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WEDNESDAY

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Vol. 14, No. 317,  
May 13th, 1939.

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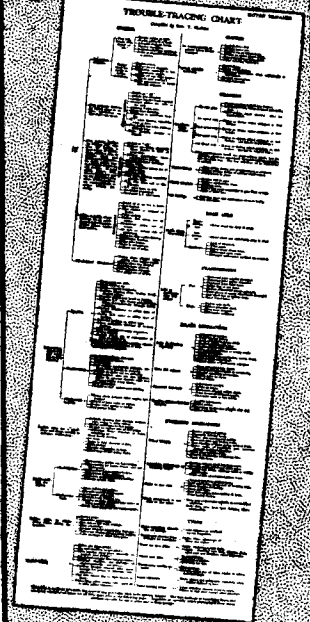
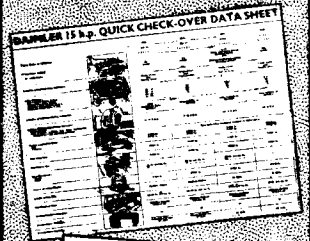
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# Practical Hints for S.W. Experimenters

See page 197




## Practical and Amateur Wireless

*Edited by F. J. CAMM*

Technical Staff:  
W. J. Delaney, H. J. Barton Chapple, Wh.Sch.,  
B.Sc., A.M.I.E.E., Frank Preston.

Vol. XIV. No. 347 May 13th, 1939.

## ROUND *the* WORLD of WIRELESS

### Crystal Sets

WITH most hobbies it is usual to commence at the bottom and work up, taking each phase in its stride and studying the various developments as you go along. In radio, unfortunately, many amateurs commence activities by trying to build a multi-valve receiver, and accordingly they are unable to trace a fault should it arise, or are unable to obtain maximum results, as they are not familiar with various parts of the circuit. It is, therefore, highly desirable to commence activities by constructing a simple receiver and then trying out the effects of various modifications, passing on by stages as the requisite knowledge is gained. The simple crystal receiver can be quite complicated in design, and there are many interesting experiments which may be carried out with the arrangement. In this issue we describe a skeleton crystal receiver which may be regarded as a suitable medium for such experimental work, the coil being so designed that various experiments may be carried out, and various crystal combinations may be tried. We also describe in this issue another crystal receiver of more standard design for those who require a small stand-by receiver for use whilst the standard receiver is undergoing modification or repair, or for portable use.

### Doug Browning Joins N.B.C.

DOUGLAS BROWNING, since 1936 a member of the announcing staff of WLW, recently left Cincinnati to join the staff of the National Broadcasting Company, Radio City, New York.

One of Cincinnati's most popular announcers, Browning became noted for his "ad libbing" ability, and won especial favour for his handling of dance band broadcasts of WLW. Born Thomas Douglas Browning, he received his education in Cincinnati grade and high schools, the University of Cincinnati, and the Cincinnati Technical School. Later he made an extensive study of dramatics with Francis Duff Robinson in New York.

Having completed his studies, he made his acting debut in the stage version of "Craig's Wife," and later appeared in "Clarence," "Cat o' Nine Tails," "Family Affair," "The Brat," and other productions. Afterwards he became a member of the old "Opera Guild" network show, leaving to

join the staff of the Nation's Station. Browning is 29 years of age.

### "Admission Free"

LONDON'S Museums will be dealt with in a new television talks series, beginning in June, entitled "Admission Free." It is hoped that the directors of all the principal museums will face the cameras to show and describe some of the principal items in the collections, and particularly those which often escape the notice of the public.

Besides the ten-piece band, the outfit includes a cabby-crooner, Alec Stringer, and a straight singer, Ted Frost. Albert Gray is conductor and compère.

### Reactions

HERE is a new parlour game for listeners taking the form of a development of the old family game of "clumps," which, when it was recently introduced on the air, brought many requests for a repeat performance. In "Reactions," to be broadcast on May 14th, each player in the game is given a famous identity and he has to guess who he is supposed to be by finding out from his opponents their reactions to his assumed personality. The fewer the questions the better, the side scoring the fewest points being the winner.

A team of authors, consisting of Horace Richards, Brian Flynn, James Gilroy, and Shirley Long, will be pitted against four B.B.C. officials—John Cheadle, Robert MacDermott, Jack Inglis and Leslie Baily having volunteered their services as "reactionaries."

### "Urdd" Peace Service

EVERY year an "Urdd" Peace Service is broadcast on the Welsh wavelength. This year it will come from Canaan Chapel, Maesteg, Glam, on May 14th. The address will be given by the Rev. E. J. Williams. In the course of the service children will recite the Welsh Children's Message of Peace, which has been broadcast for many years on Goodwill Day, May 18th.

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### Taxi-drivers' "Cabbyret"

TEN London taxi-drivers who have formed themselves into a band have been booked by the B.B.C. to broadcast as London's contribution to the fourth of the series of all-Regional "Roundabout" programmes on May 24th. The combination was recently organised by Albert Gray, who, at present a cab-driver with a West-end rank as his headquarters, has had some stage experience, and broadcast not long ago in "In Town To-night."

Several other members of the band are colleagues of his at Hanover Square; two are from Oxford Street; another "prefers railway stations"; one is stationed at "The Rat's Hole," near Charing Cross Station; yet another is a "cruiser."

### Who are the Irish?

ESTYN EVANS, Lecturer in Geography at Queen's University, Belfast, will give the third of his talks in the series entitled "Who are the Irish?" on May 10th. Having shown in his previous talks why the terms "English race" and "Celtic or Gaelic race" are confusing and misleading, Mr. Evans is now to examine the question of whether there is a distinctive race-type evolving in Ireland. He will tell listeners something of the data on which anthropologists work, how head-measurements are taken, and details of colour and stature. With him at the microphone will be a field worker, Mr. John Moge, who will answer questions about his researches.

# ROUND the WORLD of WIRELESS (Continued)

## New S.W. Station for Finland

MARCONI'S Wireless Telegraph Co., Ltd., recently secured an important contract from Finland for the supply and erection of a 50kW short-wave broadcasting station to be installed at Pori, near the Gulf of Bothnia. The station is to be completed in time for the Olympic Games, which are to be held in Finland in 1940.

## Shades of Bonaparte

ACCORDING to a Paris radio journal it is reported that a small wireless transmitter is to be installed at Longwood, St. Helena, the house actually occupied by

## INTERESTING and TOPICAL NEWS and NOTES

and veterans of this popular type of entertainment in the Region, managers as well as artists, will be taking part. The same week (Friday evening, May 19) will bring a relay from Leslie's Pavilion, Rusholme, Manchester, a famous home of concert-party, and a hall in which many now-famous stars of the music-halls and of "straight" drama made a start, or at any

be broadcast. The concert is given by the City of Birmingham Orchestra, conducted by Eric Woodward, and Grieg's Lyric Suite will be the chief work. Stuart Robertson (bass-baritone) will be the vocalist for two arias by Handel.

## Variety from Dudley

THE Hippodrome at Dudley is a theatre which has an interesting history. It formed the subject of a broadcast last year in the series entitled "Variety Comes Back." On May 16, Regional as well as Midland listeners will hear several of the star turns in the Dudley Hippodrome's "bill." It is hoped that these will include Beryl Orde and Dawn Davies.

## Concert from Plymouth

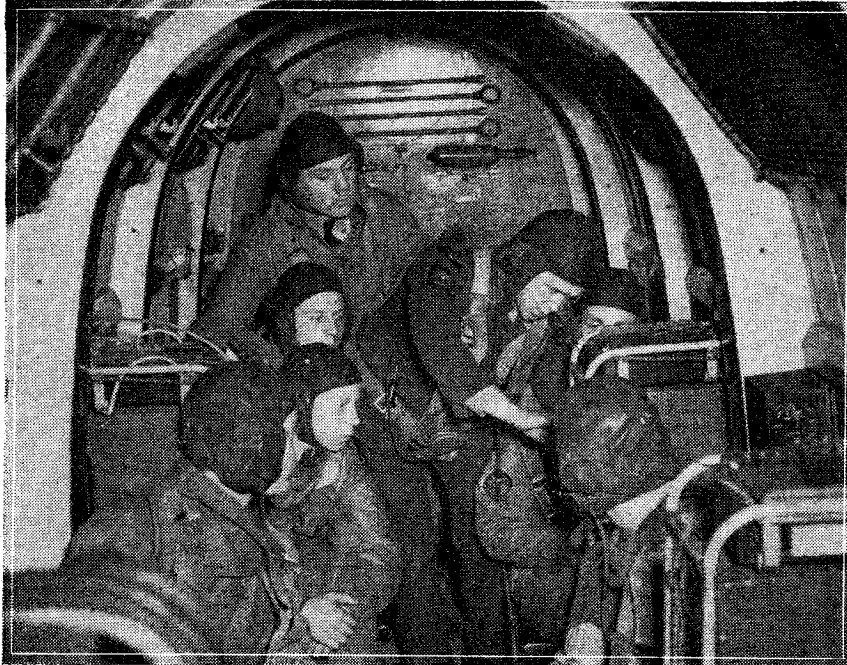
THE Plymouth Orpheus Society, conducted by David Parkes, will broadcast on May 13th in the Western programme. The solo artist will be Barbara Woodbery (pianoforte).

## Licences in Palestine

IT is announced that an increase of 50 per cent. on the present annual receiving licence of 500 mils (approximately 10s.) was imposed from the beginning of April by the Palestine Broadcasting Service. It is now anticipated that the annual revenue from licences will amount to roughly £P30,000.

## Kingswood Prize Silver Band

HOOPER BUSSELL (baritone) will be the solo artist in a concert to be broadcast by the Kingswood Prize Silver Band, conducted by W. Stanley Smith, from the Bristol studios on May 24. The band has been in existence for over fifty years, and is well known in the West of England.



Young radio operators for Britain's Air Force are now being trained largely in flying classrooms. Machines have been equipped with radio transmitters so that many youngsters may be trained at once. Our illustration shows an instructor (without overalls) with a radio apprentice showing some detail of the working of a set, whilst others look on.

Bonaparte when he was a prisoner of the British in that island. To commemorate his memory the broadcasting studio will use the call:  *Ici Poste Napoleon.*

## Another Radio Conference

THE next meeting of the U.I.R. (Union Internationale de Radiodiffusion) will take place at St. Moritz (Switzerland) on June 14-24 next.

## Higher Power for London and North Regional Transmitters

THE B.B.C. announces that a contract has been placed with Marconi's Wireless Telegraph Co., Ltd., for the supply of two transmitters to replace the present 70-kilowatt Regional transmitters at Brookmans Park (London Regional) and Moorside Edge (North Regional) stations. The new transmitters will each be capable of supplying an aerial power of 120 kilowatts, the maximum allowed by the provisions of the European Broadcasting Convention recently concluded at Montreux. It is expected that the new equipment will be ready for service by the spring of 1940.

## Concert Party "High Spots"

VICTOR SMYTHE is putting on another "Northern Concert Party Cavalcade" for half an hour on May 16,

rate made appearances early in their careers. This broadcast will present a good part of the "Quaintesques" show presented by Billie Manders.

## Charlie Kunz in Belfast

WORLD-FAMOUS syncopated pianist Charlie Kunz will pay a visit to Belfast in the near future to appear at the Royal Hippodrome and, on May 16, the microphone will be taken to the Hippodrome for an excerpt from the show, which will include a special turn by this popular pianist.

## The Club of Queer Trades

THE fifth episode of the "Club of Queer Trades," by G. K. Chesterton, adapted for broadcasting by Douglas Cleverdon, will be produced by Michael Goodwin in the National programme on May 14. This episode is entitled: "The Noticeable Conduct of Professor Chadd." The first four episodes have been broadcast in the Regional programme.

## Cheltenham Festival Concert

THE fourteenth annual competitive music festival at Cheltenham will open with a public concert in the Town Hall on May 14, when the second part will

## SOLVE THIS!

### PROBLEM No. 347

Jackson made up an A.C. mains receiver, but before plugging in the valves decided to test everything. He commenced his tests at the mains end and connected the mains in order to measure the outputs and see whether any short-circuits were present. He connected one side of his meter to the chassis and transferred the other meter lead to various parts of the circuit. He found, however, that when his lead was placed on the heater terminals of the rectifier valveholder he obtained a reading of 350 volts. He decided that he had mistaken the secondary windings, but a check proved that this was not so. He tested again and still found 350 volts at the heater. He therefore took a resistance meter to trace for short-circuits but could not find any. What was wrong? Three books will be awarded for the first three correct solutions opened. Address your entries to The Editor, PRACTICAL AND AMATEUR WIRELESS, George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. Envelopes must be marked Problem No. 347 in the top left-hand corner, and must be posted to reach this office not later than the first post on Monday, May 15th, 1939.

### Solution to Problem No. 346

Lester's aerial was shorted to earth, and thus when he joined it to the anode of the H.F. valve, which was joined to H.T. positive through the choke, he short-circuited the mains through the choke which accordingly burnt out.

The following three readers successfully solved Problem No. 345 and books have accordingly been forwarded to them: J. Heard, The Gardens, Ripon House, Putney Heath, S.W.15; G. Barrow, 9, Meadow Lane, Long Eaton, Nr. Notts; A. R. Watson, 75, Elwyn Road, March, Cambs.

# An Experimental Crystal Set

Constructional Details of a Highly Efficient Receiver in Skeleton Form for Beginners and Advanced Experimenters - - By W. J. DELANEY

**M**ANY newcomers to radio read of the "old days," when crystal sets and simple valve receivers were totally different in appearance from those which we know to-day. They read how long-

of the field of the coils and this naturally led to very large lay-outs. If two coils had to be used the apparatus became unwieldy, or screens had to be employed. These naturally came within the field of the coils and reduced efficiency.

### Higher Efficiency Components

Reducing the size of a coil, or placing it within a screen reduces efficiency, but

the widest adjustments for varying conditions was the carborundum, although this has the disadvantage of requiring some form of applied potential. To enable newcomers, therefore, to participate in experimental work with a crystal receiver, and to judge just what such a receiver can do under the correct conditions, we have built up an experimental set on the old lines and the finished model may be seen in Fig. 1. The coil is home-made, using a heavy gauge bare wire with a thin primary, offering maximum inductive and minimum capacitative coupling.

To retain selectivity the crystal may be tapped on to the coil, and provision is made for four separate adjustments. Three separate degrees of aerial coupling are also available, whilst the detector may be replaced by any preferred type. A carborundum combination was used in the original model, the parts for this being obtained from Electradix Radios for 2s. 6d.

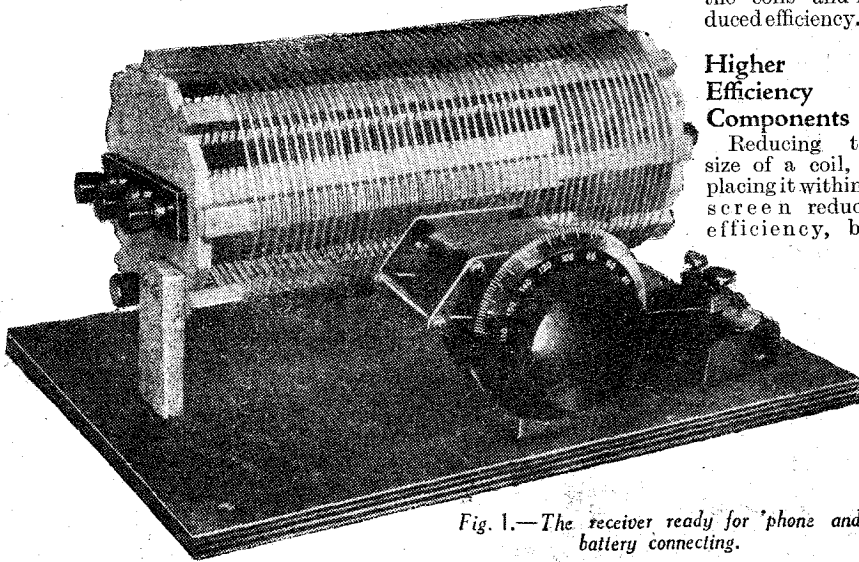


Fig. 1.—The receiver ready for 'phone and battery connecting.

distance reception was often carried out on crystal receivers, but the apparatus which they try to-day does not seem to give the same high performance. It is true that conditions on the air to-day are vastly different, and it is often overlooked that the many changes which have been made in components and designs are not necessarily for the better. For instance, in the early days, coils having a diameter of 4in. or so were the only ones in use and newcomers are apt to think that the smaller coil in use to-day is naturally a more up-to-date design. A large diameter coil has naturally a large field surrounding it, and as valves became lower in price constructors built multi-valve receivers. In order to enable the coils to function properly it was necessary to place components out

this was offset by the introduction of valves of higher efficiency, and thus, what was lost on the swings was gained on the roundabouts. In a simple crystal receiver, however, we are not concerned with any valves or other high-efficiency parts, and thus must rely upon the tuning circuit to supply to the rectifier as much energy as possible. It is also necessary in such a case to introduce some form of selectivity device, as a very efficient coil of the type previously described will naturally be fairly flatly tuned.

The type of crystal detector which is most popular to-day is the semi-permanent type, as there is no question of searching for a sensitive point or of continual re-adjustment. The original form of rectifier which was most reliable and capable of

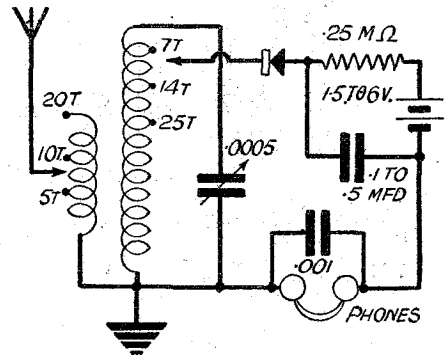


Fig. 3.—Theoretical circuit of the crystal set.

### Making the Coil Former

The coil is made round a skeleton wooden former, for which three octagonal pieces are cut to the dimensions given in Fig. 2, and round these eight strips of wood 3/4in. by 1/4in. are nailed and glued. These strips are grooved to accommodate the wire and the most satisfactory way of doing this is to cut all the strips first to exactly 9in. in length. Four shorter pieces are then nailed on a large piece of board round the strips packed closely together, as shown in Fig. 4. The strips are then numbered in pencil from 1 to 8. At a point half-an-inch from the right hand end, a line is ruled across with a square and at the upper edge a further point 1/16in. to the left is marked. From this latter and the point at the lower edge, lines are ruled off 3/4in. apart right across the strips, and saw-cuts are then made with a thick hacksaw blade as shown in Fig. 4. Twenty lines are then cut with the point of a sharp penknife between the first set of cuts, the primary winding being accommodated in these thinner cuts. They should be made slightly deeper than the saw-cuts. Clean off the top surfaces of the strips with fine sandpaper before removing the

(Continued on next page.)

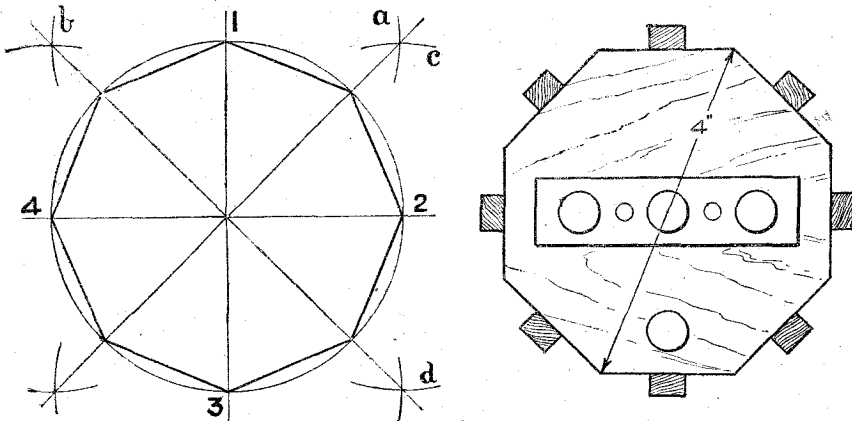


Fig. 2.—How to mark out the coil ends, and details of the finished end. Three of these discs are needed. Compasses are used to mark off the arcs in order—a, b, etc.

**AN EXPERIMENTAL CRYSTAL SET**

*(Continued from previous page.)*

locking strips, and then cut out the two ebonite terminal strips. Three terminals are attached to these and they are screwed to the end plates with two small screws. To enable the terminal plates to be at-

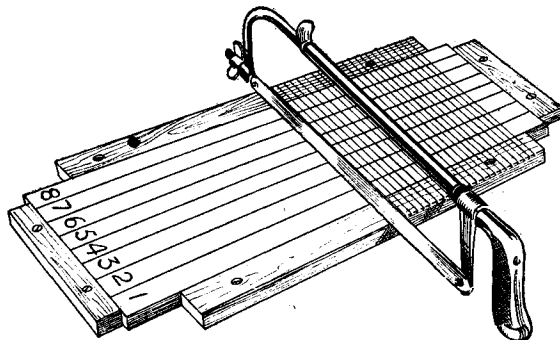


Fig. 4.—Marking out and cutting the grooves in the supporting strips.

tached to the wood end cheeks clearance holes must be drilled in the latter. Soldering tags should be attached on the terminal strips and small holes drilled through which the wire may pass for connection purposes.

**Winding the Coil**

Nail the strips of wood on the end cheeks with the centre disc in position. The latter was not used in the original model, but it prevents the strips from being bent with the pressure of the wire and ensures that the turns will not move when the coil has been completed. Two lengths of tinned copper connecting wire (18 gauge) were used in the original coil, but if you have a reel of the wire this may be used. It is sold by Messrs. Peto-Scott in 20ft. and 30ft. lengths, and two of the latter will just complete the coil described. The end of the wire is passed round the first strip and through the lower hole in the end cheek and attached to the soldering tag. The wire is then carefully wound round the former

until it is full, the termination being taken to the other lower terminal. The tapping points for the crystal are made with spare tinned copper wire soldered to the three terminals and taken up to the 7th, 14th and 25th turns from that end.

The primary is wound with 34 gauge enamelled wire, the beginning being attached to the first of the three terminals at the primary end of the coil, and tappings being taken by making a loop, pushing this down and hooking it through the small holes in the terminal strips by means of a crochet hook. The end of the loop is scraped and soldered to the terminals. The tappings are made at the 5th and 10th turns from the earthed end.

The coil is mounted by means of small strips of wood screwed to the baseboard, which measured in the original model 12ins. by 8ins. The condenser is mounted on a metal component-mounting bracket fitted to the front of the baseboard.

**Mounting the Crystal**

The crystal is obtained in two separate parts and these will have to be mounted on some form of mount the method depending upon the facilities you have for drilling ebonite and the adjustments which you may wish to make to the parts. As the set is intended as an experimental model no panel has been provided, but one could be used and the crystal mounted on the panel for ease of adjustment, although with this type of detector it is not necessary to make adjustments unless experiments are being carried out.

To enable the potential to be applied a leak may be joined in series with a battery or a potentiometer used as shown in Figs. 3 and 5. Phones are, of course, connected between earth and the crystal combination as shown in the theoretical circuit Fig. 3.

**Using the Set**

The aerial should be joined to the top end of the primary winding for preliminary

tests, whilst the crystal should be joined to the lower terminal on the right-hand end of the coil. This will give maximum

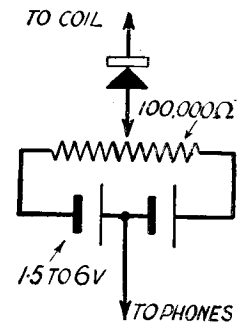
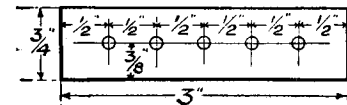


Fig. 5 (above)—Alternative battery connections for the crystal, and Fig. 6 (below): Marking out details of the terminal strips.



results for preliminary tests. Screw down the adjusting screw of the crystal and use about 1.5 volts. Rotate the tuning condenser until the local station is heard. You can then try the effects of transferring the crystal connection to either of the three taps on the coil, and also of shifting the aerial connection to the remaining taps on the primary. After this, varying potentials on the crystal may be tried out. With these varying adjustments the set may be made to suit any particular conditions—maximum selectivity and sensitivity when long-distance listening is required and no local station is on the air, or maximum selectivity when a local is present on a nearby wavelength.

**NEWNES' TELEVISION AND SHORT-WAVE HANDBOOK**

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**Erie High-voltage Multi-Resistor**

THE Erie Multi-Resistor is of particular interest to television engineers and designers, for it is intended for use with relatively high voltages such as those used in cathode-ray tube circuits. Furthermore, it will dissipate a very much higher wattage than most forms of carbon or composition resistances.

**Description**

In order to use a resistance with very high voltages the length of the unit must be greatly increased to prevent breakdown. To overcome this difficulty the Erie Multi-Resistor is constructed in the form of rings of resistance material which are connected in series and separated by Isolantite insulating spacers, the whole being assembled on a tube of similar material. Thus a resistor of fairly large effective length is obtained in a small space with the added advantage that a large number of tappings may be made without difficulty.

The length of a multi-resistor unit

depends entirely upon the rating required. At the moment two sizes are manufactured, and these are designated Size A and Size B respectively. The ratings given by the makers are as follows:

SIZE A.			
Overall diam. . . . .	.. ..	1 1/2 in.	
Max. W. per in. length . . . . .	.. ..	3.5	
Max. V. per in. length . . . . .	.. ..	5,000	
Max. V. per ring . . . . .	.. ..	1,000	
SIZE B.			
Overall diam. . . . .	.. ..	1 in.	
Max. W. per in. length . . . . .	.. ..	1.75	
Max. V. per in. length . . . . .	.. ..	3,000	
Max. V. per ring . . . . .	.. ..	600	
Prices are available on request.			

**Test Result**

We received for test a sample of Size A, about 3in., long containing 16 resistance rings in series. Each ring has therefore a resistance of about 62,500 ohms. On the basis of 3.5 W. per inch, and about five rings per inch, the wattage per ring

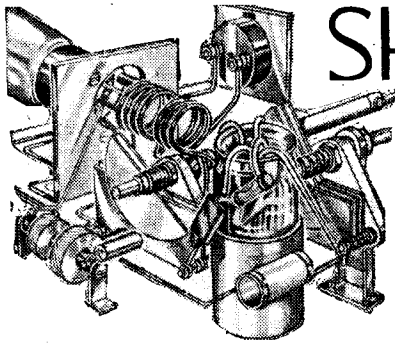
is 0.7 W., and therefore the maximum voltage across each ring of our sample should be about 209 V.

We tested it with 215 V. across each section, and found that the resistance elements became warm, but there were no signs of over-heating, so that the wattage rating is quite conservative.

The voltage rating also appears to be satisfactory, and providing the 3.5 W. per inch is not exceeded, the voltage can be as high as 5,000 V. per inch.

From the information supplied by the manufacturers it would appear that the only limit to the size of the tubing they can supply is the length of the ceramic tubing forming the core. They indicate that 18in. is the limit here, so that working on a basis of 5,000 V. per inch, it should be possible to obtain a resistance capable of working under an applied maximum voltage of 90,000 V., which is more than is likely to be encountered even in television receivers.

The resistors are certainly of an interesting design, and should form highly satisfactory solutions of many television and amplifier resistance problems.



# SHORT-WAVE SECTION

## PRACTICAL HINTS FOR S.W. EXPERIMENTERS

A Few Methods of Assuring Rigid Mechanical Erection of U.S.W. Aerials are Discussed in this Article. By A. W. Mann.

IN articles dealing with the construction and erection of ultra-short-wave aerials of the tubular and rod types, it is often stated that the aerial proper is supported by means of stand-off insulators. The experimenter with practical experience knows just what the foregoing sentence is meant to imply, but the beginner has sometimes to do a little thinking before he can make a start, and in many instances binds a few turns of wire around the aerial rod, loops it around the terminal heads of the insulators, and makes that do.

Such methods are more or less satisfactory in the same way as a hook-up receiver is satisfactory. It works, but its reliability is doubtful.

Apart from the danger factor, which applies to all types of overhead erections, there are other factors to be considered. For example, sway due to wind resistance and consequent artificial fading of signals.

aerial arrays and multiple reflector arrangements, the different units being arranged on wooden frameworks, the method as outlined at Fig. 5 is worth considering.

In this instance the larger type stand-off insulator is recommended, owing to the fact that the larger diameter base, which is fitted with three screw holes, and is in general of more robust construction, makes them very suitable for supporting half-wave tube and rod aerials and reflectors.

### Methods of Mounting

Fig. 6 shows one method of mounting, the end being flattened, drilled and bent at right angles. The bend, however, should not be sharp, but gradual, in the interests of strength, and to avoid fracture.

Reverting to Fig. 3, this method has much to recommend its use, where beam systems of the four-element type are to be erected.

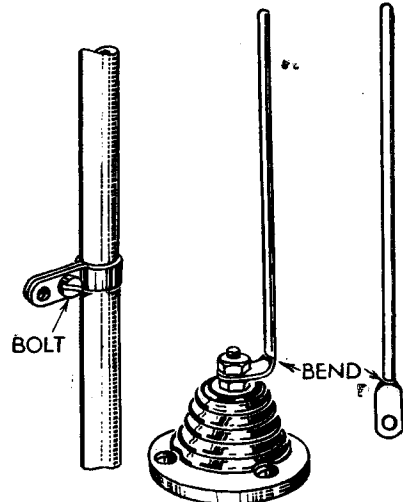
Whilst there are acknowledged difficulties associated with the construction of ultra-short-wave receivers, the most general one does not concern construction but the calibration of completed receiving apparatus, due to the fact that in many districts there are no amateurs working on the five-metre band. This difficulty also applies to the short-wave club fraternity, who share their headquarters with other organisations on alternate evenings. Under such circumstances it is impossible to install permanent calibration apparatus.

One of the most accurate and useful methods of calibration, and one especially applicable to ultra-short-wave work, is the Lecher wire method. Unfortunately to set up suitable apparatus requires considerable space, and in addition the work of calibration requires time and care in order

that a worth-while standard of accuracy may be achieved.

### Measuring Apparatus

Figs. 7 and 8 show a very useful and efficient mechanical arrangement of Lecher wire measuring apparatus. First let us examine in detail its general construction. We have two parallel wires 4ins. apart and each 25ft. long fastened at the one end to a stand-off insulator. At the other there is a ceramic double-eye insulator, and a coil spring. This spring is fastened to another



Figs. 4, 5 and 6.—A clip clamped to an insulator rod, and method of fixing an aerial rod to a stand-off insulator.

stand-off insulator, and in both instances the double-eye insulator isolates the Lecher wires from the tension springs. Across the two parallel wires is the shorting bridge, which consists of a short length of stiff wire, with the ends turned over so that it may be moved to any point at will, in order to short-circuit the two wires. Thus with the wires, loop, and shorting bar there is a closed circuit, the constants of which can, within defined limits, be varied at will.

The single-turn loop is, of course, coupled to the respective stand-off insulators.

### Constructional Details

In the interests of accurate calibration the mechanical construction must be as rigid as possible, and the tension of the two

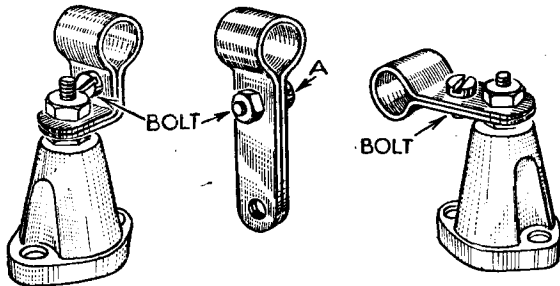


Fig. 1 (centre), Fig. 2 (right) and Fig. 3 (left).—Details of special clips for tubular aerial support.

Another factor is that of unsatisfactory mechanical construction producing cracking. The methods described below assure rigid mechanical erection of short and ultra-short-wave aerials in which copper tube or solid rods are incorporated.

### Special Clips

Fig. 1 shows a special clip made from thin gauge sheet brass. These are bent and formed around a piece of rod or tube of the same diameter as the aerial element to be used, the bending being carried out in a way that on completion the space between the leg portions of the clip is  $\frac{3}{16}$  in. so that when tightened on to the aerial the locking bolt, which is fitted in a suitable hole drilled as far up the neck of the clip as possible, will draw the legs together so that the clip has a firm and rigid hold around the aerial rod or tube. Fig. 2 shows a clip mounted on a Raymart type insulator, a terminal screw hole being drilled at the lower edge of the legs.

Passing to Fig. 3 we have the same type of clip bent at right angles, and fitted to an insulator. Fig. 4 shows a clip clamped to an insulator rod. Two or more clips are, of course, required according to the length of the aerial to be erected.

When experiments are being carried out with reflectors, and especially in the case of

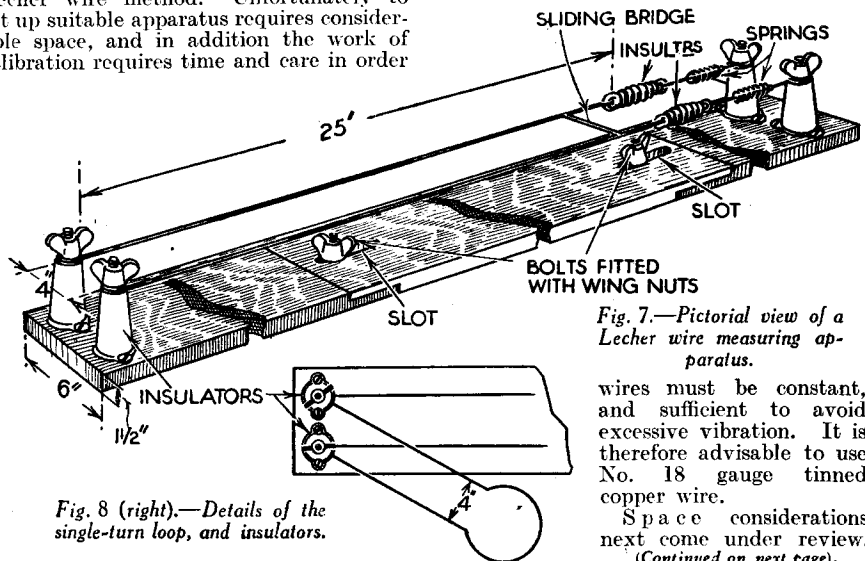


Fig. 7.—Pictorial view of a Lecher wire measuring apparatus.

Fig. 8 (right).—Details of the single-turn loop, and insulators.

wires must be constant, and sufficient to avoid excessive vibration. It is therefore advisable to use No. 18 gauge tinned copper wire.

Space considerations next come under review. (Continued on next page).

**SHORT-WAVE SECTION***(Continued from previous page.)*

The length of wire required is 25ft., plus insulator base dimensions, tension springs, and double-eye insulator, and a clear run of at least 28ft. will be necessary.

Comparatively few club rooms, and fewer experimental workshops, have a bench of this length available, and this means that a specially built bench is necessary. As such apparatus is not in constant use, the expense would hardly be justified and clubs sharing their room with other organisations must rule out the idea.

The idea of arranging the Lecher wires on a plank of sufficient length comes to mind, but presents another problem, i.e., where to store it when not in use.

With the foregoing considerations in mind, the arrangement shown in Figs. 7 and 8 will perhaps prove to be of interest.

**Three-section Base**

Instead of a single 28ft. by 6in. by 1½in.

plank, we have three separate sections which are half-lapped, as shown in Fig. 7.

Slots are cut to suit the bolts used through the combined thicknesses of the half-lap joints, and the whole is bolted together with suitable bolts and washers.

These slots also serve the additional purpose of allowing tensioning adjustments to be carried out, in addition to the tension provided by the springs.

The adaptability of this method of construction will be appreciated where conditions are as outlined earlier in this article, because the apparatus can be assembled in a short time, and after use can be dismantled and stored in a comparatively small space.

Lecher wires as specified are suitable for calibration purposes up to seven metres, the coupling coil, as shown, being used as the means of coupling the oscillator and Lecher wire circuit inductively.

The fundamental principles, and the

application of the Lecher wire system having been fully dealt with in past issues, and various text books, I do not propose to deal with them in this article, in which we are concerned only with the setting up of suitable apparatus.

There remains one important point, and this concerns the support of the three-section base. This should be arranged so that there is absolutely no possibility of the base sagging, as if this should happen the tension of the wires will be reduced, and calibration with any degree of accuracy will be impossible, therefore a centre as well as end supports should be provided.

In use, the apparatus should be set up clear of surrounding objects.

The method of construction outlined is less complicated than others in which hinged sections are used, and where club room facilities allow may be assembled and supported on trestles as semi-permanent apparatus.

## Leaves from a Short-wave Log

**Good Signals from Burma**

**R**ADIO-BURMA is the call of the XYO transmitter at Mingalodon working on 49.94 m. (6.0072 mc/s) with a power of 1.2 kW. It is on the air daily from B.S.T. 14.00-17.40 with a news bulletin in the English language at B.S.T. 16.15. The distance from Rangoon to London is roughly 5,400 miles. All reports of reception should be addressed to Station XYO, Burma P.T.T. Department, Central Telegraph Office, Rangoon, Burma.

**Radio Saigon**

**T**HE new 10-kilowatt short-wave station is now broadcasting daily on 25.02 m. (11.991 mc/s), and 49 m. (6.122 mc/s) simultaneously. The programme schedule is as under: G.M.T. 23.45-00.15, news in Annamite and French; 04.45, Annamite entertainment; 05.00-05.45, music and news; 12.00, native songs, etc.; 12.15, music and drama (French); 12.30, news bulletin in French only; 12.45, Variety (French); 13.30, Concert (European music); 14.00, Broadcast in English; 14.15, Chinese transmission. All reception reports should be addressed to the Société Indo-Chinoise de Radiodiffusion, at Saigon (French Indo-China).

**New Short-wavers for Morocco**

**I**T is stated that on behalf of the Office Chérifien a 12-kilowatt transmitter is in course of construction near Rabat (Morocco); it may start testing towards the middle of August on 36.64 m. (8.188 mc/s) and 25.13 m. (11.94 mc/s). The call-sign allotted is CNR2.

**Morse Tuition**

**I**T may interest readers to know that F.Y.D., Paris, on 74.35 m. (4.035 mc/s), broadcasts almost daily at B.S.T. 20.30 a series of slow morse transmissions for the purpose of providing tuition to French amateurs.

**New Hungarian Transmitter**

**O**NE of the Szekesharvar (Budapest) stations would appear to be testing on 25.32 m. (11.85 mc/s) almost every evening at B.S.T. 22.15. The call is given out in Magyar, German, French and

English. So far, the details of the station have not been published in the Berne list.

**A New Call from Hayti**

**C**ALLING *Broadcasting Nacional* a transmitter in the Dominican Republic has been logged on 47.06 m. (6.375 mc/s). The call-sign allotted to the station is HILB, and the studio is located at Santiago de los Caballeros. The broadcasts may be heard nightly from B.S.T. 23.30-04.00.

**Good Signals from Georgetown**

**S**INCE the closing down of VP3MR, of British Guiana now only owns one short-wave station, namely, VP3BG, and although only of a power of 200 watts, its signals are well heard in the British Isles, from midnight B.S.T. onwards. The transmissions are made on 48.94m. (6.13 mc/s), daily between B.S.T. 16.15-17.15, and from 21.45-01.45. Man and woman announcers. The studio usually closes down with the melody: *Good Night, Pretty Maiden, Good Night, followed by God Save the King.* All reception reports should be addressed to the British Guiana United Broadcasting Co., Ltd., 16, Robb and Hincks Street, Georgetown (British Guiana).

**Another Powerful U.S.A. Short-waver**

**T**HE World Wide Broadcasting Corporation of Boston (Mass.) has under construction a new 20-kilowatt transmitter, WIXAR, which will operate on 25.58 m. (11.73 mc/s).

**The Short-wavers of Chile**

**A**CCORDING to the latest lists, here are the details of the principal S.-W. stations in the Republic of Chile.

Santiago: CB1185, 25.32 m. (11.85 mc/s), 5 kW; CB1180, 25.42 m. (11.8 mc/s), 1 kW; CB1174, 25.55 m. (11.74 mc/s), 4 kW; CB1170, 25.64 m. (11.7 mc/s), 150 watts; and CB960, 31.25 m. (9.6 mc/s), 100 watts.



Mr. G. Stephenson, who recently flew across the Channel in a glider, is also a radio expert. He is a designs engineer in the research laboratory at the H.M.V. factory at Hayes. In our illustration Mr. Stephenson is seen at the testing bench.



# ON YOUR WAVELENGTH



## Television in the Provinces

THE R.M.A. move to press the Government for the establishment of television transmitters throughout the country, starting at Birmingham, is gathering momentum. It recently formed the subject of a question in the House of Commons, when Major Proctor referred to the fact that only £21,000,000 out of a total of £36,000,000 raised by wireless licences had been passed over to the B.B.C. since broadcasting was inaugurated in this country. He suggested that the need for a television service throughout the country warranted arrangements for the B.B.C. to receive the whole of the revenue from wireless licences. Mr. R. Morgan also directed the attention of the P.M.G. to the R.M.A.'s scheme for the immediate establishment of a television station in the Birmingham area, under which scheme the R.M.A. would be prepared to meet part of any loss.

The official reply came from Sir Walter Womersley (Assistant Postmaster-General), who said that the total receipts from wireless receiving licences up to the end of 1938 was about £36,000,000. The Post Office has received about £4,000,000 of this to cover its expenses, and the B.B.C. has been paid about £22,300,000. The Exchequer has kept about £9,700,000. He points out that the percentage of the licence revenue paid to the B.B.C. has been progressively increased, and under present arrangements the amount accruing to them to cover the costs of their services represents about 81 per cent. of the total licence receipts, while the Post Office keeps 9 per cent. and the Exchequer 10 per cent. He went on to say that the question of extending the television service to cover the whole of the country raised many problems, both financial and technical. All aspects of the question, including the tentative proposals of the R.M.A., are being investigated, but a decision has not yet been reached.

## Radiolympia

NOW let me turn to the plans which are in hand for the Radio Show which this year will take place from August 23rd to September 2nd. Its

By *Thermion*

layout will include an architect-designed exhibition with standardised lines of form both for the hall and for the individual stands; the largest theatre show ever staged at Olympia, which will include radio and television stars; television operating on all stands occupied by television manufacturers, a television section in which the public may view in comfort a model factory, including working exhibits; a technical section, a special export section, tea gardens and restaurant, and a cinema are other features which will ensure that this is the best radio exhibition ever. At one end of the exhibition will appear a replica of Broadcasting House, and at the other a version of the Alexandra Palace television area.

The cabaret show which makes its reappearance will run four or five shows daily, whilst the model factory will exhibit examples of bakelite moulding, condenser manufacture, loudspeaker testing, repetition work, valve making, coil winding, etc.

There will be a special section for home constructors, and this will also include exhibits of interest to the service engineer. The cinema will show films indicating various facets of radio manufacture.

The "Services" exhibit will indicate the use which the Army makes of radio, and this will include the latest predictor devices for plotting the course and speed of aircraft. The Navy will exhibit a radio cabin as fitted to a modern battleship. A flying squad car, radio-equipped, and a reconstruction of Scotland Yard's famous radio room will constitute the police display. The G.P.O. also have an interesting exhibit. A special theme song is entitled "Let's All Go to the Radio Show." It is to be broadcast some weeks before the opening of the show.

## Interference

THE Anti-Interference Bill was mentioned in the House of Commons recently. It is the fervent hope of every television manufacturer that legislation will be introduced making it an offence to operate any electrical gear which interferes with television programmes. I have expressed the point of view on a number of occasions that such legislation will never reach the Statute Book because it cuts across Common Law. I have stated also that, however much we desire users of apparatus to suppress it, it is a problem which will be finally solved at the receiving end. In the House of Commons, Mr. Day asked the question as to when such legislation would be introduced, such legislation to give to the Post Office additional powers in connection with electrical interference with wireless and television. In reply, Major Tryon said that he had nothing to add to his previous answer of March 13th, in which he said that the annual cost to the Post Office of helping owners of wireless sets to obtain broadcast reception free from interference was £95,000. He had also stated that work on a new Wireless Telegraphy Bill, which would deal, among other things, with interference, was continuing, but it was indicated that the problem is one of great complexity, involving consultation with many commercial and other interests which would be affected. Major Tryon, therefore, could not give any assurance that the Bill would be introduced during the current session.

## Relays by 'Phone

IN spite of international crises home affairs do continue to occupy a little of the Government's time. The question of the Post Office relays by 'phone was raised by Mr. R. Morgan, and in reply Sir Walter Womersley said: "Generally a subscriber to the service will be able to use his existing wireless set, but a small amount of additional apparatus will be necessary to connect between the telephone circuit and the wireless set. This will be provided by the Post Office, but there will be an additional charge for it, which will include also its maintenance. I hope to be able to announce the details of the new

service shortly." It is stated that existing relay systems will be used for the radiating of emergency messages either local or national. The Postmaster-General hinted at that in a further reply.

### Crooners, Take Warning!

TAKE warning, all crooners, with ears to the ground; Thermion rightly declares that you're not worth five pound, "At the end of the week," when you've finished your "croon," Which is all "nasty noise" and very small "tune." 'Tis like bellow of bull and like bleating of sheep, And groans of the dying which make our nerves creep. Jungle-folk gibberings, whining and howls, Grunting of porkers and cluckings of fowls! Would be no more annoying to hear in our rooms, Than the horrible noises you make in your "croons."

You always drag in the word "memoree," To rhyme with a line that concludes "melodee"; And though oft born in Britain, you sing down your nose, With "Ammurrican accent" you vainly suppose. Sometimes human language you firmly discard, And drift into monkey talk, noisome and hard. Such as "Rodeodo" or "Hide-do-dee." Oh! would from such drivel we soon may be free. And we cannot deny that it's rightly been found, That a week of such rubbish is not worth five pound!

"TORCH."

### Empire Day Programme from Canada

IT is interesting to note the details of the programme preceding the broadcast to the Empire by the King on Empire Day, May 24th, in the course of the Royal visit to Canada. The programme, which has been prepared by the Canadian Broadcasting Corporation, will begin at 7.15 p.m., B.S.T., and will conclude with the speech of His Majesty at 8.0 p.m.

The broadcast opens with a greeting to the King from the peoples of all the nations of the British Commonwealth. Then will follow individual greetings from each province in the Dominion of Canada, spoken by typical citizens of the Dominion—a fisherman in Nova Scotia speaking



### Anchoring Leads

THE increasing use of wire-end components has led in many cases to difficulty owing to the absence of terminals to which flexible leads (for mains or battery supplies, for instance) can be attached. It will have been noticed in recent designs published in these pages, that a simple way of overcoming this trouble is to attach small pieces of ebonite or paxolin to the bolts holding down the larger components, and to mount soldering tags on these insulated strips. In this way various components may be held rigid and flexible leads may be anchored. It should be remembered, of course, that many of the smaller components with wire ends may introduce difficulties if they are not held rigid by some such device as that mentioned.

### Symmetry in Layout

MANY constructors who try to design their own receivers fall into the trap of arranging all parts symmetrically, or at least in some kind of order. This can introduce difficulty, although wiring may be simplified. For instance, chokes and transformers when placed in line may cause the windings on the components to be inductively coupled. If a case of hum is found and smoothing does not produce any effect one of the transformers or chokes should be provided with fairly long flexible leads and the holding-down bolts removed from the component. It should then be turned at various angles and, if necessary, tilted up on one or other of its corners. It may be found that only when this latter procedure is adopted is induction removed, and with it, the introduction of hum.

### Test Bench Fitments

WHILST on the subject of hum it is important to remember that when building or fitting-out a test bench, wires carrying A.C. should be very carefully arranged and if possible screened by passing through standard earthed conduit. A case recently came to notice where a constructor had built such a bench and after it had been in use some time decided to fit a bench light. He accordingly carried a length of flex from the nearest lamp to the bench and mounted a pivoting light on the back. The result was that when he next tried to service a set he could not remove the hum which was introduced by reason of the close proximity of the mains lead to the aerial lead across the bench.

for the maritime provinces; a member of an ancient French-Canadian family from Quebec greeting His Majesty in the name of French Canada; from Ontario an elevator operator from the Bank of Commerce Building, Toronto, the highest building in the British Empire; a farmer's wife speaking for the prairie provinces from Saskatoon; a transport pilot talking from Edmonton, Alberta, in the name of the people of the Canadian North; and finally a dock worker in the Port of Vancouver sending greetings in the name of British Columbia.

From Canada the programme moves to South Africa, where greetings to the King come from an English-speaking engine driver and an Afrikaans-speaking worker. Then to Macheke, Southern Rhodesia, for greetings by a tobacco planter. Next in the roll-call, Australia, where a doctor of the Australian Medical Aviation Service speaks in the name of all Australians. Turning south to New Zealand, a Wellington school-girl and a Maori student salute the King. The greetings from India will take the form of a special poem written for the occasion by the famous Indian poet, Sir Rabindranath Tagore. The Governor of Jamaica will then be heard speaking from Kingston in the name of the peoples of the British Islands in the Caribbean Sea; to be followed by a greeting from St. Johns, the capital of Newfoundland.

Last in this Empire-wide chain, messages of loyalty and devotion in the names of the people of the United Kingdom—the motherland—a schoolmaster from Scotland, a linen worker from Northern Ireland, a Welsh miner, and, in the name of England, a boy from the training ship H.M.S. Conway, will be broadcast. But why not include England first?

The programme concludes with a final salute from Canada. The voice of the King will then be heard speaking from Winnipeg to his peoples in all parts of the world.

## PRACTICAL MECHANICS HANDBOOK

By F. J. CAMM

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# RADIO IN AVIATION—3

THE range requirements for the aeronautical services vary considerably. They may extend the full length of the course flown or they may be limited to half the course or even to a small fraction. There are, for instance, the short-distance services which are met with on European lines, the long-distance flights of trans-oceanic services, and the short ranges of certain military and naval aircraft.

This variety of ranges has brought about the use of a gradually widening band of radio frequencies. In the early days all aircraft communications were made on long and medium-waves up to frequencies not exceeding 700 kc./sec.; the ranges required did not normally exceed 100 miles or so, and for these ranges medium waves and trailing aeriels were quite satisfactory. As aviation developed, these wavelengths failed to provide adequate signal strength, and attention was turned towards the use of short waves. It was already known, however, that short waves, which were fairly reliable for distances less than 70 miles or so and for distances in excess of 300 miles up to several thousand miles, were quite unreliable for use over the skip zone, which can be roughly estimated for the present purpose as ranging from 100 to 300 miles. Consequently it was found necessary to provide two wavebands; one, the medium waveband, for use on the first part of the journey, and the other for use from 200 miles onwards. This provision called for the use of two aeriels and means for changing over from one to the other. One particular type, utilised in the R.A.F. over a certain period but now abandoned, took the form of a compound trailing wire. This consisted of two trailing wires end to end with a length of insulating cord between them; one was of the full length of 200ft. for use on the medium waves, while the other, for the short waves, had a length of 30ft., and so was very much more efficient than the fixed type. It would have been best to make the short aerial the lower one, so that when the long one was wound in the remaining wire would be unaffected by possible resonances in the 200ft. length; this, however, entailed a considerable loss of time in winding in and out to change over from short to long waves, and the reverse arrangement was adopted. It has now been replaced by the provision of a fixed aerial and a trailing aerial to meet the need of rapid wave-change. In some cases it is necessary to utilise several short waves at various times of day and night and at varying distances.

In the case of military aircraft, and particularly of fighters and others intended at certain times to fly in formation, the question of range of communications is a rather peculiar one. The occupants of the several aircraft may be required to communicate with each other by means of radio-telephony when the formation is flying wing-tip to wing-tip, i.e., at a range of a few yards. At any instant the leader of the formation may be called from the ground station, situated perhaps 100 miles away. Alternatively, the aircraft may separate to distances of many miles. Under these conditions it will be appreciated that automatic volume control is an insufficient means of maintaining relatively constant output. For this reason hand control is usually found more satisfactory, although care is required to avoid leaving the receiver at low gain after a local communication to ensure against the loss of a distant call. This

## We Now Deal With the Question of Range of Communications, Microphones, and Other Important Factors

problem does not arise in the case of civil aircraft, which can, therefore, take advantage of the automatic form of control.

### Vibration

One of the most troublesome features of aircraft radio-communication is the insidious effects of vibration. Considering the power and speed of the engine, the aerodynamical reactions of the air-frame (which includes wings, fuselages, and tail), and the forces acting on the propeller, it is not surprising that vibration is at a rather high level.

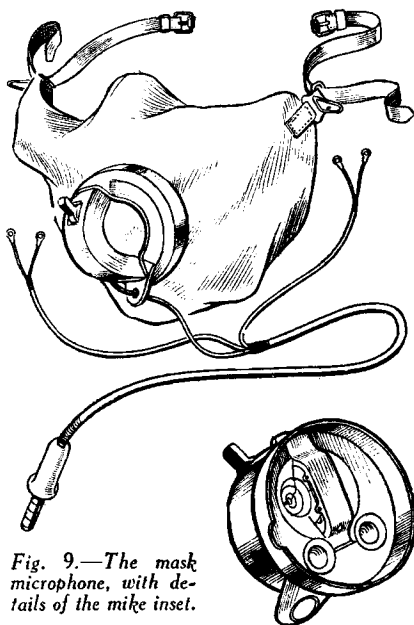


Fig. 9.—The mask microphone, with details of the mike inset.

Very careful attention must be given to the secure locking of all screws and bolts and the tying-down of all anchorages in the wiring. Methods of locking and securing which are normally found satisfactory for occasional mechanical shock and vibration are frequently unreliable when subjected to the continuous trepidations to which this class of apparatus is subjected in aircraft. It is generally found preferable, at some inconvenience, to secure internal screws and bolts by cementing them in place with a touch of varnish or like substance.

But the chief difficulties occasioned by vibration are in connection with the frequency stability of the radio-communication circuits and electrical stability of components. These vibration effects belong to two separate classes: (1) direct transmission, and (2) airborne vibrations. The former are fairly easily dealt with, but the latter have been more troublesome.

### Microphonic Valves

Microphonic trouble with valves can be said to be contemporary with the introduction of the dull-emitter filament. Early

valves of this class generated a continuous ringing sound in the telephones, which completely swamped weak and even medium signals. It was, therefore, usual to select valves having this characteristic present to a minimum extent, and these were reserved for use as detectors, where the trouble was most felt. Medium-quality valves were employed in the early stages of amplification, and bad ones in the output stage; valves of excessively bad quality were relegated for use in ground receivers. The subsequent development of the multiple suspension filament afforded a marked improvement and it can now be said that microphony is a thing of the past. The growth of broadcast reception played no mean part in the elimination of this extremely annoying defect.

### Microphonic Circuits and Components

But valve microphony is by no means the only cause of vibration-produced radio-frequency instability. The rather flimsy construction of the variable air-condensers originally available caused serious frequency-modulation effects which adversely affected superheterodyne reception. These effects naturally produced a chopping-up of the received signal, which was particularly distressing in the case of telephony. Condenser designs had to be overhauled to ensure substantial rigidity and stability of the rotor and stator.

Receiver inductances, being usually wound on solid formers, naturally gave no trouble, but rigidity of the general wiring has had to receive careful attention to obviate changes in circuit impedance.

### Noise

Owing to its close association with vibration, noise may conveniently be considered as the next cause of difficulties.

Noise affects radio-communication efficiency in three ways: first, in connection with its direct effect on the valves, as already considered; secondly, in relation to the speech efficiency of the microphone when telephony is employed; and thirdly, in respect of aural reception.

### Microphones

From the earliest days of radio-telephony the direct impact of extraneous sound waves on the microphone was a cause of considerable trouble. The subject was actively studied in many quarters, but perhaps nowhere with such insistence as in the R.A.F., where telephony occupied an important place. Starting from standard ground-type microphones held in the hand and completely unprotected from the effects of external noise and, incidentally, of wind and slip-stream, there were developed many types of protected hand-held microphones giving a gradually improving ratio of speech to noise. Many designs were evolved in England, and particularly in America, in which an attempt was made to balance out the unwanted noise while retaining a certain amount of sensitivity to the closely applied vocal sounds. But, on the whole, improvements were slight and not infrequently quite negligible.

Seeing that there was little hope of keeping noise out of the microphone, even when the latter was completely enclosed in a padded mask, which, incidentally, introduced serious acoustical difficulties, the problem was attacked from the point

## RADIO IN AVIATION

(Continued from previous page.)

of view of the sonic spectrum essential to intelligible speech. It was soon realised that it was desirable to eliminate response to frequencies below 700 cycles per sec. or thereabouts—this, more by good luck than good design, was already partially catered for in the characteristics of the microphone sound-box, of the speech transformers and of the earphones. It was also ascertained by trial and error that frequencies higher than about 2,500 cycles per sec. were unessential to the production of satisfactory speech in the presence of aircraft noise. Further progress was made on this basis, but such progress was always behind requirements, owing to the fact that aircraft engines constantly increased in power and air speeds rose.

The introduction of the combined oxygen and microphone mask was another serious setback, the requirements of the one clashing with the needs of the other. The necessity for ventilation reintroduced extraneous noise and wind effects. A further complication arose when it was required to use the microphone while lying prone on the floor. Nevertheless, there was produced a useful compromise in the form of a microphone fitted to a ventilated oxygen-fitted mask and capable of being used in all positions except with the operator lying on one side. This microphone is shown in Fig. 9. The chief point of interest is the fact that the capsule is held with its plane normal to the face of the user and is double-sided.

As the level of aircraft noise showed unmistakable signs of increasing still further, it became necessary to study the problem from a more scientific point of view. It was soon realised that no amount of filtering in the electrical circuits could produce any appreciable improvement, for the main trouble was caused by the non-linearity of the carbon microphones then in use. Acoustic filtering appeared to be out of the question, although of recent years much has been done in telephone laboratories to modify the characteristics of the diaphragm and impart to it a filter action cutting off the lower frequencies. It thus became apparent that the only hope of appreciable relief was to be found in the use of microphones possessing substantially linear characteristics. It is too early to state with certainty that by this means adequate quality may be hoped for, but results of tests on linear microphones are promising. Various types have been produced, such as the crystal class and the electromagnetic type. Unfortunately, all these types are considerably less sensitive than the carbon type, even when the latter is relatively insensitive for use in noisy surroundings. The loss of sensitivity can be roughly expressed as 20 db. and can only be compensated by the provision of a pre-amplifier. This, unpleasant as it may appear at present, will probably have to be accepted if telephony is to survive. With linear microphones the noise of that part of the spectrum which for obvious reasons cannot be eliminated, is heard as an independent background but does not cause the dis-

trussing "chopping up" which is the consequence of inter-modulation.

It is desirable to refer here to a class of microphones which is frequently brought forward as the obvious cure for noise background; it is the type in which the microphone capsule is applied externally to the larynx, and sometimes to the face at the corner of the mouth and other places, with the object of leaving the mouth free while sealing off the capsule and the diaphragm from the extraneous noise. Over a period of 20 years, ever since the War in fact, this class of instrument has been repeatedly tried and experimented with under all possible conditions, but with complete failure. It is not meant to imply that this class of microphone is incapable of providing satisfactory service; in fact, it is known to be sufficiently satisfactory for use with good results in noisy surroundings such as power stations and industrial shops. But aircraft conditions are too severe for it, and if it is designed to eliminate noise its acoustic characteristics are such as to produce speech of low intelligibility. Its application to aircraft for continuous use over a period of an hour or more is further debarred on account of objections of a medical nature. In military aircraft, where high altitudes and the use of oxygen is almost a normal state, the pressure on the jugular vein is a source of danger, and it is not easy to produce a design which shall be comfortable, safe, and efficient. Perhaps a more intensive study would overcome the above difficulties, but the outlook is far from promising.

If the carpenters who lay down ballroom floors could be persuaded to reveal the truth, it is quite possible they would be able to disclose that the magic words, VICTOR SILVESTER, were strewn among the foundations, for this well-built six-footer has undoubtedly done more for modern ballroom dancing than anyone else.

Despite his astonishing success as a performer and teacher of ballroom dancing, the fact is, he was never really trained for it, and had no idea of this profession becoming his career.

Born at Wembley (Middlesex), this enterprising son of the Vicar of Wembley escaped from school to join the Army at the age of fourteen-and-a-half, and was almost at once precipitated into the thick of the battle. He fell a victim to wounds during a grand display of courage, which earned him the Italian Bronze Medal for Military Valour, and when he was demobilised in 1919, he found himself very much at a loose end.

Wandering around Harrods store one afternoon with a friend, he was introduced to Miss Belle Harding, dance hostess at Harrods' Restaurant and the Empress Rooms, and speaking of his inactivity, found her suggesting that he accepted a post as professional partner under her charge at the princely sum of £1 a week!

Naturally enough, he agreed gladly—he just about knew how to dance but had no idea what his duties would be until he started—this situation getting him interested in steps and tempo. He spent hours every day at home practising, and to this diligent application of his own accord, he is able to attribute his subsequent success and fame. It is not an expression of conceit on his part, but, on the contrary, an example of the value of patience and devotion to practice.

In three short years he won the World's Dancing Championship, and he was only twenty-two years of age at the time. He became one of the original committee of the Ballroom Branch of the Imperial Society—

## Radio Biography

VICTOR SILVESTER

largest dancing organisation in the world—which was formed in 1924. Thanks largely to Victor Silvester's aid and advice, this movement founded the basic technique of modern ballroom dancing. He is looked upon as the originator of the waltz as we know it to-day, and to him we have to bow for immeasurable improvements in the execution and tempo of dancing. With his wife—who like him was not a dancer at first, but a "beauty queen" in a national newspaper contest—he is perhaps the greatest demonstrator of ballroom



VICTOR SILVESTER

dancing in the British Isles. He knew that thousands of folk who wanted to learn the essentials of dancing could not afford continuous lessons, so he spent many months getting into book form most of his incomparable knowledge of the subject, so that you and I could purchase the key to success as a dancer for a moderate price, and teach ourselves from his personal tips in our own homes.

His editions include "Modern Ballroom Dancing," "Theory and Technique of Ballroom Dancing," and "The Art of the Ballroom," all brilliant volumes packed with facts, photos and diagrams, the first of which has been the best-seller of all dance books ever published. It has run to 20 editions and over 100,000 copies have been sold.

While the books were selling, it occurred to Victor that the man-in-the-street would find it a distinct disadvantage not having the right kind of music with which to practise to, as it was practically impossible to obtain gramophone records that were ideal for dancing.

Such a loop-hole had to be remedied, so he paid a visit to the Parlophone Company, explained the difficulty and the prospect attached to venturing to make some strict-tempo records with an orchestra specially chosen for the purpose, and they were enterprising enough to give him their immediate backing.

Having learnt the piano—he was taught music and pianoforte in his childhood—he was able to take the matter completely in hand, and Parlophone allowed him to make the first recordings of what has since become known as non-vocal music in perfect dance-tempo.

In Australia, his records are—statistics show—played on the air more often than those of any other band or artist. Even in America—spiritual home of jazz—he is a best-seller, and his ideas have been widely adopted throughout the continent, copied straight off his records.

A PAGE OF PRACTICAL HINTS

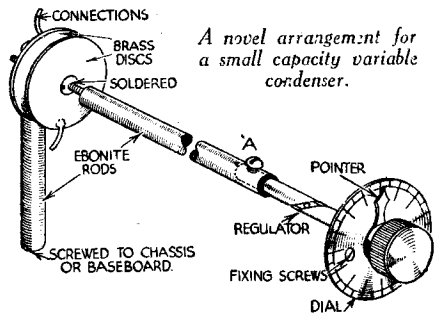
**SUBMIT YOUR IDEA**

**READERS WRINKLES**

**THE HALF-GUINEA PAGE**

**Small Capacity Variable Condenser**

THE accompanying sketch shows a small capacity adjustable condenser I am using in the aerial circuit of my S.W. receiver.

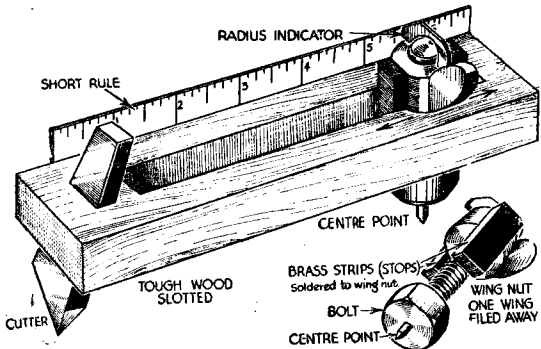


The main part is a speed regulator taken from an old gramophone. The ebonite rod is drilled to take the lower end of the regulator (as shown by dotted lines), which is then held in position by screw "A," the other end of the rod being tapped to take a flat-headed screw to which a brass disc is soldered. The length of travel of the regulator is about 1in., and being complete with dial and pointer makes a neat panel control.—R. PHILPOTTS (Cramlington).

**A Cutting Tool for Large Circular Holes**

A PIECE of wood, a short rule, a large bolt with a wing nut, and a short blade shaped, as shown, from an old file were used for this tool. A slot was cut in the wood wide enough to allow the bolt with the strips of brass to slide up and down its length.

The blade was inserted in a tapered hole, thus fixing screws are not necessary. Screwed to the back of the wood is the short rule, and a tin pointer is fixed into a slot cut in the top of the wing nut. The tool is easily tightened from underneath and a centre point is soldered into a hole in the centre of the bolt head.



An adjustable cutting tool for large circular holes.

**THAT DODGE OF YOURS!**

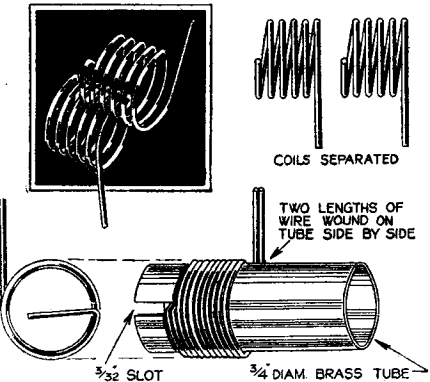
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**SPECIAL NOTICE**

All wrinkles in future must be accompanied by the coupon cut from page iii of cover.

**Winding Ultra-short-wave Coils**

WITH ultra-short-wave coils, it is usual to arrange for the turns to be spaced about one diameter of the wire apart. This spacing can easily be obtained by winding two coils together, and after-



A method of winding ultra-short-wave coils.

wards separating them. For winding purposes, all that is required is a metal tube about 3in. long, and of a diameter equal to the required inside diameter of the coils (usually 1/16in. for the ultra-short waves), and having a slot cut at one end as shown in the sketch. This can be about 3/32in. wide by 3/16in. long. In winding the coils, it will be found best to cut off two equal lengths of wire, say, 24in. long (the wire being, of course, 16 or 18 gauge), and fixing two of the ends together in a vice. The two free ends should then be bent at right-angles and slipped into the slot in the tube. Pulling the pair of wires taut, the required number of turns can then be wound on by rotating the tube. Next cut off (allowing a short length of wire for

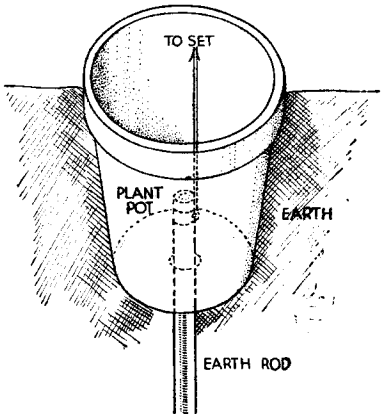
direct connection), and slide off the inter-meshed coils from the tube.

It is then only necessary to rotate one of the coils until both become separated.

In the inset of the sketch, two such coils are shown partly separated, and for clearness, these are shown rather more out of mesh than is actually necessary when separating.—R. L. GRAPER (Chelmsford).

**An Effective Earth Device**

THE accompanying sketch shows an earth device which I have found very effective. A small plant pot is sunk to the



A flower pot and a copper stake form this effective earth.

level of the ground, and through the centre a long copper stake is inserted from which a wire is attached to the set. If the plant pot is periodically filled with water, thereby keeping the surrounding earth moist, results will be improved.—J. WALKER (Ipswich).

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**D**ESPITE the increased popularity of all-wave receivers during the past few years there is still a predominance of sets designed only for the reception of medium- and long-wave broadcasts. And the increased use of shorter waves, as well as wavelengths between the normal S.W. bands from about 10 to 80 metres, makes it worth while to modify the receiver to tune to one or more of these lower ranges. Additionally, of course, there are certain ship-to-shore transmissions on wavelengths which are just above those normally reached on the medium-wave broadcast receiver.

It is not always desirable or even possible to modify an existing set to make it a first-class all-wave model, but there is seldom much difficulty in making simple alterations to permit of the inclusion of one or more of the alternative bands. Provided that a high degree of efficiency is not considered essential—and it is not important in many instances—the alteration need not be difficult or expensive. Nor is it necessary to impair the efficiency of the set as it stands, nor even to make operation more difficult.

The actual procedure to be adopted quite naturally depends upon the circuit of the receiver and upon the form of construction employed. Thus the method must be different for a superhet than for a Det.-L.F. outfit. A commercial receiver cannot easily be altered since the chassis is generally so arranged that extra components cannot well be accommodated. In that case the most satisfactory method is, in the majority of instances, to make use of an adaptor or converter.

But here we are not concerned with that side of the question, which has been adequately dealt with in many previous issues. Our concern is more with simple additions that can be made within the present receiver; the changes need scarcely change its appearance, and will not involve the addition of external units and will not make it necessary to modify the outside appearance to any marked extent.

**In O-V-1 Circuit**

Thus, when using a Det.-L.F. circuit, the input circuit of which is shown in Fig. 1, it is seldom difficult to add an extra coil unit which can be used in place of the broadcast tuner by the turn of a switch. The simplest arrangement is that shown by heavy lines in Fig. 1. It will be seen that it is here assumed that the broadcast tuner has an aperiodic aerial winding, a grid winding and a reaction winding, and that the reaction condenser is connected between the end of the reaction winding and the anode terminal of the detector valve.

What we require is a three-pole change-

# ADDING AN EXTRA

over switch, or three separate single-pole change-over switches ganged together. It will be seen that the earth ends of the three windings on each tuner are connected to the earth line, and that the switch makes possible the immediate transference of the aerial lead-in, grid and tuning condenser, and the reaction condenser from one tuner to the other. It does not matter whether the additional tuner is made to cover a single waveband (as a plug-in six-pin coil would do) or two bands controlled by means of a built-in two-way switch. In

Some Notes on the Modification to Permit of Tuning Over Wavebands Between Approximately 200

it will be appreciated that maximum efficiency will be obtained when the switches are placed as near as possible to the terminals to which they are connected. One very convenient method is to use three baseboard mounting toggle switches of the two-way type, ganging these by means of a common spindle, as shown in Fig. 2. A less expensive method is to use a so-called rotary selector switch of the three-pole three-way type as illustrated in Fig. 3; in this case the three poles are employed, but only two of the available three "ways." This type of switch, like the baseboard-mounting pattern previously referred to, can be mounted close to the coils and operated by means of a long spindle. There are, of course, many other types of

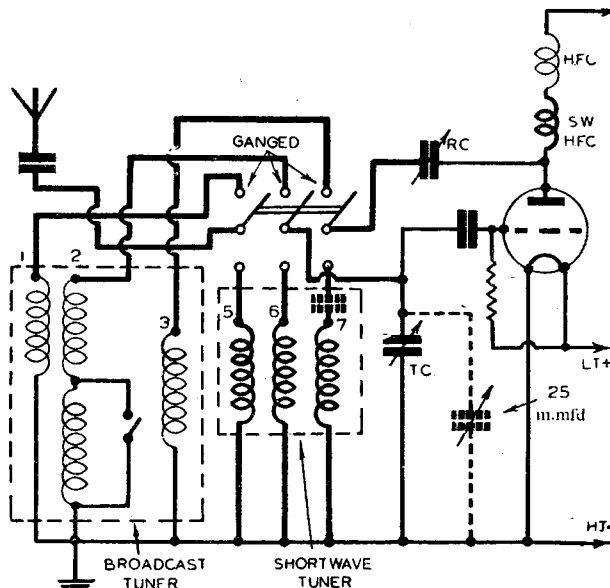


Fig. 1.—Method of connecting the switch, or switches, and additional tuner when using a Det.-L.F. type of receiver. It will be noted that new connections are shown in heavy lines.

the latter case there would be an extra pair of switch knobs on the panel, and one of these would give the change from broadcast to S.W. bands, while the other would permit of the use of either of two S.W. bands when the main three-pole switch was set to the short-wave position.

**Suitable Switches**

It will be understood that the three-pole switch, or the three single-pole switches, must be of the anti-capacity type, whilst

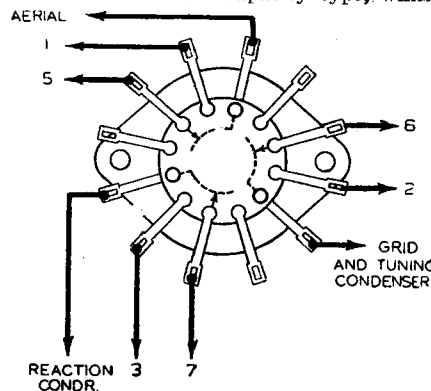


Fig. 3.—A less expensive and sometimes more convenient method of ganged switching is by means of a rotary switch, of the type shown above. Connections correspond with those given in Fig. 2.

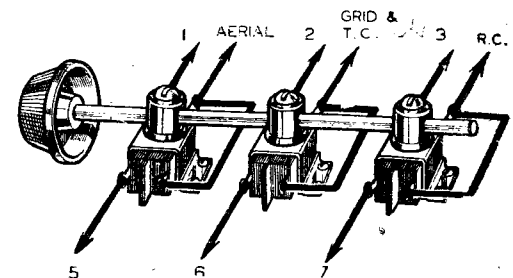


Fig. 2.—One convenient method of switching is by means of a number of Q.M.B. toggle switches of the chassis- or baseboard-mounting type, operated by means of a single spindle, which provides ganging.

switch available for the purpose, and it is not necessary to enumerate them.

Unless the tuning condenser—probably of .0005-mfd. capacity—is provided with a very good slow-motion drive, it is generally worth while to connect a low-loss variable condenser of about 25 mmfd. in parallel with the existing tuning condenser, as indicated by broken lines in Fig. 1. Even this should be provided with a good drive. In the majority of instances, however, it is preferable to replace the existing condenser drive by a first-class one giving a smooth, slow-motion control. By that means the symmetry of the panel need not be spoiled, and the advantage of the better drive is obtained on all wavebands.

**H.F. Chokes**

Another desirable modification is the inclusion of a short-wave choke between the anode of the detector valve and the "reaction" choke already included in the circuit. The combination acts in a similar manner to an all-wave choke. In many instances it might be found that the capacity of the reaction condenser is too high to give smooth control on the lower wavebands, but this difficulty can easily be overcome by inserting a fixed or pre-set condenser between the end of the reaction winding on the short-wave coil and the change-over switch. This is also shown by broken lines in Fig. 1.

When the aerial tuner in the broadcast



# A "STAND-BY" CRYSTAL RECEIVER

An Efficient Crystal Receiver is Always Useful, and No Constructor Should Be Without One, as it Forms an Ideal Stand-by Arrangement for Emergencies

By THE TECHNICAL STAFF

JUDGING by the number of inquiries received about crystal receivers, it would appear that they are again on the upward swing of the cycle of popularity. Whether this is due to the appreciation of the splendid quality of their reproduction, when used in conjunction with a good pair of headphones or a high-fidelity amplifier, the fact that they are not dependent on batteries or mains supplies for their operation, or the less pleasant realisation that they are ideal for emergency use in A.R.P. shelters, cannot be determined from available records. The fact remains, however, that a compact, sturdy, fool-proof receiver is required by many of our readers, therefore the model described below has been produced to meet those demands.

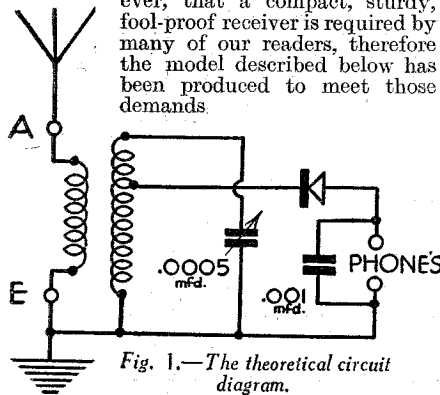


Fig. 1.—The theoretical circuit diagram.

For the benefit of those who have not yet used a crystal receiver and, incidentally, for those who have not used one since the day when they switched over to a more ambitious valve set, a few words of warning concerning what some might call the defects of this type of receiver would not be amiss.

It must be appreciated that during these days of high-powered transmitters the selectivity of a circuit plays a very important part in satisfactory interference-free reception. The required degree of selectivity is invariably obtained by the use of several tuned circuits employing coils designed to give the utmost selectivity; the fact that a certain loss in efficiency is often produced is not so serious in the case of a receiver using modern valves, as the overall arrangements can be so designed to provide an adequate surplus of power under normal, or average, conditions.

With the more simple crystal circuit, however, it is not possible, owing to its sensitivity and effective range of reception being within fairly definable limits, to obtain a degree of selectivity comparable with, even, a one-valve set using reaction. With a set of the experimental type, along the line of the one described on other pages of this issue, quite sharp tuning can be secured but, generally speaking, the characteristics of the crystal, the fact that loosely-coupled circuits cannot be used *ad lib* by reason of signal strength, and the

remaining consideration of simplicity, makes the selectivity of a crystal set a factor which tends to limit its application nowadays.

This does not mean that it is a one-station arrangement, except, of course, for those who are living within the swamp area of a transmitter, but it does mean that razor-edge tuning must not be expected by all users, and that local conditions can play a very important part in the performance of the set. At Tower House, both the London stations can be received without noticeable interference, though it is possible to hear, faintly, the other station when the one to which the set is tuned has a break in the programme. In S.E. London, a higher degree of selectivity is obtained and, as a point of interest, Radio Normandie can be heard when the locals are off the air.

With the majority of crystal receivers,

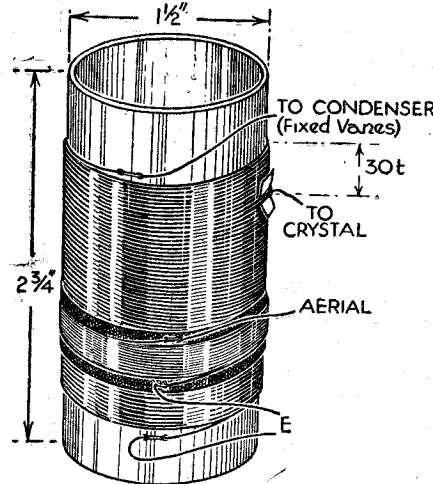


Fig. 2.—Details of the coil.

trouble is often experienced on the long waves by the "break-through" of the nearest medium-wave station. Admitted that this can be overcome by inserting in series with the aerial lead-in a suitable inductance and tapping the aerial well down

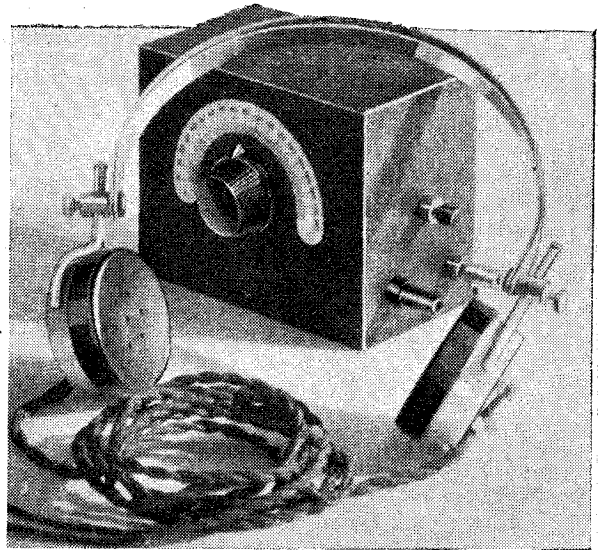


Fig. 4.—This view of the finished receiver gives a good idea of its size in comparison with a pair of headphones.

the tuning coil, but as this only complicates matters and as the same programme as that of the long-wave National can be heard on the medium-wave National, it was decided not to include a long-wave section on the coil specified for the "Stand-by" receiver.

### Design

To obtain the maximum amount of selectivity consistent with signal strength, the aerial is coupled to the crystal circuit by means of a small coil wound over the tuned section while the crystal is tapped down its associated coil to reduce damping effect. The tuning is carried out by means of a .0005 mfd. solid-dielectric variable condenser connected across the whole of the secondary winding.

For simplicity and reliability a detector of the semi-permanent type is used as it is far less susceptible to vibrations, and it allows a sensitive point to be obtained without the fiddling adjustments associated with the old cat's-whisker type of detector.

The theoretical circuit is shown in Fig. 1, and owing to its simplicity it does not call for any detailed explanation.

### Construction

To make the receiver as compact and robust as possible, all the components are mounted in a small wooden box measuring 4 1/2 in. x 3 1/4 in. x 2 11/16 in. The one used was fitted with a sliding lid and supplied in plain whitewood finish. The latter item is

(Continued on facing page)

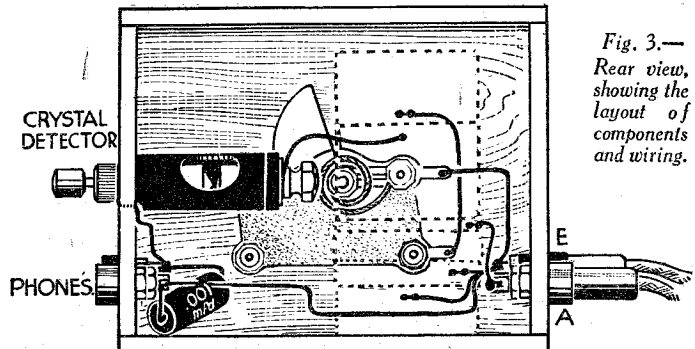


Fig. 3.—Rear view, showing the layout of components and wiring.



**A STAND-BY CRYSTAL RECEIVER**

(Continued from previous page)

a consideration, as it allows the case to be painted or finished off according to individual taste.

Assuming that the sliding lid forms the back of the receiver, the tuning condenser is mounted in the centre of the front panel. Along the bottom edge of the left-hand side are fitted two small Clix sockets for the aerial and earth connections, while in a similar position on the right-hand side are fitted two more for the headphones. Terminals could, of course, be used for these connections, but they would not give such a neat finish, and would be likely to work loose in the wood fixing.

Just above the headphone socket a hole can be drilled to accommodate the crystal detector, but before fixing this component in position connections can be made between the earth socket, the moving vanes of the variable condenser, one telephone socket, and the .001 mfd. tubular condenser can be joined across both headphone sockets.

After this, mark off the fixing holes for the coil on the outside of the bottom section of the box, taking care to see that it is located clear of the variable condenser and the lid. At the point thus marked a hole can be made to take a 1/4 in. countersunk screw to hold the coil in a vertical position inside the case.

Once the coil has been fixed the remaining connections, namely, the aerial, the crystal detector, one side of the 'phones, the fixed vanes of the tuning condenser and, finally, the earth connections can be completed. The receiver is now ready for testing.

**LIST OF COMPONENTS FOR "STAND-BY" CRYSTAL SET.**

- 1 Coil (T.W. Thompson), 2/-.
- 1 Perikon Crystal Detector (Electradix), 2/-.
- 1 .0005 Tuning Condenser (Jackson Bros.), Type 2093, 2/6.
- 1 Plain Wooden Case (T.W. Thompson), 9d.
- 1 Scale (Electradix), 2d.
- 1 .001 Fixed Condenser, Dabilier Type 4601/S, 1/-.
- 4 Clix Sockets, No. 8, with 4 extra nuts, 8d.
- 2 Clix Plugs, No. 35, 5d.
- 2 Clix Plugs, No. 1, 4d.

**Operation**

With a set of this type it is very desirable to use an aerial of at least average efficiency but, on the other hand, don't use one of excessive length with the idea of increased signal strength, unless you are well away from your local station, otherwise selectivity will be poor.

With the headphones in position, rotate the tuning condenser until a station is heard, and then adjust the crystal detector to obtain the most sensitive contact. When doing this be sure to *withdraw the plunger* before *rotating* or else the crystals will be damaged. If no station is heard, and you are satisfied that aerial and earth and all wiring are in order, it is possible that the crystal is not making satisfactory contact, so make the adjustment as mentioned above.

Don't overlook the fact that the strength of the rectified signal allows nothing for wastage, so it is very essential to use a good pair of headphones.

**THE DIRECTOR-GENERAL'S ASSURANCE**

THE present Director-General of the B.B.C., Mr. Ogilvie, is certainly keen on making television a national system at the earliest opportunity. In a speech he gave recently at Liverpool he stressed the fact that the development of the resources at Alexandra Palace was not being undertaken for the benefit of those situated in and around London, but was for the purpose of acting as a nucleus of a national system. The figures for the cost involved had already been supplied to the Treasury, and to assist matters it was hoped that a larger proportion of the four and a half million pounds paid annually for wireless licences would be allotted to the B.B.C. than had been the case in the past. If this was done then development would be rapid. Experiments on the coaxial cable and direct radio link were still being conducted by Post Office engineers both in the field and the laboratory, and the results of this work should be available before very long. It was certain, however, that the ultimate decision would depend on cost.

**METAL RECTIFIERS**

IN our issue dated April 22nd, we published an article on Metal Rectifiers and their various applications. Fig. 4 in that article showed an arrangement using H.17 units for the supply of D.C. receivers from A.C. mains. It should be noted in this connection that four of the H.T.17 units are called for in this circuit, each of the symbols in that diagram representing one H.T.17 unit. If only two units are employed and wired in the usual manner they will be damaged by the application of excessive voltage.

**WORKSHOP CALCULATIONS TABLES AND FORMULÆ**

By F. J. CAMM

3/6, by post 3/10 from

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**A French Television Inauguration**

THE formal entry of French television into the commercial field has just taken place when the Minister of P.T.T., introduced the first public showing of a 6ft. by 4ft. television picture at the Marigny Theatre, Paris, as announced in April 29th issue. The standard of definition employed was one of 455 lines with 50 frames per second interlaced to give 25 pictures per second. The vision programme was radiated from the Eiffel Tower aerial on a wavelength of 6.52 metres, the accompanying sound being on 7.14 metres. Apart from line definition the standards of modulation, synchronising, etc., followed quite closely those used by the B.B.C. The big screen receiver used a projection cathode-ray tube with a voltage of 40,000, the equipment being designed according to the Barthelémy system. Observers report that there was a lack of brilliance in the pictures, and in the medium and long shots from the studio the actors were not clearly recognisable. The quality was, therefore, below that which has already been demonstrated in this country, but no doubt improvements will be effected as experience is gained. The same difficulty with the cinema industry has arisen in France as was the case initially here. That is to say, the promised regular transmission of feature films has raised the fear that television will become a competitor instead of an ally to films. This matter will regularise itself once the full purport and scope of television has been thoroughly understood by the executives involved. It is learned that the P.T.T. are proceeding with their plans for provincial centres, and in this category they are certain to steal a march on the British Post Office.

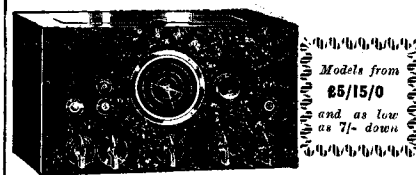
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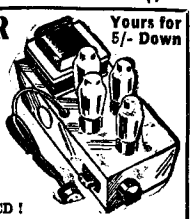
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These chassis are guaranteed for 12 months including valves, which, coupled with modern-to-the-minute features, ensure complete satisfaction. ALL-WAVES 8-stage S/HET A.C. Model 908MT. This advanced 8-stage 6-valve chassis represents wonderful value for the connoisseur. Wave-range 10-2,000 metres. A.V.C. Station and metre calibrated scale. Pick-up sockets. 3 watts output. Complete with 6 valves. Normal list value £9/19/6. OUR PRICE, £6/19/6, or 9/6 down and 18 monthly payments of 8/7. We Save You £3/0/0. ALL-WAVE S.G.S. Battery Model 901. Proved sensitive 3-valve H.F. Pent., Det. and Harries distortionless output. Pentode. Wave-range, 18-2,100 metres. Station and metre-calibrated scale. All-world reception. Low H.T. consumption. With all valves. Normal list value, 5 gns. OUR PRICE, £3/12/6, or 5/- down and 12 monthly payments of 6/2. We Save You £1/12/6. ALL-WAVE 7-stage S/HET. Battery Model 902. Sensitive and selective 4-valve circuit. All-waves. 18-2,000 metres. Pentode output. Station-name and metre calibrated scale. Complete with 4 valves. Normal list value, £6/16/6. OUR PRICE, £4/17/6, or 5/- down and 18 monthly payments of 6/1. We Save You £1/18/0. Complete Chassis List FREE.

HOW, FOR 17/6 ONLY, you can cut out that interference. Invest now in a Peto-Scott Anti-Noise All-Wave Aerial outfit complete with instructions, 17/6 or 8 monthly payments of 2/6.

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SEND FOR COMPLETE RADIO LISTS

# An Adjustable Slow-motion Drive

A Novel Device with Coarse Driving Spindle and Fine Driving Spindle for Receivers or Transmitters

**A**DJUSTING devices for rotating the condensers of a receiver having a coarse driving spindle and a fine driving spindle are already known. Either spindle may be set in rotation by an operating knob, as desired. In known arrangements of this type special reduction gears are provided between the two spindles, mostly ball reduction gears or friction disc gears. According to the device shown in the accompanying illustrations, a driving cable coupled with the condenser to be adjusted is taken round a pulley fixed to the coarse driving spindle and also round a pulley seated on the fine driving spindle, or round the fine driving spindle itself, in such a way that it is set in motion on rotating one of the two spindles of the condenser.

## Simple Operation

The advantage of the device lies in the great simplicity of the arrangement. The ratio of the reductions with coarse and fine drive may, within wide limits, be easily adjusted as desired. Figs. 1 and 2 show clearly how the device operates. Fig. 1 shows a cross-section through a receiver cabinet, through the panel G of which is led the coarse driving spindle W1, which is in the form of a hollow spindle, and which carries the coarse-tuning knob D1. The spindle W1 is seated in the bearing L, which is secured to the frame, and the pulley E is fixed to the free end of the spindle W1. The fine driving spindle W2

is led through the coaxial bore of the spindle W1 and carries the fine-tuning knob D2.

## Driving Cable

The driving cable, which is coupled with the condenser, is slung round the pulley E on the one hand by the part S1 and directly round the free end of the spindle W2 on the other hand by the part S2, in such a way that when one of the two operating knobs is rotated the cable drives the condenser with greater or smaller reduction.

The way in which the cable is led is shown more clearly in Fig. 2. In this, figure pulley B. On the long, stretched part of the

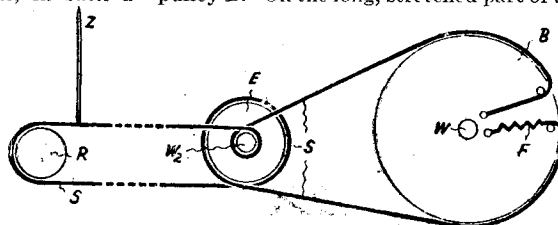


Fig. 2. Diagram showing how the driving cable is led round the pulleys.

B represents the large pulley fixed to the condenser spindle W, to which both ends of the cable S are secured. The spring F maintains the cable always taut. From the pulley B the cable first passes to the pulley E, fixed on the coarse driving spindle, thence over a guide roller R to the fine driving spindle W2, and finally back to the cable S between the roller R and the spindle W2 is fixed the pointer Z, which during

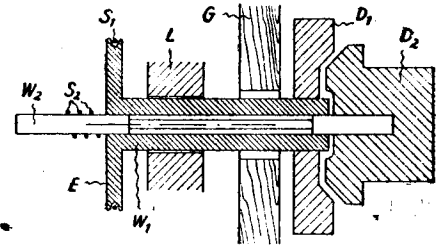


Fig. 1. Cross-section through a receiver cabinet and the slow-motion drive.

tuning moves to and fro in front of the receiver scale. Thus, in this case, a single cable serves to transmit the drive from the tuning knobs to the condenser, to produce two couplings having different reduction ratios between condenser spindle and each of the tuning knobs, and also to couple the rotating condenser with the scale pointer.

## Reduction Ratio

The ratio of the reductions with coarse drive and fine drive is given by the ratio of the diameter of the spindle W2 to the diameter of the pulley E. Naturally, instead of being led directly round the spindle W2, the cable may alternatively be led round a small pulley fixed on it. In this case, the diameter of this pulley will determine the reduction ratio.

The pulley B need not be fixed directly to the condenser spindle W, but may be coupled with the latter via any sort of reduction gear: in particular, the cable S may also serve to produce this coupling between the pulley B and the condenser spindle, the arrangement, approximating to one already known, being that on the spindle W are seated one fixed and several rotatable pulleys, round which the cable is slung according to the compound pulley principle, in such a way that one of the movable pulleys moves with double angular velocity, and hence the portion of cable which operates the scale pointer moves with double velocity. By this means not only is the attainable scale length doubled for the same diameter of pulley, but also the reduction ratio of each of the two driving spindles to the rotating condenser spindle is doubled. This development has arisen in the laboratories of Telefunken Gesellschaft für drahtlose Telegraphie m.b.H., of Berlin.

## Mayfly on the Colne

**JOHN SNAGGE**, of the B.B.C.'s Outside Broadcasts Department, himself a keen fisherman, is busily organising a fishing broadcast for Springtime, which will take place in the late evening of May 19th on the banks of the Colne in Buckinghamshire. The Mayfly usually rises during this week of May in Buckinghamshire rivers, while the moon being full, all auspices should be propitious.

A strong team has been recruited, including Captain Edwards, the world's champion fly-caster, Howard Marshall and Freddie Grisewood. The latter, it will be remembered, conducted the fishing broadcasts on that Elysian trout river, the Test.

This broadcast, mainly designed for fishermen and country lovers, will also reflect the peace of the Colne's water meadows and of a Spring evening in England. The programme will be built around the actual fishing so that in any case a profitable 20 minutes should be spent discussing country matters. Talk will be general among these four experts, on tackle, the various methods of casting and about the character of the river and colour of the water.

## ITEMS OF INTEREST

Previous broadcasts were from the Test, a clear chalk river, beautifully weedy like a pre-Raphaelite picture.

As one of the fishermen hooks a trout, and that, on a Mayfly evening, should occur frequently, John Snagge will carefully approach with a portable microphone, describing the landing of the fish and catching the angler's enthusiasm.

## WLW Singers and Huskies

**DON** and Helen, "sweet singers of sweet songs," whose programmes are heard regularly over WLW (Cincinnati), last week received an unusual letter from a fan in the Far North.

The missive, postmarked New Liskeard, Ontario, was sent by one, "Cody E.," a trapper, who declares that he went into his lonely business as the result of an unhappy love affair. "If my singing seems odd," he said, "do not feel that I am someone hiding from the law, or an outcast, for I come from a good and popular Cana-

dian family and expect to return to civilization this year."

Cody E. wrote his letter to inform the WLW vocalists that the leaders of his dog team are a pair of huskies named Don and Helen. Helen is the leader of the team. Commented Cody E.: "Anyone who thinks a female of any kind should not have a say in leadership, no matter what it is, does not want to tell it to me or to Don, the second of my dogs."

Cody E. said that on his long trips he carries with him a portable radio, and has taught his dogs, on a given signal, to gather around it when Don and Helen come on the air from hundreds of miles away. The dogs have grown to like the idea, he noted. "Now they will sulk if they are not allowed in, or if we are on the trap line, and have to keep mushing on account of the weather. When I give the sign they stop dead and form their circle, and I tune in. You would never forget the expressions on their faces if you saw them like this, their ears cocked up, heads on first one side and then the other. If one dog sneezes or moves, he gets a bite from both sides and down he goes in disgrace."

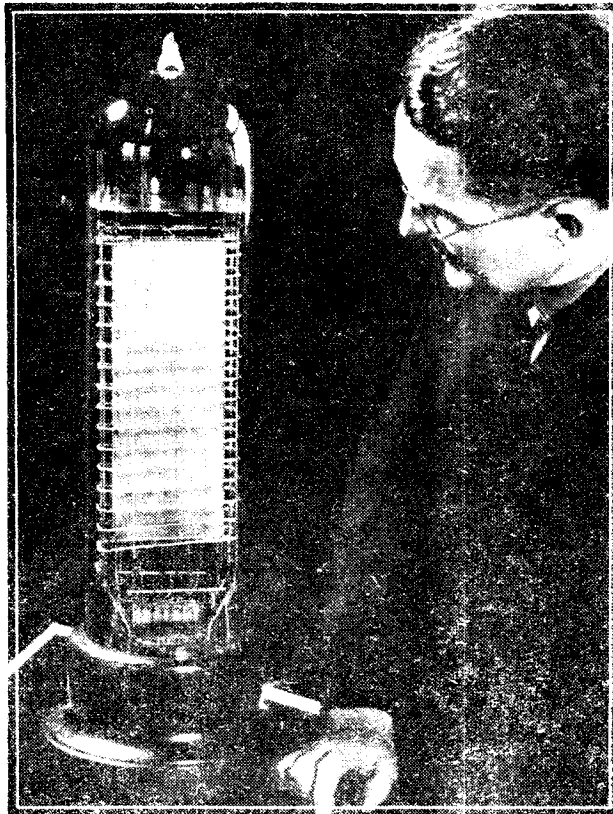
# Harnessing the Electron Stream

RESEARCH engineers of the Westinghouse Electric and Manufacturing Company have made electrons obliging actors for the visitors to the New York World's Fair. To show what goes on inside a three-electrode valve and the effect of a magnetic field on a stream of electrons flowing through a vacuum, the engineers have built a triode 27in. high and 7in. in diameter. It is similar to a standard radio valve, except that it has two filaments and two grids on opposite sides of the plate so that the action is visible from both directions.

The surface of the plate is coated with fluorescent material, so that wherever electrons impinge on the plate, a green colour shows. By changing the negative biasing voltage supplied to the grid, the stream of electrons to the plate can be varied from zero to the maximum of which the valve is capable. A pattern on the face of the plate shows the area normally bombarded by electrons.

By placing a permanent magnet near the valve the electron stream can be deflected by the magnetic field. The effect of the field on the electron stream can be seen plainly. This effect varies according to the way the magnet is

applied to the valve. The circuit used is similar to that in audio-amplifiers. A 60-



This 27-inch triode was built by research engineers of the Westinghouse Electric & Manufacturing Company to demonstrate at the New York World's Fair what happens inside a three-electrode vacuum tube when a stream of electrons is affected by a magnetic field.

cycle frequency is applied to the grid, and the valve output is connected to a loud-speaker. The loudness of the audio signal corresponds to the area of the green glow on the plate of the valve.

## The Camera in Our Daily Lives

THE uses of photography are legion these days, but it is interesting to see how more and more it is being turned to practical account by people who are in no sense professional photographers. Just recently, for instance, one of the photographic magazines, called "The Home Photographer," has been publishing a series of articles contributed by those of its readers who, being themselves keen amateur photographers, have found ways of applying the camera to their businesses and professions.

Better cameras and gadgets make photographs easier and certain in these days, although perhaps the most striking development of all is the way in which the modern enthusiast can make his hobby pay for itself, no matter what type of camera he's got. Many amateurs now make quite a second income from fees for topical and "general interest" pictures submitted to the press, and every year there are interesting competitions for him alone (professionals barred) with substantial prizes. One of the first announced this season (run by "The Home Photographer," monthly magazine for amateurs) offers a first prize of £100, with a string of cash prizes to follow up.

## BOOKS RECEIVED

### B.B.C. Music Programmes

A NEW issue of the B.B.C. Music Programmes booklet containing details of music programmes, and other general information concerning music to be broadcast during the second quarter of 1939, has just been issued. The booklet includes details of the Beethoven Concerts to be conducted by Toscanini in the Queen's Hall; the Sunday evening and other studio concerts which will be devoted to orchestral and chamber music; and the most important "outside broadcasts." The booklet may be obtained on application by post to the B.B.C. Publications Department, 35, Marylebone High Street, London, W.1, price 2½d. post free, or on personal application to Broadcasting House, Portland Place, London, W.1, or to any B.B.C. Regional office, price twopence.

### Broadcast Talks

Full details of the new series of talks to be broadcast during the quarter April to June 1939, are given in the booklet, "Broadcast Talks," which is obtainable, price 2½d. post free, or price 2d., from the addresses given above.

## ● AROUND the SALES

### SPECIAL BARGAINS NOTED

SINCE introducing this feature for the benefit of "Practical and Amateur Wireless" readers, congratulations have poured in to the office. My advice about ORDERING EARLY still holds good because it is understood that some of the following offers may not be repeated.

It can't be helped, but in view of the importance of the short-waves in regard to communications and entertainment the N.T.S. Bandspread 4 Kit at 49/6 is still worth recommending as an amazing bargain. You obtain it complete with coils for 12-94 metres and FREE valves and the easy-way deposit with order is only 3/6. It's also worth while illustrating (see below) a special N.T.S. 1-valve complete kit bargain. This is amazing value for money. ORDER EARLY.

MR. CAMM gave an excellent report a week or so ago on the N.T.S. PENTAKIT. This amazing-value kit comprises all parts for building alternatively a 1, 2 or 3-valve receiver for 9-2,000 metres, Adaptor or Converter and with each kit is presented FREE a complete set of valves (British), including a pentode output. This kit receiver, with coils, costs only 42/- cash or 2/6 with order and 12 at 3/9. Performance and value is certainly outstanding.

These Amplifier bargains are worth repeating again. There is the N.T.S. A.C.7-watt 4-valve model to clear at 70/-; A Push-Pull circuit is employed, giving an output of 7 watts; 5/- only is the deposit required. What about an N.T.S. 4-watt battery amplifier for P.A. work and boosting up low-powered battery sets? A 4-valve push-pull output model is now available at only 55/- (complete and ready for use). Terms are 4/6 down and 12 monthly payments of 4/9. Why not improve your microphone technique and buy a good mike for connection to your radio set or amplifier. The N.T.S. table model at 25/- or the professional model at 42/- should be secured now; a deposit of 2/8 only is required for either microphone, balance over 12 months.

Never heard before of such a stupendous bargain which aptly describes this special valve offer. To pay only 5/6 for 3 new 2-volt valves—standard U.S.A. types in fact—together with 3 valveholders, data and diagrams, is to pay a fraction only of the real list price. Order NOW is really sound advice. Obtainable, by the way, only from N.T.S. and sent POST FREE!

**SEE IT FOR YOURSELF**

This is the amazing value for many one-valve short-wave kit mentioned above. You get everything illustrated for only 27/6—all first-class parts and coils for 12 to 94 metres, condensers, FREE valve, and a pair of sensitive (and very handy) headphones and all instructions, of course. Really astonishing value, and terms are as low as 2/6 down and 10 monthly payments of 3/-. Don't miss it!

Undoubtedly, your best chassis "buy" is still the N.T.S. 6-valve All-mains All-wave model at 6 gns. The waverange is 16 to 2,100 metres, it has illuminated station scale and pick-up sockets, and is an exceptional bargain for those who want to replace their old set. There is a guarantee of 12 months and to secure, you merely send a 5/- easy-way deposit with your order. Buy this and be satisfied completely, is best advice. Note the following amazing N.T.S. chassis bargains. A Battery Straight 3 model at 12/6 (less valves), a Class "B" 4 (with valves) at 59/6, an A.C.4 (with valves) at 55/-, and an All-Wave A.C.4 chassis, complete with valves, at 79/6, or 5/- down and 15 monthly payments of 6/-. Thousands of these chassis have been sold of late. More details are available.

If you've got 6/6 to spare, send for the N.T.S. bargain parcel. There's 32 very useful parts in this lot for experimenters including coils, condensers, resistances, and a drilled chassis, etc. Marvellous value. Postage paid.

"World Kits." Heard a lot about these which represent striking value. I think the best one is the 3-valve S.G., det., Pentode model, with FREE valves at 29/6 or 2/6 down and 12 monthly payments of 2/10. Really don't know how it's done at the price. You can get a set of 10 self-lacing coils for 9-2,000 metres for 17/6 extra.

**BARGAINS only from N.T.S.**

You can only obtain real value-for-money bargains from N.T.S. We pass on all the benefits of favourable purchasing. But you must order EARLY.

**FREE** The following catalogues post free on request: 1939 Bargains, Chassis, Kits, Amplifiers, Valves and the N.T.S. revised short-wave book. N.T.S. cash prices are the lowest and terms are the easiest.

**NEW TIMES SALES CO.**

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May 13th, 1939.

Vol. 4.

No. 151.

### A Peculiar Situation

THE sailing of Baird technical experts to America, and the shipment of large-screen receiving apparatus for installation in certain of the New York theatres have, according to one newspaper report, brought to light a very peculiar but interesting legal aspect. When big-screen television is featured in any London cinemas the rediffusion rights have to be paid for to the promoter of the event to be televised, and the B.B.C.'s permission sought in order to be allowed to use their transmitted signal. In America, however, the situation appears to be quite different, for according to legal opinion, if any company chose to use any television pictures radiated by the networks existing in that country, the networks would have no excuse for action, since they are not engaged in the theatre exhibition business and so cannot ask for damages. It is said that once the programme matter is on the air the networks have lost their property rights to the subject. If this turns out to be the case, then it seems certain that big-screen television in cinemas and theatres, once started in the United States, should forge ahead more rapidly than in this country. Programme costs and any profits are already guaranteed in America by the sponsors before the transmission starts, whereas here every effort is being made to sell rights to sponsors at the receiving end. What will be the final outcome of this apparent tangle only time will tell, but in any case there does not seem to be the same financial restriction "across the water" as in this country, and this may allow America once more to steal a march on England in so far as big-screen development is concerned.

### Signal Modulation

OF late many interesting schemes have been suggested whereby light beams can be modulated by incoming television signals. One of the latest has emanated from Germany, and makes use of the principles of secondary emission. The light itself is focused on the photo-electric cathode, and the resultant primary electron stream is made to impact on a series of target electrodes so that electron intensification occurs by secondary emission. Now the incoming signals at carrier frequency are made to control the magnetic field, which in turn guides the electrons in their path down the tube. The effect of the modulation is to shorten, or lengthen, the

path of the electrons and influence the impacts on the target electrodes, with the result that the output signal from the device is said to conform to the signal generated at the transmitting end, and can be made to modulate an ordinary cathode-ray tube to reproduce a picture.

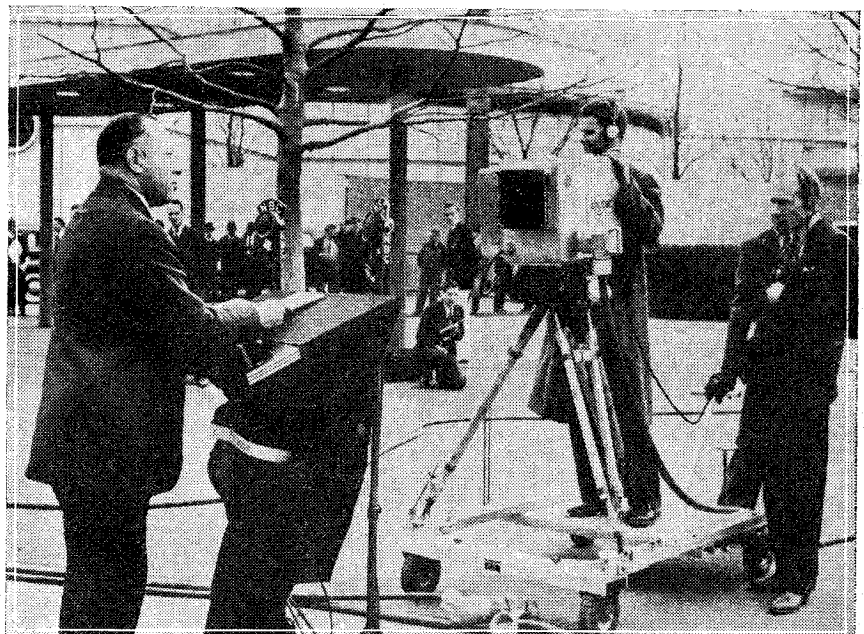
### America's Effort

IN assessing the value of America's effort for entering the television service field to coincide with the opening of the New York World Fair, it is sometimes overlooked that experimental field tests on a high-definition basis have been undertaken for a period of over three years by more than one company, particularly by R.C.A. One of the biggest troubles, however, has been in connection with settling the picture and transmission standards, and much valuable time for testing has been lost because of the late decisions. The Empire State Building has the R.C.A. transmitting aerial on its roof, and the picture signals are being radiated on a carrier frequency of 45.25 megacycles, with the accompanying sound on 49.75 megacycles. This gives a video to audio carrier spacing of 4.5 megacycles as against the 3.5 megacycles used by the B.B.C., and it will also be noticed that the sound carrier is higher than the vision, whereas the reverse holds in this country. If

television gets a really good start this spring in New York—at least eight manufacturers are proposing to offer receivers for sale—then the hope is expressed that other American cities will follow suit and install their own transmitters so as to extend rapidly the home net sales market. Many experiments have already been undertaken with a view to linking certain cities into a television network, and in this connection it is interesting to record the opinion of the R.C.A. engineers for it may have a bearing on the research work for provincial television extension now being expedited by the Post Office here. The American engineers are confident that television networks will be effected through the medium of automatic radio relays employing ultra-high frequencies. It is said that the practicability of such relays has already been established after exhaustive experiments. Since considerable work has already been undertaken with coaxial cables as well it would seem to show that the cable method has been abandoned.

### PATENTS AND TRADE MARKS

Any of our readers requiring information and advice respecting Patents, Trade Marks, or Designs, should apply to Messrs. Rayner and Co., Patent Agents, of Bank Chambers, 29, Southampton Buildings, London, W.C.2, who will give free advice to readers mentioning this paper.



David Sarnoff, president of the Radio Corporation of America, speaking before the microphones as he dedicated the R.C.A. building at the New York World Fair in a television broadcast to spectators in Radio City, eight miles away. Mr. Sarnoff is speaking in the garden of the building.

# RADIO CLUBS & SOCIETIES

Club Reports should not exceed 200 words in length and should be received First Post each Monday morning for publication in the following week's issue.

**RADIO, PHYSICAL AND TELEVISION SOCIETY.**  
Headquarters: 72A, North End Road, West Kensington, W.14.

Meetings: Friday evenings at 8.15 p.m.  
Hon. Sec.: C. W. Edmans, 15, Cambridge Road, North Harrow, Middlesex.

On Wednesday, April 26th, a number of members of the above society attended a meeting of the Golders Green and Hendon Radio Scientific Society, held at the Regal Cinema, Finchley Road, at which Mr. Maurice Childs described his 40-metre direction-finding apparatus.

During the past three months the Radio, Physical and Television Society has made considerable progress. Several new members have now been granted full transmitting licences, and it is claimed that this society now has more members with transmitting licences than any other local club in the country. Many interesting lectures have been delivered from time to time; these have included "Rectifier Equipment," "Thermo-electric Instruments," and "Television Time Bases"; a transmitting evening was also held recently during which several distant stations were contacted.

Several meetings have been arranged for the near future. New members will be welcome; particulars may be obtained from the Hon. Secretary, at the society's headquarters, or prospective members may call any Friday evening without formality.

**SLOUGH AND DISTRICT SHORT-WAVE CLUB**  
Headquarters: 35, High Street, Slough, Bucks.  
Meetings: Alternate Thursdays, at 7.30 p.m.  
Secretary: Mr. R. J. Sly, 16, Buckland Avenue, Slough.

At the last meeting, held on April 27th, the first item on the agenda was the usual discussion on conditions, the general conclusion was that during the past fortnight DX signals had been noticeably absent on all bands, except for a short period from April 14th—16th. This was put down to the recurrence of the sunspot cycle on those particular dates. The construction of the club receiver was carried a stage further when Mr. Baldwin (2BVV) explained his design for the power pack. Members agreed upon final details of layout, and Mr. R. J. Sly undertook the task of putting a further heater winding on the mains transformer. Morse practice followed, members finding it very gratifying to see two members taking an interest for the first time in the slow morse class. It is hoped that all the beginners in morse will soon be up to the 10 word per minute standard, whilst more experienced members are reading and sending at speeds up to 17 words per minute.

The agenda for the next meeting, to be held on Thursday, May 11th, will include a lecture on "High Voltage Electrical Phenomena," given by a member and accompanied by a demonstration. The usual morse practice, construction of receiver, etc., will also be included. New members are welcomed at any of our meetings, where they will find much of interest to all radio enthusiasts. The annual subscription is 2s. 6d., with an extra 3d., payable at meetings, to pay for the hire of the club room.

**WIRRAL AMATEUR TRANSMITTING AND SHORT-WAVE CLUB**

Hon. Sec.: J. R. Williamson, 13, Harrow Grove, Bromborough.

Meetings: Last Wednesday each month, at 7.30 p.m. at H.Q., Beechcroft Settlement, Birkenhead.

At the annual general meeting, held on March 29th, the chairman expressed his pleasure at the financial position of the club in view of two additional ventures, i.e., the club mag, and morse class.

The net total of club members is 45, an increase of 11 over last year. Two members obtained full licences—Mr. R. J. Murray (43PT) and Mr. R. Barlow (G3QN), while Messrs. E. Blocksidge (2FN1), N. Griffith (2FSN), G. Oxtou (2DFB), and C. Burnham (2ABC), obtained A.A. licences.

New members of committee are: Mr. W. E. Corbett, President, and Mr. W. Harding-Miller.

The following committee members were re-elected. Mr. W. O. Bretherton, chairman; Mr. R. Cumberledge, treasurer; Mr. J. R. Williamson, secretary.

## ELECTRADIX

CRYSTALS AS SPECIFIED FOR

"STAND-BY" CRYSTAL SET  
Enclosed 2-Crystal Permanent Detector 2/-  
"EXPERIMENTERS" CRYSTAL SET  
Carborundum Marconi Army Detector 2/6



**HEADPHONES.** Lightweight for Crystals. Famous makes, 2,000 ohms, 4/6. Single high res. earpieces, 2/6. Sullivan 120 ohm. W.B. model, Aluminium body and headbands. Makers price 2/6 day. 15/- Our price 2/9 per pair. 3d. postage.

**CRYSTAL SETS.** Model B, Pol. Mahog. case 9in. x 10in. 2 tuning condensers, plug-in coils, Permanent Detector, 7/6. 4,000 ohms. Phones, 4/6.  
**MIDGET 49 CRYSTAL SET** complete with Perm. detector, 6/6. M 111 Army Double Crystal All-wave Receiver, very rare. Cost £20. 56/-, M 111 Station Finder W.D. Crystal Sets, double Detector, wave range calibrated in enclosed mahog. case, 24/6.

**CRYSTALS RECEIVING.** Super Detector, glass cover, fine adjustment, 10/-, Enclosed 2-crystal permanent Detector, 2/-, Carborundum Marconi Army Detector, 2/6. Galena point Detector, mounted, 1/-, Galena and Neutron Crystals, 4d., 6d., and Perikon, 1/-, Carborundum mounted, 8d.

**CRYSTAL OR BATTERY SET BUILDERS.** Fitted Table Cabinets, polished oak 13 1/2 in. x 7 in. x 6 1/2 in. oval aluminium black panel fitted geared 0005-mfd., sunk dial, 3-way coil switch and a single plate vernier condenser, and 10 terminal Strip, new stock, 15/-.  
**SLOPE FRONT TEAK CABINETS.** New, make fine instrument panel, 10in. x 7in. x 1 1/2 in. 3/- each. COILS. 3-W. Coils, plug-in, 1/6 ea. L.W. 2-pin, 1/- Reaction. 3-W. Coils, 9d. H.F. Twin Chokes, 2/- Spark Emergency Transmitter short-wave chokes for remote control, 25/-.

**S.W. COMPONENTS.**—Coils, 1-2.6. Chokes, 6d. Ceramic Valveholders, 1-/. Crossferred aerial blocks, 6d. Beehive Insulators, 6d. Glass insulators, 6d. Frequentite 6in. rods, 3/6. Screened flex, 4d. yd. Twin, 6d. yd. **NEW PANELS.** Polished aluminium, 18 and 16 gauge, bright or enamelled, 12in. x 12in., 3/-, 18in. x 18in., 5/6. Ebonite 1in. panels 24in. x 24in. for 5/6.

**WIRE WOUND POWER RESISTANCES.** 5 watt 8,000 ohms, 10 m.a., 10d. 5 watt Potential Dividers, tapped 50,000 ohms, 1/6. Mains Transformers, 3.6. 1-mfd. Condensers, 4d.

**CONDENSERS.** Variable low-loss F. type, .0005, 1/6. J.B. .0003, 2/-, Reaction varia., 1/3. Fye, .0003 with S.M. dial, 5/-, 2-gang varia., all aluminium, 3/- only. Fixed Condensers, 2 mfd. 250 v., 6 for 4/-, 3/- doz. 4,000 v. 1mfd., 6/-, etc.

**MICROPHONES.** Table Model "N.W.11." For home broadcasting. Bakelite square body on bronze base, containing transformer, switch and plugs, is a marvellous production at a low price. Worth 2 guineas. Only 15/-, Lesdix No. 10B Pedestal, 10in. high, 12/6. Lesdix Superior No. 12BB Ring, 4 1/2 in. pedestal, 18/6. Hand mikes in 2in. case, No. 11 at 5/6. Superior type, No. 11a, 7/6. Home microphone No. 11 is a solo general-purpose robust mike, with solid bakelite body, back terminals, front metal grille, hand or sling design, 5/6.

**V-ALVES.** Midget Peanut 1 volt, 4-pin, 1 1/2 in. long, new, 2/- each, or 12/- dozen. 6 volt 20 watt Transmitting Valves, 6/-.

**STAND-BY PETROL OR GAS ENGINES** with Dynamos, 150 watts to 4 kW.

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**A.C. MAINS MOTORS.** Enclosed, self-start on load. A.C. relation, 1.60 h.p. with pulley, Type 38, 1,500 revs., 18/6. Ditto, 1/16 h.p., G.E.C., 3,500 revs., 27/6. Induction 1.10 h.p., 2,500 revs., 35/-, 1h.p., 1,425 revs., 49/-.

**D.C. MAINS MOTORS.**—1/40 h.p., 110 v. or 220 v., K.B series, 1,750 revs., 15/-, Ditto, 1/40 h.p., G.E.C., 230 v series, 2,000 revs., 18/-, Ditto 1/12 h.p., Croydun 110 and 230 v shunt, 1,700 revs., 30/-.

**HOME SOUND RECORDING at low cost.** The FEIGH RECORDER fits any Radiogram, positive drive, worm gear and rack. Complete, ready for use, only 37/6. Super Feigh Fidelity Set, 42/6. Tracking Gear only, 21/6. Either 4-in. metal blanks can be used or the glass-coated simplets, 10in., 3/- each. Pre-amplifiers for Recording Mikes, 1-valve. Battery Model in cabinet, 25/-, A.C. Mains pre-amplifiers, with valve rectifier, steel-cased model, 60/-.

**PARCELS** of experimental odd coils, magnets, wire, chokes, switches, terminals, etc., post free; 10 lbs., 7/-; 7 lbs., 5/-.

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## IMPORTANT BROADCASTS OF THE WEEK

**NATIONAL (261.1 m. and 1,500 m.)**  
Wednesday, May 10th.—*Midsommarvaka: Rhapsody of Swedish melodies relayed from Sweden.*  
Thursday, May 11th.—*The London and Home Counties Individual Darts Championship, from the Royal Agricultural Hall, Islington.*  
Friday, May 12th.—*Dance Band programme.*  
Saturday, May 13th.—*Commentaries on Cricket at Lord's (M.C.C. v. West Indies) and Championship Cycling at Herne Hill.*

**REGIONAL (342.1 m.)**  
Wednesday, May 10th.—*Roundabout No. 2, a Regional variety programme.*  
Thursday, May 11th.—*The Duchess of Dantzic, an operetta.*  
Friday, May 12th.—*Northern Music Hall: Variety from the Winter Gardens, Morecambe.*  
Saturday, May 13th.—*Hugh the Drover, an opera from Sadler's Wells.*

**MIDLAND (297.2 m.)**  
Wednesday, May 10th.—*Midland contribution to Roundabout: Inn-door Games.*  
Thursday, May 11th.—*Choral programme.*  
Friday, May 12th.—*Running Your Own Show: Our String Orchestra, a talk.*  
Saturday, May 13th.—*Band programme.*

**WEST OF ENGLAND (285.7 m.)**  
Wednesday, May 10th.—*The House and the Man: John Opie at Harmony Cot, a talk.*

**Thursday, May 11th.—Cockle-mouth Comet, by R. F. Delderfield: No. 1, The Comet goes to Press.**  
**Friday, May 12th.—A Children's Concert from the Colston Hall, Bristol.**  
**Saturday, May 13th.—Instrumental recital.**

**WELSH (373.1 m.)**  
Wednesday, May 10th.—*Instrumental and vocal programme.*  
Thursday, May 11th.—*The Thin Red Line, No. 6, The Royal Welch Fusiliers, feature programme.*  
Friday, May 12th.—*The Shadow Dance, a play by J. D. Strange.*  
Saturday, May 13th.—*An Exchange programme with Scotland of Scottish and Welsh national airs.*

**NORTHERN (449.1 m.)**  
Wednesday, May 10th.—*Religious Impressions: Pianoforte Recital.*  
Thursday, May 11th.—*The Vale of Eden, the story of a walk.*  
Friday, May 12th.—*Variety from the Winter Gardens, Morecambe.*  
Saturday, May 13th.—*Saturday Concert Hall: Music by Arthur Bliss, conducted by the composer.*

**SCOTTISH (391.1 m.)**  
Wednesday, May 10th.—*Men singing—3, In the Mountains: gramophone records.*  
Thursday, May 11th.—*Variety from the Palace Theatre, Dundee.*  
Friday, May 12th.—*Pipe Band programme.*  
Saturday, May 13th.—*Songs of Wales and of Scotland: An Exchange programme with Wales.*

# TELEVIEWS

## The Television Questionnaire

A PRELIMINARY analysis has been made of some of the 4,000 entries recently received by the B.B.C. regarding television programmes. One thousand two hundred of these have been examined to provide a basis for the first report, and some very interesting facts have emerged from these. The B.B.C. state that it is obvious that the present proportions and the types of programme material are well in line with viewers' preferences. Ninety per cent. of viewers voted for plays and variety programmes direct from theatres; news relays; and picture page.

Outside broadcasts of sporting and other events came next, followed by full length plays, cartoon films, demonstrations and talks. It transpired from the replies to the questionnaire that viewers prefer plays to last about 1½ hours, with occasional intervals. Forty-four per cent. of viewers appear to have no marked preference for men or women announcers, the remainder voting overwhelmingly for women announcers. Television announcers appear to give complete satisfaction to viewers—they don't talk too much as has been suggested in some quarters. The average number of people who watch television programmes regularly on each set is four. Many of these figures will, no doubt, come as a surprise to those who have not yet seen television programmes, and the final result of the analysis of the questionnaire will, no doubt, prove of very great interest both to the B.B.C. and viewers.

## Television for the Provinces

THE offer made by the television manufacturers to the Government with the hope of speeding up the provincial extension of television has caused not only a great deal of public interest, but also some confusion. It should, therefore, be made clear that there is no attempt by the trade to subsidise or control the transmitting side of television, nor has there been a promise of funds with which to continue provincial extension.

The Government Committee said in effect that while they agreed that television must eventually expand to the provinces they were unable to make up their minds whether to do it by means of a radio link or by means of the co-axial cable until their experiments were completed.

## Radio Link Method

THE manufacturers replied that they did not care what method was used, so long as it worked, but it was important that some action should be taken quickly. The manufacturers declared themselves in favour of the radio link method and they were so certain that it did not need any further experiments to show it would work that they were prepared to pay for any equipment that had to be scrapped, if only the Government would go ahead at once on this method.

The total cost of extending the system to the Midlands area by using the radio link method is estimated at something well under £100,000, and this would include the transmitter itself at Birmingham. The transmitter can in no sense be described as experimental, since it would be equally suitable for use with either the radio link or the co-axial cable, and it will, therefore, be required sooner or later in any case.

It will be seen, therefore, that the manufacturers are not asking the Government to risk very much in going ahead with the radio link method straight away, but it is to overcome any qualms that the Government may still have that the offer is put forward.

What are the technical difficulties that still have to be overcome before the radio link method is an established fact? So far as the manufacturers know, there are none that would be insurmountable, although the first practical steps in a project of this nature naturally bring problems which can only be answered by the kind of development work that has already given Britain its two year lead in television.

If we want to keep this lead, the manufacturers argue, we must still do the pioneer work, and there can be no doubt that other countries are following hot on our heels.

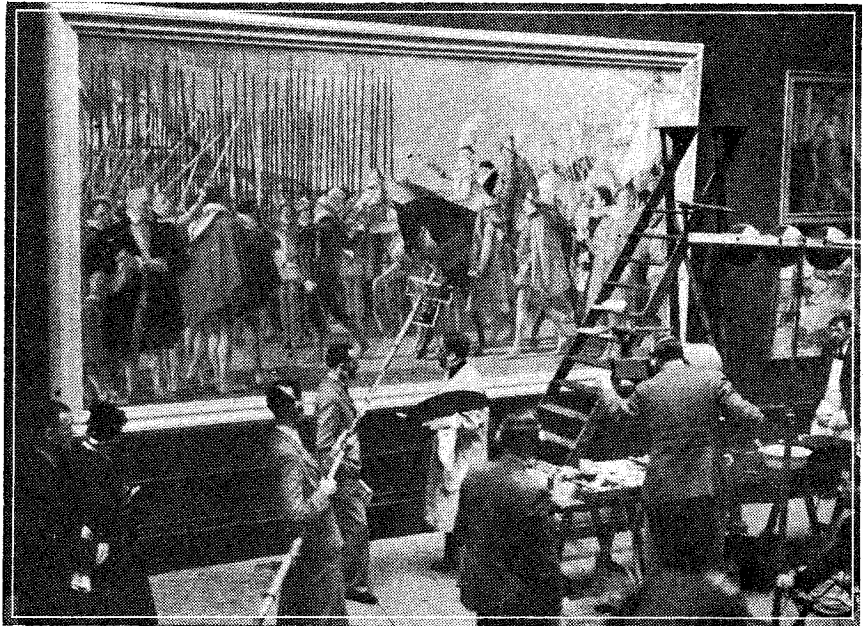
## Linking American Cities

RALPH R. BEAL, the Research Director of the Radio Corporation of

one day sweep the world in the same way as radio, and in urging the immediate expansion of the British system, the manufacturers are looking a few steps ahead. They remember the stranglehold that America established on radio, thanks to the enterprise of their manufacturers in the early twenties. They have seen the British motor industry faced with ferocious competition both at home and in world markets, and they are anxious to build up their own resources of knowledge, research and commercial experience into a force that will keep this country in the position to which its pioneer efforts entitle it.

## Disagreement with the C.E.A.

A SHORT time ago mention was made in these columns of a technical report which had been put forward by the C.E.A. in connection with recent big-screen television demonstrations. It is learned that the conclusions advanced in that report are being disagreed with in some quarters, and not without apparent justification. For example, on the question of comparative screen brightness between the Baird and Scophony pictures it is difficult to be dogmatic, because the former screen is six



A private view by television, in advance of the actual event, was afforded the public recently when a pre-view of the famous "Varnishing Day" at the Royal Academy, Burlington House, London, W., was held. The illustration shows Mr. A. K. Lawrance, the artist, being televised during the varnishing of a giant work depicting Queen Elizabeth with her troops.

America, wrote the other day: "R.C.A. engineers are confident that plans for linking American cities into a television network will logically follow the city-by-city establishment of transmission facilities. They are confident, moreover, that such networks will be effected by means of automatic radio relays employing ultra-high frequencies. The practicability of such relays has been proven by exhaustive experiments with equipment developed in the R.C.A. laboratories."

This is ample evidence that America is already convinced of the possibilities of the radio link method. France is not lagging behind in television development, with provincial stations planned at Lyons and Lille, while it is now learned that German television apparatus will be displayed at the Wireless and Television Exhibition in Buenos Aires.

Nobody can doubt that television will

times the area of the latter, while auditorium illumination has to be taken into consideration as well. According to some measurements which have been furnished, however, the Scophony picture may be nearly double the screen brightness of the Baird one, but the latter is receiving nearly three times the light flux to distribute over its bigger area. As far as the new form of projection cathode-ray tube is concerned, the improved efficiency is attributable to many factors, among which mention can be made of the increased aperture lenses employed, the large fluorescing screen area, and the direct reflection from the screen, which is not attached to the glass face, and therefore necessitates illumination passing right through the screen powder with its attendant losses. Any transmission defects arising from inherent camera faults are more readily apparent on a big-screen television picture.

# LETTERS FROM READERS

The Editor does not necessarily agree with the opinions expressed by his correspondents. All letters must be accompanied by the name and address of the sender (not necessarily for publication.)

## Television Transmissions

**SIR**,—It is generally understood that high-definition television cannot be radiated on longer wavelengths than at present used.

For many years I have been considering the matter from a theoretical standpoint, but I cannot obtain particulars of practical experiments which prove that it is so. I wrote to the Television Advisory Committee last December, suggesting that the assumed difficulties of radiating television transmissions on comparatively long wavelengths may be purely theoretical—but no reply has been received.

If it is a fact that high-definition television can be radiated on considerably longer wavelengths than at present, it would be a simple solution of the question of covering the whole country; and also the receiving apparatus would be more simplified, and less liable to instability. I am aware that this is impossible in theory—but *is it impossible in fact?*—D'ARCY FORD (Exeter).

## Correspondent Wanted

**SIR**,—I have been a regular reader of PRACTICAL AND AMATEUR WIRELESS for about five months, and owe practically all my radio knowledge to it. I should very much like to correspond with any young reader living in the South Seas, or in U.S.A., I will also gladly accept correspondents from other parts of the world. I shall try and answer all letters wrote to me.—ALEXANDER BERGOL, 294, Brookvale Road, Erdington, B'ham, 23.

## The Prefect S.W. Three

**SIR**,—I wish to thank you for the useful book presented to me for solving problem 342. I think that PRACTICAL AND AMATEUR WIRELESS becomes more interesting and instructive every week.

I don't know if it is exceptional, but I manage to obtain at loudspeaker strength the television sound programme on your Prefect S.W. Three, with the windings on one of the coils cut down, and retaining the usual tuning condensers.—A. CARTER (Shoreditch).

## "Audible Radiations"

**SIR**,—I fear my letter on the above subject was misunderstood, at least by one reader. The curious radiations I heard were not caused by a pick-up acting as grid inductance. I was using a crystal set in the place of a pick-up, when I switched on with only the aerial and earth connected to grid and filament negative in that order. There was no grid inductance whatever, and the signals were not received without the aerial connected. The signals seemed to consist of two programmes. One from the B.B.C., and one foreign. The local "relay" wires run within 20ft. of my aerial at several angles. The same relay station supplies two programmes. High frequency

can get to the output circuits of some sets and cause trouble.

If high-frequency currents can stray out of a "relay" amplifier what a wonderful opportunity they have of affecting radio apparatus!

Will Mr. Yalden (London) please state the efficiency and wavelength of the ordinary pick-up when used as grid inductance or tuner? Also, what rectified the signals, if not a superhet, straight or relay, radio set?—A. W. (Bridlington).

## Station HCJB

**SIR**,—On April 20th I received a letter from Mr. C. W. Jones, Director of Radio station HCJB in the Andes, South America, asking me if I would pass on the information regarding the following tests. The effect would be to increase the extent of listeners' reports. Beginning on May 1st until May 30th, HCJB will broadcast in the English language on a wavelength of 24.8 metres (12.460 mc/s). Transmission 1 (for Australia, New Zealand, West Pacific), time about 10.00 p.m. Transmission 2 (for India and the East), time 7.00 p.m. Transmission 3 (for England and Atlantic), time 8.00 p.m.—G. T. EUSTACE (Reading).

CUT THIS OUT EACH WEEK.

## Do you know

- THAT special automatic Morse sending apparatus may be obtained on hire from various firms.
- THAT special slow morse transmissions are carried out regularly by amateurs for speed practice.
- THAT push-pull transformers may be improved by shunting the primary by a centre-tapped resistor or two resistors in series.
- THAT automatic grid bias may be applied to a battery set even if there are two or more L.F. stages.
- THAT screening a component or lead will not prove effective unless the screen is effectively earthed.
- THAT a severe shock may be obtained from the heater circuit of the rectifying valve in a mains set, although there is nominally only 4 volts on that circuit.

The Editor will be pleased to consider articles of a practical nature suitable for publication in PRACTICAL AND AMATEUR WIRELESS. Such articles should be written on one side of the paper only, and should contain the name and address of the sender. Whilst the Editor does not hold himself responsible for manuscripts, every effort will be made to return them if a stamped and addressed envelope is enclosed. All correspondence intended for the Editor should be addressed: The Editor, PRACTICAL AND AMATEUR WIRELESS, George Newnes, Ltd., Tower House, Southampton Street, Strand, W.C.2.

Owing to the rapid progress in the design of wireless apparatus and to our efforts to keep our readers in touch with the latest developments, we give no warranty that apparatus described in our columns is not the subject of letters patent. Copyright in all drawings, photographs and articles published in PRACTICAL AND AMATEUR WIRELESS is specifically reserved throughout the countries signatory to the Berne Convention and the U.S.A. Reproductions or imitations of any of these are therefore expressly forbidden.

## Wallington Enthusiasts Please Note!

**SIR**,—I should like to place on record the fact that there is not enough amateur spirit in this town. Two or three times a short-wave club has been started here, but each time it has faded out owing to the fact, I think, that the intending members lived mostly about two miles from Wallington.

I believe this difficulty could be overcome if really local enthusiasts co-operated, and therefore I invite local short-wave enthusiasts to get in touch with me with a view to starting a club.—T. G. GIBBS, 18, Bandon Rise, Wallington, Surrey.

## A 20m. Log from Ilkeston

**SIR**,—Some weeks ago you published a 20m. log submitted by myself. Since then I have received several DX amateur stations in countries not heard hitherto at this QRA. Incidentally, the results here have been far better since I directed the main antenna NNE-SSW, instead of N and S. The following stations were received on 20m. (phone):

CX2CO, KA3KK, LU3HK, PY1IM; 2BH; VUICH, UK3AH, VP3CO, VQ2CM, 4ECJ; VS7RA, VU2CA, 2FA; YL2CD, YV5AK, 5ABS; ZB1E, ZE1JA, and ZS6AJ.

The receiver is a 4-valve superhet.—A. HART (Ilkeston).

## Why Keep Television Separate?

**SIR**,—It seems to me to be a very grave mistake for the B.B.C. to endeavour to keep the sound and television programmes so distinct from each other. I know that it has on occasions incorporated both systems—to the tune of a handful of sporting events!

I very much doubt whether one per cent. of ordinary listeners ever tune-in to the television sound wavelength, yet the majority of listeners always long to see the expressions on the faces of those at the microphone. I honestly think that the present childish display of rivalry between both services should cease, and that a larger number of television fans would be the direct result of closer co-operation.

There appears to be little reason to fear that ordinary listening folk would miss the point of television programmes, because if sporting events can be radiated via the television transmissions, plays and other features can be equally as well received and understood.—ERIC L. ADLEM (Notting Hill, W.11).

## EMPIRE FLYING BOAT ACCIDENT

The Postmaster-General announces that the first-class mails for the Union of South Africa, Southern Rhodesia, Nyasaland and South West Africa posted between about noon on April 21st and 4.30 p.m. on April 25th at the Head Post Office, London, E.C.1, and corresponding times elsewhere, were on board the flying boat *Challenger* which met with an accident at Mozambique, Portuguese East Africa, on May 1st. Air mail correspondence for Portuguese East Africa posted between 7 p.m. on April 21st and 7 p.m. on April 25th at the Head Post Office, London, E.C.1, and corresponding times elsewhere, were also on board. So far as is known at present, all the mails have been salvaged though some may be damaged.

## PRACTICAL MECHANICS HANDBOOK

By F. J. CAMM

6/- or 6/6 by post from George Newnes, Ltd., Tower House, Southampton Street, W.C.2.

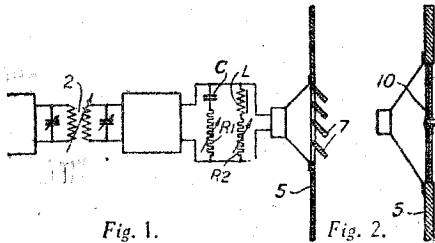
# LATEST PATENT NEWS

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume or in bound volumes price 2s. each.

## Abstracts Published.

**LOUD-SPEAKERS.**—Naamlooze Vennootschap Philips' Gloeilampenfabrieken. No. 399108.

Means for varying the radiating aperture of a loud-speaker, operated in conjunction with electrical band-width control means,



comprises louvres 7, Fig. 1, or a rotary aperture disc 10, Fig. 2, mounted in a baffle 5.

**DIAPHRAGMS.**—Marguerat, R., and Chevrier, M. No. 497692.

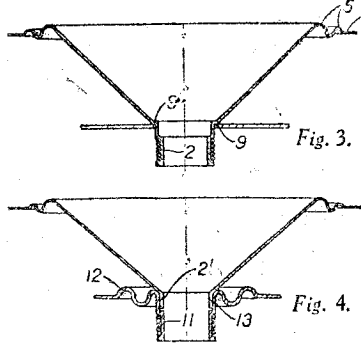
In a loud-speaker diaphragm comprising a diaphragm portion proper and a flange 2, Fig. 3, for carrying a speech-coil moulded therewith, a shoulder 9 is provided between the diaphragm portion and the speech-coil flange to constitute an abutment for the location of a spider. The diaphragm has a flat peripheral portion 1 and a number of concentric corrugations 5 and is preferably made by the processes and apparatus described in Specifications 440543 and 440544 (both in Group V).

The Specification as open to inspection under Sect. 91 includes a construction, Fig. 4 (Cancelled), in which the centring spider 12 has an integral flange 11 carrying the

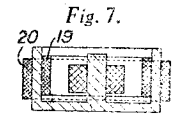
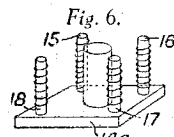
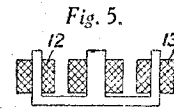
speech-coil and a cylindrical portion 13 into which is fitted a cylindrical extension 2' of the diaphragm portion. The thickness of the diaphragm portion may decrease gradually from the apex to the periphery. This subject-matter does not appear in the Specification as accepted.

**LOUD-SPEAKERS.**—Telefunken Ges. Fur Drahtlose Telegraphie. No. 498470.

Relates to an electro-dynamic loud-speaker of the energised type employed in conjunction with a television receiver of



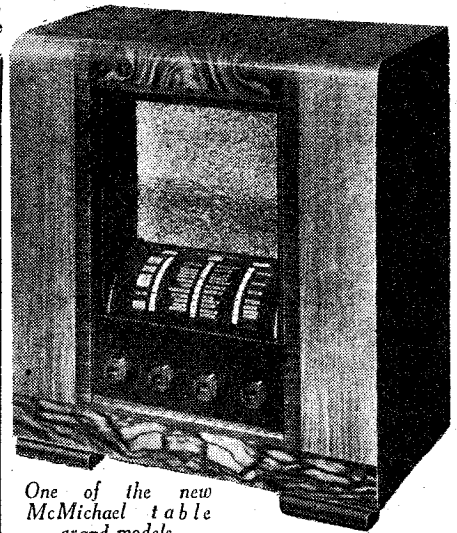
the cathode-ray type and in which means are provided to prevent or reduce the stray magnetic field in the region of the magnet. As shown in Fig. 5, the field magnet is E-shaped and windings 12, 13 supplied with direct current are mounted on the outer limbs of the field magnet. In a modification, Fig. 6, the base 14a of the field-magnet is connected to the annular pole-piece (not shown) by a number of separate members 15, 16, 17, 18, each provided with a separate



auxiliary winding. In a further modification, Fig. 7, having a pot-shaped magnet, auxiliary concentric windings 19, 20, are provided within and without the wall of the pot. Additional windings may be provided on the inside and outside of the base of the pot and are concentrically arranged with regard to the core carrying the energising winding of the magnet (not shown).

## New Season's Programme:— HIGH-QUALITY A.C. AND BATTERY TABLE GRANDS BY McMICHAEL

**D**URING the past season there has been a steady swing-over in public demand from the inexpensive to the medium-priced superhet. McMichael have accordingly concentrated their first 1939-40 production arrangements on the medium-priced market, in which the McMichael reputation for quality and workmanship makes a strong appeal. They announce the release of two moderately priced all-wave superhets of excellent all-round performance and exceptionally attractive appearance. Housed in identical table grand cabinets, the model 391 costs £12 5s. for the A.C. mains, the corresponding model 398 costing £11 5s. for battery operation, batteries being extra. Both sets use the new Clear-Curve tuning scale, occupying the whole width of the speaker aperture and following a semi-circular shape between the speaker and the control panel; the wave-bands are arranged



One of the new  
McMichael table  
grand models.

in side-by-side sections, only the band in use being illuminated, whilst the pointer moves behind both stations and wave-lengths. In the same way, the usual tone control is replaced by a four-way super-fidelity control, incorporating variable selectivity and controlled negative feedback and giving best possible reproduction on practically any strength transmission.

The cabinets are considerably larger than usual, attractively modern, and distinctive by reason of the unusual recessed speaker. The circuit is an 8-stage (7-stage in model 398), 3-wave-band design covering from 16.5 metres upwards, with band-pass tuning, high-peak constant-gain aerial coils, pick-up and extra-speaker sockets, etc. Batteries for Model 398 are supplied separately at 21s.

## NEW PATENTS

These particulars of New Patents of interest to readers have been selected from the Official Journal of Patents and are published by permission of the Controller of H.M. Stationery Office. The Official Journal of Patents can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s. weekly (annual subscription £2 10s.).

### Latest Patent Applications.

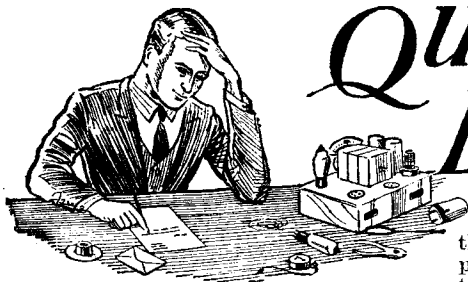
- 11286.—Dierks, C. H.—Radio-receivers, etc. April 13.
- 11749.—Dix, W. T.—Simplified junction unit assembly for and ultra short-wave di-pole receiving aerial, etc. April 19.
- 11537.—Eckersley, P. P., and Howard, R. E.—Wire broadcasting systems. April 15.
- 11582.—General Electric Co., Ltd., Aldous, W. H., and Edwards, G. W.—Apparatus for receiving television. April 17.
- 11279.—Gollnow und Sohn, J.—Mast aerials. April 13.
- 11181.—Midgley, A. H., and Midgley, A. M.—Electrical production of musical tones. April 13.
- 11658.—Pearce, A. F.—Cathode-ray tubes. April 18.
- 11281.—Rudkin, E. P.—Wireless receiving system. April 13.
- 11345, 11480.—Semper, A. E.—Wireless, etc., aerials. April 14.
- 11382.—Woodley, W. E.—Tuning devices for radio receiving-apparatus. April 14.

### Specifications Published.

- 503589.—Scophony, Ltd., and Lee, H. W.—Optical systems.
- 503520.—Radioakt.-Ges. D. S. Loewe.—Cathode-ray tubes operated with high tension.
- 503596.—Hromadko, J. F.—Tuning-indicators for radio-receivers.
- 503598.—Ropohl, F.—Electrical musical instruments.
- 503600.—Browne, C. O.—Optical-projection apparatus.
- 503762.—Baird Television, Ltd., and Jones, V. A.—Electron multipliers.
- 503529.—Baird Television, Ltd., and Gilbert, A. H.—Television and like systems.
- 503555.—Blumlein, A. D.—Television transmitting and receiving systems.
- 503876.—Cole, Ltd., E. K., and Bradfield, G.—Superheterodyne radio-receiver.
- 503560.—General Electric Co., Ltd., and Bloch, A.—Optical-projection apparatus.
- 503638.—Cole, Ltd., E. K., and Brooke, H. A.—Radio receivers with automatic volume control.
- 503692.—General Electric Co., Ltd., and Espley, D. C.—Apparatus for transmitting television and the like.
- 503698.—Mayr, H.—Coupling systems for wireless aerials.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at the uniform price of 1s. each.





# QUERIES and ENQUIRIES

## D.C. or Universal 4

"I wish to build a 3 or 4-valve mains set, D.C. or Universal, with a mains energised loudspeaker, to receive the long and medium-wave programmes. Have you described such a receiver lately? If so, I would be pleased if you would kindly mention in which issue I shall find it, or whether you are about to do one in the future.—J. R. F. (S.W.13).

WE have not described such a receiver recently, but can supply a blueprint, P.W. 47. This is the Universal Hall Mark 4, which, although described first in 1935 is still standard for a receiver of the "straight" type. There is one H.F. stage and a push-pull output stage employing pentode valves. A permanent magnet speaker is used in this receiver owing to the difficulty with D.C. and Universal receivers arising from the limited voltage input.

## Energised Speaker

"I am building a mains receiver which draws about 120 mA and gives about 10 watts output. Can I use an energised speaker or will I have to use a smoothing choke and P.M. speaker? If I can use an energised speaker, could you tell me where I can get one and what price they run about? The receiver requires 250 volts on the anodes of the output valves."—A. G. S. (Edinburgh).

IF you have not already designed the mains section of the receiver, it should be possible to use the energised speaker. There will, of course, be a voltage drop across the field of about 100 volts and thus the mains section must deliver 350 volts or more. If you have designed the section for 250 volts output, you will have to employ a small smoothing choke and P.M. speaker. A field with a D.C. resistance of 2,500 ohms would drop 300 volts and a 1,000 ohm field would drop 120 volts. These figures may enable you to decide upon a suitable speaker and rectifier for the mains section. Speakers vary in price according to the size and general design.

## Chassis Problems

"I recently bought a ready-drilled (ex-makers surplus) chassis, intending to use this for a home-made set. I built up a design, but find results very poor and wonder if you can give me any idea where to look for the trouble. I used all odd parts to a published circuit, but the chassis was bare of parts and thus there should be no question of dud parts on it. What are the pitfalls most likely to be met with in this connection?"—L. E. (N.9.).

WITHOUT a circuit diagram or voltage or current test it is not possible to give you any definite advice. One point which you may have overlooked was a chassis of the type mentioned, is that it may be painted or enamelled and you may thus have used components or connections which are intended to be earthed via the chassis. Unless the contact points have first been thoroughly scraped to remove the

protective surface you will thus be unable to rely upon the connections and this is the commonest fault met with. If these points have been attended to, we suggest that you send us a diagram with voltage and current readings at various points and this may enable us to help you.

## Superhet Oscillator Fault

"I recently made a superhet, but cannot obtain any signals. I have made many tests and have adjusted all trimmers until I am tired of trimming. I wonder if there is any way of knowing whether or not it is due to the frequency changer not working.

## 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 on general wireless matters. We regret that we cannot, for obvious reasons—

- (1) Supply circuit diagrams of complete multi-valve receivers.
- (2) Suggest alterations or modifications of receivers described in our contemporaries.
- (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 enclosed 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.

Send your queries to the Editor, PRACTICAL AND AMATEUR WIRELESS, George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. The Coupon must be enclosed with every query.

I assume that unless the oscillator is actually oscillating no signals would be received and I am not certain how to test this point in the set."—D. R. A. (Cardiff).

THE trouble mentioned is a fairly common fault in home-made apparatus, but it is not a difficult matter to ascertain whether the oscillator is in fact oscillating. Simply connect a milliammeter in the anode circuit of the oscillator stage and then touch the grid of the oscillator with a finger. This may be moistened to increase the effect. If the valve is oscillating the needle will rise when the grid terminal is touched, due to the fact that under the oscillating condition the current falls and earthing the grid (through the body capacity) prevents oscillation and thus current returns to normal. If there is no change in anode current, then the valve is not oscillating and tests should accordingly be carried out to ascertain the reason. The H.T. applied to the valve, the coupling between grid and anode windings, and similar points should be attended to.

## Coil Design

"I was thinking of making up a coil for a simple one-valver, but am rather uncertain regarding the type of aerial coil to use. The secondary will be wound in two sections for medium and long waves. The reaction is to be placed between these and will also be split. So far as the aerial winding is concerned, however, I wonder whether to split this also and fit a wave-changing switch across a portion, or whether to use a single winding for both medium

and long waves. Could you explain the merits of the two schemes, please?"—A. S. S. (Wisbech, Cambs).

IF you wind a single coil for the aerial this will have to be so placed that it will provide good coupling on both medium and long waves. On the other hand, by using a split winding you can arrange this to offer maximum coupling on medium and also on long waves. A single winding may be too small for the long waves or too large for medium waves, and therefore a switched winding may be regarded as offering maximum results. Unfortunately it is not always a simple matter to dispose the two sections of the winding in such a position that when one portion is short-circuited it does not affect the efficiency of the remaining portion, and therefore a lot depends upon the design of your coil.

## REPLIES IN BRIEF

The following replies to queries are given in abbreviated form either because of non-compliance with our rules, or because the point raised is not of general interest.

**J. B. (Walton-on-Thames).** We regret that we are unable to supply layout or other details of the circuit in question.

**H. W. G. (E.7).** An output transformer would enable you to match the speaker correctly, or alternatively you could obtain one of the special extension speakers which have multi-ratio transformers fitted. These would be better than your old type unit.

**E. V. W. (Enfield).** We can supply blueprints of mains amplifiers, but you should obtain results with your apparatus if correctly connected. Perhaps you could give further details as to the method of connecting when we may be able to suggest the cause of your failure. A stamped addressed envelope should be enclosed if you require a postal reply.

**T. W. W. (Aberdeen).** We regret that the blueprint is now out of print and we are unable to supply any details. The design has, of course, been superseded.

**W. J. W. (Caernarvon).** We cannot supply a blueprint and do not know where you could get one as the paper is no longer on the market. We did not design the receiver.

**F. G. T. (Granwell).** Your connections were in order, and it would therefore appear that the unit is defective.

**W. A. J. (Newbridge-on-Wye).** Have the valves tested by a dealer who has a proper valve tester. If they are in order, communicate with the makers of the receiver who may be familiar with the particular difficulty you are experiencing.

**R. K. (Edinburgh).** We could not recommend any of our blueprints to enable you to make a set from parts dismantled from your old receiver. You might be able to replace the coil by modern all-wave components, but as the set is not one of our designs, we are unable to give precise instructions for this purpose.

**D. J. L. (Penygraig).** The device is sold by Messrs Philips Lamps, Ltd., 145, Charing Cross Road, London, W.C.2.

**J. B. (Much Wenlock).** The best procedure is to take a course at one of the Technical Training Colleges and on obtaining a Diploma or similar certificate you could apply to one of the well-known firms.

**P. B. (Cheadle).** Your sketch was too skeletonised to enable us to judge for certain, but we should imagine that you cut out the reaction winding and the reaction condenser was earthed. If the reaction winding was in the wrong direction the direct reaction condenser might have given better results and this could account for the effect.

**M. J. K. (Londonderry).** Upon receipt of a list of the receivers in which you are interested, and a stamped envelope, we will let you have the details you require.

**S. McD. (Manchester, 12).** We regret that we are unable to supply a blueprint for your particular arrangement.

**L. W. (Birmingham).** The coils may be unsuitable—there are Unigen, Universal, and Universal Type A, and the switching will have to be modified according to the coils you are using.

**W. G. (Holyhead).** An S.G.1 is a "straight" set. What modifications do you require?

**W. C. S. (Sidcup).** Could you make an anode-current test? This would undoubtedly reveal the cause of the trouble.

The coupon on page iii of cover must be attached to every query.

# Practical and Amateur Wireless BLUEPRINT SERVICE

These Blueprints are drawn full size. Copies of appropriate issues containing descriptions of these sets can in some cases be supplied at the following prices, which are additional to the cost of the Blueprint. A dash before the Blueprint Number indicates that the issue is out of print.

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The index letters which precede the Blueprint Number indicate the periodical in which the description appears: THIS P.W. refers to PRACTICAL WIRELESS, A.W. to Amateur Wireless, P.M. to Practical Mechanics, W.M. to Wireless Magazine.

Send (preferably) a postal order to cover the cost of the blueprint and the issue (stamps over 6d. unacceptable) to PRACTICAL AND AMATEUR WIRELESS Blueprint Dept., George Newnes, Ltd., Tower House, Southampton Street, Strand, W.C.2.

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**S**OUTHERN RADIO, 46, Lisle Street, London, W.C. Gerrard 6653.

**R**ESISTANCES!—Parcels of 50, 1-watt to 2-watt consisting of 20 useful values, only 1/9 for 50.—Harrison & Co., 89, Great Portland Street, London, W.1. Langham 2471.

**V**AUXHALL.—All goods previously advertised are still available; send now for latest price list, free.—Vauxhall Utilities, 163a, Strand, W.C.2.

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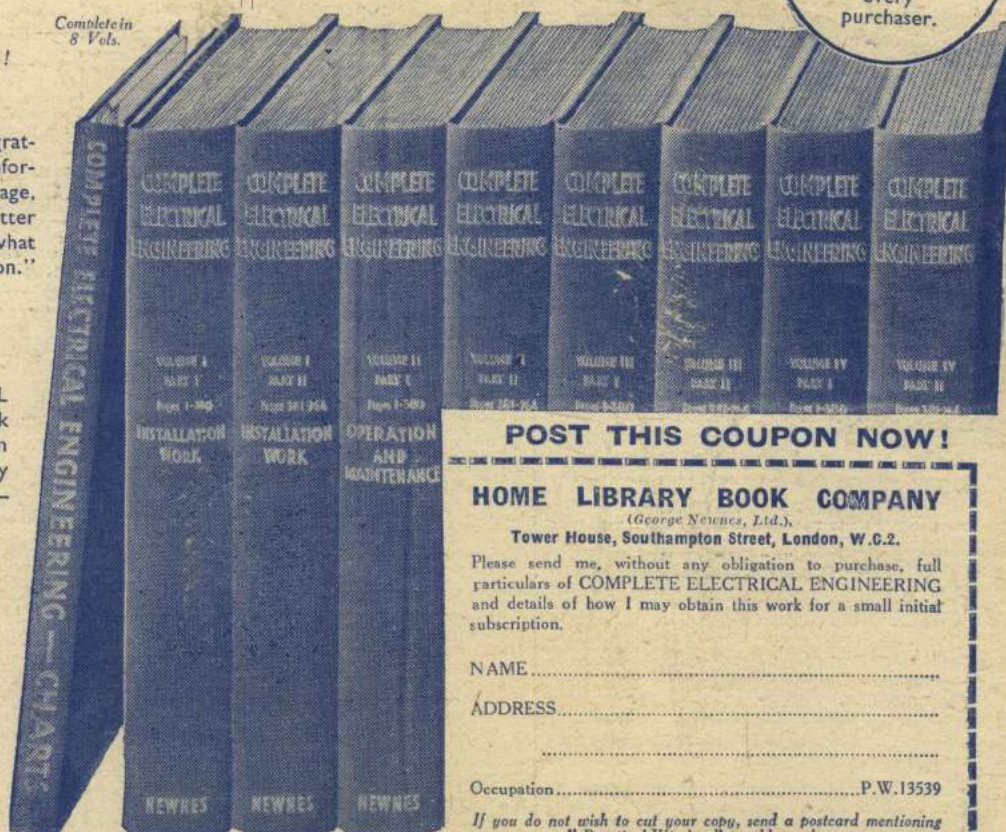
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