all your radio requirements. Get our illustrated sections covering thousands of components for use in modern radio and television construction. Packed full with technical and dimensional data, THE HANDBOOK OF THE INDUSTRY—YOU CANNOT AFFORD TO BE WITHOUT IT.

London Radio Supply Company, Ltd., 11, Oat Lane, Noble St., London, E.C.1. Phone: SW 6828

Name

Address

P.W. 269.39

August 26th, 1939

PRACTICAL WIRELESS 589

***** GET YOUR ***** ARMSTRONG QUALITY CHASSIS on EASY TERMS—

from L.R.S.

The new range of Armstrong Chassis represent a real advance, and we recommend them with every confidence. See advt. on page 550.

Write for your 1940 Armstrong Folder showing full range of Chassis on similar terms.

HOW TO ORDER


2. Name of item required.

3. Full information regarding size, etc.

4. Address for delivery.

5. Any special instructions.


7. Remittance, or full price with order.

The new range of Armstrong Chassis represent a real advance, and we recommend them with every confidence. See advt. on page 550.

Send for this catalogue now.
Reaction Effects

"I recently built a one-valve set of the straightforward type. The set works quite well, with one exception. When I tune to a very distant station it is naturally very weak, and as soon as I adjust the reaction to bring up the strength the station goes. I can find it again, however, by adjusting the tuning control. Does this indicate that the set is not working properly?" — L. F. (Barnsley).

WITH quite a number of reaction arrangements, adjustment of the reaction circuit does affect the tuning setting. This is on account of the fact that the damping on the grid circuit is changed, and accordingly the tuning characteristics of the coil are also changed. In other cases the trouble may be due to the fact that the reaction coil is so placed in relation to the grid winding that capacity coupling is rather large. The ideal arrangement is, of course, inductive and not capacitive coupling. Therefore, you may be unable to modify the effect in your case without changing the coil.

Loudspeaker Design

"I have an old balanced-armature speaker in a box, and this seems to me to give all that I require in the way of quality. I have been told, however, that a moving-coil speaker would be a great improvement, and I wish to know whether this is the case without changing the coil.

Microphones

"My receiver is a commercial model, 6 valves, with self-contained speaker. I find, however, that on the local stations before I can get maximum volume out of it there is a terrible howl which comes up and grows in volume till I have to switch off. Can you tell me how to cure this?" — D. W. E. (Barnsley).

THERE may be no actual fault in the receiver, as the trouble mentioned could be caused by endeavouring to push volume beyond the capabilities of the output stage. You may find that the output stage is overloaded before the howling point is reached and therefore should not advance the gain control beyond the howling point. On the other hand, a microphonic valve can give rise to the trouble, but it would not do to present

on certain distant stations also where a fair volume was obtained the valve was frequently off a ringing sound, and if so, have it tested in case it is faulty.

Prefixes

"I am a newcomer to radio, and am rather confused by some of the terms used. I am not quite clear concerning the microhenry and the millihenry, and should be glad if you could tell me what the prefixes mean, as I see that they are also used in conjunction with other standards used in modern apparatus." — L. van F. (Hove).

THE prefix "milli" means one-thousandth, and the prefix "micro" indicates one-millionth. A millamp is, therefore, one-thousandth of an amp.

In modern condensers a capacity rating of so many micro-microfarads is often used, therefore, a millamp.

RULES

We wish to draw the reader's attention to the fact that the Queries Service is intended only for the solution of problems or difficulties arising from the construction of receivers described in our pages, from articles appearing in our pages, or from the general wireless matters. We regret that we cannot, for obvious reasons—

(1) Supply circuit diagrams of complete multi-valve sets.
(2) Suggest alterations or modifications of receivers described in our Contem-
poraries.
(3) Suggest alterations or modifications to commercial receivers.
(4) Answer queries over the telephone.
(5) Grant interviews to querists. A stamped addressed envelope must be

for the reply. All sketches and drawings which are sent to us should bear the name and address of the sender. Requests for Blueprints must not be enclosed with queries, as they are dealt with by a separate department.

We wish to draw the reader's attention to the fact that the Queries Service is intended only for the solution of problems or difficulties arising from the construction of receivers described in our pages, from articles appearing in our pages, or from the general wireless matters. We regret that we cannot, for obvious reasons—

(1) Supply circuit diagrams of complete multi-valve sets.
(2) Suggest alterations or modifications of receivers described in our Contem-
poraries.
(3) Suggest alterations or modifications to commercial receivers.
(4) Answer queries over the telephone.
(5) Grant interviews to querists. A stamped addressed envelope must be

for the reply. All sketches and drawings which are sent to us should bear the name and address of the sender. Requests for Blueprints must not be enclosed with queries, as they are dealt with by a separate department.

We wish to draw the reader's attention to the fact that the Queries Service is intended only for the solution of problems or difficulties arising from the construction of receivers described in our pages, from articles appearing in our pages, or from the general wireless matters. We regret that we cannot, for obvious reasons—

(1) Supply circuit diagrams of complete multi-valve sets.
(2) Suggest alterations or modifications of receivers described in our Contem-
poraries.
(3) Suggest alterations or modifications to commercial receivers.
(4) Answer queries over the telephone.
(5) Grant interviews to querists. A stamped addressed envelope must be

for the reply. All sketches and drawings which are sent to us should bear the name and address of the sender. Requests for Blueprints must not be enclosed with queries, as they are dealt with by a separate department.

We wish to draw the reader's attention to the fact that the Queries Service is intended only for the solution of problems or difficulties arising from the construction of receivers described in our pages, from articles appearing in our pages, or from the general wireless matters. We regret that we cannot, for obvious reasons—

(1) Supply circuit diagrams of complete multi-valve sets.
(2) Suggest alterations or modifications of receivers described in our Contem-
poraries.
(3) Suggest alterations or modifications to commercial receivers.
(4) Answer queries over the telephone.
(5) Grant interviews to querists. A stamped addressed envelope must be

for the reply. All sketches and drawings which are sent to us should bear the name and address of the sender. Requests for Blueprints must not be enclosed with queries, as they are dealt with by a separate department.

We wish to draw the reader's attention to the fact that the Queries Service is intended only for the solution of problems or difficulties arising from the construction of receivers described in our pages, from articles appearing in our pages, or from the general wireless matters. We regret that we cannot, for obvious reasons—

(1) Supply circuit diagrams of complete multi-valve sets.
(2) Suggest alterations or modifications of receivers described in our Contem-
poraries.
(3) Suggest alterations or modifications to commercial receivers.
(4) Answer queries over the telephone.
(5) Grant interviews to querists. A stamped addressed envelope must be

for the reply. All sketches and drawings which are sent to us should bear the name and address of the sender. Requests for Blueprints must not be enclosed with queries, as they are dealt with by a separate department.
KIT BARGAINS

Valves FREE!

29/6

List Value £3 : 15 : 0

A triumph in receiver design. Built-in P.N.C., and Pentode Output stages. For the enthusiast who requires maximum efficiency and wide band performance in receiver design. Short, Medium & Long Waves. 3 Short-wave ranges. Superhet with 19 stages, operation on N.T.S. 7 1/2-6 volts. Slow-motion Tuning. Complete Kit for high use with Steel Chassis. Full parts and instructions. Slow-motion Tuning. Station-name dial. Transformer, Resistances, etc. and assembling instructions. Less coils, £3 6 0. Less Coils, £4 11 6. in 12 monthly payments of £2.3.9. with £13 down. £3 6 0. in 12 monthly payments of £2.3.9. with £13 down.

VALVES G4NED FREE.

No. 1 ALL-WAVE A.C. 4-Valve Chassis.

List Value £7 Gns.

BARGAIN C.O.D. 79/6

Amazingly efficient A.C. superhet model, 4 valves, wave-range 16,000-20,000 metres. Station scale as model. Special offer - Above kit with set of 6 Coils Cash, or £2 3 6. on delivery. Special offer on delivery.

SPECIAL OFFER - Above kit with set of 6 Coils Cash, or £2 3 6. on delivery. Special offer on delivery.

No. 2 ALL-MAINS 6-Stage ALL-WAVE SUPERHET

BARGAIN 6 gns.

List Value £4 : 13 : 0

WITH SPEAKER

Brand new 6-valve 190 watt short-wave model. Wave-range 18-2,000 watts. A.V.C. lock, half-wave conversion, and volume control. Pleasure station scale as model. A.C. mains, 18-2,000 volts. This superb receiver, as illustrated below, will give you programmes from all over the world.

GUARANTEED 12 MONTHS.

No. 3 A.C. Super Bandpass 4-Valve Chassis.

List Value £4 : 6 : 0

Special offer. 4-valve, A.C. chassis, wave-range 200,000 metres. Calibrated scale, P.U. noches. Output 3 watts. With all valves, fully tested. Cash, C.O.D. 500-5-5. 6-5. secure, balance in 12 monthly payments of £5.

No. 4 SUPER All-Wave S.G.3.

BARGAIN 55/-

List Value £5 : 9 : 0

BARGAIN 55/-

With A.D. Test and Pentode output. Station name dial. Station scale as model. Station scale as model. A.C. mains, 200-2,000 volts. Great output and low H.F. consumption. Station scale as model. A.C. mains, 200-2,000 volts.

14 to 3,000 metres. Full output and low H.F. consumption. Station scale as model. A.C. mains, 200-2,000 volts. Great output and low H.F. consumption.

YOURS FOR 2/6 DOWN

POST FREE 5/6

Valve Bargain!!

A new matched 2-valve battery set.

Pentode output. Brand new in 12 monthly payments of 5/-.

POST FREE 5/6

Valve Bargain!!

A new matched 2-valve battery set. Pentode output. Brand new in 12 monthly payments of 5/-.

HUNDREDS of Set Bargains!!

Send P.O. now for the new N.T.S. radio lists, which contain a host of fabulous bargains in new sets and chassis.

NEW TIMES SALES CO., LTD.

50 (P.W.J.), LUDGATE HILL, LONDON, E.C.4.

Phone: City 5516.

E.52, 1924. LISTS FREE.

N.T.S. BARGAIN BEST SELLERS

AMAZING RADIO OFFERS!! HURRY

POST YOUR ORDER AND SAVE £££'S

PARCELS!

N.T.S. Bargains. Free replacement parts are always available. Simply order your parts, and you can have our New Times Superhet chassis. A magnificent receiver.

Here's a new offer!

SPECIAL BARGAIN 5/9

For 5/9 only, you get 1 each and a 2-valve set, a useful-value fixed condensers, resistances, controls, etc. and a brand-new unitally curved chambers, 12 components in all, worth more than £1.

AMPLIFIERS—BUY NOW

2-WATTS A.C. MODEL. For Dance Band and all P.A. Work. Powerful model with wide sound range. Superhet, with steel chassis complete with 4 valves. Bargains 79/- or 5/- down and 12 monthly payments of £2.6. FOR our own use.

4-WATTS BATTERY MODEL. 6-valve push-pull model. For home use and cut-up units. Portable battery sets. Assembled on steel chassis. Bargains. Fully tested. 1st kit £2. BARGAIN 21/- down and 12 monthly payments of £3.

N.T.S. FOR NEW VALVES

We save you up to 50%. All British, all types—battery and high efficiency. Send now for copy of the N.T.S. Valve Guide.

RIGHT-PRICE PARTS

Post free on orders over 10.

BARGAIN 10/--

A.D. TYPE 2-GANG CONDENSERS. 0005 mfd. each. Suitable for use on steel chassis complete with 4 valves. Bargain. 2/-.

BARGAIN 2/-

1-GANG CHROME CONDENSERS. Types. For Dance Band. Bargain, 1/-.

BARGAIN 2/-

METAL CHASSIS. Brand new. Steel chassis complete with 4 valves. Bargain. 1/16.

BARGAIN 1/16


BARGAIN 1/16

BARGAIN 3/-

VOLUME CONTROLS. Potentiometers. Well known, makes all valves up to 150G. £1-0-0. With switch, 7/6.

BARGAIN 3/-

BARGAIN 2/6

VALVE SCREENS. 3 portent. Latest type 1911. Each, £1-1-0. Bargain, 1/-.

BARGAIN 2/6

BARGAIN 5/-

RESISTORS. All values, 1-watt, 4d. 3/6; 2-watt, 6d. 2/9; 5watt, 1/16; 10 watt, 2/9; 20 watt, 5/-.

BARGAIN 5/-

BARGAIN 5/-

CONCORD-FIX LUGS. Brand new, complete with screwed head and nut. £2.10. Bargain, 5/6.

BARGAIN 5/-

BARGAIN 2/6

B.T.S. ULTRA 5-WAY TUNING COILS. Brand new. 2 coils (4.4mm and 1.5mm). Employing self-supporting 10g, copper wire silver-plated to reduce resistance to H.F. currents. Ready mounted with connections on chassis. Bargain. 1/6.

ADABAND BARGAIN!!

10 only.

Send P.O. to your set simply rests on top

Connect the Adaband to your battery set and tune in the pick of the transmitters. Suitable for regular service and popular stations only. Complete with valves, fully tested. Send P.O. now for your set. Yours for 5/-down and 12 monthly payments of 4/-.
Classified Advertisements

Advertisements are accepted for these columns at the rate of 3d. per word. Words in black face and/or capitals are charged double this rate (maximum charge 2½ per paragraph). Display lines are charged at 7½ per line. All advertisements must be prepaid. All communications should be addressed to: Advertising Manager, "Practical Wireless," Tower House, Southampton Street, Strand, London, W.C.2.

receivers, components and accessories

Southern radio’s wireless bargains: 1/4; Parcel of assorted up-to-date components — resistances, coils, capacitors, etc., etc. Value 2½/- per case. Volume controls, assorted capacities, with switch, 10/- per dozen, without switch, 9½/- doz.; Assorted Telefer Transformer 3½ by 3½; Telcon W410 Coils, 3/-; W60 Coils, 3/-; A.C./D.C. Meters, 5/- each; P.O. Microphones, 7/-; Neutron Crystal, 7½/-; Marsey V24 Valves, 6d.; Ormond Speaker Caps 3/-; Valves and other accessories. Please note that all goods are new. Full stock of receivers, transmitters, etc. Please send 2d. for 60-page catalogue. Write for Free Book on the art of “self” soldering and ask for Leaflet on Case-Hardening Steel and Tempering Tools with Fluxite.

The Fluxite Gun is always ready to put Fluxite on the soldering job instantly. A little pressure places the right quantity on the joint spot and a short charge lasting lasts for ages. Price 1½/- or filled 5½/-.

All Mechanics Will Have


The red diamond detector

RD40

€2/-

By inserting post 2½ or 2½/- with

Can be mounted on brackets or through existing 3½ or 2½/- aerial panels. Once set the same may be read. Not affected by vibration. Each one is shock-proof.

Of all high-class radio dealers or Sony mhores:

JEWEL PEN CO.,
Radio Dept. 63 21-22 Great Sutton St., London, E.C.3

Loudspeaker repairs

L.S. Repair and Rewinding Service. 24-hour service, see above.


Loudspeaker repairs, British, American, any make. 24-hour service, moderate prices. Sinclair Speakers, Fulferry Terrace, London Street, N.1.

New loudspeakers

3,000 Speakers from 6½ inch, P.M. and energised 6½ to 14½ inch, including several Epoch 15cm. — Sinclair Speakers, Fulferry Terrace, Copenhagen Street, N.3.

New receivers, components and accessories

Stand-by Crystal Set. Specified coil 2a or complete kit of parts 10a, 2d. per set. W. Thompson and Co., Ltd., 1/4, Greenwich High Road, S.E.1.


New receivers and chassiss

Chassis, panels, cabinets, transmitting racks and accessories, for the Amateur. Constructor and Radio Engineer. Made to your own requirements. Quotations and catalogues free on request. — The Universal Productions, Highley Lane, Streatham, London.

Cabinets

A cabinet for Every Radio Purpose.

Convert your set into a Radiogram at Minimum Cost; surplus cabinets from noted makers under complaint. Send 3d. for price list. For all contracts, 30/- upwards; 6 months at wholesale price.

Undrilled Table, console and soundproof cabinets from 4½.

Inspection invited; photos loaned to co关节 customers.

H. L. Smith and Co., Ltd., 289, Edgware Road, W.2. Tel.: Pod 5861.

Literature

Detection. Enthusiasts methods, theory, circuits, Books 2s., post free.—D’Arey Ford, Sandy Street, Exeter.

Situations vacant

Wireless careers.

Incorporated supplies and Premises under Radio a profitable and interesting profession. We train students for themselves and guarantee appointments to Britain’s leading Colleges. Boarders accepted. Write for free particulars. — Wireless College, Chyran Bay, or Wireless College, Calmore, Southampton.

The one aerial for the modern set

Pix, London, S.W.4

Double Length 3/6

Forbes

Bookstellers to the world. New and secondhand books on Wireless and every other subject. 113-125 Charing Cross Road, London, W.C.2 Telephone: G.B.4306 15 lines.

"Red diamond" detector

RD40

€2/-

By inserting post 2½ or 2½/- with existing 3½ or 2½/- aerial panels. Once set the same may be read. Not affected by vibration. Each one is shock-proof.

Of all high-class radio dealers or Sony mhores:

JEWEL PEN CO.,
Radio Dept. 63 21-22 Great Sutton St., London, E.C.3

The one aerial for the modern set

Pix, London, S.W.4

Double Length 3/6

Forbes

Bookstellers to the world. New and secondhand books on Wireless and every other subject. 113-125 Charing Cross Road, London, W.C.2 Telephone: G.B.4306 15 lines.

"Red diamond" detector

RD40

€2/-

By inserting post 2½ or 2½/- with existing 3½ or 2½/- aerial panels. Once set the same may be read. Not affected by vibration. Each one is shock-proof.

Of all high-class radio dealers or Sony mhores:

JEWEL PEN CO.,
Radio Dept. 63 21-22 Great Sutton St., London, E.C.3

The one aerial for the modern set

Pix, London, S.W.4

Double Length 3/6

Forbes

Bookstellers to the world. New and secondhand books on Wireless and every other subject. 113-125 Charing Cross Road, London, W.C.2 Telephone: G.B.4306 15 lines.

"Red diamond" detector

RD40

€2/-

By inserting post 2½ or 2½/- with existing 3½ or 2½/- aerial panels. Once set the same may be read. Not affected by vibration. Each one is shock-proof.

Of all high-class radio dealers or Sony mhores:

JEWEL PEN CO.,
Radio Dept. 63 21-22 Great Sutton St., London, E.C.3

The one aerial for the modern set

Pix, London, S.W.4

Double Length 3/6

Forbes

Bookstellers to the world. New and secondhand books on Wireless and every other subject. 113-125 Charing Cross Road, London, W.C.2 Telephone: G.B.4306 15 lines.

"Red diamond" detector

RD40

€2/-

By inserting post 2½ or 2½/- with existing 3½ or 2½/- aerial panels. Once set the same may be read. Not affected by vibration. Each one is shock-proof.

Of all high-class radio dealers or Sony mhores:

JEWEL PEN CO.,
Radio Dept. 63 21-22 Great Sutton St., London, E.C.3

The one aerial for the modern set

Pix, London, S.W.4

Double Length 3/6

Forbes

Bookstellers to the world. New and secondhand books on Wireless and every other subject. 113-125 Charing Cross Road, London, W.C.2 Telephone: G.B.4306 15 lines.

"Red diamond" detector

RD40

€2/-

By inserting post 2½ or 2½/- with existing 3½ or 2½/- aerial panels. Once set the same may be read. Not affected by vibration. Each one is shock-proof.

Of all high-class radio dealers or Sony mhores:

JEWEL PEN CO.,
Radio Dept. 63 21-22 Great Sutton St., London, E.C.3