

## December 1949

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## R.S.G.B. BULLETIN

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Top Band Contest

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Editor: JOHN CLARRICOATS-G6CL

Editorial Office: NEW RUSKIN HOUSE,

LITTLE RUSSELL STREET, LONDON, W.C.I

Telephone: Holborn 7373

Honorary Editor: ARTHUR O. MILNE-G2MI

Advertisement Manager: HORACE FREEMAN

Advertising Office: PARRS ADVERTISING LTD.,

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### Forthcoming Events

### **REGION 1**

Ashton-under-Lyne,-January 8, 3 p.m., New Jerusalem Schools,

Katherine Street.

Birkenhead (Wirral A.R.S.)—December 21, 8 p.m., Y.M.C.A.,

Whetstone Lane.

Bolton.—January 3, 8 p.m., Y.M.C.A.

Burnley.—January 4, 7.30 p.m., Mechanics Institute, Manchester Road.

Bury.—January 12th, 7.30 p.m., Atheneum, Market Street.

Darwen and Blackburn.—December 30, January 13, 7.30 p.m.,
Y.M.C.A., Limbrick, Blackburn.

Manchester.—January 9, 7.30 p.m., Reynolds Hall, College of
Technology, Sackville Street.

Oldham.—Alternate Wednesdays, 7.30 p.m., Civic Centre, Clegg

Street. Preston .- December 23, January 6, 8 p.m., Three Tuns Hotel,

North Road. Rochdale.-January 8, 3 p.m., Drill Hall, Baron Street.

### REGION 2

Barnsley.-December 23, January 13, 7.30 p.m., King George

Barnsley.—December 23, January 13, 7.30 p.m., King George Hotel, Peel Street.
Bradford.—December 27, January 3, 17, 7.30 p.m., Cambridge House, 66 Little Horton Lane.
Darlington.—Thursdays, 7.30 p.m., Club Room, British School Yard, Skinnergate.
Doncaster.—Wednesdays, 7.30 p.m., 73 Hexthorpe Road.
Harrogate.—Wednesdays, 7.30 p.m., rear of 31 Park Parade.
Newcastle-upon-Tyne.—December 19, 8 p.m., British Legion Rooms, I Jesmond Road.
Sheffield.—December 28, 8 p.m., Dog and Partridge, Trippet Lane.
January 11, 8 p.m., Albreda Works, Lydgate Lane.
Spenborough.—December 21, January 18, 7.30 p.m., Temperance Hall, Cleckheaton.

Hall, Cleckheaton.

### **REGION 3**

South Birmingham.-December 18, 10.30 a.m., Stirchley Institute.

### **REGION 4**

Derby (D. & D.A.R.S.),—December 21, 7.30 p.m., Room No. 4, 119 Green Lane. Film Show. January 4, 7.30 p.m., Room No. 4. A.G.M. January 11, 7.15 p.m., Club Room, Derby School of Arts and Crafts.

Mansfield.-January 8, 3 p.m., Swan Hotel.

### REGION 6

High Wycombe.-December 21, 7.30 p.m., G3DQC, 6 Peterboro Avenue.

### REGION 7

London.—December 16, 6.30 p.m., Institution of Electrical Engineers, Savoy Place, Victoria Embankment, W.C.2. Tea 5.30 p.m. Annual General Meeting. Barnes and Richmond.—January 10, 7.30 p.m., 22 Lowther Road, S.W.13.

Croydon (Surrey R.C.C.).—January 9th, 7.30 p.m., The Black-smith's Arms.

 East London.—December 18, 2.30 p.m., Lambourne Room, Ilford Town Hall.
 Edgware (E. & D.R.S.).—December 21, 28, January 3, 10, St. Michael's School, Flower Lane, Mill Hill.
 Enfield.—December 18th, 3 p.m., George Spicer School, Southbury P. Poed. Road

Finsbury Park.—December 20, 7.30 p.m., 164 Albion Road, N.16.

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Hayes.—January 1, 7.30 p.m., The Vine, Uxbridge Road. Hoddesdon.—January 4, 18, 8 p.m., The Salisbury Arms. Holloway (Grafton R.S.).—Mondays, Wednesdays and Fridays, 7.30 p.m., Grafton School, Eburne Road, N.7. Peckham.—January 1, 7.30 p.m., The Kentish Drover, Rye Lane. Slough.—January 18, 7.45 p.m., Labour Memorial Hall, Chandos

St. Albans.—January 10, 8 p.m., The Beehive, London Road. Welwyn.—January 2, 8 p.m., The Council Offices.

### REGION 8

Brighton.—Tuesdays, 7.30 p.m., Eagle Inn, Gloucester Road.
Reading (R.R.S.).—January 12, 14, (Instructional Section). 28, 7 p.m., Abbey Gateway, The Forbury

### REGION 9

Bristol.—December 16, 7 p.m., Keen's Cafe, Park Row. Exeter.—January 6, 7 p.m., Y.M.C.A., 41 St. Davids Hill. Plymouth.—December 17, 7 p.m., Tothill Community Centre, Tothill Park, Knighton Road, St. Judes. Torquay.—December 17, 7.30 p.m., Y.M.C.A., Castle Road.

### **REGION 14**

Ayr.—December 21, 7.30 p.m., Royal Hotel, Prestwich.
 Falkirk (Clackmannan Group).—January 12, 7.30 p.m., Temperance Cafe, High Street, Falkirk.
 Glasgow.—December 21, 7 p.m., 39 Elmbank Crescent.

### PRESIDENTIAL ADDRESS

Mr. W. A. Scarr, M.A., G2WS, will deliver his Presidential Address at 6.30 p.m., Friday, January 27, 1950, at the Institution of Electrical Engineers, Victoria Embankment, London, W.C.2. Following the address Mr. J. Neale, B.Sc. (Eng.), A.M.I.E.E., will lecture on "The Use of V.H.F. for Radio Telephone Services."

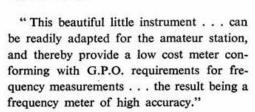
## ONCE AGAIN-THE CLASS 'D'

## WAVEMETER

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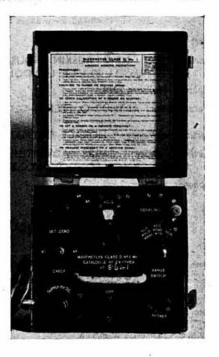
Packing and Carriage 2/6

R.S.G.B. MEMBERS are familiar with the Articles about this instrument published in the "Bulletin" for December, 1947, and October, 1948, but for the benefit of new readers who are desirous of obtaining a high grade wavemeter we reprint below, by kind permission of the Editor, extracts from these Contributions :-



"Although the meter nominally operates over the range 1.9 to 8.0 Mc/s., it will be found that it may be used with complete satisfaction on the 14 Mc/s. band (actually up to 18 Mc/s.), and with rather reduced signal strength on the 28 Mc/s. band."

"The great advantage of this meter is that the dial is direct reading in kc/s., and the scale is very open. No verniers or graphs are required."



"As the harmonics of the instrument cover a very wide range, it is easily possible to obtain readings against any of the medium or long wave broadcast stations. . . . "

EVERY INSTRUMENT is supplied in its metal case, as illustrated, and is complete with two 6 V. vibrators and two valves ARTH2. Please note that this form of supply cannot be varied. The instrument is designed for use on 6 V. D.C. supply, making it ideal for Field Days, running from a car battery, or is easily adapted for use on 6 V. A.C., details A suitable mains transbeing supplied. former is available at 7/6.

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## R.S.G.B

For the advancement of Amateur Radio

VOLUME XXV No 6.

DECEMBER 1949



### SIMPLE EQUIPMENT

THE success of the last two R.S.G.B. National Field Days, to say nothing of the support given to the recently-held 3.5 Mc/s. Contest, proves that many members are interested in low power work. It is not our business here to press the claims of those who hope the Contests Committee will recommend to the Council that the 1950 N.F.D. shall again be run on low power lines but it cannot prejudice the issue if we record that most of the 600 members present at the Convention business meeting held in Manchester voted in favour of the input remaining at 5 watts in preference to reverting to the former value of 25 watts. There were even some who thought the figure should be 1 watt!

It is a little difficult to explain why there is so much interest in QRP work—particularly in contests—unless it be that many of those who participate remember the successes they achieved 25 years ago with simple gear.

In those days the single valve tuned-plate, tuned-grid oscillator and an A.O.G. aerial were capable of producing results at least comparable with those attained to-day by many newcomers blessed with modern components, valves and rotary beams. Many of those early QRP transmitters employed a Cleartron CT25X—obtainable from Selfridge's bargain basement for the princely sum of sixpence—yet the DX that was worked with them was nobody's business!

During the recent Amateur Radio Exhibition in London one piece of home-constructed equipment that attracted a great deal of attention was a small battery transmitter-receiver. Last June this little set—described elsewhere in this issue—was operated under field day conditions and in the course of ten hours it contributed points to more than 50 competing portable stations. Since then it has performed yeoman service at holiday resorts on the south coast, and in October it did a job of work at the Manchester Convention when it was operated under extremely poor conditions from a hotel bedroom in the centre of the city.

There are probably many other simple portable rigs in constant use around the country—we have heard of one, assembled in a car, which works W6's on 10 metres like shelling peas! Perhaps the claims made in this issue for the MIghty MIdget will induce others to sing the praises of their own pet design.

This reference to simple transmitters reminds us of the amazing results achieved before the war with two and three valve receivers. Components, judged on present day standards, must have been pretty inefficient, yet DX rolled in with great consistency.

Looking round the recent Exhibitions in Manchester and London the only receivers on show were superhets costing £45 or more. Is there no demand these days for a modern version of, for example, the *Eddystone* DX Two, that wonderful little set that helped to give many a British amateur a coveted proficiency certificate and a high place in pre-war B.E.R.U. Contests?

With the improvements which have been introduced in the manufacture of valves and components, it should be possible to produce modern versions of those comparatively simple receivers that remained popular until the American—and later the British—superhets pushed them aside. It may be argued that receivers of the type we have in mind would fall by the wayside under present day conditions. Maybe; maybe not!

Which reminds us—have YOU purchased a copy of Simple Transmitting Equipment? This latest R.S.G.B. publication describes a number of items of simple transmitting equipment which should interest old-timers and newcomers alike. The price is 2s. 3d., post free.

J. C.

## SINGLE-SIDEBAND TRANSMISSION APPLIED TO AMATEUR TELEPHONY

### PART I.—A REVIEW OF S.S.B. TRANSMISSION SYSTEMS

### Introduction

-HEsingle-sideband system of telephony transmission offers many interesting possibilities in Amateur Radio, partly due to the many distinct advantages that this method possesses over a doublesideband amplitude modulated transmission, and also because of the large amount of development that is still necessary in connection with both transmitting and receiving circuits. Considerable experimental work has been carried out in America, but only recently have British amateurs been granted use of this facility.

By N. G. HYDE\*

(G2AIH)

Transmission by means of a single-sideband system is not new, having been introduced on commercial circuits about 25 years ago, the original long-wave transatlantic telephone employing this method. Since that time effective short-wave systems have been developed, and several circuits now utilise this principle, the latest being the ship-shore telephone service.(1)

### Outline of S.S.B. System

The method involves the radiation of one sideband only, since this contains all the modulation intelligence necessary, the other sideband being suppressed at the transmitter(2). Usually, in commercial practice, the carrier is suppressed as well, when the system is known as "Single-Sideband Suppressed Carrier" transmission. In this case the carrier must be re-introduced at the receiver to effect demodulation, and thus (in commercial transmitters) a low-level carrier, known as the "pilot," is radiated in order to synchronise the locally generated carrier.

The different methods of working are :-

 Single Channel—Unsuppressed carrier
 Single Channel—Suppressed carrier.
 Double Channel—Suppressed carrier.
 The second method is that used on long-wave circuits, and is adaptable to amateur use. The third method, used extensively on short-wave commercial circuits, makes available two speech channels with one transmitter. It has some application from an amateur point of view, particularly with reference to the modulation circuits employed, and will be described here in order that an understanding may be obtained of the methods of sideband generation in current use(3).

### Carrier Suppression—

### The Balanced Modulator

Carrier suppression and sideband generation is achieved by means of a balanced modulator, using a push-pull circuit (Fig. 1).

Carrier voltage is applied to the grids of the two valves in phase, through the centre-tapped secondary of the input transformer, the modulation being applied to each valve 180° out of phase.

\* N. G. Hyde, Assoc.Brit.I.R.E., Earlston, Beacon Road, Crowborough, Sussex.

Then if

 $f_c$  = Carrier frequency.

 $f_m = \text{Modulation frequency.}$   $E_c = \text{Peak input carrier voltage.}$ 

 $E_m =$ Peak input modulation voltage. = A constant.

The voltage appearing in the output of each valve. due to carrier alone

 $= K.E_c \sin \omega_c t.$ 

Since these are in opposition, they will cancel out. Also, voltage in output of each valve, due to modulation alone

 $= K. E_m \sin \omega_m t.$ 

These voltages will add, and in the absence of carrier, a voltage at modulation frequency will appear across the output transformer.

Now considering both carrier and modulation applied together, the resultant voltage across the output circuit will be

 $K(E_m \sin \omega_m t. \sin \omega_c t + E_c \sin \omega_c t)$ 

and  $K(E_m \sin \omega_m t. \sin \omega_c t - E_c \sin \omega_c t)$ 

The sum of these being

K( $E_m \sin \omega_m t$ .  $\sin \omega_c t + E_m \sin \omega_m t$ .  $\sin \omega_c t$ )  $= 2K(E_m \sin \omega_m t. \sin \omega_c t)$   $= K. E_m(\cos (\omega_c - \omega_m) t - \cos (\omega_c + \omega_m) t)$   $= K. E_m (\cos 2 \pi (f_c - f_m) t - \cos 2 \pi (f_c + f_m) t)$ Showing that two frequencies, corresponding to lower and upper sidebands of the original carrier frequency, are produced; no carrier frequency component being present.

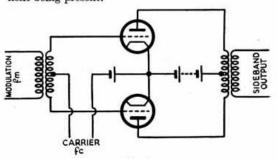


Fig. 1.

Balanced modulator.

Upper sideband output = fc + fm
Lower sideband output = fc - fm

A recommended circuit for a balanced modulator is shown in Fig. 2.

An R.F. voltage is injected into the cathodes of a twin triode valve (6SN7) the potentiometer VR being used to obtain balance, and adjusted until no R.F.

voltage appears in the output circuit.

Audio frequencies are applied to the grids in antiphase via T1. The by-pass condensers C1 and C2 should have a low reactance at the radio frequency used and a high reactance at the highest audiofrequency transmitted.

### Transmission Systems

### Single Channel Suppressed Carrier

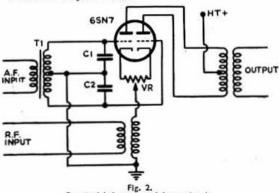
A block diagram of a transmitter employing this system is shown in Fig. 3. Speech is applied to the input of the first balanced modulator, to which is also fed a signal from a 10 kc/s. oscillator.

The output of this balanced modulator will consist

of upper and lower sidebands (10  $+f_m$  kc/s. and  $10 - f_m$  kc/s.), no carrier frequency being present. These two sidebands are applied to the input of a high-pass filter, which passes only the upper sideband

 $(10 + f_m \text{ kc/s.})$  frequencies.

These frequencies are passed to the input of the 2nd balanced modulator, into which a frequency of (say) 50 kc/s. is injected. Again, the output of this modulator consists of the two sidebands. The upper sideband  $(60 + f_m \text{ kc/s.})$  is again selected by the second filter, and this frequency is passed on to the transmitter power amplifiers, and is that frequency which is finally radiated.



Since the final frequency has the characteristics of a modulated wave, all power amplifier stages following the 2nd balanced modulator must be linear; hence Class A amplifiers are used for low-level amplification, followed by Class B final amplifiers.

Practical balanced modulator circuit.

In order that filtering is effective, modulation must take place at relatively low frequencies.

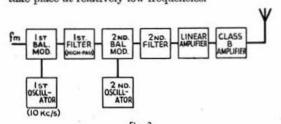


Fig. 3. Single channel transmitter.

### **Double Channel Suppressed Carrier**

A block diagram of a typical short-wave transmitter employing this system is shown in Fig. 4. Speech on each channel, after amplification, is fed to a balanced modulator, together with the output of a 100 kc/s. oscillator. Crystal filters follow each balanced modulator, and these pass the upper sideband from Channel 1 and the lower sideband from Channel 2 modulator. These two sidebands are then applied, together with the output of a 3.0 Mc/s. oscillator, to the input of a second balanced modulator, the sideband output of which passes to a 3.1 Mc/s. tuned filter, which selects the upper frequency components only, these, after amplification, being mixed in a third (non-balanced) modulator with the output of the transmitter crystal oscillator and frequency multipliers.

A small voltage at 100 kc/s. is fed through the "carrier re-supply" circuit and appears at the output of the second balanced modulator at 3·1 Mc/s. This frequency, being mixed with that from the crystal oscillator and multipliers, is finally radiated at low level (-10 db on a fully modulated sideband) to

form the pilot carrier, the output of the frequency multipliers being  $\pm 3\cdot 1$  Mc/s. from the pilot frequency.

### Phase-balancing Method of S.S.B. Generation

The two methods of transmission previously described depend to a large extent on the characteristics of the various filters for their success, since these must have sharp attenuation near the carrier frequency to eliminate the unwanted sideband, without affecting the characteristics of the desired sideband.

Recently, another method of S.S.B. generation has been developed in which the undesired sideband is balanced out (4) (Fig. 5.) This system consists of two modulators, into both of which are fed carrier and modulation voltages, those applied to one being 90° out-of-phase with the carrier and modulation applied to the other. The output from the two modulators is then combined, with the result that one sideband is cancelled out, while the outputs of the other are added. The single-sideband R.F. wave is then followed by linear amplifier stages to raise the power to the desired level.

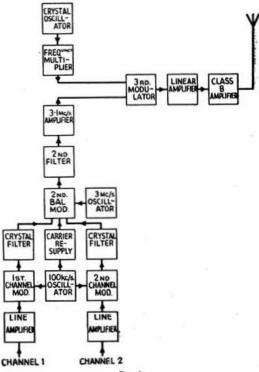


Fig. 4.
Double channel transmitter.

With the phase-balancing method the oscillator generating the carrier can be working at the final radiated frequency, the chief problem involved being to maintain the 90° phase-change over the whole band of speech frequencies it is desired to transmit. A satisfactory system has been developed in America that has a constant phase-difference over a wide band(5).

### Reception of S.S.B. Signals

From the description of S.S.B. systems it will be seen that the transmitted speech signal consists of different frequencies of varying amplitude that have been displaced upwards in the frequency spectrum.

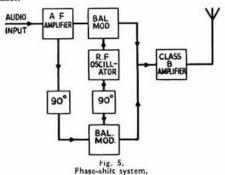
Considering a 1 kc/s, tone on Channel I in the case of the double-channel system, this will be radiated

as a frequency of 3.101 Mc/s. plus (or minus) the frequency from the crystal oscillator and multipliers which is (say) 5 Mc/s. Thus the frequency radiated will be 8 101 Mc/s., with a pilot of 8 1 Mc/s. To effect demodulation, therefore, it is necessary to reintroduce a carrier at the receiver—in this case, at a frequency of 8.1 Mc/s.—in order to extract the modulation component.

Thus it will be seen that the demodulation of S.S.B. telephony is somewhat similar to that of C.W. telegraphy, heterodyning taking the place of actual

rectification.

The phase of the re-inserted carrier is not important in the case of amateur working using a single speech channel.



### Advantages of S.S.B. Transmission

The chief advantages are :-

(1) The frequency band required is half that of D.S.B. amplitude modulated telephony, thus it results in an improved signal-to-noise ratio at the receiver.

(2) There is less distortion caused by selective fading along the transmission paths. Fading of carrier alone results in over-modulation, with consequent increased second harmonic distortion. the locally generated carrier is at constant level this form of distortion is minimised.

(3) There is a saving in transmitter power input, since with no speech input the Class B amplifiers employed are more or less quiescent. Alternatively the transmitter power input can be increased, the effective gain being about 9db over that of a

D.S.B. A.M. transmitter.

### Disadvantages

The main disadvantages are :-

(1) The equipment required is considerably more complicated than with D.S.B. Telephony.

(2) The re-inserted carrier must have a high order

of frequency stability.

(3) Since no carrier is transmitted, or else it is of very low level, normal methods of A.G.C. cannot be used.

### References

"Single Side-(1) Wireless World, March, 1949. band Radio Telephony." H. D. B. Kirby.
(2) Short Wave Wireless Communication,

Edition, Ladner A. W. and Stoner C. R., 1943.

Chapters 3 and 9.

- (3) Proceedings of the I.R.E. Vol. 36. No. 8. August, 1948. "Modern Single-Sideband Equipment of the Netherlands Postals Telephone & Telegraph." C. T. F. van der Wyck.
- van der wyck.

  (4) Proceedings of the I.R.E. Vol. 36. No. 11.

  November, 1948. "A High-level Single Sideband
  Transmitter." Oswald G. Villard, Jnr.

  (5) Electronics, December, 1946. "Wide Band

Phase Shift Networks." R. B. Dome.

(To be continued next month).

## The Design of Yagi Aerials

OME interesting experimental results and a simple theoretical treatment of the operation of Yagi aerials are given in a recently published article. The discussion is limited to aerial arrays more than one wavelength long, with a fixed director spacing of  $\cdot 34\lambda$ , and directors all the same length. This length is about ·43λ for aerials with fewer than 10 directors. (Although figures for aerials with up to 42 directors are given, the authors point out that it is not convenient or efficient to use more than 18.)

The director length of ·43λ given above is correct for elements of diameter ·006λ, supported near the centre by low-capacity insulators. If the diameter is less, the director length should be increased by about 2% for 50% reduction in diameter. If the "all metal" type of construction is used, the element lengths should be increased by about ‡ of the diameter of the mounting tube.

Experimental results obtained in two typical cases are shown in Table I. The beam width given is the width in the horizontal plane, but the vertical width

is only slightly greater.

TABLE I

Number of Directors	Ream width (between half field- strength points)	Power gain over ½\(\frac{1}{2}\)\(\frac{1}{2}\)
9	37° 46°	13 8

The usual amateur practice of adjusting the reflector for best back-to-front ratio is not recommended. The authors used a reflector  $\frac{1}{2}\lambda$  long, and state that the position may be varied from  $\frac{1}{4}\lambda$  to  $\frac{1}{8}\lambda$  behind the radiator without appreciably affecting the polar diagram or the power gain, but with a marked effect on the input impedance. This may form a convenient means of adjusting the impedance for matching purposes. Back radiation is best minimised by adjusting the position, or less satisfactorily, the length, of the director furthest from the radiator. The use of two additional reflectors, ½λ above and below the first, gives an increase in forward gain of about 30% for a 13 director aerial, but only about 10% for one with four directors. The back-to-front ratio is not appreciably improved.

TABLE II

Ratio: folded part/fed part (Diameter)	4	3.	2	1	ł	ŧ	ŧ
Multiply Z by	7	6	5.2	4	3.2	2.7	2.5

Calculation of the input impedance of a Yagi aerial is usually too complicated to be practicable. In general it is too low for matching to normal feeders, but may be raised by folding the radiator. Multiplying factors to calculate the impedance of a folded dipole from that of a normal dipole are given in Table II. The overall length of the dipole should be adjusted until it appears resistive. The length will depend on the spacing between the two halves and the tubing diameter, but is about  $0.42\lambda$ . J.H.W.

"Design of Yagi Aerials," R. M. Fishenden and E. R. Tiblin. Proceedings of the Institution of Electrical Engineers, Radio Section, Paper No. 731 (January, 1949).

### in B.E.R.U. c·u·

## A PORTABLE

## TRANSMITTER and RECEIVER

By ARTHUR O. MILNE G2MI\*

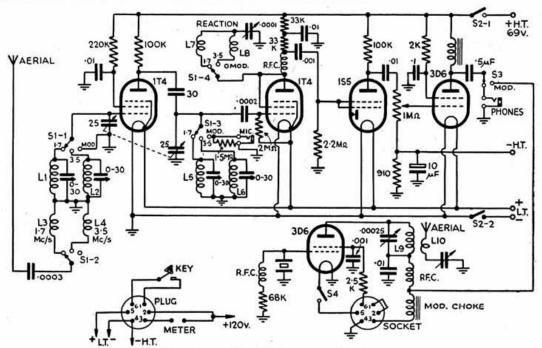
In an age when the emphasis is frequently on high power and elaborate receivers, results achieved with compact equipment warrant consideration. This article describes the construction of an effective portable station which, during the 1949 National Field Day, gave numerous contacts to competitors. The whole station was erected single handed in 33 minutes.

THIS equipment was originally designed as a dry-battery operated portable receiver for use at the Bromley, Kent, N.F.D. "A" station in 1948. A subsequent alteration in the rules rendered the use of such a receiver unnecessary but by this time, constructional work was well advanced and so it was decided to complete the set and retain it as a standby, making sufficient space available in the box to include a small transmitter as well.

accessories. The D.C. Avominor is used as anode current meter for the transmitter and station trouble-finder combined.

### The Receiver

No special precautions were necessary regarding layout, except that the R.F. and detector tuned circuit coils are mounted on opposite sides of the steel sub-chassis.



Circuit Diagram of Portable Transmitter and Receiver.

No attempt was made to purchase special miniature components nor to compress the layout into the smallest possible space. The whole equipment was built up on a panel and sub-chassis and fitted into the steel case of an ex-Army Type 102 tester. A container of this type has the advantage of a deep lid which allows plenty of clearance for the various knobs protruding from the panel and leaves sufficient room for a set of spare valves, the transmitter coils, a pair of headphones, the power plug and cable, a miniature Morse key, hank of aerial wire and the earth lead. In fact the entire station can be carried inside the case, which measures 10\frac{3}{2}\text{in.} back to front, \( \text{6}\text{in.} \) deep and an extra \( \text{3}\text{in.} \) deepth of lid, the only exception being the transmitter H.T. battery, a D.C. Avominor and the aerial and its

• 29 Kechill Gardens, Hayes, Bromley, Kent.

For reasons of economy and simplicity a 4-valve straight receiver with regenerative detector is employed having a 1T4 R.F. amplifier; 1T4 detector, triode connected; 1S5, triode connected first audio and 3D6 tetrode output. After extensive tests, the triode-connected detector with condenser reaction proved to be best for quiet silky reaction, consistent with reasonably good sensitivity. The 1S5 was used merely because it happened to be lying spare. The 3D6 was chosen for the same reason. The latter is a "loktal" base valve, rather larger than its B7G counterpart the 3A4. The additional 20 mA. of filament current taken is negligible compared with the cost of a new valve.

To conserve internal space, and to give as great a degree of band-spread as possible, the receiver has only one tuning control (a 25 μμF. condenser) and this just spreads the two low frequency bands over 180 degrees. The actual spread is from 1700 to 2020 kc/s. and from 3500 to 3790 kc/s. As the receiver is primarily intended for the reception of C.W., the "loss" of 10 kc/s. at the H.F. end of 3.5 Mc/s. is regarded as unimportant. A slightly larger variable condenser would provide a greater coverage if required.

Perusal of the circuit diagram (Fig. 1) will show that there is nothing unconventional in the design trick circuits have a habit of going wrong at inappropriate times! Although the large *Muirhead* dial may seem to be an extravagance it has proved

to be well worth-while in practice.

The components were placed where they fitted most conveniently and were the smallest suitable available in the "junk box" at the time. A small metal screen is placed between the R.F. amplifier and detector valves; this, apart from the separation of the tuned circuits, is the only screening precaution taken. It is therefore quite unnecessary to copy exactly the layout shown and any convenient box can be used to accommodate the equipment.

series-tuned to earth on 1.7~Mc/s. The rather large variable condenser is the aerial tuning condenser, approximately  $\cdot 00075~\mu\text{F}$ . This will be changed later for a fixed condenser and smaller variable condenser in parallel. Keying is effected in the screen grid lead and is clean and free from clicks. The transmitter can be operated on 1.7~Mc/s. and be entirely inaudible 50 kc/s. away on a communications receiver in the same room.

The 120 V. H.T. battery for the transmitter is external to the set. This, together with the Morse key and anode current meter are connected by means of a six-way cable and plug which can be seen at the top right-hand corner of Fig. 2. Provision is also made for the quick external connection of a new L.T. for the transmitter if required.

A general view of the inside of the set is shown in Fig. 3, mainly as a rough guide to the comparative sizes and location of some of the components and the layout. The transmitter is to the right of the centre partition, the valve being under the base plate. The four valves of the receiver and other components can readily be identified.

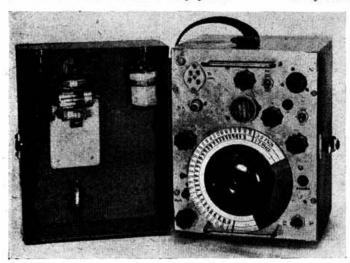


Fig. 2.

View of the complete equipment showing at the left how spare coils and valves are stowed-away in the lid. Note the method of calibrating the Muirhead dial to give direct readings every 10 kc/s. on both 1-8 Mc/s. and 3-5 Mc/s. bands.

The switch S1 has four sections and six positions, only three of which are in use. Position 1 is for the 1.7 Mc/s. band, position 2 is for the 3.5 Mc/s. band, while position 3 short-circuits the aerial input and connects the microphone jack to the grid of the detector valve, thus turning the last three valves of the receiver into a modulator, to be discussed later. The switch S3 connects the output of the receiver either to the headphone jack or to the transmitter.

A word of advice to the constructor; make sure that the components used are not faulty. Several hours of wasted effort would have been avoided if all the condensers and resistors had been tested on the Megger beforehand. A faulty detector grid leak and a leaky coupling condenser in the audio section, combined to produce a puzzling fault which was extremely difficult to trace.

The power supply for the receiver is a "Batterymax" B114, 1.5 V. +69 V. which is housed on a shelf of the sub-chassis, part of the original tester. The method used for biasing the output valve is of interest as it obviates the need for a separate bias battery.

### The Transmitter

The transmitter consists of a single 3D6/1299 valve as crystal oscillator with its filaments connected in series operating from an ordinary "twin cycle lamp battery. The aerial is tapped directly on to the tank coil for 3.5 Mc/s. operation and is

### Accessories and Field Tests

The original intention was to carry the accessories for the station in a duplicate of the set case. In field use these are as follows: D.C. Avominor, H.T. battery, aerial insulators and guy ropes, earth pin, tent pegs, mallet, pliers, screwdriver, log-pad, pencil and portable licence. The combined weight about balances the set itself which makes for ease of transport. When the set was completed and preliminary tests had been made, the possibility of using telephony on the transmitter was investigated. As good quality was desirable and a crystal microphone was available, a switch (already mentioned) was included to transfer the output of the receiver via a modulation choke, to the transmitter. At the same time an extra position of the wave-change switch was used to bring in the microphone which is plugged into the socket provided on the front panel. With this rather unorthodox modulator excellent quality speech has been transmitted on the 1.7 Me/s. band up to 20 miles and up to 100 miles on 3.5 Me/s.

### Practical Operation

Apart from a few tests at the home station, the first opportunity to give the set a work-out in the field occurred when it was included with the rest of the baggage on the writer's annual vacation in the so-called summer of 1948. An aerial some

75ft. long and about 15ft. high was erected and the results obtained exceeded all expectations. Many contacts were made, both on 1·7 and 3·5 Mc/s. with an S9 at 160 miles as one of the outstanding reports. Tests were made with a small vertical aerial from a beach châlet on the sands at Cliftonville, near Margate, Kent, and several stations were worked on "top band" despite terrific QRM from North Foreland Radio only about one mile distant.

With the coming of the milder winter weather and the long evenings, the set was left on one side until N.F.D. of 1949, when it was decided to operate as a truly portable station with the self-imposed restriction that the entire station, exclusive

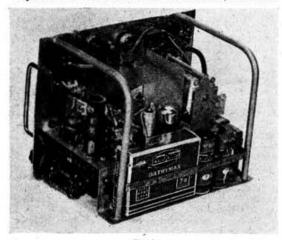


Fig. 3.

Rear view showing position of main tuning components, valves and batteries.

of tent and any other extras, must be transported to and from the site by one man on a pedal cycle; said bicycle to be pedalled, not pushed. The expression "entire" station to include one 30ft. mast.

A quantity of lin. high-tensile dural tubing was to hand and a suitable mast was constructed from six 5ft. lengths of this material. Short sleeves were fitted on to each section into which the next section fits and each section was secured by a piece of threaded rod and a thumb screw. This makes the finished mast a continuous electrical connection throughout and serves as a satisfactory vertical receiving aerial.

The transmitting aerial (a 132 ft. long-wire) was secured to a tree at the end remote from the tent, the dural mast being erected by the side of the

operating position.

The station was operated for approximately 10 hours out of the available 24 with a resulting "score" of some 240 points, which compared favourably with some of the "A" station scores put up by the actual competitors. The writer operated the station throughout the event and no transmission was made between 10.30 p.m. and 6 a.m., in fact no great effort was made to keep going all the time; the whole thing being treated more as a day's outing than a scrious test. Of the 50 odd contacts made, none was lost due to QRM at the G2MI/P end and no inconvenience was experienced because of the lack of selectivity normally associated with a "straight" receiver. Despite the fact that only three spot frequencies were available in each band, the use of crystal control did not prove to be such an embarrassment as was forecast. The entire station was put up and was on the air in 33 minutes and was dismantled and properly packed in 28 minutes.

Later in the year, the equipment, including the dural mast, was again taken to the Isle of Thanet during summer vacation. This time a rather oddly-shaped 132ft. aerial was put up and as the mast had to be remote from the set, a separate 10ft. vertical aerial was connected to the receiver.

10ft. vertical aerial was connected to the receiver. S6 telephony signals were exchanged with G3AEX of Bromley on 3·5 Mc/s. as an opening ceremony. During the remainder of the two weeks, most of the contacts were made on C.W. and several regular schedules were maintained. In addition contacts were made with places as far away as Pembroke, Prestatyn, Liverpool, Jersey, Germany, Holland and Belgium. The best times for operation were between 0600 and 0800 B.S.T. and between 1800 and 1900 B.S.T. After about 1900 B.S.T. QRM, it must be admitted, usually swallowed and strangled the 1 watt signal! One contact with G3AA of Bristol was made with 40 volts H.T. (·22 watt).

It is of interest to note that the same 120 V. H.T. battery which did duty during N.F.D. was used throughout the vacation fortnight. It measured 109 V. at the end. The receiver battery has been changed only twice since the set was built and the transmitter L.T. only once.

To conserve battery power, the receiver is normally switched-off during transmission and *vice-versa*; but 100 per cent. break-in is possible if desired.

The experience gained with this little set has encouraged the writer to further efforts and a second unit is now under construction which will incorporate a number of minor refinements and will cover 7 and 14 Mc/s. as well as the two lower frequency bands. Experiments are also in hand to develop a reliable V.F.O. drive using small directly-heated valves. The spare set of valves and other extras will be carried separately. The H.T. for the transmitter will be housed in the lid and will be of the modern layer type dry cell.

Anyone building such a set may rest assured of much interest and satisfaction in its use and quite a lot of fun during any field day event. The design and construction of equipment using dry battery power has been sadly neglected both in this country and in the U.S.A. There is not a single example of the practical application of the B7G series of battery valves in the A.R.R.L. or Radio Handbooks. There may be a general impression that their capabilities are such as to be useless for reliable communication. This, most certainly, is not the case.

### Additional Uses

Two supplementary, though quite fortuitous facilities, are also afforded by the little set described in this article. It can be used as a highly effective emergency deaf-aid and with the wave change switch turned to position 4, i.e. with the grids of the R.F. and detector valves untuned, good readable reception is possible of the GBR transmissions from Rugby on 16 kc/s. We have yet to find out just why!

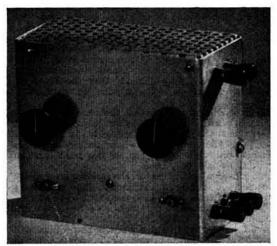
Coil Data

Coil.	Diameter.	Turns.	Wire.	Winding.
Lı	inches	82	32 D.C.C.	Close wound.
1.2	î	20 26	"	"
L3	1	26		11
1.4	+	8	**	**
L5	*	82 22 30 20	**	
L6		22		
Li		30		"
L8 L9	11	56	28 D.C.C.	**
(1.7 Mc/s.)	14	90	28 D.C.C.	10
L9 (3.5 Mc/s.)	11	32	26 Enam.	Spaced one
L10 (1.7 Mc/s.)	11	11	28 D.C.C.	at earthy end.

## IMPROVING RECEIVER SENSITIVITY

## A Simple Pre-amplifier for 14 Mc/s.

By A. G. WOOD (G5RZ)\*



View of the pre-amplifier for 14 Mc/s, operation showing position of tuning controls.

THERE can be few amateurs who, at some time or another, have not wished that their receivers possessed just that added sensitivity which would enable them to copy weak signals only faintly audible in the background noise. While a great improvement can usually be effected by a periodical re-alignment of R.F. and I.F. tuned circuits, on one band at least there usually persists the impression that signals are being missed due to lack of receiver sensitivity.

It was felt that a satisfactory answer to this problem would be provided by a carefully designed pre-amplifier, capable of being switched in or out of operation, and possessing sufficiently broad-band characteristics to render constant re-tuning of the unit unnecessary over any particular band. A unit of this type would also considerably reduce second-channel interference and provide a means of accurately matching almost any aerial to the input impedance of a normal receiver. In order to keep costs to a minimum the power consumption of such a unit should be low enough to permit the use of the receiver power pack without placing an undue strain upon it; components, as far as possible, should be of the type to be found in almost any junk box.

The circuit finally adopted was found to meet

The circuit finally adopted was found to meet with these general requirements and is shown in Fig. 1. It consists of a single stage R.F. amplifier using a metal 6AC7 high slope pentode valve with slug-tuned grid and anode circuits. The two 100 μμF. pre-set condensers, C2 and C4, enable the input and output impedance of the unit to be varied. It will be recognised that the circuit is based on the well-known American "R9-er" manufactured by the James Millen Co. and the General Electric Co., and also incorporates a number of modifications originally suggested by G5UX in an article published in The Short Wave Magazine. The layout, however, has been simplified and readily available components used throughout.

· Holmeside, Heath Road, Leighton Buzzard, Beds.

### Constructional Details

The chassis is made up in two parts; the front and side panels are formed from a single aluminium sheet, 12 in.  $\times$  6 in., with two sides, 6 in.  $\times$  3 in., bent back at right angles to leave a front panel 6 in.  $\times$  6 in.; a second sheet is cut first to the size 8 in.  $\times$  6 in., and then marked out and cut approximately to the dimensions shown in Fig. 2, after which the four flaps are turned down at right angles to the main section. The dimensions given can be only approximate since the final measurements will depend upon the thickness of the metal.

The 6 in.  $\times$  3 in. section, which forms the chassis proper, must fit snugly between the front panel and the two side panels, and the dimensions must be adjusted accordingly. In practice this will not be difficult to arrange. The 1 in. flaps are next bolted to the front and side panels so that the 6 in.  $\times$  3 in. section is just 2 in. up from the base of the front panel. A small piece of aluminium is used to form two compartments under the chassis, one being approximately twice the size of the other; the smaller compartment being to the left when viewed from the front of the panel.

The front panel carries on the left-hand side a Yaxley four-pole two-way wafer switch, mounted above the chassis and a 100 µµF. pre-set microdenser below. On the right-hand side the 20,000 ohms gain control is located above the chassis and the remaining 100 μμF. microdenser below. The two screened tuning units are mounted at opposite ends of the chassis with the valve holder in the centre close to the dividing screen. The input co-ax. socket is located on the left-hand side panel, the corresponding output socket (or terminals) balancing the layout on the other panel with three supply terminals or a multiway connecting socket placed below. The other components can be wired to suit the builder's convenience. It is important, however, to ensure that the valve holder is so mounted that the grid pin is adjacent to the internal screen through which

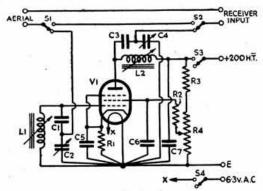


Fig. 1. Circuit of single stage pre-amplifier.

			1700			
CI	24 µµF.	mica.		VI	Metal 6AC7.	
C2, 4	100 µµF.	pre-set		RI	180 ohms.	
C3	15 µµF.			R2	20,000 ohms.	
C5, 6, 7,	·01 µF.			R3	10,000 ohms.	
51,2,3,4	4-pole switch.	2-way	wafer	R4	20,000 ohms meter.	potentio-
11.2	See text	â				

a small hole is drilled to take the lead from the grid tuning unit. This precaution makes for short R.F. leads and prevents the possibility of feed-back.

leads and prevents the possibility of feed-back.

The tuning units are built up from a pair of the familiar ex-Service slug-tuned inductances which are readily obtainable complete with screening cans and with slug adjustment screws at the top. To modify these units the existing wiring and the small fixed condensers are removed and the formers rewound with a single layer of 26 S.W.G. D.C.C. wire starting from the end remote from the slug. In the original model it was found by trial and error that the grid unit required 21 turns and the anode unit 27 turns, but it is advisable to wind on three or four extra turns in each case, since it is easier to prune afterwards rather than to be obliged to increase the number of turns! The two fixed mica condensers-24 uuF., in the case of the grid unit, and 15 µµF. for the anode unit, can be incorporated inside the screening cans and the three leads taken out through the base by means of suitable holes drilled in the chassis.

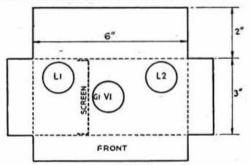


Fig. 2.

Approximate dimensions of chassis, showing position of screen.

When wiring-up, care should be taken to make all leads and components rigid and with the shortest possible R.F. leads. It will be seen that the Yaxley switch controls the H.T. and filament supply while the remaining two arms by-pass the aerial lead to the main receiver when the unit is not in use. A three-core cable carries H.T., L.T., and common return, to a suitable three-pin socket built into the station receiver.

### Aligning the Unit

If a signal generator and valve voltmeter are available these can be used for preliminary tests, the oscillator being tuned to the centre of the required band and loosely coupled via a length of co-ax. line to the input of the unit, both microdensers being set at their minimum positions with gain potentiometer adjusted about half-way. the output of the unit fed into the valve voltmeter it can be readily seen whether either or both of the slug units tune to resonance. If they fail to do so it will be necessary to remove the screening can or cans, leaving the units supported on their own wiring, and to remove one turn at a time until the desired result is obtained. Final adjustments are made with the aerial and receiver connected; a peak in back-ground noise indicating resonance. In the absence of test equipment the entire lining-up can be accomplished by this method.

When satisfied that the unit covers the required band, adjust for matching with the aerial and receiver connected. Starting with the grid circuit, increase the microdenser slightly and retune the slug. Continue this procedure until maximum results are obtained and repeat this process with the anode circuit. Finally mark the position on the front panel where no increase in either noise or signal strength is observed with any further increase of gain control.

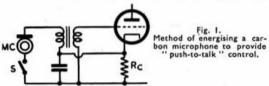
### Coverage

Since the writer is mainly interested in C.W. communication on 14 Mc/s. the band-width required was of the order of 150 kc/s. (14,000 to 14,150 kc/s.). It was found that the gain achieved at the edges of this band was sensibly the same as that at resonance—i.e. 14,075 kc/s. Where there are fewer losses in construction or where a wider band-width is desirable one or both of the tuned circuits may have to be shunted with a resistance of suitable value in order to give a level response over the band-width required. Suitable values to try would be 10,000 or 12,000 ohms.

In the reception of weak DX signals it has been found in practice that best results are obtained by adjusting the gain controls of both the pre-amplifier and the station receiver.

### Carbon Microphones

THE article "Carbon Microphones" published in the October, 1949, issue of the BULLETIN, gave details of a system whereby a carbon microphone could be energised without the use of a separate battery. Mr. B. M. Adkins, BRS4397 (Radlett, Herts.), has contributed a second method which achieves the same object but which also possesses additional advantages. The basic details of this circuit are shown in Fig. 1. The carbon microphone



(MC.) is energised by placing it (in series with the transformer input winding) across the cathode bias resistor of the first speech-amplifier stage. A highcapacity electrolytic by-pass condenser is connected across the cathode resistor as shown.

If the bias resistor (Rc) is made so high that the valve is biased almost to cut-off (except when S is

closed and the microphone circuit resistance thus shunted across the bias resistor), then the speech amplifier can be conveniently controlled by the switch S which should be of the "press-to-talk" variety. If, in addition, a suitable relay is included in the plate circuit of the controlled valve, the other amplifier stages, the R.F. stages, and aerial change-over switches may also be controlled by this switch. The success of the system will depend upon the microphone circuit resistance providing approximately the correct bias: fortunately most carbon microphones have an internal resistance suitable for use with triodes of the 6C5 variety.

### Quartz Crystal Discovery

THE U.S. Army Signal Corps has announced a new discovery in the processing of quartz crystals which, it is claimed, may "revolutionize" the quartz crystal industry. The discovery involves super-heating of crystals to approximately 900 degrees Fahrenheit followed by slow cooling for 24 hours. Crystals treated by this process are stated to maintain a higher degree of frequency stability.—

Proc. I.R.E.

## WHY NOT A WINDOM?

By ERIC JOHNSON (G2HR)\*

THE dipole with single-wire feeder has recently fallen somewhat into disfavour amongst British amateurs. This loss of popularity is largely due to the reputation it has acquired of being difficult to adjust. The purpose of this article is to show that such criticism is largely undeserved, and that with a little care excellent results can be achieved. Perhaps the most important point to remember is that the usual formulæ (no two of which appear to be the same!) for calculating feeder tap should be used merely as a guide. Why this is so can easily be shown.

### Dipole Characteristics

The radiation resistance of a dipole varies with height, and ranges from about 80 ohms at a quarter-wave above earth to nearly 100 ohms at the  $\lambda/3$  position. At a height of roughly  $2\lambda/5$  it falls to below 60 ohms and thereafter oscillates with decreasing amplitude around a mean value of a little over 70 ohms.

Forget radiation resistance for a moment and consider the dipole as a horizontal wire above earth the characteristic impedance of which will vary with height in accordance with the formula

$$Z_0 = 138 \log_{10} \frac{4D}{d}$$

where D is height above earth, and d is wire diameter, both, of course, being measured in the same units. Table I shows how both radiation resistance and

TABLE I. Charac-Radiation End Aerial teristic Resistance Impedance Height Impedance Ohms Ohms Ohms 3 98 610 3,800 27 60 645 6,900 5 678 6.100

The values of end-impedance shown are theoretical. In practice considerably lower values may be expected due to the "end-effect."

characteristic impedance vary with height of aerial above effective ground. The last column indicates how the impedance also varies at the ends of the dipole and this question must be considered in more detail.

Each half of a dipole can be thought of as a quarterwave transformer, and the end impedance can be calculated by the relationship

$$Z_2 = \frac{Z_0^2}{Z_1}$$

where  $Z_0$  is characteristic impedance and  $Z_1$  is radiation resistance.

### Feeder Impedance

By attaching a feeder to a point where its impedance matches that of the aerial at that point,

\* 25 Clivedon Road, Highams Park, London, E.4.

there will be a minimum of feeder radiation and all the power will be delivered to the aerial. The thinner the feeder wire the higher its effective impedance, so one may well argue that it should be possible to feed the aerial at any position along its length provided the right gauge of wire is chosen for the feeder. In practice, however, an amateur is limited to values around 400–600 ohms. To feed the aerial near its centre would require a tube of impossibly large dimensions, while conversely a feeder attached near the ends of the aerial would have to consist of wire far too thin to be of any real use.

### Trial and Error

The best method of finding the correct feeder tap is to choose some arbitrary point somewhere near the assumed point, and adjust its position until standing-waves on the feeder are reduced to a minimum. It will be seen later that there is no virtue in selecting a feeder of different gauge wire from that of the aerial unless multi-band operation is required.

The dipole can be cut according to the usual formula, provided that it is to be erected well in the clear. On 7 Mc/s. the feeder should be temporarily fixed at a point some 9 feet from the centre; about half this value will serve for 14 Mc/s.

At this stage it is necessary to make certain that the aerial is resonant at the operating frequency, since if this is not the case, no subsequent amount of juggling with the tapping point will eliminate standing-waves on the feeder.

In order to check aerial resonance, two flash-lamp bulbs should be inserted on either side of the feeder tap as shown in Fig. 1 (a). If the aerial is the correct length these lamps should glow with equal brilliance, when the aerial is energised with a few watts of R.F. In this connection it is important to reduce the transmitter power—this will not only prolong the life of the bulbs but will also be much appreciated by amateurs endeavouring to work DX on your frequency! Aerial adjustments can be a tardy business, so earn the thanks of other operators by avoiding busy times.

If the aerial is too long or too short, there will be a "bump" in the current distribution on either side of the tapping point. Under these conditions the standing-wave, which should "sit" comfortably along the aerial, will endeavour to accommodate itself on the feeder, and nothing we do to the feeder will eliminate it.

When tests indicate that the aerial has been cut to resonance, lamps should be inserted at roughly

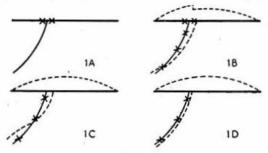


Fig. 1.

(A) Lamps inserted at points "X" for adjustment of aerial length.

(B) Effect of incorrect aerial length. Feeder correctly tapped. Standing-wave "overflows" on to feeder. (C) A Feeder incorrectly tapped. High standing-wave. (D) Correct operating conditions with "flat" line.

twave intervals along the feeder. The tapping point should then be adjusted until equal glowing of the lamps indicates that the standing waves have been reduced to a minimum. The various conditions of operation, faulty and correct, are shown in Figs. 1 (b), (c) and (d). In practice it will probably be found that it is difficult to eliminate entirely standing-waves on the feeder, particularly as the impedance of the feeder will tend to fall towards the station end owing to capacity effects. Resistance and radiation losses—the latter being inseparable from a single-wire transmission line—will tend to cause a gradual decrease of current towards the tapping point.

### Feeder Length and Current

If the line is accurately matched it may be—theoretically—of any length. But since standing-waves can seldom be entirely eliminated it is preferable to make the feeder an integral number of quarter-waves long. Irrespective of the standing-wave ratio, the line will then present a resistive load to the final amplifier. In determining the feeder length it should be remembered that the resonant length will only be some  $2\frac{1}{2}\%$  shorter than the freespace value as there is no "end-effect" where it is attached to the aerial.

Assuming all adjustments are correct, it can usually be determined whether there is any serious matching error by measuring the feeder current at the transmitter end. A 10 watt P.A. should produce about 0·1 A.; 50 watts about 0·3 A.; and 150 watts about 0·4 A. Any serious departure either way from these figures indicates a high standing-wave ratio on the feeder.

### Modified Windom or VS1AA

The Windom is essentially a one-band aerial. On harmonics the impedance at the tapping-point no longer matches the characteristic impedance of the If, however, a feeder is tapped exactly one-third of the way along the aerial, it will be seen that it is approximately the same distance from a current loop on the fundamental frequency and on harmonics. At this point, therefore, the impedance is roughly the same on all bands. Unfortunately this impedance is too high to match into a wire which is the same gauge as the aerial but a very satisfactory all-band match can be achieved by using a thinner gauge of wire for the feeder. With a 14 S.W.G. aerial the feeder should be 20 S.W.G. The same general method of adjustment will apply as with the conventional Windom. It is admittedly a compromise, and a precise match cannot be expected on all bands. For this reason it is usually advisable to cut the feeder to a resonant length.

### As Others see Us . . . Not to be taken too seriously

Bug Key: An instrument for multiplying dots. C.W.: Continuous Wave. So called because it is broken up into dots and dashes.

Dope: Generally inaccurate information imparted by one amateur to another. Induces a feeling of sleepiness in both.

Er: The break sign (telephony version).

Ham: One who says HI in his sleep.
Ham Spirit: The bond of friendship binding together all who use the same crystal frequency.

Handle: Usually attached to a LID.

R: Means "received" to the extent that at least two words have been copied correctly.

Shack: A shed or similar building completely surrounded by wire.

Australian Radio and Television News.

### **Corresion of Beam Aerials**

HE important effects of galvanic corrosion on beam aerial elements and supports in smokeor salt-laden atmospheres are described in an article "Your Beam-Will it stay up?" by Mr. R. W. Woodward, WIVW, in the October, 1949, issue of QST. The author points out that while precautions against the rusting of iron and steel are usually taken when erecting beams, it is not always realised that considerable corrosion of such metals as aluminium can take place where two dissimiliar metals are in contact. In the presence of an electrolyte—such as exists where the atmosphere contains sulphur dioxide fumes or salt-a small galvanic cell is established and the metal forming the negative pole will be attacked. A combination of metals particularly prone to such corrosion is aluminium and brass: a fact which accounts for the rapid deterioration of some beams where tubular aluminium elements have been bolted together with brass screws and nuts.

It is suggested in the article that the screws, bolts and nuts should be made of steel with a more protective coating such as a zinc plate, or galvanised coating. Cadmium or nickel plate can also be used. Anodised tubing, where procurable, could be employed for the elements. As a final precaution, the joint should be painted to keep out moisture as well as the electrolyte which causes corrosion.

### Using the VCR517 for Television

MEMBERS who are experimenting with homebuilt television receivers constructed from ex-Government materials will be interested in the following notes on the VCR517 cathode ray tube contributed by F./Lt. M. E. Pulvermacher, BRS7553.

This tube, which is available in various indicator units, is generally disregarded by television constructors on account of its long persistence or afterglow. However if the tube is run for several hours with the "raster" at maximum brilliance, the long afterglow screen can be burnt off, leaving an instantaneous screen giving a yellow-brown picture which appears considerably more natural than the green picture of the widely used VCR97.

The dimensions, E.H.T. and base connections of the VCR517 are identical with those of the VCR97 but the definition is slightly better and plate sensitivities are somewhat different, the X-plate being more sensitive and the Y-plate less sensitive than the VCR97. These variations can be compensated for quite easily by minor changes in circuit values or H.T. supply. F./Lt. Pulvermacher has found the change to a VCR517 to be well worth making.



PROBLEM PICTURE

Well-known DX Operator—made first 50 Mc/s, contact with England from ———— Who is he?

## THIRD R.S.G.B. AMATEUR RADIO EXHIBITION

## An Outstanding Success—Technically and Socially

THE third R.S.G.B. Amateur Radio Exhibition, held at the Royal Hotel, Woburn Place, London, W.C.1 from November 23rd to 26th, 1949, like those which preceded it, was an outstanding success

in every way.

Technical considerations apart, the Exhibition was a happy social occasion attracting wide support from a large body of members. The presence of visitors from abroad—many of whom hold transmitting licences—helped to give the Exhibition an international character, in keeping with the spirit of Amateur Radio.



Mr. A. O. Milne, Mr. A. E. Watts, Sir Stanley Angwin, Mr. S. K. Lewer, Lord Sandhurst and Mr. J. W. Mathews at the reception prior to the opening of the Exhibition.

Bearing in mind that admission is free to members on presentation of a catalogue—a privilege which appears to be much appreciated—it is not possible to estimate how many people attended this year, but if the number of R.S.G.B. lapel badges on display was taken as a criterion then the support from members exceeded that given last year.

Incidentally these Exhibitions are now as important in their own field of interest as are the much larger—but less intimate—radio exhibitions held at Olympia.

### Stands

The trade stands—attractively arranged against a grey and maroon background—were manned throughout the Exhibition period by competent technicians many of whom identified their association with the Amateur Radio movement by displaying a personal QSL card when on duty.



A happy group on the R.S.G.B. stand a few minutes after the Exhibition was opened. Left to right: Mr. W. A. Scarr, G2WS (President Elect), Mrs. Clarricoats, Mr. Gerald Marcuse, G2NM (Past President), Lord Sandhurst, Miss Hazel Lightfoot (H.Q.), Mr. V. M. Desmond, G5VM (President), Miss May Gadsden (H.Q.), Mr. J. W. Mathews, G6LL (Hon. Secretary), Mr. John Clarricoats, G6CL (General Secretary).



Sq./Ldr. C. K. Street, Col. E. S. Cole, —, W/Cdr. L. H. Stewart, Mr. John Clarricoats, Air Vice Marshal E. B. Addison, Mr. G. C. Clifford and Mr. A. H. Mumford at the reception.

The continued support given to the Exhibition by the Post Office Engineering Department was favourably commented upon by visitors, many of whom took the opportunity of discussing their licensing problems with the officials in attendance. The technical exhibits on the stand, which evoked great interest, will be the subject of a special article

in the January, 1950 issue of the BULLETIN.

The R.S.G.B. stand—more roomy than in 1948—was again the meeting place for members. It was here that old friendships were renewed and new ones established. One section of the stand was set aside for a display of home-constructed technical equipment arranged by members of the Technical Committee, whilst the other was given over to a display of R.S.G.B. and U.S. technical publications. Business throughout the Exhibition was brisk, especially good support being given to two new books in the "Amateur Radio" series—Receivers (by S. K. Lewer, B.Sc., G6LJ) and Simple Transmitting Equipment (by W. H. Allen, M.B.E., G2UJ and J. W. Mathews G6LL). By dint of much hard work on the part of authors, staff and printers, both books appeared on the opening day.

Large boards placed at the side and rear of the R.S.G.B. stand were used to mount the QSL cards which members were invited to leave for display. By the time the show finished both boards were

filled to overflowing.

For the first time the representatives of the contemporary radio press supporting the Exhibition were invited to show items of technical equipment which had been described in their respective publications. Many interesting displays resulted.

The Air Ministry exhibit, designed primarily to assist a drive for recruits to man Fighter Control Units, attracted a good deal of keen interest. It is understood that the results achieved far exceeded

expectations.

In another page will be found a review of the stands with notes concerning some of the outstanding exhibits.

### Luncheon

Prior to the opening of the Exhibition at 2.30 p.m. on Wednesday, November 23rd the President and Council entertained at lunch, a number of distinguished guests as well as representatives of the Radio Industry.

The following were among those present:—Lord Sandhurst, O.B.E., Sir Stanley Angwin, K.B.E., D.S.O., M.C., T.D., M.I.C.E., M.I.E.E. (Chairman, Cable and Wireless Ltd.), Sir Archibald Gill, B.Sc(Eng)., M.I.E.E. (Engineer-in-Chief, G.P.O.), Air Vice-Marshal E. B. Addison, C.B., C.B.E. (Director General of Signals, Air Ministry), Col.

E. S. Cole, C.B.E. (Chairman, British Joint Communications Board), Dr. R. L. Smith-Rose, Ph.D., M.I.E.E., F.I.R.E. (Director of Radio, D.S.I.R.), M.I.E.E., F.I.R.E. (Director of Radio, D.S.I.R.), Wing Commander L. H. Stewart (Air Ministry), S/Ldr. C. K. Street, Mr. A. H. Faulkner (Deputy Engineer-in-Chief, G.P.O.), Mr. A. H. Mumford, O.B.E. (Radio Branch, G.P.O.), Mr. Hugh Pocock (Managing Editor, Wireless World), Mr. R. T. B. Wynn, C.B.E., M.A. (Chairman I.E.E., Radio Section), Mr. P. Adorian and Mr. G. C. Clifford (British I.R.E.), Dr. C. B. Bais, PA0CB (representing V.E.R.O.N.), Messrs. E. L. Gardiner, B.Sc., G. Marcuse, A. E. Watts and S. K. Lewer, B.Sc. (Past Presidents).

After welcoming the representatives of the Radio Industry the President (Mr. V. M. Desmond) spoke of the special value of the exhibition to members living in isolated areas who seldom if ever enjoy an opportunity of discussing their technical problems with experts. Mr. Desmond referred to the support given by the Post Office Engineering Dept. and by the Air Ministry. He regretted that the Secretary of State for Air had not yet been able to announce the formation of an R.A.F. Civilian Signals Reserve, but he expressed the hope that many keen young men would be interested in the proposal to join the Fighter Control Unit organisation.



Lord Sandhurst, right, with Gerald Marcuse, G2NM Photo: E. W. Yeomanson BRS.18370

The President thanked the representatives of contemporary publications for the excellent publicity

given to the present and past exhibitions.

Replying on behalf of the Radio Industry Mr. E. J. Emery (Managing Director, E.M.I. Sales and Service Ltd.) spoke of the cordial relations which exist between manufacturers and radio amateurs. He congratulated the President and Council upon their enterprise in organising the Exhibition and assured them that the industry welcomes the opportunity which it provides for contacting amateurs in a friendly and congenial atmosphere.

Mr. Emery congratulated those amateurs who are pioneering the development of the very high frequency bands and appealed for a high degree of co-operation between amateurs and the viewing public in regard

to television interference.

On behalf of the Council the General Secretary extended a cordial welcome to the guests. In the course of his speech Mr. Clarricoats voiced the thanks of members to the Post Office Engineering Dept. for "batting so well" at Geneva. He assured Sir Archibald Gill and his colleagues that the support which the Post Office had given to the Amateur Service at the Region I Conference was greatly appreciated, as was the facility recently granted which permits amateurs to use increased power on certain of the V.H.F. bands.

Mr. Clarricoats expressed regret that the Post Office had not yet seen its way clear to allow U.K. amateurs to use a band of frequencies around 72 Mc/s. or to make experimental television transmissions within the 420-460 Mc/s. band. He suggested

that both facilities are urgently required if the amateurs of Great Britain are to maintain their high place in the realm of V.H.F. developments.

Mr. Clarricoats then spoke of the support given to the Society by Sir Stanley Angwin, Dr. Smith-Rose and Col. Eric Cole, all of whom he said were aware of the importance of the Amateur Radio movement in times of peace and war. The close and friendly relationship which exists between the R.S.G.B.and professional bodies was demonstrated by the presence at the luncheon of representatives of the I.E.E. Radio Section and Brit.I.R.E.

Col. Cole—himself an active amateur—in his reply on behalf of the guests, spoke of the immense amount of support which the Post Office has given, and is giving, to the Amateur Radio movement. In his view the next International Conference will witness still further attempts by other users of radio to oust the amateur from the lower frequency bands. To safeguard the position the R.S.G.B. and other I.A.R.U. Societies should, he said, work in the closest co-operation and present a united front at Buenos Aires in 1952. He thanked the Council for the hospitality which had been extended to the guests.

Mr. Arthur Milne welcomed the representatives of the technical and lay press and invited their cooperation in the matter of television interference. All sections of the press, he said, could do much to help in the solution of the problem, which would tend to become more acute as new T.V. stations are opened. Mr. Milne urged the lay press to check the technical accuracy of stories featuring radio amateurs.

Mr. Hugh Pocock, replying for the Press, recalled his early association with the Amateur Radio movement explaining that not always had the Post Office been so well disposed towards the amateur as is the case today. Mr. Pocock congratulated the Society upon the very great strides which had been made in recent years.

### **Opening Ceremony**

In the presence of a large gathering which included many distinguished visitors and representatives of the industry, the President warmly welcomed Lord Sandhurst who, he said, was well known to members.

In the course of a much appreciated speech Lord Sandhurst spoke of the growing tendency on the part of many newcomers to the Amateur Radio movement to neglect the key for the microphone. He wondered how many of those who had obtained their first licence since the war ended could still send and receive at 12 words a minute. He believed that the Post Office should require licensees to pass a Morse Test once every year for the first five years



The R.S.G.B. stand just before the Exhibition opened on the last day. By evening the board at the rear had been completely filled with QSL cards. Most of the equipment on the left hand counter was loaned by members of the Technical Committee. The portable transmitter-receiver described by G2r1 in this issue can be seen in the extreme right hand corner of the picture.

after being licensed, His lordship suggested that in the event of a further National emergency, radio amateurs would again be required to play an important role and, as in the past, they might become "the saviours of mankind."

Lord Sandhurst regretted that the War Office had not so far made any attempt to form a Signals Reserve on the lines of the R.N.V.(W.) R. and prewar R.A.F. C.W.R. He felt sure that all three Services would benefit from the closest possible liaison with the R.S.G.B.



The President (Mr. V. M. Desmond) welcoming Lord Sandhurst at the opening of the Exhibition. The President Elect (Mr. W. A. Scarr) and the General Secretary are also in the photograph.

Photo: E. W. Yeomanson BRS.18370

The President Elect (Mr. W. A. Scarr, M.A.) voiced the thanks of the Council and members to Lord Sandhurst for opening the Exhibition. The speech, he said, was a challenge to every transmitting amateur. Lord Sandhurst's wide knowledge of the Amateur Radio movement and its requirements had been amply demonstrated during the Second Reading of the new Wireless Telegraphy Bill. A record of what his Lordship said on that occasion had appeared in a recent issue of the Society's Journal.

Following the official opening the President and several distinguished visitors made a tour of the Exhibition.

### R.S.G.B. Stand

Throughout the period of the Exhibition the R.S.G.B. stand was manned by a number of volunteers including the following:—G/Capt. H. W. Evens, Rtd., S/Ldrs. H. Bennett and A. Evenett, Messrs. P. C. Bond, C. H. L. Edwards, T. L. Delvin, R. G. Hammans, J. M. Davie, R. Loughrey, C. T. Wakeman and S. F. Sharpe.

Copies of Exhibition photographs may be purchased from Mr. F. G. S. Wise, 5 Victoria Street, London, S.W.1. Price 5/- each.



Sir Archibald Gill (Engineer-in-Chief, G.P.O.), Lord Sandhurst, Mr. V. M. Desmond and Mr. W. A. Scarr, begin their tour of the Exhibition after the official opening by visiting the G.P.O. stand. The transmission line demonstration set is in the foreground. The receiving end of the 3 cm. frequency modulated link is on the right.

### Gerald Marcuse and Arthur Milne in Telecast

ITHIN a few hours of the opening of the R.S.G.B. Amateur Radio Exhibition on November 23 last, Past President Gerald Marcuse, G2NM, and Honorary Editor Arthur Milne, G2MI, were facing the television cameras at Alexandra Palace where they were interviewed by Leslie Mitchell in a "Picture Page" programme.

Mr. Marcuse recalled some of his early Amateur Radio experiences and spoke of the part he had been privileged to play in the development of what has been

termed "Empire Broadcasting."

Mr. Milne described how the R.S.G.B. QSL Bureau operates and showed some of the interesting cards which had arrived recently. He aroused great interest by displaying a scale model of a boat which had just been sent to him by Mr. B. Mobey, ZD9AA, of Tristan da Cunha. (The boat was on show for the rest of the week on the R.S.G.B. stand.)





These photographs were taken by Mr. F. G. S. Wise without special preparation direct from the tube of a Denro Radio kit receiver installed at the Exhibition. Mr. Marcuse above, Mr. Milne below.

REVISED

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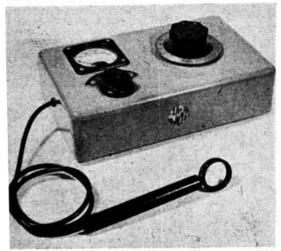
## AROUND THE STANDS

## A Review of Some of the Outstanding Exhibits at The Amateur Radio Exhibition

A LTHOUGH it seemed last year that the lists of those British manufacturers catering for the amateur market were practically complete, it was interesting to note at the 1949 Exhibition that many new and useful items have been introduced. Improvements in design and construction, though perhaps less spectacular than in previous years, were evident and the general standard of components and equipment was very high. The exhibits were well-balanced to arouse the interest of amateurs and enthusiasts whether concerned with V.H.F., long-distance communication, or television construction. Once again the presence of many well-known amateurs on the stands provided an excellent opportunity for direct manufacturer/customer liaison.

### New E.M.L. Amateur Equipment

Of particular interest was the new range of specialised test equipment produced by the Amateur Division of E.M.I. Sales and Services Ltd. It is extremely encouraging to find that this well-known firm has formed a consultative panel of amateurs associated with the E.M.I. Group to advise on equipment specially suited to the needs of the amateur. The equipment shown (which will be available shortly), included a general purpose absorption wavemeter covering 1.6-30 Me/s. incorporating a germanium crystal and a 0-500 microammeter, and providing an accuracy of  $\pm 2$  per cent. Apart from frequency measurement the instrument is suitable for detecting harmonic output and standing waves, and for field strength comparisons. A V.H.F. model of basically similar design covers the range 100-160 Mc/s. Another new calibration device is a spot frequency marker providing 1 Mc/s. check points up to 150 Mc/s., for use with an external power supply. Two grid dip oscillators (1 6-30 Mc/s. and 40-150 Mc/s.) should prove invaluable for check purposes. A feature of both the absorption meters and the G.D.O.'s is the use of a convenient probe consisting of either a single or three turn link connected to the meter by up to 3 feet of coaxial cable, an idea which could profitably be incorporated in many homebuilt meters. Other items in the new E.M.I. range



A useful absorption wavemeter. One of the new range of E.M.I. test equipment for the amateur.

include a C.R.T. modulation indicator and a general purpose power supply unit.

### **Transmitters**

Low and medium priced amateur transmitters were exhibited by Radiocraft Ltd. and Southern Radio and Electrical Supplies. The Radiocraft kits, which are supplied ready wired and tested, have been designed especially for the 25-watt licencee. Most types make use of the Pierce oscillator circuit and 807 P.A. with either built-in or external modulators. The So-Rad transmitters, shown for the first time, include the 491 series suitable for an input of 30/40 watts on C.W. and 25 watts on telephony, fitted in a steel cabinet 21 in.  $\times$  10½ in.  $\times$  10½ in. Controls have been reduced to a minimum and a built-in pi-network matches the output to short or long-wire aerials. The 492 series comprises three units: R.F., power and modulator. A single 813 P.A. is conservatively rated at 120 watts input 'phone or C.W. The units, which fit into a three tier rack, are available separately. The 493 series consists of a 60 watt R.F. unit with modulator in a two tier rack.

A complete transportable transmitter-receiver assembly, intended primarily for commercial application, was shown by G.E.C. The 25 watt transmitter covers the range 2-9·1 Mc/s. with provision for six spot crystal frequencies. The entire equipment, including aerial matching and power units, is housed in a stout wooden case built to withstand rough treatment on overseas roads.

Beam aerials were represented by the G.S.V. products shown by Radiocraft. The elements are fashioned in an uncorrodible aluminium alloy containing acceptance in the product of the containing acceptance in the containing

taining copper, iron, silicon and manganese. Types shown included a 144 Mc/s. omni-directional and a corner reflector for 420 Mc/s. but arrays are available for frequencies as low as 14 Mc/s.

Standard Telephones and Cables Ltd., exhibiting for the first time, displayed a number of items of considerable interest to the amateur. A range of midget relays, designed originally for airborne equipment but suitable for a number of amateur applications, possess an "operate time" of the order of 4-10 ms. and require one watt of energising power. They are available with a coil resistance of 1 to 5000 ohms. Brimar valves shown included the 12AT7, a miniature V.H.F. double triode, similar to the popular 6J6, and the 5763 a miniature R.F. beam power tetrode (B7G base) which should prove of great value as a frequency doubler and general purpose low power transmitting valve. Also shown on this stand, was a range of thermistors which can be briefly described as resistances with a high negative temperature coefficient. Already widely employed in electronic devices, thermistors would appear to have a number of applications for amateur purposes, such as surge suppression in A.C./D.C. equipment, amplitude stabilisation of oscillators and negative feedback networks, power measurement etc.

### Receivers and Components

The new Eddystone type "750" communications receiver was displayed on the Webb's, Radiocraft and Southern Radio stands. Available shortly, it comprises a 10-valve double superheterodyne covering 480 kc/s. to 32 Mc/s. (apart from a small gap at the first intermediate frequency of 1600 kc/s.). A high order of selectivity is provided by the second I.F.

of 85 kc/s. With the exception of the rectifier and voltage stabiliser all valves are of the miniature all-glass variety. Mechanical bandspread, direct calibration, a series diode noise limiter and tropicalised

components are other features.

A wide range of mains, audio and modulation transformers and chokes were shown by Woden and Oliver Pell Control Ltd. (Varley). The Varley high wattage resistances also have many applications. Cyril French Ltd. had on view a wide range of loudspeakers and valveholders.

Quartz crystals were shown by the Quartz Crystal Co. Ltd., Salford Electrical Instruments Ltd. and Standard Telephones and Cables Ltd. The Q.C.C. stand disclosed many of the processes involved in the manufacture of crystals, including hot air soldering of the lead-out wires of gold-plated crystals. The construction and testing of silicon mixer crystals was exhibited by G.E.C.

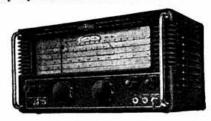
### **Television Kits**

Television construction kits which can be assembled without an extensive knowledge of television technique and which give pictures fully equal to those of commercial receivers were shown by T.C.C. ("Viewmaster"), Denco and Electronic Engineering. An experimental high-quality F.M. receiver for 90 Mc/s, was also displayed on the latter stand. Short Wave Magazine Ltd. was another publishing firm which exhibited equipment described in recent magazine issues.

### Chassis

In view of the widespread use of high voltages in amateur stations the totally enclosed racks and cabinets shown by A. Imhof Ltd. and E. J. Philpott's Metalworks Ltd. should provide a valuable safeguard. A turntable arrangement attached to the Philpott's enclosed rack and intended for exhibition purposes only, proved so popular that consideration is being given to the incorporation of this feature as a standard fitting. It would certainly facilitate servicing and adjustment of equipment. The new range of Denco chassis with mitred corners gives added neatness as well as extra strength. Other new items introduced by this firm include a double R.F. choke for insertion in the mains lead of a receiver in order to reduce mains borne interference and a compact alignment oscillator providing 465 and 1600 kc/s. output.

Measuring instruments were featured by—amongst others—the Automatic Coil Winder and Electrical Equipment Co. Ltd., Salford Electrical Instruments Ltd., Sangamo Weston Ltd. and Taylor Electrical Instruments Ltd. The Avo range has been extended recently by the introduction of an electronic test



The new Eddystone " 750 " communications receiver.

unit to facilitate measurement of A.C. voltages, inductances, capacities and "Q" at radio frequencies. Sangamo Weston showed precision instruments with a sensitivity of 20,000 ohms per volt. With the model E772 currents as low as 1 microampere can be measured. A number of new models were also shown by Taylor.

S. G. Brown Ltd., newcomers to the Exhibition, had in operation disc recording apparatus. Sapphire gramophone needles and the world-famous range of headphones were also shown on this stand.

One of the more amusing stories of the show was provided by the member (?) who, gazing at the *Douglas* coil-winder on the *Avo* stand, was heard to be explaining the principles of wire-recording.

### Post Office Exhibit

An excellent display was once again staged by the Of particular G.P.O. Engineering Department. interest to the amateur was the demonstration of the measurement of harmonics and spurious emissions from amateur or commercial stations. transmission line demonstration set composed of festoon lamps gave a visible indication of the importance of correct matching and the elimination of standing waves. Another outstanding item was the transitor or crystal triode amplifier. First announced in 1948, this remarkable system requires no heater current and provides a relatively high ratio of signal power to total power consumption. The development of synthetic crystals (ethylene diamine tartrate) was also shown. These crystals have many applications in filters and should result in considerable economy. A phase modulated 80 Mc/s. telephone link intended to provided normal telephone services to remote island communities was in operation on the Museum exchange. A 3 cm. television microwave link employing a reflex klystron oscillator and lens aerial systems proved to be of considerable technical

### Air Ministry Stand

Full information on the Fighter Control Units of the Royal Auxiliary Air Force was available at the Air Ministry stand. These Reserve Formations have particular need for radar and wireless mechanics and valuable spare-time training in these trades is provided. One of the latest 10 channel V.H.F. airborne transmitter-receiver assemblies, covering 100–156 Mc/s. in two sections with an output of 5 watts was also shown. The total weight is only 25½ lbs.

### R.S.G.B. Stand

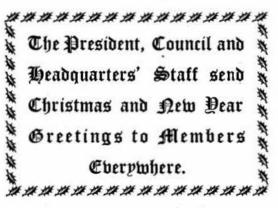
The display of home-constructed equipment arranged by the Technical Committee received much favourable comment. Emphasis was placed on recent V.H.F. and U.H.F. developments. The impedance and power meter for 144 Mc/s., described recently in the BULLETIN, was shown by G6OT. Specialised equipment for 420 Mc/s. included three new pieces of apparatus designed and built by G2WS: a convertor for use with a broadband I.F. unit employing a crystal mixer and Mullard ECC91 twin-triode; a tripler stage giving 432 Mc/s. output when used in conjunction with a 144 Mc/s. transmitter; and a power amplifier employing two S.T.C. 3A/146J grounded-grid triodes in push-pull.

Other V.H.F. equipment shown included a model of the 6-element 144 Me/s. aerial array (G6UH) described recently, and G3ENS's trophy-winning 420 Me/s. transmitter. For the lower frequencies there was the compact transmitter/receiver built by G2MI and a grid-dip oscillator (G2IG). Also of particular interest was the group of versatile equipment built by G6LL, including a general-purpose 10-watt transmitter, a crystal calibrator and a Clapp V.F.O. all of which are fully described in the new book Simple Transmitting Equipment published (together with Receivers) on the day the Exhibition opened.

### N.F.D. 1949

The Jersey (Channel Islands) group was omitted from the N.F.D results published in the September issue of the BULLETIN. Their score of 300 points, obtained by their "A" station, GCSNO/P, gives them 88th place in the list.

## IT'S TOPICAL



### London Members' Luncheon Club

T has been suggested that members who are in business in the Central London area might welcome an opportunity of meeting for lunch once a month.

In order to ascertain whether the suggestion is likely to be well supported, members are invited to send a postcard to the General Secretary by not later than December 31 next, indicating the preferred day and commencing time.

Preliminary enquiries at the Kingsley Hotel, Bloomsbury Way (immediately opposite Headquarters), show that the management would be prepared to provide lunch in a private room for approximately 5s. 0d. a head.

If the suggestion meets with a reasonable measure of success the Secretary will arrange the inaugural luncheon. At this gathering those present will elect a Chairman and Committee for the year and, if thought desirable, fix a small annual subscription to pay for the cost of circulars and postages.

If inaugurated, the club would aim at inviting a

guest speaker each month.

### Town and Country Planning

" THE 1947 Act, 144 Questions and Answers" is the title of a new Stationery Office publication. The booklet tries-very successfully-to answer some of the questions which the Man-in-the-Street is likely to ask about the 1947 Act and to show how this far-reaching and unavoidably complicated piece of legislation affects him personally.

It does not pretend to answer any and every question and it does not seek to give rulings on points of law. It does however give the simplest possible guidance to the main provisions of the Act. particular it makes plain to the average citizen his rights, his opportunities to object or appeal and whether he is entitled to compensation.

It may save a busy man or woman a visit to the local Council or to a solicitor. Incidentally Question No. 73 is of special interest to radio amateurs.

This most useful little booklet can be obtained for sixpence from any branch of H.M.S.O. Add an extra penny if you write for a copy.

### Australian Food Parcels

URING the past few weeks much-appreciated food parcels have been delivered to a number of members who responded to the invitation published in the June issue of the BULLETIN. Many of the fortunate recipients have asked that thanks be recorded publicly to the members of the Wireless Institution of Australia who contributed to the Food for Britain Fund.

### The 5 Ack R Trophy

•HE 5 Ack R Trophy, presented to the East London R.S.G.B. District by Mr. E. Dawson Ostermayer, G5AR (a Past President of the Society), to encourage amateur construction, adaption and invention, has been awarded this year to Dr. A. H. Kosler, G3ECA. The winning entry was a flexible, high-stability, V.F.O.-cum-exciter unit. The entries were examined by a panel of judges drawn from five of the townships in the East London District, and although a high standard of workmanship was exhibited by many of the entrants, the decision of the judges was unanimous. Entries of great merit included an amateur station control console; a 144 Mc/s. aerials demonstration unit; an absorption meter and capacity bridge; a semi-automatic key; a 28 Mc/s. "plumber's joy" aerial array and 150 watt transmitter, as displayed during the Ilford Civic Week, a utility 7 and 14 Mc/s. Field Day transmitter and a television test oscilloscope constructed from surplus materials.



VALE, VIC !

The President-Elect offers this tribute to the retiring President, Mr. Victor Desmond, G5VM. Mr. Desmond is a qualified pilot and in pre-war days frequently flew his own machine to Society meetings.

### S.A.R.L. DX Contest 1950

•HE South African Radio League announces that its second International DX Contest will be held in January, 1950. The contest, which is open to licensed amateurs throughout the world, will be divided into two sections, C.W. and telephony, each section lasting for 48 hours. The C.W. section will commence at 0001 G.M.T., Saturday, January 21, and close at 2359 G.M.T., Sunday, January 22. The telephony section will commence at 0001 G.M.T., Saturday, January 28, and close at 2359 G.M.T., Sunday, January 29. The scoring system outlined in the copy of the rules received at Headquarters is not clear and it is hoped that further information will be received in time to publish a summary of the rules in the January issue of the BULLETIN. It is unfortunate that this contest clashes with the B.E.R.U. Contest (details of which were announced in the September issue) although neither C.W. nor telephony sections coincide.

### H.M.S. Mercury

EMBERS who served "aboard" H.M.S. Mercury during the war will be interested to learn that a tablet was recently unveiled at the King Edward School, Witley, Surrey to commemorate its occupation from 1942-1948 by the Radar Department of the Admiralty.

### Errors in Direction Finding

RRORS in direction finding by radio at high frequencies may occur because of deviations from the great circle plane of waves reflected from the ionosphere. Radio Research Special Report No. 19, published for the D.S.I.R., by H.M.S.O., price 9d. (by post 10d.), gives details of the results of investigations on this problem that have been carried out during the years 1938–1947.

Some errors in the indication of certain direction finders occur when waves are received having a state of polarisation different from that for which the direction finder is designed. Instrumental errors of this sortvary when the polarisation of the received waves varies. They are reduced to negligible proportions in the spaced-loop type of direction finder used in the investigations. This equipment can indicate the correct direction of arrival of the waves to within a fraction of a degree. It has been found, however, that the bearing obtained is not necessarily in the great circle plane through the sending station.

Deviations from the great circle are random and variable and may amount to several degrees. They are ascribed to a tilting of the ionospheric layer at the point of reflection of upwards of one or two degrees. The extent of these tilts is not known, but the experiments seem to indicate that they may be measured in

tens of kilometres.

Thé tilts, some of which are systematic and occur at particular times, such as sunrise, produce the most serious effects at short ranges. The deviations progressively decrease with distance up to 1,000 kms. or more. The observations at the Radio Research Station, Slough, were made at distances ranging from 90 to more than 9,000 kms., and they gave results which are consistent with the theory of the tilting of the ionosphere. Special programmes of transmission were made by the B.B.C. from some stations during the course of the experiments.

The study of the lateral deviation of waves transmitted by way of the ionosphere has been greatly extended in the present programme of work at the Radio Research Station as a result of these investigations.

### Recording of Television

WITH the advent of television recording or "telefilm" as it is called, a new tool has been placed in the hands of the television programme builders. Until now, television pictures, however notable the event, have been ephemeral: the picture flashes on the screen and is gone. With the new system, the pictures are captured in an enduring photographic record on ordinary cinema film.

After several months work, the system, which is covered by a patent application, has been developed to the stage at which it is possible to telefilm a broadcast and reproduce it again in the programme days or weeks afterwards, with little loss of the

original picture quality.

This result has been achieved by a detailed study of the deterioration of picture quality that must inevitably take place in the complex electronic and photographic recording. The B.B.C. engineers have assessed these losses, and have introduced into the process accurately judged degrees of electrical overcompensation which almost exactly counter-balance the degradation in picture quality that accompanies the recording process.

The recording system uses a continuous-motion camera in which the movement of the film is chased by an optical image of the television picture reflected from a rotating mirror drum. By this means, all the 405 interlaced lines of the picture are recorded on the screen, and the difficulties of relating the television frame frequency to the picture repetition

frequency on the film are overcome.

### Television Servicing Certificate Examination

THE Radio Trades Examination Board and the City and Guilds of London Institute announce that the first Television Servicing Certificate Examination will be held on May 2 and 4, 1950. The practical examination will take place on a date to be announced later. In this instance as London will be the only centre it may be necessary to restrict the number of entries. Admission to the examination is to be limited to candidates who have passed certain radio servicing examinations.

The closing date for entries is Thursday, December 15, 1949. Regulations and entry forms are obtainable on application to the Secretary, The Radio Trades Examination Board, 9 Bedford Square, London, W.C.1.

### **Unexpected Propagation Conditions**

THE recent high maximum usable frequencies, which have led to many reports of the reception of American police and other V.H.F. services on television frequencies, were apparently unexpected. The Department of Scientific and Industrial Research has now issued a warning that the values for critical frequencies predicted by the Department for December should be increased by 10 per cent.

### An All Band Crystal Calibrator

In Fig. 2 on page of the October, 1949, issue, the two cathodes of the double-triode valve V5/6 are shown joined together inside the envelope. This is incorrect and would, of course, be detrimental to the operation of the circuit.

### Expulsion of a Member

A T a meeting of the Council specially convened and held on Tuesday, the 15th November, 1949, in accordance with Article 28 of the Articles of Association of the Society, full consideration was given to evidence submitted concerning approaches made by Mr. F. A. Robb, a Member of the Society, to certain other Members of the Society in Northern Ireland in connection with the A.R.R.L. DX Telegraphy Contest 1948.

The Council, being satisfied as to the accuracy of the evidence before them, were unanimously of opinion that it disclosed such conduct on the part of Mr. Robb as rendered it undesirable in the interests of the Society that he should continue a Member thereof. It was accordingly unanimously resolved that Mr. Robb be expelled forthwith and his name removed from the Register of Members.

Mr. Robb, who had been given reasonable notice of the above meeting and a proper opportunity of being heard in his own defence, did not appear.

Article 28 of the Articles of Association of the Society reads as follows:—

"The Council may at a meeting specially convened for the purpose expel any person who shall have acted wilfully in contravention of these Articles, or who shall, in the opinion of the Council, have been guilty of such conduct as shall have rendered it undesirable in the interests of the Society that he should continue a Member thereof, and the Council may remove the name of any Member who is expelled from the Register of Members, and any person so expelled shall not be entitled to have returned to him any moneys paid by him as entrance fee, subscriptions or otherwise. On a motion for expulsion at least eight Members of the Council shall vote, and unless three-fourths of the votes are in favour of expulsion the motion shall be lost. No member shall be expelled unless and until he has been given reasonable notice of the meeting at which his expulsion is to be proposed and a proper opportunity of being heard at such meeting in his own defence.



By W. H. ALLEN, M.B.E. (G2UJ)\*

THE R.S.G.B. Amateur Radio Exhibition provided the opportunity for many meetings between members interested in the V.H.F.'s, and the writer had the pleasure of discussing many matters of mutual interest with contributors to and readers of this feature.

### First Contact on 24 cm.

On November 17, for the first time in this country, and so far as we know for the first time outside the U.S.A., contact was made between two amateur stations operating on the 1215-1300 Mc/s. (24 cm.) band. Credit for this achievement goes to G6CW and G8DD of Nottingham whom, it will be remembered, were active to some purpose on the 12 cm. band about this time last year.

Tranceivers with earthed-grid triodes in suitable cavities were employed at both ends, one set being installed at 6CW and looking through a closed window and frame owing to the heavy rain at the time. For the same reason 8DD/P operated from inside a car with the windows closed. Despite the resulting cut-off of part of the radiation from the dipoles and parabolic reflectors in use, telephony signals were 89 in each direction over a distance of 4½ miles. The two operators wish to record the assistance given them by G3QC and 3CZV.

We look forward to hearing news of further contacts from this team in the near future. Remember, the world amateur record for this band is only 37 miles.

### Two-Metre Activity

GW2ADZ (Llanymynech) heard PA0PN at RST 449 at about 1900 G.M.T. on October 7 with no other station audible on the band at the time. As related last month, G2CIW (Brentwood) worked three French stations during the same evening. October yielded good results for 2ADZ, and his daily sked. with G3EHY (Banwell, Som.) failed only on the 20th. Last month produced exactly opposite results except for the 15th when excellent conditions prevailed during the evening. Otherwise it was a dreary month. On 'phone, with some 40 per cent. modulation only, 'ADZ raised G2BMZ, 4HT, 6WT and 6YP (all around the 160 mile mark) and made CW contacts with G3EHY, FD, FXG, VM, 4RO, 5MV and 5UD. G5BY (Bolt Tail, Devon) at 190 miles can usually be worked when G-DX from all other directions is non-existent. 2ADZ is looking for a contact with a station in Sussex.

Conditions for the Short Wave Magazine contest during the week-end November 12–13 were no more favourable than for the earlier R.S.G.B. event, and although quite a few G-DX stations were heard, most stations found them difficult or impossible to raise.

As G4CG (Wimbledon), 2MV (Keston, Kent) and 3FP (Croydon), are often able to be on the band during mornings and/or afternoons on week-days, stations are invited to put out calls between 1030-1100 and 1430-1500 G.M.T. Those wishing to

144 - 146 Mc/s. W4JFV-W0EMS Sept., 1949 860 miles G3BLP—GI2FHN Aug., 1949 Oct., 1949 327 miles FA8IH heard by G6UH 1030 miles 420 - 460 Mc/s. W6VIX/6—W6ZRN/6 GM2JT/P—GW6DP/P G3AHB/A—G3FZL/A July, 1949 262 miles Aug., 1949 Aug., 1949 130 miles 63 miles 1215 - 1300 Mc/s. W10FG/I-W1MZC/I July, 1949 37 miles G6CW-G8DD/P Nov., 1949 4.5 miles 2300 - 2450 Mc/s. W6IFE/6—W6ET/6 G3CBN—G8IH/P G6CW/P heard by Oct., 1947 Oct., 1948 150 miles 24.4 miles G8DD/P Nov., 1948 45 miles

V.H.J. Achievements

arrange daytime skeds. can telephone 4CG on Liberty 1661.

### An Attempt at Real DX on Two

Readers will remember the reception of FASIH (Algiers) by G6UH (Hayes, Middlesex) reported last month. This led to a meeting at the Amateur Radio Exhibition between G6UH and Z86GX who is particularly interested in V.H.F. propagation, and a decision was made to carry out tests on two metres between this country and South Africa from December 8 to 18 inclusive. Unfortunately most of these scheduled transmissions will have taken place by the time this appears in print, but if any reader made a note of the reception of G6UH's signals while he was calling Z86GX we should be interested to have his comments together with a description of the type of aerial in use, the apparent direction of reception and, if possible, the normal strength of 6UH's signals. Such reports will be welcome from any distance, as during the period of the tests—1900 to 1915 G.M.T. daily—6UH will be employing an unusual type of aerial the effect of which is at present unknown. His frequency will be 144 · 0 Mc/s. and that of Z86GX 144 · 148 Mc/s. The South African station will call from 1915 to 1930 G.M.T. daily using a similar radiating system.

### 70 cm. Band

Realising the amount of experimental and constructional work entailed, G2FKZ, 3CU and 3FZL of the South London V.H.F. Group have wisely decided to divide the design and construction of an up to date 70 cm. station between them. Work is well advanced on a transmitter P.A., receiver R.F. stage, a C.C. driver unit and a C.C. receiver. Tests

Continued on page 199

G2AK G2AK

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## CHAS. H. YOUNG, G2AK

102 HOLLOWAY HEAD BIRMINGHAM

## THE MONTH ON THE AIR

By ARTHUR MILNE (G2MI)\*

Stupidity

HY do so many operators continue to call the rare DX at zero beat long after said DX has made a contact? We still receive many complaints of this sort of thing and experience it ourselves. No one has actually sent "If I can't get him I'll darned well see you don't "; but we can

almost hear them thinking it!

The lack of good manners is appalling, quite apart from the sheer stupidity of such conduct. ZD9AA keeps a "black book" in which the callsigns of constant offenders are recorded. In short, they have "had it." It is a pity a few more super DX stations don't do likewise. Come, come, chaps! This is Amateur Radio—a hobby, not the jungle! The recent appearance of FY8 stations has been responsible for a further outburst, so have the opening of the 3.5 and 7 Mc/s. bands for DX.

May we suggest, therefore, that if the DX does not come back to you, it is not exactly the thing to call CQ on his frequency! What shall it profit you, if by gaining all the certificates in the world, your name and call-sign are made to stink?

### Thought for the Month

When fuming at DX stations who have not OSL'd have you ever wondered if there is anyone waiting for YOUR card?

### Top Band Contest

Just a suggestion to the stations who come on for the first hour or two. Why not come on for the last few hours-when new stations are at a premiumand experience all the thrills of true popularity!

### Notes and News

G3AAE says watch for F9QV on 14 Mc/s. C.W. He is in Corsica. G2BJU informs us that ZS9F is leaving soon for ZE. MP4BAE who was VQ4HRP is now home in this country. A new MP4BAB should be active now. QSL via R.S.G.B.

G3BGX writes regarding the recent S.S.S.C. claim made on his behalf in this article. He points out that we should have stated that it was on 14 Mc/s. It had been done several times before on 28 Mc/s.

BRS14675, of Stranraer, has been pulling in the VK's on 28 Mc/s. with a 16 ft. vertical wire. G5DQ made a rapid WAC during the "CQ" Contest with VE7ZM, CR6AI, SM2AUK, XZ2FK, PY7WS and KH6ES. Time 37 minutes.

BRS18017, of Coventry, offers the following, HH2AN, 14040. Box A116, Port au Prince, Haiti: 4X4XV/MM, 14050 off Persia. He says YK1AC

uses 3 kW. !

In a letter from FF8PG, we learn that his QTH is Pierre Guillard Ets Vezia B.P. 165 Dakar. QSL either direct or via R.S.G.B.

A speedy recovery to VS7RA, reported to be in

hospital.

Congratulations to G3ATU on being the first G3 plus three letter call to qualify for the Empire DX Congratulations also to G2PL, first amateur outside Oceania to gain the new Worked All Pacific award issued by N.Z.A.R.T. G2PL's credited total in DX.C.C. listing is now 212. G6RH has recently passed the 200 mark.

GM3BEB offers consolation to those unable to erect an outdoor aerial. He recently had a 24 hour QSO on 28 Mc/s. with VK3AQL. Input 120 watts.

MD4GC who is P.M.G. in Somalia, claims to be the only amateur who has issued himself with a licence in two different countries. He advises us that MD4JH operates only occasionally, MS4A is an Italian named Caramelli, and that MS4UU is now back in Eriterea as MI3UU. MD4BPC was in British Somaliland and should have had a VQ6 call.

G6XS recently worked ZS6BJ who said he had three cards from VPSAD. Come on, Mac! What about using up some of those 250 cards we sent you? Frank says "look out for FB8AX who will shortly appear on both 14 Me/s. and 28 Mc/s., 'phone and C.W.' This is the amateur call of the French Antarctic expedition ship; S.S. Commandant Charcot. The operator is CNSAO. The call-sign of the ship is FNFM. The point is, will he QSL?

BRS18470 sends some revised information on the Mobile Marine Radio Club. The certificate, referred to last month, will be awarded to those proving 30 M.M. QSO's. not 25 as previously reported.

These contacts must be beyond ground wave distance. G3FED made his first 3.5 Mc/s. contact with G3FDE, not by prior arrangement! G8PB commends 7 Mc/s. for DX. He has worked VP6WF, VE11W, PY2AC, F9JD (Corsica), W0BMM, V01AK, VK5KO, PY2AVY, ZL4HI, VK2EO, UL7KAB and CO8FH. ZE2JI is now G3AGZ. He has QSL'd all his ZE

contacts but will send a repeat card if the former one has not arrived. Address the cards to ZE2JI/

G3AGZ c/o R.S.G.B.

G6XS suggests the following for W.A.S. enthusiasts: W3IYE, Delaware, W7JPY, W7JIW, W7LEE, W7LQB and W7QAP, Arizona, all on 28 Mc/s. C.W.

ON4AZ says "XON4AZ" is a pirate and has caused him considerable embarrassment.

BRS11494's list for the month shows KG6SF, Saipan at 1030 G.M.T., on 285000. Others on this band include VP2CW around 1630, FF8FT, 1530 on 28400 and XZ2FK 1500 G.M.T. 28200. On 14 Mc/s.: HP1TS, 2230 G.M.T. H.F. end. KR6CE, HISWF 2230, U.S. 'phone band. 1300, 14190. HP1LQ 2200, Box 612 Panama City.



Lucas Ralli, G4AJ, who has recently returned from Japan suggests a new approach to the problem of air cooling the rig in tropical climates

<sup>• 29</sup> Kechill Gardens, Hayes, Bromley, Kent.

### OUR FRONT COVER

THIS MONTH we reproduce a photograph showing a Universal AvoMinor with its D.C. voltage range connected to the input of an RII55 receiver for the purpose of making comparative tests to assess the effectiveness of various types of aerial. The photograph was submitted by Mr. J. Worthington (G3OOI) of Wolverhampton. Fully descriptive details of the meter, which is a compact A.C./D.C. combination testing instrument, may be obtained on application to the manufacturers, The Automatic Coil Winder & Electrical Equipment Co., Ltd., Winder House, Douglas Street, S.W.I.

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### J. E. FORD (BRS 15045)

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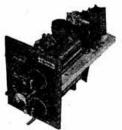
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### Algeria

G3BID has been lucky with his FA's and has cards from FA3DS, 3GZ, 9MZ and 9WD.

We have recently contacted FA9UO—ex EP3D—and discussed this matter of QSL's from Algeria. The trouble seems to be partly due to the fact that every call brings back a dozen G replies and the cost of sending cards becomes prohibitive. We have, therefore, offered the facilities of the R.S.G.B. Bureau to receive the FA cards in bulk and the possibility of getting someone in Algeria appointed to receive cards from the Bureau is being pursued.



George Bloomfield, VS2CQ-G2NR, operating his B2 equipment from Kuala Lumpur. He has just completed his 300th DX contact.

### Thanks

To BRS7594, of Yeovil, for information on the present whereabouts of EQ1RX, Y17G (now G5JG) and VQ6HOS (now G2HOS). A short wave listener friend of his has just received a card from YJ1AA who still wants his first G. (0800 G.M.T. on 14 Mc/s.) 7594 will also forward cards for PJ5KO.

### ZD9AA

This station will close down early in January, 1950. The present operator will be returning to South Africa and the radio station is to be taken over by the fishery company now established on this island.



Ted Ironmonger, VK3WU, originator of the G8PO reversible unldirectional aerial system (third from left), visits VK2AGU (second from right).

### Pakistan

Just as this issue closed for press, news reached us that the Pakistan Government has again agreed to issue licences to qualified persons. One of the first DX contacts made after the ban was lifted was between G2ZI and AP2J, the station of Wing-Commander Kenneth Jowers.

### One Minute Quiz-

A memory test for old-timers; but newcomers are invited to "have a go."

- 1. Where and when was the International Amateur Radio Union formed?
- 2. In 1910 a notable criminal was arrested due to the use of wireless telegraphy. His name was?
- Name the following early broadcasting stations:
   ZZY; KDKA; FL; 5IT; PCGG.
- 4. Which well-known amateur pioneered Empire broadcasting?
- For what countries were the following prefixes (or intermediates) used before 1929: A; GC; K; N; U.

(Answers on page 205)

### Around the V.H.F.'s-Cont. from Page 195.

on the prototype models have been most encouraging: particularly is this true of the receiver R.F. amplifier where a newly developed *Mullard* valve is employed which produces really worth-while gain at this high frequency.

We would draw the attention of interested readers to the 70 cm. skeds.—including the Sunday morning 1.7 Me/s. "get together"—mentioned on this page

last month.

G2WS and 4DD (Shortlands) are carrying out tests to determine the effect of intervening objects upon the polarisation of their signals using various types of aerial systems.

### American Police Transmissions

We are informed by G6CH (South Benfleet) that it is by no means unusual in his area to hear R5 S4/6 signals from the police V.H.F. network in Chicago and possibly from other American cities on a T.V. receiver between the end of the afternoon programme and about 5 p.m. A similar report has been received from Sheerness, but whether such signals have been heard in other parts of the country is not known.

We take this opportunity of wishing our readers the compliments of the season and of reminding them that owing to the Christmas holidays this feature will close for press on December 20.

### W.I.A. "Food for Britain" Parcels

MEMBERS who have not received a food parcel from the Wireless Institute of Australia are invited to send a *post-card* to the General Secretary by not later than December 31, 1949. Names and addresses should be printed in block letters.

### British Short Wave League

Due to "declining membership and serious financial difficulties" a complete reorganisation of the British Short Wave League has recently been announced. In future the League will be managed as an independent membership association by Short Wave Magazine Ltd., and the B.S.W.L. Review will appear in special editions of the Short Wave Listener. While Mr. W. N. Stevens (G3AKA) will be responsible for the production of the Review, the management of the League will be directed by the Editor of the Short Wave Listener through a Committee to be appointed by him.

### COIL INDUCTANCE TABLES AS SUPPLIED TO H.M. GOVERNMENT,

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## **Top Band Contest**

THE results of another "Top Band" contest pass into history, with many competitors again expressing their enjoyment of the event. The three leading stations, all located in Region 7, are to be congratulated on their record scores, despite the slightly reduced activity probably due to a DX contest taking place at the same time.

### **Leading Stations**

The winner, Mr. K. E. V. Willis, G8VR, of Upper Abbey Wood, London, S.E., with an excellent log, scored 505 points. His equipment consisted of an ECO-BA-PA transmitter with 10 watts to an 807, feeding a 175 foot aerial, tuned against earth. The receiver was an *Eddystone* 640.

The runner-up, Mr. D. N. Biltcliffe, G6NB, of Chertsey, Surrey, only one point behind, used a VFO-BA-PA transmitter, again with 10 watts to an 807. The aerial was 132 ft. long, and the

receiver an HRO.

Mr. H. J. M. Box, G6BQ, of Gravesend, Kent, whose call has appeared so frequently among the leaders in "Top Band" events, takes third place with a score of 495 points. He employed a gangtuned three stage transmitter, with 10 watts to a 6L6. Two aerials were used: a half wave for high and a Marconi for low angle radiation. The receiver was a home-built double superhet.

The keenness of competition is shown by the closeness of successive scores for a long way down the table, particularly when it is remembered that each

contact adds at least three points.

### Comments, Complaints and Criticisms

Several members commented on the confusion caused by those operators (including some entrants) who did not know their Region number, in spite of the reference, in the preamble to the rules, to the recently published list.

There is evidence in the logs, of a few stations commencing contest operation several minutes

before the specified starting time.

Unfortunately, it was necessary to disqualify a few entrants who failed to complete their entry, or

to sign the declaration.

The quality of operating and of signals was—as usual—generally good, but comments were received that it was fortunate for some stations that "T9" indicates "Pure D.C." and does not include the absence of clicks and chirps.

### Conditions

Conditions were good, though a few competitors complained of static in the early part of the contest. The DX signals from DL2CH, OK1ZB and OZ1W were remarkably consistent, as were those of the northern stations as received in the south. It was pleasing to find another continental country represented by OK1ZB, to accompany the two regular stations, DL2CH and OZ1W. The log of OK1ZB has, unfortunately, not been received, although he indicated his intention of sending it.

Distribution of signals in the band was considerably better than in the last contest, but, as various entrants remarked, still more use could have been made of the ends of the band. The spirit of the contest is well expressed in the comment of an entrant whose score appears near the bottom of the list—"Sorry could not stay on the full time, but here is the log

for the sport of the thing.'

Posn.	Call Sign	Reg.	Pts.	Posn.	Call Sign	Reg.	Pts
1	G8VR	07	505		G3AMO	08	334
2	G6NB	07	504	40	GW2HH	10	332
3	G6BQ	07	495	41	G6WH	03	330
4	G3SU	07	490	42	GSBTP	07	329
5	G4AU	07	489	43	GM3BJD	12	311
6	GSNF	02	482		G2DAN	03	306
7	G3FAB	03	470		G3CHQ	07	302
8	G2DU	06	469	46	G3AUT	03	299
9	G2JF	08	468		GSBM	01	296
10	G6HD	07	463		G6UT	05	281
11	G6ZN	02	461	49	G2JB	07	280
12	G6GM	09	454		GI3KV	15	278
13	G2YY	13	453		DL2CH	-	276
14	G4DC	07	440		G2DZF	08	264
15	G6NC	09	438		G4LX	02	262
16	G8JI	03	434	554	G2BTO	01	256
517	G2DTD	06	433	1 54	G3FRV	07	256
117	G2LC	07	433		G3CU	07	251
19	G2YS	01	419	57	G3DDM	08	246
20	OZ1W		408	58	G2CFC	04	244
21	GM6RI	12	401	59	G3AMM	04	242
22	G2AOL	07	398	60	G2DQX	01	222
23	GM2HIK	12	397	61	G3ATZ	01	213
24	G5TO	02	390		G5JU	03	209
25	G8WF	02	383		G3EPV	07	203
26	G2BOI	02	382	1 63	GM3BL	14	203
27	G3AED	08	373		G2AJU	05	200
28	G6VC	07	365		G5FI	07	195
29	G5ZX	03	361		G5HS	06	186
T 30	G3AGQ	03	358	68	G6LM	09	178
30	G3AH	01	358		G3GDW	09	164
30	G3CBU	07	358		GW3CBY	10	154
33	G2NJ/A	04	351		G2UJ	08	140
34	G2FMF	07	350		G2AKK	01	138
35	G3CTN	09	345		G6QC	04	116
T 36	G3AKY	02	342	74	GSIP	07	99
36	G3LP	09	342		GM2CHN	12	43
36	G6US	03	342	(17/07)	Hand Region 177	9570	

The following are thanked for forwarding check logs:—G2 AFV, CLL, FSR/A, HOX, HR, ZZ;
G3 ACR, ALE/A, BCC, EDW, FIO, GLV; G5 PX;
G6 IO, JJ, UP, YJ, ZA, ZT;
GM3A WF and GW2AVV.

### Coventry Amateur Radio Society

Recent meetings have covered a wide variety of subjects including a talk by G5GR on the Manchester Convention, an auction sale a lecture and demonstration of television equipment by BRS6290 (who built his first TV receiver in 1929) and an aerials demonstration.

### Reading Radio Society

The Society's annual "Hamfest," held on November 6, was attended by more than 120 members, friends and visitors, including amateurs from overseas. "Extra-Sensory Perception" was the subject of a series of tests, under the direction of the President, Dr. Lemon (G2GL) and Miss Whittington, at a recent meeting.

### Sussex R.A.E. Course

A series of weekly lectures—each of two hours duration—covering the syllabus of the Radio Amateurs' Examination will be given at the Preston Technical Institute, Brighton commencing

be given at the Preston Technical Institute, Brighton commencing at 6.45 p.m., January 9, 1950.

The inclusive charge for the series, which will continue until the examination next May, is 6/-. Only those with some basic knowledge of radio can be accepted for the course. Further details may be obtained from The Principal, Preston Technical Institute, Coombe Road, Brighton 7. The instructor is to be Mr. F. R. Canning, A.M.I.E.E. (G6YJ).

## Silent Keys

With sorrow we record the passing of Warrant Officer Eric G. Clarke, G3CMD, who was a member of the crew of a Lancaster aircraft lost in an air collision early in November.

Eric's death will be mourned by a wide circle of amateurs especially those in the Ipswich area where he was particularly well known.

The sympathies of all who knew him are extended to his widow, parents and baby daughter.

\* \* G2AJU

It is also our sad duty to record the death, on 30th November last, of Mr. G. Conway, BRS9110 of Purley, Surrey. Mr. Conway was a most enthusiastic listening member of the Society and was always willing to assist on Field Days and similar occasions. He was also a much appreciated member of the Surrey Radio Contact Club, Croydon.

To his widow and family we tender our deepest sympathy. BRS3003

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## **HEADQUARTERS CALLING**

### COUNCIL, 1949

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Executive Vice-President: W. A. Scarr, M.A., G2WS. Hon. Treasurer: A. J. H. Watson, F.S.A.A., G2YD. Hon. Secretary: J. W. Mathews, G6LL.

Hon. Editor: Arthur O. Milne, G2MI. Immediate Past President: S. K. Lewer, B.Sc., G6LJ.

Members: W. H. Allen, M.B.E., G2UJ, A. P. G. Amos, G3AGM, I. D. Auchterlonie, G6OM, F. Charman B.E.M., G6CJ, D. N. Corfield, Amos, Gano... Charman B.E.M., G6CJ, (Hons.). A.M.I.E.E., D.L.C. (Hons.), A Thorogood, G4KD. GSCD,

Co-opted Member: W. N. Craig, B.Sc., G6JJ.

General Secretary: John Clarricoats, G6CL.

### October Council Meeting

Resume of the Minutes of the Proceedings at the Meeting of the Council of the Inc. Radio Society of Great Britain, held at New Ruskin House, Little Russell Street, London W.C.1 on Tuesday, October 11th, 1949, at 6 p.m.

Present.—The President (Mr. V. M. Desmond in the Chair), Messrs. A. P. G. Amos, I. D. Auchterlonie, D. N. Corfield, W. N. Craig, S. K. Lower, J. W. Mathews, A. O. Milne, P. A. Thorogood and John Clarricoats (General Secretary).

Apologies for absence were submitted on behalf of Messrs. W. H. Allen, F. Charman, W. A. Scarr and A. J. H. Watson.

I.A.R.U. 25th Anniversary Congress.
Resolved to invite the members listed below to prepare short papers on the international co-operation aspects of the following subjects, for circulation to the I.A.R.U. Societies which will be participating in the above mentioned Conference:

Scientific Observations.

Messrs. W. A. Scarr, M.A., G2WS, and D. W. Heightman,
A.M.Brit.I.R.E. G6DH.

Band Planning and Operating Practices.

Messrs. I. D. Auchterlonie, G60M and J. W. Mathews G6LL

Contests.
Mr. F. Charman, B.E.M., G6CJ, and Mr. T. L. Herdman

Future International Conferences.
Mr. S. K. Lewer, B.SC., G6LJ.
Resolved further to recommend to the 1950 Council that all documents issued by the Society in connection with the Congress be translated into French and circulated in both English and French to participating Societies.

Membership. Resolved

(a) to elect 58 Corporate Members, 11 Associates and 3 Junior Associates. (b) to grant Corporate Membership to 8 Associates who had applied for transfer.

(c) to grant Life Membership to Mr. T. L. Herdman, G6HD.

Affiliated Societies.

Resolved to grant affiliation to the Worthing & District Amateur Radio Club, and the Walsall & District Amateur Radio Society.

Slough Group.

The Council considered a resolution from the Slough Group relating to the appeal to the Minister of Town & Country Planning made by Mr. A. Houchin, G3GZ, after his application for permission to erect a lattice tower had been refused by the Bucks Country Council.

Resolved to inform the Slough Group that as the Society was not informed of the date or venue of the hearing of the appeal no action was possible.

Hoddesdon Group.

The Council considered a letter from the Hoddesdon T.R. relating to the question of Master and Towers and in particular to the Editorial published in the July issue of the Bulletin.

Resolved to inform the Hoddesdon T.R. that it is the considered opinion of the Council that any member who contemplates

the erection of a large structure to accommodate an aerial system would be advised to consult his local authority first.

The Council considered a letter from Mr. C. H. Young, G2AK, wherein he stated that he had been involved in correspondence with his local Town Planning Authority in respect of a lattice tower which he had erected on adjoining land and since taken down. Subsequently his application for permission to erect a

tower on his own land had been refused. He had appealed to the Minister of Town & Country Planning and enquired whether the Society could be represented at the hearing. It was reported that Mr. Young had been asked for a precis of the correspondence but this was not available for consideration at the meeting.

Resolved to authorise the Secretary, after examining the precis, to consult the Society's legal advisers if, in his opinion, such an action appears to be justified.

Co-operation with the Armed Forces.

Co-operation with the Armed Forces.

The Council considered a resolution in the following terms from the Manchester Group "that the Society will cultivate through Headquarters, their acquaintance with the Senior Officers of H.M. Armed Forces to such a degree as will be of assistance to the amateur movement in this country."

An assurance was given to the Group that the Council will continue, as hitherto, to maintain a close liaison with senior officers of H.M. Armed Forces.

Finance.

Resolved to accept and adopt the cash account for the month of September, 1949.

Wireless Telegraphy Act, 1949.

Resolved to enquire whether the President of the Institution of Electrical Engineers is willing to nominate a member to serve on the Advisory Committee to be set up in accordance with the provisions of Section 9 of the Wireless Telegraphy Act, 1949.

Bulletin Layout.

Bulletin Layout.

Mr. Mathews expressed himself as opposed to various changes of layout which had recently been introduced by the Editor. Mr. Clarricoats informed the meeting that he had received a large number of letters from members commenting favourably on the changes. Until Mr. Mathews voiced his protest at the last meeting of the Technical Committee he had received no critical comment of any kind other than a request from the Hon. Editor to set his name beneath the title "Month on the Air" instead of in a panel, Mr. Lewer supported Mr. Mathews particularly in his criticism of the title page.

of the title page.

After the President and several members had spoken in favour of the changes which had been made, it was agreed to

issue no new instructions to the Editor.

The meeting terminated at 9.25 p.m.
(The meeting dealt with a number of other matters, details of which have already appeared in the BULLETIN.—Ed.)

### Slow Morse Transmissions

		Slow Morse Transmissions					
G.M.T		Call		kc/s.		Town	
Sundays		Alcherot				THE PART OF THE PA	
09.30		G6NA		1840		Guildford	
10.00		G5XB		1950		Reading	
Mondays		done	***	1000	***	rending	
		00177		1070		Carthand on Can	
13.00	111	G3AXN	***	1870	255	Southend-on-Sea	
20.00	***	G2AJU		1900	***	Stutton, Ipswich	
20.00	***	G3DSR	***	1750	***	Derby	
20.00	***	G2CLD	***	1775	***	Tunbridge Wells	
21.00	***	G2BLN		1900	***	Bournemouth	
21.00	***	G8VR	***	1850	***	London, S.E.2	
21.00		G3BHS		1820		Eastleigh, Hants.	
22.00		G8TL		1896		Ilford	
22.30		G4GA		1896		Chingford	
Tuesdays							
13.00		G3AXN		1870		Southend-on-Sea	
19.00		G5XB		1780		Reading	
20.00	***	GIZHLT		1900	***	Belfast	
22.00	***	G3ELG	***		***	Rotherham	
	***		***	1772	***		
22.30	***	G6JB	***	1820	•••	Salcombe, Devon	
23.00	***	GM4AN	***	1820	***	Kirkcaldy	
Wednesda		2200				72207	
20.00		PAGAA	***	3625		Hilversum	
20.00		G3AFD	***	1783	***	Southampton	
22.00		G6N·A		1840		Guildford	
22.00		G3DLC		1800		Grays, Essex	
22.00	***	G2NY		1850	***	Preston	
Thursdays							
18.00	٠	G3AXN		1870		Southend-on-Sea	
22.00		G2BCX		1990		South Woodford	
22.30		GSARU	***	1990		Wanstead	
22.30		G3OB	1000	1803	***	Manchester	
	***	GOOD	***	1003	***	Manchester	
Fridays		COLVE		1000		0 11 1 0	
13.00	***	G3AXN	***	1870	***	Southend-on-Sea	
19.00	***	G3BLN	***	1900	***	Bournemouth	
20.00		G2AJU	***	1900	***	Stutton, Ipswich	
20.00	***	G3AKW	***	1860	***	Wirral	
20.30	***	GSLZ	***	1868	***	Gravesend	
21.00		G3BHS	***	1820		Eastleigh, Hants.	
22.80		G6JB	***	1820		Salcombe, Devon	
23.00		GM4AN		1820		Kirkcaldy	
Saturdays				1.10/10/27		The second secon	
23.00		G3CHY		1800		Ashton-u-Lyne	
		COLUMN A		1000	***	Honoria a. Di no	

Volunteers are required to cover the following areas: Birmingham, Bristol, Carlisle, Kent, Newcastle, North Buckinghamshire, North and South Wales, North, West and South London. Write to Mr. C. H. L. Edwards, GSTL, 10 Chepstow Crescent, Newbury Park, Ilford, Essex.

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### Representation

### Result of Ballot

HE following is the result of the Ballot for Regional, County and Town Representatives.

### Regional Representatives

Region	Name and Call Sign		Votes
4	W. A. MEAD, G5YY *DR. E. S. G. K. VANCE, G8SA		55 86
5	S. J. GRANFIELD, G5BQ *R. F. G. THURLOW, G3WW	:::	1 40
7	F. G. LAMBETH, G2AIW *W. H. MATTHEWS, G2CD	:::	60 130
15	*N. H. LOWDEN, GI2HLT		

#### · Elected.

The nomination submitted on behalf of Mr. F. A. Robb, GI6TK, was declared void as a consequence of his expulsion from the Society.

### County Representatives

Region	County	Name and Call Sign	Votes
1	Lancashire	J. BRADSHAW, G2NY	12
	West	*S. M. SUGDEN, G3GSS	28
4	Leicestershire	*L. FISHER, G4MK L. RIDGWAY, G2RI	19 6
8	Kent (outside	S. A. HOWELL, G5FN	7
	London Area)	W. G. ROWLANDS, G6KT	14
	Sussex	R. J. DONALD, G3DJD *G. W. MORTON, G3DRC	18
9	Gloucestershire	*A. BARBER, G5WA R. M. SHARPE, BRS7961	33 31
12	Angus and	R. B. BROWN, GM3AOR	7
	Perthshire	•G. W. ROBERTSON, GM3FEU	22
13	Fifeshire and	*C. A. M. CLACKSON, GMSKR	11
	Kinross	J. TAYLOR, GM2DBX	1

### · Elected.

Messrs. E. G. Brown, G5BJ, and T. Martin, G2LB, polled an equal number of votes (36) in the ballot for the election of a County Representative for Warwickshire. Subsequently Mr. Martin withdrew his name. Mr. Brown is therefore declared elected.

### Town Representatives

Region	n County Name and Call Sign		Votes
4	Nottingham	A. E. CLIPSTONE, G8DZ *B. H. SINGLETON, G3CZV	3 27
8	Southampton	E. R. BASSETT, BRS16075  P. A. MAINWARING, G3BSM L. M. WORBOYS, G3AFD	1 6 3
	Worthing	*R. B. FORGE, G3FRG H. PALMER, G3BF	3
14	City of Glasgow Postal District	•W. R. EADIE, GM4JO	-

### · Elected.

The nomination submitted on behalf of Mr. I. Hamilton, GM3CSM, was found to be out of order as he is resident outside the City of Glasgow Postal District.

### Corrections

The following corrections should be made to the list published last month Catterick and Richmond are in the North (not the Region 2

West) Riding of Yorkshire.

5 The address of the new Suffolk C.R. is Post Office Farm, Stutton (not Sutton), Near Ipswich.

12 Montrose is in Angus (Region 12) not in Fifeshire

(Region 13).

### Manchester Convention

Labgear Ltd., Cambridge, have reminded us that the prize which they donated at the Manchester Convention has not yet been claimed. The winning catalogue number was 278.

### London Meeting

More than 220 members were present at the meeting held on November 18, 1949, in the Lecture Theatre of the Institution of Electrical Engineers, when Lt. (L) G. C. Chapman, B.A., R.N., and Mr. Peter Cummins, A.M.I.E.E., lectured on the radio control of models. The lectures were followed by a demonstration. The Chair was taken by the President Elect (Mr. W. A. Scarr, M.A., G2WS), and a vote of thanks to the lecturers was proposed by Mr. D. N. Corfield, G5CD.

It is hoped to publish a precis of the lectures in an early issue of the BULLETIN.

the BULLETIN.

### Exhibition in Birmingham

The Midland Amateur Radio Society have accepted an invitation from the Institution of Electronics (Inc.) to take a stand at an exhibition which the Midland Branch of the Institute is promoting at Lewis's Stores. Birmingham, next month.

The Exhibition will be opened at 12 noon on Thursday, January 5 and will close at 5.30 p.m. on Saturday, January 7, 1950. There will be no charge for admission and all members will be cordially welcomed.

welcomed.

### Radio Controlled Models Society

Meetings of the London Group of the above Society will be held Meetings of the London Group of the above Society will be held at St. Ermine's Hotel, Caxton Street, London, S.W.1 on Sundays, February 12 (Lecture on Mark-Space Systems) and March 12 (A.G.M. followed by lecture on 465 Mc/s. technique). Commencing at 2 p.m. Visitors will be made very welcome. Further details of the activities of the Group can be obtained from the Group Secretary, Lieut. (L) G. C. Chapman, R.N., Pine Corner, Heathfield, Sussex.

### Royal Air Force Amateur Radio Society

This Society which has its Headquarters at R.A.F. Cranwell, caters for the needs of radio amateurs serving in the R.A.F., and also enables former members of that service to keep in touch with their old friends who are still "in uniform." The Headquarters Section meets regularly in Hut 369, East Camp, Cranwell and the winter programme includes lectures on alternate Thursdays. On Thursday, January 12 there will be a demonstration of television reception from the Sutton Coldfield transmitter. Local amateurs are cordially welcomed at these meetings which are usually followed by a general discussion and refreshments.

### Torbay Amateur Radio Society

Continuing his series of technical lectures, Mr. Launder, B.Sc. (G3FHI), spoke at the November meeting on "Wave Propagation." Forthcoming talks include "Aerial Arrays" by G2BMZ (December 17) and "Wire and Tape Recorders" by Mr. Sands of Dawlish (January 21). Members of the British Sound Recording Association have been invited to attend the January meeting. Meetings are held on the third Saturday in each month at the Y.M.C.A., Castle Road (7.30 p.m.).

### Ouiz Answers (See page 199)

1. Paris, 1925. 2. Dr. Crippen. 3. 2ZY Manchester; KDKA Pittsburgh; FL Eiffel Tower, Paris; 5IT Birmingham; PCGG The Hague. 4. "Gerry" Marcuse, G2NM. 5. A Australia; CGC Scotland; V. Germany, N. Holland, I. United GC Scotland; K Germany; N Holland; U United

### Problem Picture (See page 187).

Major Ken Ellis, G5KW, ex-MD5KW and hosts of other calls, now serving in Saudi Arabia, made the first 50 Mc/s. Egypt-England contact in 1947.

### REPRESENTATION 1950-1951

PRESENT County, Town and Area Representatives who were not properly nominated for re-election prior to November 1, 1949, will go out of office automatically on December 31, 1949.

The responsibility for recommending to the Council the names of persons to serve as Representatives in those Counties, Towns, or Areas where no nomination was received at Headquarters prior to November 1, 1949, will rest with the incoming Regional Representatives.

A list of Corporate Members who were properly nominated appeared in the November, 1949, issue of the BULLETIN.

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NEW PERFORMANCE METERS TYPE AP53874. Contain Parmeko Power Pack for 230 V. 50 c/s., Magic Eye Indicator Y63, 2 EF50, 1 RL16, 1 524G, 1 EA50. Instrument type cabinet. In maker's cartons. 45/-.

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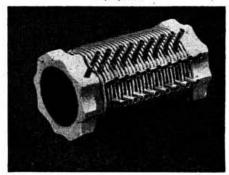
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### re THOMAS BERTRAM WIMBUSH (Deceased)

PURSUANT to the Trustee Act 1925, Section 27 NOTICE TO

CREDITORS.

NOTICE IS HEREBY GIVEN THAT ALL PERSONS having claims against the Estate of THOMAS BERTRAM WIMBUSH late of 27/29 Canning Street Burnley in the County of Lancaster who died at Regent Street Haslingden in the said County on the 20th day of March 1949 and Administration of whose estate was granted on the 23rd day of September 1949 by the Principal Probate Registry to Audrey Winifred Wimbush and Clara Wimbush must send PARTICULARS of such claims to the undersigned Solicitors on or before the 31st day of January 1950, after which day this Deceased's assets will be distributed having regard only to the claims of which Notice shall have then been received AND all persons Indebted to the said Estate are asked to pay their respective debts at once.

(Signed) Robt. Kidd Whitaker & Pratt, I Queen Street, Accrington, Lancs.

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