

# **June 1950**

The original front cover for this edition was not available.



#### G2AK

# This Month's Bargains

G2AK

FORMERS. 620/55 SPECIAL OFFER. PARMEKO POWER TRANS-FORMERS. 620/550/375/0375/550/620 V. at 200 mA., also plus 250 mA. at the 375 V. taps. Two separate windings of 5 V. at 3 A. each for rectiflers. Rated at 278 watts (this is a very conservative rating and could be exceeded by at least 50 per cent. for amateur use). Weight 24 lbs. This is the transformer buy of the year. Price only 50/-. Carriage paid.

PARMEKO MODULATION TRANSFORMERS. 360 watts. Prim. 5500, 5000, 4500, ct. Sec. I 3550 at 450 mA. Sec. 2 6,700 ohms 12 watts. Ideal for Plate and Screen modulation. Price only 27/6. Carriage paid. Both of the above transformers are fully shrouded and are new and unused but some may be a very little store soiled.

HEAVY DUTY L.F. CHOKES. FULLY POTTED.
30 Hy. 100 mA. 150 ohms (Weight 14 lbs.). Price 13/6.
20 Hy. 126 mA. 100 ohms (Weight 14 lbs.). Price 15/6.
30 Hy. 150 mA. 150 ohms (Weight 18 lbs.). Price 17/6.
(For Amateur use, above ratings could be doubled.) All transformers and chokes are carriage paid except to Eire for which we must ask for 5/- extra.

SPECIAL METER OFFER. 100 µA. Scaled 0-100 21".

Only 22/6 each. 500 µA. Scaled 0-500 2" dia., 7/6 each. 500 µA. Scaled 0-15-600, 6/3 each.

500 pA. Scaled 6-13-600, 8/3 each.
Ditto, but ex equipment, 5/- each.
•5 A. Thermo, 2" dia., 2/6 each, or 5 for 10/-.
0-5 mA., 2" dia., 5/- each.
0-100 mA. and 0-500 mA., 2½", flush mounting, 7/6 each.
0-20 V., 2" dia., 5/- each.

20-0-20 A., 2" dia., 5/- each.
0-3,500 V., moving coil, 3½" dia., 25/- each.
0-9 A., hot wire ammeters (by removing external shunt full scale deflection is 4 A.), 1/6 each.
Radiator Thermometers, 2" dia., movements 2-5 mA., backwards reading, ideal for "5" meters, 1/6 each.
Postage on single meters 6d, 3 or more post free.

U.H.F. RECEIVERS, TYPE R1481 (66-86 Mc/s.). Same as R1132 except for frequency range. R.F. mixer osc. (voltage stabilised), 31 F. stages, 2nd det., B.F.O., etc. Tuning meter. Brand new in transit case, £3 . 19 . 6, plus 7/6 carriage.

HIGH VOLTAGE OIL-FILLED CONDENSERS. 4 µF., 1.500 V., 4/-; 4 μF., 1.000 V., 3/-; 4 μF., 600 V., 2/-; 8 μF., 500 V., 2/6. Postage 6d. each. **R.F. Chokes.** Pie wound, 2-5 mH., 100 mA., receiver type, 9d. each or 7/6 per doz. 250 mA., transmitter type, 1/- each, 10/- per doz.

SPECIAL FOR AR88 USERS. Matching Speakers, 2.5 ohms, black crackle case, £3.15.0.
AR88 Spare Crystals for D model only, 455 kc/s., 15/- each. Complete set of spare valves (14), £5.

VIBRATOR PACKS. 6 V. input, output 150 V. 40 mA., complete with all smoothing, 17/6.

VIBRATOR PACKS. 12 V. input, output 300 V. 100 mA., fully smoothed, in black crackle case, 19/6.
Postage on either pack 1/6. All packs are sent out tested and in working order.

Carriage paid on all orders over £1 except where stated. Please include small amount for orders under £1.

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The type P5 Quartz Crystal Unit is now fitted with a low temperature co-efficient crystal, having a co-efficient of two cycles per Mc/s. per degree C temperature change. It is available in an extended range of frequencies, and each crystal is acid etched finished and artificially aged for permanence of performance and calibration.

When used in the Colpitts oscillator-multiplier circuit, with a 6AG7 valve at an anode voltage of 300V. sufficient output is available on the fundamental frequency, and 2nd, 3rd and 4th harmonics to drive any of the usual tetrode valves as a further frequency multiplier or power amplifier. Details of this circuit, and an official certificate of calibration are included with each crystal.



- Ground to your own specified frequency.
- † Ground to a frequency from our own or your dealer's stock.

Telephone: MALDEN 0334. Cables: QUARTZCO, NEW MALDEN.

PRICES

The P5 unit is available in the following ranges:-

- 1,750 to 2,000 kc/s., for use on the fundamental frequency (1,800-2,000 kc/s.) and with frequency multipliers in the 3-5, 7, 14, 21 and 28 Mc/s. bands.
- 3,500 to 3,800 kc/s., for use on the fundamental frequency (3,500-3,800 kc/s.) and with frequency multipliers in the 7, 14, 21 and 28 Mc/s. bands.
- 7,000 to 7,425 kc/s., for use on the fundamental frequency (7,000-7,150 kc/s.) and with multiplier stages in the 14, 21 and 28 Mc/s. bands.
- 8,000 to 8,111 kc/s., for use with multiplier stages (x 18) in the 144 Mc/s. band.
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- 12,000 to 12,166 kc/s., for use with a quadupler stage in the 144 Mc/s. band.
- 14,000 to 15,000 kc/s., for use on the fundamental frequency (14,000-14,400), and with a doubler stage in the 28 Mc/s. band.
- \*12 and 14 Mc/s. ranges, £2. All other ranges, £1 17s. 6d.

†12 and 14 Mc/s. ranges, £1 15s. All other ranges, £1 12s. 6d.

# THE QUARTZ CRYSTAL CO., LTD.

63-71 KINGSTON ROAD, NEW MALDEN, SURREY

# CLYDESDALE-

Bargains in Ex-Services Radio and Electronic Equipment

#### ASB8 Receiver CAY46ACE Cat. No. H224.

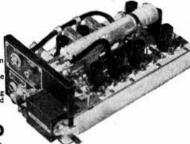
12-valve double superhet operating on 516 Mc/s. Containing an R.F. stage 446A lighthouse triode in a precision machined silver plated cavity.

1st oscillator 460 Mc/s. 955 Mixer. 2X6AC7 1st and 2nd I.F. 55 Mc/s. 6J5 2nd oscillator 39 Mc/s. 6AC8 Mixer. 2X6AC7 1st and 2nd I.F. 15 Mc/s. 6H6 6AC7

Diode detector. Video Amplifier. Cathode follower, 230 ohm output. By recalibrating this set can be tuned to the 425 Mc/s, band.

Details can be supplied for the calibrating and fixing noise limiter, "S" meter and A.C. Power Pack. Unit dimensions:-131" x 51" x 71".

Clydesdale's Price Only. £4. 10.0 Carriage Paid.



#### Receiver Unit type 25.

Cat. No. H229, ref: IOP/IL part of the

Cat. No. H229, ret: 107/1L part of the TR1196 equipment. Frequency Range 4:3-6-7 Mc/s. Valves: 2/VR53 (EF39), 2/VR56 (EF36), VR55 (EBC33), VR57 (EK32), 2/I.F.T., 460 kc/s., plus various microdensers, mic. and output transformers, pots., condensers, resistors, etc., connections brought to 10-pin Jones type chassis plug.
Circuits are provided in the unit, which is

totally enclosed in case 8½" x 6½" x 6½". Would make the basis of an All-Wave Receiver, requires tuning pack and power

Clydesdale's Price Only. Post Paid.

with valves 22/6 less valves

Brand new.

#### Moving Coil Mic./Headphone Assy.

Comprising moving coil microphone (Hand No. 7) with pair of M.C. Headphones and 3' lead with rubber 5-point socket. Imp. approx. 60 ohm, per insert.



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12/6

## **NOW READY**

Complete Illustrated List No. 7 of EX-SERVICES' BARGAINS, Plus

List of Radio and Television Components by foremost manufacturers fully illustrated, also containing useful valve, coil, and other data.

Send 6d. to Cover distribution cost. Please print name and address.

# Ex U.S.A.A.F.



Frequency 3·0-6·0 Mc/s. 100-49 metres. I.F. 1,415 kc/s. 6 valves, 125K7 R.F., 12K8 F.C., 125K7 ist I.F., 125F7 2nd I.F., 125R7 det., B.F.O., 12A6 output. 3-gang tuning condenser (remote controlled), complete unit (less dynamotor) in metal case 11" x 5½" Input 24 V. x 5". Input 24 V. Clydesdale's Price Only.

Post Paid.

Set of Circuits for SCR-274-N at 4/6 or BC-453 or BC-454 or BC-455 Circuits 1/3 each, post paid.

Brand New, Ex U.S. Navy, in maker's original carton.

#### Control Box Cct-23156, Equal to U.S. Army, BC-496-A.

For Two Command Receivers, with dual tuning and volume controls, switches, Inlet and Outlet points, black crackle finish box, dimensions 6½" x 4" x 12".

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#### Brand new in maker's cartons.

AN/ARC-5 - SCR-274-N.

"Command" Receiver Units R-26/ARC-5 or BC-454.



# Viewmaster Television.

Metal Mine Detector.

design and construction.

complete unit.

wood case.

Clydesdale's

Cat. No. H179, ref: ZA-24238, of Canadian

design and construction. Designed for under water use and completely water-proofed (rubber sealed). Comprises:—3 valve (IT4 pentodes 1-5 V.) T.C. amplifler, in metal box 13" x 9" x 2\frac{1}{2}", with recess for battery (Ever-Ready B125 will said before the pental box 13" x 9" x 2\frac{1}{2}".

Telescopic sweep pole.
Control Box, 8½" x 3" x 2½", with on/off switch and regeneration control.

Headphones, moisture proof type, rubber

Test Unit for use with Search Coil when "setting up."
Rucksack, back sling, webbing type, to hold

Instruction Leaflet, the whole supplied in

Clydesdale's Price £5.19.6 each.

£14 10s. 6d.

£10 10s, 0d.

£7 18s. 6d. £12 12s. 0d.

£35 0s. 0d.

£5 19s. 6d. £3 19s. 6d.

£1 19s. 6d.

19/6

STILL AVAILABLE. \*Wireless Set No. 48

T1154 Transmitter Unit

4 range ... ★TII54 Transmitter Unit

\*Bridge Megger 100 megs. at 1,000 V.

\*Wee Megger 20 megs. at 250 V. .... \*A.C. Power Unit type 3 \*Crystal Multiplier type MI-19468 .... \*BC-456 "Command"

Modulator Unit ... \*

\*Battery Amplifier A.1368

\*Reflector Aerial

carriage.

case.

Price Only.

2/11

each.

Post Paid.

No. Clydesdale's

(MX-137/A) As previously advertised, prices include

Ex Tank Corps. Morse Key.

3 range ... ... \* R1155 Receiver Unit

will suit with plug changes). Search Coil, surface area 10\frac{1}{2}" x 6\frac{3}{4}".

Circuit and Data. State whether London (A) or Sutton Coldfield (B). Component Kits available.

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Cat. H67 for BC-453 or H68 for BC-454 or H69 for BC-455. Clydesdale's Price Only. 10/- each. Post Paid.

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#### Transmitter Tuning Units.

Each having Vernier tuning dial; variable capacitors. Tank coil unit on ceramic former; ceramic switch; R.F. chokes, etc., in metal cabinet 17½" x 7½" x 8".



TUSB. 1,500-3,000 kc/s. 22/6each. Carriage Clydesdale's Price Only.
TU6B. 3,000-4,500 kc/s.
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TU8B. 6,200-7,700 kc/s.
Clydesdale's Price Only.

TU26B. 200-500 kc/s. Clydesdale's Price Only.

17/6each. Carriage Paid.

10/-each. Carriage Paid.

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## BULLETIN R.S.G.B.

**IOURNAL** INCORPORATED RADIO SOCIETY OF GREAT BRITAIN

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## Forthcoming Events

#### REGION 1

Ashton-under-Lyne.—July 2, 3 p.m., New Jerusalem Schools. Bolton.—July 4, 8 p.m., Y.M.C.A. Bury.—July 6, 7.30 p.m., Y.M.C.A., The Rock. Darwen and Blackburn.—June 30, July 13, Y.M.C.A., Limbrick, Blackburn.

Manchester.—July 3, 7.30 p.m., Reynolds Hall, School of Technology, Sackville Street.

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

Preston.—June 23, July 7, Three Tuns Hotel, North Road. Rochdale.—July 2, 3 p.m., Drill Hall, Baron Street. Wirral A.R.S.—June 21, July 5, 8 p.m., Y.M.C.A., Whetstone Lane, Birkenhead.

#### **REGION 2**

Barnsley.-June 23, July 14, 7.30 p.m., King George Hotel, Peel Street.

Bradford.-June 27, 7.30 p.m., Cambridge House, 66, Little Horton Lane.

Catterick.—Wednesdays, 7 p.m., Loos Lines, Catterick Camp. Darlington.—Thursdays, 7.30 p.m., Club Room, British School Yard, Skinnergate.

Doncaster.—Wednesdays, 7.30 p.m., 73, Hexthorpe Road.
Gateshead.—Thursdays, 7 p.m., Y.M.C.A., Sutherlan

Sutherland Hall,

Durham Road.
Hull.—June 28, 7.30 p.m., R.E.M.E. Barracks, Walton Street.
Leeds.—Fridays, 7.30 p.m., Swathmore Settlement, Woodhouse

Square. Middlesbrough.-Thursdays, 7.30 p.m., All Saints' Hall, Grange Road.

Newcastle-upon-Tyne.—June 19, 8 p.m., British Legion Rooms, 1 Jesmond Road.

Scarborough.-Thursdays, 7.30 p.m., Boys XIX Club, St. Nicholas

Street.

Street.

Sheffield.—June 28, 8 p.m., Dog and Partridge, Trippet Lane.
July 12, 8 p.m., Albreda Works, Lydgate Lane.

Spenborough.—June 24, 7.30 p.m., Temperance Hall, Cleckheaton.
Wakefield.—June 28, July 12, 7.30 p.m., Carr Lodge Park, Horbury.
(If wet, in Café.)

York.—June 28, July 12, 7.30 p.m., Rechabite Building, Clifford

Street.

#### REGION 3

Birmingham.—July 18, 8 p.m., Imperial Hotel.
Birmingham (M.A.R.S.).—June 20, 6,45 p.m., Imperial Hotel.
Birmingham (South).—July 2, 16, 10.30 a.m., Stirchley Institute.
Coventry.—June 16, 7,30 p.m., Priory High School, Wheatley Street.
Coventry (C.A.R.S.).—June 19, July 3, 8 p.m., B.T.H. Social Club,
Holyhead Road.

Stourbridge (S.D.A.R.S.).—June 23, 8 p.m., Corn Exchange. July 4, 8 p.m., King Edward VI School.

#### **REGION 4**

Derby (D. & D.A.R.S.).—June 21, 28, July 5, 12, 7.30 p.m., Club Room No. 4, School of Art, 119 Green Lane. Leicester (L.A.R.S.).—June 19, July 3, 7.30 p.m., Holly Bush Hotel, Belgrave Gate. Loughborough.—July 12, 7.30 p.m., Science Lab., Limehurst

School.

Mansfield (M. & D.A.R.S.).—July 2, 3 p.m., Swan Hotel.
Northampton (N.S.W.C.).—June 23, 30, 6 p.m.; July 7, 7 p.m.;
July 14, 6 p.m., Club Room, 8 Duke Street.
Nottingham (South).—July 11, 7.30 p.m., Trent Bridge Hotel.
Peterborough.—July 4, 7.30 p.m., St. John's Ambulance H.Q.,

Cowgate.

Retford.—July 2, 3 p.m., 8A Bridge Gate. Worksop.—July 3, 7.30 p.m., King Edward Hotel.



#### REGION 6

High Wycombe.-June 20, G61F, 5 Squirrel Lane, Booker.

#### REGION 7

Barnes and Richmond.-July 11, 7.30 p.m., 22 Lowther Road, Barnes.

Barnes.
Brentwood.—June 23, July 7, 8 p.m., Drill Hall, Ongar Road.
Croydon (Surrey R.C.C.).—July 11, 7.30 p.m., Blacksmiths Arms,
South End, Croydon.
Edgware (E. & D.R.S.).—Every Wednesday, St. Michael's School,
Flower Lane, Mill Hill.
Enfield.—June 18, 3 p.m., George Spicer School, Southbury Road.
Erith/Dartford.—Second Monday each month. Contact T.R.
Frith.

Erith/Dartford.—Second Monday each month. Contact T.R. Erith.

Erith. Erith. —June 20, 7.30 p.m., 164 Albion Road, Stoke Newington, N.16.

Hampstead.—June 23, 8 p.m., 1 Broadhurst Gardens, N.W.2 (behind John Barnes).

Hayes and Uxbridge.—July 7, 7.30 p.m., The Vine, Uxbridge Road, Hoddesdon.—June 15, 29, The Salisbury Arms.

Holloway (Grafton R.S.).—Mondays, Wednesdays and Fridays, 7.30 p.m., Grafton School, Eburne Road, N.7.

Ilford.—June 15, at G2BRH; June 29, 78 Eccleston Crescent.

Peckham.—July 3, 7.30 p.m., The Kentish Drover, Rye Lane. St. Albans.—June 15, 21, July 5, 8 p.m., The Beehive, London Road, Slough.—June 15, 7.45 p.m., The Golden Eagle Hotel, High Street. Sutton and Cheam.—June 27, July 11, Sutton Adults School, Benhill Avenue.

Welwyn.—July 4, 8 p.m., Council Chambers, Welwyn.

Welwyn.-July 4, 8 p.m., Council Chambers, Welwyn.

#### REGION 8

Brighton.-Tuesdays, 7.30 p.m., Eagle Inn, Gloucester Road.

#### REGION 9

Exeter.—July 7, 7 p.m., Y.M.C.A., 41 St. David's Hill. North Devon.—July 7, 7.30 p.m., Rose of Torridge Café, The Quay, Bideford.

Bideford,
Plymouth.—June 17, 7 p.m., Tothill Community Centre, Tothill
Park, Knighton Road, St. Judes.
Torquay.—June 16, 7.30 p.m., Y.M.C.A., Castle Road.
Weston-super-Mare.—July 4, 7.30 p.m., Y.M.C.A.
Yeovil.—Wednesdays, 7.30 p.m., Grove House, Preston Road.

#### REGION 14

Ayr.—June 28, 7.30 p.m., Royal Hotel, Prestwick. Falkirk.—June 30, 7.30 p.m., Temperance Café, High Street, Glasgow.—June 28, 7 p.m., 39 Elmbahk Crescent.

# MAZDA AC/DC TELEVISION VALVES

1 AMP. HEATER RANGE					·2 AMP. HEATER RANGE				
		Vh	BASE	LIST PRICE			Vh	BASE	LIST PRICE
IOFI	Screened H.F. Pentode	22.0	B8A	15,6	20DI	Double Diode (Separate Cathodes)	9-5	B7G	9/-
10CI	Triode Heptode Frequency Changer	28.0	B8A	14/-	20F2	Screened Pentode (Video Amp.)	11.0	B8A	15/6
10LD1	Double-Diode Triode	15.0	B8A	12/-	20P1	Beam Power Scanning Amplifier	38.0	1.0.	17/6
10P13	Beam Power Amplifier	40.0	B8A	13/-	U801	Half-Wave Rectifier	80.0	1.0.	17/6
10P14	Beam Power Amplifier	40.0	1.0.	13/-	U281	Half-Wave Rectifier or Efficiency Diode	28.0	1.0.	9/-
U404	Half Wave Rectifier	40.0	B8A	11/6					

THE EDISON SWAN ELECTRIC CO. LTD., 155 Charing Cross Road, London, W.C.2

RA209

# HIGH LEAKAGE RESISTANCE TERMINAL



Twenty million of anything is a lot, 20 million megohms is the resistance of the new "Belling-Lee" high leakage resistance terminal specially designed for instrumentation in nuclear physics, triode electrometers, high resistance bridges, etc. A smaller type is available with a resistance of 3 · 6 million megohms. Tests were taken at 850 volts D.C. 55° F and 70% relative humidity.

#### LIST NUMBERS

Stem	1-50"	Stem	1-50"	.75″	
	L1001/42W	Small	/ L1001/32W	L1001/31W	Plain top
version	L1001/425W	version	L1001/325W	L1001/31SW	Top socket

#### OTHER TERMINALS AVAILABLE

Туре	Rtg. in Amps	Peak Wkg. Volts	Stem Length	Thread
" B " Standard High Voltage " H "	15	1,000 2,000 1,500	( ·750) (1·50) 1·685	2 B.A. 2 B.A. 1 × 26 T.P.I.
" F " " L " Standard High Voltage	30 15	1,000 1,000 2,000	( ·750) (( ·50 )	O.B.A. 2 B.A. 2 B.A.
"R" when fitted with insulating bush and washer "W"	T 8	350 750	-625 -75	4 B.A. 2 B.A.

Types "B," "H" and "F," are similar in construction; non-rotating disc in red or black; no thread in clamping gap; anti-twist wedge in collar; nickel plated.
"B" type supplied with

4 mm. top socket.

"L" and "R" terminals have non-removable rotatable heads in red or black. "W" type black only.

CAMBRIDGE ARTERIAL RD., ENFIELD, MIDDX., ENGLAND

# R·S·G·B

For the advancement of Amateur Radio

VOLUME XXV No. 12

**JUNE 1950** 



#### IN GOOD COMPANY

ITH the memory of another National Field Day still fresh in our minds, it is worth considering the lesson which the undiminished popularity of this event brings home to us each year: the value of communal activities.

While there will always be some who prefer to follow individual paths, for the majority the pursuit of our hobby brings added pleasure when carried out in the company of fellow enthusiasts. For this and many other reasons, local Groups and Clubs have an important role to play in the Amateur Radio movement. The newcomer finds in them a source of instruction and guidance as well as a chance to meet those who know the answers to his problems. The old-timer looks to them for social entertainment, for news of technical developments, and—if he is a public-spirited individual—for an opportunity to help his neighbours by undertaking his share of the work involved in their smooth running.

For Groups and Clubs do not run themselves. Without hard work and planning they soon dissolve. Much has already been written on how to form a local association; what rules are usually necessary; the choice of representatives and officers; the dangers of attempting to meet too often, of not keeping to time, or of holding too many "business" meetings; starting instructional and Morse classes or a Newsletter; and the recruitment of lecturers—with emphasis on the employment of local talent. But there are two aspects which, perhaps, have not received sufficient attention: the importance of attracting

and encouraging newcomers, and the constant need to introduce fresh activities.

All Societies and associations must expect to lose a percentage of their members each year. A few (misguided) individuals give up Amateur Radio, others move from the district or fall temporarily under the influence of what is generally termed "YL QRM." A vigorous recruiting campaign must, therefore, be continuously waged to fill the gaps. More essential still—the battle should not be regarded as won when the new "victim" has been lured to his first meeting. Too often one sees a stranger sitting by himself, puzzled and dejected by his inability to understand the radiese which flows over his head. It is not enough for the T.R. or secretary to welcome him politely and take his name. The American system of appointing an "official greeter" is not entirely suitable for this country, but it might result in far fewer "once only" visitors. The ideal procedure is where all members take an active pride in making

the stranger as keen as themselves on Amateur Radio.

The importance of new activities is not always fully appreciated. Nothing ever seems quite so interesting or enjoyable the second time. So many Groups are content simply to repeat their past successes -lectures, Brains Trusts, visits, "hamfests" - and then wonder why attendances dwindle. The alert Group, on the other hand, will be for ever seeking fresh ideas. The scope of activities is limitless. Why not hold a D/F hunt this year? Or if you already do so, why not try to run it on 420 Mc/s., with simple gear; or after dark? How about a competition for the smallest complete station or the most "home-made" transmitter? Someone will probably remember how to make variable capacitors from sardine tins! Why not copy the Swiss and run a "Mountain Day" with ultra portable gear? Or the Swedes with their "desert island" field day in which each team is provided with a minimum of components, and then race to make the first contact? Why not invite neighbouring Groups to compete and then, for a return match, organise an "all-round" competition which includes Morse copying, a technical quiz, construction and design? The difficulty of travel is fast losing its value as an excuse for inactivity. There are hundreds of possible "contests" totally different from the usual communication type and eminently suitable for local rather than national organisation. And for the more serious minded there remain many technical investigations which could best be tackled on a communal basis. The painstaking D/F tests carried out in the early 1930s by the Golders Green Society, or the more recent 420 Mc/s. work of the South London U.H.F. Group, are but two examples which spring to mind. The radio control of models, amateur television-witness the recent demonstration on a closed circuit—interference-tracing squads are all activities which offer equal opportunities for licensed and non-licensed members alike, and which may add to the common fund of scientific knowledge.

And remember that reports of whatever your Group or Club does, which is fresh, original and of J. P. H.

general interest, will always be welcome for publication in the BULLETIN.

# A GRID DIP METER AND MONITOR

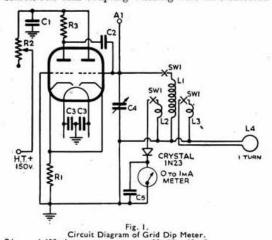
THE amateur who builds his own gear often feels the need of some piece of ancillary equipment for checking and measuring purposes, either during the construction and testing period, or during the course of operation. The old, but reliable, standby, the absorption wavemeter, has many limitations and requires for its operation a circuit having R.F. energy flowing in it. The more modern grid dip meter has none of these defects and possesses enormous additional advantages. It will be found invaluable in any modern station for a wide variety of test purposes. The model to be described is a combined G.D. meter and monitor for both C.W. and telephony. Either section could, of course, be built separately, but the combination, as described, avoids duplication of power supplies and forms a most useful piece of equipment.

By C. A. SHARP\*

#### Grid Dip Meter

A grid dip meter operates by a reduction of grid current in an oscillator, for example by coupling it to a circuit resonant at the frequency of the oscillator. The indicating meter may be placed directly in the grid circuit, though this system has some disadvantages. The cathode coupled circuit, shown in Fig. 1, uses a 6SN7GT double triode valve, which has been found to be very suitable for this type of operation, since it will oscillate readily over a wide band of frequencies. The coverage in this instance is sufficient for the requirements of most amateurs, being from 800 kc/s. to 28 Mc/s. in five bands with an overlap on each band, the ranges being selected by switching.

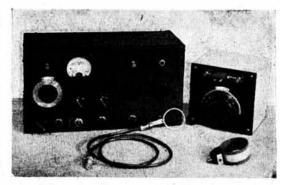
In the original tests the indicator meter, rectifier, search coil and coupling winding were all connected



R2	200,000 ohr			02 με. 00 μμε.	
R3	68,000 ohm	s	SWI F	lange Switch	1.
CI	· Ι μΕ.			pling Termi	
		Coil	Data.		
Range 'I	.8 —	1-6 Mc/s.	LI IIO turns.	L2. 6 turns.	6

Rang	e I		3 <b>—</b>	1-6	Mc/s.	110	urns.	6 1	.2.	6	L3. turns.
	2	1.0	6 —	3.8		44	**	5		5	••
	4	6	=	14	::	23		i	::	1	::
**	5	13	-	28		6	,,	1		-	"

56, Moore Avenue, Wibsey, Bradford, Yorkshire



View of the completed instrument (left) with an absorption wavemeter. The search coil is attached to the grid-dip meter via a 4-foot length of co-axial cable.

in series, and the winding coupled closely to the oscillator tuned circuit. It was found, however, that on coupling the search coil to a resonant circuit the dip on the meter was not very clearly defined. A big improvement was made by having two separate windings coupled to the oscillator coil, one for the meter and rectifier, and the other for the search coil.

#### Monitor

This is in effect a small shielded receiver, having switched coils similar in coverage to the G.D. meter. It consists of a detector, with capacity-controlled reaction, and a transformer coupled L.F. amplifier: 6J5 valves are used for both stages. The grid leak is of low value in order to avoid blocking of the valve by strong signals. The H.T. on the detector is reduced to approximately 40 volts in order to facilitate smooth reaction control. When the valve is in a non-oscillating condition, telephony transmissions may be monitored; when the valve is oscillating, C.W. signals may be checked, either on the fundamental frequency or harmonics where frequency drift or chirp can be readily detected.

#### Construction

The chassis is made from 16 gauge mild steel, size 15 in. × 6 in. and depth 2 in. with a front panel 8 in. high. The midget mains transformer, smoothing condensers and metal rectifier are mounted underneath the chassis. Due to the small size of the complete instrument it was found necessary to put the smoothing choke on top of the chassis, in the extreme left hand rear corner. The 6SN7GT oscillator is in front of this choke. To the right are the five coils, mounted on a strip of paxolin, and raised 1 in. from the chassis to enable the leads from the coils to be taken from under the strip to the range switch SW. I, which is mounted on the panel in front of the coils. The switch is a three-bank six-way type, and changes the grid circuit, the rectifier winding, and the search coil respectively. The coils are wound on in. diameter paxolin formers 13 in. long. At the bottom (cold) end of the grid winding, a couple of link windings are wound side by side for the rectifier and meter, and search coil.

The coils are tuned by the 100 μμF. variable condenser C4, and for this position a straight-line frequency type is to be preferred, as it will enable a more open scale to be obtained. The condenser in the original model is not of this type, and there is some crowding at the H.F. end of the scale, although this has not proved serious. On the left hand side of the panel can be seen the I mA. meter for indicating dip,

and to the left of this is the slow-motion dial used with C4. The controls at the foot of the panel are, from left to right: anode voltage control resistance (to enable the standing current in the meter to be set to a suitable midway position); H.T. switch for the G.D. meter; Pye socket for the cable and search coil; the mains switch for the whole instrument; the H.T. switch for the monitor; and the 'phone jack. The search coil consists of an insulated 2½ in. diameter 14 S.W.G. loop at the end of a 4-foot length of flexible co-axial cable terminated in a Pye plug. At the top left hand of the panel can be seen the insulated terminal A1 for a high impedance coupling to the grid circuit. The suggested panel layout is shown in Fig. 2.

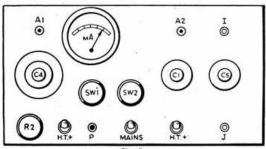


Fig. 2. Suggested layout of front panel,

#### Monitor Construction

This section (see Fig. 3) occupies the right hand half of the chassis, with the bank of coils and 6J5 detector placed together in the centre of the chassis, behind the range-change switch SW. 2; the grid tuning condenser Cl being located just to the right. Next comes the 6J5 amplifier behind the reaction condenser C5. At the rear of the chassis is a miniature L.F. coupling transformer, and to the right is the output transformer. The secondary winding of this transformer has a centre tapping which is connected to chassis and earthed. One side of the secondary is connected to the 'phone jack, which is bypassed by a

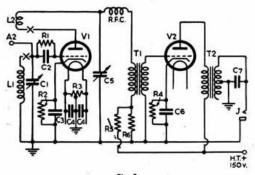


Fig. 3.

	Circuit Diag	ram of Monitor	•
R1	160,000 ohms.	C3, C6	25 μμF.
R2, R4		C4, C7	1,000 μμF.
R3	60 ohms.	VI. V2	6J5.
R5	47,000 ohms.		Aerial.
R6	120,000 ohms.	TI	3-1 Ratio.
C1, C2, C5	100 µµF.	T2	1-1 Ratio (half).
R6	120,000 ohms.	TI	3-1 Ratio.

Coil Data.

					L	.1.	L	2.
Rang	e I		8 - 1-	6 Mc/s.	110	turns.	16 t	urns.
**	2	1.0	6 - 3-	В "	44		8	
**	3	3	- 7		- 23		6	
**	4	6	- 14	**	11		3	
**	5	13	- 28	**	6	• •	2	

Coils are switched at points marked X by a two-pole, five-way switch. If VI does not oscillate the connections to L2 should be reversed.

·001 µF. condenser to prevent R.F. entering th monitor via the 'phone cords. The other side of the secondary is fed to the output of the station receiver in a similar manner, enabling monitoring to take place without removing the 'phones from the receiver. The transformer is an ex-Government type having a ratio of approximately I to I each half. The monitor H.T. switch and 'phone jack J are at the bottom of the panel, and an aerial terminal A2 can be seen near the grid tuning condenser. This many not be found necessary and may even require shielding if very strong signals are to be monitored on their fundamental frequency. Under the chassis are grouped the various resistors and condensers: the exact lay-out is not critical if the usual precautions are taken to make grid and anode leads fairly short. The heater windings for the valves is centre-tapped and bypassed for R.F. at the detector valve socket in order to eliminate hum. In both Fig. 1 and Fig. 3 the coils are switched at points marked X. To make the diagrams as clear as possible only one set of coils is

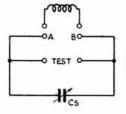
The power supply which is common to both G.D. meter and monitor, is of conventional design. It provides an output of only 150 volts at a modest 5-15 mA

#### Operation (G.D. Meter)

Close the mains switch and the H.T. switch for the meter, taking care that the H.T. control resistance R2 is in the minimum voltage position, to avoid over-deflection of the milliameter. Adjust R2 until the meter reads about 0.7 mA. On coupling the search coil to any tuned circuit, with the range switch in the appropriate position, a pronounced dip of the needle will occur if the grid circuit is tuned, by C4, through resonance. In the original model the various ranges were calibrated from a crystal sub-standard and multi-vibrator, 50 kc/s. points being obtained on all but the highest frequency range where 250 kc/s. markers were used owing to the wide frequency coverage. The meter may of course be used in a converse manner, by setting the oscillator to the required frequency, and adjusting the circuit under test until resonance is indicated by the dip.

#### Further Applications

Capacities may be measured by coupling the loop to a coil at AB (see Fig. 4), tuned by a standard calibrated condenser Cs, of say 250 μμΓ., with the condenser set at say 200 μμΓ. The meter should be adjusted to the dip position and left there. On connecting a condenser of unknown capacity—provided it is less than 200 μμΓ.—in parallel with the standard condenser (at the point marked "test"), and reducing the capacity of the latter until the dip is noted again, the difference in the two readings of the standard condenser will give the capacity of the unknown one. An accuracy of one or two micromicro-farads can be obtained if the coupling is very loose and the test carried out carefully. This method is most useful for finding the correct tuning capacity on a tank tuning condenser in a transmitter, to ensure the correct L/C ratio for operating at a particular value of Q. A pair of short leads can be connected from the test terminals of the standard condenser and



Standard Condenser.
With the aid of a standard condenser, calibrated in micro-micro-farads, the grid dip meter may be used to measure capacities and inductances.

Fig. 4.

coil, to the sockets of the tank coil, which should be removed; the actual tuning capacity may then be measured. The correct tank capacity will vary according to the frequency band in use and the type of circuit, as described in the various radio handbooks.

Approximate values of inductances may be found by coupling the loop to the inductance which is placed across the standard condenser, and noting the frequency of dip; the value being obtained from the formula:

$$\mathbf{L} = \frac{25300}{\mathrm{C} \times f^2}$$

where L is in μH., C in μμF. and f in Mc/s.

Aerials with low impedance feeds, such as dipoles, may be checked for resonant frequency by coupling to the *Pye* plug, or by means of a single turn loop coupled directly to the appropriate coil in the G.D. meter, and tuning for dip.

A high impedance aerial such as an end-on half wave may be coupled to the high impedance terminal A1 through a 3-30 μμF. variable condenser, very loose coupling being required. The resonance of a long wire aerial, which is to be worked on its har-

monics, may be similarly checked on each of the bands on which it is to be operated. The loosest possible coupling should be used, and the exact frequency noted by means of a calibrated receiver or frequency meter.

The meter may also be employed as a normal absorption wave-meter by switching off H.T. and coupling in the usual manner by means of the search

coil.

The instrument was found invaluable in helping to resonant coils in a V.F.O. where they were operated as broad-band couplings. The coils were resonated to the middle of the bands—being tuned by circuit stray capacities only—no tuning slugs or condensers being used.

The foregoing are but a few of the uses to which this interesting piece of equipment may be put. In addition it can be used as a general test oscillator of wide frequency range, or as a field strength meter; its range being extended to the V.H.F.s by suitable choice of valves and circuit. Amateurs will find it a most valuable adjunct in saving time by cutting out lengthy adjustments, and by permitting tests to be conducted on a more scientific basis than the usual traditional stand-by of "trial and error."

### "D'accord!"

T is almost a rule at Conferences that the most vivid experiences and sometimes the most valuable results come not from the advertised sessions but from the informal gatherings, the unpredictable conversations and the new or renewed friendships which inevitably result from a congregation of people having a common interest.

The I.A.R.U. Congress in Paris was certainly no exception and dimming memories of the happy "asides" and delightful moments of five crowded days mingle now into a satisfying impression of good company, real enthusiasm and cordiality on all sides—"ham spirit" in fact in its deepest, truest and, if

one dare say so, its old-fashioned sense.

From that kaleidoscopic impression, a hundred incidents linger in the minds of those who enjoyed them and before they fade, some should perhaps be recorded both to revive memories in days to come and to give to the membership at large a brief glimpse of the atmosphere of those days. Fortunately we have a fine record in still and moving picture to help.

The U.K. delegation will always associate René Thomas, F9TR, most vividly with the more personal side of the Congress. René, who met us when we arrived, showed us round, interpreted for us in and out of the Conference; René, always smiling, always helping—even journeying on the last morning to Gare du Nord to see us off—we owed much to his kindness.

Then our own G.O.M. of Amateur Radio—Gerald Marcuse, G2NM, who like Stan Lewer, G6LJ, had been at the first conference a full twenty-five years earlier. We shall long remember his rubicund face below the eternal beret, sitting in Dupont's—the café to which the delegation gravitated at the end of each day; Gerry, just as much at home in Paris as anywhere else—talking to the "garçons" like a pal and often chatting merrily to the surrounding customers in his excellent French. First of our party to return home we were sorry to bid him good-bye.

What a joy it was to meet FSOL—France's ace V.H.F. man! Those who attended the Technical Committee will long remember his burning enthusiasm for his subject—his bright roving eyes and his intense, forceful speech. No less impressive were his writings and the beautifully made 420 Mc/s. apparatus on exhibition at Congress Headquarters—the Aero Club de France. Certainly 80L—or to give him his

full title, Lieut.-Col. Revirieux—is every inch (or every centimetre perhaps) a ham.

The delegates were so impressive, so imbued with the finest spirit of Amateur Radio, that it is impossible to mention more than a few. We remember especially Lars Heyerdhal, LA6A, of Norway, gracious and kindly, who soon endeared himself to our hearts; and the Brazilian delegate, PY2JU, full of We remember too, M. Barba, fun and friendship. F8LA, President of R.E.F., who entertained us in his own home, and the delegate from Holland who spoke in French and then gave his own translation in perfect English-and many, many others, all making their separate contributions in their own way, without exception courteous, humorous and charming.

Would that one could record too, some of the numerous episodes that filled our few leisure moments. For some of us, the taxi smash on the Saturday evening after the last plenary session had finished will remain as an "expérience mémorable"—when, as we approached the Pont d'Alma, all the available space suddenly seemed to fill with cars until we were hit first on the left, then on the right. An altercation on the bridge, policemen and whistles. Then, as we waited in the taxi whilst our driver and the other interested parties wrote out reports, a violent thunderstorm broke overhead. We could do nothing but wait and wait—and in less than an hour we had to be back changed and tidy at the banquet! And how it rained!

For some of us, and especially for those who lately have attended rather disappointing O.R.M.'s, it brought a new faith in the *camaraderie* of Amateur Radio—a new realisation that we belong to a worldwide brotherhood—that Amateur Radio is more than sitting in a "shack" and operating a station; that it is, in fact a dynamic force—one which can destroy mistrust and misunderstanding and help to blaze the trail that someday will lead to permanent peace.

W. A. S.

MAKE A NOTE OF THESE DATES

June 22nd to June 24th, 1951

FESTIVAL OF BRITAIN YEAR

NATIONAL CONVENTION

## HE RADIO CONTROL OF MODELS\*

PART II - A RADIO-CONTROLLED MODEL D.U.K.W.

By P. A. CUMMINS, A.M.I.E.E.+

HE electronic equipment associated with this model will be described as a typical example of a multi-channel audio-frequency control system, operated over a U.H.F. radio link.

Simultaneous proportional control of two functions is obtained, with an additional on-off channel, which, in this model, is used to sound the horn. The main controls are of steering and engines, and each requires two channels. The five audio-frequency signals may be added in any desired combination, and used to amplitude modulate the radio frequency carrier. After detection at the receiver, the complex signal is applied to five filter circuits, the output of each of which operates a relay. The filter selectivity is such that the relays may be operated singly or in any desired combination.

#### The Signal System

The audio-frequencies used are 2.5, 3.0, 3.6, 4.7and 5.8 kc/s., and the carrier frequency 465 Mc/s. The audio-frequency band has been chosen to compromise between filter elements of practicable size and the frequency response of the complete system. The individual frequencies must be such that no pairs are in harmonic relationship, and that none of their difference frequencies or their harmonics fall in any of these channels. This latter provision is made necessary by the distortion that inevitably takes place in the amplifier, modulator, and receiver circuits. With moderate care this distortion can be kept low.

The selectivity of the filters in the receiver is such that a change in frequency of 0.5 per cent. in any channel will cause a failure of the corresponding relay to operate. This obviously necessitates a very stable source of channel frequencies, and the final choice fell on the resistance-capacitance tuned oscillator. This oscillator consists essentially of a low gain amplifier with positive feedback through a frequency selective network. The gain of the amplifier is adjustable, and is set to the value necessary to just sustain oscillation. Under these conditions the frequency stability is good and the harmonic content low. The complete oscillator unit consists of five such circuits, identical except for the frequency-determining networks, and five buffer stages incorporating output transformers and signal control circuits. One oscillator and buffer circuit is shown in Fig. 1. Signal switching is effected by opening an earthing contact in the grid circuit of the buffer stage. By this means pulsing can be carried out at high speeds without the production of transients. The only requirement is that the cable between the control unit and the oscillator unit be kept as short as possible to avoid cross-talk between channels. A length of six feet has been found practicable.

The addition of signals for simultaneous operation is very simply carried out by connecting the secondaries of the output transformers in series. One end of the chain is earthed and the other feeds a high impedance gain control in the modulator unit. Since the current flow in this circuit is negligible no interaction between channels can take place.

A preset level control is incorporated in each buffer circuit to enable individual signals to be

adjusted, while the overall gain control in the

modulator sets the carrier modulation depth. This is adjusted to be about 10 per cent. with one channel on, giving a maximum of approximately 25 per cent. with three or more channels in use simultaneously, in order to limit distortion in the detector at the receiver.

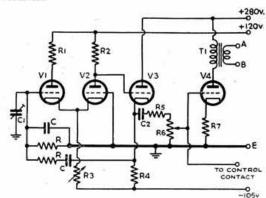


Fig. 1. Audio oscillator and buffer stages.

R1, 2 R3, 5, 6 R7	15,000 ohms. 100,000 ohms. 1,000 ohms.	CI C2 VI. 2	30 μμF. trimmer. ·005 μF. 6SN7GT (twin triode).
R	100,000 ohms., stable carbon type.	V3. 4	6SN7GT (twin triode). 26: I step down trans-
С	To suit frequency $(\omega CR = 1)$ .		former.

#### Modulator and Transmitter

The modulator and transmitter are constructed as a separate unit which includes the aerial array, and which for convenience is mounted on a camera This gives the aerial, which is a three element horizontal parasitic array, a height of about two wavelengths above ground. With 750 milliwatts of radio frequency power output, a range of approximately 200 yards at ground level is obtained: more than sufficient for effective control of this type of model.

The circuit of this unit is shown in Fig. 2. Potentiometer R1 is the modulator gain control, and has

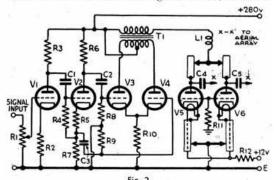


Fig. 2. Modulator and 465 Mc/s. transmitter.

RI. 4	I megohm.	C4, 5	20 m/F.
R2, 5	1,000 ohms.	LI	R.F.C. 5 turns 1 in. dia.
R6, 7	22,000 ohms.	TI	1 : I class B driver trans-
R8. 9	470,000 ohms.		former.
RIO	470 ohms.	VI. 2	6SN7GT (twin triode).
RII	10,000 ohms.	V3, 4	6SN7GT (twin triode).
RI2	15 ohms.	V5. 6	EC53.
C1, 2, 3	·01 µF.	***********	

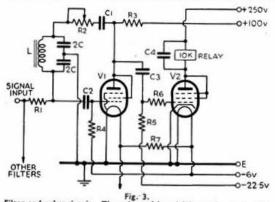
A paper read to the Society at a meeting held on November 18, 1949, at the Institution of Electrical Engineers, London, W.C.2.

<sup>†</sup> Glendevon, Well End, Barnet, Herts.

applied across it the combined signal from all channels generated in the oscillator unit and switched on as required by the control contacts. The radio frequency oscillator stage is of the tuned anode, tuned cathode type using parallel line circuits, with two EC53 valves in push-pull. This circuit works with fair efficiency, at 465 Mc/s., and delivers about 750 milliwatts of R.F. output to the array through a quarter-wave parallel-line matching transformer. The D.C. power input to the stage is 4.5 watts.

#### **Power Supplies**

Two power packs have been constructed for use with this equipment, one operated from a 12 V. accumulator for field work, and the other from the 230 V.. 50 cycles mains for test purposes and indoor use. Each provides similar outputs and plugs into the same socket in the oscillator unit. Connections to the other units are made by means of non-interchangeable leads. Three H.T. lines are provided: 280 V. positive, 120 V. positive, and 105 V. negative. The last two are stabilised and feed the audio frequency oscillators. Valve heaters are connected in series-parallel and draw about 4 A. at 12 V.



Filter and relay circuit. The values of L and 2C are chosen to give the same ratio of inductance to capacitance in each channel. Suitable values for each audio frequency are derived from the formula:  $\omega^2 LC = 1$ .

RI	220,000 ohms.	R7	10 ohms
R2	0.5 megohm.		-005 uF.
R3	47,000 ohms.	C4	· 1 uF.
R4	I megohm.	VI	354
R5, 6	470,000 ohms.	V2	6AKS.

The total power consumption is approximately 100 watts.

The electronic apparatus in the model is built into three units, interconnected by multi-pin plugs and sockets. Power is taken from a 12 V. 7 ampere-hour accumulator, the total consumption being approximately 36 watts.

### Radio Frequency Unit

The receiver is a conventional super-regenerative detector working at 465 Mc/s. A type 955 valve is used with a parallel line circuit. The high tension voltage to the detector is adjustable, and the normal setting is about 200 V. The detector output signal, consisting of equal amplitudes of quench frequency voltage and audio frequency output, appears across a 10,000 ohms anode load resistor. This signal is passed to a high gain negative feedback amplifier through a simple filtering network which reduces the ratio of quench voltage to signal. The gain of the amplifier may be preset by varying the amount of negative feedback. The final audio output is at a level of 5 V. R.M.S. per channel. When two or more audio signals are present simultaneously the resulting peak output voltage is about twice that of a single signal. The output impedance of the amplifier is reasonably low—of the order of 10,000 ohms.

#### Filter and Relay Unit

One complete filter and relay circuit is shown in Fig. 3. Each filter consists of a parallel-fed Colpitt's oscillator tuned to the appropriate frequency and provided with variable positive feedback. The feedback is set to just below the oscillation point. Under these conditions the selectivity is very high, and is such that relay operation in any one channel is completely independent of the presence or absence of signals in all other channels. The maximum operating speed of the circuit is 30 impulses per second. At this speed pulse distortion becomes apparent, and relay operation erratic. In the design of the circuit a compromise has to be made between selectivity and speed of response. Sensitive relays operating at 1.5 mA, are used in the anode circuits of high slope valves. These are biased to about four times cut-off voltage, resulting in a very small "no-signal" current. The peak output voltage from the filter circuit is about equal to the bias on the relay valve, which is therefore driven almost to saturation. The current through the relay with the signal on is approximately 8 mA. Since this is ever five times the current required to operate the relay very rapid operation is obtained. The overall time of response of the system from the closing of the control contact at the transmitter to the closing of the corresponding relay contact at the receiver is 5 milliseconds.

#### Power Pack

The motor generator used to provide high tension voltage for the control circuits is of a nominal 12 V. input and 450 V. output. Since the maximum voltage required is 250 V. considerable economy in input power is effected by running the motor field at 12 V., and the armature at 6 V. The field current is 400 mA. and the armature current at full load 2 A. The total heater load is also 2 A. at 6 V., so that by feeding the heaters from one-half of the battery and the generator from the other the load is evenly distributed. Since the generator has full field current but only half the normal armature voltage its speed is quite low, which results in very quiet running.

#### Control Mechanism

A reversible ratchet motor is used for steering the model, operated by impulse trains from two of the relays in the receiver, one for each direction of rotation. The steering control consists of a pulsing device with selector switches controlling two of the audio frequency signals. A drum carrying twelve earthed contacts rotates past a fixed brush, and is driven from the steering wheel through a member bearing two micro-switches. The application of torque to the wheel depresses one or other of the switches and connects the signal circuit, appropriate to that direction of rotation, to the brush. signal is then sent out in pulses during the time the wheel is being turned. It is arranged that the torque necessary to rotate the drum is sufficient to keep the micro-switches depressed. If the maximum stepping speed of the relays is exceeded, slipping of the control takes place, but it can be immediately regained by reducing the speed of rotation of the wheel. As no stops are fitted to the steering wheel a datum position can always be set up by visual observation of the model. The engine speed control consists of a similar pulsing device with micro-switches, but having five discrete positions. Movement of the control lever from any position to the next transmits one pulse of a signal frequency appropriate to the direction of movement. The corresponding relays at the receiver operate a twoway ratchet switch which therefore takes up a position equivalent to that of the control lever.

Continued on page 420

## AN AERIAL MATCHING UNIT

## for improving receiver performance

By R. P. ELLIS (G3SN) \*

M OST amateurs are fully aware of the importance of using an efficient aerial in order to apply the maximum possible signal voltage to the grid of the first R.F. stage of their receiver. Any improvement prior to this point represents the ideal form of amplification—an increase in signal strength without any corresponding increase in noise level. Yet in many stations comparatively little attention is paid to the all-important link between the aerial and the receiver. Frequently the same length of aerial is used regardless of frequency with the result that a considerable mis-match is almost certain to occur on one or more bands.

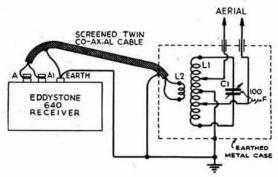
Tests have recently been carried out with an Eddystone 640 which, like most commercial receivers on the market today, has a rated aerial input impedance of the order of 400 ohms. With the aid of the simple aerial matching unit illustrated below, the following increases in strength on all signals were recorded on an S meter:

3.5 Me/s. 2 points. 7 Me/s. 3 points. 14 Me/s. 2 points. 28 Me/s. 3.5 points.

In addition the use of the matching unit resulted in an apparent improvement in adjacent channel selectivity producing the pleasant effect of a quiet background on either side of the wanted signal. While the benefit which can be expected from the installation of a similar device will depend to a large extent upon the amount of "mis-match" in the existing arrangement, nevertheless it is probable that it would prove to be well worth-while in almost all cases where no previous attempts have been made at ensuring a reasonable match.

#### Construction

The construction and operation of the unit is not in any way critical. It is, however, advisable to place the unit fairly close to the receiver so as to avoid losses due to the capacity between the co-axial line and earth: this is particularly true on 28 Mc/s. It is desirable to build the unit into a small metal box, preferably one fitted with a hinged lid to facilitate quick coil changing. Standard 6-pin coil formers should be used and all coils wound with 22 S.W.G.



Circuit diagram of aerial matching unit as used with Eddystone 640 receiver. The earthing strip between the terminals AI and earth should be removed.

CI 100 μμF, variable.

100 μμF. variable. L1 and L2 see text.

#### Coil Data

3.5 Me/s.	L1	40 turns of 22 S.W.G. enamelled wire wound on plain 6-pin former. No spacing between turns. Tapping points approximately 12 turns either side of centre. 3 turns 22 S.W.G. enamelled wire.
7 Mc/s.	L1	20 turns of 22 S.W.G. enamelled wire wound on threaded 6-pin former, Spaced approximately diameter of wire. Tapping points approximately 6 turns either side of centre. 3 turns 22 S.W.G. enamelled wire.
14 Mc/s.	L1	10 turns of 22 S.W.G. enamelled wire wound on 6-pin threaded former. Wound in alternate grooves to give a spacing of approximately twice the diameter of wire. Tapping points approximately 4 turns either side of centre. 2 turns 22 S.W.G. enamelled wire.
28 Mc/s.	L1	6 turns of 22 S.W.G. enamelled wire wound as for 14 Mc/s, coil. Tapping points approximately 2 turns either side of centre. 2 turns 22 S.W.G. enamelled wire.

enamelled wire. A large diameter coil wound with 14 S.W.G. was tried but without noticeable improvement. In practice C1 (100 µµF, variable) should be set to the centre of the band: the receiver then being tuned over the entire band without further adjustment. Optimum tapping points will vary slightly with the type of aerial in use. Bearing this in mind it is a good plan to provide a number of tapping points when winding the coils. The unit has been tested on various bands with both folded and single-wire dipoles using 300-ohm and 80-ohm transmission lines. Single wire aerials can also be used: the correct tapping position along L1 being most easily found by experiment.

## =Ten Minute Ouiz=

#### A pot-pourri of questions for the radio amateur.

- 1. Why is it generally necessary to by-pass a cathode resistor with a condenser?
- What should negative feedback in an audio frequency amplifier do to harmonic distortion?
- 3. What device is actuated by electrical signal energy and radiates acoustical energy?
- Can you give the heater voltage and current ratings of the following valves? 807, 832, 813, 6V6, 6L6, 955, 0Z4.
- 813, 6V6, 6L6, 955, 0Z4.
  5. Certain bands are used by amateurs under special conditions. What is the condition?
- 6. What is the approximate resistance of a dummy load of two 60 watt electric lamps in parallel?
- 7. When working perspex, how can the danger of cracking be minimised?
- Which of the following would you use as a grid resistor for an 807 in a conventional doubler circuit? 1,000 ohms, 10,000 ohms, 100,000 ohms, 1 Megohm.
- What countries have the following call sign prefixes? VP6 VP7, VP1.
- Which is the "odd man" out? Bruce, Hartley, Hertz, Marconi, Sterba, Windom and Zeppelin.

Now turn to page 439 and see whether you have beaten the Question Master.—H.E.B.

<sup>\* 7</sup> Sidwell Terrace, Longbrook Street, Exeter, Devon.

# In the Workshop

## By "DONEX"

#### SHARPENING TOOLS

#### Twist Drills

As mentioned in a previous article, twist drills suffer greater deterioration than any other accessory in the amateur workshop both by neglect and by extensive use in the drilling of aluminium, which is "hard" on drills. Consequently, renewal or re-sharpening is a fairly frequent necessity. Those readers who have had the opportunity

Those readers who have had the opportunity of seeing the care devoted to the maintenance of twist drills in toolrooms of engineering works, will appreciate that they are really precision tools. The devices for such maintenance are not, as a rule, available in the private workshop so that the only course open is to effect the best possible compromise with the help of a grinding wheel and a considerable amount of care. It is interesting to note that a twist-drill will never, in all probability, after resharpening by non-machine methods, drill exactly its specified size of hole again, but always larger.

The reason for this increase in size is shown in Fig. 1 (a). Any unsymmetrical shaping of the tip of the drill will give a larger and smaller cutting radius with respect to the point. Consequently the hole is cut by the larger radius, and is thus larger in diameter than the drill by an appreciable amount. This is quite a point to remember with the smaller sizes of drills where the percentage error is greater than in larger sizes, and indicates the care which

must be exercised in regrinding.

Fig. 1 (b) shows the normal included angle for a twist-drill tip,  $59^{\circ} + 59^{\circ} = 118^{\circ}$ , and also shows the three cutting faces of a drill—most people only visualise two! If the included angle of  $118^{\circ}$  is increased, the torque required in cutting is decreased but the end thrust required is increased, and viceversa. This angle was chosen after long experience, with due consideration of the mechanical strength of drills. Fig. 1 (c) shows the "backing-off" of the cutting face, and the figure of  $12^{\circ}$  is chosen as giving, with the included tip-angle of  $118^{\circ}$ , the best allround results for drills of all sizes.

#### The Bench Grinder

The grinder should consist of an electric motor of not less than  $\frac{1}{6}$  h.p., and should run at not less than, say, 1,500 r.p.m. Other points to note are:—

- (1) The shaft should carry a medium to fine carborundum wheel, not less than 3 in. in diameter, and ½ in. across the face.
- (2) The motor should be firmly bolted down to the bench in a convenient position as vibration is a deadly enemy of accurate grinding.
- (3) The wheel should run perfectly true, and it is useless to attempt to sharpen a drill on a grooved or pitted wheel.
- (4) A convenient "rest" should be provided, enabling the edge and the face of the wheel to be used.
- (5) The rotation should be "towards" the operator, and the more careful people will provide a suitable guard, as, although breakages of small wheels are not common, they can cause considerable personal damage.
- (6) A wheel-truing tool should be available for touching-up the wheel. This is quite an inexpensive item and there is no ready substitute.

#### Grinding Gauge

As it is difficult even after prolonged practice, to estimate the correct included angle of the drill-tip, it is advisable to make up a small gauge for this purpose. Such a gauge is shown in Fig. 2.

Obtain a small piece of 16 S.W.G. mild or tool steel sheet and accurately mark off with a scriber the angle of 118°. Then carefully cut away the metal within the angle with a saw—do not use shears as these may distort the shape—file up the angle accurately and chamfer it off on one side of the plate to a "near" knife-edge. This renders observation easier when the gauge is put across a drill-tip. Finish off neatly, and, if desired, harden by heating to a bright red and quenching-off in cold water.

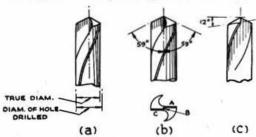


Fig. 1.

Sharpening a twist drill.

(a) Drill ground off-centre; (b) profile and cutting edges (A, B, C);

(c) "backing-off" angle.

#### Sharpening a Drill

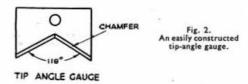
The uninitiated are advised to commence sharpening operations on, say, a 3 in. drill, which is blunt, but not broken. The procedure is as follows:—

Draw a chalk line on the bench from the outside centre of the wheel at an angle of 60° to the outside face of the wheel (59° to be precise). This will provide a rough guide to the correct attitude of the drill to the wheel. Start up the motor, hold the shank of the drill in the fingers of the right hand, and, using the fingers of the left hand and the "rest" on the grinder as a guide, bring up the tip of the drill to the face of the wheel, sighting along the chalk line to obtain as nearly as possible the correct angle. With the lightest possible pressure, rotate the drill clockwise against the wheel for a few turns and then examine, using the tip gauge previously described, to check the angle. Do not allow the drill to chatter" against the wheel. Cool off the drill in cold water after each grind.

After some practice, a feeling of apprehension will give way to one of confidence and the process will become relatively easy. Care and continual watch on what is happening is essential.

#### Backing-off

When the drill tip has been ground to the true conical profile, it is now necessary to "back-off"



each of the two main cutting edges in turn to allow them to cut. Drills which "rub" their way through a hole are usually defective in backing-off rather than in mere bluntness.

Bring up the drill at the correct angle to the wheel with one of its cutting edges on a radius of the wheel. Allow this edge to just touch the wheel and rotate the drill clockwise for about 90°, first gradually increasing the pressure and then suddenly releasing it, so that the second cutting edge does not come in contact with the wheel. A little practice will enable the 12° angle of backing-off to be reasonably obtained.

Proceed in exactly the same way with the other cutting edge and face, again taking care not to mutilate the cutting-edge previously ground. Avoid too great an angle of "backing-off" as this will cause the drill to "bite" excessively. Be careful to avoid overheating of the cutting edges when grinding, as shown by a blue coloration. To be safe dip the drill in a can of cold water after each grind.

The process of backing-off is the most difficult in drill-sharpening and a good deal of experimentation is necessary before the ability to sharpen drills which will cut properly first time, is achieved.

#### Sharpening other Drills and Tools

Many workshops include drills of other types than twist-drills, such as fluted drills and "V" drills. The former produce a much more accurate hole and do not "bite" like twist-drills. Their tip-angle is often less than 90° and the sharpening process is exactly the same as for twist-drills. V-drills usually only require the cutting edges touching up without much reference to the backing-off angle.

A final word might be added on the subject of sharpening other tools which appear in the normal workshop, such as wood chisels, plane "irons," etc. Generally speaking, the high speed carborundum

wheel is too fierce for these, and the ordinary grindstone, well "watered," is much more suitable. However, unless the tool is in a very bad state, it can generally be brought into condition with an ordinary "stone" of carborundum or other material having two faces of different coarseness, a coarser face for cleaning up the cutting-edge, and a finer one for finishing.

To sharpen chisels and planes smear the stone completely, but not copiously, with thin machine oil, hold the chisel or "bit" in the fingers of both hands, as near the cutting edge as possible (do not hold a chisel by the handle). Apply to the stone at the correct angle and move forward and backwards, with even pressure, over the whole stone, imparting a slight sinuous motion. Wipe the blade and examine frequently until a clean and even edge is achieved. To obtain the finest cutting-edge, finish off on a very fine stone (known as an India stone), using plenty of thin oil.

#### Care of the Stone

The condition of the stone is an important point, as it is impossible to sharpen tools effectively on a hollow or grooved stone, covered in or congealed with oil and dirt. If the stone is hollow or grooved, true it up on a flat steel plate, using coarse carborundum powder as an abrasive and plenty of paraffin until all blemishes and unevenness have disappeared. Clean off the stone after use on each occasion and if not supplied in a wooden case with a cover, as is usual, wrap in newspaper for protection.

#### RECEIVERS

A USEFUL GUIDE FOR THE SHORT WAVE ENTHUSIAST PRICE 3/6 (BY POST 3/9)

#### Aircraft Distress Procedure

 ENERAL details of international distress procedure were published on page 344 of the April, 1950 issue of the BULLETIN. There are, however, certain additional Q-signals which should be carefully noted by amateurs. Full information can be obtained from M.C.A.P.5 The Civil Aviation Communications Handbook (1949 edition, H.M.S.O. 5s.) and M.C.A.P.1 The "Q" Code (H.M.S.O. 1s. 6d.).

A combined distress call and message should be

made in the following form:

Distress Signal (3 times) :—SOS SOS SOS

Prosign :—DE

Callsign of Aircraft (3 times): -GABCD GABCD GABCD

Followed by as much as possible of: estimated position (QTH); course (QTI); speed (QTJ); altitude (QAH); type of aircraft; nature of distress; intention of Captain of aircraft (e.g. QUG); a 20 second dash; callsign once; K.

Any station hearing the signals SOS or XXX should commence a listening watch immediately but should not attempt to reply for at least 30 seconds and then only do so if no official station has been heard sending an acknowledgment or attempting to make contact. If told to QRT (stop sending) by an official station (or any station engaged in distress traffic) this instruction should be obeyed immediately and a listening watch maintained.

Several members have suggested that the Air Ministry should be asked to test amateur co-operation by transmitting dummy exercise messages. practice, however, is forbidden by international regulations. Similarly the adoption of an amateur

distress call corresponding to "QRR" as used in the United States is not considered desirable.

To provide maximum assistance, accurate and complete copy of messages is of the utmost importance: a ready grasp of precisely what is happeningi.e. whether the signals are being received direct or through an intermediate relay station-is also essential during an emergency.

Q-Signals, other than those employed in normal

amateur operation, include :

QAB My destination is - -

QAC I am returning to - - - .

I departed from - - - at - - - . QAD

QAH My altitude is - - - metres or feet (indication as to which units are employed should be given).

QAL I am going to land at - - - .

QAZ I am flying in a storm.

My present endurance is - - - minutes. QBD

QBO? What is the nearest airfield or landing ground suitable for my landing.

QRL I am busy, do not interfere.

I am going to shift frequency to transmit QSW on - - - ke/s.

QTA Cancel - - - as though it had not been sent. I am going to send bearing signals (followed QTG

by a long dash). QTH My position is - - - kilometres bearing - - -

from - - - (or a latitude and longitude). QTI My true course is - - - degrees.

QTJ My speed is - - - knots.

QUG I am forced to land immediately.

QUM Distress traffic is ended.

# STARTING-UP ON THE V.H.F.s

BY W. H. ALLEN, M.B.E. (G2UJ)

In this short series of semi-technical articles intended for the newcomer to the V.H.F. bands, G2UJ continues this month with the subject of receiver design.

#### The R.F. Stage

THE main requirement for an R.F. stage is that it should provide the mixer stage with a signal voltage large in comparison with the mixer noise. The valve employed should therefore contribute as little noise as possible on its own account. There are a number of considerations involved, but generally it can be said that the pentode is inherently more noisy than the triode due to "partition noise" caused by the splitting of the cathode emission into two streams to the screen grid and anode respectively.

Much has been done in recent years by careful attention to the internal layout of the valve to reduce the screen current to a small fraction of that flowing to the anode and, in general improvements which have resulted in a high stage gain combined with low internal noise. Two of the more successful designs are the Mullard EF54 and the well-known American 6AK5. In the triode, steps must be taken to prevent oscillation due to the capacity existing between grid and anode. This may be accomplished either by neutralising or by adopting—with a suitable triode—earthed or "common-grid" technique. Neutralising is effected by essentially the same circuit as was employed in the early days of valve receiver practice, or in a transmitter where a triode P.A. is in use: energy is fed back from the anode to the grid circuit in anti-phase to that transferred by the grid-to-anode capacity inside the valve, so that the two effects cancel out.

In the earthed-grid circuit the grid is held at zero potential to R.F. and acts as a screen between anode and cathode, the input signal being applied to the latter electrode. This type of amplifier is the only practical circuit for use as an R.F. stage at 70 cm. at the present time.

An important factor in all valves operating at V.H.F. is "transit time." An electron from the cathode takes a finite time to travel to the grid, in which period the grid potential will have changed under the influence of the incoming signal. This imposes a damping effect upon the grid circuit, and it is the aim of the valve manufacturer so to arrange the electrode system that the grid is as close as possible to the cathode. This reduces transit time and improves the mutual conductance, but at the same time the capacity between these two electrodes must be kept to a minimum.

The Wallman Cascode circuit, which is becoming popular in this country, consists of two triode (or triode-connected) valves, the first neutralised, and with its anode circuit tightly coupled to the cathode of the second, which operates as an earthed-grid valve. It is claimed that the overall amplification of the stage is equal to that of a pentode, but with a higher input impedance and a much lower noise factor.

#### The Mixer Stage

In this position a diode, triode or pentode valve may be employed. Triodes and pentodes are somewhat critical as regards their oscillator voltage requirements, but provide some conversion gain; that is to say the I.F. output is greater than the signal voltage applied to the input of the stage. Even under optimum conditions of operation the gain of a mixer valve is always inferior to that given by the same valve working as an R.F. amplifier; and, as

the internal noise is unaltered, the signal-to-noise ratio of the stage will be worse. Hence the desirability of R.F. amplification to present to the mixer a signal large in relation to its own noise. The practical limit of R.F. amplification is reached when aerial plus first circuit noise predominate in the receiver output, as no signals lower in value than this can be resolved.

The diode gives no conversion gain, the I.F. output being less than the signal input, but as the inherent noise is low, this type of valve makes a satisfactory mixer provided there is adequate R.F. amplification before it and the I.F. stages in the main receiver are operating with a high signal-to-noise ratio. The diode has the further advantage of being very tolerant of the value of R.F. oscillator voltage applied to it, and also of whether this voltage is at the fundamental frequency of the oscillator or at double that frequency. This makes for a more stable oscillator, and prevents "pulling" between circuits to a great extent. The efficiency of a triode or pentode mixer falls seriously when the injection frequency is at an harmonic of the oscillator frequency.

#### New 435 Mc/s. Fixed Station Record

For 25 minutes, from approximately 2100 G.M.T. on June 4, 1950, stations G6LK, Cranleigh, Surrey (170 ft. A.S.L.) and G5BY, Bolt Tail, Devon (400 ft. A.S.L.) were in contact on 435.5 and 435.4 Mc/s. respectively. The distance—161 miles— is believed to be a world record for the band between fixed stations.

Contact was established initially on telegraphy, when reports of 599 were exchanged. Later in the QSO telephony signals were logged at 58 both ends.

Station G6LK, operated by Mr. E. J. Laker, used an input of 4.5 watts to an 832A and the radiator was a 17 element Yagi. The receiver used was similar to a design described in *The Short Wave Magazine* by G3EJL:

We offer our warmest congratulations to G6LK and G5BY.

#### The Oscillator Stage

As mentioned last month, the frequency of the first oscillator may be fixed—either crystal-controlled or not—and the I.F. circuits tuned; or the latter may remain set at a chosen frequency and searching carried out by tuning the oscillator in the converter. In either case the requirements are good electrical and mechanical stability, a well-smoothed and regulated H.T. supply and adequate output at the injection frequency for the type of mixer in use.

When the oscillator operates at a lower frequency and supplies the mixer through one or more frequency multiplying stages, screening is desirable to guard against spurious responses or "birdies" due to the lower frequencies beating with extraneous signals.

#### Coupling the Converter to the Main Receiver

To prevent pick-up at the frequency covered by the I.F. amplifier the lead from the converter to the main receiver should be screened, and if its length is more than a foot or so it will be desirable to match the output of the converter into it, particularly if the I.F. is higher than, say, 2 Mc/s. This may be done by providing a low impedance coupling winding as the secondary of the I.F. transformer in the mixer stage, a suitable component being made—but only for an I.F. of approximately 10 Mc/s.—by Messrs. Stratton & Co., Ltd.

# Reduce those Sidebands!

A SIMPLE METHOD OF USING THE BC221 TO CHECK YOUR BANDWIDTH

BY F. G. SOUTHWORTH, (GW2CCU)\*

LTHOUGH most amateurs know that the band-A width of a correctly adjusted telephony transmitter is governed by the range of audio frequencies reaching the P.A. stage, comparatively few have other than a rough idea of the upper limit of their own modulators. It is not easy, except perhaps to the more musically inclined, to judge accurately the higher audio frequencies. The result is that the transmissions of many amateur stations cover a far wider audio range—and hence occupy a far wider portion of the frequency spectrum—than is necessary for good crisp speech quality. communication purposes, audio frequencies much above 2,000 c/s. represent so much wasted power; since on crowded bands the higher frequencies are usually cut by the selectivity of the distant receiver anyway! Moreover a narrow transmission is received with far greater "punch" when a crystal filter is employed in the receiver.

In order to adjust the various filter devices which can be employed to cut unwanted "top," it is desirable to be able to check roughly the audio range of the modulator. The simplest method would be to use a calibrated audio oscillator but this instrument is not always available at an amateur station. Frequency test records up to about 14,000 c/s. are marketed but here again there may be no turntable and pickup in the shack. Fortunately a reasonably accurate substitute is to be found in many stations: the well-known BC221 or similar class of frequency meter. This versatile instrument can be used, without modification, as a calibrated audio oscillator. Although it cannot be assumed, unless checked with a valve voltmeter, that the audio output obtained will be constant over the entire band, this fact is not of vital importance when used to measure the approximate upper limit of a modulator.

Operation

To use the BC221 as an audio oscillator, connect a good quality loudspeaker of the correct impedance to the 'phone socket. Some instruments are wired for low- others for high-impedance output so make certain that the loudspeaker is accurately matched. After the BC221 has thoroughly warmed up, switch to "crystal check" and "high band" range; then carefully zero-beat on 2,000 kc/s. If the main dial is now set, for example, to 2,006 kc/s. a 6,000 c/s. beat note will be heard: similarly with other points the last two figures giving the audio frequency in thousand cycle steps. Under these conditions each scale division equals approximately 300 c/s. but if a more open scale is required, the BC221 may be set to "low band" and the zero-beat carried out on 1,000 kc/s.: each scale division of the main dial will then represent approximately 180 c/s. frequencies must, of course, be obtained from the calibration book.

A simple and quick check of the modulator can now be made by tuning up the transmitter on a dummy load and placing the loudspeaker near the microphone (a slightly more accurate method is to feed the output from the BC221 through a matching transformer into the speech amplifier: this avoids the introduction of loudspeaker or room resonances but cuts out the microphone response). The performance of a normal push-pull modulator can be gauged by watching the plate current while varying the audio frequency. As the frequency rises from zero it will be observed that the current rises steeply, remains reasonably flat over the range of normal audio frequencies, and then begins to fall again. Unless precautions have been taken in the design of the modulator, it will almost certainly be found that the upper cut-off of the modulator is far higher than was expected. To quote an example, a 50-watt transmitter recently checked by this method was found to respond to audio frequencies well in excess of 15,000 c/s. After "building out" the modulator transformer, a falling characteristic was obtained from 2,500 c/s. with almost complete elimination of frequencies above 4,000 c/s. Incidentally as a result of these modifications it became possible to operate duplex to within 18 kc/s. of the fundamental frequency.

London Technical and Morse Classes

ROBABLY the most comprehensive programme of classes ever provided for Amateur Radio enthusiasts in this country is being arranged at the Literary Institute, Ilford, in conjunction with the Essex County Council Education Authority.

Due to commence in September, 1950, five separate courses will be available, namely (1) Radio Amateurs' Examination Course (six months); Wednesdays, covering the syllabus of the R.A.E.; (2) Radio Amateur Transmitters' Refresher Course I; Tuesdays, designed primarily for the newly licensed amateur; (3) Radio Amateur Transmitters' Refresher Course II; Mondays, intended for amateurs who have completed their first year on C.W.; (4) Amateur Television Course; Mondays, covering modern television receiver technique and construction; (5) Morse and Codes of Practice; Mondays, covering Morse transmission and reception at speeds up to 12 w.p.m. and amateur operating procedure, etc.

Arrangements have been made with the P.M.G. for members of the Morse class, when they reach a speed of 12 w.p.m., to take the G.P.O. Morse test at the College, thus eliminating the nervous tension involved in taking the test in unfamiliar surroundings.

All classes will be held at the Ilford Literary Institute (High School for Girls), Cranbrook Road, Ilford (7.15 to 9.15 p.m.). The Institute is adjacent to Gants Hill Station on the Central London Underground.

The fee for any of these courses for members living in the Essex County Council Area will be 5s. Students will also be admitted from other London districts at a fee of approximately 7s. 6d., provided that the local authority is notified.

Lists are now being compiled; names in the first instance should be sent to Mr. C. H. L. Edwards (G8TL), 10 Chepstow Crescent, Ilford, Essex.

It is hoped that sufficient support will be received from B.R.S. and licensed amateurs to permit an even greater expansion of these facilities in future vears.

New N.R.R.L. President

LL members who know Lars Heyerdahl, LA6A, A will wish to offer him hearty congratulations upon being elected President of Norsk Radio Relae Liga (N.R.R.L.) for the years 1950 and 1951. Lars is a Member of the Order of the British Empire having received that high order from H.M. The King, in recognition of outstanding work during the war. An account of his activities as a member of the Norwegian Resistance Movement would, if ever published, tell an epic story of the part played by radio amateurs during the war years.

Mr. Heyerdahl represented N.R.R.L. at the

I.A.R.U. Congress in Paris last month.

# 420 Mc/s. PROPAGATION

By B. H. BRIGGS, M.A., Grad.I.E.E. (G2FJD)\*

Special interest attaches to this article—from the pen of a former Norman Keith Adams prizewinner—by the news that distances up to 160 miles have been covered recently from fixed addresses on 435 Mc/s.

THERE has been considerable speculation recently concerning the results which may be expected when the 420 Mc/s. band comes into more regular use throughout the country. It may, therefore, be useful to indicate what the existing theories of propagation would lead one to expect on this frequency, and to suggest some possible points for further investigation.

Abnormal ranges on the V.H.F. bands are produced, of course, by atmospheric bending of the radio waves. This bending is due to variations of the refractive index of the air due to changes of pressure, temperature, and water-content at different levels. The refractive index of a given sample of air is constant over the whole of the radio frequency spectrum from long waves down to a wavelength of about 3 cm. (For wavelengths shorter than 3 cm. this is no longer true as from there on the refractive index of water vapour begins to vary with frequency.) might, therefore, be supposed that the propagation characteristics associated with a given atmospheric condition would be the same for all frequencies, and 420 Mc/s. propagation would be identical to that on 144 Mc/s. This is roughly true in the sense that conditions which tend to produce long distance propagation on one frequency will also tend to pro-duce long distance propagation on the other frequency, but it is not quite the whole story.

#### Ducting

To see how it comes about that the conditions can be different on the two frequencies, the mechanism of propagation must be considered in more detail. Consider first the effect of "ducting." This is the type of propagation which occurs when there is a layer of air near the surface of the Earth in which the conditions are such that a ray travelling horizontally would be bent downwards by an amount which exceeds the curvature of the Earth. The most favourable conditions for this type of propagation exist when the temperature increases and the watercontent of the air decreases according to the height above ground. The vertical distance over which the favourable conditions persist is called the "duct The theory shows that a wave may be "trapped" in the duct provided that the duct width is great enough. The wave will then be guided round the surface of the Earth, and travel to great distances with little attenuation. While a duct which can trap a 144 Mc/s. wave would always trap a 420 Mc/s. wave, the converse is not true, for a shallow duct, which could trap the 420 Mc/s. wave, might produce hardly any effect on a 144 Mc/s. wave. Thus, when propagation is by ducting, it is to be expected that abnormally long ranges would occur more often on the higher frequency. This is observed in the case of radar, where it is found that targets can be observed at exceptionally great distances much more frequently on 10 cm. than on 150 cm. The phenomenon of ducting is, in fact, generally believed to provide an explanation of most of the abnormal propagation effects observed in the case of radar over the whole range of wavelengths used. It may be noted that the most favourable conditions for the formation of ducts occur over the sea, and especially over coastal waters.

#### Reflection

The effects of ducting seem to be inadequate to

\* 28 Hardwick Street, Cambridge.

explain all the results obtained in V.H.F. transmission from point to point over land, and an alternative mechanism has been suggested. This theory supposes that waves may be reflected from atmospheric discontinuities at relatively high levels (say 1,000 to 10,000 feet). A radio wave may thus be partially reflected when it meets a discontinuity in refractive index provided that the discontinuity is sufficiently sudden. What matters is the distance over which the change of refractive index occurs in relation to the wavelength of the radio wave concerned. Thus, a discontinuity which counts as a "sudden" discontinuity on 144 Me/s. may be too gradual to reflect 420 Mc/s. appreciably. Consequently, this type of abnormal propagation is less likely to occur on the higher frequency.

Probably both these effects occur on different occasions, and a comparison of 420 Me/s. and 144 Me/s. conditions should help to elucidate this point. However, the two wavelengths differ by only a factor of three, so that rather similar propagation conditions must be expected. The mere observation that good conditions on 420 Me/s. coincide with good conditions on 144 Me/s. will be of little value. Detailed measurements of the variations of field strength on the two frequencies may, however, be of great interest.

The question of fading of V.H.F. signals is of considerable interest, and little work seems to have been done on this subject. Fading would be expected to follow changes in the refractive index structure produced by air movements. Thus, in general, one would expect rapid fading to be associated with high winds. A simple measure of "speed of fading" can be obtained by counting the number of maxima of signal strength which occur per minute (preferably observed on an S-meter or other indicating device). It would be of interest to know what weather conditions give rise to the most rapid fading, and how the fading speed compares on 144 Mc/s. and 420 Mc/s.

## Radio Control of Models — Continued

from page 414

The switch wipers control the speed and direction of the electric driving motors. The five positions give astern, stop, half and full ahead, and full ahead with propellers. A cut-out switch is included in the engine control circuit to enable the lever to be lined up with the observed position of the selector switch. The fifth channel is operated from a simple on-off push-button and the corresponding relay contact completes the electric horn circuit.

#### Performance

The total power consumption from the batteries in the model is 72 watts with all circuits energised, and the maximum length of run on one charge is about one hour. A test to "end of life" showed that the whole equipment functioned correctly with a terminal voltage of 10 V. across the section of the battery feeding the radio apparatus.

The electronic equipment has had no adjustments made to it during the twelve months since its completion. During this period it has been operated nearly one hundred times. A recent laboratory test showed that no appreciable change in circuit performance had taken place.

## **LONDON LOG**

By J. P. HAWKER (G3VA)

Although the art of radio communication is still thought of as a recent discovery, its history stretches back almost 100 years. Here are details of how the amateur with time to spare in London can trace the progress of radio, radar and television; watch television demonstrations; or make use of one of the most complete scientific libraries in the world.

A FTER an interval of almost ten years, there is once again a representative collection of historic radio equipment on show at the Science Museum. This is good news for all who can manage an occasional trip to London. It will enable old-timers to re-awaken a thousand memories of their early days, and give the newcomer a chance to learn in a few hours more of the history of radio communication—and the important role played in its development by British scientists—than could be gleaned from the printed pages of half-a-dozen volumes.

During the war the Science Museum was closed and many of its unique exhibits removed for safe-keeping. Since then the re-arrangement of the collections has proved an enormous undertaking and for several years only a very small proportion of the radio exhibits were on show. In recent months, however, rapid progress has been made and although the visitor is warned that the objects now displayed are a "token selection only," there is plenty to arouse the interest of the keen amateur.

#### The Museum

The Science Museum is located in Exhibition Road, S.W.7. The stranger to London is advised to go by Underground to South Kensington station (District, Metropolitan or Piccadilly lines) which is connected by subway to the Museum. The Museum is open every day of the year except Good Friday and Christmas Day from 10 a.m. to 6 p.m. (Sundays 2.30 p.m. to 6 p.m.) and admission is free. The radio, radar and television collections are to be found in Gallery 23 on the first floor.

The collection includes either the original apparatus or exact replicas illustrating the outstanding historical developments in radio communication: early "Hertzian" spark gaps and the actual manuscript in which Hertz described—for the first time—many of his discoveries; Marconi equipment dating from the 'nineties; coherers; the first two-electrode Fleming valve of 1904; arc radio-telephony equipment 1910; military and airborne apparatus used in the 1914—18 war; 1922 broadcast receivers on which the squeaky voice of Two Emma Toc was proudly demonstrated to unbelieving neighbours, and the strangely twisted horns and cones which soon relegated earphones to the "short wave dabbler." Here also are those primitive attempts at low loss

tuning, enabled us to hear KDKA, Pittsburgh or listen to the amateurs of that era. The part played by the experimenter in the development of short wave communication is recognised by the inclusion of a "typical amateur station" (G5FK), prominently labelled 10-watts, a magnificent 1932 specimen of gleaming ebonite panels.

But if the amateur station seems crude by modern standards what can be said of the dummy's head and revolving disc in a nearby show case. Surely nothing of merit can have been achieved with this schoolboy

construction, spidery self-supporting coils which,

when combined with careful "hand-capacity

contraption. No? It is the original apparatus with which the late J. L. Baird gave the first demonstration of practical television on January 27, 1926. Who would have dared foretell that a mighty industry was poised behind the flickering shadow of that dummy's head? Practically opposite a piece of angular metal recalls another British landmark in

radio development; it is the original cavity magnetron first tested at the University of Birmingham on February 21, 1940. Other war-time apparatus is shown, although in this section the collection is as yet by no means complete; a GL Mk. I radar transmitter which, on request, is shown working into a dummy load; various A.S.V.s; and a working example of the now famous No. 10 Set—the pulse modulated 8-channel radio telephone link which operates on 4,500 Mc/s.

Television demonstrations are given every afternoon in the ground floor demonstration room opposite the main lift. The provincial member who has not previously had an opportunity to watch television under good conditions can do so here free from the feeling that he is wasting the time of some eager salesman who may be inclined to lose interest when he learns that his audience is from the Outer Hebrides.

#### Science Museum Library

It is not everyone who is fascinated by the history of radio, but there can be few members who from time to time do not wish that they could consult some article or book not to be found in their own or their local reference library. The facilities of the Science Museum library appear to be comparatively little known to amateurs; yet it is probably one of the most complete scientific libraries in the world to-day. It is located on the first floor of the Imperial College of Science and Technology (Departments of Physics and Chemistry) building in Imperial Institute Road some two or three minutes walk from the main entrance to the Museum. The library is open weekdays from 10 a.m. to 5.50 p.m. (closed until further notice at 1 p.m. on Saturdays). It is not open on Sundays, Good Friday, Christmas Day or Bank Holidays. While according to the rules, the library is available for regular use only to those who are registered readers, no difficulties are likely to be encountered by casual visitors provided that the Visitors' Book is signed. New books, general works of reference and recent issues of selected periodicals are immediately available from the shelves. Other books may be obtained within a few minutes by completing a requisition form. Books and magazines may not be taken away, but comfortable reading room facilities are available.

#### I.A.R.U. Congress

A FULL account of the I.A.R.U. Congress held in Paris last month is in course of preparation and will appear in the July issue. For the record fourteen of the seventeen European I.A.R.U. Societies were represented as well as Brazil.

Mr. W. A. Scarr, M.A., G2WS, President of the R.S.G.B. was elected President of the Congress by the unanimous vote of all Delegations. Mr. S. K. Lewer, B.Sc., G6LJ, Past President of the R.S.G.B. was elected Chairman of the Administrative and Legislation Committee and Lt.Col. Revirieux, F8OL Chairman of the Technical Committee.

The R.S.G.B. Delegation included Mr. Gerald Marcuse, G2NM, Past President of the R.S.G.B. and Founder Vice-President of the I.A.R.U.

Many important decisions were taken including several which may well have a major bearing on the future development of Amateur Radio in Europe.

# T'S TOPICAL

#### Amateur Television

A T the May meeting of the Radio Industries Club, Mr. Charles I. Orr-Ewing, M.P. (Hendon North) asked H. M. Postmaster General (the Rt. Hon. Ness Edwards, M.P.) to give special consideration to a request made recently by the R.S.G.B., that radio amateurs be permitted to transmit television signals on frequencies within the 420 Mc/s. or higher amateur bands. Mr. Orr-Ewing referred to the contributions made by amateurs during the 1939-45 war and stressed the point that valuable experience would be gained if they were now allowed to transmit television signals. He also made reference to the good work being done by the amateurs of the Netherlands and other countries where television transmissions are authorised.

The P.M.G. was further asked to permit qualified persons to operate television links both within the U.K. and across the Channel.

Mr. Orr-Ewing's comments were made whilst moving a vote of thanks to the P.M.G., who had been addressing the Radio Industries Club on the televising of sporting events.

#### Commercial Intruders

N the instructions of the Council the General Secretary wrote again to the Post Office last month about the irregular operation of broadcasting stations in the exclusive portion of the 7 Mc/s. amateur band and in particular about the operation of Radio Tangier on 7,050 kc/s..

The following reply has been received :-

"This question has, of course, been raised by you on many previous occasions. . . . While we appreciate the feeling of amateurs concerning this type of interference, I regret that I can only repeat that there is little we can do to rectify matters until the Atlantic City frequency plan is fully implemented. As we have pointed out in previous correspondence, the activities of "out of band" stations are by no means confined to the amateur frequencies and even if we were to register a protest in each individual case, it is extremely unlikely that an offending station would shift frequency in consequence. We have, however, noted the information contained in your letter.

"We, ourselves, are anxious to secure an improvement in the position and I can assure you that when conditions are more favourable we shall take all practicable steps to that end."

#### **Band Checking Group**

HE formation of a Band Checking Group was announced in the May issue of the BULLETIN. Work has started on investigating the activities of broadcast and commercial stations operating between 7,000 and 7,100 kc/s., the exclusive amateur portion of the 7 Mc/s. band. It is desired to establish what interlopers there are, their frequencies and their operating schedules. Backed by this information, the Society will be able to submit a still stronger case for the removal of the offenders.

The resources of the Band Checking Group already include first-class D.F. and frequency measuring equipment but further active assistance is still required. All correspondence regarding the Group should be sent to W. N. Craig, B.Sc., G6JJ, 34 Blossom Way, Hillingdon, Middlesex.

#### London Members' Luncheon Club

HE third meeting of the Club, held on May 12th at the Kingsley Hotel, Bloomsbury Way, Holborn, under the Chairmanship of Ken Alford, G2DX, attracted an attendance of 35—the

best yet. Guest speakers were W. G. F. Wedderspoon, ZS5JX (ex-XZ2JB) J. de Waard, PA0ZX and D. F. Childs, SV0AJ.

The Club meets again on June 16th and thereafter on the Friday following the 15th of each month. Members foregather for a ragchew at 12.30 p.m.; luncheon (5s.) is served promptly at 1 p.m. and the

proceedings terminate at 2 p.m.

The Hon. Secretary is W. E. F. Corsham, G2UV, 143 Abbots Drive, Wembley, Middlesex, (ARNold 2727) who will be glad to book a seat for any London member providing notice is received the day before the luncheon. Overseas and provincial members will be warmly welcomed. Regular members pay an annual subscription of 5s. to cover incidental expenses.

Here is a first class opportunity for London members and their friends to meet under ideal What about starting similar clubs circumstances.

in other large cities?

## Mention the Bulletin when writing to Advertisers

#### B.S.R.A. Exhibition

WENTY firms were represented at an interesting exhibition of equipment and accessories for sound recording, reproduction and audio engineering, organised by the British Sound Recording Association, and held at the Waldolf Hotel, London on May 20-21, 1950. Several mobile recording vans, as employed by the B.B.C., Radio Luxembourg and British film companies, were also on view.

The exhibition provided an excellent opportunity to inspect recent advances in wire, tape, dictaphone and disc recorders, while to those more accustomed to communication quality, the demonstrations of British high-fidelity reproduction were most im-pressive. Considerable interest was shown in the new Decca long playing micro-groove records and associated equipment now available in the United Kingdom. By the use of 33\frac{1}{4} r.p.m. motors and tracking 246 grooves to the inch, up to 22 minutes of continuous reproduction is possible.

Home-built equipment, designed by members of the 900-strong B.S.R.A., which provides a link between persons interested in electro-acousticseither professionally or in an amateur capacity—was

also exhibited.

The Association is at present engaged upon the production of a series of non-commercial recordings, including a test frequency record (50-10,000 c/s.), which should prove of considerable value to amateurs and high-quality enthusiasts.

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# THE MONTH ON THE AIR

By ARTHUR MILNE (G2MI)\*

#### "My " Frequency

HERE seems to be a tendency amongst some amateurs to regard the particular frequency on which they operate as their own "exclusive" personal property. Such remarks as "this is my frequency," "there is always a group of stations on this frequency at this time" have been increasingly common on the air of late, particularly on the 3.5 Mc/s. band. This idea, which is something quite new to Amateur Radio, is probably a relic of Service days when particular "nets" had their allocated frequencies and woe betide the interloper. It should be appreciated that the amateur bands are for the general use of all licensed amateur stations; and whilst reasonable care should always be taken to see that no transmission is started on an occupied channel this is often difficult and sometimes impossible to avoid. Many of us have had personal experience of locating what appeared to be a clear spot on the band, only to find ourselves involved in an altercation with a number of stations taking part in a multi-way contact, merely because the one transmitting at the time was inaudible at our particular location.

#### Thought for the Month

Transmitter testing
without a dummy aerial
and reduced power
is not the way
" to make friends"
although it may " influence people"!

Congestion is something which has been thrust upon us, and should not be made the excuse for outbursts of exasperation over the air, nor high-handed claims to the exclusive use of a particular channel. It is a problem which can be met and overcome only by a combination of good sense, good manners and technical advances in transmitter technique and receiver selectivity.

We might also do well to remember that "over to John" is not the authorised procedure for ending a transmission. We have call-signs: we should use

#### them.

#### News from Overseas

Cards are arriving from FM7WE and HC8GRC. Vie Thorne is VS1BX once again. He is running 120 watts to a pair of 807's. Fancy living with FN8AD, C3AF, FO8AC, VR2BM, PK4KS and CR10AA, on your radio "doorstep," so to speak! VQ3AK who operates on 14 and 28 Mc/s. wants contacts with stations in the Eastbourne area. He uses V.F.O. but is often to be found on about 28300 kc/s.

G2CQJ, ex-VS2CH, says there is a pirate" VS2CH" active who is not in Malaya. ZB2H is now QRT and will soon be active as G3GQO. Any unconfirmed Gibraltar QSO's with this station will be verified on application to Mr. M. Steed, c/o Corporals Club, R.A.F. Station, Compton Bassett, Near Calne, Wilts. G5RI corrects the address of ZS8MK published last month: it should read Dr. R. L. Markham, Quachas Nek, Basutoland.

# Contests Diary

Two-Metre Field Day

July 2: 1100 B.S.T. to 2000 B.S.T.

420 Mc/s. Tests.

Rules for the 70 cm, event to be held on August 20 will appear next month. They will be basically similar to those for the 1949 Tests (see July and October, 1949, issues of the BULLETIN).

BERS195 sends a long list of stations who have QSL'd his reports but have failed to fill in the necessary details. When replying to a listener report, please be certain that date, time and band are filled in. Don't give the impression that the card has just been "tossed to the dogs" without care or consideration!

#### **British Isles Reports**

G5LF hopes to be on "top band" during the period July 28-August 16 with a /A call from the Isle of Islay in the Hebrides, operating times will be frequent but erratic.

G6RH mentions the following rare ones: CR4AC (who QSL's) 28090 kc/s.; FF8FP, 28500 kc/s. ('phone); CR5AM, 14120 kc/s. (C.W.); FM7WE, 14185 kc/s. ('phone); FM7WR, 14060 kc/s. (T6). He adds that VQ4ERR has a card from VQ9KRL who went to the Seychelles especially to work him!

G3CJM passes on the information that AP5B will be returning home in December and that W7MY is one of the few stations in Utah which does QSL. Incidentally OA4CJ is not a "pirate," G3APN has his card. CR5AC is very active at present; his QTH is Arribal Badosa, Vincente, Box 38, Portuguese Guinea, and his T9 signals can often be heard on 14010 kc/s.

G5WI, now on his way to California, completed his 835th sked contact with W6AY just before leaving. ZS5YF is once again on his way back to the U.K. for another spell as G3BYF.

VP8AM has started to QSL all his contacts; and a large batch of cards has already been distributed



SVOAJ-ATHENS, GREECE.

Although in the words of the owner—Doug. Childs—the transmitter at \$V0AJ was assembled from odds and ends, the rest of the world knows how well it worked. Input was 50 watts to an 807, plate and screen modulated by a pair of 6N7's in parallel push-pull Class B.

through the Bureau. All his cards are being handled by R.S.G.B.—other Bureaux please note. Cards are also arriving from VP8AJ and VP8AN. VP8AP will also QSL all contacts. Another batch of cards has

been received from CR6AI.

BRS7594 reports hearing two mobile airborne stations: DL4FY over Southern Germany and DL4NH flying at 13000 ft. over Greenland. Other calls from his log include FD3RG at 1730 on 28365 kc/s. (QTH just Lomé, French Togoland); FF8AH, 28450 kc/s.; SV5UN, 28380 kc/s.; KG4AA, 28470 kc/s.; and VU2SWL, H.Q. Station of the Short Wave League of India. He has received cards from KG4AK, VP3HAG, ZC1AR, HP1BR, JA2KK, VE6AC (15 watts on 14 Mc/s.) ZP3AW, VP7NK, W7LBN (Arizona) and YK1AC. BRS7594 always gives plenty of information in his reports. Draw the moral!

G3FJU has heard IE9K, which sounds more like



Blurb No. 6.

a military than an amateur call. G2BJY has hooked PK3JF on 28 Mc/s. and has heard ZK1AZ several times between 0712 and 0724. Calling "CQ DX" without success. BRS16857 of Yeovil offers the following selection from his 14 Mc/s. C.W. log (times G.M.T.): KH6OR, 0635; KH6QH, 1708; EA8LP, 0100; T12SJ, 0630; 3V8AW, 1950. He has had 100 per cent. Q8L's from Cuban amateurs; all sent direct, including two by air mail! BRS18542 of Redruth, Cornwall recently heard VE1VI working VO1VI which is an unusual call for a Newfoundland station.

## QRP

G2FXA has been finding out what an input of ·3 to 2 watts will do. He says the secret of success with low power is to answer CQ's near your own frequency. His best QSO was with OK using 2 watts on 7 Mc/s. He also worked many DL's; and C's by the score! Using 'phone from Durham, the best contact was with Dublin. One G in Portsmouth gave him S8. How about a campaign to use only sufficient power for each QSO?

#### Quick Looks

GD5CZ whose thrilling sea-rescue story appears elsewhere in this issue says: 1825, 1835 and 1845 kc/s. are better avoided to lessen interference to shipping using these channels.

G2DHV reports that the Two Call Club is making excellent progress and already numbers more than 23 members, some of whom have held as many as four overseas calls.

OE314 of Dorbirm, Austria, is trying hard to be the first Austrian to qualify for H.B.E. He still needs cards from GD61A, GD3UB, GD3ENK, MD7QRP VE5GD, VP61S, VE41F, VE8MI, VE8AW, VQ2JC, ZE2KA, VO1AF, VP2GB, VS9AH, ZD4AX, ZD4AH and AP2F.

#### A Warning

ERTAIN members have recently received from Czechoslovakia requests to supply drugs for the cure of a T.B. patient. There is reason to doubt the genuineness of these appeals. In any case the drugs concerned should only be administered by expert medical authorities and members are advised to ignore any such requests they may receive.

#### Top Band

THE Netherlands authorities recently complained to the Post Office regarding interference caused by U.K. amateurs to one of their services operating on 1800 kc/s.

Members using the Top Band are reminded of the 10 watt power limit and of the necessity for observing Condition 5 of the Amateur Licence so far as "listen-

ing out " is concerned.

Clause 5 states: "... Sending shall not commence without listening on the frequency which is to be used in order to ascertain, as far as possible, whether interference is likely to be caused thereby with any other station which may be working."

#### R.S.G.B. Members' Stamp Club

M. J. D. KAY, G3AAE, 68 Upton Road, Slough, Bucks. reports an enthusiastic response to his announcement last month. The Club—with 'AEE as Hon. Secretary—is already well under way and the first packets have been despatched. Rules are identical with those of the pre-war club. Interested members should write direct to the above address.

# Spotlight on...

# ALTERNATIVE ADDRESS PERMITS

PERMISSION to establish an amateur station at an alternative address can normally be obtained by licensed amateurs on payment of an additional royalty of 10s. per year. Reasons for requiring this facility should be stated. The fee payable is adjusted by the G.P.O. to make the renewal date of the permit coincide with that of the current licence. The permit is subject to the same conditions as the original licence and to the added stipulation that the station must not at any time be established or worked at more than one of the authorised places. When the station is operated at the alternative address /A (stroke A) should be added to the call-sign.



Although reasons for requiring an alternative address permit must be given there is, in fact, no such obligation when applying for a portable permit, as was incorrectly stated last month.



#### Continental Opening

 HE extraordinarily good propagational conditions which were experienced from May 12 to 15, 1950, will long be remembered by those fortunate enough to be on the two metre band at the time. On the 11th PA0PN was heard just before 2300 B.S.T. by G2UJ, and undoubtedly by many others, and this heralded a positive "PA Party" which lasted for a couple of days. Extremely loud reception of Dutch and Belgian stations in the Midlands, combined with the absence of serious fading, suggested the existance of a "duct" stretching across the centre of this country well into the Netherlands. In the south of England although many PA's and ON's were heard at good strength, they were somewhat difficult to raise, particularly on the 12th. PA0EO (Amsterdam) was heard telling G5JU (Birmingham) that he had not heard a single station south of London. This was not for lack of stations calling him; at the time he was a steady S8 on 'phone in Tunbridge Wells.

PA0HA (Hoogezand, 15 miles S.E. of Groningen) probably the best DX for most operators, told the writer on the 13th that he had worked 24 G stations

and GW2ADZ.

Although not so numerous as the Dutch, the Belgians were well represented by ON4HC, HN, IF and IW. F3LQ, the sole French representative reported (other than on the Kent and Sussex coasts), appeared to be just on the edge of the duct, and succeeded in working GW2ADZ on the 14th for what is thought to be the first GW-F contact on two metres. This performance is all the more meritorious since the French station was using only 15 watts to a single element folded dipole.

On May 13 GW2ADZ claimed two more "firsts"; GW-PA at 1735 G.M.T., and GW-ON at 1952 G.M.T. The Dutch station concerned was PAOHA, and as the distance is approximately 420 miles, these stations so far as is known, now hold the European 2 metre DX record. Hearty congratulations, OMs.!

G6LI (Grimsby) heard more than 20 Dutch and Belgian stations and worked PA0KD (Dordrecht), ON4YV (Antwerp), PA0PN (Isle of Walcheren), PA0HA, and finally obtained an RST 599 report from PA0RD (Gouda). Four ON's, 7 PA's and F3LQ were contacted by G2CPL (Lowestoft) who, apart from his excellent position for working across the North Sea, was feeling the benefit of an improved receiver and aerial system.

Conditions were far more difficult for operators in the South West. G2XC (Portsmouth) could hear stations in the London area working Holland and Belgium but could not hear the DX himself. G3EHY (Banwell) did well in raising PA0MU (Apeldoorn) on the 13th, signals being up to S8 at times. Although well placed geographically, G5MR (Hythe, Kent), is badly screened in an easterly direction, and only heard PA0IK (Kootwijk) and PA0MU, but succeeded in raising ON4YV, which station was prominent through the whole period.

Continental contacts are not as unusual for G3DIV/A (Eastbourne) as for stations further inland,

• W. H. Allen, M.B.E., 32 Earls Road, Tunbridge Wells, Kent.

and on three consecutive nights from May 9 he worked four countries.

G3WW (Wimblington, Cambs.) missed the fun on the 11th, but on the following evening worked five PA's and three ON's on 'phone and a further Belgian station on C.W. in addition to some of the Birmingham and Coventry stations.

#### Two Metre Station Reports

G3EHY (Banwell, Som.) found that the last fortnight in April was generally good, and experienced little difficulty in working stations 150 miles distant on most evenings. The exceptions to this were the evenings of the 25th-26th, when snow and low temperatures were widespread over much of Southern England. May opened brilliantly, and culminated in the remarkable "PA Party" previously referred to. The best DX contacts were provided by G2CPL (Lowestoft) 225 miles, and G3BW (Whitehaven, Cumberland) at 230 miles. A daily sked, with G8SB (Horwich, Lanes.) has been kept on 'phone for some time, and signals over the 160 mile path are quite consistent whether in daylight or at night. 'EHY that his daily transmission at 1300 advises G.M.T. beamed towards the S.E. is being discontinued, and replaced by one directed towards the North at the same time. He has had consistent results with G3CHY (Ashton-under-Lyne, Lancs.) at that time, and is looking for contacts with any other stations who may hear his five minute CQ call.

In common with G3WW, 6LI and others, 3EHY is in serious disagreement with the system of scoring adopted in the R.S.G.B. Two-Metre Fixed Contest, as it is felt that it favours unduly those operators situated in well-populated areas. The Two-Metre Field Day—with "straight" scoring—is to be held

on July 2.

Another advocate of daytime working is G5MR (Hythe, Kent), who contacted GW2ADZ for an RST 589 report at 1115 B.S.T. on the 14th. He states that F8OL (Meudon, nr. Paris) calls CQ daily from 1930 to 1940 G.M.T. on exactly 145 Mc/s. with his aerial beamed on this country. The French station has operated what must be almost a record sked. on this band, having worked F8NW (Boulogne) every evening for the past two years. The distance is approximately 130 miles.

G2CPL (Lowestoft) finds—after extensive tests—that his increased aerial height has paid better dividends than was at first thought. Several contacts have been obtained with G3EHY, and G6XM (Farnborough) heard more than once at a strength

of S9.

Apart from a number of Continental contacts, G6LI (Grimsby) has been getting out well. During the period May 10-15 he raised G2CPL at S7, 2FO (Stockton-on-Tees) S6 and 2MR (Surbiton) S7 with much other G-DX heard but not worked. Among the latter was G5VN/P heard at 558 on the 13th, but his location at the time is unknown. 6LI has constructed his own version of the Wallman Cascode circuit for the R.F. stage in his receiver, and finds it all that it has been claimed to be, both for its ease of handling and its ability to receive weak signals.

The beam in use consists of a stack of four folded

dipoles.

Although in an isolated position from the point of view of V.H.F. operation, G3BW (Whitehaven, Cumberland) has worked 18 counties. Recent contacts include G2AJ, 3BLP, 5TP, GI2FHN and GM3FOW. G3WW (Wimblington, Cambs.) has been testing two five-element Yagis in place of the single five element previously in use, and finds that the average signal strength report has improved by 1 to 1½ S points. He found the late evening of May 6 and the morning of the following day good for DX, and succeeded in contacting G2XC, GW2ADZ and G3AHT (Oswestry), the last two being worked in daylight. Others who have figured in his log recently are G2ADR (York), 2AOK/A (Moreton-in-the-Marsh), 3CFK (Great Yarmouth), 3CXD (Staffs.), 4RK (nr. Kenilworth), 5MA/P (Sussex Downs), 5RW (Derbyshire) and 5SK (Warwick), GW2ADZ (Llanymynech, Mont.) may now be heard on 144 208 Mc/s.

G2AOL (Otford, Kent) built beam, receiver and transmitter in the space of 12 days and managed to get on the band in time to take part in the R.S.G.B. Two-Metre Contest. Although the beam was only 15 ft. above ground, and the receiver had a fairly high noise factor, he worked (with an input of 20 watts) 36 stations in 12 counties in a fortnight. Not satisfied with this, the receiver was rebuilt to an "all-6J6" circuit, and 'AOL was rewarded with G3EHY on 'phone as the first station heard, followed by G3EJL (Southampton) and 3AHB (Poole, Dorset) worked

later the same evening.

From GM5VG we hear that GM3DYC (Glasgow) and GM3DIQ (Saltcoats, Ayrshire) are now active, the latter on 144·136 Mc/s.

#### German Two Metre Tests

The V.H.F. group at Detmold, Germany, are making a determined attempt to get across to this country on two metres during the period June 25 to July 2, when DL1SI, operating with an input of 400 watts on a frequency of 144 · 6 Mc/s., will be in operation 24 hours a day. From June 25 to July 1 transmissions will be beamed on this country, and on the last day of the tests the 32-element aerial will be turned in other directions. In order that reports may be passed to Germany, station DL1SJ will be on continual watch on the 14 Mc/s. band for C.W. or 'phone calls.

It is understood that DL4DD is also active on the two metre band with 200 watts to a forty element beam.

#### 70 cm. Topics

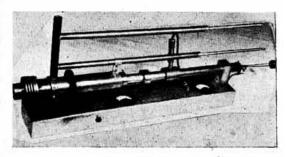
Reference has been made from time to time in these columns to the activities of the South London U.H.F. Group and to their work on problems concerned with the development of apparatus for communication on the 70 cm. band. Those who attended the London O.R.M. at Denison House, Victoria, London on Sunday, May 14 were privileged to examine what was probably the most comprehensive collection of upto-date amateur U.H.F. apparatus yet displayed in this country, and to listen to a most enlightening discourse by Mr. C. Newton, G2FKZ, on the Group's activities in the realms of 70 cm. research.

In 1948 the group set themselves the task of developing U.H.F. gear, with particular reference to 70 cm. and below, worthy of the best modern practice; and it is noteworthy that on the day that the 70 cm. band was released for amateur occupation they were active with crystal controlled transmitters and superhet receivers. The group has travelled far in the past two years; many of the original ideas having been discarded in the light of later knowledge gained

through painstaking experiments. The use of concentric line circuits has been found essential in obtaining good efficiency both from the transmitter and from the receiver, and much careful mechanical work had obviously been put into the excellent examples of turned brass work which were on display.

70 cm. marks the parting of the ways between normal circuitry, as applied on the lower frequencies, and micro-wave "plumbing." It is to be hoped that in the course of time, when practice becomes more standardised, and there is a sufficient demand from interested amateurs, it will be possible to purchase the necessary components for concentric line circuits, and thus enable those who are not possessed of the necessary workshop facilities to fabricate their own apparatus.

Much practical information was given regarding methods of coupling and matching at the U.H.F.'s, and proof of the soundness of the lecturer's advice was evident from the demonstration of a driven P.A. employing a Mullard M.E.1003 common-grid triode valve operating at an efficiency in the region of 60 per cent. and supplying R.F. power to a lamp load at



A 70 cm. power amplifier for use with a Mullard type ME 1003 triode built by the South London U.H.F. Group. All circuits are concentric lines, and an input of 25 watts is possible at an efficiency of 60 per cent.

the far end of about 100 ft. of ordinary co-axial cable. In the accompanying photograph of this P.A. unit the two plunger-tuned matching stubs in the output line can be clearly seen.

On the receiver side, a narrow band superhet was shown, and it was proved that it was capable of receiving C.W. through not only a sharply tuned I.F. amplifier, but even with a 1,000 cycle audio filter in circuit. This receiver had a crystal controlled oscillator and a tuned R.F. stage.

We hope that both theoretical and practical articles dealing with the design and construction of similar gear will appear in future issues of the BULLETIN.

#### 70 cm. in Scotland

GM5VG (Glasgow) who sends details of 70 cm. activity in Scotland, mentions that the following stations are active and would welcome reports:—GM3ENJ, FYB, GAB, 5VG, 6WL, 6KH. Those anxious to arrange skeds. should get in touch with 5VG at 13 Alder Road, Glasgow, S.3, or 'phone Merrylee 4133.

Those members who sent reports are cordially thanked for their information, and all readers are reminded that the closing date for the July issue is June 24.

## TRANSMITTER INTERFERENCE

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FROM R·S·G·B HEADQUARTERS

# Two Metre Contest Results

THE steady improvement in V.H.F. technique over the last 12 months is reflected in the results of the 1950 Two-Metre "Open" Contest held on May 6-7. More than 160 stations are known to have been active, an increase of one-third on the 1949 figures. While conditions were generally considered to be "average," two-thirds of the entrants reported contacts over distances in excess of 100 miles. One contact—that between GW2ADZ (Llanymynech) and G2CPL (Lowestoft)—exceeded 200 miles. G3BW (Whitehaven) heard G2AJ, G3BLP and G5TP all around the 250-mile mark. There were no apparent "closed periods" for distances up to 150 miles; such contacts being recorded as late as 0220 B.S.T.

It is unfortunate that V.H.F. operation is not more evenly spread throughout the country, activity still being concentrated chiefly in the South East. There are encouraging signs of a gradual improvement—notably in Scotland where at least 11 stations were active—but the Midlands, in particular, were sparsely represented when compared with the total amateur population in the area. GW2ADZ and G2OI (Lancs.), though handicapped by the lack of local stations, both did extremely well—the Welsh station making no less than 14 contacts over 150 miles. The only two overseas contacts were made by G5MR (Hythe) who worked F8AA (Boulogne) and F8NW (Hardelot). His signals were also heard by F8OL (near Paris) who reported that conditions were poor for working G stations. A newcomer to the band, G3GSE, was restricted to C.W. but succeeded in gaining 14th place.

#### Equipment

Mr. W. R. Joss, G2AJ, of Biggin Hill, Kent—past winner of several 58 Mc/s. events—finishes at the top of the table: his 90 contacts giving him 149 points, a lead of 11 points over his closest rivals, G6VX and G3BLP, who tied for second place. G2AJ's equipment consisted of a 6J6-EL91-QVO 4/7-3E29 transmitter running at 125 watts into a 16-element rotary His receiver was a 5-valve converter (two 6AK5 R.F. amplifiers-EF91 mixer-6C4 crystal oscillator and 6J6 multiplier) followed by an AR88. The increasing popularity of crystal controlled converters was a particular feature of the contest. The Wallman Cascode R.F. circuit was in use at a number of stations, including G3BLP (6AK5, EC91), G6LI, G8IP and G8SM. G6VX showed that efficiency rather than "brute force" should still be the aim in transmitter design: his 85 contacts were made with 27 watts to a 4-65A power amplifier. G6XM was using two 304A's in push-pull at an input of 150 watts. Another exception to the 832, 829 class of double tetrodes was provided by G6LI who uses a pair of 826 neutralised triodes also operating at 150 watts input. Elaborate aerials undoubtedly give great advantages: eight out of the first ten stations were using 16-element arrays of one type or another. However, many of the entrants made effective use of 6-element stacked arrays similar to that described by G6CJ and G6UH in the September, 1949, issue of the BULLETIN.

#### Scoring

Several comments, all of which are being carefully considered, were received on the subject of scoring systems. It is interesting to note that an alternative method suggested by several entrants, based on mileage, would not have materially affected the position of the leading stations: G2AJ having

covered well over 4,000 "contact-miles." The portable 144 Mc/s. event on July 2 should provide the Contests Committee with additional data on "straight" as opposed to "tapering" systems. It is apparent, however, that there can be no completely satisfactory solution to the problem until activity is more evenly spread over the entire country.

#### **Entries**

Posi- tion	Call- Sign	Location	Con- tacts	Points	
1	G2AJ	Biggin Hill, Kent.	90	149	
2	G6VX	Hayes, Kent	85	138	
$\frac{2}{4}$	G3BLP	Selsdon, Surrey.	87	138	
4	G6XM	Farnborough, Hants.	88	126	
5	G6NB	Aylesbury, Bucks.	78	116	
5 6 7	G5TP	Stoke Row, Oxon.	81	109	
7	GSIP	Hampton, Middx.	72	102	
8 9 }	G5MA	Ashtead, Surrey	61	99	
95	G8SM	East Molesey	64	93	
95	GW2ADZ	Llanymynech	27	93	
11	G2OI	Eccles, Lanes.	27	83	
12	G2NH	New Malden, Surrey.	54	81	
13	G2MR	Surbiton, Surrey.	56	80	
147	G3GSE	London, N.W.9.	52	67	
145	G2XC	Portsmouth.	43	67	
16	G2XS	Kings Lynn.	26	64	
16	G2CPL	Lowestoft.	26	64	
18	G3CC	Keyingham, Yorks.	12	60	
18	G3CGQ	Luton, Beds.	45	60	
201	G3ENS	Loughborough.	28	58	
20 ]	G8LG	Sunningdale.	58	58	
22	G5PY	London, S.W.12.	55	55	
23	G2UJ	Tunbridge Wells.	38	53	
24	G6LI	Grimsby, Lines, London, S.E.2.	12	50	
25	G8VR	London, S.E.2.	34	49	
26	G3FD	London, N.14. London, S.W.19.	35	46	
27	G6CB	London, S.W.19.	45	45	
28	G3WW	March, Cambs. March, Cambs.	23	44	
29	G3BK G5LQ		22	43	
31	GSEQ	London, W.4.	42	42	
32	G5BM	North Harrow, Middx. Cheltenham, Glos.	18	40 39	
33)	G3BW	Whitehaven, Cumb.	5	39	
33	G6PR	Slough, Bucks,	32	132	
33	G2AOL	Otford, Kent.	32	32	
36	G2FNW	Melton Mowbray, Leics.	9	27	
37	G3CAZ	Gillingham, Kent.	15	26	
38	G2ANL	Nr. Leicester.	5	23	
39	G5MR	Hythe, Kent.	11	22	
40	G5UM	Knebworth, Herts.	19	19	
41	GM3EGW	Dunfermline.	11	17	
42	GSAPX	Grimsby, Lines.	3	3	

Check Logs: The following are thanked for forwarding check logs: G2BMI, G2FJD, G2WJ, G3CWW, G3EYV, G3SU, G5AS, G6CJ, G6HD and G6LX.

#### Two Metre Field Day

N order to encourage maximum activity during the R.S.G.B. Two-Metre Field Day, on July 2, the publishers of Short Wave News are offering a prize of one year's subscription to their magazine to the fixed station (i.e. station operating from normal location) which scores the most points for contacts with portable stations made during the contest period. Certificates will be issued to runnersup. Any licensed transmitting amateur may compete for these awards.

Rules and scoring, where applicable, are similar to those published in the April, 1950, issue of the BULLETIN for the Field Day event; but points may only be scored from contacts with portable stations. Fixed station entries should be sent to the V.H.F. Editor, Short Wave News, 57 Maida Vale, London, W.9, in time to be received there not later than July 10, 1950. The R.S.G.B. Contests Committee would appreciate a copy of all such logs, for checking purposes in connection with the judging of the Field Day.

#### Around the Trade

Mr. E. P. Harris, G3GFN, has been appointed Technical Manager to the Mail Order Supply Co. Ltd., 33 Tottenham Court Road, London, W.1. Specimen copies of the M.O.S. Newsitter, containing constructional articles and useful conversion data, will be forwarded free of charge to members.

## Held in Belfast and London

THE Official Region 15 Meeting held in Belfast on May 6th, 1950, was attended by the President (Mr. W. A. Scarr, M.A., G2WS), the General Secretary, Council Member, Mr. A. P. G. Amos, G3AGM and about twenty-five local members. Although there can be little excuse for such a small attendance, we were relieved to hear from G6CL that Northern Ireland is not alone in this respect. It would seem that the simple "business meeting and meal" programme of this and earlier O.R.M.'s must in future be replaced by something more elaborate if attendances are to be increased to anything like pre-war level.

During the meeting Mr. Clarricoats spoke on a wide variety of topics stressing in particular the need for close co-operation between the European Member-Societies of I.A.R.U. in order to strengthen



BELFAST O.R.M.

Front row, reading left to right: GI3CDF, G6CL, G3AGM, G2WS, GI2HLT, BRS—, GI5HV, GI3DQE.

the amateur position in regard to frequency allocations at future International Telecommunication Conferences.

After tea, Mr. Scarr, at short notice, delivered a much appreciated talk on V.H.F. work; a talk which has done much to stimulate a wider local interest in this branch of our hobby.

As the President had to leave Belfast on the Saturday evening local members were unable to show him as much of Ulster as they had planned to do. It seems however that he is already well acquainted with the Province, and particularly with its many golf-courses! The other representatives 'from Headquarters were entertained during the evening, whilst on the following morning, G12HLT became temporarily a "G" station when "Clarry" spoke to his nearest amateur neighbour in London, G5FA. A visit was also paid to the station of G15SJ, where, in addition to an excellent selection of home-built gear, the party were shown a transmitter which tunes itself to any pre-set frequency by means of a motor

and a complex gearing system.

After lunch, G3AGM and G6CL traversed the famous Antrim Coast Road to Carnlough, stopping at Ballygalley for tea and, on the return journey, for an excellent dinner. The weather was kind and a memorable day was brought to a fitting conclusion by a visit to the home of G15HV for supper. Our best thanks are due to Mr. and Mrs. Martin for their hospitality, and to Mr. Stanley Johnson, G15SJ, for the use of his car.

Prints of the photographs taken at the O.R.M. can be obtained from Mr. L. Lyske, 63 Church Street, Portadown, (price 1s. 6d.) or on application to the R.R. N.H.L.

ETWEEN 180 and 200 members attended the London O.R.M. held in the Denison House Council Chamber on May 14. The meeting began just after 3 p.m. The President took the chair and opened with a few remarks to precede the review of the Society's activities given by the General This review was rather shorter than usual but the main emphasis was laid upon the international aspect, which seems to be assuming great importance. He reported upon a recent visit to Sweden and the coming I.A.R.U. meeting in Paris, and it appears that Europe, or at least Region I, which was created after the Atlantic City Meeting of the International Telecommunications Union, has special problems of its own. A question raised later asked whether splitting the World into Regions would tend to reduce American interest in Region I, and the General Secretary gave it as his opinion that there were no fears in that direction. A lively interest by members of Region I, in matters appertaining to that Region was, however, of the utmost importance.

The President then called upon the Regional Representative to put three motions which had been tabled. Surveying the illogical position caused by the two subscription rates now existent and suggesting advantages which would be gained by standardisation, the R.R. put a motion calling upon Council to assemble a Special General Meeting, according to the Articles, to standardise the Corporate members' subscription. The extra funds so collected were to be used to consolidate the Representation Scheme. The Meeting voted in favour.

The second motion was replaced by an alternative motion asking Council to look into the wording of the Articles of Association, regarding the wording of the ballot papers in Council Elections, to ensure that the position was made clear to the membership.

A further motion was proposed calling for a Committee to be set up to advise on possible improvements in the administrative machinery at Headquarters. It was pointed out that a Committee had just been appointed by the Council with wide terms of reference and this matter might be one with which it would be concerned.

The meeting then broke up into two parties for tea, and at about 6.45 p.m. settled down to enjoy a demonstration by the South London U.H.F Group.

Mr. C. Newton, G2FKZ, D.R. for South London, was the lecturer whilst G3CU and G3FZL did yeoman service putting circuits on to blackboards which were relayed to the rostrum as required. At suitable periods, pieces of equipment, loaned by G2AUS and the members already mentioned, were handed round for inspection, illustrating points in the Group's search for efficiency at U.H.F. The Mullard Electronic Products Co., Ltd., had given permission for their experimental valve ME1003 to be used in the demonstrations.

Although the demonstrations continued until nearly 9 p.m., no one appeared to notice the passage of time, and it was a pity that the meeting missed being brought right up-to-date with a demonstration of crystal control at 1200 Mc/s. (24 cm.), which had been arranged, although the lower frequencies already shown assured those present that this Group was competent to crystal control almost anything!

A very hearty vote of thanks was expressed to Mr. Newton for his informative and often highly amusing lecture and to those who so ably assisted him. The meeting concluded with a raffle which allowed at least some to agree that the six hours had been spent together in a very fruitful and enjoyable manner.

W. H. M.

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# R.S.G.B. DIRECTION FINDING CONTESTS, 1950

 OUR Direction Finding Contests, open to members of R.S.G.B. and of Affiliated Societies, have been arranged to take place in the Home Counties this summer. Three of these will be conducted by local groups or societies, and the fourth will be a special event, in which only the leading competitors of the first three "qualifying events" will be eligible to compete. The R.S.G.B. will make an award to any fully paid-up member who is winner of the "final contest, and such certificates and other awards as the

R.S.G.B. Council may decide.

Full details of Event 1, and preliminary details of the later events are given below. Details of Events 2, 3 and 4 will be published later. Any further information may be obtained from the organisers indicated. If other groups wish to arrange qualifying events, they may do so by application to the Contests Committee, giving one month's clear notice of the proposed date and venue, but it should be noted that for this season, at least, the final event will be located in the Home Counties. Qualifying events must be arranged and conducted by R.S.G.B. groups or Affiliated Societies according to the rules below. In addition, an appointed R.S.G.B. observer who will be responsible for the conduct of the event, must be present.

#### Qualifying Events

The number of qualifying events may, of necessity, be limited for the present, but if interest is shown in other parts of the country, the Committee may elaborate more extensive plans for

The four events are as below:

Date	Approximate Location	Organiser	
July 23	Edgware	H. W. Pope, G3HT, 4 Gainsborough Gdns., Edgware, Middx.	
August 13	Romford	A. E. Glozier, G3CRR, 40 Lancaster Ave., Barking, Essex.	
September 3	HighWycombe	G. T. Peck, BRS15402, c/o Ernest Turner Electrical Instru- ments Ltd., High Wycombe, Bucks.	
September 17, or October 1	To be announced later.	" yeombe, Ducks.	

Details of the EDGWARE event are as follows: CALL SIGN: G3HT/P. FREQUENCY: 1,920 kc/s.
ASSEMBLY POINT: Stanmore Station, Bakerloo line,
MAP: Ordnance Survey, "One Inch, N.W. London and Watford."
ASSEMBLY TIME: 1345 B.S.T. TEST COMMENCES: 1400 B.S.T.
Intending entrants must notify Mr. Pope of their intention to
compete not later than Monday, July 10 (enclosing 2s. 6d. per
head, if tea is required).

Rules

1. Events will be open to members of the R.S.G.B. and of Affiliated Societies, and will be held on Sunday afternoons, commencing at 1400 B.S.T. and concluding at 1630 B.S.T.

2. Transmissions will take place in the 1 · 8 Mc/s. band, with not more than 10 watts input, power to remain constant throughout the test. Identification signals will be given in Morse for the first two minutes after zero hour and be followed immediately by a further three minutes of speech transmission. Subsequent first two minutes after zero hour and be followed immediately by a further three minutes of speech transmission. Subsequent transmissions, which will be speech modulated, will take place at irregular intervals, but with a minimum continuous transmission of one minute and a maximum silent period of 15 minutes; at the discretion of the organiser, transmissions may be increased in duration and number towards the end of the test.

3. The hidden station will be located within 10 miles of the starting point, at least 50 yards from any inhabited building, and directly accessible to the competitor without entering, crossing or treapsasing upon any private property. Organisers will

ing or trespassing upon any private property. Organisers will specify a map, scale 1 in, to the mile, covering both the starting point and transmitter location.

Each competitor must sign on at the starting point before zero hour, and only this competitor may actually locate the

transmitter. Any member of a party arriving at the transmitter prior to the competitor or found searching the vicinity will entail disqualification of the party.

5. Each competitor will, at the start, be given a sealed envelope containing the location of the transmitter and of the place at which refreshments will be served at the conclusion of the test.

6. Only one receiver per party is permitted and the same receiver must be used throughout the test.

7. Competitors may, if they wish, leave the starting point at zero hour, and the time of arrival at the transmitter will be taken as the time at which the envelope is handed, with seals intact, to

as the time at which the envelope is handed, with seals intact, to the operator by the competitor, who must at that time have his receiving apparatus with him and, if required, demonstrate that it is in working order.

The winner of the event will be the entrant whose sealed envelope is first accepted by the operator of the hidden station.

### Isle of Man Amateur aids Sea Rescue

R. R. A. COLBY CUBBIN, GD5CZ, of Douglas, Isle of Man, rendered valuable service on the night of April 29-30, 1950 when the Lowestoft steam trawler "Mary Heeley" ran aground, during a dense coastal fog, on the rocks at Clay Head, about 11 miles from his home. His co-operation helped the Douglas lifeboat to locate the wreck and to save the crew of ten men.

GD5CZ was listening on the "top band" at 0045 B.S.T. on the morning of April 30 when he heard an urgent SOS from the trawler being transmitted by telephony on approximately 141 metres (2130 kc/s.). He immediately informed the local police who stated that the noise of a vessel running ashore had been heard on the cliffs, that the lifeboat had been called out, but that very little definite information was known.

As the messages were becoming more urgent, 5CZ switched on his transmitter and called the vessel on 1782 kc/s. The skipper of the "Mary Heeley" at once replied, giving details and requesting the amateur to keep his station open for further transmissions. '5CZ was able to give the reassuring news

that help was on the way.

Soon the swell began to increase dangerously and the pounding of the ship on the rocks could be heard through the radio link. The fog was dense and the "Mary Heeley" reported that her stock of flares was running low. GD5CZ hurriedly ascertained the exact time when the lifeboat had left Douglas so that the trawler could be given some idea of its probable time of arrival. He also suggested to the Captain that he should sound the ship's siren at frequent intervals. An intimate knowledge of the coast -'5CZ is a keen amateur yachtsman—also made him warn the Captain not to attempt to launch the ship's dinghy as the cliffs in the vicinity are very high.

Shortly afterwards transmissions from the "Mary Heeley" ceased: GD5CZ's anxiety for the safety of the crew giving way to relief when he heard that the lifeboat—guided by the siren—had reached the trawler and successfully rescued the crew. A listener who had followed the contact hastily prepared hot

baths and a meal for the trawlermen.

Members will wish to offer their congratulations to Mr. Colby Cubbin for carrying through his part in this rescue with efficiency and good sense. It is also interesting to reflect that if the "top band" had not been made available to the amateurs of the United Kingdom after the war, ten men might easily have lost their lives.

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# QUA

S there less serious interest, to-day, in the sending of useful listener reports than there was before the war? Claims received for the Heard the British Empire (H.B.E.) certificate suggest that this is the case. So far during 1950 only one B.R.S. member—Mr. G. P. Watts (B.R.S.3129)—and an American S.W.L., have been awarded this much-prized certificate, compared with almost fifty successful B.E.R.T.A. claims based on the same prefix list. Both awards require QSLs from fifty different Empire call-areas; those for H.B.E. confirming reception; those for B.E.R.T.A. confirming two-way contact.

G2BSA reports that the radio amateur programmes from Leopoldville (9,767 kc/s.), mentioned in this column last month, are now radiated at 2040 B.S.T. (1940 G.M.T.) on Wednesdays. Dutch and French speaking versions of the same programme are broadcast at 1840 and 2040 G.M.T. respectively.

Recent articles in CQ focussed attention on the therapeutic value of Amateur Radio and the comfort it brings to the physically handicapped. This was underlined by a QSL received the other day by G5ZA. It was from ZL4KE who operates on 14 Mc/s. C.W. from the Clyde Hospital, Central Otago, since a chest complaint forced him to give up globetrotting with the R.N.Z.A.F. Incidentally, the number of sightless amateurs in the U.K. runs into double figures. An account of the difficulties which G3DRE and G3FHX had to overcome in preparing for the licence examination was published a few months ago in The Weekly Telegraph. Latest recruit to this gallant band is GM3GJJ.

Back in England, after several years as Harbour Master at Karachi, is AP2G, who surprised many "tube-conscious" Americans by working them consistently on an 0-v-1 receiver. Amateur migration works both ways: GM3ATV is shortly leaving for Canada, while VE3ATU is now settling down for a year in the U.K. He hopes to be operating soon

with a G call from Catterick Camp.

"En pligt mod samfundet" is not a printer's error, but the Danish title of the recent BULLETIN editorial, "A Duty to the Community," which has also appeared in the Norwegian Amatér Radio. Overseas amateurs frequently read translated versions of "Bull" articles in their own journals.

The C.W. versus 'phone controversy is not confined to Amateur Radio. For many months the Radio Officers' Union has been strongly attacking the Ministry of Civil Aviation's support for the exclusive use of V.H.F. telephony on passenger carrying aircraft. The Union claims that reliable communication cannot be guaranteed when the plane is below a certain height and that the burdening of the pilot with extra duties is contrary to the interests of safety in the air.

The final aim of telecommunication has been defined as the ability to communicate with anyone, anywhere, anytime. Past experience suggests that 24-hour short wave point-to-point communication with low power over distances of the order of 100 miles is often more difficult than when much longer distances are involved. There is an interesting field of research open to amateurs in testing the comparative reliability at all times of the day and night of the 1-8, 3-5 and 144 Mc/s. bands, for such distances

At an international meeting of television experts in London, representatives of Austria, Belgium, Denmark, Italy, Netherlands. Sweden and Switzerland, declared themselves in favour of 625-line systems. French and U.K. representatives, while confirming the continued use of present standards

in their countries, expressed their willingness to discuss the unification of standards for the London and Paris transmitters to facilitate overseas TV relays. Television licences in the U.K. exceed 345,000. The morning demonstration transmissions from 1000 to 1200 hours now consist of a new selection of sample programmes interspersed with Test Card C, tuning signals.

The Automobile Association has asked its members to help in eliminating television and radio interference by fitting suppressors as soon as possible. The Radio Industry Council claims that one 5,000 to 15,000 ohm resistor in the high tension lead between the ignition coil and the distributor is between S5 and 95 per cent. effective.

#### Subscriptions

•Please pay your subscriptions promptly when due. Failure to do so may result in the loss of valuable issues of the BULLETIN: high costs of production make it necessary to limit the number of extra copies printed each month.

Amateurs are sometimes accused of having no time for activities outside their own hobby; but, in fact, they play a prominent part in many walks of life. For example, 28-year-old Reg Lacelles, G3AKX, has just been elected President of Manchester University Union, with the added distinction of obtaining an immediate clear majority for the first time since the present voting system was introduced.

## FREE FOR THE ASKING

# "What is the R.S.G.B.?"

The R.S.G.B. is a non-political organisation of 14,000 members with a record of nearly 40 years service to the Amateur Radio movement in Great Britain and the British Empire.

The R.S.G.B. maintains a close liaison with the G.P.O. on all matters relating to amateur transmitting licences and is controlled by a Council elected annually by the Corporate Membership.

The R.S.G.B. Bulletin—issued monthly—provides all members with an authoritative, up-to-theminute review of all phases of Amateur Radio activity and technical development.

The R.S.G.B. QSL Bureau is indispensable to the amateur and short-wave enthusiast.

The R.S.G.B. local representatives organise meetings and other activities throughout Great Britain.

The R.S.G.B. asks for the support of all who are genuinely interested in Amateur Radio communication. By enrolling now you will be strengthening the only National Amateur Radio Society in Great Britain.

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NEW RUSKIN HOUSE, LITTLE RUSSELL
STREET, LONDON, W.C.I

In response to numerous requests, copies of this R.S.G.B. poster (20 in. × 15 in., printed red and black) are now available from Headquarters to Local Representatives, organisers of Amateur Radio Stands at Exhibitions, etc.

# **Designing** A RADIO AMATEUR'S

LIBRARY!



WHEN a radio amateur designs an important piece of apparatus, he will-if wise-choose his components from the catalogues of firms which he knows from experience produce reliable goods. The same sound policy applies equally to the vital task of collecting, and keeping up-to-date, his sources of technical information and reference. That's why so many amateurs turn naturally to the books published by the two largest amateur radio organisations in the world: the R.S.G.B. and the American Radio Relay League. Behind each of their publications lies more than twenty years experience of what the amateur requires: no frills, but straightforward technical explanations, practical guidance and plenty of useful circuits. Written by radio amateurs, for radio amateurs . . . and at prices ganged to the average enthusiast's pocket!

NEW EDITION: HOW TO BECOME A RADIO AMATEUR\* (A.R.R.L.).
This 58-page guide to Amateur Radio is packed with useful constructional features: receivers, transmitters, power supplies, etc.; and fundamental theory simply explained. 11th edition. Price 4/6.

## Ten Essential Titles:

THE TRANSMITTING LICENCE. (3rd revised edition.) A complete guide on how to obtain an Amateur Transmitting Licence in the United Kingdom, and other useful information. Price 9d. (by post 1/-).

SERVICE VALVE EQUIVALENTS. (3rd revised edition.) Gives the commercial equivalent type numbers of hundreds of British and American Service Valves and Cathode Ray Tubes. Price 1/- (by post 1/3).

TRANSMITTER INTERFERENCE. Invaluable advice on the cure of broadcast and television interference caused by amateur transmitters. 32 Pages. Price 1/3 (by post 1/6).

SIMPLE TRANSMITTING EQUIPMENT. This new 52-page book provides full constructional details of three simple but efficient transmitters, a stable V.F.O. unit and a crystal-controlled sub-standard. Information on simple transmitting aerials is also included. Price 2/-(by post 2/3).

MICROWAVE TECHNIQUE. An excellent introduction to the design of communication equipment for frequencies above 500 Mc/s. 54 Pages. Price 2/- (by post 2/3).

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# **HEADQUARTERS CALLIN**

#### COUNCIL, 1950

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General Secretary: John Clarricoats, G6CL.

#### April Council Meeting

Resume of the Minutes of a Meeting of the Council of the Inc. Radio Society of Great Britain, held at New Ruskin House, Little Russell Street, London, W.C.1, on Tuesday, April 18, 1950, at 6 p.m.

Present.—The President (Mr. W. A. Scarr), in the Chair, Messrs. W. H. Allen, A. P. G. Amos, F. Charman, D. N. Corfield, W. N. Craig, V. M. Desmond, C. H. L. Edwards, J. W. Mathews, A. O. Milne, P. A. Thorogood, and John Clarricoats (General Secretary).

Apologies.—Apologies for absence were submitted on behalf of Messrs. L. Cooper and A. J. H. Watson,

Membership. Resolved

(a) To elect 79 Corporate Members, 19 Associates and 2 Junior Associates. (Total elected 100.)
(b) To grant Corporate Membership to 6 Associates who had

applied for Transfer.

Applications for Affiliation.

Resolved to grant affiliation to the Sheffield Amateur Radio Club and the Warrington and District Radio Society.

Commercial Stations in the 7 Mc/s. Band.

Reference was made to the continued operation of commercial circuits—notably broadcast stations—in the exclusively amateur portion of the 7 Mc/s. band. The Secretary was instructed to protest once again to the Post Office. (See page 422.)

Band Checking and Band Occupancy.

Arising from a consideration of the previous item, Mr. Mathews suggested that a group of qualified observers should be set up to furnish full details of commercial stations operating in the exclusive amateur bands, and also to check the occupancy of the amateur bands. Mr. Mathews considered that the information so obtained would prove of value to the Council in its negotiations with the Post Office.

The suggestions were supported by the Council and following were supported by the Council and following

The suggestions were supported by the Council and, following an enquiry from the Chairman, Mr. Craig agreed to organise the proposed group. (See page 422.)

Television Interference.

A statement reviewing the present position in regard to television interference was approved for publication. (The statement was published last month.—ED.).

Mr. D. L. Davies, GSQW.

A letter was submitted from Mr. D. L. Davies, GSQW, of Totton, Hants, wherein he asked that the Society should be represented at the hearing of his appeal to the Minister of Town and Country Planning against a decision of the Hampshire County Council not to allow him to continue to use his present lattice mast as a support for a rotary beam aerial.

Resolved to authorise Mr. Hawker to attend the hearing as an observer.

observer.

I.A.R.U. Congress

Full consideration was given to matters relating to the forthcoming Congress in Paris.

The meeting terminated at 9.50 p.m.

#### Representation

The following are additions to the list published last month:-Town and Area Representatives

Region	Town	Name, Call-sign and Address				
4	Spalding	F. S. G. Rose, G2DRT, 10 South				
5	South Hunts.	R. A. Harding, G3AKU, Tenterleas Road, St. Ives.				

Vacancies
Messrs J. H. Macdonald, G4GJ and R. Evenett, G3AGZ, have
resigned as Representatives for the towns of Bradford and Wood
resigned as Representatives for their successors should be Green respectively. Nominations for their successors should be made in the manner prescribed in the September 1949 issue of the Bulletin and sent to reach the General Secretary by June 30, 1950.

Buckinghamshire

The telephone number of the Buckinghamshire C.R. (Mr. B. Hayes) is Wolverton 2280.

#### R.S.G.B. Slow Morse Transmissions

B.S.T.		Call		kc/8.		Town
Sundays						
09.30		G6NA		1750		Guildford
10.00	::	G5XB		1950		Reading
22.00		G2FXA		1900		
Mondays		UZFAA		1300		Stockton-on-Tees
13.00		COLVE		1000		0 1 0
		G3AXN		1870		Southend-on-Sea
19.00		G3NC		1825	+ +	Swindon
19.30		G3ESP		1850		Wakefield, Yorks
20.00		G2AJU		1900		Stutton, Ipswich
20.00		G3DSR		1750		Derby
20.00		G2CLD		1775		Tunbridge Wells
21.00		G2BLN		1900		Bournemouth
21.00		GSVR		1850		London, S.E.2.
21.00		G3BHS		1820		Eastleigh, Hants
22.00		GSTL		1896		Ilford
22,30		G4GA		1896		Chingford
Tuesdays	**	OTOA		1000		Citingtora
13.00		G3AXN		1070		Conthond on Co.
19.00		G5XB	• •	1870		Southend-on-Sea
				1905		Reading
20.00		G12HLT	+.+	1900		Belfast
21.00		G3EFA		1855		Southport
22.00	**	G3ELG		1772		Rotherham-
22.00		G2FXA		1900		Stockton-on-Tees
22.30		G6JB		1820		Salcombe, Devon
22.30		G3ERD/P		1820		Derby
Wednesda	ys	Washington Contractor of	0.5050	ALCO ALCO		
20.00		G2NY		1850		Preston
20.00		G3AFD		1783		Southampton
22.00		G6NA ·		1840		Guildford
22.00		G3DLC		1800		Grays, Essex
Thursdays		OUDDIC		1000		Grays, Essex
18.00	٠	G3AXN		1870		Southend-on-Sea
19.00		GSNC				
				1825		Swindon
19.30		G2AQN		1850		Ossett, Yorks
20.00		G3NT		1805		Northallerton
22.00		G2FXA		1900		Stockton-on-Tees
22.00		G3ARU		1990		Wanstead
22.30		G3OB		1803		Manchester
22.30		G3ERD/P		1800		Derby
Fridays		PECANNESCH (CT.)				
13.00		G3AXN		1870		Southend-on-Sea
19.00		G3BLN		1900		Bournemouth
20.00		G2AJU		1900		Stutton, Ipswich
20.00		GSAKW		1860		Wirral
		GSLZ	• •			
20.30				1868		Gravesend
21.00		G3BHS	* *	1820		Eastleigh, Hants
22.30		G6JB		1820	++	Salcombe, Devon
22.30		G3ERD/P		1808		Derby
Saturdays		*************				
10.00	.:	G3FPS		1800		East Molesey
23.00		G3CHY		1800		Ashton-u-Lyne
23.00		G2FXA		1900		
23.00			••	1900	••	Stockton-on-Teo

ER AMATEURS ARE ASKED TO AVOID CAUSING INTERFERENCE TO THESE TRANSMISSIONS

Volunteers in districts not covered are invited to write to: Mr. E. H. L. Edwards, GSTL, 10 Chepstow Cresent, Newbury Park, Ilford, Essex.

### Fourth Annual

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# AROUND THE REGIONS

#### Babcock & Wilcox Staff Association Radio Society

A Contest for the Alpha Receiving Trophy commenced on June 1. The Contest is open to members of both B. and W. Societies. The award for 1950 will be based on the results of the next six months and is presented by Mr. G. A. Leicester, BRS18230.

Dumbuck Club Radio Section, is the title of the club recently formed at the Dumbarton works of B. and W. Mr. Janes, GM3AEC, is the Convenor.

#### Cambridge Amateur Radio Club

Mr. S. R. R. Kharbanda. G2PU, is to give a talk on "Amateur Acrials" at the next meeting of the Club (June 23, 8 p.m., The Jolly Waterman). Members will also be attending the Region 5 O.R.M. at Cambridge on July 9. The value of panoramic reception as an aid to amateur V.H.F. operation was stressed in an interesting lecture by G2FJD at the April meeting.

### EASTERN REGIONAL MEETING SUNDAY, 9th JULY, 1950 AT CAMBRIDGE

Assemble at Haigh Road for Demonstra-tions of Coloured Television by Pye Ltd., and Radio Model Control 11.20 a.m and noon Lunch, Cambridge Borough Restaurant, Petty Cury I p.m. Business Meeting or Conducted Tour of Colleges ... Tea and Raffle ... 2.30 p.m. ... \*\*\* 4.45 p.m. ... Station Visits ... 6 p.m. \*\*\* \*\*\* \*\*\*

Inclusive charge 8/-. Tickets from T.R.'s, C.R.'s or the R.R. (Mr. R. F. G. Thurlow, North House, Wimblington, Cambs.) not later than July Ist—please.

#### Chester Amateur Radio Society

The Society's new transmitter, operating under the callsign 3GIZ, is now regularly active. All R.S.G.B. members are The Society's new transmitter, operating under the callsign [3361Z, is now regularly active. All R.S.G.B. members are welcome to attend the weekly meetings held on Tuesday evenings (7.30 p.m.) at The Tarran Hut, Y.M.C.A. Grounds, Chester, Prospective members are asked to get in touch with the Hon. Secretary: Mr. H. Morris, G3ATZ, 24 Kingsley Road, Chester.

#### Coventry

To mark the increasing membership of the R.S.G.B. Group, arrangements have been made to hold Morse classes and a series of talks on passing the Radio Amateur's Examination. Preparations are also being made in connection with the forthcoming 144 Mc/s. Field Day. On May 20, twenty-one members visited the Physics Laboratory of Birmingham University where Mr. J. Symonds explained the Cyclotron and Synchrotron machines: the latter is fitted with a 1000-ton magnet!

#### Exeter Hamfest

To encourage closer co-operation between the widely-scattered Groups and Clubs throughout Region 9, the first of what is hoped may become an annual Hamfest was held at the Royal Clarence Hotel, Exeter on Sunday, May 21, 1950. The attendance of fifty included Messrs. H. Bartlett, G5QA, (R.R.); A. A. Barrett, G5UF (C.R. Dorsetshire); D. J. Beattie, G2WW (C.R. Cornwall); A. G. Wheateroft, BRS13958 (C.R. Devonshire); F. A. H. Wrigley, G2BDO, (C.R. Somerset); and parties from

North Devon, Plymouth and Torquay. G5JU of Birmingham was a welcome visitor from outside the Region. One of the highlights of the afternoon—an inter-district quiz for a miniature silver cup presented by G5QA—was won by Torquay: while G3ID of Dawlish was successful in a radio "treasure hunt." A programme of films and station visits helped to make the event one of the most enjoyable social occasions yet held in the South

#### Gateshead and District Amateur Radio Club

This newly-formed society with about 20 members already possesses the basis of a fine club station which is now being assembled. Morse and technical classes are in progress and six members intend taking the examination next May. The club is fortunate in having a lock-up room for apparatus, ample scope for aerials and good facilities for lectures and film shows.

scope for aerials and good facilities for lectures and film snows. Members also have the use of a cafeteria.

The chairman is Mr. J. Brown (BRS13800) and the Secretary-Treasurer, Mr. L. Blackle (G3DIJ), 109, Brighton Road, Gateshead, 8, will be pleased to welcome visitors and new members. Meetings are announced in Forthcoming Events.

#### Mansfield and District Radio Society

The Society has now been allotted the callsign G3GQC. A weekly "club night" is held on Tuesday evenings at the Westfield Folkhouse. Monthly meetings at the Swan Hotel are scheduled for July 2 and August 13 at 3 p.m. Details from the Hon. Secretary: Mr. F. Knowles, (G3DBF), 8 Victory Drive, Forest Town, Mansfield.

#### Midland Amateur Radio Society

During a lecture on "Human Vision and Television," Dr. Summer discussed the human eye and nervous system in relation to television; an unusual subject but one which proved of considerable interest. Meetings are held on the third Tuesday of each month at the Imperial Hotel. The July 18 meeting will be the second in the series of combined North and South Birmingham R.S.G.B. Group events.

Middlesbrough

Prospective members of the Middlesbrough R.S.G.B. Group should note that meetings are now held every Thursday, 7.30 p.m. at All Saints' Hall, Grange Road. A full programme is being arranged for the fortheoming season: details of which are available from the T.R. for Middlesbrough, Mr. H. Walker (G3CBW), 64, Ayresome Street. The Club looks forward to a period of increased activity and useful work at its new Headquarters.

#### North Kent Radio Club

R.S.G.B. members in the Bexley, Erith, Crayford and Dartford area are warmly invited to attend the meetings of the North Kent Radio Club, held on the second Monday in each month. The T.R.—Mr. Kenneth Chapman, (BRS17024), 327 Bexley Road, Erith—will gladly supply full details. A club station operates under the callsign G3EHT, and a local Field Day is planned for July 16.

#### South East London

A most successful demonstration of T.V.I. suppression was given by Mr. Louis Varney, G5RV during the course of a lecture on that subject which he delivered recently to the South East London R.S.G.B. Group.

Using the prototype of the T.V.I.-proof 50 watt transmitter to be described in the July issue of the BULLETIN he was able to show a picture on a standard make of Television receiver completely free from any trace of interference while keying the transmitter on 14 Mc/s. C.W. with 50 watts input.

The transmitting and television receiving aerials were separated by 20 feet, and the television receiver and transmitter were in

the same room.



EXETER HAMFEST, MAY 20, 1950. The goodly company that supported the Exeter Hamfest photographed against the background of the former Mol's Coffee House, established in 1596

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SELENIUM RECTIFIERS. H.W. 250 V. 60 mA., 4/6. 120 mA., 6/6. F.W. 6 or 12 V. 1·5 A., 10/6. 6 or 12 V. 4 A., 25/-.

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MAINS TRANSFORMERS. Our own make—12 months' guarantee. Input 200/240 V. Output 6·3 V. I·5 A., 7/6, post 9d. 6·5 x 6·5 V. 2 A., 25/6, post 9d. 4 V. 8 A., 25/6, post 9d. 300–0–300 V. 120 mA., 6·3 V. 3·5 A., 5 V. 2·5 A., 21/6, post I/-Also 350–0–350 at same price. Special Offer 230/4 or 6 V. 4 A., 6/9, post paid.

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NEW MINIATURE CONDENSERS in ali-cans, 450 V. D.C.W., 8  $\mu$ F., 3/6. 8 × 8  $\mu$ F., 16 × 8  $\mu$ F., and 32  $\mu$ F., 4/9 each, post paid. 32 × 32  $\mu$ F. 350 V., 6/6, post paid.

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M/C MICROPHONES. 31,", round, with pressel switch, 5/-, post 6d. Transformer to match, 5/-, post 6d.

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POWERFUL MINIATURE MOTORS with geared spindle. 24 V. or 110 V. A.C./D.C. 3\(\frac{3}{4}\)" \times 2\(\frac{1}{2}\)" \times 2, 8/6, post

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NEW 250 W. Double Wound TRANSFORMERS. 230 V./ 115 V. Made by G.E.C. in grey steel cases. New, 47/6 each, carriage paid

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large calibrated slow/motion dial, tuning meter 0-5 mA., attenuator, etc. A really first-class receiver at only £4 19s. 6d., complete with valves. Carr. and packing 10/-.

POWER PACK TYPE 3 for above receiver, input switched 200-250 V. A.C. 50 c/s. Output 250 V. 120 mA. D.C., with two moothing chokes, fitted D.C. voltmeter 0-300, milliammeter 0-150, switch, fuses, etc. Standard rack mounting a superb job at £4 19s. 6d., carr. and packing 10/-.

R.F. AMPLIFIER. 100-124 Mc/s., using two VT62 triodes in push-pull, link coupled output circuit with grid and cathode current meters, individual valve switching VR67 monitor, with

current meters, individual valve switching VR67 monitor, with jack. Standard rack mounting, brand new, less valves, our

CONDENSERS, BLOCK TYPE. 8 JF. 750 V. D.C., 10/each. 4µF. 750 V. D.C., 4/6 each. Brand new.

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Variable Condensers, twin-gang 500 µµF. with slow motion drive, 8/-.

Three gang 500 µµF., direct drive, 7/6.

Transmitting valves, type 832, 19/6.

Paxolin Coil Formers, 1", 7", 1", 1/-, post free.

Twin gang midget condensers, 25 + 25, 50 + 50 and 75 + 75  $\mu\mu$ F. 2/6 each.

Labgear Viewing units, two only, £10/10/-

Scott "Imperial" chassis, power pack, 15" speaker, 2 tweeters, 23 valves, all wave, chromium finish, £50.

Radiogram Cabinet, walnut, 4' high, 2' 9" wide, I' 8" deep, fitted with Collaro Record Changer, £22/10/-, carriage extra.

Baird T5C Console Televisor, new 15" tube, walnut cabinet, £35, carriage extra.

VRL 250 communications receiver, 19 valves, 1.5-28 Mc/s., good condition, £21.

H.R.O., new condition, 9 coils, 9" speaker in matching cabinet. £55. Complete with A.C. power pack.

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#### South Shields Amateur Radio Club

Great efforts are being made by the South Shields Amateur Great efforts are being made by the South Shields Amateur Radio Club to form a local 420Mc/s. network, but receiver snags are proving difficult to overcome. Meanwhile the 25 members enjoy the use of the Club transmitter which operates under the callsign G3DDI. Meetings are held every Friday (8 p.m.) at Trinity House, Laygate; new members are always welcome. Hon. Secretary is Mr. G. G. Duff, G3EJD, 50 Sutton Way, Cleadon, South Shields.



This Club, with a widely scattered membership, recently This Clib, with a widely scattered membership, recently held one of its twice-yearly Combined General Meetings, and in this case, the official business was followed by a dinner at Penzance, to which the ladies were also invited.

The President, Mr J. Watson, GSAET, after welcoming the guests, read a message from Mr. John Clarricoats conveying the best wishes of the Parent Society to the Club. The President

mentioned that whilst every member of the Club was also an



HEREFORD HOBBIES EXHIBITION. Local members of the R.S.G.B. and the Hereford Amateur Radio Society provided an excellent display of amateur equipment at a Hobbies Exhibition held during May. Two exhibition held during May. Two transmitters were demonstrated on 'phone and C.W.: a 150-watt station built by Mr. Max Conu, BRS15036 (C.R. for Hereford), operating under the call G3ESY/A; and a 25-watt rig built and operated by G2DFL. Other amateurs loaning apparatus included G3EYH and G3NA who also designed the stand. The Hereford T.R.—Mr. T. B. Atkins, BRS7280 designed the stand. The Hereford T.R.—Mr. T. B. Atkins, BRS7280— was responsible for the general organisation.

#### Thames Valley Society

At the May meeting a large number of members heard Mr. Stanley Ward, G2QS, give an interesting talk on "Instrument Measurements," emphasising the theory and practical uses of A.C. Bridges. The speaker at the July meeting will be Dr. Frank Aughtie, G6AT, whose subject will be "Electronics." A welcome is extended to non-members who would care to attend. Details from Mr. A. Mears, GSSM, 4 Broadfields, East Molesey,

During N.F.D. the Society co-operated with the East Molesey town group.

#### Torbay Amateur Radio Society

Members of the Society recently attended the R.S.G.B. "Hamfest" at Exeter and succeeded in winning a miniature silver cup, presented by Mr. H. A. Bartlett (G5QA), as the result of a "quiz." Summer activities will health? quiz Summer activities will include a visit to a transmitting station. Visitors are invited to the meetings held on the third Saturday in each month at the Y.M.C.A., Castle Road, Torquay (7.30 p.m.).

#### Wakefield Amateur Radio Society

After a successful winter season the membership stands at 48 including 10 licensed transmitters. During the summer informal meetings are to be held in Carr Lodge Park every fortnight (see Forthcoming Events). Activities being planned include:—visit to B.B.C. Station, Moorside Edge; Field Day, late in August; social outing to Knaresborough, end of July; visits to factorles as well as to the Yorkshire Hamfest at Bridlington on July 9. A printed programme of events for the winter will be available in August for distribution to members and interested parties. Slow Morse transmissions on "Top Band" are also planned.

#### Warrington Radio Society

Provisional arrangements have been made for a local inter-club "top-band" telephony contest to be held on Sunday, September 24. Operating periods will probably be from 3-5 p.m. and 7-10 p.m. and there will be a section for listener mem-bers. At the June 19 meeting G3LZ will describe his 3 cm. experiments. Meetings are held on the first and third Mondays of each month at the Sea Cadet H.Q.

R.S.G.B. member, about 75 per cent, of the total R.S.G.B. membership in Cornwall were also members of the Club.
Proposing a toast to the Club, Mr. K. Mildren, G3FVD, also welcomed the guests and spoke of the value of the Club to those interested in Amateur Radio throughout West Cornwall. In his reply, Mr. Watson foresaw the return of the day when we should again have to make a large portion of our own equipment.

should again have to make a large portion of our own equipment. A toast to the R.S.G.B. was proposed by Mr. C. H. N. Elliott, BRS.15699, who briefly reminded his listeners of all that had been done and was, in fact, at that moment, being done for the Amateur Radio movement by the Council and Headquarters staff. He welcomed the presence of Mr. H. A. Bartlett, G5QA, R.S.G.B. Regional Representative. Mr. Bartlett, in his reply, congratulated the Club on its progress and enthusiasm, and asked for strong support at the O.R.M., to be held at Plymouth, in Sentember. He spoke also of the excellent relationship which asset for stope support at the Co. R. M., to be first a region of the excellent relationship which exists between the R.S.G.B. and the Post Office.

Mr. D. J. Beattie, G2WW, R.S.G.B. County Representative for Cornwall and Chairman of the Penzance Group of the Club,

in proposing a toast to the guests spoke warmly of the assistance he had received from Mr. Bartlett, and of the desire of his Club for close co-operation with the Hayle and District Club, whose Secretary and Treasurer were present as guests. He extended a welcome to Messrs. Carter and Tiddy, of the G.P.O. Engineering Department, and spoke of their courtesy and kindness in carrying out their duties.

out their duties.

The dinner was followed by light entertainment, and the presentation of prizes kindly donated by Mr. W. W. Shipton, G3AVX. There was also a raffle for prizes donated by G3DQ. Mr. J. H. L. Cable provided amplified sound and music with the aid of his Williamson amplifier.

#### West Kent Radio Society

Fortnightly meetings of the Society are held at Culverden House, Tunbridge Wells. Recent lectures have included "F.M. and the Amateur," by F. M. Smith, G8KG (Vice-President), and "Two-Metre Development," by W. H. Allen, M.B.E., G2UJ (President), while a debate on "Television" provoked lively discussion. All persons interested in radio are welcome: lively discussion. All persons interested in radio are welcome: details from the Hon. Secretary, Mr. A. C. Pollard, 28 Greentrees Avenue, Tonbridge, Kent.

REGION 9 STALWARTS.
From left to right: D. Beattie,
G2WW (Cornwall C.R.), F. Wrigley,
G2BDO (Somerset C.R.), A. A.
Barrett, G5UP (Dorset C.R.), Herbert
Bartlett, G5QA (Region 9 Representative), E. G. Wheatcroft, BRS13968
(Devon C.R.), T. W. A. Smith,
G3EFY (Exeter T.R.). A group taken
at the group Fereier Hamfers at the recent Exeter Hamfest.



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The following are brand new but in plain cartons or unboxed:—6H6GT, 1/6; 2X2, 2C26, 2C26A, 4/3; 65K7, 4/9; 6B8, 5/-; 6F6G, 5Z4, 5U4G, 5R4GY, 65L7GT, VR105, 5/9; 6J7, 6K8, 6V6GT\*, 6Q7GT\*, 6/-; 6Y6G, 6/3; 6C4, 65N7GT, 6/6; 6L6G, 7/9; 6AK5, 9/-.

\* Denotes Manufacturers' Surplus.

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**TRANSFORMERS**, 230 V. A.C. Mains, similar 150-0-150 V., 0, 10, 20, 30 and 40 V. all at 70 mA., size  $2\frac{1}{4}$ "  $\times$   $3\frac{3}{4}$ "  $\times$   $3\frac{3}{4}$ ". No heaters.

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- "I am an absolute beginner, but knowing of the efficacy of the Candler System, I should be glad if you would forward your 'Book of Facts."
- "I am just a beginner of Morse and I would like to improve. I have heard glowing reports of your system and am very interested."
- "Kindly send me details of your 'Scientific Code Course for Beginners." I know enough of your system and its merits not to require any testimonials."

The following extracts are from letters sent us by Candler students-

- "I would like to take this opportunity of thanking you, not only for the Course, which I consider to be unbelievable 'value for money,' but also for your kindness and personal attention." REF, 3120. N.H.
- "I have successfully passed the P.M.G. amateur's licence test and have been allotted my callsign. I took it with ease, after completing lesson 3."

  REF. 3301. V.H.T.
- "Have passed out on the final Morse exam, here with a plain language speed of 30 w.p.m. and code/letter groups mixed at 28 w.p.m. Sending at 30 w.p.m. REF. 3601. E.L.
- "I passed the code test to obtain my Amateur licence with flying colours. The Telegraph Inspector wanted to know where I had learnt to do Morse with such precision and co-ordination. I could do nothing but give all the honours to the Candler System. . . . At present I am able to get a good 25 w.p.m. without any faltering. . . . It will always be a pleasure and an honour to recommend the Candler System to anyone who might require it." REF. 2566. P.J.L.

There are Candler Morse Code Courses for Beginners and Operators. Write for the Candler "Book of Facts." Free on request.

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A.C. VOLTAGE: 10 V. to 2,500 V.

Model 1. 0.1 ohm to 5 megohms. Model 2. 0.1 ohm to 20 megohms.

The instrument can be supplied, if required, fitted with magnetic screening for protection against stray magnetic fields. It will stand up to heavy overload and is protected by an automatic cut-out.

In addition to its multi-range facilities it can be used as a Galvanometer, for which purpose the zero can be offset to the extent of 30% of full-scale deflection by a simple knob adjustment.

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#### West Somerset Radio Society

A demonstration at Taunton of 13 cm. technique, by Messrs. T. N. and J. Archard, was preceded by a programme of R. S.G.B. and British Electrical Development Association films. At Minehead, Mr. D. J. Tuffin described his 27 Mc/s. equipment for the radio control of model aircraft. A combined visit to Burnham Radio G.P.O. Coast Station should have taken place shortly before these netters are restricted from the product of the second of these notes appear. An attempt may be made to organise meetings in the Bridgwater area.



Southend amateurs met on April 21 for their Annual Hamfest. Left to right (back row):—G2BHA, 6CH, 5XI, 6MH, 3AXN, BRS16814. Front row:—G3CQL, 3BUJ, Mr. Bridges, G3BSI, Mr.Ward.

#### Wirral Amateur Radio Society

The Society continues to meet on alternate Wednesdays (7.30 p.m.) at the Birkenhead Y.M.C.A. Recent talks have been given by G2OA, G2YS and G3ERB, who has just spent six months in the United States. At the n.ecting on June 21, G2AMV will speak on "A Practical Approach to V.F.O. Design." A D.F. Contest was held at the beginning of May and a second is due to take place on July 2, when members of other local clubs are invited to participate. The Hon. Secretary is Mr. R. A. Browning, 24 Norbury Avenue, Belrington, Wirral.

#### Visit to Sweden

Mr. H. Andrews, G5DV, 175 Moorland Road, Weston-super-Mare, who is organising a trip to Stockholm, Sweden, during the first two weeks in August for R.S.G.B. members and their friends (see page 237 of January, 1950, issue of the BULLETIN), has three vacancies, due to late cancellations. The party will comprise approximately 25 persons. Interested members should write immediately to G5DV for full details.

## Ten Minute Quiz

### Answers to the questions set on page 415.

- To avoid degeneration and hum.
- 2. Reduce it.
- 3. A loudspeaker or earphone.
- 4. 807 = 6.3 V. at 0.9 A.
- $832 = 6 \cdot 3 \text{ V. at } 0 \cdot 8 \text{ A.}$ 
  - 813 = 10 V. at 5 A.  $6V6 = 6 \cdot 3$  V. at  $0 \cdot 45$  A.

  - 6L6 = 6.3 V. at 0.9 A.955 = 6.3 V. at 0.15 A.
  - 0Z4 has a cold cathode.
- 5. Non-interference with official stations who share the bands in question.
- About 500 ohms (but the resistance varies with the temperature of the filaments).
- By heating the perspex uniformly by immersing it in warm (not hot) water.
- 9. VP6, Barbados. VP7. Bahamas. British Honduras.
- 10. Hartley is the name given to a type of oscillator; all the other names refer to types of aerials.

#### TECHNICAL ARTICLES WANTED



#### Self Clipping Modulator

DEAR SIR,—I have had some enquiries about the self-clipping modulator circuit referred to in my letter which you published recently, and as other members may be interested, here are a

recently, and as other members may be interested, here are a few details.

The basis of the system is the fact that it is impossible to obtain an instantaneous peak output voltage from a push-pull stage which is greater than twice the H.T. voltage. This can be proved quite easily. A practical self-clipping modulator using the system consists of a push-pull stage with negative feedback, and the modulation transformer ratio is found from the formula of the property of the pro

 $\frac{2 \times HTmod}{2 \times HTmod}$ , for 100 per cent modulation, where HTmod is the HTpa, for 100 per cent modulation, where HTmod is the modulator H.T. voltage, and HTpa that applied to the PA stage.

If it is desired to clip at a lower modulation level, the ratio given by the formula is divided by the required modulation percentage expressed as a decimal, e.g. by 0.95 if 95 per cent. peak modulation is desired.

As an example, suppose a P.A. stage drawing 100 mA. at 500 volts is to be modulated by a pair of valves with 285 volts on the plates. The transformer ratio will be

$$\frac{2 \times 285}{500}$$
: 1, or 1.14: 1,

for 100 per cent. peak modulation.

For 95 per cent. peak modulation, the ratio would be

$$\frac{1\cdot 14}{0\cdot 95}$$
: 1, or  $1\cdot 2$ : 1.

These figures assume that there are no losses in the transformer or in the filter which must follow it, and allowance will have to be made for these. The effect of the losses will be to reduce the available peak modulation depth, so that ignoring them will only result in lower modulation level than calculated, and can do no harm.

do no harm.

The system has the great advantage that it can be set up without an oscilloscope, and with the aid of very few measuring instruments, if the transformer ratios are known. The use of negative feedback is essential to obtain a sharp clipping action, and this also enables greater output power to be obtained from the modulators. A pair of 6V6s will modulate a 50 watt P.A. stage, whilst for a 100 watt P.A. stage a pair of 6L6s, which need not be run in Class AB2, will be ample.

It is believed that this system has not been described in print in this country, and although similar systems have been described.

in this country, and although similar systems have been described in the U.S.A., full design data was not given.

Yours faithfully.

79, Hayton Grove,

ALAN G. DUNN, G3PL.

79, Hayton Grove, Hull, Yorks.

#### Television Interference Suppression

DEAR SIR,—May I reply to Dr. Aughtie's letter published in the May issue?

I entirely agree with him on the subject of correct push-pull-

I entirely agree with him on the subject of correct push-pullamplifier design for minimum even harmonic output. But, surely,
it is a sine qua non of such design that grid, cathode and anode
circuit centre-tap return paths should be of absolutely minimum
inductance? I specifically mentioned the necessity for effective
R. F. by-passing in my article to which he refers.

The use of a Faraday shield, or its modern version—the coaxial
cable link coil—is, naturally, a further insurance against even
order harmonic transference into the aerial circuit by electrostatic coupling and should be used.

With regard to Dr. Aughtie's comments on the integral series
trap circuit, while I am in agreement with his remarks and
consider his expansion of the point most interesting, I must point
out that I never stated that the optimum harmonic rejection condition of such a circuit would track over an extended frequency
range. Clearly, it will not do so. However, it can give usefur
results over the limited range 14 to 14 \*4 Me/s. (fundamental) and,
provided the main tuning capacity, C, is arranged to be of the same
value for fundamental resonance in each of several amateur bands,
then it will also function effectively on those bands. Its main use then it will also function effectively on those bands. Its main use is as an additional harmonic reducing device, to be employed particularly in cases where "every little helps "—i.e. third harmonic suppression of 14 Mc/s. in the A.P. (Channel 1) area.

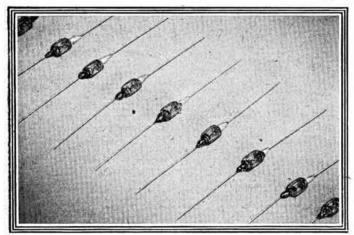
Yours faithfully,

LOUIS VARNEY, A.M.I.E.E. (G5RV).

Chelmsford, Essex.

(Continued on page 441)

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I. Provides a high frequency Diode requiring no heating power.

Very small in physical size.

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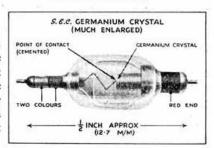
7. Indefinitely long life.

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3" MAGSLIPS, suitable for beam indicators, 50 V. A.C., 17/6 pair. CERAMIC SWITCHES. 3-bank 2-way, easily modified to 12-way, make fine 150 W. P.A. turret, 5/- each or 3 for 12/6. Similar but 2-bank, 3/6 each or 3 for 9/-.

METERS. 350 mA.,  $\frac{1}{4}$  A.,  $2\frac{1}{4}$  A., all TC 2", 4/6 each. Transmitting condenser, 146  $\mu\mu$ F. 4 kV., 3/3. CH OKES, midget 5 H., 2/3; swinging 3·6/4·2 H. 150 mA., 5/6; 6 H. 70 mA., 5/6. See last month for Dural Tube, Ribbon Feeder, Copper Wire.

We stock EDDYSTONE - DENCO - RAYMART Components. 1801 PERSHORE ROAD, BIRMINGHAM, 30. (Kin. 2797.) RECEIVER 18. A four-valve, battery operated superhet, covering 6-9 Mc/s., and suitable for converting for other frequencies. Complete with circuit, connecting data and suitable batteries, 27/6.

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The Headquarters' Station, GBIRS, transmits daily for two minutes at each hour from 1800 B.S.T. to 0900 B.S.T. on a frequency of

## 3500.25

when the following message is sent automatically in Morse Code at a speed of 12 words per minute:

CQ de GB1RS QRG 3500 · 25 kc/s VA GB1RS

#### Measuring Meter Resistance

Dear Sir,—The standard laboratory method of measuring the resistance of a meter is rather simpler than that suggested by Mr. Hughes (p.338 R.S.G.B. Bulletir, April, 1950) though it suffers from the possible disadvantage of requiring a resistance box

The meter is connected through the resistance box to the accumulator, and the resistance is adjusted to give a reading well up the scale :



The resistance is then increased until the current through the meter is halved:



The equations are obviously  $E = (r + R)i = (r + R + R^{1})i/2$ 

which gives  $r = R^{1} - R$ 

The graphical method may give a more accurate result in some cases, since any irregularities in the calibration can be smoothed

Harpenden, Herts.

Yours faithfully, JOHN B. ROSCOE (G4QK).

#### QLM or not to QLM?

DEAR SIR,—Much has been written on present DX working difficulties. Suggestions, rules, ideas and what-not have been expounded—in fact if all were observed the really conscientious operator would never press the key as he would know one or other were bound to be violated.

QRM is without doubt the major problem of modern DX. There is no hope of the number of stations decreasing—rather the reverse. Consequently if a large number of stations have to be accommodated, then the only possible way to reduce QRM is to see that they are on the air for the shortest possible time in one station calling another. Calls must, therefore, be kept short. Calls, however, can only be kept short if the station being called knows for certain he is going to find his "customers"—on his own frequency—in other words QMF.

At this point QLM dies a natural death. Surely no DX station would say to his fellow amateurs, "Now you chaps spread out over 40 kc/s. of this 100 kc/s. band. QRM all the other follows in that 40 kc/s. section but don't QRM my channel." No I don't believe any fellow amateur seriously hoping for improved conditions would say that. Rather let the call be "One Q80, one channel." Obviate searching for replies thus reducing the calling period and leave the other channels for the rest of the DX. Live and let live.

CHAS. J. OLIVER (GW5SL).

Colwyn Bay, North Wales.

#### Local Meetings

-I have read with interest the letters of G5GQ and BRS Mead. As one who has spent much time, money and energy in organising and speaking to R.S.G.B. meetings, my heart goes

Had I received a reply asking what we were doing about 21 Mc/s. I would have replied "Nothing—like yourself, sitting back, looking after Number One—and criticising."

It is my experience that the more genuinely busy a man is, the more readily does he give up his time to attend meetings and so help the other fellows. The persistent stay-aways are generally the eternal Blurb-wallahs if licensed and Card-cadgers if not. It is largely because they have less discussion and co-operation with their fellows that they never "grow up."

If you have nothing of interest to say to others at a meeting; if you have no interest in what is going on around you; if you are too clever to talk down to them or too dim to understand them, it is time your licence was taken away. You are no longer a ham.

a ham. In conclusion, may I appeal for co-operation between town groups in the case of the smaller towns. Meetings held alternately in two adjacent small towns will produce bigger audiences, more discussion, better friendships, and more worth while activities. There must be many small groups which exist in name only, or nearly so, yet in alliance with a neighbour group, could form a virile and interesting organisation.

Yours sincerely, H. S. Chadwick, GSON, 25 Raines Avenue, Worksop, Notts.

Dear Sir,—As honorary secretary of our local radio society, I endorse G5GQ's point of view expressed in the April issue of the Bulletin. In my opinion every amateur (both transmitting and receiving) should support his local Society and the R.S.G.B. whether able to attend the local meetings or not. After all it is the R.S.G.B. and the local societies which have disseminated radio knowledge and technique and made it possible for the amateur to enjoy his hobby in whichever way he chooses.

I feel sure if any "ham" not now a member could read "Headquarters Calling" and "Around the Regions," he would realise how much is being done for him and would write immediately for a membership application form.

Yours faithfully. R. S. Babbs, B.Sc.

Kingston-upon-Thames.

DEAR SIR,—In reply to BRS18249 (May issue), I am not interested in the organising and/or social side of Amateur Radio. Instead, in common with many other active amateurs, I regard any services I perform in those fields to be a duty, and a very worthwhile duty if they help in any way to preserve the amateur bands. These are our territorial rights, which we must fight for

bands. These are our territorial rights, which we must light for and guard constantly. Suppose, for example, that a shut down were imposed during T.V. hours.

Whilst our BRS friend's presidency and chairmanship of a Rhythm Club is no doubt interesting and a proof of his devotion to public work, I fail to see its connection with Amateur Radio. Neither can I understand his logic in referring to those who prefer the collective way and others who "belong to the R.S.G.B. because of the benefits it confers on them (and the money it saves them) but have not the inclination and/or the time for attending meetings." meetings

meetings."

Surely the very fact of belonging to the R.S.G.B. means a belief in collective thought and action? We, the members, are the R.S.G.B., and what we take from it is relative to what we put into it. The limbs do not normally work independently of the intelligence, although, of course, I cannot speak for Jam Sessions. One comment is his after-thought, expressing a fear that I should be in a fix if I had 100% attendance. Let me hasten to assure him that such a miracle would produce no accommodation problem since obviously it would have been considered long before writing my first letter.

writing my first letter.

Yours faithfully, Basil Wardman (G5GQ).

London, N.W.3.

#### BULLETIN CONTRIBUTIONS

- Since July, 1925, the BULLETIN has aimed at providing up-to-the-minute news and information on every phase of Amateur Radio. This objective can only be achieved if members are prepared to furnish details of their experimental and constructional work.
- Afticles on a wide variety of Amateur Radio topicsboth transmitting and receiving are always welcome and will receive the most careful Editorial consideration.
- New circuits, ingenious hints and tips, successful aerial systems and photographs of station layouts are invited: Editorial assistance will be given if the subject is of sufficient general interest.
- To avoid later disappointment, authors are urged to submit a synopsis of full-length articles at an early stage.
- The Society purchases the copyright of BULLETIN contributions at the rate of £2 2s. 0d. per 1,000 words (£3 3s. 0d. per 1,000 words for highly original articles.)

Now that paper restrictions have eased, there is a growing need for sound technical articles. Can YOU help to make the BULLETIN the mirror to amaceur progress in this country?

FOR THE ADVANCEMENT OF AMATEUR RADIO.

#### Around the Trade

Following the success of their series of film strips on "The Radio Valve," Mullard Electronic Products Ltd., have recently introduced two new strips in colour describing the "mechanism" of television and the general features of television receiver circuits. They are being distributed by Tartan Filmstrips, price £1 complete with summarised lecture notes. Detailed lecture notes are available from the Mullard company, either for use as a besig for reconstript descended expensive. either for use as a basis for more extended lessons, or for verbatim delivery before scientific or radio societies. The *Mullard* Educational Service is at all times willing to assist teachers and

Educational Service is at all times willing to assist teachers and lecturers by providing additional technical data.

"Television" Part I (Number 7 in the Mullard Series) comprises 18 frames, and describes the basic principles of television transmission and reception. It is suitable for senior classes in secondary schools and as an introduction to the subject of television in Technical Colleges, Training Centres, Radio Societies and Radio Trade Associations. "Television" Part II (Number 8 in the Mullard Series) comprises 30 frames, and develops the stheet in more detail

subject in more detail.

#### V.H.F. TECHNIQUE

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PRICE 3/6 (By post 3/9) FROM R.S.G.B HEADQUARTERS

The General Electric Co., Ltd., announces two additions to the range of Osram miniature valves: the X109 and the N19.

The X109 is a high efficiency triode-hexode frequency changer on a miniature B9A (noval) base and completes the range of Osram D.C./A.C. miniature valves designed for series heater operation with a current of 100 mA. All other valves in this series have B7G bases. The X109, however, has been mounted on a B9A base so that heater and cathode connections can be separate. This permits the frequency changer to be "one up" in the series heater chain, and the double-diode-triode to be wired at the "earthy" end of the chain to minimise hum.

The N19 is a 1·4 V. battery output pentode on a B7G base. The filament is centre-tapped to enable the dual rating of 2·8 V., 0·5 A.; or 1·4 V., 0·1 A. to be obtained when the valve is used in battery/mains receivers. It is equivalent to the American 3V4 and completes the range of Osram battery miniature valves, which comprises: X17 (=American 1R5) frequency changer; W17 (=American 1T4) H.F. Pentode; ZD17 (=American 1S5) single diode pentode; N17 (=American 3S4), N18 (=American 3Q4) and N19 (=American 3V4) alternative output pentodes.

## Silent Kers

We record with regret the death at a comparatively early age of Adrian Rosario, CR9AN, of Macao. In prewar days he operated as VS6AN when his station became one of the best known in the Empire.

His passing will be felt keenly throughout the world of

Amateur Radio

It is also our sad duty to record the death of Martin George Bourke, B.E.M., GC2AOU in London on April 7. Winner of the B.E.R.U. Receiving Contest in 1938 and runner-up in 1937 and 1939. 2AOU was one of the outstanding receiving stations of the 1930's. During the war he spent several years in the U.S.S.R. and later, as a member of the Diplomatic Wireless Service, was stationed at Bucharest, from whence he had recently returned owing to the serious illness of his wife. His remarkable operating ability and quiet efficiency will long be remembered by his friends and colleagues. Sincere condolences are offered to his wife and parents. his wife and parents.

The sudden death is reported of William G. H. (Bill) Brown, G5BK, of Cheltenham. A pioneer amateur active since the early 1920's, he was widely respected for his kindly personality and his readiness to encourage newcomers. Mr. Brown played a leading role in the foundation of the Cheltenham Amateur Radio Society which is to perpetuate his name in the annual award of a challenge cup. Only a few hours before his death, G5BK was on the air testing equipment for N.F.D. Engaged for many years in the printing trade, he leaves a wife and son to whom our deepest sympathy is proffered. G3BCC.

Also with deep regret we record the passing on May 6 of Everitt ("Ev.") Allmore, G3AUH, of Codnor, Derbyshire at the early age of 33. Active in almost every branch of Amateur Radio, his kindness and consideration for others earned him the respect and affection of all with whom he came in contact. His rotary beam and rhombic aerials helped him to form many lasting friendships throughout the world, whilst a warm welcome always awaited those who visited his station. To his wife and family we extend our symmetry, sharing in their tracits family we extend our sympathy, sharing in their tragic G3AQX. loss.

### R.S.G.B. BULLETIN (JULY 1950) Silver Jubilee Issue

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W. R. CRAWFORD, Cumberland House, Woodbridge, Suffolk. B. F. DENTON, 49 First Avenue, West Molescy, Surrey. P. DUTT, 43 Anson Road, Tufnell Park, London, N.7.

H. E. HRYMAN, Redlands, South Holmwood, Surrey. B. E. HOGBEN, Cardrona, Minnis Lane, River, Dover, Kent. R. J. HOWELL, 20 Mess, H.M.S. Diadem, c/o F.M.O., Chatham, B. KENNEDY, 102 Grove Road, Chadwell Heath, Romford, Essex. J. LITTLEJOHN, Skaith, Newton Stewart, Wigtownshire, Scotland. J. A. LUCKEN, 31 Bamford Avenue, Alperton, Wembley, Middx. N. O. MILLER, 10 Rom Crescent, Romford, Essex. W. G. MILLS, 16 Castle-view Road, Knock, Belfast. A. H. PAUL, 54 Northgate Road, Crawley, Sussex. A. R. PENN, 15 Woodbrook Terrace, Burry Port, Nr. Llanelly, South Wales.

R. L. POULTER, 80 Ellesmere Street, Moss Side, Manchester, 16. RAMSBOTTON, Inglewood, Queen's Drive, Newton-le-Willows, Lancashire.

Lancashire.

D. WALLACE, 6 Horncastle Road, Moston Lane, Man-

W. D. WALLACE, 6 HOTHCASTIC ROAD, MOSTON LAME, MA chester, 10.

A. M. SMITH, 21 Hamsey Green Gardens, Warlingham, Surrey. C. C. SMITH, 70 Leed's Road, Newton Hill, Wakefield, Yorks. M. P. SQUANCE, 14 Bendigo Road, Dewsbury, Yorkshire. S. R. WHINCUP, 47 Derwent Crescent, Stammore, Middlesex.

#### British Empire Receiving Stations

Due to an error certain British Empire Receiving Numbers have been duplicated. A corrected list of numbers issued since July, 1949, is published below:—

July, 1949, is published below:—
Mohammed Mansoor, A.M.I.E.E., c/o M.E.S. Construction School, Rawalpindi, Pakistan.
R. N. Joyce, c/o No. 4 Forces Broadcasting Station, Lakatamia, Cyprus.
K. C. WHITLEY, 19 Currong Street, Reid, Canberra City A.C.T., Australia.
W. R. DUFFIN, c/o P.O. Box 2123, Calcutta, India.
K. SRINIVASAN, No. 4 Tirupparkadal Street, Mannargudi, Tamjore District, South India.
P.O. T. G. BLACK, P.O.'S Mess, R.N. W/T Station, North Front, H.M.S. Rooke, Gibraltar.
U. LLATIL, Wireless Operator Mechanic, Petroleum Development, Bahrein, Persian Gulf.
A/C P. Kelly, R.A.F. Station, Athalassa, Nicosia, Cyprus A/C.P. Kelly, R.A.F. Station, Athalassa, Nicosia, Cyprus B. P. Box 1993, Nairobi, Kenya. On leave at 15 Montrose Avenue, Whitton, Twickenham.
K. RICHARDS, P.O. Box 2466, Johannesburg, South Africa.
D. GRIEVE, c/o P.W.D., P.O. Box 662, Nairobi, Kenya.
L. WILDMAN, c/o S.T.C., Isis Building, Sharia Lazogli Garden City, Cairo, Egypt.
B. K. M. CHEMBOLLI, Foreman Wireless Mechanic, Petroleum Development, Bahrein, Persian Gulf.
L. K. A. TOWNSEND-GREEN, H.M.S. Triumph, c/o G.P.O., London.
CAFT, J. MONTALTO, R.M.A., 10/2 Prince of Wales Junction,

London CAPT. J. MONTALTO, R.M.A., 10/2 Prince of Wales Junction, 765

CAPT. J. MONTALTO, R.M.A., 10/2 Prince of Wales Junction, Sliema, Malta.
W. E. V. PALMER, H.B.M. Embassy, Athens, Greece.
D. DUMBLETON, H.Q. Wireless Regt. (T/M Section), Royal Signals, M.E.L.F.3.
G. R. RAMALIGAM, 6 Dorfaiswamy Mudly Street, Krish napet, Madras, 5.
R. ARROWSMITH, Transmission Section, Eng. Branch, G.P.O., Brisbane, Australia.
M. B. BROWNE, Ragotyllle Village, West Bank, Democras. 767 768

769

M. B. Browne, Bagotville Village, West Bank, Demerara,

British Guiana.

RADIO-ELECT. W. G. LAMB, Cape South W/T Station, c/o F.M.O., Simonstown, C.P., South Africa.

Correction to List Published Last Month

GM3CCZ Should read GM3GGZ, J. P. RYRIE, 767 Pollokshaws Road, Glasgow, S.1.

Denotes transfer from Associate Grade.
 † Re-elected to membership.

## EXCHANGE AND MART SECTION

ADVERTISEMENT RATES. Members' Private Advertisements 2d. per word, minimum charge 3/-. Trade Advertisements 6d. per word, minimum charge 9/-. (Write clearly. No responsibility accepted for errors). Use of Box number 1/6 extra. Send copy and payment to Parrs Advertising Ltd., 121 Kingsway, London, W.C.2.

A DVERTISER offers 70s. for H.R.O. 20-metre bandspread coil or will part exchange general coverage similar coil. Other coils also wanted.—Box 274, PARES, 121 Kingsway, London. W.C.2.

AR88 (540 kc/s.-32 Mc/s.) For Sale or exchange for smaller receiver and cash; S.640, BC.348, or similar.—Box 248, Parrs, 121 Kingsway, London, W.C.2.

BC/348 Receiver with mains Power Unit. Perfect condition, £12. Mains Power Unit—Electronic voltage regulation, £5. tfor Heterodyne Wavemeter and 100 kc/s. standard. (A.R.R.L. Handbook, 1945.) Highest grade components, £5. V.F.O. (Franklin), £2.—WILSON, 57 Hotspur St., Tynemouth, North Shields. North Shields.

BC3480, built-in P/P, A.C., "8" meter (0-250 microammeter), external 3½ in. speaker, smart cabinet. 74-page instruction manual. Spare set of new valves. R.F.24 unit. Components and conversion details for ten metres. 5-valve streamline superhet Marconi TD11DA A.C./D.C. portable, 188-580 metres. £20 for the lot.—G3CCX, PETER CRAW, Sea Breezes, Harsfold Road, Littlehampton, Sussex. [258]

BUNGALOW in Wiltshire rent free available to middle-aged D couple (without children) in return for small services.—Box 247, PARRS, 121 Kingsway, London, W.C.2. [247]

CABINETS. Reproductions of H.R.O., SUPER PRO, ARSS, SX28. Send for full details and prices. State requirements.— PHILPOTT'S METALWORKS LTD., Chapman St., Loughborough. [178] CNY/1 Marconi transmitter receiver. 4 spot frequencies, 6 range V.F.O. C.W. M.C.W. 'phone 1 to 9 Mc/s. High performance superhet receiver 1 to 10 Mc/s. with microphone, key, 'phones, wavemeter, £6 10s. Buyer collects.—G3OD, Low Hills, Carrsfield, Corbridge, Northumberland.

Carrsfield, Corbridge, Northumberiand.

DIGS where he can operate wanted by Ham. Bedford or near.—

DIGS where he can operate wanted by Ham. Bedford or near.—

JOHN COLLINGS, G3BIX, Oakwood Court Hostel, W.14. [251]

EDDYSTONE or American Bug key wanted. Please state condition and price.—Box No. 260, PARRS, 121 Kingsway, [260]

EDDYSTONE 640, almost new, £20.—W. Cross, 8 Ibbotroyd Avenue, Todmorden, Lancs. [272]

Avenue, Todmorden, Lancs.

EMPIRE DX Cert, winning transmitter, Admiralty improved version of 1131, 6 ft. cabinet rack, expertly modified plug-in coils 10 and 20, C.W./phone relay, remote V.F.O. control, etc., with remote control panel, very cool 150 watts 'phone/C.W., high efficiency. Immediate sale essential owing no room changed QTH. Take any reasonable price or consider communication receiver exchange. Buyer must collect. Collins TCS12 receiver, 1.5-12 Me/s., B.F.O., ctc., £4; tape auto-sender tape punch; coil tape, Any offer accepted. Valves OK. PT15 (2), 4s.; T55, 8s. 6d.; HK24 (new), 12s. 6d.—G6YR, 80 Heathfield Road, Southport, Lancs.

[268]

EXCHANGE modern miniature camera Sem-Kim 35 mm. 2·9 lens, auto counting and overwind check, etc. For good communications receiver.—Write G3GAD, 13 Agnew Road, [257

FOR SALE.—1 Walkie Talkie 58 set, complete (as new), £10.

1 1155A complete with Power Pack and speaker, with 160 metre band, good working order, £10.—Apply H. TONKII.

1 Beacon Field Place, Church Town, St. Agnes, Cornwall. [246]

FOR SALE.—V55R receiver, £16. Taylor 65B signal generator, £12. Eddystone C40, £24. All as new. Near offers. P/P.

807PA rack mounting. New, £3 10s. Valves, components. Misst sell, S.A.E. details.—G3FII, 9 Dunsford Place, Bath. [253]

sen, S.A.E. details.—G3F11, 9 Dunsford Place, Bath. [253]

FOR SALE.—Complete transmitter. 50 watts 'phone and C.W.,
3.5 to 28.0 Me/s. Modulator, Power Pack and Aerial Coupler.
Originally hand-built by Webbs. "Top-Band" transmitter
owner-built, well known on band. All in 6 ft. rack on movable
platform with space for additional equipment, blank panel and
chassis supplied. Has given owner W.A.C. and W.B.E. Bargain
at £50, plus carriage. Reason for sale, now on V.H.F.—GW2HH,
Fairwinds, Pare Drive, Bridgend, Glam. [266]

LARGE stock of transmitters, communication receivers, condensers, valves, crystal, insulators and other components. Alignment and repair of all amateur equipment. Receivers and amplifiers built.—Cambridge Grove, W.6. Tel.: RIV. 3279. [216]

"OFFICIAL" log books (G.P.O. approved) 300 pages, heavy stiff cover, 12s. 6d. QSL's—largest block service—samples "G" or SWL.—G6MN, MARTIN, Printer, Worksop. [127]

PANEL handles 5½ in. centres, 3s. 3d. 4½ in., 2s. 9d. pair. Post free. S.A.E. other gear. No callers, post only.—G2RP, 191 Park Lane, Heage, Derbyshire.

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QSL's and log books (P.M.G. approved); samples free; state whether G or B.R.S.—ATKINSON BROS., Printers, Elland. [809

Q.C.C. variable frequency crystals, 3,500 kc/s., 3,506 kc/s., 25s. each. 4,519 kc/s. (160 kc/s. on "TWO"), 30s.; type 26 unit, 30s.; modified P48 receiver, £4; type 24 unit, 10s.; 500 V. power pack, £3 3s.; 2-5 kV. power unit with controls, etc., for VCR97, £4 18s. 6d.; VCR97, £1; VCR517, 14s.; ET1013 mlerophone, £3 18s. 6d. Carriage extra.—Raithey, G8G1, 1962 Martin, Lincoln. 1264

REPAIRS, re-alignment by Wobbulators, and scope to all types communication receivers. Collection and delivery 20 miles radius Manchester,—G2ALN, 76 Sidney Road, Blackley, Manchester,—G2ALN, 76 Sidney Road, Farenter, Faren

Receivers, brand new, tested, guaranteed, 10 gns, carriage and packing 7s. 6d.—Weston's Radio, Harman's Cross, Corfe Castle, Dorset.

Cross, Corfe Castle, Dorset.

R 208 10-60 Mc/s. FB TV and ham bands, £7 10s. 0d. 1155
complete power output, £7 10s. 0d. TV "H" aerial. BC453.
500 V. power pack, amplifier. Wanted: Microphone and ham
receiver. Liverpool area.—Box 240, PARRS, 121 Kingsway, receiver. Liver London, W.C.2.

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SALE.—TR9H, new condition, little used, £5 5s.—Write POWELL, 105 Bourne Way, Hayes, Bromley, Kent. [255 SALE.—R208, £10. BC342 with speaker and transformer, £20. MCR1 with power pack, needs slight attention to receiver, £8. All above for A.C. mains. Wavemeter Class D No. 1 Mk. II, £4. BC453-B partly modified as "Q" Fiver, with valves, 30s. Must sell, offers considered, buyer collects.—Box 261, PARRS, 121 Kingsway, London, W.C.2. [261]
STATION closing down. Must sell Wavemeter Mk. 2 D.I. R208 and oscillator 37. Good condition, £20 the lot. Will sell separately—offers considered.—KERR, BRS9936, 73 Lynwood Road Ealing W5.

Road, Ealing, W.5.

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TWO 58 Mk. 1 sets complete all spares, etc., as new, £20 pair. T Two 33 Me. 1 Sets complete all sparts, etc., as new, 120 pair.
T Two 103 Me. 1 Canadian Receivers. As new, £12 10s. each.—
Box 245, PARRS, 121 Kingsway, London, W.C.2.

VIBRATOR convertor 200/250 D.C. to 200/230 A.C. 150
Watts, £3.—COTTRELL, 117 Mount Road, Birkenhead. [242]

Watts, £3.—COTTRELL, 117 Mount Road, Birkenhead. [242]
WANTED.—H.R.O. coils, etc. State ranges, condition, quantity and price to: R. T. & I. SERVICE, 254 Grove Green Road, London, E.11. Ley. 4986. [269]
WIRELESS WORLD A.C.3 in polished aluminium case, coils, valves, phones, power pack, £8.—Offers for ARSSLF and S640 as new.—10 Moor Park Road, Northwood, Middx: [270]
TYPE A Transceiver, 10 watts C.W., 80 and 40, mains or battery. Complete as new with all spares, £10.—G3DKI 14 Oxford Street, Cotham, Bristol 2. [271]
XVIND your own I.F. transformers, R.F. chokes, etc. on a

WIND your own I.F. transformers, R.F. chokes, etc. on a Kaynite Wave Wound Coil Winder. Standard, 50s. De Luxe, 84s. Stamp brings particulars from RICHARD SHEARGOLD & Co., Sunbury-on-Thames.

WANTED ARSSD's, SX28's. Cash or part exchange.—PCA RADIO, The Arches, Cambridge Grove, W.6. Tel.: RIV.3279.

WANTED.—Speech amplifiers for BC610 Hallicrafters transmitters (type BC614A or B.C.D.E.).—PCA RADIO, The Arches, Cambridge Grove, W.6. Tel.: RIV.3279. [218]
WANTED.—Circuits and official handbooks—BC348M—BC453/4/5. Also modification data. Buy—borrow.—G3DTA, 51 Carr Lane Acomb, York. [249]
W1191 wavemeter, £5 5s. R1155, £6. Mk. 58 transmitter/receiver chassis less valves, with vibrator pack, 35s. 2 large cartons of useful components, etc., 15s. All carriage paid. Wanted, MCR1 receiver.—Write BRS15533, 120 Stanwell Road, Ashford, Middlesex. [250]

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19 set complete, with mains transformer, rotary converter, Circuit, £5. BC453 (" Q " Fiver) with mains transformer, £2. —Dawson, 225 George Road, Erdington, Birmingham. [265]

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