

# R.S.G.B.



# BULLETIN

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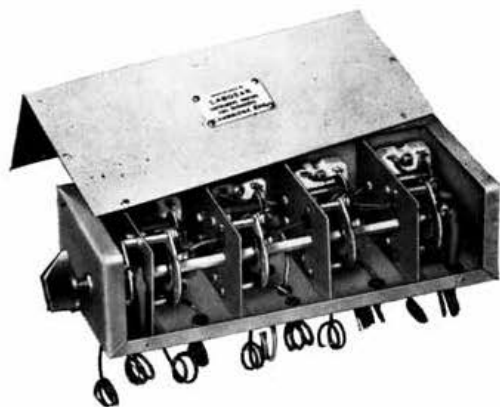
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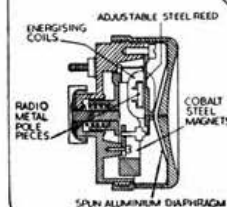
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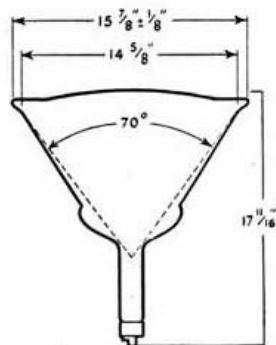
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# R.S.G.B. BULLETIN

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JULY

1952



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R.S.G.B. QSL BUREAU: G2MI, BROMLEY, KENT

# Forthcoming Events

## REGION 1

**Blackpool (B. & F. A. R. S.)**—July 22, 7.30 p.m., Geneva Gardens, Stockydale Road, Marton.  
**Bury**—August 14, 7.30 p.m., Y.M.C.A., The Rock.  
**Chester (C. & D. A. R. S.)**—Tuesdays at 7.30 p.m., Tarran Hut, Y.M.C.A.  
**Crosby**—Tuesdays at 8.0 p.m. over Gordons Sweetshop, St. John's Road, Waterloo, Liverpool.  
**Darwen & Blackburn**—Aug. 1, 7.30 p.m., Y.M.C.A., Limbrick, Blackburn.  
**Liverpool**—Sept. 6, 2.30 p.m., Larkhill Mansion House, West Derby.  
**Manchester (M. & D. R. S.)**—First Monday each month, 7.30 p.m., Brunswick Hotel, Piccadilly, Manchester.  
**Preston**—July 18, August 1 and 15, 7.30 p.m. Three Tuns Hotel, North Road, Preston.  
**South Manchester (S.M.R.C.)**—Alternate Fridays, 7.30 p.m., Ladybarn House, Mauldeth Road, Manchester, 14.  
**Southport**—July 21 and 28, August 11, 8.0 p.m., Y.M.C.A., off Eastbank Street.  
**Stockport (S.R.S.)**—Alternate Tuesdays, 8.0 p.m., Blossoms Hotel, Buxton Road.  
**Warrington (W. & D.R.S.)**—First and Third Tuesdays each month, 7.30 p.m., Kings Head Hotel.  
**West Cumberland**—August 2, 7.0 p.m., Kells Community Centre, Whitehaven.  
**Wirral (W.A.R.S.)**—July 23, August 6 and 20, 7.45 p.m., Y.M.C.A., Whetstone Lane, Birkenhead.

## REGION 2

**Barnsley**—July 25, August 8, 7.30 p.m., King George Hotel, Peel Street.  
**Bradford**—July 29, 7.30 p.m., Cambridge House, 66 Little Horton Lane.  
**Catterick and Richmond**—Wednesdays, 7 p.m., Loos Lines, Catterick Camp.  
**Darlington**—Thursdays, 7.30 p.m., 129 Woodlands Road.  
**Doncaster**—August 13, 7.30 p.m., Black Bull, Market Place.  
**Gateshead**—Thursdays, 7 p.m., Y.M.C.A., Sutherland Hall, Durham Road.  
**Hull**—July 30 (General), August 13 (Beginners), 7.30 p.m., R.E.M.E. Canteen, Walton Street.  
**Middlesbrough**—Thursdays, 7.30 p.m., Joe Walton's Boys' Club, Feversham Street.  
**Newcastle-on-Tyne**—July 28, 8 p.m., British Legion Rooms, 1 Jesmond Road.  
**Pontefract**—July 24, August 7, 8 p.m., Fox Inn, Knottingley Road.  
**Rotherham**—Wednesdays, 7 p.m. Cutlers Arms, Westgate.  
**Scarborough**—Thursdays, 7.30 p.m., L.N.E.R. Rifle Club, West Parade Road.  
**Sheffield**—August 13, 8 p.m., Albreda Works, Lydgate Lane. August 26, 8 p.m., Dog and Partridge, Trippet Lane.  
**Slithwaite**—Fridays, 7.30 p.m., 3 Dartmouth Street.  
**Sunderland**—July 23, August 6, 7.30 p.m. 16 North Bridge Street.  
**York**—Thursdays, 7.30 p.m., Y.A.R.S. Club Rooms, Fetter Lane.

## REGION 3

**Birmingham South**—July 20, 10.30 a.m., Stirchley Institute.  
**Coventry**—July 25 meeting cancelled. August 22, 7.30 p.m., Priory High School, Wheatley Street.  
**Kenilworth, Warwick and Leamington**—July 17, August 21, 7.30 p.m., Dalehouse Lane.  
**Rugby**—August 5, 7.30 p.m., Public Library, St. Matthew Street.  
**Stourbridge (S. & D.R.S.)**—August 5, 8 p.m., King Edward's School.  
**Worcester (W. & D.A.R.C.)**—Thursdays, 7 p.m., City Library (basement), Foregate Street.  
**Wrekin (W.A.R.S.)**—Mondays, 8 p.m., Wrekin Service Club, Roseway, Wellington.

## REGION 4

**Alvaston**—Tuesdays and Thursdays 7.30 p.m., Sundays 10 a.m., Nunsfield House, Alvaston, Nr. Derby.  
**Chesterfield**—July 29, August 12, 7.30 p.m., Bradbury Hall, Chatsworth Road.  
**Derby (D. & D.A.R.S.)**—No July meeting. August 6, 13, 7.30 p.m., Derby College of Arts and Crafts, Sub-basement, 119 Green Lane.  
**Leicester (L.R.S.)**—July 21, August 18, 7.30 p.m. Holly Bush Hotel, Belgrave Gate.  
**Loughborough**—July 16, August 20, 7.30 p.m., Great Central Hotel.  
**Mansfield (M. & D.A.R.S.)**—August. No meeting.  
**Newark**—July 20, August 17, 7 p.m., Northgate House, Northgate.  
**Northampton (N.S.W.C.)**—Fridays 6 p.m. August 1, 7 p.m., Clubroom, 8 Duke Street.  
**Retford**—August 10, 3 p.m., Community Centre, Chapel Gate.  
**Workshop**—August. No meeting.

## REGION 5

**Ipswich**—Second and last Wednesdays. 7.30 p.m., T.A. Drill Hall, Woodbridge Road.

## REGION 6

**Gloucester**—Alternate Thursdays, 7.30 p.m., Spreadeagle Hotel.  
**North West Wilts.**—Fridays, 8 p.m., G3HXA, London Road Inn, Calne.  
**Portsmouth**—Tuesdays, 7.30 p.m., Signal Club Room, Royal Marine Barracks, Eastney.  
**Southampton**—Saturday, August 2, 7.30 p.m., 22 Anglesey Road, Shirley.  
**Stroud**—Wednesdays, 7.30 p.m., Subscription Rooms, Stroud.  
**Swindon**—August 16, 7.30 p.m., Connaught Rooms, (Off Regent Street).

## REGION 7

**Acton, Brentford & Chiswick**—Tuesdays, 7.30 p.m., A.E.U. Rooms, 66/68 High Road, Chiswick, W.4.  
**Barnes, Richmond & Putney**—August 12, 7.30 p.m., 308 Upper Richmond Road, East Sheen, S.W.14.  
**Bexleyheath (N.K.R.S.)**—Second and fourth Thursdays, 7.30 p.m., Congregational Hall, Clock Tower.  
**Bromley (N.W.K.A.R.S.)**—August 1, 8 p.m. Shortlands Hotel, Station Road, Shortlands.  
**Chingford**—Recess to find new meeting place.  
**Croydon (S.R.C.C.)**—August 12, 7.30 p.m. "Blacksmith's Arms," South End.  
**Dulwich & New Cross**—Summer recess.  
**East London**—Summer recess. Next meeting September 28 3 p.m., Ilford Town Hall.  
**East Molesey (T.V.A.R.T.S.)**—August 6, 8 p.m. "Carnarvon Castle," Hampton Court.  
**Eltham & Sidcup**—July 15, 29, August 12, 7.30 p.m., Broadway Cafe, Southend Crescent, High Street, S.E.9.  
**Enfield**—August 17, 3 p.m., George Spicer School, Southbury Road.  
**Finsbury Park**—August 19, 7.30 p.m., 164 Albion Road, Stoke Newington, N.16.  
**Guildford & Woking**—Summer recess. Next meeting September 28, 3 p.m., Royal Arms Hotel, North Street.  
**Hayes & Uxbridge**—August 1, 7.30 p.m., "The Vine," Uxbridge Road.  
**Hendon & Edgware**—July 23, 30, August 13, 21, St. Martin's School, Goodwins Avenue, Mill Hill.  
**Hoddesdon**—August 7, 8 p.m., "Salisbury Arms."  
**Holloway (Grafton R.S.)**—Mondays, Wednesdays and Fridays, 7.30 p.m., Grafton School, Eburne Road, N.7.  
**Ilford**—July 24, 8 p.m., July 31 8 p.m., 579 High Road, Ilford.  
**Kensington & Shepherds Bush**—Summer recess.  
**Norwood**—August 16, 7.30 p.m., 35 Grangecliffe Gardens, South Norwood.  
**Slough**—August 21, Third Thursday, 7.45 p.m. "Golden Eagle," High Street.  
**Southgate**—August 14, 7.30 p.m., Arnos Secondary Modern School (Geography Room), Wilmer Way, N.11.  
**Sutton & Cheam**—August 19, "The Harrow," Cheam Village.  
**Watford (W.R.A.T.S.)**—August 5, 19, 7.45 p.m., Cookery Nook, The Parade.  
**Welwyn**—Summer recess. Next meeting September 8, 8 p.m., Council Offices, Welwyn Garden City.

## REGION 8

**Brighton (B.D.R.C.)**—Tuesdays, 7.30 p.m. "Eagle Inn," Gloucester Road. (E.B.S.W.C.)—Thursdays, 7.30 p.m., 27 Warren Avenue, Woodingdean.  
**Chatham (M.A.R.T.S.)**—Mondays, 7.30 p.m., Co-Operative Hall, Luton Road.  
**Eastbourne**—July 24, August 7 and 21, 7.30 p.m., 333 Seaside.  
**Gillingham (G.T.S.)**—Alternate Tuesdays, 7.30 p.m., Medway Technical Institute.  
**Hastings (B. & H.R.C.)**—July 29, August 12 and 26, 7.30 p.m., Saxon's Cafe, Sea Front.  
**Isle of Thanet (I.O.T.R.S.)**—Fridays, 7.30 p.m., George Hotel, Hawley Street, Margate.

## REGION 9

**Bath**—July 21, 7.30 p.m., Y.M.C.A., Broad Street.  
**Bristol**—July 18, August 15, 7.30 p.m., Carwardine's Restaurant, Baldwin Street, Bristol, 1.  
**Exeter**—August 1, 7 p.m., Y.M.C.A., 41 St. David's Hill.  
**North Devon**—August 7, 7.30 p.m., Rose of Torridge Cafe, The Quay, Bideford.  
**Penzance**—August 7, "Railway Hotel."  
**Torquay**—July 19, 7.30 p.m., Y.M.C.A., Castle Road.  
**West Cornwall**—July 17, August 7, "Fifteen Balls," Penryn.

(Continued on page 35)



# R · S · G · B · BULLETIN

Volume 28 No. 1

July, 1952

## Current Comment . . .

### N.F.D.: Retrospect and Prospect

**E**VEN the rain that fell upon many National Field Day tents during the afternoon of Sunday, June 8, could not quench the enthusiasm which has helped to make this event the outstanding one in the British radio amateur year. Those who had no hope of winning, at least achieved—in many cases—the objective of notching up a higher score than they made last year.

Success during N.F.D. is not measured solely by making a high score. It is measured rather by the fact that a station can be put into the field at all! The amount of organisation needed is very considerable and those who, by undertaking it, achieve the erection and operation of a station which functions as well as the "home station" under often unpromising conditions can regard this as sufficient reward in itself.

As soon as one National Field Day is behind them the enthusiasts turn their thoughts to the next. And in respect of the 1953 event they are turning them in that direction with more than usual intensity. For the proposal that each station should use one l.f. band and one h.f. band is a revolutionary one likely to give quite new shape to the event.

Already the suggestion has given rise to much correspondence in this journal—and welcome indeed the letters have been as indicating—as has been said here before—that the reader-interest of any publication can be measured very largely by the size of its correspondence page.

The correspondence about the proposed changes for N.F.D. for 1953, and the many discussions also going on in local groups, show the interest which the suggestion has aroused.

Members can make their voices heard on this particular question by letting their representative know what they think. The resulting consensus of opinion will be of the utmost value to the Contests Committee in framing the ultimate rules for National Field Day for 1953.

Which brings us on to a somewhat related subject. . . .

### Efficient Filter

**C**OMMENT has been made on this page before now that the individual member will get just as effective service if he expresses his views (and

complaints, if any) to his local representative as if he writes to Headquarters.

The scheme of representation works as a very effective filter for the transmission of information from the Council and Headquarters to the members at large, and in the opposite direction. It is the unusual phenomenon of a valve that works both ways!

Much correspondence received by the hard-pressed Headquarters staff could be adequately dealt with by the local town, area, county or regional representative, in that ascending order. In fact, time must be wasted when queries sent to Headquarters are referred back to the local representative as the man best fitted to deal with them.

Keep in touch with your local R.S.G.B. man. He knows most of the answers.

### "Twenty-one Megs"

**B**Y the time these words reach our readers the new 21 Mc/s band will be a fortnight old—at least so far as British stations are concerned. Before amateurs lies quite a new field for exploration.

The release of the band comes as a particularly pleasing augury to the average amateur who, faced with increasing encroachment upon his territory by more powerful interests, sometimes feels thankful for small mercies.

The 21 Mc/s band is by no means a small mercy. It is a sizable slice of frequency allocation which amateurs everywhere can be counted upon to put to the very best use.

Just a final thought: those who tend to assume that the 21 Mc/s allocation is something they should have by right would do well to remember that the band might perhaps not have been released by now did not a close liaison exist between the Society and the Post Office representatives who are answerable for us all, and for the frequencies we occupy.

The thanks of the average member will go to the hardworking people on the Council's G.P.O. Liaison Committee who did so much "pre-release" negotiating, and to the gentlemen at the G.P.O. who have released the band with such alacrity.—

J.H.

# Skybeams, Moonbeams and Howitzers

## Part I

By P. H. SOLLUM, B.Sc., A.C.G.I. (G3BGL, ex-VS7PS)\*

Popular misconceptions concerning the uselessness of very high-angle radiation, and the inevitability of skip zones for short-wave communication, are exposed by the author in this description of his investigations into unconventional aerial and propagation techniques, carried out in Ceylon with the aid of local amateurs. Although erection of the aerial systems described may be beyond the scope of most readers, the article indicates how professional organisations sharing our low-frequency bands could increase efficiency and minimise interference, resulting in much mutual benefit.

### Introduction

THIS article describes experimental work carried out by the author during the years 1949-51 with the co-operation of many amateurs. The results, which are applicable to ambitious amateur installations and to commercial and broadcast systems, represent a considerable development in aerial techniques for short-distance short-wave transmissions. These techniques are of general interest in that they provide a means of increasing the practicable amount of channel-sharing, and of decreasing the interference level now present on the short-wave bands. The article also introduces a new type of aerial data chart, showing

BULLETIN. The site of the broadcasting station was originally a coconut plantation, the trees being suitable as masts for the support of experimental aeriels. From the broadcasting station Ceylon extends approximately 200 miles to the north, 140 miles east, 100 miles south, and five miles to the west.

### Wave-angle

The object of the initial experiments was to beam the transmission from VS7PS so that it would give the strongest signal possible over the whole of Ceylon, with the least wastage of power in the sea or in South India. A data chart, similar to that in Fig. 1, but with the curve drawn for

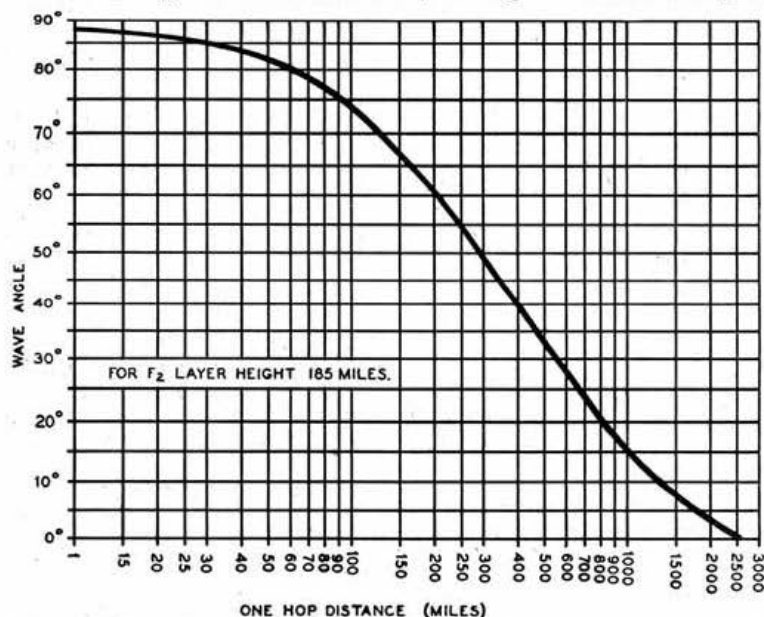


Fig. 1

Data chart showing the wave-angle required for a one-hop transmission by reflection from the  $F_2$ -layer. The average height of this layer over the British Isles is about 185 miles.

on one diagram the relative power radiated in all directions in space around the aerial. The chart can be analysed into conventional polar diagrams for the vertical plane in any required direction, or for the horizontal plane at any required wave-angle. The directivity and gain of an aerial can also be evaluated from the chart, which may then be calibrated to show the field strength that will exist at a given distance in any direction for a given power input.

A description of the amateur station VS7PS—situated on the premises of the Ceylon Government short-wave broadcasting station "Radio Ceylon," about 17 miles North of Colombo—was published in the May, 1949, issue of the

the average height of the  $F_2$ -layer above Ceylon, i.e. 210 miles, was therefore prepared to determine the wave-angles required for the beam.

The wave-angle is the angle, measured from the horizon, at which the wave must set out if it is to be reflected by a particular layer and return to earth at a particular distance. It will normally be the same as the angle measured from the horizon at which the reflected wave approaches the receiving aerial. For a given distance and layer there is a lowest value of wave-angle which is the angle for a one-hop transmission; and the data chart gives this for the  $F_2$ -layer. There are, however, higher angles which will be correct for transmissions to the same distance by multiple reflections. For example, a transmission received

\* "The Rowans," Green Street Green, Farnborough, Kent.

600 miles away must have been beamed at a wave-angle of  $28^\circ$  if it was one-hop,  $50^\circ$  if it was two-hop (each hop 300 miles),  $61^\circ$  if it was three-hop (each hop 200 miles), etc., assuming a normal state of the ionosphere and reflection from the  $F_2$ -layer. If such transmission was made using a low-angle beam aerial, it must have been radiation of a minor lobe, or radiation from the top of the main beam, that was received; or the signal must have been reflected by a lower layer. If there is a choice, as in the example above, the aerial can be designed to favour the transmission at one particular wave-angle.

### Frequency

Although a two-hop transmission will suffer more reflection losses than a one-hop transmission, and although it may have to travel a greater distance to reach the receiver, the signal arriving may be stronger because the frequency used is more suitable for a higher-angle transmission. The lower-angle wave might never arrive at the receiver if the frequency is correct for reflection from a lower layer at that wave-angle. At mid-day, the E-layer may reflect in this way if the frequency used is approximately half the  $F_2$ -layer m.u.f. for the required path, and considerable absorption results. With amateur powers, satisfactory signals are possible, under normal conditions, only when the frequency is close to the m.u.f. for the  $F_2$ -layer.

The m.u.f. changes widely with the wave-angle, other things being constant. The amateur frequency bands are so restricted that the correct frequency for a given distance cannot be chosen. However, the optimum wave-angle for a given frequency at any time can be found, and best use can be made of this knowledge in aerial design. Alternatively, it may be possible to select the time of day (or year, etc.) so that the m.u.f. is then correct for the particular frequency and the required wave-angle.

Experimental aerials at VS7PS were designed for the 40m band, but the techniques were adapted for broadcast services in the 88m, 61m, 49m, 41m, and 31m tropical broadcast bands. The monthly propagation bulletins of the Ionospheric Prediction Service of Australia provided the necessary m.u.f. data. In the tropics, frequencies up to 11 Mc/s are reflected at vertical incidence to the  $F_2$ -layer at midday.

### Skybeams†

Any aerial system which radiates a maximum signal vertically into the sky, and which confines the radiation to high wave-angles only, is a "Sky-beam." Certain arrangements of elements and feeder systems are readily adaptable for this type of service, and the eight-element beam (Fig. 2) erected at VS7PS for the original experiments was particularly convenient. Coconut trees served as masts to support the elements and feeder at a uniform height of 20 ft. above ground. The beam-width of this array is more than adequate for coverage of Ceylon by one-hop transmission. The ideal beam for the job would be an elaborate slewed array with 16 or 18 elements.

The vertical plane polar diagram of the eight-element beam showing the variation of field strength with wave-angle in the plane of the elevation of Fig. 2a is given in Fig. 2c. The effect of varying the height above ground between  $0.25\lambda$  and  $0.1\lambda$  is almost negligible, the beam being  $2^\circ$ - $3^\circ$  sharper at the lower height. The feed-point impedance will, however, change appreciably. At heights lower than  $0.1\lambda$  ground

losses are significant; at heights over  $0.25\lambda$  the ground fails to reflect upwards efficiently.

### High-angle Multi-hop Transmissions

The eight-element skybeam was erected at VS7PS with the geographical directions shown in Fig. 2b, thus ensuring that a null in the radiation pattern occurred at  $60^\circ$  (see Fig. 2c)—the wave-angle required for a one-hop transmission to Jaffna, 200 miles away in North Ceylon. Any signal reaching Jaffna from the skybeam must therefore have made at least two hops. The multi-hop signal strength received from the skybeam by VS7SN in Jaffna, was found to be the same as that of the one-hop signal from a single half-

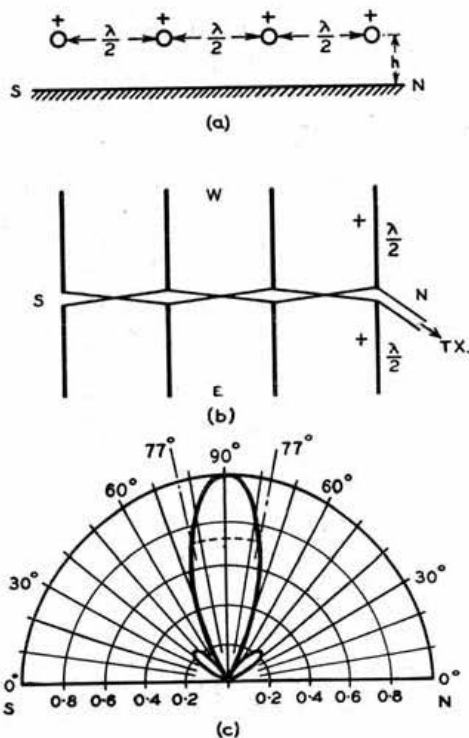


Fig. 2.

Skybeam: the original experimental arrangement at VS7PS. (a) side elevation, (b) plan view, (c) vertical plane polar diagram in the plane of the elevation (a) for height " $h$ " =  $0.25\lambda$ . All elements are fed in-phase and if " $h$ " is between  $0.1\lambda$  and  $0.25\lambda$  earth reflection enhances the beam.

wave dipole at the same height as the skybeam. The maximum signal from the skybeam (at  $90^\circ$  wave-angle) is about 12 db above that of the dipole; the two-hop signal from off the side of the beam at  $74^\circ$  wave-angle is 6 db down on the maximum or 6 db above the dipole. This 6 db was lost as the signal had to make two hops and travel twice as far as the signal from the dipole.

### Low-angle Minor Lobes

The arrangement shown in Fig. 2 had undesirable side lobes, and when used for a broadcast service in the 49m band, the transmission was received in Africa and Europe, although intended for home listeners only. The arrangement shown in Fig. 3 was therefore developed for a broadcast service opened for home listeners in the 41m band, to reduce unnecessary interference. The polar diagram of Fig. 3c shows that the minor lobes are almost completely eliminated by the unconventional element spacing at a cost of a

† Word coined by author.

very small increase in the width of the main beam. A report (via VS7GD) on reception of this transmission from the radio operator† of one of the new P & O liners on the Australian run, was that it could be received at sea only within a distance of approximately 250 miles from Colombo.

### "Geographical" Polarisation

Skybeams of the types shown in Figs. 2 and 3 have a marked polarisation in a geographical sense. If the dipoles lie north-south, then the transmission is polarised in that direction. Optimum reception occurs when the receiving aerial is similarly polarised, and not necessarily when the receiving dipole is broadside-on to the transmitter. For broadcasting purposes, where

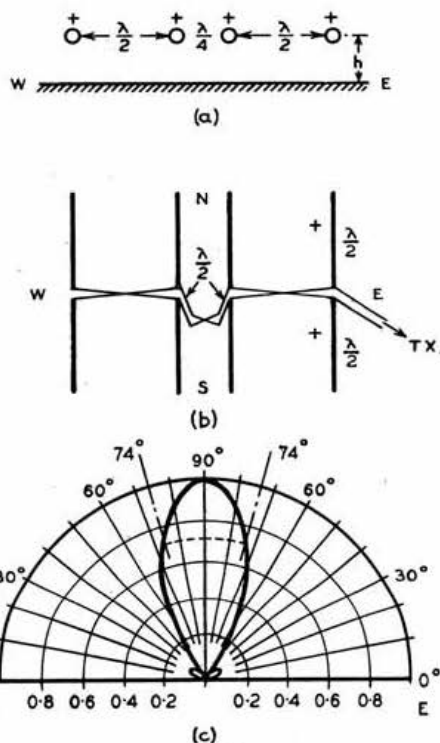


Fig. 3.

Skybeam with element spacing arranged to minimise side lobes (a) side elevation, (b) plan view, (c) vertical plane polar diagram in the plane of the elevation (a) for height " $h$ " =  $0.25\lambda$ . With feeder system shown, centre section must be  $0.5\lambda$  so that elements are all in-phase. The gain at " $h$ " =  $0.125\lambda$  is 12.5 db over a free-space  $0.5\lambda$  dipole.

untuned receiving aerials are normally used, this factor was not found to be important. However, when VS7EP later installed a four-element skybeam ("lazy-H" in a horizontal plane) polarised at right-angles to that at VS7PS, signals were little better when using skybeams at both stations than when using a correctly polarised dipole at one station. In all other cases the skybeams gave the expected gain of about three S-points for the eight-element beam and two S-points for the four element beam, at places within the intended service area.

### Fading

The fading experienced on reception of skybeam transmissions had in all cases different characteristics from those observed when using

a single dipole. In general it was less deep and less frequent. The type of fading on signals from a skybeam polarised east-west was different from that on signals from one polarised north-south, the former being more severe. It was not possible to carry out exhaustive observations on this problem, but the fact that the characteristics of fading can be modified by aerial design is of interest and deserves further investigation.

### Direction-Finding Defeated

Since the skybeams described radiate no ground-wave, direction-finding equipment is inoperative on such transmissions. At the H.F. D/F station at R.A.F. Negombo, five miles North of VS7PS, the operator VS7BJ was unable to take bearings on VS7PS or on the broadcast transmissions which used skybeams, although he received excellent signals.

The use of a skybeam for the  $7\frac{1}{2}$  kW broadcast transmission on the 41m band removed the swamping from the receiver at VS7PS and made it possible to receive signals on the amateur band up to 20 kc/s from the broadcast frequency. At night the sky-wave echoes of the skybeamed transmissions were as strong as the ground waves at VS7PS—only 100 yards away—and fading occurred. By applying pulses to the modulator of a small broadcast transmitter, and by connecting an oscilloscope to the receiver at VS7PS and using a suitable time scale calibrator, the ionosphere height could be measured. Up to five echoes of the same pulse could be detected. Severe selective fading occurred as the first echo split in two or three echoes close together, indicating simultaneous reflection from different heights.

### Miscellaneous Remarks on Skybeams

Dispersal of waves due to refraction by lower layers may permit the use of a sharper beam than would be suggested by Fig. 1. Geographical polarisation diversity reception, using two horizontal receiving aerials at right-angles, provides a useful reduction in fading.

Multi-element arrays possess considerable mechanical tolerance, sagging elements and uneven ground having negligible effect on the shape of the main beam. No special precautions were found necessary when metal masts and mast stays were used; insulators were not required in the stay wires. An insulated tail of 5 ft. may be inserted between the end of an element and the tensioning halyard.

For the beams of Figs. 2 and 3, the elements may be cut to  $472/f$  for single-wire dipoles (No. 6 s.w.g. to No. 14 s.w.g.) with a spacing of  $492/f$  ( $f$  in Mc/s, length in feet). Broadband dipoles of two wires (e.g. No. 14 s.w.g.), spaced 6 in. apart and bonded together, may be cut to  $454/f$ .

Half-wave transposed sections of feeder must be of well-insulated, open-wire construction. Ribbon feeder is quite unsuitable for this purpose. Feeders should, if possible, be taken away from the beam along or under one of the axes of symmetry; tuned or matched open-wire line is the most suitable feeder.

The feed-point impedance for the beam of Fig. 2 is about 900 ohms; for that of Fig. 3 with broadband dipoles, 400 ohms; for the horizontal "lazy-H" four-element beam, 2,000 ohms. Other feed-points or feed-systems may be used to obtain different impedances.

Two-band arrangements can be devised for low-angle transmissions on the higher frequency band, and skybeam work on the lower band. Simple feeder switching will enable the same beam to be used for high or low-angle transmissions on the same band.

† A British amateur, call-sign unknown.



A Chireix-Mesny array affords some saving in wire and insulators for the same beam-width as the types described above. This array is a balanced unterminated system in which, as a skybeam, each

Table 1

Half-power beam-width	Wave-angle at half-power points	No. of elements	Spacing of elements	Arrangement of elements
120°	30°	1	—	broadside
100°	40°	2	0.25λ	broadside
70°	55°	1	—	co-linear
58°	61°	2	0.5λ	broadside
54°	63°	4	0.25λ	broadside
46°	67°	2	0.5λ	co-linear*
38°	71°	3	0.5λ	broadside
36°	72°	2	0.75λ	broadside
34°	73°	3	0.5λ	co-linear
32°	74°	4	as Fig. 3a	broadside
32°	74°	2	0.75λ	co-linear†
26°	77°	4	0.5λ	broadside
24°	78°	4	0.5λ	co-linear
18°	81°	6	0.5λ	broadside
12°	84°	8	0.5λ	broadside
9°	85½°	12	0.5λ	broadside

\* i.e. "Double-Zepp." arrangement.

† i.e. "Extended Double-Zepp." arrangement.

section has the configuration of a rhombic with  $0.5\lambda$  side-lengths and  $90^\circ$  corner angles, though the corner angle at the feeder may be increased to  $120^\circ$ . Height above ground should be the same as for the skybeams previously described. Tuned feeders or matched lines are required and the unterminated end can feed a further section. Both a three-section and a six-section array of this type were tried at VS7PS with good results.

#### Summary of Beam Widths

Table 1 gives figures for beam-widths for co-phased elements carrying equal currents, all at a height of  $0.25\lambda$  above ground. In-line dipoles are "co-linear"; side-by-side dipoles are "broadside." The performance of a beam can be assessed from the beam widths in the broadside and co-linear planes. For example, the beam of Fig. 2 has four broadside sets of two co-linear dipoles each, with uniform  $0.5\lambda$  spacing; its beam widths are therefore  $26^\circ$  and  $46^\circ$  between the half power points. In all cases the beam maximum is at  $90^\circ$  wave-angle.

(To be continued)

#### The British Institution of Radio Engineers

HER Majesty The Queen has been graciously pleased to grant her Patronage to The British Institution of Radio Engineers.

His late Majesty King George VI became Patron of the Institution in 1946.

#### Dr. R. L. Smith-Rose now a C.B.E.

CONGRATULATIONS are offered to Dr. R. L. Smith-Rose, Director of Radio, Department of Scientific and Industrial Research, who was appointed a Commander of the Order of the British Empire in the recent Birthday Honours List. Dr. Smith-Rose is an Honorary Member of the R.S.G.B.

#### R.S.G.B. Amateur Radio Exhibition

THE Sixth Annual R.S.G.B. Amateur Radio Exhibition will be opened at 12 noon on Wednesday, November 26th, 1952, by Lt.-Col. Sir Ian Fraser, C.B.E., M.P., a Past President of the Society. Sir Ian is Member of Parliament for the Morecambe Division of Lancashire, President of the British Legion and President of St. Dunstons.

#### Radio Amateurs' Examination

THE G.P.O. announce their willingness to hold a Radio Amateurs' Examination in both London and Edinburgh on Saturday, October 4, 1952, from 2.30 p.m. to 5.30 p.m., provided at least 55 applications are received for the London centre, and 12 for the Edinburgh centre, by September 1.

The examination fee (25/-) should be remitted by cheque, money order or postal order made payable to the Postmaster General, and should accompany the candidate's application to sit for the examination, stating the centre at which he desires to attend. Applications should be addressed to: The Inspector of Wireless Telegraphy, G.P.O., London, E.C.1.

In London the examination will be held at the Cripplegate Institute, Golden Lane, E.C.1, and in Edinburgh, at a building suitable to accommodate the number of candidates. The actual location will be communicated to each applicant.

R.S.G.B. BULLETIN, JULY, 1952.

Depending on the number of candidates who present themselves at Edinburgh, it may be possible to arrange for an examination to be held next year in London, Edinburgh, and in one other centre most convenient for Welsh candidates.

#### The 21 Mc/s Band

UP to the time this issue closed for press, no date for the release of the remainder of the 21 Mc/s band had been announced by the G.P.O. The Society's Liaison Committee has, however, been in regular communication with the G.P.O. in regard to this matter and has stressed the point that the United Kingdom is one of the very few administrations not to have released the full band.

The Liaison Committee is aware that with the opening up of 21 Mc/s, official circles are concerned about the possible increase in T.V.I., especially in the London area, due to the second harmonic of frequencies in that band falling into the television band. It is this fact which may be responsible for the present cautious tactics at St. Martin-le-Grand. It is nevertheless an ironic situation that amateurs in countries which were not represented at the Atlantic City Conference were among the first to be granted permission to use the full 21 Mc/s band.

#### London Members Luncheon Club

MR. R. E. FORD, W4DPM, of Florida, and Mr. O. Johannessen, LA4K, of Moss, Norway, accompanied by his wife, were guests of the Club at the luncheon held on Friday, June 20; the Chairman (Mr. S. E. Vanstone, G2AYC) presiding. Following the luncheon Messrs. Ford and Johannessen spoke on Amateur Radio topics and expressed their pleasure at being present.

The Club meets monthly at the Kingsley Hotel, Bloomsbury Way, London, W.C.1 (opposite Headquarters) when visitors to London, whether Society members or not, are assured of a warm welcome.

Seat reservations should be made by postcard or telephoned to Miss May Gadsden at R.S.G.B. Headquarters (HOL 7373), not later than the day before the luncheon.

The Club is due to meet on July 18 and August 22 (12.30 p.m. for 1 p.m.).

# Technical Aspects of the Amateur Licence

By D. N. CORFIELD, D.L.C. (Hons.), A.M.I.E.E. (G5CD)\*

Members will have read in recent issues of the "Bulletin" that, as the result of negotiations between the G.P.O. and the R.S.G.B., certain concessions have been granted and additional facilities made available to amateurs. In this article—based on a lecture given at a London meeting in November, 1951—the author outlines the nature of these concessions and new facilities, explains the meaning of the various requirements, and interprets existing clauses which are affected by modern techniques not visualised when the present licence was drafted.

## Frequency Modulation (46F3 and 180F3)

IT was recently announced that frequency modulation (f.m.) may now be used in the 144-146 Mc/s band. Since, however, this use is only permitted when the carrier frequency lies between 144.5 and 145.5 Mc/s, a guard band of 0.5 Mc/s is provided, and it is, therefore, unnecessary to define the extent of the deviation ratio. In normal circumstances, it is unlikely that a deviation greater than  $\pm 75$  kc/s would be employed, and a guard band of 500 kc/s is adequate. The power-input limits are the same as those laid down for c.w. or a.m. telephony.

Although this facility is provisional for one year, in order to ascertain whether interference is being caused to Government services, it is not anticipated that evidence of such interference is likely to prevent permission to use frequency modulation from becoming permanent.

Whilst it is to be expected that stations using f.m. will employ some means of measuring or checking the deviation ratio, it is presumed that G.P.O. inspectors will be satisfied if no signal is audible outside the limits of the 144-146 Mc/s band.

In a f.m. transmission, the amplitude of radiated power remains constant, while the frequency of the carrier is varied about its nominal frequency (known as the *centre frequency*) by the modulation waveform (Fig. 1). The change of

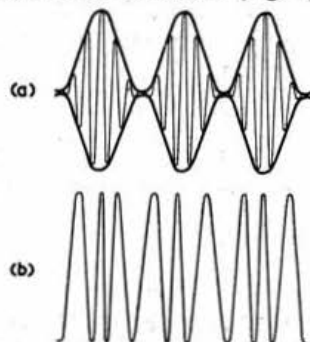


Fig. 1

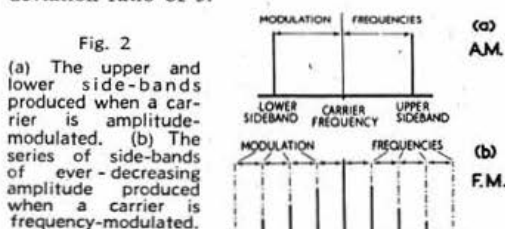
(a) The envelope of an amplitude-modulated carrier. (b) The envelope of a frequency-modulated carrier.

frequency of the carrier in either direction (which should be equal for linear modulation) is known as the *deviation*. If the modulation is not linear, the mean carrier frequency will shift, the degree of shift being a measure of the distortion due to this cause.

The bandwidth occupied by a f.m. transmission is defined by the Atlantic City Convention Regulations as the band of frequencies containing 99 per cent. of the total radiated power, including any discrete frequency on which the power is more than 0.25 per cent. of the total power.

Figs. 2a and 2b illustrate what happens when an a.m. and a f.m. carrier are modulated. In the first case two side-bands of equal amplitude are produced on either side of the carrier frequency;

in the second, a theoretically infinite number of side-bands are produced, but since they decrease rapidly in amplitude, those beyond the first few can be ignored. The relative amplitudes of the side-bands depend upon the modulation index, and not upon the deviation (i.e. "depth" of modulation). The *modulation index* may be defined as the ratio of the maximum carrier-frequency deviation to the modulating frequency in use, while *deviation ratio* is the maximum carrier-frequency deviation divided by the highest modulation frequency employed. For example—the B.B.C. f.m. standard is a deviation of 75 kc/s for a modulation frequency of 15 kc/s, or a deviation ratio of 5.



The amplitude of the carrier and side-bands varies with the modulation index, but the total power remains constant. As the modulation increases, the amplitude of the carrier decreases, passing through zero at an index of approximately 2.4 (Fig. 3a), and successively increases and decreases again, passing through zero each time. This does not imply that the carrier is ever a negative quantity, but merely indicates a phase change. The zero points are spaced according to Bessel functions; the increase for each value after the first can be taken approximately as  $\pi$ , so that the next zero is 5.52, followed by 8.65, etc.

In the Atlantic City Convention Regulations, the designation 46F3 indicates a maximum modulation

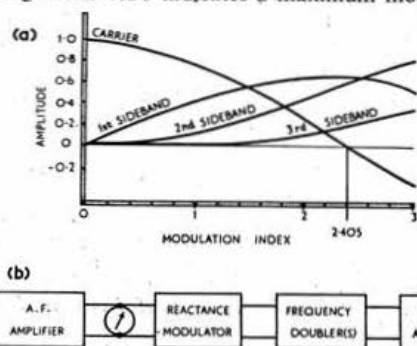


Fig. 3

(a) Graph showing the variation of the amplitude of the carrier and side-bands with modulation index. (b) Block diagram illustrating a method of monitoring deviation by means of an instrument connected across the input of the reactance modulator.

\* 20 Hoop Lane, London, N.W.11.

frequency of 3 kc/s, with a 20 kc/s deviation. The first numerals (i.e. 46) are derived by adding twice the maximum modulation frequency to twice the deviation—thus  $[(2 \times 3) + (2 \times 20)]$  kc/s = 46 kc/s, which is the approximate bandwidth of 46F3 signals. Similarly, the designation 180F3 indicates a maximum modulation frequency of 15 kc/s and a deviation of 75 kc/s. The first numerals define the bandwidth of the emission, and the letter followed by the final numeral the type of emission (e.g. F3—frequency modulated telephony).

### Monitoring Deviation

Deviation can be monitored or measured by the methods outlined in a lecture on *Frequency Modulation* given by the writer, and subsequently published in the *Proceedings of the R.S.G.B.*, No. 4, autumn, 1948.

One method is to calibrate the reactance modulator so that the input audio voltages required to produce given deviations are known. The voltages can be measured as a.f. or d.c. voltages, converted to r.m.s. or peak values as applicable, but if the calibration is made with d.c., due allowance must be made (by measuring the carrier shift both positively and negatively) for the fact that the reactance modulator may not be decoupled to d.c., so that, for the purpose of measurement, fixed

d.c. voltages must be used for all electrodes. The a.f. voltage applied to the modulator can be read on a rectifier-meter or valve-voltmeter connected either directly across the input, or following a suitable amplifier stage, as shown in Fig. 3b.

Another method is to build a monitor which can derive some input from the r.f. output of the transmitter, or from an intermediate point. The circuit would comprise a discriminator of the Seeley-Foster, ratio or counter, type, followed by an a.f. amplifier and a suitable indicating meter which can be directly calibrated in deviation. Provision for monitoring the quality of transmission can be included if desired.

The circuit of a monitor previously described by the writer<sup>(1)</sup> is shown in Fig. 4. This item of equipment is intended for use in conjunction with a reactance modulator which can usefully incorporate an audio amplifier and a frequency doubler giving a r.f. output on 8 or 9 Mc/s which provides drive for the main transmitter. Some of the output from the reactance modulator or doubler stage is mixed in a frequency changer with the output of a crystal oscillator of suitable frequency to provide an i.f. output for the f.m. detector. The d.c. output from this detector can be utilised for a.f.c. to reduce frequency drift of the carrier-frequency oscillator. The a.f. output, after amplification, operates a meter which can be calibrated directly in deviation. Jacks are shown in the circuit for frequency-checking and for monitoring the transmission with headphones, while a meter is provided for observing a.f.c. action, and to make sure that the i.f. is in the centre of the discriminator characteristic (or vice versa).

### Measurement of Deviation

If a calibrated instrument for reading deviation directly is not available, the only way of measuring the deviation of a transmission, and so calibrating a monitor, is by using a fundamental method originally described by M. G. Crosby in the *R.C.A. Review*, July, 1940. This method requires a communications receiver, preferably having a crystal gate, tuning to the centre frequency of the modulated oscillator (or a harmonic), and an a.f. oscillator or constant-frequency gramophone record. The receiver should be adjusted to a position of maximum selectivity at the centre frequency (which may be 4.5, 9, 18 or 36 Mc/s for a 144 Mc/s transmitter), the b.f.o. being switched-on to give an audible beat with the carrier. If an a.f. filter, to pass only this audible beat note, is available, it should be used.

The a.f. output from the oscillator is then applied to the reactance modulator or amplifier input, the voltage being slowly increased. A series of minima will be heard in the beat-note output from the receiver. The frequency deviation is equal to 2.405 times the frequency of the a.f. modulation for the first minimum, 5.52 for the second, 8.654, 11.792, 14.931, 18.071, 21.212, 24.353, 27.494 and 30.635 for the other minima up to the tenth. The increase for each value is nearly  $\pi$  (3.1416), and an error of less than 0.5 per cent. results if this figure is used. During this operation, the modulation tone may be audible in addition to the beat note, but this should be ignored.

Thus, if the receiver is tuned to 18 Mc/s (which may be the fourth harmonic of the reactance modulator), and an a.f. modulation frequency of 2000 c/s is employed, minima will occur at levels of input corresponding to deviations of approximately 4.8, 17.3, 23.6, 29.9 and 36.1 kc/s. These figures correspond to frequency deviations at the fundamental of 1.2, 4.3, 5.9, 6.9 and 9 kc/s, and,

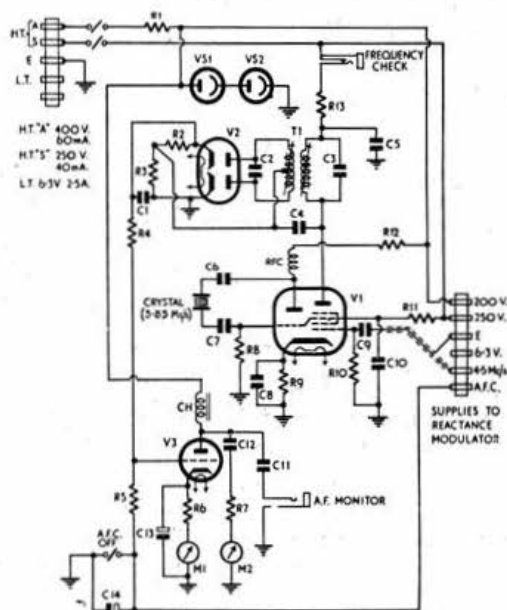


Fig. 4

Practical circuit for a Deviation Monitor and A.F.C. Unit for use with a reactance modulator on 4.5 Mc/s, suitable for the 144 Mc/s band. T1, Seeley-Foster discriminator 1.32 Mc/s, primary and secondary Q=100, inductance 150  $\mu$ H. For mid-band operation the reactance modulator frequency is 4.53 Mc/s, and the crystal 5.85 Mc/s. M1 records a.f.c.; M2 is the a.c. monitor.

R1—2,500 ohms, 10 W  
R2, 3, 5—100,000 ohms  
R4, 12—33,000 ohms  
R6, 13—1,000 ohms  
R7—22,000 ohms  
R8, 11—47,000 ohms  
R9—300 ohms  
R10—500,000 ohms  
Ch—Choke 100 H 10 mA  
M1—0—12.5 mA  
M2—0—500  $\mu$ A

C1—500  $\mu$ F  
C2, 3, 4, 6, 7, 9  
C5, 8, 10—0.01  $\mu$ F  
C11, 12—1  $\mu$ F  
C13—50  $\mu$ F electrolytic  
C14—8  $\mu$ F electrolytic  
V1—6K8G or 6J8C  
V2—6H6G  
V3—6J5C  
V51, 2—Mullard 7475  
100 V stabilisers

similarly, to 38.4, 138.4, 188.8 kc/s, etc., on the 144 Mc/s band. If several different modulation frequencies are used in successive tests, then sufficient points will be available to calibrate a deviation monitor (Fig. 4).

Alternatively, if a variable-frequency a.f. oscillator is available, it is easier to set the frequency in order to obtain even values of deviation. Thus, in the case of a 145 Mc/s carrier using a 4.5 Mc/s fundamental with the receiver tuned to 18 Mc/s, the first minimum would be for 25 kc/s deviation at 145 Mc/s, using an a.f. modulation of 1300 c/s. Or, if the receiver were tuned to 9 Mc/s, the same deviation at 145 Mc/s would result from an a.f. modulation of 650 c/s.

### Pulse Modulation

The use of pulse modulation is now permitted on the three high frequency bands 2350-2400 Mc/s, 5700-5800 Mc/s, and 10050-10450 Mc/s. The systems specified are P1, P2d, P2e, P3d and P3e, as laid down in the Atlantic City Convention Regulations, and these may be defined as follows:

P1—Telegraphy without the use of a modulating audio-frequency signal.

P2d—Amplitude modulation of the pulse by audio frequencies for telegraphy.

P2e—Width modulation of the pulse by audio frequencies for telegraphy.

P3d—Amplitude modulation of the pulse by audio frequencies for telephony.

P3e—Width modulation of the pulse by audio frequencies for telephony.

Phase or position modulation of the pulse (P2f and P3f) is not permitted at present. Fig. 5 shows the relative difference between the three basic systems of pulse modulation.

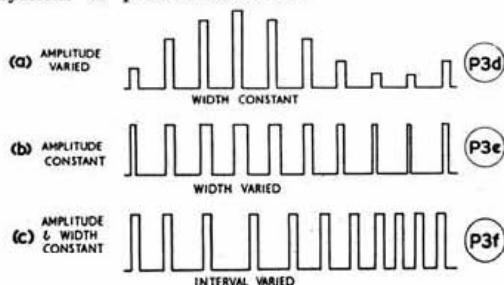


Fig. 5

The three types of pulse modulation specified in the Atlantic City Regulations: (a) P3d, amplitude modulation; (b) P3e, width modulation; (c) P3f, position or phase modulation.

The maximum permissible mean d.c. power input is rated at 25 watts. A r.f. power output limit of 2.5 kW peak was originally imposed, but it has now been stated that this figure should refer to the peak input power at the crest of the pulse, since it is unlikely that the station would have means of measuring peak r.f. power on those frequencies, nor could a G.P.O. inspector verify the value. Assuming a limit of 2.5 kW peak d.c. input, this would imply a maximum peak-to-mean ratio of 100-1, or a 1 per cent. duty ratio.

Duty ratio is defined as the ratio between pulse duration and pulse repetition period. For example—if the pulse duration is  $t$ , and the interval between the beginning of one pulse and the beginning of the next is  $T$ , then  $t/T$  is the duty ratio. A clause will be incorporated in the licence requiring that some means of measuring the duty ratio shall be provided at the station, so that the peak d.c. input can be readily determined by multiplying the mean d.c. input (as measured by d.c. instruments in the usual way),

by the duty ratio. As it would be considered essential for a station employing p.m. to have a suitable cathode-ray oscilloscope available in order to set-up the transmitter, this clause cannot be considered onerous.

In order to display the envelope of the r.f. pulse on an oscilloscope, some of the r.f. output should be applied to the "Y" plates of the tube, the "X" plates being operated from the time base, which should be locked at a sub-multiple of the repetition frequency. In practice this is not so easy as it may sound, particularly if the pulses are of very short duration, but it is essential that it should be done before transmission can be attempted.

### Television

Amateur Television is now permitted in the 425-455 Mc/s and 1225-1290 Mc/s bands. The maximum d.c. power input for peak-white or peak-black (whichever system is used) is 25 watts for the former band, and 150 watts for the latter. The waveforms of typical signals for both positive and negative modulation systems are shown in Fig. 6.

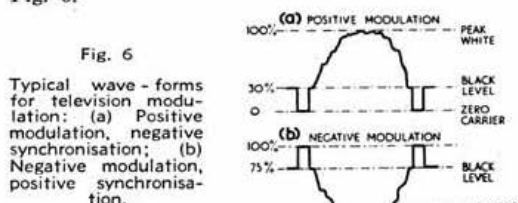


Fig. 6

Typical wave-forms for television modulation: (a) Positive modulation, negative synchronisation; (b) Negative modulation, positive synchronisation.

It is understood that the G.P.O. do not intend to restrict transmission to B.B.C. standards, and other standards may be used by agreement, though it is evident that difficulties may arise in monitoring the transmission. The call sign of the amateur television station shall be sent out either as a visual caption at minimum intervals of ten minutes, or radiated on the same frequency as the vision signal by means of c.w. or telephony. This is essential, because it may not always be convenient to transmit a visual caption, since this requires a camera or flying spot scanner which may not be available when test patterns are being transmitted.

### Single Side-band Transmission

With this form of transmission, the maximum d.c. input to be employed is as licensed for normal double side-band operation in the band in question.

### High-efficiency Grid Modulation

When high-efficiency grid modulation, such as the Taylor or Terman-Woodward systems, is employed, the licence condition shall be interpreted as requiring a maximum total input of 150 watts (or whatever power is specified) to both valves delivering power to the aerial, in an unmodulated condition. Care must be exercised, however, to ensure that over-modulation does not occur.

Normal modulation of such transmissions assumes that the r.f. output is symmetrically modulated; in other words, the upward modulation cycle of the r.f. envelope is equal to the downward. If this is exceeded in such a way that the carrier shifts (i.e. the upward modulation is greater than the downward, so that, in effect, controlled-carrier operation is employed), then the maximum licence ratings are as for television (i.e.

(Continued on page 31)



## STACKS v. YAGIS

How to "see" their radiation

The present controversy on the relative merits of Stacks and Yagis for v.h.f. use has led the author to suggest the following novel method of understanding the operation of multi-element arrays without involving the knowledge of mathematics normally considered necessary in aerial theory.

THE controlling factor in the reception of DX signals at v.h.f. is signal-to-noise ratio. The design of two-metre converters has now reached the stage where a considerable proportion of the noise heard is external to the receiver—i.e. cosmic and man-made noise. Consequently, pure gain from the aerial, although perhaps overcoming residual converter noise, is not the ultimate requirement; it is the *noise discrimination* of the aerial which governs the final signal-to-noise ratio achieved.

Man-made noise can be reduced by improving the horizontal directivity of the aerial system, the degree of narrowing of the frontal beam depending upon the location of the station and the intention of the operator; thus, a narrow beam will provide greater discrimination in a locality where noise-level is high. On the other hand, a station situated in an open and relatively noise-free environment may well find that a narrow beam restricts the number of contacts obtainable—which is undesirable when DX is not the main consideration. The question of horizontal directivity is therefore largely one of site and personal choice.

Cosmic noise, however, comes from above, and is controllable by the vertical directivity of the aerial. Its existence can be proved conclusively by beaming the aerial array at the setting sun (as

first suggested to the writer by G3BA), when a considerable increase in noise will immediately be apparent. From the point of view of transmission, it is obviously wasteful to radiate power into space, and the amount of power thus lost from certain kinds of aerial is often effectively demonstrated by the violent flutter-fading caused by aircraft flying in the vicinity. The question of vertical directivity is therefore an important factor in aerial design, influencing both transmission and reception.

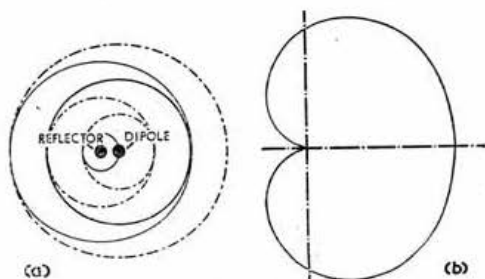


Fig. 2.

(a) End-on view of radiation from two horizontal dipoles spaced quarter-wave apart, and fed 90° out of phase for Yagi operation. (b) Vertical polar diagram of 2-element Yagi aerial, derived from (a).

## Polar Diagrams

It is now necessary to visualise the way in which waves are radiated from an aerial, and in order to do this, the radiation must be stopped at some instant in time, so that the waves can be drawn as they appear at that instant. Having done this, it will be found that the radiation wave-form from each element of the aerial at that particular instant can be regarded as d.c., and the normal additions and subtractions of positives and negatives made to show the final radiation pattern. The conventional conception of wavelets in a pond radiating in concentric circles from some central disturbance (in this case the aerial) may be used, the peaks and troughs being represented by the lines and dotted lines respectively.

Since vertical directivity is being considered, the "pond" must be turned on its side, and Fig. 1a illustrates the radiation from a horizontal dipole in free space, viewed end-on. Each full circle represents the positive peaks of the wave-form, a wave-length apart, while the intermediate dotted circles are the negative peaks—all depicted as stationary at one instant in time. A second dipole placed half a wave-length below the original aerial (i.e. in stack formation), if fed in phase as a stack should be, would radiate an identical wave pattern (Fig. 1b). The inter-action of the two patterns results in the addition of the positives and negatives in the horizontal direction, and their cancellation in the vertical direction. The combination of

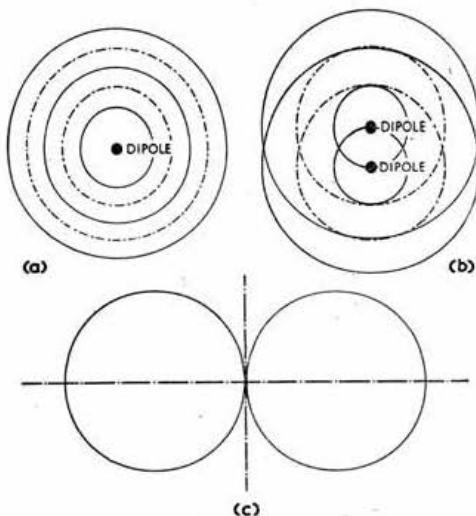


Fig. 1.

(a) End-on view of radiation from a horizontal dipole at one instant in time. Full circles indicate positive peaks, dotted circles—negative peaks. (b) End-on view of radiation from two horizontal dipoles fed in phase and spaced half-wave apart in stack formation. Positives and negatives add horizontally and cancel vertically. (c) Vertical polar diagram of two stacked dipoles, derived from (b).

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these additions and subtractions can be drawn as a vertical polar diagram (Fig. 1c), indicating the final radiation pattern of the aerial array.

Similarly, a picture of the radiation from a Yagi aerial may be obtained, by placing a dipole behind the original aerial, as shown in Fig. 2a, the phasing being so arranged that the additional dipole behaves as a reflector. In this case, the method is not strictly accurate, because of the phase changes involved in tuning the element as a reflector to avoid the necessity of feeding it. The results do, however, indicate the mode of operation of this type of aerial, and enable comparisons to be made. Fig. 2a shows that although the positives and negatives add at the front and cancel at the rear, they do not cross as in the stack, and the vertical polar diagram (Fig. 2b) is considerably broader. The two systems show approximately the same gain, but although the Yagi is unidirectional, a considerable proportion of the radiation is away from the horizontal, and is wasted on transmission. If used for reception, a low signal-to-cosmic-noise ratio may be expected.

The addition of further elements to the stack narrows the main lobes still further, and produces a number of small side lobes; while the addition of more elements to the Yagi narrows the main lobe, but adds a minor lobe at the rear. The reader is recommended to draw diagrams to illustrate these effects himself, as space does not allow illustration.

### Reflection from Earth

Since vertical directivity is the main concern, the effect of the reflection of radiation from the ground must now be considered, and an optical analogy may be used, the effect being that of another aerial situated the same distance below the surface of the ground as the original is above. This is illustrated in Fig. 3a. Allowance should be made for the 180 degree phase change which occurs on reflection. Again, the circles of the wave pattern cross, addition and subtraction showing the forma-

tion of lobes, as illustrated in the vertical polar diagram of Fig. 3b. The fact emerges that virtually none of this radiation occurs in the horizontal plane, where it is needed, and if drawings are made for different aerial heights, it will be found that the higher the aerial, the greater is the percentage of power lost upwards.

This state of affairs is unsatisfactory, but can be overcome by arranging for the inherent vertical directivity of the aerial to be such that little or no radiation reaches the ground, so that reflection cannot take place. This can be achieved to a large extent by using stack formation, but is impossible with the Yagi. Direct comparison between a 4-element stack and 4-element Yagi under normal conditions shows that up to a distance of about 80 miles (depending on location) there is little to choose between them, but beyond this, the Yagi signal is rapidly lost, while the stack attains a much greater range. This effect is due, in the case of the Yagi, to deteriorating signal-to-noise ratio, and to tropospheric bending of the radiation until the grazing angle becomes suddenly too great, and no further bending can take place. In the case of the stack, because of the lower angle of radiation, the critical grazing angle occurs at a greater distance from the aerial, thus extending the range.

It will be realised that, both in theory and practice, the pure stack has the advantage over the pure Yagi. A combination of the two systems, however, in the form of a 4-over-4, would undoubtedly be ideal from the viewpoint of distance, adding the good vertical directivity of the stack to the sharp horizontal directivity of the Yagi. The writer, being interested in working *stations* rather than a *particular DX station*, finds the narrow horizontal directivity of the stacked Yagi a disadvantage, and prefers to remove *all* directivity in the horizontal plane by using a stacked turnstile array (vertical directivity being increased still more by using a "stack of eight"). Results with this aerial show no loss of DX, and a normal service area of some 150 miles in all directions at once.

The above method of visualising the radiation pattern of an aerial is useful for determining the effect of errors in installation, such as incorrect phasing in an array. As proof of this, the reader is invited to re-draw Fig. 2 with the dipoles out of phase—as would occur if the feeders were not crossed. Radiation will then be found to be straight upwards!

### VERON Code Proficiency Runs

THE Netherlands National Amateur Radio Society (VERON), through its Headquarters station PA0AA, is transmitting code proficiency runs at speeds of 15, 20, 25 and 30 w.p.m. Texts are sent in plain English by automatic key and run for five minutes at a time.

If a period of at least one minute is copied free from error of any kind, and without the help of another person or mechanical means (which facts must be confirmed in writing) an applicant may claim, free of charge, a special Code Proficiency Certificate.

PA0AA is operated by VERON Traffic Manager, PA0LR, and the runs take place on Sunday mornings from 1000 G.M.T. onwards, on a frequency of 3625 kc/s.

Further details can be obtained from PA0LR, 77 Middenduinerweg, Santpoort, The Netherlands.

T.V.I. and 21 MEGS.  
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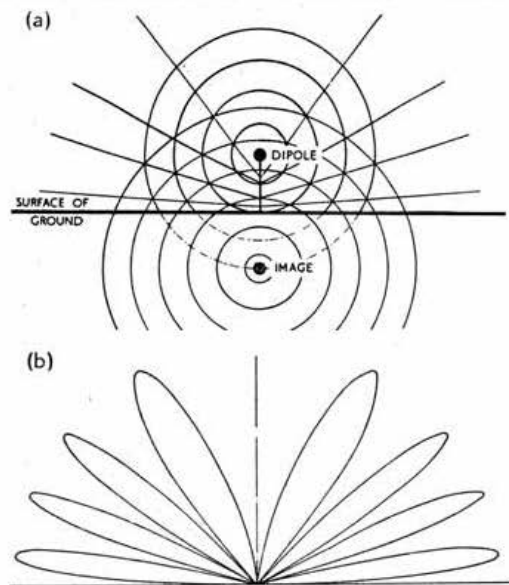


Fig. 3.

(a) End-on view of radiation from a horizontal dipole two wave-lengths above ground. Positive peaks only are shown, the points of addition being joined to indicate centres of lobes. (b) Vertical polar diagram of horizontal dipole two wave-lengths above ground, derived from (a).

# Direct-Coupled Screen Modulator

By Alan G. Dunn (G3PL)\*

FOR the past three years the writer has been using a simple form of screen modulation which can be added to an existing transmitter with the minimum of trouble and expense. This system has recently been "discovered" in the U.S.A. and given the somewhat misleading title "Clamp Tube Modulation."

A 25-watt transmitter of the popular Pierce c.o.p.a. type, was employed for c.w. work on 3.5 and 7 Mc/s., and it was required to use this rig on 1.8 Mc/s. telephony at reduced power. The easiest and cheapest method of modulating the p.a. was sought, and after some experiment, the arrangement shown in Fig. 1 was devised. Additional components required were: three fixed resistors, one 500-ohm wire-wound variable resistor, two 50  $\mu$ F. electrolytic condensers, a 0.1  $\mu$ F. paper condenser, microphone transformer, single-pole switch, jack, and an SP61 valve and holder.

S1 is then closed, and R5 adjusted until the aerial current is about 0.6 of its original value. The p.a. tuning should be readjusted for maximum aerial current. The difference from the full-power adjustment will be slight.

Finally, R5 is adjusted for optimum speech quality, the transmission being monitored while this is being done. The function of R5 is to control the voltage on the screen of the p.a. valve, by altering the bias on the grid of the modulator valve and therefore the anode current drawn by it.

After the initial setting-up, R5 need not be altered unless either the p.a. valve or the modulator valve is changed. Tuning for maximum aerial current with S1 closed is the only adjustment needed during normal operation.

## Performance

With this circuit, it is not possible to over-modulate in the usual sense. To reduce the carrier power to zero, the screen voltage must be swung to zero or even slightly negative. The anode impedance of the modulator valve can never be low enough to reduce the screen voltage to zero, so that the carrier can never be cut-off completely, with the result that the negative-going peaks of

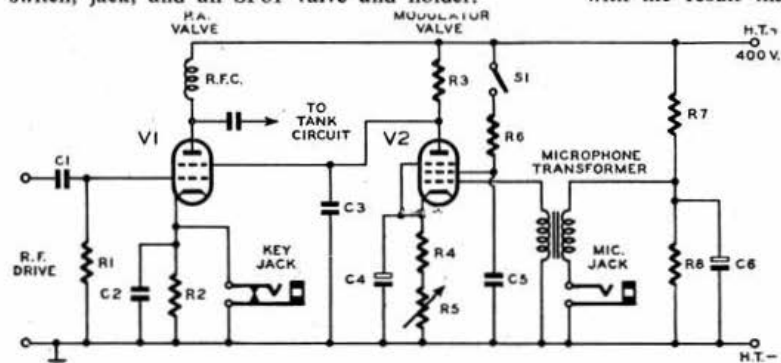


Fig. 1.

Circuit of the direct-coupled screen modulator.

C1, 300  $\mu$ F.; C2, 0.01  $\mu$ F.; C3, 0.001  $\mu$ F.; C4, 6, 50  $\mu$ F. electrolytic; C5, 0.1  $\mu$ F.; R1, 30,000 ohms; R2, 6, 100,000 ohms; R3, 50,000 ohms 5-W.; R4, 50 ohms; R5, 500 ohms variable; R7, 20,000 ohms 20-W.; R8, 470 ohms, 1-W. V1, 6L6; V2, SP61.

## Circuit Details

The modulator valve is an SP61, chosen because of its low signal input requirements, the anode being connected directly to the screen of the 6L6 p.a. valve. Switch S1 breaks the screen circuit of the SP61. When open the valve draws no anode current and the voltage on the screen of the p.a. valve is normal for c.w. operation—in this case a little over 220 volts. When closed, the anode current passed by the modulator valve causes an extra voltage drop in R3, and the p.a. screen voltage falls, reducing the p.a. input power from the c.w. valve.

The grid of the modulator valve is connected to the secondary winding of the microphone transformer. A gain control could be inserted here, but was not found necessary with the particular carbon microphone in use. A method of obtaining "free" energising current for the microphone from a tap on the power-pack bleeder resistance chain is incorporated. The microphone input circuit is arranged so that a single screened conductor can be used for the microphone lead, the screening braid acting as the return. The braid should be connected so that it is earthed when the microphone plug is inserted.

## Adjustment

With S1 open, the transmitter is tuned-up and the p.a. stage loaded to 25 watts input, aerial current being measured with an r.f. ammeter.

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modulation are restricted, but the positive peaks are not. Due to the low screen voltage used in this method, modulation in the positive-going direction is reasonably linear to well over 100 per cent.

Thus, the average level of the screen voltage, and therefore the average carrier power, rises when a degree of modulation is reached which, if an anode-modulated stage were under discussion, would be termed rather less than 100 per cent. This provides a small degree of "controlled carrier" operation, or as it has recently been termed, "Super-modulation." In spite of the fact that the negative-going peaks of modulation are slightly clipped, the effect is not detrimental, as the type of splatter caused by over-modulation is absent. Unless carried to extremes, the distortion of the modulation waveform cannot be detected by ear. If the upward carrier shift is excessive, however, then the speech voltage input to the grid of the modulator valve should be reduced. The grid drive to the p.a. valve should not be too high; in the case of the writer's transmitter it is about 2.5 mA.

For c.w. operation on 1.8 Mc/s, the microphone plug is removed and the p.a. stage is keyed in the cathode circuit with S1 closed. The resistor across the key jack is to prevent the voltage between the cathode and heater of the p.a. valve from exceeding the safe value when the key is up (about 200 V. maximum for the 6L6). When S1 is closed, the input power is about 8 watts.

# Effective Noise Limiter

By R. W. Harris (B.R.S. 4029)\*

AFTER "suffering" for a long time the many forms of noise which the ether contains, the writer decided that something drastic must be done to improve receiving conditions on the R.208 receiver installed at his station. Odd remarks by amateurs who own receivers of this type, concerning the difficulties and complications involved in fitting a noise limiter, acted as a deterrent at first; but after trying out various methods using a single diode and crystal, something really effective was achieved with a double diode, a pair of resistors, and a single condenser. Incidentally, only one connection in the original circuit was altered.

Although the noise limiter to be described was fitted to the R.208, there seems to be no reason why a similar device should not be included in the circuit of any communications receiver. It has already been fitted to a CR.100 with very effective results.

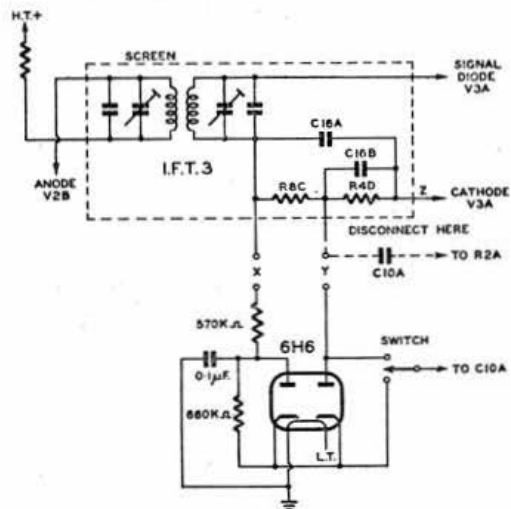


Fig. 1.

Theoretical circuit diagram of 3rd i.f. transformer in the R.208, and noise limiter. The points of interconnection are at X and Y. The limiter on/off switch is connected to C10A.

## The Circuit

The upper part of Fig. 1 illustrates the theoretical circuit of the third (and final) i.f. transformer of the R.208, the dotted line indicating the screening can which contains it. Two resistors are shown inside the can, together with a number of condensers. Point "X," which is important, is brought out through the base of the 3rd i.f. transformer, but is not connected; this point is actually the "bottom end" of the secondary of the transformer.

An examination of Fig. 2, which shows the base of this transformer and its surrounding components when looking underneath the chassis, will indicate where point "X" is situated in relation to the other components. A tubular condenser will be found attached to the side of the chassis immediately over the i.f. transformer, but it should not be necessary to remove it, as there is sufficient space to manoeuvre a small soldering

iron. A check can be made with an ohm-meter between points "X" and "Y" for resistor R8C (50,000 ohms), and between points "Y" and "Z" for resistor R4D (500,000 ohms), in order to confirm the connections.

The lower part of Fig. 1 shows the noise limiter, and its mode of connection to the i.f. transformer circuit. A switch has been provided for switching the limiter in or out of circuit. The values of the resistors shown, each of which was made up of two in series, were found to be the most effective. Experiments revealed that the resistor between anode and cathode of the diode must have a value about 90,000 ohms greater than the other.

## Construction

A small sub-chassis, large enough to take an octal valve base, was mounted on a bracket, the latter being secured to the chassis by the nut which holds the i.f. transformer on the right-hand side of the group board (on the under side). This enables the 6H6 to be mounted on its side in an accessible position, both for replacing the valve and wiring the base. It also allows connecting leads to be kept short. The wire from point "Y" to the condenser C10A (on the group board) was disconnected from the condenser and soldered to one of the diode anode pins. It was found to be of the correct length for this purpose. The remainder of the wiring was carried out as shown in the diagram (Fig. 2), leads being kept as short as possible.

The wiring from the noise limiter to the switch, and back to C10A, requires the use of screened cable in order to prevent hum. In the particular case described, the last traces of hum were not eliminated until the screening was bonded to earth at each end.

The switch was mounted on the front panel, between the mains-battery switch and the a.f. gain control, as high as possible under the chassis. After completing the modification, it may be found that the 3rd i.f. transformer needs re-trimming, due to slight detuning caused by circuit alterations. This may be carried out on a steady signal, without the aid of any special instruments. The secondary trimmer should be adjusted first.

## Results

The results obtained were beyond expectations, and the writer feels justified in recommending the

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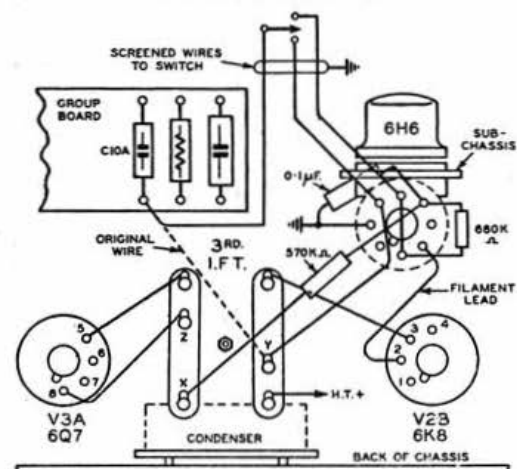


Fig. 2.

Under-chassis layout of R.208 showing 3rd i.f. transformer and associated components, with noise limiter installed and connected.

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# Automatic Aerial Change-over Switch

By C. Andrew (G2HF)\*

**A**CTING on the generally accepted principle that the best aerial for reception is the transmitting aerial, the writer experimented with various types of change-over switches, but found that most of them suffered from one bad fault or another. Some were too heavy for amateur use, others were too unstable in action, practically all had too little "throw" movement. New switches were too expensive, whilst war surplus gear of this kind proved cumbersome and required too high an energising voltage. As "press-to-talk" facilities and relays are so important in modern amateur stations, a satisfactory change-over switch of some kind had to be procured.

Finally, the writer devised a simple polarised switch which proved to be reliable in action, light in weight, with ample distance between the contacts to make and break a fully modulated 150-watt carrier. Most of the material used is of the type that abounds in every shack.

The diagram and photograph (Figs. 1 and 2) show the aerial coupling unit with the change-over switch in position. The mode of construction and operation will be immediately apparent. The switch is operated automatically by the usual system of "press-to-talk" switch and relays. The "throw" distance between contacts is from one to two inches, ensuring a minimum of coupling between receiver and transmitter, with less chance of feed-back from this source.

polarity so that the fields are additive and do not cancel each other.

Wound over the armature laminations is the coil, the gauge and number of turns of wire being chosen to suit the voltage supply. For instance, the relays used at G2HF are operated from a six-volt rectified and smoothed a.c. supply, for which No. 26 s.w.g. enamelled wire is suitable. In the case of a 4 volt supply, No. 24 s.w.g. wire should be used, as it will be required to carry a greater current. The direction of "throw" of the armature will depend upon the polarity of the supply, and this is reversed by means of a double-pole double-throw relay (Fig. 1), actuated by the "press-to-talk" switch.

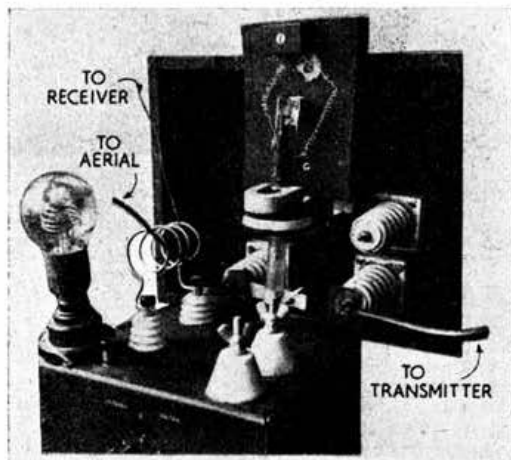


Fig. 2

The aerial change-over switch in position at G2HF.

When changing from receive to transmit, the aerial switch should function automatically, together with receiver muting, h.t. switching, etc. One relay can be arranged to do all this.

The contacts are made from copper strip—that on the armature being bent in the form of a knife edge, and the two on the insulators (mounted on rigid supports not shown in Fig. 1) being folded so as to "sandwich" the moving knife contacts. The photograph also shows the neon lamp over which the aerial lead-in passes for radiation checks. By using a double set of knife contacts, the switch may also be used to make and break twin feeders.

It is important that the top of the swinging arm should not be screwed up too tight, but should be allowed to move freely. Apart from this there is nothing to go wrong with this simple piece of apparatus which has been working perfectly in the writer's station for more than a year without fault or failure.

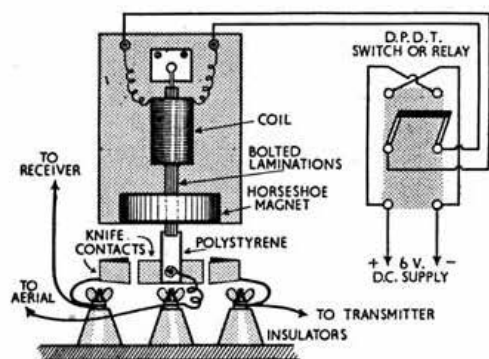


Fig. 1

Diagram of the simple aerial change-over switch described in text.

## Construction.

The device comprises an armature, made from old transformer laminations bolted together, attached to a length of polystyrene to which the copper contacts are secured (rivets or nuts and bolts may be used). The contacts are connected to the aerial insulator by means of a flexible "pig-tail" of braided wire. The armature is suspended from a simple bearing and allowed to swing freely between the poles of one or two old loudspeaker magnets of the horseshoe type. One magnet would be sufficient, but two are preferable in order to obtain a strong positive action. When two magnets are used, they must be placed together in the same

## Summer is here . . .

Have you got your R.S.C.B. Pennant?

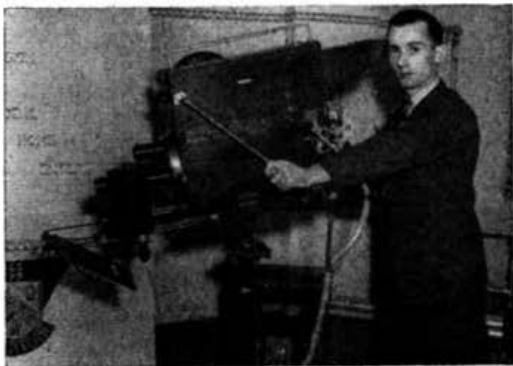
If not, order now from Headquarters.

These miniature pennants, in red and blue double bunting, are ideal for clubroom, shack, bike, car or portable station.

Large size (12" long) - - - 6/6  
Small size (10" long) - - - 5/6  
(add 3d. for postage)

\* 2 Courtland Road, Wellington, Somerset.

## AMATEUR TELEVISION IN REVIEW



George Short, of East Heckington, Lincs, with his home-constructed TV camera, incorporating an RCA 5527 tube, a servo-operated lens turret, and separate view-finder (top of assembly). Power supplies and pulses are generated by units on the floor.

**T**HE father of television, John Logie Baird, began his pioneer experiments in the '20s in a truly amateur fashion. With no money to spare for apparatus, and utilising old packing cases, cheap lenses, and a hundred and one bits and pieces of "junk," he produced the first television pictures ever to be publicly demonstrated. Many amateur enthusiasts soon made replicas of his simple apparatus, and several of the original 30-line disc-scanning units are still in existence in this country today. (At the recent Television Convention arranged by the Institution of Electrical Engineers an early 30-line model was demonstrated successfully. Many visitors from abroad seemed surprised that worth-while picture transmissions were radiated by Baird and others more than 25 years ago.—Ed.).

With the change to high-definition electronic scanning and the introduction of the cathode-ray tube for reception, the pre-war amateur TV experimenter was rather left behind. Tubes were expensive, and the normally available valve types were inefficient; nevertheless, some experiments were made. The first edition of *The Amateur Radio Handbook*—published in 1938—devoted a short chapter to television techniques, covering the design of a simple 100-line disc transmitter for flying-spot scanning, using a small arc-lamp light source. Valves such as the SP41 were becoming available, and, considering the simplicity of the equipment, results were fair.

### Post-war Developments

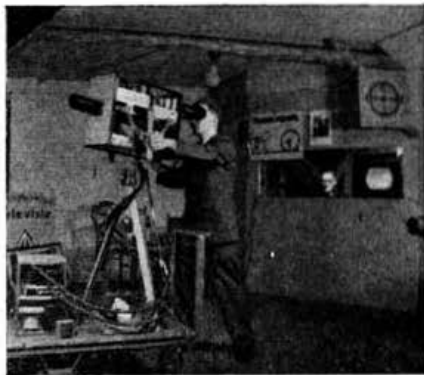
The great emphasis laid on radar during the war brought about vast improvements in valves and circuits, and after the war much useful equipment came on to the surplus market. Two further developments were the production of small camera tubes† at a reasonable price and the development of electron-multiplier photocells having a greatly increased sensitivity as compared with pre-war types. Fortunately, these cells were used in large numbers as noise generators in radar jammers, and many became available very cheaply. With high-slope pentodes of the EF50 class being almost given away, and

numerous cathode-ray tubes available, it was obvious that Amateur TV could start without delay.

Dutch amateurs, under the leadership of PA0ZX, were the first to become organised. Early in 1948 work was started on a transmitter at Groningen, and was sufficiently far advanced by September of that year for a public demonstration, witnessed by some 15,000 people, to be held. A two-way sound link installed between camera and receiver enabled visitors to talk to, as well as see, their friends who were being televised. The camera consisted of an RCA 5527 iconoscope, running at 250-lines 50-pictures per second, sequentially scanned, while the transmitter was a 100 watt p-p 24G unit operating on a frequency of 59 Mc/s. The first receiver was a converted Gee set. About the same time, closed-circuit experiments were being made by PA0XN in Haarlem and PA0TZA in Eindhoven.

### Recent Activity

In February, 1949, as a result of notices in the R.S.G.B. BULLETIN, several British amateurs met to organise a British TV Club. Among the early members was Ivan Howard, G2DUS, whose 5527 camera and closed-circuit equipment received wide publicity and was later demonstrated at the 1950 R.S.G.B. Amateur Radio Exhibition. Although much work was done on closed-circuit, it was not possible to overcome official inertia until 1951, when, as a result of pressure by the R.S.G.B., Amateur Television Licences were at last issued by the G.P.O. Meanwhile, the British TV group (known as the British Amateur Television Club) had grown to some 120 members, and contact had been established with similarly interested amateurs in France, Germany, Sweden, Finland, Canada, U.S.A., Australia, New Zealand, South Africa, Eire and even Fiji! By this time, the Dutch transmission had moved to 144 Mc/s, and a regular weekly programme was being radiated, as there was then no commercial television station in Holland. Most other countries—including the U.K.—have, unfortunately, restricted the use of Amateur TV to the 420 Mc/s band and higher frequencies, and this has, of course, limited the number of stations on the air. Suitable v.h.f. valves are at last becoming avail-



The new Amateur TV studio at Hogezaand. PA0ZX is operating the camera, while PA0VWL sits in the control booth (rear).

\* Cheyne Cottage, Dukeswood Drive, Gerrards Cross, Bucks.  
† Unfortunately not generally available in Great Britain.

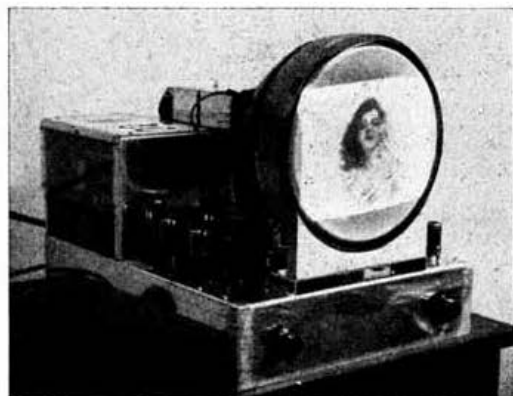
able, however, and the techniques involved in modulating them are under active consideration, notably by G3FNL.

### Current Difficulties

As the majority of the British TV group cannot afford either the Amateur Television licence or a camera tube (which costs about £28), and as, in any case, the import of the latter has now been stopped, the transmission of stills and cine-film by flying-spot methods has received a good deal of attention. Experiments are continually being made in economising still further in the number of valves and circuits employed without seriously impairing picture quality; new valves are being made available by some manufacturers so that the group can study their applications. Research into colour and stereoscopic television is in progress, and if members of the v.h.f. TV research group can manage it, there should be a possibility of achieving a cross-Channel television QSO in the not too distant future.

This is the record of activity to date. Despite the fact that there is no published data or literature to help, and all the work has been

done in their spare time, TV amateurs, with extremely limited resources in both money and test gear, are continually breaking new ground.



Untouched photograph of test picture displayed on monitor screen (SM5TT, Sweden).

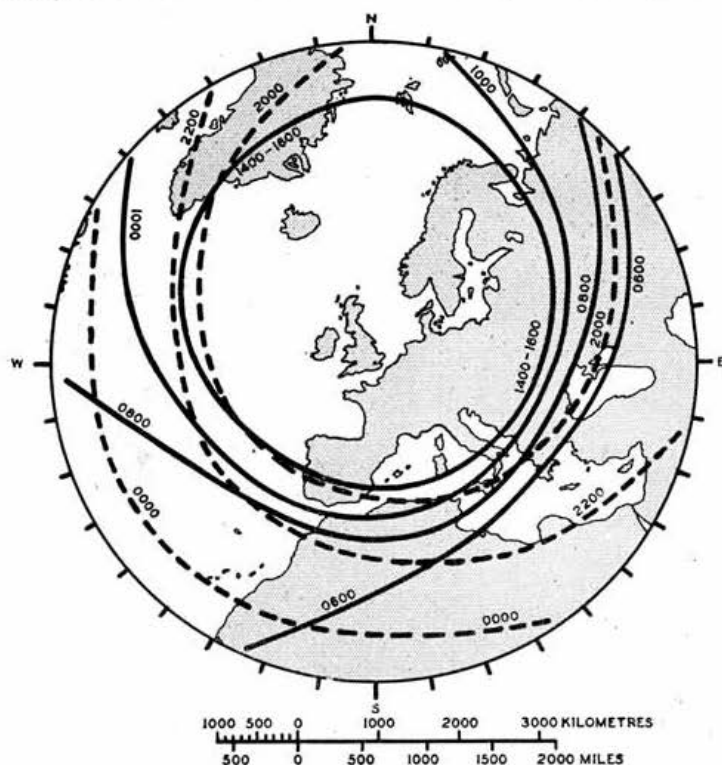
## Skip Distance Predictions for the Amateur Bands

By P. H. SOLLUM, B.Sc., A.C.G.I. (G3BGL)\*

**I**F the skip distance for a particular frequency is defined as that distance for which it is the maximum usable frequency, it is known as the maximum skip distance; the actual skip or region of zero sky-wave signal is always slightly less.

The method used for computing a chart of maximum skip distances at various times during

the day for a given frequency band was described in the April issue. The predictions are based on data supplied to the Society by the Department of Scientific and Industrial Research. Points on a great circle map plotted for the same time are joined together by a curve showing the fringe of the skip zone at that time.



The curves on the accompanying map, centred on London, show predictions, for August, 1952, of the fringe of the skip zone for transmissions in the 14 Mc/s band from S.E. England via the  $F_2$  layer, at various times throughout the day (expressed in G.M.T.). At any given time signals may be received from points between the appropriate curve and the edge of the map. The solid curves are for the period when the skip is shortening; the broken curves are for the period when the skip is lengthening.

Skip distances from Ireland are similar to those measured from London in corresponding directions, but will occur about 45 minutes later. Skip distances from Scotland are, in general 200-500 km. longer than those measured from London in corresponding directions.

Used in conjunction with the Skip Distance Map, published last month, the trend in conditions can be followed. Since the hours of sunrise and sunset are continually changing, and as the sunspot cycle proceeds on its way, it is to be expected that the predicted maximum skip distances (which are for an average day) will be too short at the beginning of the month, and too long at the end, or vice versa, depending upon this trend.

\* The Rowans, Green Street Green, Farnborough, Kent.

## THE MONTH ON THE AIR

by A.O. Milne  
G2MI

## Conditions

THERE was something for everyone during June: one or two excellent DX days on 14 and several "short skip" days when old friends, whom one seldom hears, came roaring in at "nine plus 40".

On 28 there were several sessions of short skip to Western Europe with everything from LA round to I coming in at tremendous strength, only suddenly to fade out in a few seconds. The evening of June 24 was probably the most extraordinary of the month when noises which sounded very much like the inter-island telephone links around our coasts were let loose on the TV frequencies, temporarily scattered far and wide by tropospheric ducting. At the same time 14 was full of GM and G1 signals at colossal strengths in the South with G's filling the band up North.

## Notes and News

Ed Wagner, G3BID has it from ZP5CF, who used to be ZP4AF, that all Paraguayan amateurs have had their calls changed because the country has been divided into numerical zones. Ed's recent DX includes SU5EB (QSL via R.S.G.B.) 14155 at 0600; JA8OT, 14205, 1640; HZ1TA (operated by HZ1HZ) and KL7ADR 14290, 0715.

Les Coupland, ex-G2BQC, now VK2LJ, advises anyone thinking of settling in Australia to take as much gear as possible as it is scarce and very expensive.

Roland Beardow says British amateurs settling in Canada have to pass the exam for a licence, even though they held a licence in the U.K.

G3IBL complains that someone with a very poor note is pirating his call on 3.5. At present he is rock-bound on 1883.8 kc/s.

G3APX reports that VE3CCK hopes to operate as FP8AJ during August and comments that he expects to be a merchant navy operator by the time this appears in print. Good luck o.m.!

G8OJ has done quite well for himself on 14. Recent contacts have included ZD9AA, VP7NM, FQ8AP, FI8AB, FF8AG, ZC2MAC, JY1OG, JY1AJ, ZD2HAH, SV0WW and EA9DC who has been very busy in Ifni. On 'phone, his best QSO's have been with OX3WX, M13LK, EK1JC and KT1UX. LX6XD is active from Jan Mayen on 14020. Times unknown.

G5VT has worked YA1AA, who said "await card." OY3IGO has checked up on OY3FP who is definitely a pirate. F9QV/FC has been active again on 14.

B.R.S. 7594 in Yeovil says 3.5 has remained open at times. According to G5JL, 7 Mc/s has dropped off badly and very few VK or ZL signals have been heard or worked.

G3ETQ raised VE1AAS and 9S4BE on that band but agrees conditions have generally been poor. G2HKU of Sheerness, on the other hand,

has worked KP4BR, 7021, 0348; OA4ED, 7038, 0600 (card received); KZ5RG, 7021, 0447; and many W's. Those heard have included CE7AY, 7020, 0515; HK4DP, 7050, 0700; HK5DH, 7021, 0345; LU3DI, 7015, 0330; CM7PT, 7031, 0445 and several PY's and YV's. He says W3SPI is M/Sgt. Wenglare 1909, A.A.C.S. Sqdn., Andrews Air Base, Washington 25 D.C. and is ex-TA3AA. QSL's for ZD3B may be sent via G3FHV.

## Plums

VR1A and VR1B are on 14140 'phone and KW6BB on 14041 c.w.

From W5KUC's DX C.C. Bulletin we glean that FB8BS and FB8BE are now active, the latter being Pierre Reyter, Rue Lagongine, Tamatave, Madagascar. He is c.c. on 7050 and 14100. FB8BC is in Nossi-Bé. Cards from FB8XX and FB8ZZ should be in the next batch to arrive at R.S.G.B. from R.E.F. VR9YT is in New Ireland but counts with New Guinea.

## DX on 80

B.R.S. 19107 of Croydon says South Americans still come through on 3.5 Mc/s. Those heard include PY2AY, PY7LN, LU1EP, LU5AAO, LU9MK, CE4AD, and CX1FY mostly about 2 a.m. He has also heard EL9A, FL8MY, HR1SO, 14150, 2225; HZ1TA and 15US, 14180, 1900, ZP5CB, 14172, 2225 and W8MY who says he is "portable in Europe"! Ten has produced CR6BH, 28370, 1755 and CR6BX, 28500; OA4BC, VP6SD, VQ2NS.

G8FC offers MF2AB, 7025, 1415; AP2N, 14134, 1740; FB8BF, 14025, 1600; FB8ZZ, 14050, 1630; FR7ZA, 14025, 1530 and ZC2MAC, 14025, 1530. W1MXG/MM is operating from s.s. L. V. Stanford



A compact station with a good DX record. At the microphone is Jimmy Taylor (G2MDBX). Equipment pictured includes a workmanlike transmitter, a Commander receiver, and a BC.221 frequency meter.

\* 29 Kechill Gardens, Hayes, Bromley, Kent.



in the North Atlantic. W2PFL/MM is on the s.s. *Esso Portland*.

#### Apology

To G3GVK whose call was inadvertently mentioned last month due to an error of handwriting. It is G3GUK who is in Aden. G3GVK is Chairman of the Leicester Radio Society and is very much in Great Britain.

#### Ham Hospitality

En route to Australia, G3GUN contacted VSIEC in Singapore. During a conversation the latter said he would tell any VK2's he worked that 'GUN was on his way to Sydney. Imagine his surprise when within an hour of his ship tying up, VK2ANC was on the 'phone asking him out to his station. Invitations to visit local stations poured in, one being VK2VY who arranged for him to spend fourteen days of his leave with him. G3GUN says the Australians are quite outstanding in the way they keep up the true Ham Spirit. Meeting up with VK2VL, 2XH, 2NJ, 2OQ, 2APT, 2ABA, 2US, 2AFQ and many others has been a real experience.

VK2AFQ/MM is on the motor launch *Syngie* on the lovely Hawksbury River. This station has maintained reliable and regular contact with ZL1CA on 7 Mc/s 'phone using 40 watts input, and is looking for G contacts on 14 Mc/s. ZL1CA gives away a little silver badge to regular DX-ers who remain in contact over a set period!

#### Who's Who

ZD4BF will be back home in September and will return to the Gold Coast next January. Two new operators, both amateurs, will soon be manning ZS2MI. All QSL's should go to M. E. Brokensha, ZS5AZ, 6 The Drive, Durban, Natal.

Sgt. Abrey, B.R.S. 19230, who is in Korea, spends his spare time listening to the locals in JA, DU, KR6, etc.!

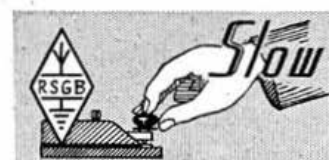
MD6BZL who was active during N.F.D. will be on most weekends with 5 watts to a Vee beam.

Reports for August by July 26 please.

#### 21 Megs Opens Up

AS the first strokes of Big Ben ushered in the morning of July 1st, so 21 Megs sprang to life—at least in the London area. Moments later many old timers, thrilled at the prospect of participating in the opening of a new amateur band, were making their first contacts. G2AJ, 2JG, 2MI, 2WS, 6CJ, 6CL, 6KP, 6UT, 6ZO, 8FF, were among those heard just after midnight.

KP4CC was one of the first DX stations to be worked from the U.K. On the next day (July 2) W2AJR gave many Britishers their first U.S. contact on the new band. The only European heard that evening was I1AMO but I1RY was logged the previous day. VQ4HJP was worked from London during daylight hours on the opening day. Old timer G5BJ was heard being called on the 2nd, as was GM3CSM.



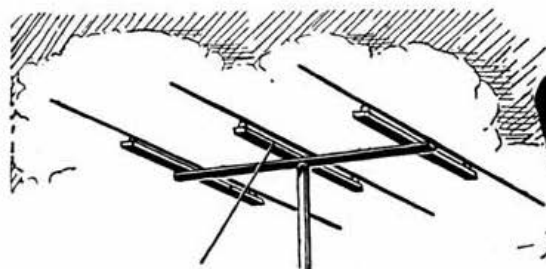
## Slow Morse Practice Transmissions

The following slow Morse transmissions, sponsored by the Society, are intended to assist those who aspire to obtain an amateur transmitting licence. More volunteers are still required for parts of the British Isles not already covered, particularly in the London Area. Stations listed who find themselves unable to continue transmissions should immediately notify the organiser, Mr. C. H. L. Edwards, A.M.I.E.E. (G8TL), 10 Chepstow Crescent, Newbury Park, Ilford, Essex.

\* Each station will operate in turn.

B.S.T.	Call	kc/s	Town	B.S.T.	Call	kc/s	Town
<b>Sundays</b>				<b>Wednesdays (continued)</b>			
09.00	G3LP	1850	Cheltenham	19.00	G3ADZ	1900	Southsea
10.00	G6MH	1990	Southend-on-Sea	19.30	G3HBX	1870	Warwick
	G3AAZ	1780	Welwyn		G6XA		
10.30	G3EPK			21.30	G3HKC	1770	Birmingham
	G5UM			22.00	G3DLC	1800	Grays, Essex
10.30	G3GIO	1915	Guildford	22.00	G3GIO	1915	Guildford
11.00	G2FXA	1900	Stockton-on-Tees	<b>Thursdays</b>			
14.00	G5AM	1900	Witnesham, Ipswich	19.00	G3NC	1825	Swindon
21.00	G2FIX	1812	Nr. Salisbury	19.30	G3GRM	1815	Derby
22.15	G3AEZ	1847	Dorking		G2DOF	1830	S. Birmingham
<b>Mondays</b>					G3DTG		
19.00	G3NC	1825	Swindon	19.30	G3ENH		
20.30	G6LX	1875	Croydon		G6KI		
	G3BLP				G8JI		
21.00	G3BHS	1720	Eastleigh, Hants	20.00	G3FVH	1920	Hull, Yorks
21.00	G3BLN	1900	Bournemouth	21.30	G6DL	1760	Birmingham
22.00	G3AEZ	1847	Dorking	22.00	G2NK	1730	St. Mary Cray
22.00	G3GIO	1915	Guildford	22.00	G3AEZ	1847	Dorking
22.15	G2BRH	1900	Ilford	22.00	G2FXA	1900	Stockton-on-Tees
22.30	G8TL	1896	Ilford	22.00	G3GIO	1915	Guildford
<b>Tuesdays</b>				22.30	G3OB	1803	Manchester
19.00	G3IBL	1883	Derby	22.45	GM3GUS	1800	Dunfermline
	G3HGY	1830	Coventry	<b>Fridays</b>			
19.30	G5PP			19.00	G3BLN	1900	Bournemouth
	G5SK			20.00	G3CSG	1870	Wirral
21.00	G3EFA	1855	Southport	21.00	G3BHS	1720	Eastleigh, Hants
22.00	G3ELG	1772	Rotherham		G3AUT	1785	Rugby
22.00	G3BND	1890	Dalston, E.	22.00	G3AUF		
22.00	G2FXA	1900	Stockton-on-Tees		G3CBV		
22.00	G3GIO	1915	Guildford		G3GTX		
22.45	GM3GUS	1800	Dunfermline	22.00	G3GIO	1915	Guildford
23.00	G2XG	1735	Chingford	<b>Saturdays</b>			
<b>Wednesdays</b>				14.00	G3ADZ	1910	Southsea
14.00	G3ADZ	1910	Southsea	22.00	G3GIO	1915	Guildford
				23.00	G2FXA	1900	Stockton-on-Tees

MEMBERS USING THIS SERVICE ARE REQUESTED TO SEND LISTENER REPORTS TO THE STATIONS CONCERNED



## AROUND THE V.H.F.'s

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

### G8AO/MM

As recorded in this feature last month, Capt. E. A. Clarke, G8AO, holds the first Marine Mobile Licence to be issued in this country, and has already made a voyage up the east coast from London signing G8AO/MM.

To avoid disappointment, it should be pointed out that Capt. Clarke is restricted by the terms of his licence to communication with certain specified stations on 2 metres, and although he will doubtless be interested to receive reports on his signals from other amateurs, he must not effect two-way contact with them. It is understood that the six specified stations referred to are: Northern—G3CYY and G4LX; Midland—G5YV and GW5MQ; Eastern—G3VM and G3WW.

G8AO/MM's sked with G3WW is at 18 minutes past any hour. At 1818 G.M.T. on June 17, when the ship was off Southwold, contact was established, reports being RS59 both ways. Five hours later, when 5 miles north-west of Cromer, signals were beginning to fade, and on the following morning nothing was heard by G3WW when the ship's position should have been off Scarborough.

This was G8AO's last trip before dry-docking for annual overhaul, but he should now be back at sea again.

### Two Metre News

The period of the *Radio Amateur* magazine contest—May 24-25—was marked by conditions ranging from poor to very good, according to G3EHY (Banwell, Som.), who found the band at times alive with stations in all parts of the country. As is usual in such cases, conditions did not become uniformly good until just after the contest had finished! During the event, G3WW worked 78 stations, including G2DKH/P (Stanley, Durham), OI, 3ABH, CC, EHY, FAN (Ryde, I.O.W.), FEX, 5UF, 6YO, EI2W, F8AA, PA0EO, FB, NL. The most distant station was EI2W, 290 miles away.

Exceptional propagation appeared to prevail during the evening of June 12 when northern stations were heard at great strength, G2OI (Manchester) being plainly readable off the back of his beam when he was in contact with stations in Northern Ireland. No GI's were heard by G3EHY on that occasion, but on May 21 he heard one working another GI, though it was impossible either to hear his full call or attract his attention.

On the evening of June 17, with the barometer low and an appreciable amount of rain falling, the band appeared quite dead—apart from EI2W, whose strength was much below normal. On beaming north, however, G3EHY heard GM3BDA—310 miles away—calling CQ at RST559, but failed to raise him. No northern stations were heard at that time—2230 B.S.T.—but an hour later very loud signals were received from stations in the Midlands.

Good openings were observed between Banwell and the London area on June 5 and 14 when S9 signals were exchanged with a number of stations

not previously heard. G3EHY considers that on such evenings 70 cm contacts should have been possible between London and the West Country, and he deplores the fact that none of the stations in that band made an appearance either on 70 cm or 2 m.

During a vacation tour in Scotland, G3WW visited GM3BDA at Airdrie, near Glasgow. As 'WW had never managed to work into Scotland, it was arranged that an attempt should be made at a later date, with G5YV (Leeds) acting as relay post. In the early hours of the morning of June 13, G5YV reported that the Scottish station was RS59, and a few minutes later contact was established, on c.w., between G3WW and GM3BDA, signals being RST569 and 439 respectively. A GM6 was also heard.

GM3BDA is situated 200 ft. a.s.l., but, being near to a main road, suffers severely from tram and car QRM. He has a 16-element stack, an 829B modulated by p.p. 807's in the final of the transmitter, and an "all 6J6" converter into an HRO receiver.

On several occasions G3WW has been on the band between 0730 and 0800 B.S.T., and has had contacts with G2FCL and 5YV, but activity at that hour was very low indeed. Other contacts during the past months included G2FCL, 3BPD (North Notts, 12 miles S.E. of Doncaster), CXD, EDD, HUQ (Ilford), IIT, IWA (Bath), 5IX (Norwich), 6LI (nr. Grimsby), 6NB/P (Herefordshire), 8AO/MM, 8GL, GD3DA/P, GW5MQ 8UH and PA0FC. Conditions were most favourable on June 10-13.

G3IIT (on the outskirts of Cambridge near to G2XV's new home)—an enthusiastic listener for many years—is to be congratulated both on getting his licence and on his decision to make a first appearance on 2 metres.

G3WW points out that inquiries regarding folded-slot aerials should be made to G2HCG (B. Sykes, Rosslyn, Debdale Road, Northampton). The latter has a new array comprising four such slots backed by reflectors, and has evolved a new method of feeding the aerial. (An article on slot aerials written by G2HCG will appear shortly.—Ed.).

### GD3DA/P Again Active

G3DA visited the Isle of Man during the period May 15 to 18 and operated once again from the summit of Snaefell with the call sign GD3DA/P. During the first two days the weather was very hot with a slight haze, but conditions were poor. On the 17th, when the weather deteriorated, with low cloud and wind increasing to gale force later in the day, results were excellent and a number of contacts were made. For the last day of the test conditions were again rather worse than normal. Some 60 contacts were made in all, ranging from Poole in the south, Scunthorpe in the east, Belfast in the west and Fifehire to the north. A number of QSO's resulted with GW5MQ on 70 cm (with reports of

\* 32 Earl's Road, Tunbridge Wells, Kent.

RST 599 both ways) but the remaining three stations heard on the higher frequency band—GI2HML and GI3QGB (Belfast) and G3AOO (Manchester)—were all worked cross-band with GD3DA/P transmitting on 2m owing to receiver troubles at the distant stations. For the record the call signs of the stations worked from Snaefell were as follows: G2AJ, DCI, FCV, FZU, HCJ/P, HGR, HIF, OI, 3ABH, AGS, AMM, AOO, BLP, BPD, BPJ, BY, CCH, CXD, GMX, GSS, HII, HWC, WW, 5BM, CP, RW, SK, VN/P, 6NB, QT, XX, YU, 8DV/A, KL, GI2FHN, HML, 3AXD, BIL, QGB, 6VU, GW3ENY, FYR, 5MQ.

The receiving equipment consisted of a Cascode for 2m while for 70 cm the converter comprised a type 446b "lighthouse" r.f. stage and IN21a crystal mixer, both in tunable cavities. The 832 final amplifier in the 2m transmitter gave a measured output of 3 watts into a three-element close-spaced Yagi delta-matched to 72 ohm coaxial line, and this transmitter was employed to drive an 832 tripler for 70 cm output, the aerial in this case being a 12-element stack.

G3DA does not intend sending cards to stations whom he worked during his previous visit but new contacts will receive cards in the usual way. On May 13 he attended the A.G.M. and annual dinner of the I.O.M. Radio Society and gave a lecture on his 2m and 70 cm equipment and the results achieved.

## In Ireland

EI2W (Dublin) continues his regular activity on two metres and by June 10 had brought his total number of stations worked to 101. The week-ending May 26 provided some good openings, followed by a period, to June 9, when contacts over distances exceeding 200 miles were much more difficult. GI3BIL (Belfast) was worked for the first time on May 20 at RS59 in both directions, and on the same evening GM3DDE and GM3DIQ were received at great strength. May 22 brought the first contact with Edinburgh, when a QSO was effected with GM3LS; another Scottish station, GM6KH, was worked on May 25. Conditions improved on June 10, and during the evening GM3BDA and G5YV were heard in QSO—both at S9 on 'phone in Dublin.

EI2W is interested in the establishment of an All-Ireland V.H.F. Society to encourage interest in the higher frequency bands outside of the main cities; much progress was made in its formation during a recent visit to Belfast. It is hoped to launch the V.H.F. Research Society of Ireland in the near future—its main objects being the exchange of data on v.h.f. propagation and the design of equipment.

## 70 cm Activity Plan

In April some suggestions were made in this feature for increasing activity on 70 cm and a list of stations active on the band in various parts of the country was given together with their frequencies. G3EHY (Banwell, Somerset), refers to the scheme in scathing terms and complains of "the emptiness of what has been put before us as a serious plan for encouraging activity."

He bases this somewhat sweeping assertion on the fact that no scheme has been worked out for regular long distance schedules between different parts of the country, and points out that so far as he is concerned skeds have been run with two of the stations mentioned in Group 1 for some two years past. This is perfectly true, and no one will belittle in any way the dogged perseverance displayed by G3EHY and GW2ADZ which

was at last rewarded by the establishment of a reasonably reliable 70 cm link between their stations over what is an extremely difficult v.h.f. path.

A few other operators—but we feel very few—have done similar work, gradually improving their apparatus until they have been able to produce the results they strove for. Their activities have been reported from time to time in these columns. But for every one of these enthusiasts there are many who have tried their luck and, either by reason of lack of activity or the use of inferior apparatus, have lost heart when no signals were heard and migrated to other bands where contacts were easier to obtain. On the lower frequency bands—even on two metres in most parts of the country at the present time—it is usually possible to hear something during an evening and from such observations to form an idea whether ones equipment is good, bad or indifferent and take the necessary steps to remedy it. On 70 cm with its much lower state of activity, and no particular time when activity could reasonably be expected, the lone amateur is left in ignorance of the effectiveness or otherwise of his gear. What would be the good of organising long distance skeds which only the experienced amateurs might have a chance of realising, and doing nothing for the newcomer?

The ideal state of affairs would be for everyone on the band to be possessed of the persevering spirit of the pioneers: that, unfortunately, is beyond the power of anyone to order. What *can* be done, however, is to suggest that local groups get going so that even inefficient gear will produce some results at short distances and by awakening and sustaining interest induce operators to improve their apparatus until they may take part in longer distance skeds with some confidence. We should not blind ourselves to the fact that the 70 cm band is a very useful part of the spectrum for short distance point to point working: if we do not put it to adequate use there are many other interests who will be only too eager to press for the chance to do so.

## The Ladder

As an example of what can be done in the Regional V.H.F. Ladder scheme, G6XX (Goole, Yorks), states that between November 1, 1951, and June 19, he worked a total of 63 stations in 10 of the R.S.G.B. Regions, and a total of five countries. This, of course, is not eligible for inclusion in the 2-metre "Ladder" entries, for which contacts must have been effected during the twelve months commencing July 1 this year.

\* \* \*

Reports for inclusion in the August issue of the BULLETIN should be submitted by not later than July 21.

## PACC Certificate

THE Netherlands National Amateur Radio Society (VERON) will issue a certificate—known as PACC—to any licensed amateur who submits evidence of having been in two-way contact with 100 different Dutch amateur stations since 1946. There are no restrictions and any amateur band may be used. Confirmations must be sent to VERON Traffic Bureau, 77 Midden-duinweg, Santpoort, The Netherlands.

The cards will be returned by registered post. No fees are required.



## Amateur Television Topics

A topical feature devoted to the study of Amateur Television problems

SINCE the last article in this series (May issue) there have been two big advances in the field of amateur television transmission: the first was the successful two-way TV QSO on 70 cm between B.A.T.C. members G5ZT and G3BLV; and the second is that nine more camera tubes have been brought into use by members, so that the number equipped with live cameras is now in the region of twenty-five. Camera tubes are still very difficult to obtain, but limited numbers are occasionally made available from various sources to *bona fide* experimenters. The situation should ease considerably next year, however, when British-made tubes become available to amateurs.

During the summer months, a good deal of amateur TV activity occurs, since much of it can be done in the open air. Many members are exhibiting their equipment at various fairs and shows; for instance, G3ETI hopes to show some examples of typical equipment at the Television Society's show at Manchester, and G3AKJ will be exhibiting at the Dagenham Trade Fair. Amongst the newcomers to our ranks is Ian Waters, B.R.S. 17906, of Ely, who has an Image Iconoscope in operation. The entire camera unit, pulse generator and monitor assembly took about 18 months to construct, but the results have astonished many professional TV engineers.

G3AST, T.R. for Luton, is altering his 35mm filmstrip facsimile transmitter to employ a 3FP7 scanning tube for testillit use. In Ross-on-Wye, Grant Dixon, ex-G2DBQ, is continuing experiments with his three-colour scanning unit, but is having trouble with grain on the scanning-tube face, and with non-panchromatic photocells. David Nolan (Eire) is experiencing the same trouble in his colour rig, but his stereo experiments are better. All of which goes to show that some original research is in progress!

Research of a different variety has produced a camera dolly for use at G3CVO which can only be described as a "front-wheel drive, fixed-gear, twin front-wheel, rear-steering tricycle!" This contraption, of which a photo will duly appear, is designed so that one operator can move the camera in any direction as well as concentrate on the optical and electrical side of things. The only snag is that in reverse the camera cable tends to get tied up in the back wheel!

### Assistance Wanted

Owing to the amount of work involved in building a complete camera unit plus transmitter, as distinct from just making a simple transparency scanner for use at home, many members would welcome offers of help, technical or otherwise. To encourage readers of the BULLETIN, it may be of interest to note that the main centres of amateur TV activity are Stotfold (Beds.), Plymouth, Sunderland, Romford (Essex), Ely, Manchester, Cheshire and N. Wales, Bristol, Ross-on-Wye, Bournemouth, and Slough-Gerrards Cross (Bucks). Help from those with transmitting apparatus for the 70cm band is particularly required at many of these centres, where the operator, due to the cost or inappropriate conditions, may not possess a licence.

Readers interested further in transmitting pictures are asked to write to G3CVO, or to tune

in to the 80-metre "CQ-TV" sked at 1400 B.S.T. on Sunday afternoons.

### DX TV Reception

During a warm spell on May 30, PA0BE and PA0ZX of Groningen, in North Holland, while experimenting with the former's multichannel TV receiver, were elated to receive weak signals on 48.5 Mc/s. Signal strength soon improved, and from 8.00 p.m. till 9.30 p.m. very good reception of the programme—a circus show—was obtained. Title cards were in Russian, and the sound channel carried Russian dialogue. From the gist of the programme, it is assumed that the programme originated in Moscow.

On June 8, PA0ZX was monitoring the 21 Mc/s band, and noticed that short-skip conditions prevailed. He 'phoned PA0BE, who found another Russian transmission on about 55.5 Mc/s. The programme this time was a French film with Russian sub-titles—the very film that PA0ZX and his wife had seen in Groningen just three weeks earlier!

Both transmissions conformed to the Continental standard of 625 lines with negative modulation, the second programme probably originating at Kharkov.

### Good Cheer at Chessington

A social event which looks like acquiring much the same status as the now famous "Worthing bucket and spade party," is the "Chessington 10 metre party," the first of which was tried out on May 25 by a large contingent of members, friends and ladies, who came from the Thames Valley area west of London. Among those present were Council members P. W. Winsford (G4DC) and F. G. Lambeth (G2AIW).

Although this was the first such party to be held at Chessington Zoo—the appropriateness is purely coincidental!—similar events in the area had taken place in previous years with encouraging results. Small wonder, then, that the 1952 event, aided by perfect weather, drew a record gathering of 121 people—a degree of success which encourages its sponsors to consider organising a "repeat" later in the summer. Members who would be interested are asked to write to Mr. F. G. Lambeth (G2AIW), 21 Bridge Way, Whitton, Twickenham, Middlesex.

### On the Banks of the Avon

An Amateur Radio station, operating under the call G8TO/P, will be featured at the Stratford-upon-Avon Flower Show to be held from July 24 to 26. Special QSL cards will be used to confirm contacts with the station, which will operate in the 40 and 20 metre bands. Further details may be obtained from the Hon. Secretary, Stratford-upon-Avon Horticultural Society, 185 Evesham Road, Stratford-upon-Avon.

### Can You Help?

▲ D. W. J. Haylock (G3ADZ), 230 Devonshire Avenue, Southsea, Hants, who wishes to contact another ex-Army 12 set owner in order to exchange ideas on the design of a T.V.I.-proof p.a./f.d. unit (100 W c.w. on 7, 14, 21 and 28 Mc/s) using the 12 set as an exciter with v.f.o. bandspread.  
▲ P. A. Murphy (Associate), 22 Malling Down, Lewes, Essex, who requires circuit details of the U.S. ex-Service units ID-6 A/APN-4 and R-9A/APN-4

\* Cheyne Cottage, Dukeswood Drive, Gerrards Cross, Bucks



# Tests and Contests

## Frequency Measuring Test

**J**UDGING by the comments of those who entered for the first frequency measuring test organised by the Society, the event proved to be very popular. Seventy-three entries were submitted. A study of the results shows that a high standard has been achieved by the leaders, whilst all who took part are to be congratulated on finding the relatively weak signals in the usual welter of interference, and on making their measurements so accurately.

Analysis of the equipment employed shows that the BC221 was by far the most popular commercial instrument, although almost a third of the entrants used home-constructed frequency meters. Details of the equipment used are as follows:

BC221/LM7	-	-	-	-	40
Class D	-	-	-	-	8
W.1191	-	-	-	-	2
Home-made	-	-	-	-	23

## Leading Stations

The most accurate measurements were submitted by Mr. E. Digman (G3BVA), of Bromley, Kent, with errors of only 4 c/s and 1 c/s respectively on the first and second transmissions. This in itself is a first-class performance, but it is all the more creditable because the measuring equipment used was home-constructed and calibrated. Mr. Digman's sub-standard is a 100 kc/s crystal oscillator which is constantly compared with the 200 kc/s transmission from the B.B.C. on a BC453 receiver. The unknown frequency is mixed with the output of a calibrated frequency divider driven by the 100 kc/s oscillator, and the residual frequency measured using an audio oscillator and cathode-ray oscilloscope.

Second place is taken by Mr. J. Kroon (PA0IF) with an average error of just over two parts per million. He used a BC221 frequency meter to which he had fitted a reduction drive and dial on the frequency correcting condenser. He adjusted the 1 Mc/s crystal to zero beat with the 10 Mc/s WWV transmission and then interpolated

between closely-spaced check points with the aid of a visual zero-beat indicator. Thus, in the case of the first frequency, he used 3571.429 kc/s and 3578.947 kc/s, i.e., the 25th harmonic of the 1 Mc/s crystal divided by 7, and the 68th harmonic of the 1 Mc/s crystal divided by 19. Similarly, the second frequency was determined by interpolation between 3523.809 and 3526.316 kc/s, the 21st harmonic of the v.f.o. zero beat with the 74th harmonic of the 1 Mc/s crystal, and the 19th harmonic of the v.f.o. zero beat with the 67th harmonic of the crystal. Mr. Kroon considered that his measurements would be accurate to within 20 cycles per second—and they were!

Third place is taken by Mr. W. L. Ely, G3HQQ, of Worthing, Sussex, whose average error was less than three parts per million. He used a type LM7 meter and arrived at his final results by averaging four determinations on each frequency.

Fourth, with the same order of accuracy is Mr. E. L. Owen, G2SF, of Chelmsford, Essex. His measuring equipment, similar in many respects to that of the winner, was also home constructed, comprising a 100 kc/s crystal oscillator monitored on 200 kc/s and compared with Droitwich, a frequency divider giving either 10 or 8.333 kc/s, a calibrated heterodyne wavemeter, and an audio oscillator checked by a 1 kc/s tuning fork.

## Transmitter

The transmitter used at G6JJ for the test was a c.o.-b.a.-b.a.-p.a. running at an input of 75 watts. To ensure stability, the crystal oscillator was operated at very low power, the anode voltage being only 50V. Keying was in the primary of the transformer supplying h.t. to the p.a.

## Comments

Many useful comments and suggestions for future tests were received and it is hoped that the majority of them can be applied. Many entrants are of the opinion that half-minute dashes would be an improvement over the five-seconds dashes.

## Results of Frequency Measuring Test

Posn.	Name and Call Sign	Average Error (parts per mill.)	Posn.	Name and Call Sign	Average Error (parts per mill.)
1.	E. Digman (G3BVA)	0.7	28.	W. J. Graham (GM3GDS)	39.9
2.	J. Kroon (PA0IF)	2.1	29.	A. Withers (B.R.S. 14252)	43.1
3.	W. L. Ely (G3HQQ)	2.8	30.	I. O. Shaw (GM3ANO)	47.3
4.	E. L. Owen (G2SF)	3.5	31.	C. Lancelfield (G3DWQ)	47.9
5.	D. E. Law (G3IBR)	6.1	32.	W. B. Hopkins (G3FPI)	48.6
6.	P. H. Sollow (G3BGL)	6.6	33.	M. Barnsley (G3HZM)	49.9*
7.	W. A. W. Lauder (G3FHI)	8.0	34.	J. W. Swinnerton (G2YS)	61.5
8.	H. J. Edwards (G5YM)	9.0	35.	F. G. Hoare (G2DP)	65.4
9.	A. S. Davey (G2CIX)	9.3	36.	O. Postle (CW3EFZ)	66.9*
10.	N. Ashton (G3DQU)	10.8	37.	G. Berrisford (G3HIS)	71.7
11.	L. Parfitt (G6PF)	12.2*	38.	E. A. Matthews (G3FZW)	72.7
12.	G. C. Turner (G5IH)	13.4	39.	S. N. Radcliffe (G3CZB)	76.4
13.	C. I. Turner (G3DGN)	13.5	40.	G. F. C. Layzell (G3AMM)	79.7*
14.	D. I. Thompson (G3IDT)	14.8	41.	D. E. Davies (CW3FSP)	83.3
15.	J. S. Rowe (G3ERH)	16.7*	42.	Nottingham University R.S. (G3BDP)	85.4
16.	{ J. Hunter (G3AZ) } { O. Luhrs (DL1KV) }	21.5	43.	C. L. Turner (G3LA)	85.9
17.	J. R. E. Driscoll (G3RC)	25.8	44.	A. G. Dunn (G3PL)	90.3
18.	T. R. Stevens (G3DUQ)	26.3	45.	{ J. E. Bromley (G3EXE) } { W. J. Mason (G3HSM) }	92.5
19.	J. L. Goldberg (G3ETH)	27.5			
20.	R. T. Bowler (G3GKN)	30.0*			
21.	R. A. Norrington (B.R.S. 3526)	32.4			
22.	A. Scott (B.R.S. 19579)	34.2			
23.	B. J. Mitchell (G3HJK)	35.2*			
24.	{ R. J. Corps (G3FOR) } { J. Douglas (GM2CAS) }	35.6			
25.					
26.					
27.	G. Ullrich (DL6MU)	38.4			

Entries were also received from G2ZC, 2BDR, 3DZ, 3BXN, 3CBC, 3COI, 3CRR, 3DFF, 3DRE, 3EWC, 3CQM, 3HIK, 3HSC, 3HTP, 3HWO, 4IV, 5SY, 6HR, 6MU, 6YC, CW3HJR, DL6YK, PA0VU, B.R.S. 250, 1759, 14864 and 19416.

\* Only one frequency measured.

There is a demand too that subsequent tests should be on the 1.8 Mc/s band rather than on 3.5 Mc/s.

#### Acknowledgements

The Organisers' grateful thanks are due to Mr. E. A. Dedman of the Quartz Crystal Company, Ltd., who loaned the crystals used in the test, and to the Engineering Department of the G.P.O., who made the master measurements of the frequencies radiated.

### Contests Diary

- July 26-27 - 144 Mc/s Open Event
- August 17 - D/F Qualifying—High Wycombe and Oxford\*
- September 7 - { Low Power Field Day  
D/F Qualifying—Edgware\*
- September 21 144 Mc/s Field Day (No. 2)
- September 28 D/F National Final\*
- October 4-5 - Low Power
- November 8-9 "Top Band" (No. 2)

\* Rules on p. 503, May issue

#### D/F Contests

**F**URTHER to the announcement published in the June issue of the BULLETIN regarding new facilities for portable station operation, the Post Office state that such stations when operating in D/F Contests need not announce their location, provided the Engineer-in-Chief, Radio Services and Maintenance Branch WM3/3, G.P.O. Brent Building, North Circular Road, London, N.W.2, has been informed of the proposed site and confirmation has been received from that Branch that operation without an announcement is permitted for the occasion of the Contest.

#### D/F Field Day

**D**ETAILS of the qualifying Field Day to be held on August 17, 1952, are as follows:

- Organiser:** G. T. Peck, c/o Ernest Turner Electrical Instruments, Ltd., Chiltern Works, High Wycombe, Bucks.
- Call Sign:** G8VZ/P.
- Frequency:** 1854 kc/s.
- Assembly Point:** Bovington Green, ½-mile N.W. of Marlton and 150 yards W. of the "Royal Oak."
- Map:** Ordnance Survey, New Popular Edition, Sheet 159.
- Assembly Time:** 1330 B.S.T.

Intending entrants should notify the Organiser by not later than August 11, stating the number in their party, and whether tea is required.

#### Romford Nocturnal D/F Hunt

**A**N unusual D/F Contest to be held during the hours of darkness will take place at Romford commencing midnight (2400 B.S.T.) on Saturday, August 23. As far as is known, it will be the first post-war nocturnal D/F contest of its kind.

The rules will be generally similar to those for the 1952 series of R.S.G.B. D/F events. Members who wish to take part should inform the organiser (R. N. Grubb, G3FNL, 64 Deyncourt Gardens, Upminster, Essex) by not later than August 16. Details of the start and transmission times will

be sent individually to entrants. Breakfast will be provided, and prizes will be awarded to the winners.

### Identify Yourself during Field Days by Flying a R.S.G.B. PENNANT

Large size 6/6; small size 5/6 (postage 3d. extra)

#### First Two-Metre Field Day, 1952

**T**HE first field event of 1952—the Two-Metre Field Day held on May 11—was enjoyed by a record number of entrants, despite poor weather conditions. Thirty-nine entries were received from the forty-nine portable stations which were active. Most competitors encountered rain at various times, while high winds prevented many aeriels from being used at maximum height. No outstanding distances were worked this year, the longest—265 miles—being between G2DIV/P and G3AGA; the greatest distance achieved between portable stations was the 210 miles separating GW3ATZ/P and GM6WL/P.

The contest was won by G3ERD/P (the Derby and District Amateur Radio Society's station) which was operated by G3EMJ, G2DLJ, G8QZ and G3GUD; they are to be congratulated on their rise from eighth position last year. Second place was taken by G3DIV/P, while G3ABA/P, who was second last year, came third this time in spite of generator trouble.

Equipment used by portable stations shows signs of becoming standardised. Transmitters usually employed an 832 as p.a.—although several competitors used much smaller valves, some with very low power. Receivers generally comprised a converter and a normal communications receiver; there were, however, some completely home-built sets in use.

The majority of entrants seemed to prefer either

#### Results of First Two-Metre Field Day, 1952

Posn.	Call Sign	Location	Points
1.	G3ERD/P	Harboro' Rocks, Derbyshire	206
2.	G3DIV/P	South Downs, Eastbourne	201
3.	G3ABA/P	2 m. N.E. Meriden, Warks.	199
4.	G3BEX/P	Devil's Dyke, Brighton	176
5.	G6XM/P	1 m. N. Farnham, Surrey	173
6.	GW5BM/P	2 m. N.W. Clyro, Radnorshire	147
7.	G3APY/P	2 m. N.E. Matlock, Derbyshire	141
8.	G2ENS/P	Broombriggs Hill, Leics.	133
9.	G2HCG/P	Honey Hill, Northants.	128
10.	G8QY/P	5 m. S. Birmingham	116
11.	G3PM/P	3 m. N.E. Luton, Beds.	95
12.	G3MA/P	Rudge Hill, Gloucestershire	94
13.	GW3ATZ/P	1 m. S.W. Hope, Flintshire	93
14.	G2XV/P	River Hill, Linton, Cambs.	88
15.	G3MY/P	Houndkirk Moor, 6 m. S.W. Sheffield	87
16.	G5ML/P	4 m. N.W. Coventry	87
17.	G5RP/P	4 m. W. Wantage, Berks.	84
18.	G3FD/P	2 m. S.W. Dunstable, Beds.	83
19.	G3GBO/P	2 m. S. Bledlow, Bucks.	81
20.	G3EUQ/P	10 m. W. Southampton.	75
21.	G3EDD/P	3 m. N. Saffron Walden, Essex	56
22.	G3FMK/P	3 N.E. Maidstone, Kent	55
23.	G4JJ/P	1 m. W. Barnsley, Yorks.	53
24.	G2FKZ/P	Woldingham, Surrey	52
25.	G2HCJ/P	Frodsham, Cheshire	50
26.	G3FRB/P	Shooters Hill, Woolwich	50
27.	GW5MA/P	6 m. S.E. Bala, Merionethshire	47
28.	G8SI/P	Olivers Mount, Scarborough	42
29.	G4IB/P	Mark Beech, Kent	40
30.	G3CCH/P	2 m. E. Scunthorpe, Lincs.	38
31.	G3AYT/P	1 m. S. Hyde, Cheshire	31
32.	G3FEX/P	1 m. S.W. Storrington, Sussex	29
33.	G5MP/P	11 m. W. Dover	26
34.	G3FKO/P	2 m. N. Bath	25
35.	G8VN/P	Staverton, Nr. Daventry	23
36.	G3FFV/P	5 m. E. Thirsk, Yorks.	21
37.	GM2DRD/P	7 m. S. Forfar	16
38.	G12HFN/P	Nr. Knockagh, Co. Antrim	13
39.	G3HSD/P	6 m. N. Wells, Somerset	5

\* Entry disqualified—station erected day before event. Check Logs. G2DHY, G2OI, G3CWW, G8LY, F8AA, F8NW.

R.S.G.B. BULLETIN, JULY, 1952.



# AROUND THE REGIONS

*Good support at Lincoln and York meetings*

## Lincolnshire County Meeting

THE Duke of Wellington, Broadgate, Lincoln, was the venue for the Lincolnshire County meeting held under ideal weather conditions in the famous cathedral city on Sunday, May 18, 1952. An attendance of 94 (including wives and lady friends of members) was recorded.

The event was organised by the Lincoln T.R. (Mr. L. Gostelow, G2FOW) and a group of local members who had the support of the Lincolnshire C.R. and T.R.s.

Headquarters was represented by the Executive Vice President (Leslie Cooper, G5LC); the Honorary Secretary (Arthur O. Milne, G2MI), and Council Member, C. H. L. Edwards, G8TL.

Prior to the meeting members were afforded an opportunity of inspecting a display of metal work arranged by Mr. L. J. Philpott, G4BI, of Loughborough.



*Photo courtesy "Lincolnshire Echo."*

### Lincolnshire County Meeting

Left to right : G2FOW, G8TL, G8SA, G5LC, G2MI.

## Business Meeting

In opening the business meeting the Regional Representative (Dr. E. S. G. K. Vance, G8SA), mentioned that members were present from Gainsborough, Grimsby, Horncastle, Leasingham, Lincoln, Mablethorpe, Scunthorpe, Sleaford, Spalding and Spilsby within the County, and from Chesterfield, Loughborough, Mansfield, Newark, Worksop and London outside the County.

Dr. Vance expressed his pleasure that the Lincoln Short Wave Club had become affiliated to the R.S.G.B. and welcomed the members of the Club who were present. Appreciation was also expressed at the assistance given by the members of that club in making arrangements for the event. Dr. Vance thanked Mr. L. J. Philpott as well as those who had donated prizes for the raffle. The Lincoln T.R. warmly welcomed the representatives from Headquarters, after which Messrs. Cooper and Milne addressed the meeting on a number of subjects of topical interest. Questions followed. An official photograph was taken after which tea was enjoyed.

The draw for prizes and a sale of surplus equipment brought to a happy conclusion a memorable and pleasant Amateur Radio occasion.

## Yorkshire County Meeting

THE Yorkshire County Meeting held at the Windmill Hotel, York, on June 15, with 84 members and friends present, was the first official R.S.G.B. meeting held in that city since 1937. Members from places as far distant as Sheffield and Newcastle were present to greet the official party, which comprised the Hon. Editor (Jack Hum, G5UM), Council Members P. W. Winsford, G4DC, H. McConnell, GM2ACQ, and the General Secretary (John Clarricoats, G6CL). The County Representatives for the West Riding of Yorkshire (J. R. Petty, G4JW), the North Riding (G. Kenyon, G3YK), Co. Durham (T. Orr, G3IV), and Northumberland (L. G. Spencer, G4LX), as well as the Regional Representative (C. A. Sharp, G6KU) attended with the T.R.'s from Darlington (P. Lucas, G3BQJ), West Hartlepool (L. Foden, G3CHJ), South Shields (T. L. Peterson, G6VG), Scarborough (P. B. Briscoe, G8KU), York (G. F. Nottingham, G2DTA), Cleckheaton (J. Clegg, G3FQH), Barnsley (C. T. Malkin, G5IV), Hull (J. R. Borrell, G3FKK), and the County Scribe (J. R. Macdonald, G4CJ).

## Business Meeting

Mr. Sharp, after extending a welcome to the visitors and introducing the official party, invited the County Representatives to speak on Society matters of national and local interest.

Mr. Winsford referred to the financial aspects of the Society's work, and spoke about BULLETIN production costs, the staffing of Headquarters, and the cost of operating the scheme of representation. Mr. Winsford also reported on the progress being made with the revision of the Articles of Association, and of the arrangements for the forthcoming R.R.'s conference. Mr. McConnell spoke about representation in general and of the duties of the representatives in the present Regional Scheme. The privileges and responsibilities of Affiliated Societies were also outlined. Mr. Hum referred to the present and future of television in relation to the amateur, with particular reference to interference, and of the possibilities of sponsored TV in the years to come.

The General Secretary—after recalling his last visit to an R.S.G.B. meeting in York during 1937—spoke on licence matters, and explained that many of the recently announced facilities had come about as the result of negotiations between the G.P.O. and the Society. He also referred to the BULLETIN and to the structure and work of the I.A.R.U.

At the conclusion of the meeting, questions were answered by members of the official delegation, after which a vote of thanks to them was expressed by Mr. Kenyon.

## Social Occasion

During the afternoon, the visiting ladies were taken on a sightseeing tour by the wives of local members. Following an informal session, during which numerous photographs were taken, a substantial high tea was served. The York T.R., his colleagues and their ladies are warmly congratulated on their efficiency and kindness in showing the many visitors round the beauties of York, and helping to make the event a very pleasant occasion.

Kay-You.



the peak input at maximum modulation must not exceed 150 watts).

L. A. Moxon<sup>(2)</sup> has recently described in great detail the operation of these systems, and all that need be said here is that basically they comprise two valves, effectively in parallel, feeding the aerial, one valve dealing with negative peaks, so that its input decreases with modulation, while the other deals with positive peaks so that its input increases with modulation. Hence, under no conditions of modulation can the d.c. input be 200 watts. It should be borne in mind, however, that a normal anode-modulated transmitter under conditions of 100 per cent. modulation has an input of 225 watts—150 watts to the carrier-producing valves, and 75 watts of a.f. modulating power.

In conclusion, the author would like to convey his thanks to H. A. M. Clark, G6OT, for making suggestions that have been embodied in this article.

#### References

- (1) CORFIELD, "Practical Use of Frequency Modulation on Amateur Frequencies," Proceedings of the R.S.G.B. No. 4, Autumn, 1948.  
(2) MOXON, "High-efficiency Grid Modulation," R.S.G.B. BULLETIN, October and November, 1951.  
London Gazette Notices, R.S.G.B. BULLETIN, p. 192, November, 1951.  
Types of Emission, Atlantic City Radio Convention (R.R.), Chapter 2, para. 82-84.  
Definition of Bandwidth, Atlantic City Radio Convention (R.R.), Chapter 1, para. 58.  
Calculation of Bandwidth, Atlantic City Radio Convention (R.R.), Appendix 5RR, para. 229E.

#### AN EFFECTIVE NOISE LIMITER—(Continued from page 18)

inclusion of this noise limiter in any R.208 or similar type of receiver. With the limiter in circuit, the only car ignition impulses which can be heard are those in very close proximity to the aerial, and even these are so faint that they do not interfere with reception. The device is also very effective with all forms of electrical interference, including the blind approach and radar transmissions which frequently spoil 28 Mc/s. reception in the West Country.

#### Improved Harmonic Indicator

REFERRING to the improved harmonic indicator described in the article "An Improved Low-Pass Filter," by Louis Varney, G5RV, in the June issue, E. H. Trowell, G2HKU, points out that the GEX33 crystal diode has been replaced by the television type GEX35, which gives identical performance (the B.T.H. CG1C is an equivalent). Alternatively, the GEX66 may be used, providing greater sensitivity at low signal levels.

#### Olympic Games—Helsinki

LIEUT. Commander (L) S. A. Potter, L.A.M.Brit.I.R.E., G3GPJ (ex - ZBIAW), of Wootton Bridge, Isle of Wight, sailing with Lieut. Bruce Banks, R.N.V.R., in the International Star Class *Fortuna*, won all seven of the Olympic Trial races recently held in Torbay, and has been chosen to represent Great Britain at Helsinki.

\* \* \*

S.R.A.L. announces that radio amateurs visiting Helsinki can obtain help and advice on arrival from Ahti Vallinheimo, OH2NW, who will be at the Ticket Office, Kluuvikatu 8, 5th Floor, Olympia-XV, Helsinki. Telephone 37319.

## NORTH WESTERN REGIONAL MEETING

SUNDAY, SEPTEMBER 14, 1952

BRADFORD HOTEL,  
TITHEBARN STREET, LIVERPOOL.

Tickets 9/- each (Luncheon and Tea), will shortly be available from all representatives in the Region, direct or by post. Full details of programme, which will include a Raffle, will be published next month.

#### Sheffield O.R.M. 1951

MEMBERS who were present at the highly-successful Regional Meeting held in Sheffield during May, 1951, may like to know that copies of the group photograph, which was reproduced in the August, 1951, issue of the BULLETIN, can be obtained from Mr. J. R. Petty, G4JW, 344 Carterknowle Road, Sheffield 11, price 4/6 each post free. The photograph measures 8 in. by 4½ in.

#### N.F.D. PHOTOGRAPHS

The Editor would be glad to consider for publication in the BULLETIN photographs taken during N.F.D., 1952. Prints should be of good contrast, and should be accompanied by an informative caption.

#### Affiliated Societies

THE following are additions to the lists published in the March and April issues of the BULLETIN:—

- BLACKPOOL & FYLDE AMATEUR RADIO SOCIETY**, c/o H. G. Newland, 161 Penrose Avenue, Blackpool.  
**BRITISH AMATEUR TELEVISION CLUB**, c/o M. Barlow, Cheyne Cottage, Dukes Wood Drive, Gerrards Cross, Bucks.  
**CAMBRIDGE UNIVERSITY WIRELESS SOCIETY**, c/o M. Barlow, St. John's College, Cambridge.  
**CO-OP RADIO SOCIETY**, c/o Mr. W. F. Jordan, Husband Memorial Hall, Frederick Street, Belfast, N. Ireland.  
**HERTFORD & DISTRICT RADIO SOCIETY**, c/o R. L. S. Harrison, 12 Westfield Road, Bengoe, Hertford.  
**LINCOLN SHORT WAVE CLUB**, c/o G. C. Newby, 18 Birchill, Fiskerton, Lincoln.  
**SALISBURY & DISTRICT SHORT WAVE CLUB**, c/o V. G. Page, 32 Feversham Road, Salisbury, Wilts.  
**STROUD & DISTRICT AMATEUR RADIO SOCIETY**, c/o B. L. Horton, Prescott, Haven Avenue, Bridgend, Stonehouse.  
**VICKERS-ARMSTRONGS, LTD. (WEYBRIDGE) SOCIAL & ATHLETIC CLUB (ELECTRONICS SECTION)**, c/o A. W. Warner, Sales Accounts Dept., Vickers-Armstrongs, Ltd., Weybridge Works, Weybridge, Surrey.  
**WEST LANCS RADIO SOCIETY**, c/o S. M. Sugden 44 Gores Lane, Formby, Liverpool.  
**YORK AMATEUR RADIO SOCIETY**, c/o G. F. Nottingham, 51 Carr Lane, Acomb, York.

#### Malta Amateur Radio Society

At the recent Annual General Meeting, Frank Hague, ZBIAH, was re-elected President. The Hon. Secretary is J. Spafford, ZBIBZ, and the Hon. Treasurer, M. Schinas. The address of the Secretary is "Argus," Pacefield, St. Julians, Malta, G.C.

Amateurs passing through Malta are assured of a welcome if they contact either ZBIAH or ZBIBZ. Their telephone numbers are Sliema 1551 and Pembroke 100 respectively.

#### Ham Hospitality

George Morton, G3DRC, of 42 Southfarm Road, Worthing (who is the Sussex County Representative), is at home most Monday, Wednesday and Friday evenings, and extends an invitation to amateurs visiting Worthing to call on him.

# COUNCIL PROCEEDINGS

*Résumé of the Minutes of the Proceedings at the Meeting of the Council of the Incorporated Radio Society of Great Britain held at New Ruskin House, Little Russell Street, London, W.C.1, on Wednesday, May 14, 1952, at 6 p.m.*

**Present.**—The President (Mr. F. Charman) in the Chair, Messrs. H. A. Bartlett, L. Cooper, C. H. L. Edwards, D. A. Findlay, T. L. Herdman, J. H. Hum, F. G. Lambeth, H. McConnell, A. O. Milne, W. A. Scarr, R. Walker, P. W. Winsford and John Clarricoats (General Secretary).

## Certificates of Merit.

An estimate for printing 250 copies of a new form of Certificate of Merit was considered to be too high. It was agreed to obtain further estimates.

## Membership.

**Resolved:—**

- (a) to elect 91 Corporate Members and 27 Associates;
- (b) to grant Corporate Membership to 9 Associates who had applied for transfer.

## Applications for Affiliation.

Resolved to grant affiliation to British Amateur Television Club, Cambridge University Radio Society, Co-Op Radio Society (Belfast), Vickers Armstrong (Weybridge) Social and Athletic Club (Electronics Section), West Lancashire Radio Society, York Amateur Radio Society.

## Memorandum and Articles of Association.

Resolved to hold a Regional Representatives' Conference early in July to discuss proposed amendments to the Memorandum and Articles of Association.

## BULLETIN Contract—Volume 28

Resolved to accept an estimate, submitted by South London Press Ltd., for printing the R.S.G.B. BULLETIN for 12 months commencing with the July, 1952, issue.

The Secretary explained that, although the estimate (based on a 48-page issue) showed an increase of £76.4.6 over the estimate submitted in 1950, £60.5.8 of this amount was due to rises in the price of paper. The balance of £15.19.0 was due to an official increase in printing prices brought about by a new cost-of-living bonus paid to all employees in the printing trade. Only half of the total 8% increase had, however, been passed on to the Society.

## E.D.R. Silver Jubilee Celebrations.

Resolved to authorise the General Secretary, in addition to the President, to attend the E.D.R. Silver Jubilee Celebrations during August, 1952.

## Circular to Representatives

It was reported that a Member of Council had arranged to have printed, in booklet form and at his own expense, 300 copies of a circular to representatives which had been prepared by Mr. C. H. L. Edwards. The purpose of the booklet is to give advice to the Society's representatives on a variety of subjects.

Resolved that the thanks of the Council be recorded to the member concerned for his generous gift.

## County Meetings in Region 6.

Consideration was given to a letter (of which the following is a copy) from the Area Representative for Petersfield and District:—

"At our last District meeting my members discussed the Council's proposal to hold two County meetings, at Southampton and Reading, during 1952, in lieu of an O.R.M., and I was asked to enquire whether the preparation of the agenda for such meetings would be the prerogative of Headquarters, as appears to be the case at O.R.M.s.

"My members feel that this practice tends to stifle discussion of problems and is not in the best interests of the Society."

The Secretary was instructed to inform the Region 6 Representative that, whilst members may bring forward for discussion at the forthcoming Hampshire and Berkshire County Meetings any business that appears relevant, the preparation of an agenda of business for consideration at such meetings is the prerogative of the Council.

## Card Files of Members.

It was reported that new card files of members had been issued to the Regional Representatives.

## Meeting with G.P.O.

Consideration was given to a report, prepared by the Secretary, of a meeting which had taken place between representatives of the G.P.O. and the Society.

The report dealt with the release of the 21 Mc/s band; the withdrawal of the frequencies between 14,350 and 14,400 kc/s; commercial stations which operate in exclusive amateur bands; matters relating to the amateur licence; portable and alternative address licences.

The Secretary explained that, although the G.P.O. is concerned at the continued operation of commercial and broadcast stations in the exclusive amateur bands, they are

unable, presumably for reasons of policy, to take effective action to have such stations moved.

## Mr. J. Hunter.

It was reported that, because of pressure of private business, Mr. J. Hunter, G6HU, had resigned his membership of the Contests Committee. The Secretary was instructed to thank Mr. Hunter, on behalf of the Council, for his past services.

## Finance.

Resolved to receive and adopt the Cash Account for April, 1952, as submitted by the Honorary Treasurer.

## Finance and Staff Committee.

Resolved to receive, as a Report, the Minutes of the Meeting of the Committee which met on April 16, 1952, and to adopt a Recommendation of the Committee that steps be taken to engage a Male Assistant at Headquarters.

It was reported that the Committee had decided not to adopt a suggestion put forward by the Worthing Group that subscription receipts be sent out in envelopes. The Group had, however, been informed that Headquarters is always prepared to send out a receipt in an envelope if so requested.

It was further reported that the Committee had given consideration to a suggestion of the Region 3 Representative (Mr. J. N. Walker) that R.R.s should be authorised to attend more than three group meetings in each year; that C.R.s should not be restricted to making only one visit to each group during their year of office; that R.R.s should be re-imbursed for all out-of-pocket expenses, including the provision of meals at meetings with their C.R.s.

The Committee had decided to advise Mr. Walker that, in view of the current financial position of the Society, it cannot, at present, agree to recommend the Council to authorise representatives to claim for additional expenses, but consideration will be given to the matter if, and when, subscription rates are increased.

## Membership and Representation Committee.

Resolved to receive, as a Report, the Minutes of a Meeting of the Committee which met on May 14, 1952, and to adopt the Recommendations contained therein. The Recommendations dealt with matters concerning Official Meetings and N.F.D.

It was reported that the Committee had authorised its Chairman (Mr. C. H. L. Edwards) to reply to a letter from Mr. J. N. Walker wherein he criticised the arrangements made by Headquarters to provide the R.R.s with card files of members.

## Contests Committee.

Resolved to receive a Report covering five meetings of the Committee.

Resolved (a) (by 6 votes to 4) to accept the proposal of the Committee that Regional V.H.F. Ladders should be published in the BULLETIN; (b) to invite qualified members to contribute articles on D/F equipment for publication in the BULLETIN.

## Falkland Islands Dependencies.

A letter was submitted from the A.R.R.L. wherein it was stated that the League proposes to recognise, for DX Century Club and other purposes, contacts with Argentine stations which operate from the Falkland Islands Dependencies.

The A.R.R.L. explained that the State Department in Washington could produce no positive evidence to show which nation holds Sovereign Rights over the Dependencies.

It was agreed to point out to the A.R.R.L. that, as Her Majesty Queen Elizabeth II claims Sovereign Rights over the Falkland Islands Dependencies, the R.S.G.B. cannot agree to the suggestion that contacts with Argentine stations located in the Dependencies should be accepted for official purposes. In the view of the R.S.G.B. such stations have no legal status.

The Meeting terminated at 10.5 p.m.

## Silent Keys

We record, with regret, the death last month of Capt. W. R. Dainty, G3HP, of Brighton.

During World War I Rex Dainty served with the Royal Flying Corps subsequently retiring with the rank of Captain. A member since 1934, he took a keen interest in the work of the Society and of the Brighton & District Radio Club.

His death will be mourned by all who knew him.

It is with sorrow that we record the passing of Walter Ryan, VK2TI, well-known Australian amateur, past winner of B.E.R.U. Contests, and indefatigable worker for W.I.A. He will be missed by VK2 amateurs and friends throughout the world.

R.T.P.

# REGIONAL AND CLUB NEWS

## Brighton & District Radio Club

The General Secretary of the R.S.G.B. (Mr. John Clarricats, G6CL) will be the guest speaker on July 15. A week later Mr. Dixon, R.N.V.W.R., will lecture on "Naval Communications." Club nights during August will be informal, with the club station, call G3EVE, active on 80 metres. *Hon. Secretary:* R. T. Parsons, 14 Carlyle Avenue, Brighton.

## Bristol

At the June meeting, H. Gratton, G6GN, outlined the points to be considered by the amateur who hopes to be successful on the DX bands. He was due to conclude his talk at the July meeting with a reference to operating practices. At the same meeting D. V. Newport, G3CHW, will give some practical hints on improving the performance of receiver r.f. stages. An outing to Portishead, Clevedon, and Weston-super-Mare is planned for August 16. *Hon. Secretary:* D. F. Davies, G3RQ, 51 Theresa Avenue, Bishopston, Bristol 7.

## Chester & District Amateur Radio Society

J. W. Swinnerton, G2YS, recently discussed his pre-war radio experiences in the course of a talk entitled "Those Were the Days." Meetings are held at 7.30 p.m. on Tuesdays at the Tarran Hut, Y.M.C.A., Chester. Future speakers include L. N. Goldsborough, G3ERB, on 1.7 Mc/s propagation (July 15), and D. Rickers, GW3HEU, on the reaction of the new licensee to present conditions (July 29). *Hon. Secretary:* W. Lloyd, 124 Tarvin Road, Chester.

## Coventry

At a recent meeting the C.R. (R. Palmer, G5PP), presented his first "Quiz" programme, which promoted lengthy discussions on many of the problems encountered in Amateur Radio. During N.F.D. 1952, the Group scored more points than in any previous year.

## Coventry Amateur Radio Society

To foster interest in v.h.f. activities, a Cup has been presented to the Society by the Chairman, Freddie Miles, G5ML. Details of a contest for its award will be announced later. The future programme includes a practical demonstration of direction-finding on July 21, and the first part of a lecture on 144 Mc/s equipment by Ray Bastin on August 18. *Hon. Secretary:* K. G. Lines, 142 Shorncliffe Road, Coventry.

## Eastbourne

During the summer meetings will be held monthly at 333 Seaside, the next being on August 7 at 7.30 p.m. The group supported N.F.D., and a good time was had by all, the final score being considered very satisfactory.

## Eltham & Sidcup

The group (formerly known as Cray Valley) meets at 7.30 p.m. on alternate Tuesdays at the Broadway Cafe, Southend Crescent, High Street, Eltham, S.E.9. Members in or visiting the area are cordially welcomed. Further information may be obtained from the Acting T.R., E. J. King, G3DCC, 109 Marlborough Park Avenue, Sidcup, Kent.

## Hull & District Radio Society

The T.R. for Hull (J. R. Borrill, G3FKK) who has been elected Hon. Secretary of this newly-formed Society, will be pleased to meet prospective members either at his home address (321 Priory Road, Hull) or at meetings (see *Forthcoming Events*).

## Leicester Radio Society

Amateur Radio was featured on the front page of the local illustrated *Leicester Chronicle* on June 14 under the title "Calling the World." This feature, arranged by the Society's Publicity Officer, covered all aspects of Amateur Radio, and included photographs of QSL cards, amateur stations, and field day activities. The Society now has its own badge, and membership is increasing. Meetings are held at the club room, "Holly Bush Hotel," Belgrave Gate, on the first and third Monday each month. *Hon. Secretary:* A. L. Milnthorpe, 3 Winstor Drive, Thurmaston, nr. Leicester.

## Mid-Kent Amateur Radio Society

At the recent A.G.M. the following officers were elected: *Chairman:* J. Oliver, G3GWG, *Treasurer:* D. Whitehead, G3GOW. *Secretary:* B. Holmes, 62 Waterlow Road, Maidstone, Kent. The club took part in a local Exhibition held in the Corn Exchange. Meetings are held on Fridays at 8 p.m. at the Elms School, London Road, Maidstone.

## Midland Amateur Radio Society

"The Use of V.H.F. in Mobile Radio Schemes" was discussed by M. A. Brett, G3HBE, and J. F. Collett, G3BUR.

at a recent lecture. Meetings are held on the third Tuesday at the Imperial Hotel, Temple Street, Birmingham. *Hon. Secretary:* G. W. C. Smith, G3HDK, 84 Woodlands Road, Birmingham 11.

## North East Amateur Transmitting Society

The Society meets on the third Monday. *Hon. Secretary:* L. Bergna, G3EIE, 121 Addycombe Terrace, Newcastle-on-Tyne 6.

## Purley & District Radio Club

At the June meeting, K. Perry, G3GKP, spoke on "Oscilloscopes and their Uses." Meetings are held on the fourth Tuesday at the Railway Hotel, Purley. *Hon. Secretary:* A. Frost, G3FTQ, 18 Beechwood Avenue, Thornton Heath, Surrey.

## Slade Radio Society

Highlight of the June meeting was a talk on "Electronic Digital Computers." The second part of a lecture on "Nuclear Physics" will be given by J. Y. Freeman on July 18. Meetings are held on alternate Fridays, commencing 7.45 p.m., at the Church House, High Street, Erdington, Birmingham 23. *Hon. Secretary:* M. Fowler, 25 Crossway Lane, Perry Bar, Birmingham 22b.

## Southend & District Radio Society

"Aerials and Aerial Coupling" by K. Crispin, G6MH, and "Feeders and Wave Guides"—the first of a series of four talks by W. A. Smith—were subjects for recent lectures. *Hon. Secretary:* G. Chapman, Bell Hotel, 20 Leigh Hill, Leigh-on-Sea, Essex.

## Stockport Radio Society

The Society now has 55 members. "V.H.F. Transmitters and Aerials" (K. Birch, G2FOS and D. Birch, G3AOO) and "Piezo-Crystals" (J. Eaves, G6UQ), were discussed at recent meetings. On August 5, L. A. Potter, G3ESK, will talk on "Pulse Communication Systems." *Hon. Secretary:* G. R. Phillips, G3FYE, 7 German Buildings, Buxton Road, Stockport.

## Walsall & District Amateur Radio Society

The Society recently took part in a Carnival and Fête organised by the British Limbless Ex-Servicemen's Association in aid of funds for the disabled. The exhibit featured an Amateur Radio station—call G2FPR/A—operating on "Top Band," phone and c.w., installed in a hut, the walls of which were decorated with QSL cards and R.S.G.B. posters. Another section of the exhibit featured a display of equipment loaned by members, including v.h.f. and midget receivers, wavemeters, and a tape-recorder. The thanks of the Society are due to R.S.G.B. headquarters, the G.P.O., and to the Wolverhampton Amateur Radio Society for their support and assistance; also to those who loaned equipment, as well as "Top Band" operators who gave up so much of their time so that QSO's could be effectively demonstrated throughout the period of the Exhibition. *Hon. Secretary:* F. J. Merriman, G2FPR, 123 Wolverhampton Road, Walsall.

## West Raynham Amateur Radio Society

The club station is now on the air as G3IDE using a frequency of 7040 kc/s and an input of 25 watts. Equipment comprises a 6AG7/807 transmitter and an AR.77 receiver using a 126ft Hertz aerial. The QTH is: R.A.F. Station, West Raynham, nr. Fakenham, Norfolk.

## Worthing & District Amateur Radio Club

Advance notice has been received that the A.G.M. will be held at the Adult Education Centre, Worthing, on September 8. There will be no ordinary club meeting during August.

## Worthing Bucket & Spade Party

This annual function will take place on Sunday, July 27, at Beach House, Worthing.

## Wirral Amateur Radio Society

Nearly 60 members and friends attended the Society's first Hamfest and Dinner, held recently at the Woodside Hotel, Birkenhead. A recent "Gadgets Contest" was won by B. O'Brien, G2AMV. *Hon. Secretary:* A. H. Watts, G3FXC, 9 Coronation Drive, Bromborough.

## Witney & District

It is proposed to form an Amateur Radio and Television Society in this area. Prospective members are asked to communicate with J. E. Swayne, G3BLE, 12 Oxford Hill, Witney, Oxon.



# LETTERS TO THE EDITOR

The Society assumes no responsibility for the views expressed herein by correspondents.

## National Field Day

DEAR SIR,—I should like to make a few comments on the proposed change in N.F.D. rules, namely that A stations shall operate on 1.7 and 7 Mc/s, and B stations on 3.5 and 14 Mc/s. The reason advanced in support of the change is that activity would be spread out more evenly between the two stations. I feel that this argument is fallacious.

At present one can achieve a medium-to-high scoring rate on both 1.7 and 3.5 Mc/s between 9 p.m. and 8 a.m., with a consistent low-to-medium rate at other times, with 3.5 Mc/s superior to 1.7 Mc/s in daylight. Half the battle is, therefore, knowing when to switch between these two bands to increase the scoring rate. In my opinion this requires shrewd judgment of conditions based on experience.

At the other end, 14 Mc/s yields few contacts with G portables, and scoring rates are inconsistent; the same applies to 7 Mc/s if skip is long, as was the case this year. The effect of the proposed change will be, therefore, that the stations wishing to make high scores will tend to use the bands on which consistent scoring rates can be maintained. These are, of course, 1.7 Mc/s and 3.5 Mc/s, for at all times contacts with G portables are the rule there and the exception on the other bands, and these are the contacts which score heavily. I conclude, therefore, that the effect of the change will be increased activity on the l.f. bands to the detriment, or even exclusion, of activity on the h.f. bands. If we must have a change, therefore, let one station work 3.5 and 7 Mc/s, with the other on 1.7 and 14 Mc/s, with two transmitters for that station only.

An additional reason is implicit in the proposed change, namely that a change is in any case beneficial, and will pose new technical problems to be solved. I believe that this will operate against the small groups with limited resources. Many groups have a sizable investment in N.F.D. gear, or rely upon one or two members holding gear for N.F.D. use. The prospect of having to replace this—for modification may be impossible—is, I am sure, definitely unattractive to many groups. I do not want to suggest that they will not accept the technical challenge but rather that more cogent reasons for so doing are required.

In conclusion, please let us hear no more of these suggestions for increased power. One can work the whole world with five watts provided the transmitter and aerial system are efficient; 25 watts will not lead to significantly higher scores, only to increased QRM.

Yours faithfully,

L. N. GOLDSBOROUGH (G3ERB).

Bebington, Cheshire.

DEAR SIR,—The subject of N.F.D. seems to have aroused considerable interest this year, the two main points being the use of higher power and the change of frequencies.

GWSC finds the power restrictions irksome, but if the restriction were removed, N.F.D. would develop into just another contest, and one might as well go home and put the main rig on the air. I think that the power limit should remain at 5 watts, and that in addition a restriction on the use of commercially-built gear should be imposed. I wonder what the reaction of members would be if the receivers in use on Field Day were limited to "straight" sets?

There seems to be little to be said in favour of the change of frequencies, except perhaps during the night, when activity on the h.f. bands is rather limited by conditions (though these will improve during the next few years).

Yours faithfully,

D. W. ROBINSON (G3FMT).

East Sheen, London, S.W.14.

DEAR SIR,—In the event of the Contests Committee coming to the conclusion that all the membership is up in arms against the proposed new N.F.D. bands rule, I would like them to know that here is one member who thinks it is a good idea. It seems to me that the objections put forward so far are either totally invalid or are based on some trifling detail so as to make them completely inconsequential.

Since, in the majority of cases, a major degree of structural alteration to existing equipment will not be involved—contrary to the claims of Mr. H. S. Chadwick (G8ON)—I would urge those who dislike this new rule to give it a fair trial and then to pass judgment.

Yours faithfully,

ANDREW M. SMITH (G3IAS).

Worlingham, Surrey.

DEAR SIR,—In view of the practice of stations netting on a CQ call and calling before that station has signed, I suggest crystal control with a maximum of four frequencies for any band. This would not give any advantage to the large groups or penalise the smaller ones.

Yours faithfully,

R. PULLIN (G4OL).

Bromham, Bedford.

DEAR SIR,—While appreciating the good intentions behind the Contests Committee's proposals for N.F.D., I feel that the present approach to this annual institution of ours is vastly different from the early idea—which was to provide an annual "emergency" for us to cope with. The possibility of rigging up a "net" under real emergency conditions with the gear used at many of the Field Day stations is very remote, and the time taken to gather the station together—quite apart from its assembly at the site—would make the whole scheme farcical. Furthermore, having a "stand-by" transmitter and/or receiver on the site totally defeats the emergency idea: in the event of a breakdown, the fault should be cleared—and not the equipment replaced.

As an alternative, I should like to see an overall power limit of 50 watts imposed, such power to include the whole input to the transmitter and receiver—including valve heaters! This would leave much to the discretion and constructive ability of Groups in that they could apportion the power as they wish, e.g. a 40-watt transmitter with 10 watts left to supply the receiver. This suggestion has been carefully considered in my own district and has met with considerable approval. As a practical example, the equipment used under my call sign in the last Field Day was mains-operated (from local supply, of course), and comprised a 5-valve superhet (excluding rectifier), v.f.o.-doubler-p.a. operating into a "random wire" aerial, and a built-in 100 kc/s calibrator. The total power consumption of this equipment, which was contained in a standard 19-inch cabinet, did not exceed 47 watts.

As to the question of change in frequencies, I think that previous comments have been very apt, and I personally should be sorry to have to scrap several months' work on the above-mentioned B-station transmitter-receiver in order to rebuild it for the proposed new B-station allocations.

Yours faithfully,

A. V. DYER (G6VV),  
D.R. South-East Area, Region 7.

Bexley, Kent.

DEAR SIR,—It is interesting to note the various opinions recently expressed regarding N.F.D. It is the opinion of this writer that, like so many other contests, this, the most enjoyable of all radio events, is tending to get out of hand.

One hears vague stories of the high degree of organisation effected by some, but by no means all, of the high scoring stations. It is difficult to know where to draw a line but if it is true that some of the contesting groups use remote controlled transmitters, field telephones and banks of crystals with one for every five kc/s, to mention a few points, then it is time we did some thinking.

While it is agreed that there is no special facility amongst these features that gives a station a greater advantage over any other, nevertheless the overall effect is to reduce the hazards normally associated with field days and to obviate the need for ingenuity which is so much in keeping with the spirit of the event.

It seems to boil down to the fact that the larger group and/or the group with the most advantageous commercial contacts has a better chance of amassing a higher score than has the small ingeniously improvised station where all comers (within reason!) are allowed to "have a go on the key." Surely this is how N.F.D. was meant to be conducted.

For reasons of this nature the writer deplores the suggestion that the power should be increased, even to 25 watts, but favours the suggestion that petrol electric sets, whether to provide 230 volts a.c. or a charging source for accumulators, should be banned from the site. It is all part of the fun anyway to be lugging accumulators round on wheelbarrows in the small hours—as long as it is only once a year!

The enjoyment to be had from crawling round with an Avo, wondering if "that big 6 volt" will last until 5 p.m. has to be experienced to be believed.

There are a number of points here that could be enlarged upon considerably but in their present form they are intended to form more of a topic for discussion than a treatise on Field Days.

But please, for reasons obvious to most of us, do let us keep the frequencies of the "A" and "B" stations as they are at present.

Yours faithfully,

BASIL O'BRIEN (G2AMV).

Prenton, Birkenhead.

DEAR SIR,—The time appears to be opportune to revise certain of the rules governing N.F.D., and to review the purpose of this popular event.

As G2HW aptly put it in his recent letter (April, 1952, issue), N.F.D. was originally intended to afford amateurs an opportunity of constructing apparatus capable of providing reliable communication under emergency conditions. To lend additional interest, competition in operating was introduced.

What would happen if an emergency arose? Firstly, I suggest, every available communication-type receiver would be pressed into service. Readily available portable transmitters would be sought out, but if none could be found, a simple c.o.-p.a. would be constructed. The amount of power used would depend on the gear and source of supply available, be it batteries or generating plant.

Should not N.F.D. attempt to simulate emergency conditions? If not, what is its primary purpose?

The present rules seek to govern such matters as aeriels, power, and time spent on site, but do all competitors abide



by those rules? While one group is content to run a single 6V6G from batteries, another employs push-pull 807s and a petrol-electric generator, yet both transmitters are rated at 5 watts! Presumably this refers to anode current in one case and heater current in the other! Why cannot the rules be specific and state clearly that the final valve must be a 6V6 or equivalent?

If the rules were to prescribe that the aerial must be constructed on the site not sooner than the morning of the Contest, it would eliminate those who build beams at home and transport them to the site ready for erection.

Finally, why limit the height of the aerial to 45 feet when a few more steps up the same tree will permit an aerial 50 or 60 feet above ground to be used?

Yours faithfully,

WALTER VINCOMBE (GM8RV).

Hawick, Roxburghshire.

DEAR SIR,—As at present regulated, N.F.D. is a farce. The word *portable* should mean *capable of being carried*—with the words *without undue effort* implied. At Pontefract this year we used lightweight transmitters and light-alloy masts. There, as regards main equipment, portability ended. The receivers were R.107s, each weighing about 100 lb., to say nothing of the accumulators. The word *portable* seems to be synonymous with *open air*, but this should not be. If some weight restriction were applied to N.F.D., it would at least solve the problem of how to get the gear to and from the site: the answer would be to take it on a bus, or by cycle, or in a rucksack!

On the subject of N.F.D.—is the tent regulation necessary? A portable station is no more efficient if housed in a car, shed, etc.—so why stipulate tents?

As for the proposed reallocation of frequencies—again I ask—why? It will serve only to complicate the equipment, and as far as I can see will serve no useful purpose at all.

Yours faithfully,

W. FARRAR (G3ESP).

Pontefract, Yorks.

## Foreign, Commercial and Military Transmissions in Amateur Bands

DEAR SIR,—I was impressed by the letter on the above subject by Mr. D. P. May (G2BB) in the May issue. Those of us who operate our stations with care, to ensure that we never radiate signals outside the internationally agreed amateur bands, will have experienced the irritating interference of which Mr. May speaks, and to which he so rightly objects. I endorse the course of action he proposes, and hope that as many active amateurs as possible will co-operate to make exploitation of the amateur bands less easy for these intruders.

If we do not bestir ourselves to take some positive action in making our *legitimate frequencies* uncomfortable for such intruders, we shall find that the completely unethical tactics of the short-wave broadcasting stations in establishing themselves permanently inside amateur bands will be followed by the stations to which G2BB refers.

The B.B.C. has published a list of broadcast stations (as observed at their Tatsfield monitoring station) and this shows that no less than 27 are recorded as working in the internationally authorised amateur bands, and not just in the "shared" (by *force majeure*!) portion of the 7 Mc/s band. The following brief analysis may be of interest:

Band (Mc/s) ....	3.5-3.8*	7-7.1	7.1-7.3
No. of broadcast stations listed ..	7	20	122

\* excluding the non-amateur portion between 3635 & 3685 kc/s

Thus, we have at least 27 broadcast stations firmly established in the non-shared exclusive amateur bands already!

Clearly, in view of the apparent apathy or inability of the authorities to regulate the internationally agreed bands, we must fend for ourselves by using the *perfectly legitimate* means outlined by G2BB.

Yours faithfully,

LOUIS VARNEY (G5RV).

Chelmsford, Essex

[EDITORIAL NOTE.—Mr. Varney is not correct when he suggests that the 3.5-3.8 Mc/s band is an exclusive amateur allocation. The whole band is shared in Europe with fixed and mobile services.]

## Why Push-Pull 813s?

DEAR SIR,—One need not listen very much on the h.f. end of 80 to know there are a number of stations with push-pull 813s, etc., and it is extraordinary that signals from these stations are invariably much stronger than those from stations using modest "finals."

Strong signals are to be heard from stations using considerably less than 150 watts but when a carrier comes on with a click, and other signals go into oblivion as the S meter needle bends itself round the far stop, it makes one wonder! But it may be these stations are very efficient and have exceptional aerial systems. I would not know.

Yours faithfully,

VINCENT PENFOLD, G3JZ.

Cuckfield, Sussex.

R.S.G.B. BULLETIN, JULY, 1952.

## "First Steps on Two"

DEAR SIR,—As a plain unvarnished B.R.S. member, my v.h.f. experience is absolutely nil. I have often wanted to get started on two metres, but after perusing various articles on v.h.f. work I always gave up the idea as it appeared to demand a lot of skill or a lot of luck!

The article in the June issue, *First Steps on Two*, was the answer to my prayer. I fully understood it and enjoyed every minute spent reading it. It could not have been presented any better in any shape or form.

I wish the BULLETIN could cater more for the B.R.S. member who obviously is confined to receiving apparatus. In fact I will make this a plea—more articles, please, which will interest all members of the R.S.G.B.

As a result of the article *First Steps on Two* I shall now be "having a go" on that band—receiving only, as I shall never possess a transmitting licence due to continual ill health.

Yours faithfully,

K. T. HUMPHREY.

Banbury, Oxon.

## The "Ham" Spirit

DEAR SIR,—Having obtained the much-coveted amateur transmitting licence, may I put on record my thanks to the many Cambridge amateurs who have given me so much help and encouragement—without which I am sure I could never have "made it"?

Yours faithfully,

J. BERNARD FOSTER (G3IIT, ex-B.R.S. 15421).

Trumpington, Cambridge.

## Representation

The following are additions or amendments to the list published in the February, 1952 issue.

### County Representative

#### Region 3.—Staffordshire.

W. A. Higgins (G8GF), 28 Kingsley Road, Kingswinford.

### Town Representatives

#### Region 2.—Northumberland.

Newcastle-on-Tyne.—R. G. Jack (G3BKE), 4 Windfall Way, Newcastle-on-Tyne 3.

#### Yorkshire West.

Leeds.—E. Batty (G3DGB), 12 Beamsley Mount, Leeds 6.

#### Region 7.—London South-West.

East Molesey.—A. Mears (G8SM), 4 Broadfields.

Guildford-Woking.—R. L. F. Ramsey (G3ARM), Rock Hill, Sydney Road, Guildford.

#### London West.

Acton, Brentford & Chiswick.—J. Tovell (G5LQ), 12 Cambridge Road, Chiswick, W.4.

### Vacancies

Mr. E. A. Hayward (GW2UH), has resigned as representative for the County of Glamorganshire, and Messrs. W. A. Higgins (G8GF), P. Woodhouse (G2BQY), and J. P. Wilson (G3BGP) as representatives for the towns of Stourbridge, Eltham & Sidcup, and Canterbury and Ashford respectively.

Nominations for their successors should be made in the prescribed form and sent to reach the General Secretary by August 31st, 1952.

## Can You Help?

▲ B.R.S.19553 (R. A. Stringer, 1 Hillington Road, Edgeley, Stockport, Cheshire), who wishes to know the frequency, base connections, and functional data of the Desynn Crystal Control Unit No. 167, Ref. 10C/13741 removed from an R.76 receiver.

▲ Associate W. F. Potchery (Church Green, Woodford, Kettering, Northants), who needs wiring and circuit data for the R.1147B, in particular the connections for the input plug.

## FORTHCOMING EVENTS—(Continued from page 6)

Weston-super-Mare.—August 5, 7.30 p.m., Y.M.C.A.

Yeovil.—Wednesdays, 7.30 p.m., Grove House, Preston Road.

### REGION 10

Cardiff.—August 11, 7.30 p.m., "The British Volunteer," The Hayes.

### REGION 13

Edinburgh (L.R.S.).—July 24, August 7, Edinburgh Chamber of Commerce, 25 Charlotte Square.

### REGION 14

Falkirk.—July 25, August 8, 7.30 p.m., The Temperance Cafe.

## BOOK REVIEWS

**THE RADIO AMATEUR'S HANDBOOK (29th Edition, 1952).** By the Headquarters Staff, A.R.R.L. 608+176 pages, 1,202 illustrations, including 93 charts and tables, and 459 valve base diagrams. Price 31/- (post free) from Headquarters. Immediate delivery.

The latest A.R.R.L. Handbook is a revised edition and has considerable new material, but no very great changes in treatment or subject matter have been noticed. "A Crystal-Controlled Converter for 220 and 144 Mc/s" has been added (using the 6BQ7 dual triode in a simplified cascode circuit), and "A Cascode Converter for 220 Mc/s" has been omitted. The cascode connection is shown in three different constructions.

Descriptions of a simple audio-frequency oscillator, and a new 2" oscilloscope have been added to the chapter on "Measuring Equipment."

A simple transmitter for the "novice"; a 75-watt job for 3.5, 7 and 14 Mc/s, using 807 valves; a completely shielded 90-watt transmitter, and a "single-813" design are additions to the chapter on "Transmitters." There is little change in the chapter on "Receivers."

These are but a few of the modifications in a book which has never fallen below a very high standard in accuracy, modernity, usefulness and production. It is, almost certainly, the best-known and most welcomed book in Amateur Radio circles, and—maybe—in many professional circles, too. After examining the 29th edition with its 608 pages, excluding advertisements, the writer turned to a rather dingy and thumbed old veteran, the 7th edition, published in 1930. It had only 216 pages and cost 1 dollar, but it had already established the very high standard and sincerity which has been so steadily maintained through the years.—T.P.A.

**RADIO ASTRONOMY.** By B. Lovell, O.B.E., Ph.D., F.Inst.P., F.R.A.S., and J. A. Clegg, Ph.D., F.Inst.P., F.R.A.S. Page size 7½" x 5½"; 238 pages, 119 illustrations. Published by Chapman and Hall. Price 16/-.

This book is another in the "Frontiers of Science" series whose aim is to provide texts intermediate between the elementary and the highly specialised. The fundamentals of astronomy and radio wave transmission are outlined briefly. Radio methods for the investigation of astronomical phenomena are discussed, in particular several chapters are devoted to the origin, terrestrial effects, and radio detection of solar emission, a phenomena of no mean importance to the amateur. Galactic noise and the Aurora Borealis are among other subjects treated from a radio astronomical standpoint. As an introduction to this new and expanding branch of science the book will be found invaluable to the progressive amateur.

Dr. Lovell is Professor of Radio Astronomy at the University of Manchester and has been placed in charge of the research at Jodrell Bank, where the largest radio telescope in the world is to be constructed.

P.J.B.C.

## NEW BOOKS

**EVERYMAN'S WIRELESS BOOK (11th Edition).** By F. J. Cumm. Page size 7½" x 5½". 295 pages, 224 illustrations. Published by George Newnes, Ltd. Price 12/6.

This well-established book forms an elementary introduction to the principles of radio transmission and reception. Special emphasis is given to the needs of the reader who wishes to know how to locate and rectify faults which arise in receivers. Testing methods are well covered. The 24 chapters are liberally illustrated with well-drawn line drawings.

**WIRELESS & ELECTRICAL TRADE YEAR BOOK (23rd Edition).** Page size 8½" x 5½". 264 pages. Published by Trader Publishing Co., Ltd. Price 10/6.

This edition contains data of practical use to dealers in the new television areas. Features include condensed specifications of current commercial television receivers (with such valuable facts as valves used, i.f. values, etc.) and information on valve and cathode-ray tube base connections, with over 200 valve base diagrams. A new feature is a comprehensive list of the i.f. values of commercial radio receivers which have been marketed during the past five years.

**TELEVISION PRINCIPLES & PRACTICE.** By F. J. Cumm. Page size 8½" x 5½". 215 pages, 114 illustrations. Published by George Newnes, Ltd. Price 25/-.

This up-to-date work on the basic principles of television transmission and reception covers also servicing and installation.

The B.B.C. Television System is described in some detail after which television cameras, projection receivers, time bases, pattern generators, aerials, and the problems of interference are considered. Developments in Stereoscopic and

Colour Television are briefly discussed while a further short chapter deals with the choice of a receiver.

One of the most valuable features of this book, which should appeal to the serious student of television techniques, is a comprehensive dictionary of television terms.

**PRINCIPLES OF RADIO (6th Edition).** By Keith Henney and Glen A. Richardson. Page size 8½" x 5½". 655 pages. Profusely illustrated and published by John Wiley & Son Inc., New York, and available from Chapman & Hall, Ltd., London. Price 44/-.

This is a completely revised edition of a textbook which has been held in high esteem for nearly a quarter of a century. The major emphasis is on the fundamental principles of basic radio circuits. Step-by-step examples have been included to illustrate the more difficult of the computations. The suggested experiments were all worked out in the laboratory and the problems are of a type that is likely to be encountered in practice.

Transmission Lines, Frequency Modulation, U.H.F. Phenomena, Electronic Instruments, Transients, Television and Radar are the titles of recently added or extensively revised chapters.

Invaluable to the student striving for an engineering degree.

**HOW TO PASS RADIO LICENSE EXAMINATIONS (3rd Edition).** By Charles E. Drew. Page size 9½" x 6". 306 pages, 135 illustrations. Published by John Wiley & Sons Inc., New York. Obtainable from Chapman & Hall, Ltd., London. Price 33/-.

This book is designed to assist the reader in determining whether he has sufficient knowledge of the field of radio communication to pass a Federal Communications Commission examination for any type of radio operator licence or permit. Although written for U.S. readers, much of the information is of interest to other nationals. The treatment is by question and answer and is very comprehensive.

Most amateurs would be glad to know even half the answers.

**VADE-MECUM, 1952.** By P. H. Brans, Ltd., Antwerp. 416 pages. Obtainable from Bailey Bros. and Swinfin, Ltd., London. Price 25/-.

Due to the overwhelming growth of the book in its previous form, the compilers have decided to arrange the data in separate sections. This edition lists receiving and transmitting valves only, in numerical and alphabetical order. Affiliated Societies and Town Groups should possess a copy for reference.

**40 CIRCUITS USING GERMANIUM DIODES.** By Sylvania Electric Products Inc. Page size 7½" x 4½". 48 pages with 39 diagrams. Published by Bernards (Publishers) Ltd. 3/-.

The germanium diode has already become firmly established as an efficient substitute for the thermionic diode in a wide variety of radio, television and electronic circuits. This manual of circuits is reprinted from a booklet published by Sylvania Electric Products Inc. of U.S.A., and illustrates forty practical uses for crystal diodes in receivers, transmitters and test equipment. In addition, the book contains a comprehensive chart listing the characteristics of more than 60 different types of germanium diodes produced by various manufacturers.

## Around the Trade

A catalogue of electrical and radio components, listing various types of switches, meters, Variac transformers and test instruments, is now available on request from Claude Lyons, Ltd., 180 Tottenham Court Road, London, W.1.

Panda Radio Co., School Lane, Rochdale, Lancs, will supply a brochure giving details and specifications of the PR-120-V Table-Top 150-watt TVI-proof Transmitter on application. A circuit diagram of the r.f. chassis is included.

An attractive 36-page catalogue of poles and lattice structures for cable supports, fully illustrated by line and half-tone blocks, has been published by Painter Brothers, Ltd., Hereford, England. The booklet contains technical data on the physical properties and loading of the poles described. Copies are available on request from British Insulated Callender's Cables, Ltd., Norfolk House, Norfolk Street, London, W.C.2.

The Edison Swan Electric Co. Ltd. announce that the B.T.H. type *Minnette* magnetic pick-up—a restyled and modernised version of the old B.T.H. unit—is now available. Output is 0.7 V r.m.s. at 1,000 c/s; weight at needle point 2½ oz.; resistance of the pick-up winding 1,800 ohms, and inductance approximately 1½ H.

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 ZL1KJ R. S. HARVEY, 5 Mays Road, Te Papapa, Auckland, S.E.5, New Zealand.  
 5A2TN R. W. BERRY, 1261st A.T. Sq., 1603rd A.T.W. (M.A.T.S.), A.P.O. 231, c/o Postmaster, New York, U.S.A.  
 5A2TO C. M. UNFRIED, Box 372, Tripoli, Libya.  
 5A2TP D. JONES, Flt. C, 7th Air Rescue Sqdn., A.P.O. 231, c/o Postmaster, New York, U.S.A.

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- 814 T. KANAGARATNAM, Civil Radio Transmitting Station, Telecom. Dept., Jurong, P.O. Box 907, Singapore.  
 815 2484916 L.A.C. NICHOLSON, Signals Section, 28 L.A.A. Sqdn., R.A.F. Fayid, M.E.A.F. 15.  
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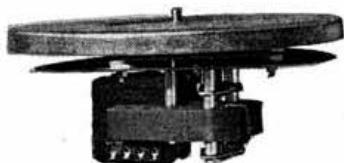
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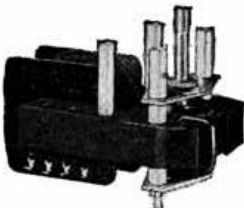
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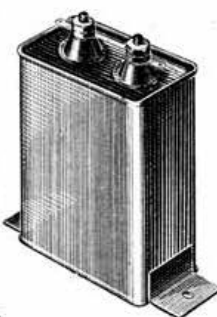
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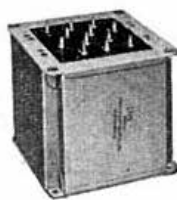
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**A** dozen Denco polystyrene horizontal 6-pin coil formers wanted, unused.—G3CMM, 8 Curzon Road, Weybridge, Surrey. (443)

**A**DVANCE signal generator, type E, model 1, as new, hardly used, complete with gen book, ES, all leads, £14. —NUTTALL, 82 Donnington Court, London, N.W.10. (460)

**A**MATEUR, immigrating, has for sale: AR.88D, perfect order, £45. Cossor 3339 DB oscilloscope, £25. Clifton 3 motor tape deck with oscillator and circuit, £15. Advance E2 generator, as new, £18. BC.221, no case, 115 V a.c. pack, £10. R.C.A. ribbon desk microphone with transformer, £5. 1155 with power-pack speaker, £10. 500-0-500 150 mA R.I. M/T. 35s. AR.88 M/T. £2. Valves: 815 (3), used but perfect, 20s.; 814 (1), new, unboxed, 25s. Carriage paid from G3BYH, 4 Woodville Avenue, Scarborough. (463)

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**B**C.342 with auto-trans., £20. BC.221 with stabilised p.p., £20. Canadian 58 set transmitter/receiver, complete vib., pack, microphones and phones, etc., £15. R.C.A. ribbon microphone, £3. All new and perfect.—HALL, 27 Redcar Road, Blackpool. (474)

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**B**OOKS.—A.R.R.L. Handbook, 15s.; 6 "Radio News," 10s. 6d.; Wireless Direction Finding, £1; Radio Designers Handbook, 10s. 6d.; Television Receiving Equipment, 10s. 6d.; Radio Laboratory Handbook, 10s. 6d.; 36 "Wireless Worlds," 47/8/9, £3. All post free.—K. OLIVER, 28 Ennismore Avenue, Guildford. (427)

**B**RT.400 receiver in mint condition; operating handbook; £100 or nearest. Labgear power pack, prim. 230 V, secs. 700-0-700 V, 1,000-0-1,000 V 250 mA, £10. Labgear crystal

calibrator, 100-1,000 kc/s, internal power pack, £6 10s. Hallicrafters HT-6 transmitter, 25 W, c.w. and telephony, with all coils for 7 and 14 Mc/s, less crystals. Internal power packs, also mains step-down transformer for above; £20 or nearest. Goodmans 12 in. loudspeaker, 15 ohms, £4. "The Short Wave Listener." Vols. 1-6 (to date), less No. 10, Vol. 1, £2 or offers. £135 the lot for quick sale.—GM2FXN, 2 Roxburgh Terrace, West Park Road, Dundee, Angus. (480)

**B**ULLETINS wanted to complete collection: July, 1925, to June, 1926; August, 1926, and February, 1928. Also complete volumes "CQ," 1945 and/or 1946. Ditto "QST," 1927 and back, also loose copy April, 1945.—G3IDG, 95 Ramsden Road, London, S.W.12. (451)

**B.2** transmitter/receiver, complete with all coils, £13 10s. H.R.O. vibrator power pack, £2 15s. Oscillator unit, type 76, £3 10s. Clifton tape deck, £18. Also large amount of equipment for disposal. Write giving requirements.—R. W. LIVERMORE, 256 Grove Green Road, Leytonstone, E.11. (449)

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**F**OR SALE.—PT15-6N7G, unused, 5s. EF39-6K8, used, 2s. 6d. RF27, £1 1s. 78 receiver, less valves, crystal, 5s. 6d. Power units, unused, 24 V input, 200 V 110 mA, 7 V 13 A output, £1 10s.; 24 V input, 1,200 V 240 mA output, £1 10s.—60 E, Lewis Buildings, Liverpool Road, London, N.1. (448)

**F**OR SALE.—R.107 receiver, complete with instruction book; in first-class condition; £14, carriage extra.—G3FTY, The Nook, Beech Road, Hadleigh, Essex. (433)

**F**OR SALE.—100 W transmitter, type T1154N, as used in Halifax aircraft, untouched, with manual and spare PA valves. Covers 80 and 40.—Box 457, NATIONAL PUBLICITY CO. LTD., 358 Strand, London, W.C.2. (457)

**H**AMMARLUND super-pro, rack mounting with power pack. Offers.—Box 476, NATIONAL PUBLICITY CO. LTD., 358 Strand, London, W.C.2. (476)

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(Continued on Page 44)

# EXCHANGE and MART SECTION

(Continued from Page 43)

**M**UST sell.—Type A Mk. III transmitter/receiver, brand new and unused, in metal case, spare valves, key, etc., with 7,021 kc/s crystal with certificate, £10. Modoscope (3PB1), 465 i.f.s., in metal case, £7 10s. Hambander with Q/Ser. £7 10s. BC.221 A.H. in wood case, p.p., as new, £15. R.1155 receiver, brand new, £5. P/PS, £2 each. Valves, etc., send wants. Wasp 1A amplifier with Wray "Super" 14.5 lens, F.B., £15, o.n.o. Voigtlander "Brilliant," £4.5, needs cleaning, £8.—FEARLEY, 72 Leeds Road, Shipley, Yorks. (446)

**O**FFICIAL handbooks for BC.348R and LMY wanted. Buy or loan please.—G3ADG, 31 Mary Street, King Cross, Halifax, Yorks. (450)

**O**LD-FASHIONED constructor requires 6 baseboard mounting 4-pin valveholders, 4 Eddystone or Raymart 6-pin baseboard-mounting coil holders.—Box 426, NATIONAL PUBLICITY CO. LTD., 358 Strand, London, W.C.2. (426)

**P**ATENTS and Trade Marks. Handbooks and advice free.—KINGS PATENT AGENCY LTD. (B. T. KING, G5TA, Mem. R.S.G.B. Reg. Pat. Agent), 146a Queen Victoria Street, London, E.C.4. Phone: City 6161. 50 years' refs. (98)

**P**RACTICALLY brand-new Sound Mirror tape recorder, portable model, with microphone; cost £86 10s. February last. Offers or will consider exchange for communication receiver of equal value.—Box 477, NATIONAL PUBLICITY CO. LTD., 358 Strand, London, W.C.2. (477)

**Q**SLs and log book (P.M.G. approved); samples free. State whether G or BRS.—ATKINSON BROS., Printers, Elland. (97)

**R**ADIOVISION 2-valve pre-selector with own power pack, RF.27 unit, unused, both perfect.—Offers, 10 Moor Park Road, Northwood, Middlesex. (434)

**R**.A.F. monitor type 25 CRO, £10. MR/3 "SPY" transmitter/receiver, 2-8 Mc/s, a.c. mains, £5 10s. Both FB condition. Will crate monitor, but collect or pay rail this item.—FELTON, G3IEF, 46 Prebendal Avenue, Aylesbury, (Aylesbury 542.) (447)

**R**EBUILDING.—Labgear couplers for 7, 14, 28 Mc/s, 10s. each. Crystals, 1 in spacing, 7,008, 7,010, 7,031, 7,051 kc/s, 9s. each. 3.5 Mc/s standard, 5s. Please reply by letter.—G3IHM, 67 Higher Croft Road, Lower Darwen, Lancs. (440)

**R**ECEIVER, much modified, 348 AC, 7 valves, no b.f.o. or crystal, £5. 100 micro ammeter round 4 1/2 in. outside, 3 in. inside, super job, brand new, £3. 809 (2), ML6 (3), RK11, HY40, 931A, reasonable offers accepted.—G3DBZ, 41 Rhodes Walk, Mansfield. (458)

**R**.M.E. 69, perfect, £28; also D.B. 20 pre-selector, £11. Wanted.—SX.28 handbook, buy or hire.—EMENV, 52 Garrison Lane, Felixstowe, Suffolk. (430)

**R**.107 receiver for sale in perfect condition; £10 or nearest.—BACON, 92 Widney Lane, Solihull, Warwickshire. (462)

**S**ALE.—CNY1, £25. Unmodified 1154-55 with R.A.F. 230 V power pack, £15. Ambassador 12 W amplifier with T.R.F., speaker; offers. Wanted.—Scrap AR.88 or similar cabinet and chassis.—Box 473, NATIONAL PUBLICITY CO., LTD., 358 Strand, London, W.C.2. (473)

**S**ALE or exchange.—Oscilloscope, VCR.139, home built, £4 10s. Haynes focus unit F.912, 20s. Signal generator (Hunts.) 300 kc/s to 30 Mc/s, £7.—EDGE, Green Mount, Stamford Road, Bowdon, Cheshire. (484)

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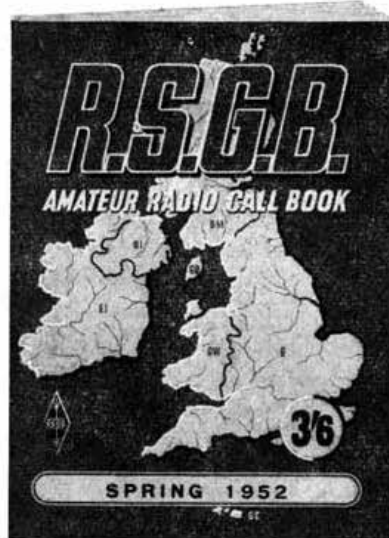
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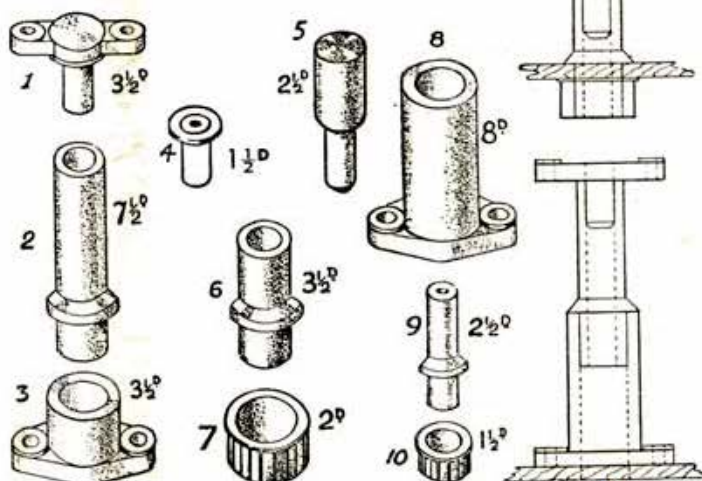
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