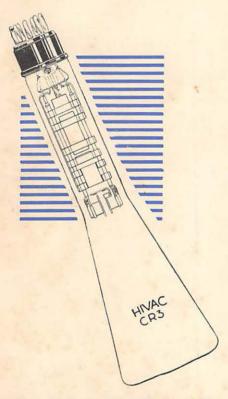


Vol. 14 No. 5

NOVEMBER 1938 (Copyright)

Price 1/6

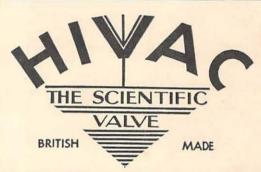


HOW TO USE THE CATHODE RAY TUBE

A 48-page Book by J. H. REYNER, B.Sc., D.I.C., A.M.I.E.E. A practical treatise of great value to experimenters and servicemen. Numerous illustrations.

Price 1/= Post Free

Obtainable from-



RAY TUBES CATHODE

TYPE CR3

3" Screen 7-pin base

Green Screen £2-2-0 TYPE CR3A

3" Screen 9-pin base

Blue Screen

£2-7-6

HIVAC VALVES

FOR CATHODE RAY EQUIPMENT

Grid controlled rectifier, mercury filled 10/-

GR2 Grid controlled rec-

tifier, Argon filled 10/-

HVUI

High voltage half wave rectifier

delivering up to 6,000 volts, at 3 milliamperes

Complete technical details of the above and of the full range of Hivac battery and mains valves will be sent on request.

THE HIGH VACUUM VALVE CO., LTD., 111-117 FARRINGDON RD., LONDON, E.C.1

CRITICAL TESTING

In case, with high

voltage leads, inter-

changeable lest

prods' and erocodile

clips and instruc-

£3: 10s.

tion booklet.



All " Avo " Instruments be purchased mdy Deferred Terms.

The word "Avo" is our Registered Trade Mark,

demands the

Electrical Measuring Instrument

HIGH RESISTANCE AVOMINOR

Electrical Testing Instrument

extremely sensitive 10 range D.C. moving-coil micro-ammeter also calibrated as a multi-range voltmeter and megohmmeter. Its six voltage ranges are all at 20,000 ohms per volt, the consumption at full scale deflection being 50 microamps. This extreme sensitivity permits precision readings with negligible loading readings with negligible loading and is eminently suitable for measuring grid, screen and anode voltages, and also for television. On the lower of its two current ranges, a deflection of approx. I mm, is produced by a current of one microamp., allowing accurate read-ings of grid current, etc.



Universal AVOMINOR

Electrical Measuring Instrument A precision meter for measuring A.C. and D.C. volts, D.C. milliamps., and ohms. it has 22 ranges. An accurate moving-coil movement gives a 3-in, full-scale deflection. Total resistance is 200,000 ohms. Complete the control of the c with leads, interchangeable testing prods and crocodile clips; and instruction booklet ...

The D.C. AVOMINOR Leather case.

Electrical Measuring Instrument
13 instruments in one, Tests circuits, valves. 13 instruments in one, Tests circuits, accomponents, batteries and power units. In case, with leads, interchangeable crocodile clips and testing prods and instruction 45/-

booklet. 43:-Write for fully descriptive pamphlets Sole Proprietors and Manufacturers: THE AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO., LTD., Winder House, Douglas Street, London, S.W.1 Telephane: Victoria 3404-7.

For Short and Ultra S/W Work





Don't forget to send for a copy of our latest Catalogue "T.R."

In the recently published Catalogue of CLIX Components, amateurs and experimenters will find an excellent range of Frequentite (Ceramic) components for use in Television work and in all lowloss high efficiency circuits. Send for a copy now and please mention the "T. & R. Bulletin."

CLIX TRIMMER CONDENSERS.

Here is another component in which the use of "Frequentite" Ceramic is unrivalled. The unique design of vane permits the condenser to be suspended in the wiring without risk of disturbance through strain being thrown on the connecting leads.

> Tc I MIDGET 3-30 mfds. 6d. each. 4-50 mfds. 6d. .. Tc 3 DOUBLE 3-30 mfds. 1/6 ...

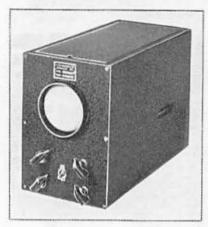
CLIX "ACORN" VALVE HOLDERS.

In addition to their low-loss characteristics occasioned by the Frequentite bases, the method of contacting the valve pins with Nickel Silver clip sockets makes for knife-edge binding.

English 90 degrees, American 60 degrees 2 - each.

BRITISH MECHANICAL PRODUCTION TO THE PRODUCTION OF THE PROPULATION OF PRODUCTIONS LIMITED LONDON S.W. I

G5N'S RCO Oscilloscope



JOHNSON "Q" **BEAM ANTENNA** FOR 2 BAND OPERATION

The new Johnson "Q" Beam Antenna requires an extra Johnson "Q" only. If you have a 20-metre "Q," using another 20-metre "Q" will increase your signal strength 4 DB. on 20 metres and 6 DB. on 10 metres, the one Antenna serving for both bands. Similarly, if you have a 10-metre "Q," another 10-metre
"Q" will give the same conditions on 10 and 5. We give Johnson's full instructions for the "Q' Johnson "Q" sold. "Q" Beam with every

Prices :

JOHNSON "Q" 20 Metres, 39/6 JOHNSON "Q" 10 Metres, 26/6

WATCH for our announcement next A 25-WATT CW. KIT for operation on 20, 40, 80 or 160 metres, complete with 230-volt power supply, Raytheon tubes, Bliley crystal, latest type square meter, assembled, only ... £4/19/6 requires wiring

Can be wired by any ham in three hours with instructions provided.

The response to our advertisement on the above was so great as to completely disorganise our delivery. We must apologise to those who ordered and who did not get delivery in less than 14 days. We now can, however, give you immediate delivery, and if you have already seen one of these in action, you will realize the exceptional value

The RCO will give you a complete picture of operating conditions in your Transmitter, in addition, telling you the percentage modulation on incoming signals. It is complete with 3-in. "Hivac" Cathode Ray Tube, self-contained power supply for 200/230-volt operation. 1,000 volts is available to operate the tube at full sensitivity. Horizontal and vertical plates are brought out to the side of the Cabinet, and a self-contained 50-cycle sweep is provided. The Cabinet matches exactly, and is the same height as HRO. RME. 69 and Hallicrafter Receivers. Price, with all Tubes, ready for operation ... £4 19s. 6d. A charge of 10s, is made for the Tube Container to ensure safe arrival of the Cathode Ray Tube. This amount is refundable in full, subject to the case being returned to our premises within four days of receipt.

STOCKTAKING

T THIS TIME OF THE YEAR WE HAVE A NUMBER OF ODDMENTS WE HAVE DECIDED TO CLEAR, IN ORDER TO MAKE MORE ROOM FOR INCOMING STOCKS.

THESE OFFERS CANNOT BE REPEATED. HURRY!

RME, 69. Stock-soiled demonstration model, only used in our Showrooms. One only

McMURDO MASTERPIECE III, 12
tubes, High Fidelity Audio (12 watts),
Speaker Air-tuned IFS, separate Beat
Oscillator, Electrical Band Spread, cost
over £60: one only. Complete with
High Fidelity Speaker ... £15

NATIONAL SW45, same as SW3, but 2 extra audio stages, complete with tubes. Callers only, come and pick yours ... 50/-

TOBE, Amateur Communication Re-ceiver, 7 valves, with 180 degs, band spread on amateur bands, beat oscilla-tor, a.v.c. Complete in Cabinet. Stocksoiled only. List £17 17s. 6d. ONE ONLY ... £12 17s. 6d.

ONLY £12 17s. 6d. McMURDO 100-watt. 'Phone Transmitter (uses RK20), cost £45, less tubes and Xtal. One only ... UTAH 80-watt 6L6 Transmitter, latest

CW type, with tubes and Xtal (230 v G.T.C. 25-watt 6L6 CW. Transmitter kit

complete with tubes, meter and Xtal ... £7 GROSS CP60-100-watt Transmitter Chassis, uses 47, 53 and 35 T, less tubes and Xtal, but with coils for 20 and 40

All the above transmitters are brand new

and unused.
TAYLOR T.125. List £4 15s. ... £3
TAYLOR T.155. List £6 £4

RCA. 913 Cathode Ray Tube and 855 gas-filled trigger tube for same. List 541, the pair ... 37/6 AMPEREX. HF.200. List £8, £5 17s. 6d. AMPEREX. 211G. List £7 10s., £2 19s. 6d.

AMPEREX. 841 carbon anode. List WESTERN ELECTRIC 211E 15/-

interleaved and smoothing Chokes, interleaved and shrouded 20 hy.

MERICAN Smoothing Chokes, interleaved but not shrouded, 100 m /A. AMERICAN 500 ohms ... 3/II AMERICAN Smoothing Chokes, interleaved but not shrouded, 15 hy

interleaved but not shrough 3/11
150 ohms. 3/11
AMERICAN Smoothing Chokes,
interleaved but not shrouded, 15 hy.
200 m/A. 200 ohms. 8/6
JOHNSON TYPE 211 50-watt. Cera-

mic Sockets ... 4/9
SPECIAL !!!
Oil-filled Condensers by leading maker,
with reversible fixing—i.e., Chassis with connections underneath or baseboard connections above.

4 MF 1,000 v. working (3,000 v., D.C test) 2 MF 2,000 v. working (6,000 v., D.0 RAYMART MANUAL

70 Pages of practical information written by G5NI, G2AK and G8HO, in language you can understand. 7 d., Post Free,

RADIOMAR'

G 5 N I (BIRMINGHAM) LTD.

THE SHORT-WAYE SPECIALISTS. We are authorised Distributors for BLILEY, THORDARSON, TAYLOR TUBES, RME, BASSETT CONCENTRIC CABLE, HOYT METERS, COLLINS, NATIONAL, ETC.

Send us your enquiries. Large stocks carried.

44 HOLLOWAY HEAD, BIRMINGHAM, I

Telephone: MIDLAND 3254

miles.



ONCE AGAIN A.C.S. RADIO offer.

in addition to the regularly advertised types of New Communication Receivers, a selection of shop-soiled and reconditioned bargains. We have been busy in our workshops checking and re-aligning these sets, and can guarantee their performance equal to new. Another point worth considering is that all sets, new or second-hand, carry our 3 months' guarantee, and we will willingly correct any trouble, however slight, that may occur during this period.

THIS MONTH'S BARGAIN LIST

and the second second second			
RME 69, Standard Model, perfec			-
condition	. £30		
Hallicrafter's Sky Challenger	I £15	0	0
Hallicrafter's Ultra Skyrider 3.5 to 55 metres, complete with	h	10	
large speaker and crystal		10	U
Hallicrafter's Super Skyride			
S-5, 10 to 160 metres	. £8	8	0
National NC-100, complete	0		
with speaker in cabinet		10	0
National NC-101X, Ham-Band			
complete with speaker		0	0
Tobe Deutschmann Ham-Ban	-		
complete with speaker	. £12	12	0
Eddystone Everest 5-Metro		FEE	100
Transceiver, complete	. £6	10	0
Simplat V.G. Recording Am			
plifier, cost £25, as new	. £12	10	0
Permarec Super Carbon Micr			
phone, on table stand		15	0
Epoch Moving Coil Micro			
phone, on floor stand, com			
plete with special matchin			
		12	4
transformer		12	0
Cossor Neon Indicator Tubes			
FB for RF		6 ea	ich

NEW COMPONENTS

A.C.S. Special Crystal Microphones, fitted with Brush inserts, 39/6. Kenco Bug Keys, 21/-. Signal Keys K63, 17/6. Tube Shields, 3-piece, 1/- each. Beede Panel Meters, 2½ ins., 18/-. 1.C.A. Acorn Sockets, 3/-each. 1.C.A. Plug-in Coil Forms, 3½ in. by 2½ in., 4/6. TUBES: RKII, RKI2, 17/6. Taylor T20, TZ20, 17/6. T40, TZ40, 24/-.

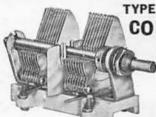


POLAR



AND N.S.F.

COMPONENTS



CONDENSERS

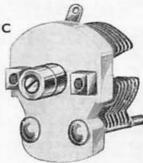
Ceramic base. Soldered brass vanes. For base-board or panel mounting.

PRICES: Single .00016 ... 5/-Two Gang 2x.00016 10/6

AIR DIELECTRIC

Ceramic base, soldered brass vanes. Specially designed to maintain accuracy of setting. Made in capacities:

25 μF. 50 ... 75 ... 100 ...



POLAR SPECIFICATION OF 28/56 Mc, A.C. RECEIVER

- I Air Dielectric Trimmer C.801 25 mmf, I S.W. Type "E" Single .00016. I Volume Control V/I 5,000 ohms.
- Volume Control V/I 5,000 ohms. I Volume Control V/4 50,000 ohms. I Volume Control V/4
- Volume Control V/4 500,000 ohms. Resistors I-watt 150 ohms. I do. 1.000 ohms.
- do. 1,000 ohms. do. 5,000 ohms.
- 1 Resistor 1-watt 3-me; 1 do. 25,000 ohms. 2 do. 10,000 ohms. 1 do. 100 ohms.
- I do. 100 ohms.

 I Micro Horizontal Drive, fitted degree scale.

 I each Tubular Condensers, .02 and .01.
- each Electrolytics, 4, 6 and 8 mfd.
- 2 Resistors 2-watt 20,000 ohms.

WINGROVE & ROGERS Ltd.

12 Dartmouth St., London, S.W.I

Works: Old Swan, Liverpool



TYPE "A"

Supplied wound to special resistances without extra charge.

Type "A" Headphones SEVEN IMPORTANT POINTS

The acknowledged superiority of S. G. Brown Type "A" Headphones with adjustable reed is accounted for by the excellence of their design and construction.

- I. SENSITIVITY (Frequency response approx. 25-16,000 C.p.s.
- 2. ADJUSTMENT (Reed Setting maintained).
- 3. QUALITY (Absence of resonance).
- 4. RESISTANCE(2,000 ohms each earpiece).
- 5. INSULATION (Headbands and cases efficiently insulated from wiring).
- 6. MOVEMENT (Dust and damp proof).
- 7. COMFORT (Light weight with perfect head band adjustment).

Used by H.M. Royal Navy. British and Foreign Air Services, The B.B.C., etc.; and by radio amateurs throughout the world.

S. G. BROWN LTD., VICTORIA ROAD, ACTON, W.3. Tel.: ACOrn 1174



CANDLER TRAINED T. R. McELROY, World's Official Code Champion,

"The Candler System taught me to read code by sound as easily as I read print, and to put it down on my typewriter by touch, without having to think how words are spelled. Candler teaches you automatic sound consciousness, concentration and coordination—absolute essentials to the bandling of fast code. And the surprising part is that you acquire these essentials so effortlessly that you will be amazed at your own progress. Every day makes you a better operator once you have learned the Candler principle."

THE QUICKEST, EASIEST ROAD to ESKI TRAINING! ANDLER

There's no royal road to learning—but there IS a quick, sure way to genuine CODE skill. Thousands upon thousands of Candler Trained Operators have proved the value of this truly remarkable system of Code Instruction, including champions and many of the fastest operators in the world.

champions and many of the lastest operators in the world. Candler teaches you the correct fundamentals, proper mental and physical coordination—and, in a comparatively short time, you will find yourself reading words, yes, even sentences, without strain or conscious effort—as easily as you read print. Your progress, after months of unproductive, undirected practice, is almost uncanny.

It costs you only postage to learn about Candler Training. Post the coupon today for the new edition of Candler's Book of Facts. It's FREE upon request.



POST COUPON TODAY FOR FREE BOOK OF FACTS

To: H. Freeman, 121 Kingsway, London, W.C.2 (Room 55)
London Representative for Candler System Co., Ashville, N. Carolina, U.S.A. Please send me FREE BOOK OF FACTS.

ADDRESS



NEED THIS BOOK

Includes a special chapter on Television as well as up-to-date information on all rectification problems.

COUPON_

WESTINGHOUSE BRAKE & SIGNAL CO. LTD., 82, York Way, King's Cross, London, N.1.

I enclose 3d. in stamps. Please send me "The All-Metal Way, 1939."

vame	 	

T.R.B. 11/38.

Wireless World

SPECIAL VALVE DATA NUMBER dated Nov. 10th

Includes a supplement with data relating to over 1,000 British and American receiving valves, tabulated for easy reference, with base connections. Other features deal with valve input resistance on ultra-short waves, and a comparison between the new German steel valves and glass types and also their earlier American metal prototypes.

From all Newsagents and Bookstalls, 4d.

ILIFFE!& SONS LTD. Dorset House, Stamford St., London, S.E.I

EVRIZONE

COMMUNICATION RECEIVER

Incorporating the Super - Tuner Unit

(This Unit is also available separately, price £4-10-0)
As supplied to the B.B.C.
Waveranges from 5-190 metres continuous
PRICE £45 (Loudspeaker
extra.)

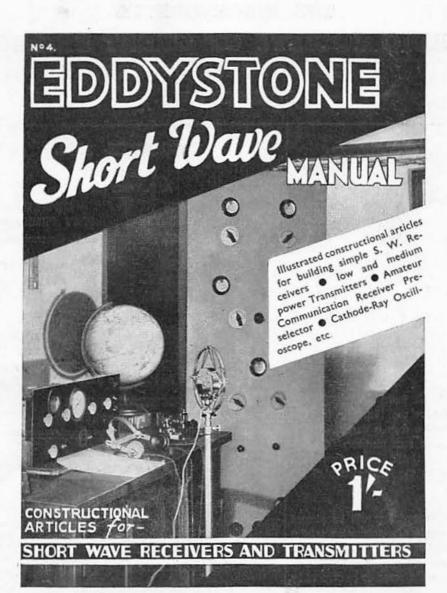
In their issue of Oct. 27th, pages 378-380,
"The Wireless World" said:
"... we are confident in recommending this receiver for serious long-distance working..."

..., no drift could be detected even at the highest frequencies. ... volume and quality judged on a high-grade permanent magnet speaker were excellent ... where most receivers are comparatively dead, the Evrizone is full of life ... but will also bring in short-wave broadcasting with a far greater reserve of volume than is possible even in the best all-wave sets.

The unbiased test report of "The Wireless World" will convince you of the remarkable quality and capabilities of this set, which, in their own words, has "such an excellent performance." If after referring to the report you require further information, we shall be glad to supply it.—(Reprint of Report sent post free on request).

EVRIZONE RADIO & TELEVISION CO. LTD. 2, Southlands Road, Bromley, Kent.

'Phone: Ravensbourne 1957



FROM YOUR RADIO DEALER; W. H. SMITH & SON, or in difficulty send 1/2 to STRATTON & Co., Ltd. Eddystone Works, Bromsgrove Street, Birmingham.

London Service: Webb's Radio, 14, Soho Street, W.I.

THE INCORPORATED RADIO SOCIETY OF GREAT BRITAIN

53, VICTORIA STREET,

LONDON, S.W.1.



VOL. 14.

No. 5.

THE T. & R. Bulletin is published on or about the 15th day in each month, and a copy is despatched free of charge to each member. Changes of address should be communicated promptly to the Headquarters of the Society.

THE Secretary-Editor will be pleased to consider for publication, articles of technical or general interest. Intending contributors are requested to indicate in advance the scope to be covered by the article under consideration.

ALL matters relating to Advertising should be addressed to Parrs Advertising Ltd., Craven House, 121, Kingsway, London, W.C.2.

COUNCIL 1938.

PRESIDENT:

A. E. Watts (G6UN)

EXECUTIVE VICE-PRESIDENT :

A. D. Gay (G6NF)

IMMEDIATE PAST PRESIDENT :

E. D. Ostermeyer (G5AR)

HONORARY TREASURER:

A. O. Milne (G2MI)

HONORARY EDITOR:

H. Bevan Swift (G2TI)

MEMBERS:

Viscount Carlow (G6XX) F. Charman (G6CJ)

H. A. M. Clark (G6OT) J. W. Mathews (G6LL)

J. D. Chisholm (G2CX)

H. C. Page (G6PA)

H. A. M. Whyte (G6WY)

SECRETARY-EDITOR:

John Clarricoats (G6CL)

HONORARY MEMBERS:

Sir Oliver Lodge, D.Sc., LL.D., F.R.S. E. Dawson Ostermeyer, Esq.

PAST PRESIDENTS:

The late A. A. Campbell Swinton, Esq. (1913-20).

The late Major J. Erskine Murray (1921). The late Admiral Sir Henry B, Jackson (1922).

Professor W. H. Eccles, D.Sc., F.R.S., M.I.E.E. (1923-4). Sir Gliver Lodge, D.Sc., LL.D., F.R.S.

(1925).

The late Brig.-General Sir Capel Holden (1926-7).

Sir lan Fraser, C.B.E. (1928). Gerald Marcuse, Esq. (1929-30). H. Bevan Swift, Esq., A.M.I.E.E. (1931-3). Arthur E. Watts, Esq. (1934-6).

E. Dawson Ostermeyer, Esq. (1937).

VICE-PRESIDENTS:

Maurice Child, Esq. Colonel M. J. Dennis, C.B. P. P. Eckersley, Esq., M.I.E.E. Commander R. J. B. Hippisley, O.B.E. J. H. Reeves, Esq., M.A., M.B.E. Rene H. Klein, Esq., F.R.S.A., M.I.R.E. Commander F. G. Loring, R.N., M.I.E.E.

Leslie McMichael, M.I.E.E., F.Inst.R.E. Captain G. C. Price, T.D.

E. J. Simmonds, Esq. John Wyllie, Esq.

HONORARY VICE-PRESIDENTS:

Sir Ambrose Fleming, M.A. G. F. Gregory, Esq., M.I.M.E. E. H. Rayner, Esq., D.Sc.

E. H. Shaughnessy, Esq., M.I.E.E.

THE T. & R. BULLETIN

OFFICIAL JOURNAL
OF THE
RADIO SOCIETY
OF GREAT BRITAIN



DEVOTED TO THE SCIENCE AND ADVANCEMENT OF AMATEUR RADIO

Hon. Editor: H. BEVAN SWIFT. General Editor: JOHN CLARRICOATS

Advertising Manager: HORACE FREEMAN

Vol. XIV. No. 5. CONTENTS NOVEMBER 1938 Page Page Editorial 255 294 Contemporary Literature .. 277 Headquarters Calling Optimum Plate Tank Values 257 .. 297 The Helping Hand 281 New Members ... A Useful Three-Circuit Oscil-Experimental Section .. 285 F.O.C. Notes ... 297 260 lator .. 286 A 56/28 Mc. A.C. T.R.F. Receiver Cosmic Notes 298 Correspondence 261 .. 287 Workshop Practice The Month on the Air Notes and News from the 269 302 British Isles The 28 Mc. Band 289 A 56 Mc. Driver Panel 304 Forthcoming Events .. 290 The 56 Mc. Band ... Automatic Change-over Sys 312 tem for 100 per Cent. Break-in Operation The West at Weston ... The B.E.R.U. Contests, 1939 292 British Notes and News .. 313 he 1938 "C.W. 56 Mc. Trophy" Contest The R.A.F. Civilian Wireless .. 293 274 315 Q.R.A. Section Reserve

THE STATUS OF THE TRANSMITTING AMATEUR

WE, and possibly many of our readers, read with much interest the editorial comments which were published recently in *The Wireless World*, wherein a plea was made that the Post Office should relax their official attitude towards those who wish to become transmitting amateurs.

Emphasis was placed on the importance to the country of having available, in case of emergency, a large body of skilled wireless operators, and the suggestion was put forward that the Post Office should remove every possible obstacle with a view to encouraging ownership of

amateur transmitting stations.

We have too much regard for those responsible for the editorial policy of *The Wireless World* to cross swords with them on a matter which is of national importance, but we believe our members will agree that unless the British Government are prepared to open up additional frequency channels for training purposes, it would be unwise to permit our already overcrowded bands to be filled with hundreds—perhaps thousands—of transmissions from persons who have

no experimental interest in radio.

For the benefit of all concerned we would emphasise that within the last five years the number of British Isles licence holders has increased from 1,300 to over 2,600. On 7 Mc. alone there are approximately 1,200 British stations regularly active. With a band of frequencies less than 300 kilocycles wide available, the congestion has to be experienced to be fully appreciated. The Cairo Conference, held in February last, decided still further to reduce our operating space around 7 Mc. by authorising broadcasting stations to use the channel 7,200—7,300 kc.

Where, then, would the thousands of newcomers find room to be trained? With additional Service demands it is unlikely that the G.P.O. would allow a large increase of activity to take place on 1.7 or 3.5 Mc. Possibly 14 Mc. would prove an attraction, but that band is already very overcrowded, due to the enormous amount of telephony operation, and the fact that it is divided into three distinct sections as a result of the 100 kc. American telephony band having been placed in the centre.

The 28 Mc. band is too much like the parson's egg to be considered a training ground, whilst 56 Mc. would, if the suggestion were adopted, develop, as it nearly developed a year or

so ago, into a band used for domestic back-chat. We admit frankly there appears little or no room available for those who desire to become proficient wireless operators without indicating

the line of experiment they wish to conduct.

Our considered opinion is that the amateur bands should continue to be used by those who can show sound technical reasons for requiring to use them. For all others who are anxious to become trained operators, as removed from trained experimenters, we most heartily recommend that they enrol either in the Royal Naval Wireless Auxiliary Reserve, or in the Civilian Wireless Reserve of the Royal Air Force.

THE AMATEUR RADIO HANDBOOK

Within a few days members will have available the first edition of our new Amateur Radio Handbook. The publication of this all-British text-book brings to fruition an ideal which has been in the minds of many of us since early editions of A Guide to Amateur Radio made their appearance.

We have not the slightest doubt that the Handbook will receive the support of all members, but in passing we would direct their attention to the fact that its production has only been made possible through the splendid co-operation of a dozen or so members who have given of

their best over a period of many months.

The high technical level which has been reached, coupled with the fact that the book is profusely illustrated by about 250 clear diagrams, should ensure its popularity in official circles, as well as in "ham" shacks at home and abroad.

Production costs are considerable, but if every member purchases one copy, and at the same time introduces it to a friend, we need have no fears that the Handbook will prove a financial burden on the Society.

We are convinced that no better value can be offered. Order your copy to-day and prove

the truth of our contention.

HONORARIUMS

In another page appears a list of members who have been awarded honorariums in recognition of the technical articles contributed by them to the last volume of this Journal.

These monetary awards are not intended by the Council to be regarded as payment for contributions, but as a token of the Society's appreciation towards those who have spontaneously given their fellow-members the benefits of their knowledge, or the results of their experiments.

In selecting those to receive recognition the Council have kept in mind the fact that general or even elementary articles have their place in this Journal, as well as those of a more technical character.

B.E.R.U. CONTESTS

Although these ever-popular Contests are not scheduled to take place until next February, we are, as is customary, including in this issue the rules and an article describing the changes which have been introduced. With an all-round increase in World DX Contests we believe members will join with us in expressing the hope that the lead we have given, in reducing the period for our Empire Contests, will be followed up by other Societies interested in such events. The 1939 B.E.R.U. Contests should, under the new arrangements, receive even greater support than in the past but, in order to make them successful, it is the duty of every member to begin advertising them to-day.

REPRESENTATION

By the end of this month we trust that every important town in the British Isles will have elected its Town Representative for 1939. See to it that the very best man is to be given the chance to keep the interests of the Society at high pitch in your town.

J. C.

Optimum Plate Tank Values

By G. W. SLACK (G5KG).

NE of the most ill-used and abused parts of a radio frequency amplifier is the plate tank circuit. It is usually dismissed with a few words in many text books, which seems unfortunate when we consider that it is from this section of the circuit that all the power output is obtained. Further, it is here that all the energy to be radiated is stored.

In the case of audio equipment we can compare the primary of the output transformer to our tank circuit in question. To obtain good-quality and intelligible speech this winding must be constructed so that it will operate under optimum conditions; if this is not done bad quality and

poor output will result.

When some of the R.F. tank circuits which are specified from time to time are examined, it is to be wondered that any output is obtained under certain of the conditions in which they are expected

to operate.

The present tendency amongst amateurs is to employ a "ready-made" tank inductance, with no more specification than that "it is suitable to operate on one specific band." No mention is made of the type of circuit it is designed for use with, or whether split stator or ordinary condensers are to be used. Furthermore, no indication is given as to whether push-pull or single-ended operation is intended and never is the plate resistance or plate voltage to plate current ratio mentioned.

An investigation will quickly prove that the plate tank circuit should be operated under optimum conditions in order to obtain maximum output and to do this the above conditions must be carefully observed.

Optimum L-C Ratio

If a high tank impedance is used with large grid bias values and excessive excitation voltages, a large proportion of output power may be converted into harmonic frequencies. These harmonic frequencies are of no practical use in the stage which feeds the radiating system and are of no use for communication purposes on the band in question. Also as our bands do not altogether fall in harmonic relationship, it is quite possible, if harmonics are radiated, that we shall be confronted with the problem of off-frequency operation. Additionally, all power which is generated in harmonics is wasted and if the quantity is such as to cause circulating currents, a large falling off in efficiency will result. Therefore, any steps that can be taken to reduce harmonic output will result in better efficiency. It should also be remembered that if a lower tank impedance than necessary is used, a low transfer of energy will result.

From these considerations it follows that there must be an optimum point in the adjustment of plate tank circuits where a maximum transfer of energy can be maintained with low harmonic output. This is known as optimum L-C ratio.

The plate tank circuit can be described as analogous to the fly-wheel used in engineering, where the fly-wheel is used as a store house for the energy output from any type of motive power. When a fly-wheel is designed it must be of such dimensions as to be large enough to supply an efficient transfer of the stored energy to any load that may be applied to it, but it must not be so large as to apply a damping effect to the source of energy. In other words, the fly-wheel, although sufficiently large to maintain an efficient output of power, should only require a minimum of energy or power to maintain the "fly-wheel effect." So it is in the case of the plate tank circuit. As with the fly-wheel there is only one correct tank circuit for any one given set of conditions. This consideration is very important in the case of modulated systems where large fluctuations in output occur and where, for best results, the output must be of a linear character.

The optimum L-C ratio to be used is governed by the ratio of the D.C. plate voltage to the D.C. plate current feeding the final amplifier. For a given input the higher the plate voltage and the lower the plate current, the higher the L-C ratio required, and vice versa. It is therefore only necessary to know the plate voltage and plate current ratio, or the D.C. resistance, to determine the amount of inductance and capacity required to obtain resonance at the desired frequency, so that optimum operating conditions are observed. This can be brought about by calculating the capacitive reactance of the capacity in question at the desired frequency and, as at resonance, this is equal to the inductive reactance. Knowing the inductive reactance, the inductance can be computed and from the inductance the physical dimensions of the coil required can be calculated.

As the value of capacity is inversely proportional to the frequency or, conversely, directly proportional to the wavelength, it makes it possible to express the capacity in micro-micro farads per metre. Thus, to obtain the required capacity, all that is required is to multiply the number of micro-micro farads per metre by the wavelength in metres. The number of micro-micro farads per meter in relation to the plate voltage-current ratio is also governed by the type of circuit employed in the final amplifier. For instance, in the case of a neutralised single-ended amplifier the capacity and inductance values employed would be entirely unsuitable to give

optimum push-pull conditions.

Before proceeding further it will not be out of place to show what a wide variation of conditions exist so far as plate tank circuits are concerned. In telegraphy transmitters conditions are generally not so bad because no attempt is made to conform the D.C. plate resistance to any given set of circumstances, but in the case of 'phone operation, the D.C. plate resistance must be of a definite value so that efficient match is made to the modulator. Usually the operator of a 'phone transmitter in his endeavour to obtain good modulation, forgets the tank circuit, yet it requires just as careful "matching" as the modulator, if efficient R.F. output is to be obtained. In the case of the telegraphy transmitter the final amplifier is generally

designed and operated according to the specifications laid down by the maker of the valve. In other words, the valve is operated under optimum conditions. It is very doubtful, however, if the tank circuit operates in the same way, especially in the case of multi-band transmitters.

A Practical Case

Let us now look at a circuit using a valve with a D.C. plate resistance of 10,000 ohms in single-ended operation and designed for multi-band operation. The optimum values of inductance and capacity for 28 Mc. operation are 2.5 micro henrys and 13 micro-micro farads, respectively. (How these values were arrived at will be described briefly later.) For 1.7 Mc. operation under the same conditions a capacity of 220 μμF with an inductance of 40.0 μH would be required. It will be seen immediately that it would be impossible to expect a 220 μμF condenser to open out to 13 μμF, ignoring altogether valve and circuit capacities. Usually a 100 paF per section split-stator condenser is specified in a circuit of this type and to tune to the 1.7 Mc. band an inductance of about 177 µH would be required and this would require to have a reactance of about 1,880 ohms at 1.7 Mc. For optimum operation and best efficiency the reactance should be about 435 ohms. To obtain optimum operation using an inductance with a reactance of 1.880 ohms, the plate D.C. resistance would require to be adjusted to about 44,000 ohms which means a plate current ratio of 44:1. In the case of a T55 valve the plate current would have to be reduced to 34 mA. at 1,500 volts.

Often when a valve which has a D.C. resistance of, say, 10,000 ohms is working under optimum telephony conditions, it has to be adjusted to, say, 5,000 ohms to match up to the modulation transformer. The reactance of the LC conditions would then require to be about 220 ohms for correct

operation.

These examples indicate how wide of the mark the designer is liable to be in choosing tank circuit

values.

It is beyond the scope of this contribution to explain in great detail how the values of micromicro farads per metre are arrived at, because to

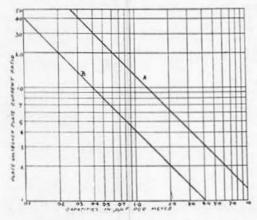


FIG. 1

Chart for computing optimum capacity per metre.
"A" single ended; "B" push-pull final amplifier

do so would necessitate going into a very lengthy description entailing a mass of algebraical formulae which would have no direct bearing on the article itself. In any case the values themselves vary somewhat according to the opinions held by those who have investigated the subject. The writer would rather not attempt to lay down any hard and fast rule on this particular matter but would prefer to state that the particular calculations used to produce the values of micro-micro farad per metre referred to herein and employed to produce Fig. 1 are based on a "Q" value of 12 when the amplifier is under operating conditions and fully loaded.

The term "Q" value, which can be briefly described as a measurement of the "goodness" of a tuned circuit or as an indication of "sharpness of resonance," can be expressed by the formula:

$$Q = \frac{2\pi f L}{R}$$

Those readers who wish to work out for themselves the values shown in Fig. 1 will find that for curve (A) the value of micro-micro farads per metre for a plate voltage/current ratio of unity is $12.5~\mu$ E per metre, so all that is required in order to find the value for any other ratio is to divide 12.5~by the new ratio.

Example: When Va/Ia ratio is 5 or D.C. plate resistance is 5,000 ohms, the "micro-micro farads" per metre value for curve A will be 12.5 ÷ 5=2.5 µµF. In the case of curve B the value at unity is 4 µµF per metre. Readers who wish to make up a chart similar to Fig. 1 will find their task simplified if they use logarithmic graph paper.

Now to proceed, all that has to be decided is whether single-ended or push-pull operation is to be employed. If split stator tuning is used, the values given have to be multiplied by two as well as by the wavelength in metres, this will give the

as by the wavelength in metres, this will give the capacity of each section of the split stator condenser which will be required to be in mesh when resonance at the desired frequency is obtained.

Practical Examples

Details will now be given of the procedure used to calculate (a) the plate current/plate voltage ratio; (b) the plate D.C. resistance; (c) the capacitive and inductive reactance; (d) the inductance in microhenrys; and (e) the way in which the physical dimensions of the coils can be obtained.

(a) Plate voltage, plate current ratio is obtained by dividing the plate voltage by the plate current when the final amplifier is fully loaded and operated under the correct conditions for the valve in

question.

Example: $\frac{1,000 \text{ volts}}{100\text{mA}}$ = a ratio of 10-1

(b) This formula will also give the D.C. plate resistance: Thus

$$\frac{\text{Va}}{\text{Ia/mA}} \times \frac{1,000}{1} \text{ or } \frac{1,000}{100\text{mA}} \times \frac{1,000}{1} = 10,000 \text{ ohms.}$$

It is therefore easy to obtain both the plate voltage/current ratio and the D.C. plate resistance of an amplifier under any working conditions. Knowing the plate voltage/current ratio, the optimum capacity per metre can be obtained from

the chart (Fig. 1) for the type of amplifier it is intended to use. After this has been calculated the optimum tank capacity can be worked out for any frequency and for any type of operation ('phone or continuous wave). In the 'phone section optimum values for any circuit can be obtained using either anode modulation, control grid, supressor grid or class B linear modulation.

(c) When the optimum capacity is known for a given set of conditions the exact value of inductance can be calculated. For example, consider a Taylor T.55 valve working under optimum conditions (1,500 volts at 150 mA on the anode). It will be apparent that the plate volts/current ratio is 10:1. and that the D.C. plate resistance is 10,000 ohms. On examining Fig. 1 it will be seen that the capacity for this ratio is 1.25 μμF per metre, therefore the optimum plate tank capacity for 40 metre operation will be:

 $1.25 \times 40 = 50 \ \mu\mu F$.

If split stator tuning is used, that value is again multiplied by two giving 100 paF, and this capacity

represents each section of that condenser.

Now with the optimum capacity known, it is required to find the value of inductance which will resonate with exactly that capacity. To obtain this we must first calculate the capacitive reactance of that capacity at resonant frequency, because at resonance the capacitive reactance must equal the inductive reactance. Therefore if Xc equals XI, then the capacitive reactance of 50 $\mu\mu$ F is calculated in the following manner for 7.5 Mc. operation:

$$Xc = \frac{10^6}{2\pi \ fc}$$

Where: 106 equals 1,000,000

 2π .. 6.28

frequency in megacycles (in this case 7.5 Mc.)

,, capacity of condenser in micro-micro farads.

1,000,000 Therefore $Xc = \frac{1,000,000}{6.28 \times 7.5 \times 50} = 427$ ohms

and as at resonance the capacitive reactance must equal the inductive reactance (to produce a pure resistance) Xc equals Xl.

By the formulæ 2π fL = $\frac{1}{2\pi}$ fC

therefore to resonate with 50 $\mu a F$ at 7.5 Mc., the inductive reactance must be 427 ohms.

(d) To find the inductance required (in microhenrys), the following formula is used:

$$L = \frac{Xl}{2\pi \text{ fMc}} \text{ when } Xl = 2\pi fL$$

Therefore: $L=\frac{427}{6.28\times7.5}=9.1$ micro-henrys.

(e) As we wish to construct a coil having exactly that value of inductance, we may calculate its physical dimensions by using the formula

$$N = \sqrt{\frac{3A + 9B}{0.2 A^2} \times L}$$

 $N\!=\!\!\sqrt{\begin{array}{c} 3A\!+\!9B \\ 0.2\;A^2 \end{array}}\!\times L$ Where: L is the inductance in micro-henrys A ,, ,, mean diameter of the coil in inches

.. ,, length of the winding in inches N ,, ,, number of turns,

The tables given in Fig. 2 show the number of turns required to make each inductance a standard size of 2.75 inches diameter with a winding length of 4 inches, this being a convenient size for a wide range of frequencies and input power.

Therefore, when: L is 9.1 micro-henrys
A ... 2.75 inches
B ... 4 inches.

 $N = \sqrt{\frac{8.25 + 36}{0.2 \times 7.56}} \times 9.1 = \sqrt{\frac{267}{\text{nearest whole number.}}}$

When a coil has been constructed to these dimensions, all that is now required is to make sure that

Plate D.C. Resistance in Ohms. Va/Ia					VAL	UES F	OR SIN	NGLE-F	ENDED	OPER	ATION											
		Opt	imum (icro-mi	Capacitic ero farac	es in is.		Optimum Inductance Values in micro-henrys.					Num	aber of turns to produce optimum actance when wound to a diameter of 2.75 inches spaced 4".									
Ratio Divide		Wa	velengt	h in me	tres.			Way	elength	in met	res.		Wavelength in metres.									
by 1,000.	160	80	40	20	10	5	160	80	40	20	10	5	160	80	40	20	10	5				
10,000 ohms. 9,000 ,, 8,000 ,, 7,000 ,, 6,000 ,, 5,000 ,, 4,000 ,, 3,000 ,, 2,000 ,,	200 224 250 286 336 400 500 666 1000	100 112 125 143 168 200 250 333 500	50 56 62.5 71.5 84 100 125 166 250	25 28 31,25 35,8 42 50 62,5 83 125	12.5 14 15.6 17.8 21 25 31.3 41.5 62.5	6.25 7 7.8 8.0 10.5 12.5 15.6 20.7 31.3	36 32 29 25.5 21.5 18.0 14.4 11.0 7.2	18 16 14.5 12.7 10.7 9.0 7.2 5.5 3.6	9 8 7.3 6.4 5.8 4.5 3.6 2.8 1.8	4.5 4.0 3.6 3.2 2.9 2.3 1.8 1.4 0.9	2.3 2.0 1.8 1.6 1.4 1.1 0.9 0.7 0.5	1.2 1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3	32 31 29 28 25 24 21 18	23 22 21 19 18 16 15 13 10	16 15 14.5 14 12.5 12.0 10.5 9.0 7.5	11.5 11.0 10.5 9.5 9.0 8.0 7.5 6.5 5.0	8 7.5 7.0 7 6.3 6.0 5.2 4.5 3.8	6 5.5 5.2 4.8 4.5 4.0 3.8 3.3 2.5				
					V	ALUE	s FOR	PUSH-	PULL	OPERA	TION											
10,000 chms. 9,000 ,, 8,000 ,, 7,000 ,, 6,000 ,, 4,000 ,, 4,000 ,, 2,000 ,,	64 72 80 92 106 128 160 216 320	32 36 40 46 53 64 80 108 160	16 18 20 23 26.5 32 40 54 80	8 9 10 11.5 13.3 16 20 27	4 4.5 5 5.8 6.6 8 10 13.5 20	2 2.3 2.5 2.9 3,3 4 5 6.8	113 100 90 78 68 57 45 33 22	56.5 50 45 39 34 28.5 22.5 16.5	28.3 25 22.5 19.5 17 14.3 11.3 8.6 5.5	14.2 12.5 11.3 9.8 8.5 7.1 5.6 4.3 2.8	7.1 6.3 5.6 4.9 4.3 3.6 2.8 2.1	3.5 3.2 2.8 2.5 2.2 1.8 1.4 1.1	58 54 51 48 45 41 37 31	41 38 37 34 32 29 26 22	29 27 25.5 24 22.5 20.5 18.5 15.5	20.5 19.0 18.5 17.0 16.0 14.5 13.0 11.0	14.5 13.5 12.8 12.0 11.3 10.3 9.3 14.8 6.5	10.3 9.5 9.3 8.5 8.0 7.3 6.5 5.5 4.5				

Fig. 2.—The resistance values represent the D.C. plate resistance of the final amplifier when fully loaded. All capacity values are in micro-micro farads and all inductance values in micro-henrys. The number of turns given in each case will produce the stated inductance when wound to a diameter of 2.75 ins. and the turns spaced out to a length of 4 ins. The condenser values are for single-section condensers. If split stator condensers are used the capacities given must be multiplied by two. This will give the size of each section of the split stator condenser.

Note.—The values given in this chart only hold good for plate-neutralised circuits.

the tank condenser will have sufficient capacity to tune to the required frequency. We can then be sure that at resonance, the optimum L/C ratio has been accomplished and the amplifier will deliver maximum output with minimum harmonic content.

It will be noticed that, although the optimum capacity is the first point to be considered, it can be forgotten as soon as the inductance values are obtained. It will also be seen that it is a simple matter to construct a coil of definite inductance. When that is achieved, the capacity automatically adjusts itself to the optimum capacity at resonance.

As some readers may not wish to take the trouble of making all the above calculations themselves, the writer has compiled a chart, Fig. 2, which gives all the required information needed for frequencies from 1.7 to 56 Mc., and with plate D.C. resistances ranging from 2,000 to 10,000 ohms. Both single-ended and push-pull circuits are catered for.

By carefully studying the chart a choice of L/C values can be made for operation near to optimum conditions on a number of bands, although it will be evident that it will be difficult to obtain optimum conditions on more than two bands if the voltage/current ratio remains constant. It will also be noticed that optimum conditions for operation on the frequencies of 28 and 56 Mc, will be difficult to obtain when valve and circuit capacities are taken into account, which of course explains the desirability of using special valves and circuits for these frequencies.

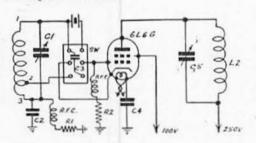
A careful study of the chart will show the reader that it is a good plan to construct separate final amplifiers for each frequency band, for only then can true optimum conditions be maintained. It is also advantageous to construct separate inductances when 'phone operation is desired, especially when the plate voltage/current ratio has to be altered appreciably from the normal C.W. settings in order to "match" the D.C. plate resistance to the impedance of the modulation transformer. If this practice prevailed the writer believes that many of the present "broad" 'phone signals would disappear, being replaced by good transmissions which tune sharply and occupy only a minimum of space in the spectrum.

A Useful Three Circuit Oscillator

By J. TROY (GM8RJ)

THIS simple and efficient oscillator has been in use at the writer's station for some considerable time and has always given consistent and satisfactory results. The three circuits covered are (1) Straight Pentode Crystal, (2) Tritet, (3) Electron coupled. The sketch shows the circuit employed.

Any of the three circuits can be brought into use by a novel method of switching. Credit is due to E16G and E18M for the fundamental basis of the circuit, but in their case it is used as E.C. or plate to grid crystal oscillator. The valve employed is a 6L6G and the output is the same when either circuit is in use. The stability on E.C.O. is equal and all stations worked could detect no difference in the quality of phone transmissions whilst all C.W. reports were T9X.



The Three Circuit Oscillator.

C1. 300 µµF C2. .005 µF mica, C3. .0001 µF mica, C4. .002 µF mica, R1 250 ohms 2 watts. R2 100,000 ohms 1 watt. RFC Pie wound choke. SW DP DT switch.

L1 is wound on a 1) in. former and consists of 14 turns of No. 20 SWG DCC wire, close wound. The cathode tap is made two turns from the earth end.

The change from E.C.O. to crystal is effected by means of a DP DT switch, and from straight Pentode to Tritet by the usual method of shorting the cathode condenser. One of the moving vanes of this condenser should be bent slightly, so that when the condenser is turned to maximum capacity it automatically shorts the fixed and moving vanes. A slow motion dial will be found of great advantage for this condenser. The cathode, on E.C.O., is tuned to 3.5 Mc. doubling to 7 Mc. in the plate circuit.

To use the straight Pentode circuit, the cathode condenser is shorted and the crystal switched into circuit. When the Tritet circuit is required, the cathode coil should be replaced by one suitable for the crystal in use. The cathode coil is wired across pins 1 and 3 as shown in the diagram. It is necessary to point out here that a reliable frequency meter of approved type should be employed when the E.C.O. circuit is in use. The ability to make easy and rapid changes of circuit is one of the great features of this oscillator and it will amply repay the cost and time of building it.

A Special J.B. Condenser for U.H.F. Work

The R.F. output produced by "The Ultra-Modern 56 Mc. Transmitter" described in the April, 1938, BULLETIN, was so high that, with no aerial load applied, there was a tendency for the P.A. tank condenser to spark over on occasions. This effect, which could lead to an arc and consequent damage was cured by substituting a specially designed condenser made by Jackson Brothers. This condenser is similar to the original model, except that double spacing is employed. It is of the split stator type, with Keramot insulation and the capacity is 14 μμF. each side, giving a working capacity of approximately 7 μμF.

It is made to special order at a slight extra cost and can be strongly recommended not only for the transmitter in which it is employed, but also for any 56 Mc. apparatus of a similar type. The condenser possesses very low losses and has a very low minimum capacity.

A 56/28 Mc. A.C. T.R.F. Receiver

By J. N. WALKER (G5JU).

R EADERS may have heard of a proverb to the effect that "there is reason in all things"—certainly when a radio amateur builds a new piece of gear he or she has a good reason for so

In the present instance the writer was studying a recent catalogue of Tungsram valves, and two types in particular claimed his attention. The first was the type VP4B, a variable-mu R.F. pentode rated for 250 volts on both anode and screen, and with the very high mutual conductance (for this type of valve) of 4 uA/v, combined with an anode impedance of one megohm. Taking into consideration that the valve is fitted with a grid top cap, giving a low input capacity and high input impedance on ultra-high frequencies, it became obvious that here was a valve which, when included in a carefully designed circuit, would undoubtedly give a definite gain at ultra-high frequencies. The

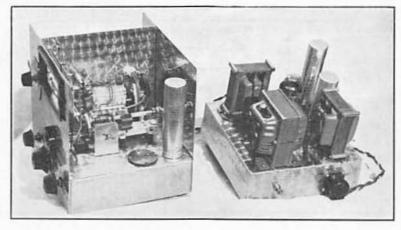
The Coils

About the same time a new type of coil had come to the writer's notice, which, like the valves, was made in such a form as to render it outstandingly suitable for U.H.F. work.

The coil referred to is the "Denco," as advertised

The coil referred to is the "Denco," as advertised in this journal, and its special qualities arise from the fact that the former, of 1½ in. diameter, is made from Trolitul, as also is the base, no other material besides the metal pins, supports, etc., being introduced; even the varnish to hold the turns firm is Trolitul. The metal pins are very small, and the leads from the coil run straight down through them by a very short and direct path, avoiding curls and loops, which means that the inductance is concentrated in the coil itself, and not in the connecting wires.

The reader is doubtless aware of the remarkable electrical qualities of Trolitul. It is difficult on



Top deck view of Power Unit and Detector stage of Receiver.

"Acorn" is, of course, the ideal, but its price makes it prohibitive to the majority, whereas the VP4B is very reasonably priced.

The second valve was the HL4g, a medium impedance triode, also possessing low input and output capacities, and having characteristics indicating that it would make a good detector.

It is well known that mains-operated valves are superior in practically all respects to battery types, this being due to the more generous electronic emission available. The idea of having a receiver specially for the higher frequency bands, running off the mains, and quite independent of batteries, was very attractive, especially since the performance would undoubtedly reach a high standard.

It was therefore decided to turn the mentally pictured receiver into concrete form, and as the design and component values for 56 Mc. operation would also be suitable for 28 Mc., and would ensure first-class results on the latter frequency, it was further decided to include coils for both bands.

the ultra-high frequencies to obtain circuits of high dynamic impedance, but, by the use of the coils specified, with their extremely low losses, an improvement is undoubtedly effected, and the sensitivity is higher in consequence.

The circuit, on the whole, follows that normally employed in any T.R.F. receiver, but special attention has been paid to apparently small points—which points make a considerable difference on the ultra-high frequencies.

The R.F. Stage

It is of little use employing a high gain type of R.F. amplifying valve unless one ensures that it is operated under conditions which will, without question, give the gain indicated in the literature which usually accompanies it. On lower frequencies liberties can be taken in several directions—for instance, cathode bias resistance and screen voltage—and any falling off in performance will probably be difficult to detect, but in the present instance, optimum values, as near as possible, must be used

throughout in order to ensure that the R.F. valve acts as an amplifier, and not merely as a buffer between the aerial and the detector stage.

For the same reason the input circuit must be fully tuned, and not of the aperiodic type, employing a choke or resistance only in the grid circuit.

As tuning is not unduly critical band spreading is not essential, providing a good slow-motion dial is used, and, as the tuning condenser is of greater capacity than the main one in the detector stage. it cannot be ganged to the latter, but is controlled by its own knob and dial on the panel.

The screen is fed with a voltage very nearly equal to that supplied to the anode, the series resistance R4 shown in Fig. 1 being in the nature of a decoupler. In passing it may be said that thorough decoupling, to keep the R.F. and A.F. currents to their proper paths, is absolutely necessary in a receiver of this type.

The Detector Stage

As in any other T.R.F. receiver, whilst the first valve gives a definite gain, the overall sensitivity depends largely on the detector stage and on the use of reaction.

On the ultra-high frequencies all the components comprising the detector stage must be carefully placed to ensure that all connecting leads are very short. As can be seen from the photograph, the detector valve is mounted horizontally, and the associated components are arranged very close to it.

To enable the reaction condenser to be con-veniently fitted, this is mounted with the rear facing the panel, so that it is actually controlled from the back of the receiver. This is no disadvantage, as it is only used for coarse setting, fine reaction control being accomplished by means of a variable resistance mounted centrally on the front panel.

Band-spreading is, of course, essential, the band spread condenser being a Webb's "Economy" type, the original capacity of 15 µµF, being reduced by double spacing, and using only one fixed and two moving vanes. The band set condenser consists of a *Polar* midget of 25 µµF. capacity, and its extremely small size allows of it being mounted on a small aluminium bracket close to the coils.

The tuning dial employed is of a rather unusual type for this class of receiver, but is peculiarly suited for use on the 28 and 56 Mc. bands, where one is in the habit of traversing the whole band

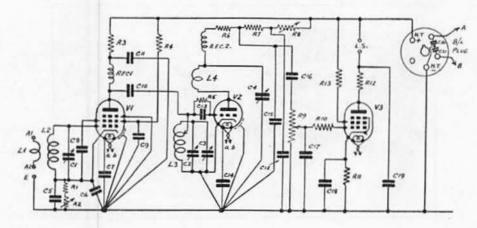


Fig. 1. Circuit of the Receiver portion of 28:56 Mc. A.C. Receiver. Keyed Components.

Keyed
C1. 15 MMF Midget variable, Hammarlund.
C2. 15MMF variable (reduced as per text), Webbs
"Economy."
C3. 25MMF Midget Trimmer, type C.801, Polar.
C4. 160 MMF variable, type "E" Single, Polar.
C5, 7, 8, 14 & 17. 100 MMF Ceramic Cup type K±5 per cent., T.C.C.
C6, 9, 11, 15, 19, 20, 21. 0003 MF type M. Mica, T.C.C.
C10, 13, 50 MMF. Ceramic Cup type K±5 per cent.,
T.C.C.
C12. 4 MF. Electrolytic Polytics

T.C.C.
C12. 4 U.F. Electrolytic, Polar.
C16. .02 U.F Paper Dielectric Tabular, Polar.
C18. 50 U.F Electrolytic 12 volt what, type F.T., T.C.C.
R1, R11. 150 ohms 1 watt, Polar.
R2. 5,000 ohms variable type V/1, Polar.

R3. 1,000 ohms 1 watt, Polar R3. 1,000 ohms 1 watt, Polar.
R4, 6. 5,000 ohms 1 watt, Polar.
R5, 3 megohm 1 watt, Polar.
R7. 25,000 ohms 1 watt, Polar.
R8. 50,000 ohms variable type V4, Polar.
R9. 500,000 ohms variable type V4, Polar.
R10, 13. 10,000 ohms 1 watt, Polar.
R12. 100 ohms 1 watt, Polar.
R12. Rdio Frequency Chebe type 100

RFC1. Radio Frequency Choke type 1010, Eddystone RFC2. " type 1011, Eddystone. 2. ., type 1011, Eddystone Radio Frequency Pentode type VP4B, Tungsram. VI.

Top Grid Triode type HL4g, Tungsram.

Audio Frequency Pentode type APP4C, Tungs-

Other Components.

Valveholders. 2 x 7 pin Ceramic, 1 x 7 pin Airsprung,

Clix. Slow Motion Dial (in degrees), "Puturo," Polar. Adjustable Insulated Bracket type No. 1007, Eddy-

stone.

I Flexible Coupler, type No. 1009, Eddystone.

1 Solid Coupler (for the reaction Condenser) type No. 2005, Bulgin.

1 Slow Motion Head with Knob Dial and Cursor, type No. 1036, Eddystone.

4 Insulating Pillars, 11 in., type No. 1029, Eddystone. 1 Midget Stand Off Insulator, type No. 1019, Eddystone. 1 Aerial Strip, 1 L.S. Control Panel, 1 Fuse Plug (1 amp.),

Clix.
2 Group Boards C31; 1 Mounting Strip T21, Bulgin. Coils and Coil Bases Trolitul, Denco.

Metal Work, Paroussi.

Cable Bush L1262; Top Cap Connectors L1175, Belling Lee.

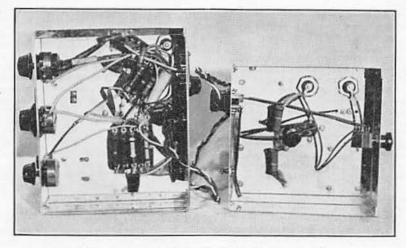
instead of just a portion of it. The single large knob controls both the slow-motion movements incorporated, and, under steady pressure, the reduction ratio of 6 to 1 enables the whole dial to be traversed fairly quickly, yet, with the very small capacity of the tuning coil, without the possibility of missing weak signals.

A signal, although heard, is usually passed over, but on reversing the rotation of the knob, the very slow-motion movement comes into operation automatically, and has a sufficient arc to enable any signal to be easily found and held.

The grid condenser is of the ceramic type, the grid leak being mounted directly across it, and

Let it be said immediately that where they are shown they are definitely required, as determined by practical tests, and the inherent freedom from instability is doubtless due to the fairly liberal use of these components. It is often very difficult to place a mica condenser very close to the valve holder, in which case it has to be mounted as close as is convenient.

The inductance of wiring affects the by-pass action to a considerable extent, so that, on 56 Mc. for instance, the effectiveness in practice may be much less than one would expect from theory. Where .0003 µF, condensers are indicated they serve as by-passes on both 56 and 28 Mc., but



Below the chassis of the 28-56 Mc. Receiver and its associated Power Supply,

both held in their own wiring, so that they are well spaced from other parts. Capacity coupling to the R.F. stage, with another ceramic condenser, is employed. The grid of the detector valve is tapped down the tuning coil to prevent the input impedance of the valve being placed across the whole tuned circuit, the effect of which would be to reduce the dynamic impedance of the latter to a lower value, resulting in poorer efficiency.

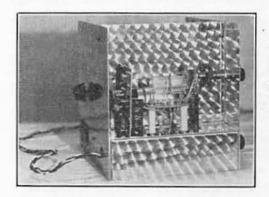
The L.F. Stage

The low-frequency stage incorporates a high slope pentode valve, and is resistance coupled to the detector. This stage follows normal practice, but precautions against the possibility of R.F. getting through to it have been taken. In consequence threshold howl, hand-capacity, and instability of any sort are conspicuous by their absence. A loudspeaker may be fed direct from the output valve, and, as the receiver is intended chiefly for loudspeaker reception, a Clix L.S. panel is fitted to the rear of the set. If it is desired to use telephones, an output transformer should be connected externally to prevent the anode current (which is in the region of 25/30 mA.) damaging the windings.

The By-Pass Condensers

Before considering the power supply, a word of explanation regarding the by-pass condensers is called for, as these are inserted in one or two unusual places, and also duplicated at certain important points.

chiefly on the latter band. The very small ceramic condensers which are mounted right on the valve holder, between the appropriate electrode and the cathode, make a very big difference on the ultra-high frequencies, even though the capacity used only .0001 µF., this being the largest value available at the time. The benefit is due not only to the very short leads reducing the inductive effect, but also to the very low losses of the condensers themselves. There is little doubt but that if similar



Close up view of radio frequency stage of Receiver.

condensers are added to existing receivers a definite improvement will result. The writer believes that larger values are now obtainable, and it would be well to substitute .0003 µF. for the .0001 µF. specified, in which case the mica condensers could well be omitted.

Other Interesting Points

The benefits obtaining from the use of a radiofrequency stage are well known, but if the buffer action between the aerial and detector stage is to be maintained, and if instability from back coupling of the aerial (which is, of course, connected to the R.F. stage) to the detector is to be avoided, no signals must be allowed to reach the detector except via the R.F. stage. For this reason a metal rear panel is fitted in addition to the front panel, whilst the valve holders of the first two valves (which are in horizontal positions) are fitted to small metal brackets, giving additional screening.

The slightest trace of hum in a short-wave receiver is objectionable, especially when sensitive telephones are in use, and there is no doubt that the difficulty of removing hum completely is one of the reasons why battery-operated receivers are still favoured by amateurs who have mains

available.

The chief types of hum are three-namely, inductive, modulation, and from insufficient smoothing. When the power supply is built as part of the receiver itself it is often practically impossible to prevent induced hum, especially where space is restricted, and it is always better to build the power supply as a separate unit, and place it several feet away from the receiver. Modulation hum is audible when a receiver is oscillating, and is usually worse when the receiver is in its most sensitive condition, i.e., just short of the point where oscillation would cease. It is due to R.F. currents being in places where they should not be; for example, in the heater or power circuits. Suitable by-passing of the valve heaters will remove the trouble, but it is usually necessary to extend the process also to the power supply unit. In the present instance, partly through the ample by-passing used, and partly due to the use of a transformer fitted with an electrostatically screened primary, no trouble of this sort has been encountered.

The circuit employed in the power pack is of the choke input type, giving a lower voltage than that obtained otherwise, but having the advantage of giving a very steady voltage independent of current fluctuations. This point is very important if smooth reaction control is to be obtained. The mains transformer and rectifying valve also run under conditions imposing less strain thereby

leading to longer life.

The smoothing provided is ample, and ensures complete freedom from hum. The transformer and chokes are of Wearite manufacture, and are well designed and beautifully finished products. The transformer is specially interesting, in view of the fact that either 4 or 5 volts is available for heating the rectifier valve filament, whilst the normal 4 volts for the other valves may be increased to 6.3 for octal base valves, etc. Two values of high-tension voltage are obtainable, the 350-volt winding (each side of zero) being tapped at 250 volts.

The power supply unit is protected by a Belling-Lee fuse in the high-tension centre tap, and by a Clix fused plug for connecting to the mains.

Construction

The receiver proper is built on an aluminium chassis measuring $10'' \times 9'' \times 21''$. The front and rear panels measure $10'' \times 9''$, and it is necessary to ensure that holes made for the variable resistances, etc., in the chassis correspond with identical holes in the panels. In addition, a screen measuring $9'' \times 61''$, and two valve-holder brackets, $3'' \times 4''$ (R.F.) and $3'' \times 2''$ (detector) are required. All, except the two brackets, may be of 18 gauge metal; the brackets, which only have the bottom flanges to support them, being of 16 gauge. All the metal work, including the chassis for the power supply unit, may be obtained ready drilled, and with all holes, including the large one for the dial escutcheon, cut out. The supplier is E. Paroussi, 10, Featherstone Buildings, High Holborn, London, W.C.1.

A sketch showing the position of the various parts is rendered unnecessary, as the photographs clearly show the general lay-out, but to help intending constructors particulars of the actual spacings between components, brackets, etc., are as follows:

Radio-frequency Stage.—Compartment measures 8"×3". Screen fixed 3 ins. from left hand side. Valve-holder bracket fixed 1 in. from rear, flush with screen. Valve holder (centre) 2 ins. above chassis. Condenser bracket, 2\frac{1}{4} ins. from front (slow-motion head occupies \frac{3}{4} ins.) from from the coupler 1\frac{3}{4} ins.). Centre 2 ins. from left-hand edge. Two insulating pillars holding coil holders, one 2\frac{1}{2} ins. from rear, other 3\frac{1}{2} ins. from front (i.e., 3 ins. apart) near left-hand edge. Aerial socket panel screwed to valve-holder bracket.

Detector and L.F. Stages.—Detector valve holder 2 ins. from rear, flush with screen. Valve centre 2 ins. above chassis. Coil holder pillars 3 ins. each from front and rear, 2½ ins. from screen. Reaction condenser—L.H. holes 2½ ins. from screen; R.H.

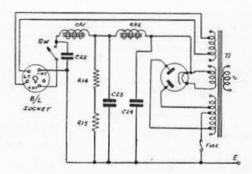


Fig. 2.

Circuit of special Power Supply Unit built to match
receiver.

receiver.

C22. 8 F Electrolytic, Polar.

C23. 6 F Electrolytic, Polar.

C24. .01 F Tubular, Polar.

R14, 15. 20,000 ohms 2 watt, Polar.

Choke 1. 40 henries H.T.13, Wearite.

Choke 2. 10 henries H.T.11, Wearite.

Transformer "Universal," Wearite.

Valveholder 4-pin Airsprung, Clix.

Valve. Indirectly heated type APV4, Tungaram.

Switch. Single Pole On-Off Type S91, Bulgin.

Plug and Socket. 5-pin Multi Connector No. 1260,

Belling Lee.

Fuse Holder and 100 mA. Fuse. No. 1045, Belling Lee.

Metal work. Paroussi.

Fused Plug (with 1 amp fuses). Clix.

holes 14 ins. from L.H. holes. Rear holes 15 ins. from rear; front holes 31 ins. from rear. (Normal position of condenser is reversed, i.e., shaft projects to rear.) Tuning condenser bracket 2"×4", with flange, centre mounted 4 ins. from R.H. side, $1\frac{1}{6}$ ins. from front; spindle $1\frac{3}{4}$ ins. above chassis (slot for condenser $\frac{7}{16}$ in.). Two small stand-offs on screen, mounted in line, $3\frac{1}{2}$ ins. apart, rear one just above valve-holder bracket. Band set con-denser bracket measures 2½"×2"; fitted 2½ ins. from R.H. side, 3 ins. from front. Electrolytic condenser 11 ins. from rear, and from R.H. side. Output valve holder 3 ins. from rear, 11 ins. from R.H. side.

Front Panel.-Main dial opening as per instructions enclosed with it. Escutcheon 1 in. from top, 11 ins. from R.H. side, 31 ins. from L.H. side. R.F. condenser S/M head 2 ins. from L.H. side 31 ins. from top. R.F. gain control 2 ins. from L.H. side. Reaction control 3 ins. from R.F. control. A.F. gain control 2 ins. from R.H. side (all

three 11 ins. from bottom edge).

Rear Panel.-Hole for reaction condenser shaft $3\frac{\pi}{8}$ ins. from side, $4\frac{\pi}{4}$ ins. from bottom. Loudspeaker panel—as directed in leaflet supplied near output valve.

Below the Chassis .- R.F. Group board held by one valve bracket (detector) screw, and one specially fitted. Other group board requires two special screws, and is fitted between output valve socket and first group board. Small bracket at rear,

to which power supplies connect.

The foregoing gives practically all the information necessary to complete the construction. Both sides of C1 have to be insulated from the chassis, this being accomplished by the use of an Eddystone adjustable bracket, and flexible coupler. A 1-in. hole should be made in the screen where the anode lead of the R.F. valve passes through, and suitable holes made below each valve holder to allow the wiring to pass underneath the chassis.

When the coil bases have been fitted to the insulating pillars the amount of threaded screw projecting above the fixing nuts must be nipped off, as they will otherwise prevent the coil pins going

properly into their sockets.

The height above the chassis of C2 may be suitably adjusted by interposing between the bracket and the chassis a piece of ebonite of the proper size and thickness. Where the fixing screws pass through they should be covered with pieces of sleeving, and insulating washers used underneath, so that metallic contact with the chassis is prevented. Unless this is done a loop circuit is formed, which will give rise to peculiar effects. When the receiver was first tried out, with the condenser bracket in metallic connection with the chassis, the tuning range was found to have a gap in it; a jump would occur from about 58 megacycles to a much higher frequency, but this effect completely disappeared after carrying out the arrangement above.

It is desirable to mount the reaction condenser above the chassis by means of 1-in. lengths of tubing (either ebonite or metal), as this brings the connecting tags nearer to the coil bases.

Wiring Up

In apparatus of this type, where the spacing between many of the components is small, it is wise to well tin beforehand all the soldering tags, etc., to which connections have to be made, or, still better, to judge the lengths of wire that will be required (with a little to spare, to be on the safe side), and to solder these to the appropriate components before they are mounted. Particularly in the case of the coil bases should this be done. as it will prove of considerable help in completing the wiring up without difficulty.

It will be found that Trolitul softens under the application of heat, but hardens up again afterwards. and is not detrimentally affected. Low melting point resin-cored solder should be used, to avoid softening the Trolitul more than is necessary.

The valve holders may be completely wired up

before the brackets are mounted.

The wiring of the R.F. circuits may be carried out with 18 S.W.G. enamelled (not tinned) copper

wire, and should be short and direct.

Components should not be wired in series, but separate wires should be taken to the appropriate points. For example, the fixed vanes of the band set condenser could easily be soldered to one side of the fixed vanes of the band-spread condenser. the other side of the latter going to the grid pin of the coil base. This, however, is inadvisable, and separate wires should be taken to the coil pin from each condenser. Wiring in this manner will ensure greater stability.

The connection from the anode of the R.F. valve must be kept well away from adjacent metal work, and also held rigid. The two insulating pillars mounted on the screen above the detector coil enable both to be done, and also provide an anchorage for the grid condenser and leak.

The ceramic by-pass condenser C5 connects directly from the coil pin to chassis, as shown in the photograph. The wires attached to the various other ceramic condensers should be cut as short as possible, to increase their effectiveness.

The use of group boards for the majority of resistances simplifies matters below the chassis considerably, as well as giving a much neater appearance. On the first one—termed, for convenience, the "R.F. Group Board"—are mounted R1, R3, R4, C6 and C11, whilst C9 connects from one side of R4 to the chassis.

On the other Group Board are found R6, R7, R11, R13 and C18. C19 connects from one fixing

screw to R12.

In addition to the condensers shown, two of .0003 µF (noted as C20 and C21 in the caption below Fig. 1) are connected from the heater tags on the power supply panel to the chassis. It will be seen that extensive precautions are employed to ensure absence of modulation hum, and it can be definitely stated that they are well worth while.

The rear panel will not be fitted until nearly all the wiring has been completed, the final operations being the connections to the "Clix" loud-speaker

panel.

Construction of the Power Supply
The chassis bearing the power supply components measures 8" × 8", and the finish matches the receiver chassis. Details of the spacing between components

The switch for cutting off the high-tension voltage (whilst allowing the heaters to be left on) is mounted in the centre of one side of the chassis, which side is considered the front.

The mains transformer is in the rear left-hand corner, with the plugs for connections to the mains facing the rear. To the left of it is the 10 Henry input filter choke. One electrolytic condenser is mounted 11 ins. from the left-hand side, 12 ins. from the front; the other 4 ins. from the front,

The 40 Henry choke is in the R.H. front corner; he valve holder practically central on the chassis, and the fuse in front of and to the left of it. No mains switch is fitted, as the special connecting device on the transformer renders it unnecessary.

Wiring up is simple. It is only necessary to note C20, a mica .0003 uF condenser (which is fitted direct from one heater pin on the valve holder to the chassis), and the position of R14 and R15 (which are identical resistances in series to give adequate dissipation) between the junction of the two chokes and chassis.

The power supplies connect to a Belling Lee 5-pin socket on the rear of the chassis, a flexible cable ending in the plug being fitted to the receiver, enabling quick and fool-proof connection between

The 250-0-250-volt output is utilised, and a very steady, well-smoothed D.C. supply of 180 volts results. If the 350-volt terminals are connected the output voltage rises to 260, and the efficiency of the receiver increases somewhat, but a slight amount of hum becomes apparent, and the reaction control is not so smooth. R7 must be increased from 25,000 ohms to 50,000 ohms in the latter case.

Operation and Adjustment

As may be expected, a receiver of this kind, employing high gain valves, and very low loss coils, is very lively to handle, and some adjustment of the coils may be called for to obtain absolutely smooth operation.

For use on 56 Mc, the aerial coil should consist of a two-turns grid winding, and, in most cases, one turn of aerial coupling. The latter may be either connected directly to the feeders, where used, or series tuned with a 15 µµF. variable condenser, when a long end-on aerial is used. In the latter case the lower aerial socket is connected to the earth socket. An earth terminal should be fitted on the rear of the chassis, and, although an earth will make little difference to signal strength, tuning, etc., it should be used in order to ensure stability of the receiver and power supply as a whole.

The detector coil windings for 56 Mc, will be two turns grid and one turn reaction-the fact that oscillation can be easily obtained with only one reaction turn indicates, in itself, the low loss characteristics of the detector stage. The tapping for the grid connection is made at the top of the turn nearest the grid pin, the connection itself being made by means of a Bulgin "Acorn" type valve clip. A crocodile clip should not be used, as the comparatively heavy mass of ferrous metal in the field of the coil will have detrimental effects.

If the wiring follows closely that of the original receiver the band set condenser will be at not quite half capacity. Once the correct position has been found a mark should be made on the bush in which the spindle rotates, so that the setting may be easily found at any time.

On 28 Mc, the aerial coil should have five turns grid, and two turns aerial coupling; the detector coil five turns grid, centre tapped for the grid connection, and one turn reaction; the latter being

very close to the grid winding. The band set condenser will be at just over half capacity.

The sizes specified for the coils and condensers will result in the amateur bands being fully covered. with a little to spare, on the tuning dial, which, being large, is easy to read. The tuning condenser of the R.F. stage will only need slight readjustment from one end of the band to the other.

The Alexandra Palace television and sound signals can be received with the 28 Mc, coil in the R.F. stage, and the 56 Mc. coil in the detector stage, with the band set condenser at nearly full capacity. Under these circumstances, however, the R.F. stage is acting in an aperiodic manner, the tuning condenser being set at minimum.

If regular reception is contemplated, either a larger condenser, of say 40 µµF., should be fitted, or a coil, specially wound with four turns grid winding, substituted. The coils are obtainable in the correct sizes as specified from Denco, of Clactonon-Sea.

The receiver is operated in a perfectly normal manner. With the variable resistance controlling reaction set at the mid-point of its movement, the reaction condenser should be adjusted (from the rear) so that the receiver oscillates. Further critical control is then carried out with the variable

Hand capacity is conspicuous by its absencethere is not the slightest trace of it, and the metal work may be touched whilst a signal is being received without changing the note in the slightest degree. This may be attributed to the large amount of screening incorporated, and the care which has been expended to ensure that the decoupling and by-passing arrangements thoroughly effective. The background noise level is very low.

The results obtained from the receiver have come fully up to expectations. At the time of writing the receiver has only been in used for a short period, but already on 28 Mc. signals from five continents have been received, whilst on 56 Mc. the signals usually heard in Bristol have gone up considerably in strength. C.W. signals from G6FO can be read easily with the reaction control backed off well below the point at which oscillation commences. In addition, telephony signals from GTL2, a police station in the North of England, have been received and copied at good strength.

LONDON MEETING

Wednesday November 23rd, 1938

I.E.E., SAVOY PLACE,

Victoria Embankment

Tea, 6 p.m.

Commence 6.45 p.m. LECTURE :-

RECENT VALVE DEVELOPMENTS By K. FROST Esq.

Standard Telephones and Cables Ltd.

COMMUNICATION RECEIVERS AND TRANSMITTERS

More and more samples of high performance, high quality instruments are coming into our stocks. Still the famous NATIONAL H.R.O. holds its own, with its two stages of R.F. Amplification, Plug-in Coils, Extended Wave Range from 30 Mc. to 50 kc. Four models always in stock : Table ; Rack and Panel ; Battery ; and Junior. Prices range for the Senior from £49 10s.

The Hallicrafters Extended Range, which now surpasses all others in scope, with the Sky Buddy at £9 9s, at the foot, and the most amazing Dual Diversity 24-Tube £150 model at the head. Perhaps the most popular is the Sky Challenger 11 at £25 (illustrated below). Employing one stage R.F., definite image rejection, and wide wave range. This

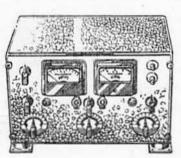
Challenger, the most popular general purpose model, EXCEPTING,
OF COURSE, THE NOW FAMOUS SKY CHAMPION. . . .
Eight Valves, Full Band Spread . . . Wave Coverage 6.8 to 550
metres. . . Monitor Speaker . . Separate B.F.O . . . AND
DRICE THE TEXT CONTRIBUTION OF THE TEXT CON

PRICE . £15 15s. MORE SKY CHAMPIONS are in use in the British Isles than any other Communication Model.

For the U.H.F. Man there is now the new HALLICRAFTER . . employing the NEW R.C.A. 1851 Tube in the R.F. ULTRA . Stage: 1,600 kc. I.F.'s, and covering the range from 3.75 metres to 53 metres. To the best of our knowledge, this is the only worthwhile U.H.F. Superhet available at the moment. PRICE Complete, £52.



HALLICRAFTERS SKY CHALLENGER II



THE HARVEY UHXIO

WEBR'S



HALLICRAFTERS SKY BUDDY

WEBB'S RANGE OF TRANSMITTERS includes the latest product of R.C.A.: The A.C.T.150: 150 to 200 watts output on all bands from 28 to 1.7 Mc.; two 808's in the final; Separate Pre-amplifier. In all, a superb instrument. Then the COLLINS 30J, which scarcely needs introduction. The range of NATIONAL EXCITERS.... MODULATORS AND PRE-AMPLIFIERS AND THE LATEST HALLICRAFTERS MODEL H.T.I. Full 75 watts Mod., 120 watts C.W. Three wave-bands, switched. Complete, ready to put on the air at £73.

Still the most popular small Complete Transmitter is the HARVEY UHX 10, the tiny unit with vast capabilities. 10 to 20 watts output on all bands from 5 to 160 metres. Fully modulated. Makes an ideal first TX or an Exciter for the advanced amateur. Capable of driving up

to 250 watts PA PRICE of the UHX10, complete with Two-Band Operation, including coils for two bands, £19.

PRICE of the UHX10, complete with Two-Band Operation, including constor two bands, 217. Power Pack, £6 10s.

Six-volt Genemotor for Mobile Work, £9 16s.

New Range of McELROY Morse Aids and Keys.

The latest McELROY Morse Code Recorder operates direct from 21 watt output from the receiver. Will take speeds from 5 to 150 w.p.m. Price complete, £8.

Tape Puller for use with Recorder, £3 7s. 6d.

McElroy Morse Transmitter.—Converts the printed tape into impulses. Used in conjunction with the TX or an Audio Oscillator, for transmitting at any speed or for Morse practice, £8.

This equipment, with auxiliary apparatus, is available to accredited societies or groups on him for available.

or groups on hire for periods of one month or more.

McElroy's New Keys include the four Light Models—The Amateur at 6/6; The Commercial, 8/6; The Professional at 12/6; and the De Luxe at 15/-The ever-popular MacSTRATE,

with heavy car available at 7/6.

RADIO

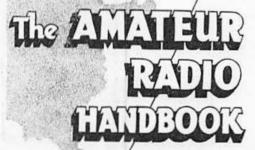


BIRMINGHAM DEPOT 41 CARRS LANE

(C. WEBB LTD.)

14 SOHO ST., OXFORD ST., LONDON, W.1 PHONE: GERRARD 2089

Through British Eyes



A WISH FULFILLED

At last a British Amateur Radio Handbook. Written by many of the leading amateurs of Great Britain this new publication will prove of inestimable value to all who wish to understand the theory and practice of Amateur Radio.

LIST OF CHAPTERS

i. Amateur Radio. ii. Fundamentals. iii. Valves. iv. Receivers. v. Radio Transmitters. vi. Modulation and Keying. vii. Power Supply. viii. Audio Equipment. ix. Artificial Aerials. x. Aerials. xi. Prevention of Transmitter Interference. xii. Ultra High-Frequencies. xiii. Ultra High-Frequencies. xiii. Ultra High-Frequency Equipment. xiv. Television. xv. Frequency Measurements. xvi. Measuring Instruments. xvii. Station Planning. xviii. Operating a Station. xix. How to Become a Radio Amateur. xx. How to Obtain a Licence. xxi. Great Circle Routes. xxii. Selected References. xxiii. The R.S.G.B. and the Radio Amateur. xxiv. Useful Data, Charts and Abacs.

300 PAGES. 24 CHAPTERS. Printed on good quality paper with stiff covers. Pages open flat. Price 2/6 or post free 2/9. Overseas 3/6 post paid.

COUPON

To the R.S.G.B. Sales Dept., 53, Victoria Street, LONDON, S.W.1.

Please send me......(copies) of The Amateur Radio Handbook. I enclose P.O. for.....

Name

Address

USE BLOCK LETTERS

Workshop Practice

PART 1. SOLDERING

By "SHACK"

We have pleasure in introducing to our readers a new

Each article will deal with some specified aspect of Workshop

Suggestions for future articles in the series will be welcomed

series of articles which it is hoped will have a wide appeal

A GOOD soldered joint is the basis of every piece of radio apparatus. When we pause to consider the number of soldered joints in a modern receiver and the slipshod way in which many amateurs make their joints, it is surprising that bad soldering does not cause more trouble. It only needs one bad joint to produce a fault which may take a week to locate. Further, it is not always possible to find a bad connection by means of a test meter since the joint may behave quite normally when an appreciable current is flowing yet its action under a minute R.F. current is that of a high, variable resistance. The moral, therefore, is to see that all soldered joints are properly made in the first instance.

Radio is a good servant but a very bad master. You can be perfectly certain that when ever you decide to chance an item, be it a minor component, a doubtful resistor or a poor soldered joint it will let you down. Take no risks but do the job

properly the first time.

The Use of Flux

We all know why a connection is soldered but few ever pause to consider what happens during the process. When we solder we endeavour to produce a continuous metallic connection of very low resistance between the tag and the wire. We

by the Author.

want the solder to form a microscopically thin alloy with the two parts to be joined. Unfortunately all metals in common use oxidise rapidly when heated in

contact with the air and it is to prevent oxidisation that a flux is used which covers the joint to form an airtight seal under which the solder can flow. The flux also has another very important function to perform in assisting the cleaning process. All fluxes are slightly corrosive when hot, some more so than others. Zinc chloride ("killed spirits") is the best flux for most metals, but as it is very corrosive even when cold and difficult to remove it must be prohibited for all electrical work. There are, of course, a number of proprietary fluxes sold which are excellent for radio joints, but the finished connection should be cleaned with a rag damped with methylated spirits. By far the best and safest flux is pure resin although it is more difficult to use and needs greater care if dry joints are to be avoided. Resin being a solid at all normal temperatures and insoluble in water, is safe to use since there is no fear of the flux causing corrosion. It is only a very mild cleaning agent when hot, therefore all parts to be soldered must be scraped scrupulously clean otherwise the solder will not flow under the flux. Watch the blob of hot solder flowing off the iron. If it forms like a globule of water on a greasy Watch the blob of hot solder flowing off the plate then the joint is not clean enough and must be scraped again. The solder should flow in a thin

even film over the hot metal, the thinner the solder flows the better the joint will be.

Solder and Resin

Solder is sold in various grades from a very coarse type containing about three parts of lead to one part of tin which is used for plumbing, to very fine blow-pipe solders containing one part of lead to four parts of tin. Fortunately the makers of electric soldering irons, which are now in almost universal use, have produced a very satisfactory resin cored solder which should always be used with these irons. In addition to the resin in the solder a small tin of resin should be kept handy on the bench. Resin can be bought at most chemists' shops, but only the best pale, straw coloured lump resin should be purchased. Refuse the powdered resin since it is often of inferior quality. A pound of resin costing about eightpence should last about a year under normal amateur conditions.

Soldering Hints

In order to produce a good soldered joint certain conditions must be fulfilled.

 All parts to be soldered must be absolutely clean.

Some suitable flux, preferably pure resin, must be used to assist in cleaning and to prevent oxidisation of the parts to be soldered.

 All the parts to be soldered and the solder itself must be heated to a temperature slightly higher than the melting point of the solder.

 The heat must be applied long enough for the solder to run into all the crevices of the joint.

The soldering iron must have the point properly tinned in order to convey the heat from the iron to the joint.

6. A class of solder suitable for the job must be

The soldered joint must be kept perfectly still until the solder has had time to solidify.

 All surplus flux, particularly if a paste or fluid, must be carefully removed when the joint is cold.

Cleaning

This sounds very simple, but it is where most beginners go astray. Cleaning does not mean polishing with a metal polish, it means mechanically scraping with a proper scraper (it is not unknown for a beginner to try cleaning parts to be soldered with a metal polish!). The most useful cleaning tool is a small three cornered scraper which can either be purchased from a tool dealer or made from a 4 in. dead smooth single ended triangular saw file. Grind the teeth away for $1\frac{1}{2}$ in. on all three sides until the end forms a point. The grinding should be done on a wet grindstone, finally inishing the edges off on an oil stone. Do not use excessive pressure when grinding towards the point

or the heat of grinding will draw the temper as indicated by the point going blue in colour. Files are tempered to what is known as "dead hard." since they are required to cut all other metals; for the same reason we require our scraper to be dead hard. If, in grinding, the temper is "drawn" it will become soft and will require resharpening too often. Under no circumstances should a high speed carborundum type of wheel be used as it is almost certain to soften the tool. Besides its use as a scraper this tool makes a good pricker for wood screws, the tapering triangular hole formed giving an excellent start for the thread.

Tinning the Iron

A soldering iron is useless until the point has been tinned because it is only through the tinning that the heat can be conveyed from the iron to the joint. The film of oxidised copper and dirt which inevitably forms on an untinned iron acts as an efficient insulation to the heat. To tin the iron, heat it until it will just melt the solder, file one face clean and before it has had time to discolour, rub it in a small heap of resin and bits of solder in a tin lid. Repeat the process with the other faces of the iron till the point is completely covered with solder for about \$\frac{1}{4}\$ in, up. Once an iron has been properly tinned it should hardly ever need retinning provided it is not overheated and resin is used exclusively as the flux. The surplus resin which finds its way on to the bit burns, to form a black scale, which can be wiped off with a cloth leaving a bright tinnend surface underneath. An excellent way of tinning a gas or coal heated iron is to have a tin containing scraps of solder and salammoniac into which the hot iron is plunged. This method should not be used indoors since the fumes are most objectionable, also the iron must be nearly redhot so it is useless for an electric iron. With the salammoniac method there is no need to clean the iron at all, just plunge the hot iron into the mixture and the salammoniac will do the cleaning. Some of the paste fluxes have the disadvantage that they attack the solder on the iron making frequent retinning essential but with resin, retinning should never be necessary. Fortunately electric irons are usually sold already tinned but the writer always prefers to retin the iron himself before using it.

Making a Soldered Joint

Let us now proceed to solder a so-called "tinned soldering tag" to a wire. If any attempt is made to make use of this, so-called "tinning" the result is most likely to be a perfect specimen of a dry joint! Treat the tinning as a dirty surface and scrape it away until the metal is laid bare underneath. It is not enough to produce a few streaks of brass, scrape till the whole of the part to be soldered shows clean brass. Pick up a small piece of solder on the iron, plunge it into the tin of resin and transfer the iron quickly to the soldering tag. The resin will run down the tag followed by a film of solder which should appear as though it wants to meet the brass of the tag. If it behaves like a spot of water on a greasy plate then the tag is not clean. Never touch anything which has just been cleaned for soldering as the grease from the hand is quite enough to prevent the solder running properly. Now having cleaned and tinned both sides of the soldering tag make the end of the wire into a small hook, put it through the hole in the tag and nip it up with a pair of

pliers to make a mechanical joint. Pick up a small piece of solder and some resin on the iron and transfer them quickly to the joint. After the solder has run all through the joint hold the iron underneath to drain off the surplus solder. It is a common fallacy to imagine that the strength of a soldered joint depends upon the amount of solder used. It does not. A good soldered joint should have the parts to be joined, in as close a contact as possible with just sufficient solder left to prevent them moving. That is why it is always best to make a mechanical joint first. Curiously enough, although the tinning on many components is often of a very doubtful quality, tinned copper wire takes solder readily without much cleaning. It is as well to pull the wire through a clean cloth to remove the surface dirt and straighten the wire. If the wire is very old or dirty then pull it through a piece of emery cloth or glass paper.

A very common method of soldering is to lay the wire on top of the tag (uncleaned of course), smear them both with flux, drop a large blob of solder on with the iron and wait until it sticks. This class of joint gets exactly what it deserves—trouble at a very early date. A light jerk would pull the joint apart, for the solder has not been given a fair chance to adhere to either the tag or the wire. The foundation of all good soldered joints should be a sound mechanical joint as a

beginning.

Now go away and solder up that frequency motor properly!

Photographing Amateur-Built Radio Apparatus

One of our contributors has forwarded a questionnaire seeking information regarding the best methods to employ for photographing amateur-built radio apparatus. In view of the fact that many others may be interested, we invite any member with expert knowledge of the subject to furnish us with a short article for publication. We shall be glad to forward a copy of the above-mentioned questionnaire to anyone able to assist.

Isle of Man Radio Society

Mr. Lawsen, the Hon. Secretary of the above Society, informs us that they have just completed the construction of a 3-valve T.R.F. receiver for use by the Club.

On October 27 a visit was paid to the Douglas Corporation Power station by kind permission of the Borough Engineer. On November 8 a series of films loaned by the B.T.H. Company were displayed.

Morse classes have been arranged, and it is hoped that at any early date the Society will obtain its

own transmitting licence.

W7BJS

We are informed by G6BW that W7BJS of Wyoming is anxious for G contacts on the 28 Mc. band. He normally works telephony on 29420 kc.

Reports Wanted

G3UT (Bungay, Suffolk) on his 7 and 14 Mc. C.W. and 'phone transmissions. All reports will be acknowledged.

A 56 Mc. Driver Panel

By W. F. HOLFORD, M.A. (G5NG)

N considering the design of a 56 Mc. Drive, Panel the first consideration was, of courser stability, but the second was equally important, namely, cutting down interstage losses and matching up the load.

It was considered necessary to have one complete panel to give a 56 Mc. output, which could be used for portable or emergency work, and which would be capable equally of driving a push-pull output stage without alteration.

Oscillator

For the CO a 6F6 very heavily biased was chosen. The drive from this is sufficient for most sensitive tetrodes used in doubling, and the anode and crystal current can be kept very low. If a Tritet is used, crystal current is unnecessarily high and the extra adjustment is a temptation to squeeze a little more out, in spite of the fact that tetrodes do not like to be overdriven, when both quality and stability suffer.

A fundamental oscillator, with a good choke, is therefore used, but the crystal must be one that starts easily. Under these conditions anode and crystal current never rise.

Harmonics

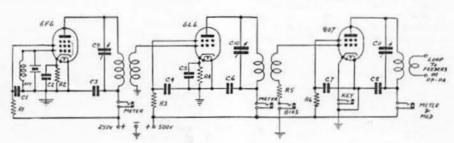
There is a snag of course; there always is when things appear so beautifully simple, and the 6F6 output is very good. Unfortunately, the odd harmonic comes through nearly as strongly and much more easily than the even, and a good deal of trouble was experienced in adjusting the load so that power was not wasted in putting out an unwanted signal on 42 Mc. The 807 would put 300 mA into 100 ohms at this frequency without any effort at all.

The cause was the overlapping fields of the coils, and the fact that both tetrodes require an amazingly small amount of drive. Faraday screens, as described in the May, 1938, issue obviated unwanted coupling, and an evening's hard work found the best working ratio for the transformers.

Coils

Since this is a one band transmitter, all RF leads are above and all others below the panel. Porcelain insulators 11 ins. apart give rigidity and enable really low loss transformers to be airspaced.

As doubling is carried out at each anode, silver plated tuned primaries are used, the wire being



Circuit of 56 Mc. Driver Unit.

R1.	50,000 oh	ms, 20 watt	Premier.	C1, 2, 4	.01 \(\mathcal{I} F. T.C.C. \type M.
R1. R2.	2,000 .		**	C3, 5, 6	.001
R3. R6.	20,000 .		**	C7. 8	.0015
R4.	5,000			C9,	5-plate, nearly all in.
RS.	150,000 .		7,	C10.	3-plate, half in, double spaced.
R4, R5, CH.	2 : 1 chok	e.	650	C11.	2-plate, neutralising spaced t in. Raymart
					Ceramic

Coupling

Tetrodes, especially low capacity ones, are very susceptible to the effects of the reflected load. Transformer coupling was therefore decided upon. Capacity coupling is unnecessarily expensive, gives rise to avoidable losses, but is simple to install. The fact that mica condenser losses are quite high at this frequency was also a deciding factor in the choice of coupling. It is well worth while taking the trouble to suit the transformer to the valve, and cheap but difficult to find the best loading conditions.

Frequency Doubling

A valve just large enough for the drive, with this very efficient coupling, is the 6L6 and the same argument applies to the second F.D., an 807, link coupled to the aerial or push-pull amplifier; input to the 807 being 5 to 40 watts, without alteration except fixed bias.

No. 10 gauge copper wire, and the diameter 1 in. This wire can be obtained in short lengths from local electricians, who use it for earthing. A 4 volt battery, a silver coin for an anode, and five minutes in a solution of silver cyanide (made from rat poison which can be obtained from any chemist) will add appreciably to the looks and possibly to the efficiency of the coils.

An aperiodic grid coil surrounding the anode coil seemed the obvious way to accommodate the greater inductance necessary, and 18 gauge enamelled wire (coils of 1½ ins. diameter) was found to be sufficiently heavy to "stay put" while the grid coil was being fitted into place to give a ½ in. all round clearance. This thickness is rigid enough, easy to work, and makes a really good mechanical job.

It is well to remember that the lowering of inductance due to the proximity of the grid coil is appreciable at these frequencies, and the primary alone should resonate with the condensers practically

The 6F6 will only stand the loading of 5 turns over the cold end of the primary; the 6L6 doubling to 28 Mc. enabled much closer coupling to be used, eight turns covering the length of the primary winding. With this adjustment the reflected load is even throughout on keying (meters dipping equally), and this panel can be run from a single 250 volt pack with condenser input and give a Yet with choke input and 600 volts final, the 807 can be run up to the full rating of over 40 watts.

Screening

To get a sufficient separation of input and output, and to avoid having to announce that " reports of reception will be welcomed for this band only, the 807 was mounted horizontally. Leads are very short and the single Faraday screen prevents

coupling between coils and condensers.

A good deal of thought was spent on the mounting of this valve. It seemed a waste of time taking the trouble to do away with iron and masses of metal and then use a metal bracket; so 1 in-celluloid was cut and clipped on to the base with two small aluminium angle pieces, pinned through, so that no fixing shows above the base-board. This adds greatly to the appearance and possibly to the efficiency

The base, 17 ins. by 9 ins., is of hand polished in five-ply, stained mahogany in this case, backed with thin copper foil. This overcomes many earthing problems, and all by-pass condensers are soldered directly from the socket wire to the copper

Metering

Closed circuit jacks, insulated on small pieces of ebonite, are screwed to the front edge for oscillator anode, F.D. anode, cathode of final for keying or cathode modulation, grid of 807 for fixed bias (three and a half times cut-off is used), and anode of 807 for metering or modulation.

Modulation

Cathode injection for modulation has several advantages. Normally using CW and its appropriate bias, it is convenient to change straight over by plugging in a 1-1 output transformer in the cathode, when the bias automatically adjusts itself for the new conditions.

Cathode keying has so far given no interference with powers up to 20 watts on the same line as the BCL set with the usual simple filter on the key

itself.

For this power two small tetrodes in push-pull, using Ferranti stock transformers, enable a good enough match for all general purposes without the expense of special modulation transformers for which a very special price is asked at present!

Head amplifiers, too, are a nuisance and unnecessary. It is possible to have a high-mu triode, mixer, low-mu triode, and tetrodes or pentodes in push-pull, with the power supply and necessary controls on a similar 17 ins. by 9 ins. chassis. Sufficient gain and power are available to run three speakers from microphones used for rebroadcasting speech in separate rooms. Although under these conditions, hum is noticeable, it is negligible when modulating the transmitter, as tested at half a mile on a superhet giving loud-speaker volume.

Careful layout and a sensible use of screened cable enables the microphone to be used even up to 100 feet from the amplifier.

Output Precautions

For use on very low power, regeneration in the 807 is easily obtained by inadequate by-passing (.0001 instead of .0015) and gives about 10 per cent. increase in output. This, however, like the Tritet adjustment which affects both stability and note, makes a T9 note difficult but possible to attain. But even then a good T8 is always given, and the slight extra range may on occasions be worth while.

A fair amount of time was spent at first in endeavouring to gang two small receiving condensers double spaced for use as a series gap and as a split stator. No mechanical difficulties were encountered in matching up, or in making a rigid job, but there was far too much metal for efficiency and the brass bracket formed a closed loop. One of the circular plate neutralising condensers does very well.

Performance

On seven watts input to the final (C.O. 12 mA, F.D. 15 mA, F.D. 30 mA), the beam* has given a consistent S5 signal at twenty miles over a fort-night's straight run (including the full moon).

It remains to be seen what it will do on full input, but optimism is as strong now as in prewireless "angling" days, and perhaps it may yet be legally possible to try it out as a driver for a pair of HF 100s.

Interference

No trouble has ever been experienced from keying interference, and this is regarded as being due to the following precautions:

- (1) A mains filter, consisting of 16 s.w.g. D.C.C. wire (wound as a shell 4 ins. diameter) and a $.1 \times .1$ μF condenser to earth has always been a permanent installation on the radio
- (2) Low resistance copper screening enables short direct connections for decoupling, and no earth is used on the transmitter.
- (3) Twenty watt resistors from Premier Supply Stores are no more expensive than graded 1 to 6 watt types as usually specified. They run stone cold, and, owing to their size (about 4 ins. × ½ in.) act as useful chokes.

See T. & R. BULLETIN, September, 1938.

Sussex Short Wave and Television Club Activities

On September 27 at The Pavilion, Bognor Regis, Mr. E. J. Williams, B.Sc. (G2XC) gave a very instructive lecture on Magnetic Storms and Sunspots and their relationship to radio conditions.

The club's annual outing took place on October 12, when 30 members and friends journed by coach to the Murphy Radio Co., Welwyn. After an extensive tour of the factory, a lecture and demonstration of television was given, followed by a talk on ultra-short wave design problems. R.S.G.B. members who are employees of the Murphy Co., joined the party for lunch. On October 27, Mr. P. G. A. Voigt lectured on

high quality reproduction.

Membership particulars can be obtained from the Joint Hon. Secretary, Mr. C. J. Rockall, G2ZV, "Aubretia," Seafield Road, Rustington, Sussex.

Automatic Change-over System for 100% Break-in Operation.

By H. C. PAGE (G6PA)

This article should prove of particular interest to members of the Civilian Wireless Reserve who are faced with the problem of operating their stations under "break-in" conditions.

POR some years the writer has been in the habit of working "Break-in" when using C.W. With the coming of the C.W.R. and the necessity for operating a receiver on exactly the same frequency as the transmitter, it soon became apparent that an improved system of control was essential.

The most general system in use to-day is to run the receiver on a separate aerial and key the first stage of the transmitter, so that no spacing wave is present when the key is up. This system works fairly well when the receiver and transmitter are not too close to one another in frequency, but when they coincide the key thumps are terrific, and no self-respecting receiver will put up with such treatment for long. Apart from this fact, the strain on the ears is too great for continual operation, whilst the system itself savours too much of the "good old days."

General Consideration

Now if the receiver can be rendered inoperative when the key is depressed we have the basis of a system which is very much better from all points of view. Although the method employed by the writer is simple, there are one or two points which it may be helpful to discuss.

The first and most necessary requirement is that no clicks of appreciable strength shall be generated. Reference to the diagram shows that the basic circuit consists of a change-over relay which cuts the H.T. off the receiver as soon as the key is depressed, and very shortly afterwards closes the keying circuit of the transmitter. While this could be effected by a single relay fitted with multiple contacts it has proved more satisfactory in practice to use a second relay for the actual keying of the transmitter. The need for very high insulation of the relay contacts is thus obviated.

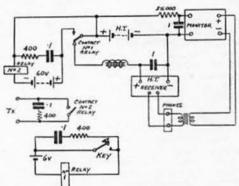
Study of the circuit arrangements shows that when No. 1 relay breaks the H.T. supply to the receiver and closes the energising circuit of relay No. 2, the keying circuit of the transmitter is closed. While this only takes a few milli-seconds, the lag in the closing of Relay No. 2 is just sufficient to allow the receiver to go quite "dead." This takes a short while owing to the click filter in the receiver H.T. + lead. This filter stops all clicks which may have passed the filter at the relay contacts, thus ensuring noiseless keying.

Click Filters

The receiver click filter can consist of a small L.F. choke and condenser of a value which must be such that the receiver does not remain energised too long. This of course depends on the H.T. drawn by the receiver, but probably most sets will be well served with a value of 1.0 µF or less.

The click filters connected directly across the relay contacts, and across the key itself may have values of .1 μF and 400 ohms. Condensers of ample rating should be used but the resistances can be of the half-watt variety, the exception to this being the filter across the key circuit, where a resistance of higher rating is advisable, depending on the power to be keyed.

Most operators prefer to monitor their C.W. signals all the time they are sending, and to enable this to be done without switching the output of the monitor may be fed via a transformer to the 'phone terminals of the receiver. If this method is adopted it will probably be necessary to include a filter circuit in the H.T. + circuit of the monitor to eliminate any remaining clicks, if the H.T. supply of the monitor is not self-contained. This filter is connected in the same manner as that for the receiver, but a resistance of 25,000 ohms may be substituted for the choke. The condenser should have a value of 1.0 µF.



Circuit of Automatic Change-over System for Break-in Operation.

Relays

The relays employed are quite inexpensive. Relay No. 1 is an old P.O. upright single-pole change-over instrument which can be purchased for a shilling or two minus contacts. Contacts of white metal or silver can be soldered in place very easily. A 3-in. length of white metal wire of about No. 16 gauge can be obtained from most jewellers for about threepence. This relay requires an energising voltage of about six volts, which can be supplied from a small dry battery as the drain is small.

Relay No. 2 is a more modern P.O. relay with a resistance of 7,000 ohms., which also is quite inexpensive. The energising voltage is of the order of 60 volts, and as the current consumption is only (Continued on page 316)

The 1938 "C.W. 56 Mc. Trophy" Contest

By J. N. Walker (G5JU)

much information as possible has been purposely included in the accompanying table (which sets out in order the com-petitors in this year's G.W. 56 Mc. Trophy Contest) because to do full justice to the entries and reports sent in would occupy much more space than the Editor would feel justified in allocating to this " write-up." As will be seen, the number of entries received is considerably greater than last year but, as appears to be a common trend where contests are concerned, very many more were active but did not send in either entries or reports. was taken, on the lines of the Band Occupancy Checks, which showed that as many as eighty-six transmitting stations, situated in Great Britain and Ireland, were heard. One or two Belgian stations were also reported, whilst it is evident that many receiving stations were active during the period of the contest.

In view of this, it is somewhat of a mystery why more did not report. It is probable that many had negative results whilst another possible reason, suggested by G6GR, is that, in the case of those situated in the populous centres, such as London, it was not considered worth while reporting unless fresh stations had been heard or worked. The writer would like to point out that those members living in the provinces are anxious to obtain information on how their fellow 56 Mc, enthusiasts in large towns and other parts of the country are faring and particularly what distances are covered regularly from fixed ORA's. Often, under District Notes, one sees that so-and-so worked so-and-so on 56 Mc., but the mileage is very rarely stated. The sending in of reports in a contest such as the one for the G.W. Trophy, when activity may be considered to reach a peak, would enable information to be correlated, to the benefit of all interested.

The Leaders

After the foregoing mild chiding, we turn to the stations which appear at the top of the table. Hearty congratulations will be offered by all to David Mitchell and his partner, M. C. Crowley-Milling, joint operators of GW6AAP, for their achievement in obtaining such a large score, which would have been over the 700 mark if the contact with G5ML, 117 miles away, had taken place before the close of the contest instead of 25 minutes afterwards. The energy and enthusiasm which these two members have displayed—witness their vigil on the Isle of Man last year—make their success well deserved.

G. Henderson, G8JVP, who finished second, has concentrated on 56 Mc. propagation and has obtained consistently good results. Whilst the number of points he obtained is much less than that of the winners, his performance was a very fine one.

Austin Forsyth, G6FO, is another well-known 56 Mc. worker and his performance is outstanding because he was operating from his home QRA, at a low level above sea. He also was unfortunate in that the contacts made with G5RD and G6XM

on the Friday evening were not repeated during the period of the contest.

It is a noticeable feature that practically all entrants heard many stations which they were unable to contact. G6FO and G8JV heard each other's signals and were unlucky not to QSO.

Individual Station Descriptions and Results

The equipment employed by GW6AAP was extensive, and rightly so, for when one decides to conduct experiments from a site out of the ordinary, it is well to make every possible preparation in order to find out just what can be accomplished with different transmitters, receivers and aerial systems. It is understood that the operators have written a full account of the station, its equipment and results, so little will be said here. To quote David Mitchell's own words, "the tests provided splendid proof of the superiority of crystal-controlled C.W. transmissions in conjunction with straight and superhet receivers, for long-distance 56 Mc. communication." His station's extremely high score can be attributed to the high average distances covered, it being notable that, out of 26 contacts, only six were under 50 miles, whilst four (or, including G5ML, five) exceeded 100 miles. Stations heard but not contacted included G6LI (Mansfield, 122 miles) and G6GO (Rugby, 130 miles). C.W. signals from GW6AAP were heard by G6OT (London, 208 miles) and G6XNP (Luton, 178 miles), and many reports were received from stations over 100 miles away. The long visual range from the summit of Snowdon is an important factor, but the use of modern apparatus also contributed largely to the good results obtained, these showing an improvement over previous expeditions.

The success of G8JVP can also be attributed to the employment of modern equipment. His transmitter consisted of a single twin-triode valve—an RK34—used as a CO/FD, with a 28 Mc, crystal. Modulation was effected, when required, by means of a 6L6, preceded by a 6C5; a small generator supplying the anode voltage supplies. The receiver consisted of a 954 (Acorn Pentode) R.F. amplifier, followed by a 6K7 detector, a combination which, as G8JV says, probably takes some beating. The whole formed a compact and thoroughly up-to-date station, whilst the results vouch for its efficiency. Snowdon was the most distant station contacted (90 miles) and the good number of OSO's (many over distances exceeding 50 miles) built up the score. Signals, all C.W. were received from G6OT (London), G6FO (Newport, Mon) and G5JU (Bristol) at an average strength of R4.

The log and report submitted by G6FO were most complete and make most interesting reading but space prevents more than a brief outline of the contents being given. The transmitter employed three valves—an APP4g tritet with a 7 Mc. crystal, another APP4g quadrupling to 56 Mc. and an RK34 push-pull power amplifier, taking an input of 24 watts on a frequency of 57,480 kc. The receiver was a straight two-valve, with a Hivac D.210SW as detector. Details of the DX contacts

made by G6FO during the period of the contest, and before, appeared in last month's BULLETIN and it will be recalled that five were over distances exceeding 100 miles. The QSO with G3HW (Teignmouth) is also noteworthy as the latter was only using 4 watts from batteries to cover the 76 miles. C.W. was used exclusively and numerous reports of reception over long distances indicated that the signals were being radiated in all directions, except to the north-west. This was probably due to the mountainous masses of North and Central Wales and was unfortunate in view of the number of stations active in that direction.

G5ZTP, who was assisted by G8MD, G3PJ and 2FFX, used the same apparatus—a battery-operated transceiver—as last year and also the

to that used by G6FO. The high spots were the contacts with G6VF and G6FO, but the score would have been much larger if more of the nearer stations had been active.

Operations at GSAAP were not commenced until noon on the Sunday, in view of which the score is a remarkably good one. It will be noticed that the number of QSO's obtained was second only to GW6AAP (G2OA's entry, it should be mentioned, was received too late to be officially included, but most of the contacts were over short to medium distances. The equipment was very similar to that employed by GW6OKP.

£18L used a battery-operated transceiver and had only two contacts, these being with E12J and GW6AAP, but the strength of signals each way

ORDER OF MERIT

Posi- tion.	Call.	QRA.	Points.	Con- tacts.	Aerial(s).	Type of Trans- mitter.	in- put. watts	Ht. a. sea.	or P.
1	GW6AAP	Snowdon	658	26	Various combina-	c.c. and	10	3560	P
2	GSIVP	Nr. Leek, Staffs	146	10	Vertical 4-wave	c.c.	8	1600	P
3	G6FO	Newport, Mon.	130	5	Long 10 × 1-wave	c.c.	24	200?	F
4	G5ZTP	10 miles North of Preston	112	8	Long 8×4-wave	s.e.	1.8	1375	P
.5	GW60KP	Nr. Oswestry	109	S	Various	s.e.	8	-	P
6	G2XC	Portsmouth	105	6	Long 8×½-wave Zepp.	c.c.	30	-	F
7	G8AAP	Birkenhead	70	12	Vertical 1-wave Zepp.	s.e.	9	-	F
8	E181.	Rock Mountain	G0	2	Vertical 1-wave and reflector	s.e.	11	900	1
9	G5MQP	Llangammarch Wells, Brec.	55	2	Vertical ½-wave di- pole	s.e.	10	600?	I
10	G3BY	Manchester	45	5	Vertical 2×½-wave in phase	e.e.	10	200	E
10	G2WSP	Long Mynd, Salop	45	3	Various	e.c.o.	6	1696	P
10	GISTS	Mourne Mts.	45	1		s.e.	100	-	F
13	G6VF	Bristol	41	3	Various	c.c.	10	300	1
14	GW5FUP	Prestatyn Mtn.	37	5 7	Vertical 1-wave	c.c.	10	800	P
15	G2JK	London, S.W.17	15	- 1	1-wave and re- flector	C.C.	10	-	F
16	fG51U	Bristol	6	2	Various	C.C.	30	350	F
16	1 GGVC	Northfleet, Kent	6	2	½-wave Windom	e.c.o.	5	-	F
18	GSLY	Winchester	2			C.C.	10	-	F
-	G2OA	Wallasey	-	13	14 Mc. doublet	C.C.	95	-	F

same site. It is evident that Parling Pike is a good location and from it the signals are sprayed in a wide arc to the south, covering most stations within an area of 60 miles or so. In this case, all stations heard, with but one exception (G5KL), were contacted.

GW6OKP set up his station near Oswestry and was most successful in working stations to the north and north-west, only G5ML being heard to the south, with no contact being effected. The transmitter was a self-excited Ultra-Audion and two receivers were employed, one with and one without super-regeneration. A number of stations using C.W. were heard on the latter.

The most southerly station taking part was G2XC, who operated from his home QRA with a crystal-controlled transmitter, employing aTZO5/20 as a final power doubler, the receiver being similar

in both cases was S9. G2OA was heard at good strength

His report does not say so, but for G5MQ, of Liverpool, to have been as far south as Llangammarch Wells, one would imagine he must have been or holiday. The equipment in his case consisted of a 6L6 connected as a triode oscillator and modulated by another 6L6, whilst the two-valve receiver could be operated as "straight" or "quench" at will. Both QSO's were with stations situated to the north, and although G5MQ and G6FO were only separated by 30 miles, neither heard a trace of the other.

The transmitter at G3BY was a multi-stage one with a type 37 valve as a power amplifier, the receiver being a 6K7 R.F.-HL2K-Pen. combination. A number of interesting aerial tests were carried out on C.W. with most of the stations worked.

G2WSP decided that the Long Mynd should be a good spot for portable work but was disappointed to find, when he arrived there, that it was not possible to reach the top and the station had to be set up in a dip of the hills. This probably explains the rather poor results obtained. G5ML, G5BM and others were heard but not worked. The transmitter employed two valves in an ECO/PA circuit and the two-valve receiver incorporated optional quench.

GISTS's only contact was with GW6AAP, 115 miles away. No other details are available but the spirit behind his remark that " I want to show there is some enthusiasm on the 56 Mc. band in

GI " is to be commended.

G6VF, a keen C.W. enthusiast, used his ordinary equipment at home, the transmitter being crystal controlled with a T20 in the final stage and the receiver a straight two-valve. He heard several weak telephony signals and was unlucky not to obtain more contacts.

The three-valve c.c. transmitter used by GW5FUP could only be modulated to a low degree and the fact that the resulting signal would be difficult to decipher on any receiver at a distance, probably accounts for his hearing many more stations than he was able to contact.

The sole entry from the London area was that sent in by G2JK, who worked seven stations, the furthest being G2UJP, 32 miles away. Many more, including G6FO, were heard on the two-valve receiver. The transmitter employed four valves with a 6L6 as final P.A.

Although telephony from a police station in the north was strongly received, G5JU was unable to hear other DX signals, possibly because his QRA is surrounded with tall trees, at that time in full foliage. It is considered that these prevent weak signals reaching the aerial. G6VC was very active throughout the contest but only succeeded in working G6OT and G6PG.

In view of the comparatively large number of contacts made by G2OA, it was unfortunate that his log was received after the closing date for the contest. Exactly what position he would have held it has not been possible to determine as the mileages have not been inserted. He was heard,

and heard others, at long distances.

The mystery station was G6LI, Mansfield, who was consistently putting a strong signal over long distances in all directions but whom nobody could contact. It since turns out that G6LI was using a commercial superhet receiver which must have been badly out of alignment, as not one of the many stations who called him was heard.

The check log submitted by 2CIL is a fine piece of work, all times being given to within 90 seconds. He received a remarkable number of C.W. signals on his two-valve receiver, which was operated on Ditchling Beacon, on the South Sussex Downs.

G8LY found conditions poor on the whole, but reports hearing G5RD at much greater strength than usual. BRS2601 (Ewell, Surrey), heard,

among many more, G6FO.

G6DH had a very unlucky week-end. Using a new superhet receiver, quite a number of stations, including ON4DJ, were heard, whilst G6DH's own signals are reported as being heard by several. Despite this, no contacts were effected.

2DLW, Bath, reports hearing GW6AAP, G2OA,

G5ML, E18L and E12J, amongst others, but, unfortunately, gives no times or corroborative

General Notes

In addition to the large number of stations active, it is interesting to note that nine entrants were at their home QRA's and ten portable. The proportion of users of controlled transmitters to self-excited is 13 to 6—much higher than in similar contests held in previous years. Not one of the fixed stations used a self-excited transmitter.

Many entrants using straight receivers remarked on the fact that numerous telephony carriers were heard and whilst they were too weak to enable the speech to be resolved, a fully readable signal would have resulted if only the carrier had been keyed. Many amateurs are therefore putting signals over greater distances than they imagine but C.W. must be used, at least occasionally, to allow of identifica-tion. Mention is made that the superiority of c.c. transmissions was most marked, it being possible to read steady P.D.C, signals when only \$2. The quality of the note is the important point, the actual input being apparently a secondary consideration.

Most operators found conditions particularly good throughout the period of the contest, although rapid fading was in evidence at times. One or two reported that signal strengths on the average were lower than during last year's contest, but this may be put down to the effect of the wet weather, experienced by many, on the apparatus. The weather was distinctly unfavourable, gales raging on the high spots to the north. The moon was at its full on September 9, but whether this had any effect on conditions on the U.H.F. is problematical.

Aerials

There is a certain amount of controversy at the present time as to which is the most suitable type of aerial to use for all-round coverage. The contest has done little to settle the point as many different types were used, all more or less successfully. winner used a number of half-wave combinations. the runner-up a single half-wave dipole 35 ft. high, whilst those filling the third and fourth positions used long-wire aerials. The latter can be very effective but it is necessary to arrange part of the aerial in the vertical plane, with the horizontal portion running in two or more different directions. Radiation is then likely to be omni-directional. The half-wave types give definite directional effects. which may be taken advantage of for working in a particular direction.

Windoms appear to be out of favour on the U.H.F. as only one entrant used this type. is no doubt that it is difficult to get a Windom to work properly when the feeder exceeds a full wave in length. The aerial employed by G2OA-a 14 Mc. doublet-is one seldom met with on 56 Mc. but, judging by the results obtained with it, this type

appears suitable for DX communication.

G2JK used a single half-wave dipole, with a reflector placed 2 ft. or so behind it, "as per Kraus." It is well to point out that such an aerial would act in a very different manner to a Kraus beam, as the reflector is parasitically energised instead of being energised directly out of phase.

The position regarding aerials can be summed up in the words of GW6OK, who used several types: "There is apparently no universal aerial for 56 Mc. operation. Signals audible on one aerial are entirely missing on another type, even though both were vertical or horizontal, as the case may be, whilst marked differences in QRK were noticeable when using two separate vertical or horizontal aerials in double doublet fashion. To hear any particular ring the changes with every available type at hand." signal and to get the best out of it, it is necessary to

Conclusions

The revised scoring system has found general favour but several raise the point that it was not clear how many points should be taken for a contact over, say, 40 miles. This will be rectified next year. It is evident that the stations situated high above sea-level have an advantage over those at low levels. Should a factor be introduced to correct this or may it be considered that the second class are compensated by the fact that they work under easier physical conditions?

Tone-modulated self-excited transmitters are capable of causing very severe interference, partly because of the broad nature of the signal and partly because the carrier is liable to split into several segments. In view of the increasing use of frequency controlled transmitters, consequent upon the ease with which these may be built, either for fixed or portable work, should next year's contest be limited to C.W.? Or to frequency-controlled telephony and C.W.? Should there be a contest to encourage listeners?

The writer would be glad to receive any suggestions with regard to these points or to any others which may occur to the reader, in order that the 1939 event may be of even greater interest, bearing in mind that it is desirable to incorporate a degree

of progress each year.

This "write-up" has already exceeded the length the writer intended it to be but, even so, much information has had to be withheld. The log sheets and reports are therefore being made available to any member who may desire to study them, provided postage is paid both ways. Applications, which should be made direct to G5JU, will be dealt with in strict rotation.

Finally, the trophy has been suitably engraved and despatched to GW6AAP. The writer thanks all those who supported the contest and the many who have written him very interesting letters concerning it.

Contemporary Literature

By L. FRYER (GM2FR).

A DIRECTION INDICATOR FOR ROTARY ANTENNAS.

L. C. Waller (W2BRO). Radio, October, 1938.
A solution to the problem of a satisfactory direction indicator for rotatable beams. The method described uses a home-made potentiometer with a high resistance D.C. voltmeter as the indicating meter.

The stable D.C. voltage supply of 250 volts is obtained from the speech amplifier supply of the author's transmitter through one of the new coldcathode voltage regulator valves, the OA4g. Full constructional details of a 32 point indicating system which has given trouble-free service for several months are given.

THE RELAXATION OSCILLATOR AND STREAMLINED CODE PRACTICE SETS. A. W. Friend (W8DSJ). Radio, October, 1938.

An article of interest to morse classes, or beginners requiring a cheap audio-frequency oscillator for morse practice. Two-watt neon or argon lamps are used in relaxation type oscillator circuits, several circuits with adjustment and operating data are given, the cost ranging from 92 cents upwards according to the refinements incorporated.

INDUCTIVE TUNING. Frank S. McCullough (W5HBU ex W6BEJ). Radio, October, 1938. Of interest to amateurs contemplating the use of vacuum condensers for final tank tuning. author draws attention to the points in which the variable C. and variable L. methods of tuning differ, and illustrates the two methods of tuning by vector diagrams.

DIAL PHONE REMOTE CONTROL. George M. Grening (W6HAU). Radio, October, 1938.

An interesting article in which the question of remote control is dealt with very comprehensively. A description is given of a system using the standard telephone type dial and ten position automatic telephone selector unit by means of which two receivers are switched on and off, switched from one to the other, frequencies changed on a five channel C.W. transmitter, everything at the remote point (three miles distant) cut off and a local emergency transmitter and receiver cut in, and a direct talking circuit between the control and remote points cut in or out. The system uses two pairs of line wires between the two points.

A 100-WATT BANDSWITCHING EXCITER. Charles W. Hunter (W6BFC). Radio, October, 1938.

A well-designed 100-watt exciter giving full output on any band from 10 to 160 metres by means of bandswitching and by means of crystal-switching and if necessary slight tuning of the final tank circuit, any frequency in the above bands. The unit uses a 6A6 crystal-oscillator-doubler, an 807 buffer or doubler and a 35T final amplifier.

REMOTE FREQUENCY CONTROL. Frank C. Jones (W6AJF). Radio, October, 1938.

The author who is well known in the amateur, world, describes a unit designed to allow quick frequency change over a good portion of the 20 metre band. The unit uses three 80 metre crystals in a Pierce crystal oscillator using a 6C5 or 6C5g followed by a 6J5g acting as doubler or unneutralised buffer. The output circuit is link

coupled to a special 40 metre tank coil which is plugged into the crystal socket of the main transmitter unit. The unit as described measures 7 by 7 by 11 inches and can be placed alongside the receiver enabling a range of frequency shift without touching the main transmitter.

THE NEWCOMERS SPECIAL. Jack Rothman (W6KFO). Radio, October, 1938.

An excellent beginner's transmitter is described in this article; using a 42 as crystal oscillator and a 6A6 as final amplifier the set will put about 15 to 18 watts into the aerial when supplied with 350 volts H.T., while with 300 volts on both anodes about 12 to 15 watts output may be expected. Full constructional and operating data, and a list of alternative valves are included.

A Broadcast Type Modulation Indicator. Henry G. Jones (W6GCT). Radio, October, 1938.

The author describes a modulation indicator having the following features: ease of adjustment, a percentage-calibrated instrument with a rapid up-swing which does not go too far on the peaks and at the same time has a slow return to avoid bouncing, and a means for instantaneous indication of peaks over any desired modulation percentage.

In addition to general monitoring the amplitude and frequency characteristics of the transmitter can be taken if a suitable audio source is available. Full constructional and calibration data is given.

INVERSE FEEDBACK FOR AMATEUR PHONES. Will A. Bell (W6 JXS). Radio, October, 1938.

An interesting description of an inexpensive system for reducing distortion in the audio frequency system and peaks throughout the audio range to a very small percentage—a simple inverse feedback regenerator costing \$1.50 to \$2.00 is applied to the audio system. The theory, installation and operation of this method is discussed, and the circuit diagram is included in the article.

The 15-watt C.W. Transmitter. (G2HK). Television and Short-Wave World, September, 1938.

This short article gives additional information on the sub-chassis layout and a power supply suitable for the 15-watt C.W. transmitter described in the July issue of the magazine.

THE BEGINNER'S 2-VALVE RECEIVER. G5ZJ. Television and Short-Wave World, September, 1938:

A description of a two valve version of the single valve receiver described in the August issue of the magazine. Built to provide loudspeaker reception on the short waves it uses an SP2D as detector followed by a Pen 220 output valve.

A SIMPLE RECEIVER FOR TELEVISION SOUND. Television and Short-Wave World, September, 1938.

Designed for reception of the Alexandra Palace sound transmission only, the receiver uses an SP4B as detector with capacity controlled reaction, resistance coupled to a Pen 4VB. The tuning is performed by pre-set trimmer type condensers which should require no attention after the initial setting. A power supply using a metal rectifier is included in the circuit Phased Antenna Systems, Bryan Groom (GM6RG). Television and Short-Wave World, September, 1938.

The author describes an aerial system which he has evolved as a result of considerable experimental work, details of which are given.

The aerial described is most suitable for amateurs having a high mast.

NORFOLK AMATEURS PREPARE FOR EMERGENCIES. Fenton Priest (W3EMM) and Laurie Turner (W3BGK). Q.S.T., September, 1938.

An interesting description of standardised transmitters with interchangeable power supplies for

flexibility in emergency work.

The transmitter uses a 6F6 as crystal oscillator and an 807 as final amplifier in the R.F. section, with 6J7, 6C5 and 6L6 valves in the audio section.

Two power supplies are available, one A.C. delivering 350 volts, one D.C. with 6 volt input delivering 300 volts. On A.C. the power input to the final is 25 to 30 watts on phone and 30 to 40 watts on C.W.

Two crystals and two coils cover the four bands from 14 to 1.75 Mc.

Preselection Simplified, T. M. Ferrill, Jnr. (W1LJI). Q.S.T., September, 1938.

The author describes an effective one-valve R.F. amplifier with switching for five bands. Full building instructions including details of panel and chassis, and coil windings are included. The amplifier will work ahead of any receiver and should make a very useful unit.

Interpreting 1938's 56 Megacycle DX. J. A. Pierce (W1JFO). Q.S.T., September, 1938.

This article deals with the deduction of Ionosphere conditions from long-distance amateur work on five metres, and while dealing more particularly with American conditions is of interest to all amateurs.

A FIVE-BAND SWITCHING EXCITER WITH 807 OUTPUT. T. P. Kinn (WICC). Q.S.T., September, 1938.

The article describes a neat exciter unit designed to enable a 1 kW. transmitter to be controlled from the operating table.

The unit includes two separate oscillators, one crystal controlled and the other self-controlled, two frequency multiplying stages and an 807 output stage.

Two power supplies are provided, one for the two oscillators, and the other for the multipliers

and output stage.

The crystal oscillator uses a type 76 valve in a straightforward circuit in which the tuning is done by means of the valve and miscellaneous circuit capacities, the alternative E.C. oscillator using a type 89, the plate circuit of which is again of the semi-tuned type.

Type 6F6 valves are used in the two multiplier stages followed by the 807 output, and to enable the operator to monitor C.W. transmissions the unit is equipped with a type 6A8 valve which works similarly to a mixer valve in a superhet receiver.

A type 6X5g serves as rectifier for the oscillator power supply with a type 83 in the second power supply circuit.

Any 10 Stations can be pre-set on this de luxe

"HIS MASTER'S VOICE"

CONSOLE RECEIVER WITH PUSH-BUTTON TUNING



Autornatic tuning by "push button" which makes it possible by simple adjustment to pre-set any ten med lium-wave or long-wave stations... automatic fre quency control... variable selectivity... a contil nuous tone control... automatic volume control... separate bass and treble controls... true-to-life tone... and a walnut cabinet of modern design that is a triumph of furniture craftsmanship, combine to make "His Master's Voice" Model 659 the radio achievement of the 1939 season, capable of a "really hot" performance.



HAIRSBREADTH TUNING BY AUTOMATIC FREQUENCY CONTROL

Specification in brief: 10-valve superhet with AVC...3-valve automatic frequency control circuit...10 station push buttons with change-over manual auto button...Quiet tuning ensured by muting L.F. circuits between stations..., Direct station to station movement... Large tuning scale illuminated according to waveband in use... Four

wave ranges, 13.5-34, 34-100, 200-550 and 750-2,000 metres. The tuning circuits are particularly suitable for the reception of all the S.W. broadcast bands, 13.5, 17, 19, 25, 31 and 49 metres... Mains aerial contact... Fluidlight tuning indicator... Vernier scale... Combined volume on/off switch... Variable selectivity switch... Manual tuning simpli-

fied by incorporation of special I.F. circuits . . . Sockets for connection of gramophone pick-up . . . Separate bass and treble tone controls . . . Elliptical mains energised loudspeaker . . . Sockets for connection of external loudspeaker . . . Switch for silencing either external or internal speaker . . . Output 8 watts . Consumption 100 watts .

40 YEARS' 'SOUND' EXPERIENCE

Christmas is Coming

ORDER EARLY BEFORE THE RUSH

RADIO AMATEURS' HANDBOOK

(Reprinted annually by the American Radio Relay League.) A Manual of Amateur High-Frequency Radio Communication,

PRICE: To Members, 5/6: Non-Members, 6/-

RADIO AMATEURS' CALL BOOK

(Published quarterly in U.S.A. on the 15th of March, June, September and December.)

Contains Call-Signs, Names and Addresses of all Transmitting Amateurs.

PRICE: To Members, 6/-; Non-Members, 6/6

THE "RADIO" HANDBOOK

(Reprinted annually by Radio Ltd.)

A Handbook covering the Theory and Practice of Amateur Radio Communication.

PRICE: To Members, 6/6; Non-Members, 7/-

HINTS AND KINKS FOR THE RADIO AMATEUR, Vol. 2

(Published by the American Radio Relay League.) A Symposium of Practical Ideas of Value to the Radio Amateur.

PRICE: To Members, 2/6: Non-Members, 2/9

"RADIO" ANTENNA HANDBOOK

(Reprinted frequently by Radio Ltd.)

An 80-page treatise dealing with propagation and radiation problems,

PRICE: 3/6 post free

LOG BOOKS

Five types are available. Each book contains 350-400 sheets bound between stiff cloth covers. Sample sheets free on request.

PRICES from 3/9 to 5/9

CALCULATOR\S

(Published by the American Radio Relacy League.) These calculators are great time-savers for all who are engaged in engineering problemis-

Frequency, Inductance and Caplacity Type A. PRICE 4/6

PIRICE 2/3 Type C. Wire data.

PRI CE 2/3 Type D. Decibel Calculator.

Resistances in parallel and condenseers in Type E.

PRICE PRICE 2/3 Type F. Measurements of Resistance.

MEMBERS ONLY

CALL SIGN BROOCHES PRICE 2/6-CAR PLAQUES OF EMBLEM Plain Type PRICE 316 Call Sign Type PRICE 4/6 COAT BADGES OF EMBLEM Brooch Type PRICE 1/6 Lapel Type PRICE 1/6 NOTE PAPER (100 Sheets) PRICE 2/6

MAPS AND GLOBES

(Published by Webb's Radio.)

GLOBES (12-in. diameter) GREAT CIRCLE MAPS

RUBBER STAMPS OF EMBLEM

PRICE 27 /6 (In British Isles only) PRICE 4/6

PRICE 1/6

All goods are sent post free but orders must be accompanied by a remittance.

TO BE PUBLISHED IN NOVEMBER

"THE AMATEUR RADIO HANDBOOK"

PRICE, 2/9 (POST FREE)

ABROAD, 3/6 (POST FREE)

R.S.G.B. SALES DEPT.

53 VICTORIA STREET

LONDON, S.W.I



By J. N. WALKER (G5 JU).

Part XV.-EXCITATION AND BIAS

BEFORE a valve can perform any useful function it is necessary first of all to supply its electrodes with proper fixed voltages, and second, to apply an alternating voltage to the control grid. When this latter voltage is at radio frequency, it is termed "drive" or "excitation," and upon its strength depends the conditions under which the valve operates. Also, for R.F. applications, the negative grid bias voltage which must be applied is dependent on it, so that bias and excitation can well be considered together.

It is desirable to commence with an explanation of (1) various operating conditions it is possible to obtain, and (2) the basic rules governing the mode of operation which should be used in different circumstances.

Class A Operation

In audio frequency work, it is necessary to obtain an output which follows the original signal as closely as possible, i.e., one which is undistorted. It is, therefore, usual to adjust the operating voltages of the valve to give what is known as Class A conditions. That is to say, the grid bias is set at a value which, at the particular anode voltage applied, results in the working point falling midway on the straight part of the characteristic curve of the valve. The grid potential must not be allowed to become positive at any instant, otherwise grid current will flow. This would result in a flattening of the peaks of the applied voltage, with consequent distortion. The applied voltage, measured from the positive to negative peaks of a cycle, must not exceed twice the negative grid voltage. In practice it will be somewhat less, due to the necessity of avoiding operating over the curved portions of the characteristic curve.

The Class A type of amplifier may also be employed in radio frequency service, but, because of its relatively low efficiency, it is seldom used. The anode dissipates considerable energy continuously, and only a small useful portion appears in the output circuit.

Class B Operation

For any given anode voltage, there is a value of negative grid voltage which will exert an influence on the electrons emitted from the cathode sufficiently strong to prevent any of them reaching the anode; in other words, no current flows. This is termed the "cut-off voltage," and may be found

by (a) studying the anode current/grid voltage curve, (b) by dividing the anode voltage by the amplification factor of the valve, or (c) by practical test. The latter may be carried out with simple apparatus, and as the valve may perhaps be used under conditions somewhat different to those specified by the manufacturer (let us hope the anode voltage will be less, and not greater!) it is the most reliable. Fig. 1 indicates the circuit to set up for carrying out such tests, the variation of grid potential obtained by means of dry batteries being convenient and sufficiently accurate for our purpose. The batteries should be in good condition so that the marked voltages can be relied on. It will usually be known roughly at what value of grid bias the valve operates normally, and the procedure will be to start with a value considerably higher, and gradually reduce it until anode current just commences to flow, switching off the anode voltage each time an alteration is made to the grid

Working the valve at the point so found is known as Class B operation. During the negative half cycle of applied voltage nothing happens, as the grid is simply being made more negative; during the positive half cycle more or less anode current flows, according to the value of the applied voltage. As this may again be nearly twice the value of the standing grid voltage, without running into grid current, the output will be considerably greater. Further, as the valve only passes current during alternate half cycles and during the time that useful energy is produced in the output circuit, the efficiency will be higher.

Class C Operation

Under the conditions so far discussed, no grid current has been allowed to flow, and no power has been absorbed by the grid of the valve. It is permissible to increase the exciting voltage to a value greater than twice "cut-off," but if it is carried to excess, several things will occur. Current will flow between the grid and cathode of the valve and, as this path possesses considerable impedance, the driving power requirements will increase to make up for the loss. The anode current will rise very rapidly, and may reach values which, being maintained over the major portion of each positive half cycle, will damage the valve.

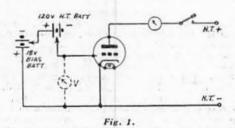
To mitigate these effects, it is necessary to still

further increase the standing bias, when the condition known as Class C operation is obtained. The positive half cycle has now to cancel out the amount of negative voltage beyond the cut-off value before anode current flows, so that the latter actually only flows during a portion of the half cycle. During that portion, however, the rise and fall is extremely rapid, a high peak current flowing momentarily and high peak voltages being generated in the anode circuit. The efficiency is a rain increased but it is necessary to ensure that the valve employed has been designed with ample emission and well-spaced electrodes to make it suitable for such operation.

Fig. 2 illustrates the types of anode current flow met with under the three conditions. Class A results in the output circuit being supplied smoothly and practically continuously with oscillating energy on the fundamental frequency, the amount of harmonic energy being very small. Class B may be considered to gently kick the output circuit into oscillation, with a rather greater amount of har-monic output. Class C kicks the output circuit sharply for brief and comparatively well-separated periods, which action gives rise to the generation of strong harmonics. Two points emerge from the use of the Class C method of operation-one is that the output circuit must be capable of storing energy to carry it over the periods during which it receives none from the valve; the other, the desirability of making the output circuit sharply resonant to the fundamental frequency so that the harmonics are not given a chance to build up any appreciable energy. The first point is taken care of by using a certain minimum of capacity in the tank circuit, to enable what is known as the "flywheel effect" to occur, and the second by keeping losses very low.

Amount of Excitation Required

It is now usual for the manufacturer of transmitting valves to specify the driving requirements of each particular type. Although the method of doing so is not standardised, it is becoming common practice to quote a figure of so many grid milliamperes; where this is given, no difficulty will be experienced. The figure is usually the maximum value recommended, and should not under any circumstances be exceeded; in fact, it should be possible to obtain perfectly satisfactory results with a grid current considerably less than the maximum. Again, the actual value of grid current, as read on a meter inserted in the earthy side of the grid choke or resistance, is dependent on quite a number of factors, such as the anode circuit



A simple method of determining the value of cut-off bias. In the case of a pentode, the screen will be set at normal operating voltage. The voltmeter V is a refinement which may be added if desired.

loading, anode voltage, and grid bias voltage. The figure specified by the makers is that which should be obtained under working conditions, i.e., with H.T. voltage applied to the anode, with the anode circuit tuned to resonance and loaded, and with no fixed bias applied, the bias for the grid being obtained from the voltage drop across the grid resistance, the value of which should be sufficiently high to enable the valve to run under either Class B or C conditions. It is, however, desirable to include at least a certain amount of fixed bias in order to prevent high anode currents flowing when no excitation is applied. The addition of such fixed bias will reduce the grid current.

It is well to mention here that it is perfectly normal for a grid milliammeter to show a much higher reading when no anode voltage is being applied. The reduction, on applying the latter, will be 50 per cent., or even more, due to the fact that the anode attracts those electrons which previously hit the grid.

Matters are somewhat difficult when the driving requirements are specified in watts or in the peak R.F. voltage. The only reliable way to arrive accurately at the R.F. voltage which is being applied to a valve is to measure it with a valve voltmeter, although a very rough estimation may be obtained by using the principle that a rectifier of the type formed by the grid/cathode path of the valve gives a D.C. voltage equal to the peak of the alternating voltage applied. In the present case, this is not strictly true, because of the effect of the load represented by the valve and by the grid resistance, but the voltage developed across the grid resistance, as measured by Ohm's Law (the actual resistance and the current flowing through it being known), will serve as an indication.

The driving power required by any particular valve is the amount lost in the grid/cathode path, and may vary enormously, due to the fact that the impedance of this path is not a fixed value, but varies with the conditions under which the valve operates, and with the applied voltages. It will be greatest with a low capacity, low magnification type of valve, in which the grid consists of an open mesh well spaced from the other electrodes. pedance will be low in the case of pentodes and Class B valves, which have a closely wound grid mounted near the cathode. Effects tend to level out, however, owing to the fact that the low u valves require a high driving voltage, whilst the second class do not. The actual choice will often depend on the frequency at which the valve will work, for reasons outlined later.

The oscillator stage must be capable of supplying a good deal more power than that specified as being necessary for the valve, if a satisfactory performance is to be achieved. A certain amount is dissipated in the grid circuit itself, and this should, therefore, be designed with care in order to minimise losses. If the grid circuit consists only of a coupling condenser and choke, the fact that these are at a high R.F. potential will introduce losses, whilst in an ordinary tuned circuit the ohmic resistance of the grid coil, eddy currents, etc., will do likewise. Then the grid resistance will absorb a certain amount of power, especially in the case where it is called upon to provide all the negative bias the valve requires. To minimise this loss, it is advisable to provide a large percentage of the bias from

an external source, whilst still retaining a certain amount of resistance. The benefit of the latter is that, as the drive increases, the voltage across the resistance will also increase so that the bias is, to some extent, self-adjusting. In practice, it is well to allow for an output from the previous stage of twice the power specified as being necessary to drive the valve.

The reason why it is not desirable to exceed the maker's figures in the way of grid current or power is because the grid, which is situated between two hot electrodes (the anode and cathode), cannot easily radiate away heat and its dissipation is therefore very limited. Should the valve be seriously overdriven, the grid may become so hot that secondary emission will commence, and the valve will be damaged. It is probable that the life of many a valve has been cut short through this

One other point may have puzzled the reader when studying a valve data sheet. This is the figure stating the maximum R.F. current which may be allowed to flow. The reason for this being specified is that, under certain conditions, a high value of current may circulate around a tuned circuit, of which the valve electrodes form a part. The wires leading into the valve through the pinch are made usually of fine platinum, and if they get very hot, there is a possibility of the seal being damaged and the vacuum of the valve destroyed.

Telegraphy and Telephony
The excitation required by a valve depends on the amount of radio frequency power it is desired to produce in the anode circuit, and this again also depends on the anode voltage. When the latter is a fixed quantity, as pertains when continuous wave telegraphy is employed, the exciting voltage must be sufficient to result in efficient Class C operation, and all is well.

When anode modulation is used, the anode voltage is not constant, but is varying each side of the standing value by an amount depending on the degree of modulation. If this is 100 per cent., the anode voltage doubles in value on peaks, and if modulation is to be linear, the anode current must also double. On peaks of modulation, therefore, the input is four times the normal power, and the excitation applied must be sufficient to fully drive the valve (still under Class C conditions) at the increased input. Should the excitation be insufficient, it will not be possible to obtain full modula-tion, irrespective of the power delivered by the modulator, whilst should the latter be allowed to swing the anode voltage to a greater degree than the excitation can take care of, severe distortion will result.

For correct telephony operation it is necessary to either increase the excitation (and the bias), or to reduce the working anode voltage. The latter is more usual in order to ensure that the valve is not

being overrun.

When the stage preceding the power amplifier is modulated, the excitation to the latter varies at audio frequency. For linear modulation in this particular case, the bias and anode voltage must be adjusted so that the valve operates under Class B conditions.

The remarks so far made apply to what is known as a single-ended stage, i.e., one using a single valve. When two valves are connected with both the grids and anodes in parallel, the effect is the same as if a larger valve of lower impedance had been substituted, and the stage is still actually single-ended. Under Class A conditions, the same amount of drive would suffice (leaving out the frequency effect), but under Class B and C conditions twice the grid current will be necessary, and also twice the excitation power, if the R.F. voltage applied to the grids is to remain the same.

When two valves are employed with the grids connected one to each side of a tuned circuit, i.e., in push-pull, only half the R.F. voltage available across the whole circuit will be applied to each grid. In this case again, the excitation power must be increased to bring the applied voltage up to its proper value.

Design of the Grid Circuit

A circuit which consists of a large value of inductance and a low value of capacity (i.e., has a high 1. C ratio) has the property of developing voltages which may be much higher than those which occur in the circuit from which it derives its energy. The peak voltages, although they only last for a minute fraction of a second, may be sufficiently strong to cause a high peak current to flow between the grid and cathode of the valve, which current will not be indicated on the grid meter, as the latter only reads the average value. To avoid this effect, which will do the valve no good, it is wise to arrange the constants of the grid circuit so that a moderate L/C ratio obtains, bearing in mind the frequency in use. The only departure from this is when the driving power available is on the low side. Under this condition a certain amount of benefit will result from allowing the voltage to build up in a circuit of high L/C ratio. The moderate L/C ratio will result in an additional benefit in the case of a driven amplifier through the voltage being of a more sinusoidal nature (that is to say, of a smoother waveform), consequently less harmonic output will be produced.

Effect of Frequency

So far little has been said about the effect of frequency on the amount of excitation required. Actually, the amount required by the grid of the valve, under any given set of conditions, is constant, irrespective of the frequency, which is the reason why manufacturers do not state the frequency

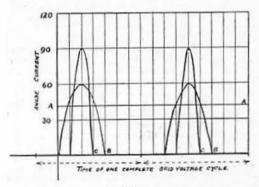


Fig. 2.

Illustrating the flow of anode current under different classes of operation. A: steady moderate current, B: current passes only during positive half cycles, C: peaky current during portion of positive half cycle.

when specifying the driving requirements of valves. What does affect it is the input capacity of the valve, upon which also depends the input impedance. The grid and cathode (in filamentary valves the filament is also the cathode) form a condenser and, as the reactance of a condenser decreases with increasing frequency, the by-pass effect it exerts becomes greater. On the lower amateur frequencies, the power applied to the grid is almost wholly dissipated as heat on the grid, but, on the high frequencies, considerable dielectric losses also occur. The result is that additional power must be provided to make up for the loss so that the grid proper is still being supplied with the correct amount.

The above explains the apparent falling off in efficiency of pentode valves at the very high frequencies; the high input capacity resulting in poor performance. Low capacity triode valves, operated under correct conditions, will almost invariably

prove most suitable.

The low input impedance of high capacity valves makes it difficult for R.F. voltage to develop in the input circuit, unless excessive power is available, and under such circumstances it is of little use making the input circuit of high L/C ratio in order to try and correct this effect. The only solution is to tap the grid some distance down on the grid coil—the damping effect of the valve will then be less, R.F. voltage across the circuit will be higher, and, due to the better matching, the grid will actually have impressed upon it a higher voltage than if it were connected across the whole circuit. This should be borne in mind when disappointing results have been obtained from a pentode or, for that matter, from any valve of low input impedance.

Bias

As the cut-off point of a valve depends on the anode voltage applied, so also will the amount of working negative bias voltage. This is usually stated by the manufacturer, and should not be

departed from to any great extent.

The greatest power amplification occurs when the valve is biased to cut-off, but the efficiency is unlikely to be greater than 50 per cent. Increasing the bias, which also necessitates increasing the drive, results in an increase of efficiency, but a point is soon reached at which the process becomes uneconomical, and beyond this point the drive has to be increased out of all proportion to the extra efficiency obtained. It is usual to bias a valve employed as a power amplifier to twice the cut-off voltage. If plenty of drive is available, the bias may be increased to three times cut-off and the excitation increased accordingly, but as this process will result in the grid being required to dissipate three or four times more energy, it is well to make sure that its dissipation is not being exceeded. In this connection, a transmitter used for CW (with a stage previous to the P.A. being keyed) may be allowed to run at higher power than a telephony transmitter because of the intermittent nature of the current flow.

A valve employed as a frequency doubler operates at a lower efficiency than as a power amplifier, and to keep the efficiency as high as possible, it is desirable to apply a high excitation voltage and bias back in proportion, preferably as much as four times the cut-off value being applied. As previously pointed out, this entails the danger of over-running the grid and, to avoid this, a valve capable of dissipating both the grid input power and that lost at the anode should be chosen. In other words, the excitation applied to a given valve used as a doubler must not exceed that for which it is rated, whilst the anode voltage and current must be reduced to figures below the maximum specified for power amplifier operation in order to allow for increased internal dissipation.

The valve chosen for this position should have a high magnification factor, as the cut-off voltage will be quite low; otherwise it will be uneconomical to provide the high negative voltage necessary. Special types are now available with which very little anode current flows at zero grid bias, and these are very suitable for operation as frequency doublers.

Effect of Anode Impedance and Load

Bound up with excitation and bias are the constants of the anode circuit, including the impedance of the anode/cathode path of the valve, the anode voltage, and the optimum load into which the valve should work. These factors will be discussed in a future article.

TRADE NOTICES

Short Wave Radio, Ltd., 97, Park Lane, Leeds 1, although a comparatively new company, have already established themselves in the amateur radio market. As we recently had an opportunity of examining some of the wide range of components they offer, the following comments may prove helpful to members.

Their transformers and chokes (including a swinging choke 5/20 H 200 mA.) are of robust construction, of good appearance and moderately priced. Windings are, in most cases, brought out to loose leads. We should have preferred the use of terminal strips. All transformers have been

tested to 3,000 volts.

Variable condensers range from 160 to $15\mu\mu F$. In addition the lower values (from 15 to 45 $\mu\mu F$) are offered with .094 spacing. Although modestly priced these condensers should stand up to good service in receivers and low power stages of transmitters. Brass is used for vanes and supports and a ceramic material as insulation.

Power resistors range from 10 to 100,000 ohms in 10, 20, and 40 watt ratings. These are Austrian

made and very cheaply priced.

Impex valves (including 6L6G's at 6s. 6d.) are guaranteed for 12 months against normal failure.

Short Wave Radio Co. are equipped to grind-in 1 watt carbon resistors to 2 per cent. limits or better.

Further details concerning the products handled by this company can be obtained from the address quoted.

The Automatic Coil Winder Co., Winder House, Douglas Street, London, S.W.1, will be pleased to send to interested members a copy of their new folder, giving comprehensive particulars of their products.

For 28 Mc Listeners

W6NLS will be pleased to QSL 100 per cent. on all reports, provided these are accompanied by an International Coupon.

Experimental Section

Manager, A. M. H. Fergus (G2ZC).

DURING the recent crisis activity in most Groups was at a low ebb, but the Group Managers report that an improvement is now taking place throughout the Section. The Aerial Group under G2IM is still undergoing its process of re-organisation, but it is hoped to publish details of their arrangements in the next issue. The Aurora sub-group have produced a much enlarged monthly magazine which now incorporates a section dealing with the Moon. Professor Carl Stormer is supplying this group with aurora observations made at Oslo and other stations in Southern Norway, and his notes cover three pages of the October issue.

Following on the successful forecast made in the September issue of Aurora, the group now forecast that conditions around the period December 2-3 will be similar to those which prevailed during mid-

September.

We feel it desirable to record that only nine members replied to the question asked in the last issue of the Bulletin regarding the Cosmic data which has been prepared in recent months by Mr. J. C. Elmer. The suggestion has been made by one member that as the B.B.C. obtain information from Greenwich (reference Page 210, October Bulletin) it would perhaps be better to publish this, which is up to date, rather than details which are a month or two old. Experimental Section members are requested to advise their G.M.'s on this point, whilst non-members of R.E.S. would oblige by addressing their views to the Experimental Section Manager.

Section members who have completed logs covering the period from 1939 G.M.T., November 7, to 0114 G.M.T., November 8, and who noticed any effects that might be attributed to the Eclipse are requested to send details to Mr. S. W. Allcorn, 2FIH, Leighton House, Holland Park Road, London, W.14, Group Centre of the Aurora subgroup. Mr. Allcorn reports that the total eclipse started at 2145 and ended at 2308 on November 7.

Membership

The rules of the Section are being reviewed following discussions during Convention, and although nothing has yet been settled it is generally felt that the smooth running of the section, can be improved by restricting entry to Group members only. It has been frequently pointed out in these columns that Individual membership is of little or no value. Such members are again urged to consider applying for transfer to Group membership.

There are a few members who have failed to send in any report of their activity although they have received individual notices from their Group manager. To them we would point out that the rules dealing with activity and with the renewal of membership (which takes place at the end of next month) are to be strictly enforced. It is the opinion of the Group Managers that failure to report indicates lack of interest: it has therefore been decided to enforce this rule by cancelling the membership

of those who fail to report. It should be mentioned that although the rule specifies a three months limit, we have in point of fact allowed more than six months, so that with this reminder those who find their membership cancelled can hardly claim that they have not been advised.

Before passing on to the Group Manager's reports, the writer would like to express his gratitude to those who have backed the Section so well.

Propagation Group

The disturbed International situation at the end of September has had its effect on the October Letter Budgets of the various groups and nearly all are smaller than usual.

A system of 28 Mc. Character Figures has been suggested by G2XC to show at a glance the variations of conditions from day to day. The method

Cosmic Data

WITH REFERENCE TO THE APPEAL MADE BY THE EXPERIMENTAL SECTION MANAGER IN OUR LAST ISSUE, IT IS WITH REGRET WE RECORD THAT ONLY NINE MEMBERS HAVE WRITTEN TO ASK FOR THE COSMIC DATA TO BE CONTINUED.

IN VIEW OF THE LACK OF IN-

IN VIEW OF THE LACK OF INTEREST AND IN FAIRNESS TO THE CONTRIBUTOR—MR. J. C. ELMER, G2GD—WE HAVE DECIDED TO DISCONTINUE PUBLICATION.—ED.

which is being tried out by all the 28 Mc. Groups will probably form the subject of a BULLETIN article in the near future. G2XC is to be congratulated on his ingenuity.

GM6JJ.

Further to the notes in the last issue concerning the lack of support for the Receiver Group, it can be added that experiments with all forms of measuring apparatus fall into the programme of this Group. It must be realised that very little experimental work can be carried out without the aid of such instruments as signal generators, valve voltmeters, etc., yet it appears that few amateurs are conversant with the design and operation of this apparatus. Oscilloscopes alone would form a very interesting line for investigation, but at present there seems to be no interest at all in this

The Group Manager would like to hear from members who would be interested in forming a group to work under the general heading of "Measuring Instruments." This does not imply extra hard work or extra energy! Here is a chance to prove we really are experimenters.

most important subject.

The T.R.F. sub-group are engaged on many interesting problems, including R.F. regeneration,

band-switching and R.F. amplification. It is hoped shortly to publish some data which will be of general interest.

Amongst other items the U.H.F. sub-group are studying a receiver for Radio Control and push-

pull detection.

Automatic Reaction Control

The G.C.'s and G.M. have discussed this problem in L/B's and are at present engaged in deciding the best lines of attack. G5HF suggests the use of tuned shunts (series and parallel resonant circuits) to grade the output impedance of the R.F.

2CSD thinks that the shunt system would be unsatisfactory owing to the fierceness of reaction at the high frequencies where a low impedance shunt would be necessary. Actually under the shunt system a high impedance would be required for automatic reaction control. He further suggests a fixed reaction and variable shunt, and points out the need for care when attaching shunts across the detector owing to the danger of reducing the efficiency of the detector stage.

G6MF considers the shunt filter would not work because of the necessity for an inverse action at the high frequency end of the tuning range. His theory is that capacitative reactance would have to predominate on high frequencies, whilst inductive reactance would have to predominate at the lower frequencies. The middle point would therefore not function at all, due to a reactive peak. He suggests as a solution utilising the electrostatic screen in the valve, by feeding back part of the signal voltage as a D.C. voltage.

R.F. Stages

2FIU and G2VO find that detector stages are easily overloaded, and instability occurs with regeneration unless a buffer stage is used. They also stress the use of good chokes, and their effect on selectivity.

2BRI mentions that when using variable regene-

ration, tuning is not consistent.

G5HF.

Transmitter Group As the main function of this Group is to conduct experimental work in connection with the design and operation of transmitters, it should be apparent that membership can only be granted to those who possess a transmitting licence. We wish to make this point clear in order to save us the trouble of declining applications from B.R.S. members.

It is also necessary to point out that the Group is not in existence for the purpose of passing on information of the type given in "The Helping Hand "articles, neither can it be used as an Enquiry Department. The Society's Technical Information Bureau exists for that purpose.

G5 JU.

Cosmic Notes

Sunspots
A very large group of spots crossed the sun's central meridian on October 11 and 12, and an average group on October 26. The latter group appeared to have increased rapidly in size during the days preceding its C.M.P. Between the passages of these two groups there was a period of low sunspot activity, the spots being particularly few on October 19. A small group of spots crossed the sun's disc early in the month, having C.M.P. October 5. In connection with the special note in last month's Cosmic Notes, it is now learnt that a big prominence was observed by Tokio Observatory on September 10. Another large prominence was observed on September 29, while a chromo-spheric eruption was reported by Canberra Observa-tory on September 27. This was associated with a Dellinger fade-out.

The Magnetic Elements

The following data covers the period September 25 to October 24. Magnetic storms were recorded on September 27 and 28. September 30, and October 1, October 7 and 8, and October 24.
The National Bureau of Standards, Washington,

D.C., reports an ionospheric storm on October 7 and 8, and sudden radio fade-outs on October 6 at 14.50 G.M.T. and on October 10 at 19.28 G.M.T.

Past Data

The International Astronomical Union's Bulletin for the second quarter of 1938 is now to hand, and several items are of interest. A very important bright chromospheric eruption was observed at Zurich Observatory at 08.30 G.M.T. on April 15. The coincidence of this with the hissing phenomenon and Dellinger fade-out observed on that date is noteworthy. (See T. & R. BULLETIN, May to July, 1938.) Active sunspot groups (associated

with numerous eruptions) are reported with C.M.P. April 6, 14, 21, 22, May 3, 10, 21, 23, June 2, 6, 11, 22, July 2. It is noticed that the groups of C.M.P. April 14 and May 10 were not the same group, as one was situated in the sun's northern hemisphere and the other in the southern. Both these groups caused magnetic storms and auroral displays which, being 26 days apart, were assumed at the time to be due to two successive central meridian passages of the same spots. This is now known to be incorrect. The spots of C.M.P. May 10 and June 6 were the same spots on successive rotations of the sun.

G2XC.

Book Review

A SIMPLE GUIDE TO TELEVISION. By Sydney A. Moseley and H. J. Barton Chapple, Wh.Sch., B.Sc. (Hons.), etc. 43 pages and 13 illustrations. Published by Sir Isaac Pitman & Sons, Ltd., London. Price 1s. net.

The authors of this little booklet, who are well known in the field of television literature, have set out to explain to the ordinary man how television originated, how it works and how it may develop. The description of the early days of television is almost entirely a record of Baird's activities.

The authors have succeeded in giving a description of the general principles of C.R. reception and the C.R. camera in 11 pages without confusing the reader with circuits. The description of modern equipment is an explanation of the transmission scheme, and the type of receiver now on the market. A chapter explains large screen television, and the concluding chapter deals with the possibilities of colour and stereoscopic television.

The book is an interesting introduction to the subject for the untechnical reader. T. P. A.

A RUNNING COMMENTARY OF RADIO CONDITIONS FOR THE MONTH OF OCTOBER, 1938 DY H.A.M. WHYTE (G6WY.)

CTOBER must have been a month of high ionisation as the skip on all bands was observed to be exceptionally long. This condition is very useful for 14 Mc. devotees, as signals up to 4,000 miles are usually scarce and erratic, whereas signals from farther afield come in at surprising strengths without the resultant QRM from local or semi-local stations. A case in point was on October 25, when FISAC, 17AA, PK's, KA's and ZS's were heard at unusual strength with a very quiet background. A quick listen on 14 Mc. might conceivably have given the impression that the band was dead. Taken as a whole, the month of October cannot be considered to have have been really good for DN; the middle of the month produced a bad trough and weak watery signals were not easy to raise.

The 28 Mc. band has not been as good as expected by most of us, and tends to lend some proof to the fear that we are on the downward trend of the sunspot cycle as far as radio conditions are concerned. G2UX, however, worked HR4AF; this station is unlicensed in Honduras, but always QSL's direct and asks those contacted to wait for his card. Other unusual stations on this band are TG9AA and YS2LR, the latter works on the LF end of 28 and according to "QST," cards should be sent via W5FNX, Box 811, Brownsville, Texas. W6QAP and W6OVK-6 have both been active in Arizona for those who still require a contact with that State,

Four W.A.S. certificates have now been issued in Great Britain: G6QS, G5BJ, G6WY and G6NF have qualified and they are believed to be the first four in Europe. G6QS's award was certainly the first.

ZB2A had a short and sweet life. He commenced operations on 14302 on September 29 and made his last transmission with G6WO on October 14. His first G contact was with G8IT and therefore this QSO would undoubtedly rank as the first between Great Britain and Gibraltar. OXVC has been very active and writes to tell us he is very disappointed to learn that contact with his station (a Danish salvage ship) does not count as Gibraltar. It is hoped that ZB2B will shortly be heard operated by Harry Worthington, and OXVC is trying to interest yet another in ham radio, so those who missed ZB2A may not have to wait too long for Gibraltar. Those amateurs who worked "ZB2A," or "ZB2B" in the early part of the year will never get proof of their QSO, and any

contact with a ZB2 outside the dates mentioned above cannot rank as genuine.

We do not believe that VQ4CT (HF 14 T6) is in Kenya, but "somewhere in Europe," he comes through at the wrong times and with a strong signal when no other Africans are audible. CNIAA has been active with self-excited CW again on about 14380, and PJ1BV (HF 14) has been working W's in strings, but a few G's managed to make themselves heard, including G6RH, 6WY and 6CJ; QSL's are sent to all stations worked, but cards for him should only be sent via the A.R.R.L. The same applies for contacts with PJ3CO, also in Curação. CPIAA, who has been very active just outside the H.F. edge of 14 fortunately possesses a good receiver and always QSL's. We should be interested to know if PX2D is genuine; he states he is in "Ciudad Andorra," but when asked if this was the name of a ship he assured us that he had no cards at present but hoped to QSL all contacts in a month's time. KASED (14300) was an un-usual station worked in Palawan I., Philippines, but this does not count as a separate country! Other KA's active included KAIRP (14350), KAIFG (14320), Box 849, Canacao, KAIBC (14300), c/o U.S. Naval Stn., Canacao and KAIDL

Haiti continues to offer HH3L (14280), HH2MC (14275) and HH4AS (14400), all of whom QSL. Chile has produced increased activity with CE3EE (14430), ČE4AD (14440), CE3BF (14370) and CE3AJ (HF). Do not overlook VP2LC in St. Lucia on 14315. The operator is a YL, and contacts are known to have been made with G8IG and G2DH, counting for Windward Is. PZ1AB has apparently come to life again in Surinam, and WIFH tells us he is active on the HF side of 14. G6RH worked OX7ZL, who seems to be a permanent resident of Greenland according to the Call Book, but no more has been heard of OX7OU this month. VPSAD has proved himself to be genuine and two batches of cards have been received at RSGB. Apparently the first contact with G from this station was G6GL. The history of Falkland Island amateur radio seems to evolve round the fact that VPSB departed for England in 1937 and left his son in charge. Transmissions were later made under the call VPSD by R. McLaren, one of the engineers in charge of VPC, and then he changed to VP8AF, but finally decided that VPSAD would be the best call with which to continue. VP8AG is genuine. We learn from ZS5BW that he worked him on the HF end of

14 with a T6 note, and the QRA given was : Mercer, Grytviken Harbour, South Georgia in the Southern Ocean. Mail boats do not call frequently in this remote part and anyone who worked him may expect their card to leave the island in November.

ZL2OU again raises the point of certain " rare " stations who fail to OSL, and mentions ZP2AC, CE7AA and FASBG, but we so often find that others have cards from such as these, therefore it is incorrect to say they do not QSL at all. The real trouble seems to be that when their interest flags they appear to forget everything and do not attend to correspondence connected with radio. This is a pity because maximum enjoyment in radio can only be achieved by collective mutual assistance throughout the whole amateur world. VR4AD has been heard on 'phone by ZL2OU, and will not be active again until the middle of November.

G3BI worked Y12BA and the operator appears to be new, with the name Eddie Behnan. Certainly this station has been more active recently than ever before, mostly on about 14200-250 self-excited. 2AOU in Jersey, C.I., produces some unusual "catches" in OQ5AV (14030), CR6AI (a new one in Angola), EL2A, active again on 14310, VP7NC, VO8AI, 14300 (Raoul Thomas, Thompson Road, Vacoas, Mauritius), YS2LR on HF14, YV8AA, HK2BL and HK5EE also on HF side of 14 Mc. On 7 Mc. 2AOU heard LU, PY, XEINN, K5AM and W5 and 6, and has now heard 158 countries, 56 being on 28 Mc. G2DH worked VO2MI 14335, OQ5AS (14300), Edmond De Mey, Tshikapa', OQ5AV, Derungs, S.V.N., Leopoldville and KA1AF (14240). Stations heard incuded VP9X (14255) and XU8UX (14405). G2DH rightly asks all contributors to state the frequency of the station heard or worked, as the information is of little value without such details.

2DQS of Thurnby, Leics., asks if we want reports on 7, 3.5 and 1.7 Mc. Yes, we do-very much, as DX on these frequencies is greater news than on other bands. He reports CX1AA (LF 14), HK5ML (HF 14) and CE1AS and 1ET. BRS3319, also of Thurnby, complained that conditions were poor, but managed to hear CE1AH and 3AT and reports that LXIAY is now on 14 Mc. 'phone.

. All who worked YA5XX will be interested to hear some authentic news of his station. Operation was made in a tent on the mountains near Herat, vibrator supply from car battery supplied the 42 output valve with an input of 4 watts. A list of all stations worked has been sent to both RSGB and ARRL for confirmation, but the operator finds it impossible to send cards for contacts, but at his request, cards for YA5XX will be held at RSGB for him to claim them. The following G's were contacted in order: G5AN, 5ZT, 6RB, 6BT, 8WF, GM6BM, 5QY, 8TC, 5WP and 6KP. Sixty contacts were made in all and those members who wish for further details in the form of a confirmation from H.Q. should write to G6CL. YA5XX ceased operation on September 1 and returned to U.S.A., but hopes to be back in an equally rare country (not Afghanistan this time), using the same call next year. We know which country this will be, and suggest you keep your ears well open!!

GSRL heard YN4AB (formerly a W7) on 14 and worked OY5D on 7 Mc. 2DKQ at Reading reports ZD7A on 14415; we shall be interested to

know if this station is really in St. Helena. PK6XX and ZP2AC were both received on 'phone on the LF side of 14, while K7FST (14360) was received when actually across the Bering Strait in Zone 19. He requires information on XX7B (14390). G6XL appears to be top scorer in the VK ZL Senior Contest with a score of 3,735 points, while he heard VR4AD and VR4BA, the latter being on 14346-CW. KA1AX was received on 7 Mc. at 20.00 on October 22. G2MI reminds us that 7 is showing definite signs of being "DX-y," so we shall expect

some interesting reports for this band.

This page is not complete without Eric Trebilcock, BERS195 in Northern Australia. In four weeks he received 84 countries and following his record CW HAC reported last month of amateur stations, he heard them all on 'phone in 3 hrs. 26 mins, on September 21; the stations were: CN1AF, E12L, PY2JC, W8BF, XU8ET and VK2XS. The reception of YS2LR brought his country total to 164 and a card from ZN1B (Bechuanaland) gave him 131 confirmations. He reports that ZLIDV made over 200 contacts and VK2HF and 2ADE nearly reached this total in the Senior VK/ZL Contest. 7 Mc. produced VK9GW, G's and F's, whereas 14 Mc. yielded OXVC, VP4TO, VP7NC, TF3C, TF5G and on 28 Mc., YVIAQ, VS6AF and two TI's were heard. BERS195 confirms that the real ZKIAA has not been active for some time, so we can forget we ever heard "ZKIAA." He raises an interesting point about hearing or working countries of which no one has details. He maintains that it is not correct to count such as ZD9B until some definite knowledge is obtained of the authenticity or otherwise of some unusual call. We agree entirely. One of the purposes of this page is to attempt to show those who are bona fide and those who are not. "FK6NW" recently reported by HIR should read K6NWF. heard frequently in North Australia.

G3JR has changed to an RK25 with 370 v. and reports contacts with ZS3F, ZS4AA, HK4DA, K7EVM (14040), and W7FYN in Montana on 14310. G2DH has now worked 117 countries with 93 confirmations, so he should be in the DX Century Club ere long: he raised PJIBV, CPIAA, VS7RA, and heard HPIA on 'phone, VP7NU, OX7ZL and XZ2KR (14240). G6GH reports a contact with OX7ZL on 14030 with a T7 note at 19.30 on October 14. ZC4EB was heard on 14400 (T4) giving his QTH as Radio Station, Nicosia, Cyprus. G2GK tells us he heard YS2LY and YS1LZ! G8UA has had news from YM4AI that Austria is now divided into two radio districts having the distinctive letters "W" for Alpenlande and "S" for Donaulande. G2UX wants to know if XU8GW

is ex-G8GW, G6RH heard FK8AA.

G5MN had an interesting experiment forced upon him. He arrived home one day to find his normal bent 66 ft. end-on aerial lying on the ground; not wishing to be off the air he hastily put it up off the ground (only just) and worked ZS and VU for the first time. He had found it impossible to work these parts with the normal aerial, but altering the slope just made the difference. ZD2H is still very active and is as anxious to contact rare countries as we are to work him! CXICX, CE3AJ/BF, K6OJE, U2NE were contacted on 14 Mc. and W6PMV on 7 Mc. VP4TO has been having trouble with his receiver, which accounts for the large number of CQ's and small number of QSO's. His input is 22 watts and he is usually active between 20.30-22.30 G.M.T. on 14300. Our contemporary, W6QD, tells us that K6TE is back from Wake I., but K6CKM is to take his place and will operate on 14324 or 7162. Cards should be sent to Larry Dickey, c/o P.A.A., Radio Stn., Wake Island, but he will answer all cards when he returns to Honolulu, as postage per card costs 20 cents by air!

G8DA with 5 watts from batteries was reported to have worked XU and VP4 on 'phone last month, but we regret that this was not so—he only heard them! New stations received by 8DA include HZIA (14390) (obviously a fake), K7ETS (14010), XX7B (14400), K6PLZ (14390) (who is coming on with 1kW. soon), K6LBH (14380), K6DUA (HF 14) and VP6FA on 14050 'phone. G3CY added XU6ST and CR7AU and G8UY heard XU's 6TL, 6WA and 8NR. We hope that XU6's have not been injured in the recent Canton fires. G2QY reports the QRA of VQ2GW: 67, Bie Avenue, Luanshya, and G6NF tells us that VQ3ALT can be QSLed c/o Box 45, Lindi, Tanganyika. GM6BM does not agree that 220 v. D.C. mains constitutes QRP and assures us that he can use 25 watts with ease at this voltage. He has not been active owing to illness, but had his receiver by his bed and heard W6NPO/K6 (14025), KHAKH (the Hughes' plane) working W6MQS. G5AN worked VQ2MI and was given the following QRA: A. J. Middleton, Box 235, N'Kana.

In Search of B.E.R.T.A.

Call		Dominion Districts	Colonies	Total
G5HH		23	12	35
G8HA		22	11	33
G5ND	***	22	10	32
G6ZO	***	20	11	31
G2GK	***	23	7	30

VU2AN has been very active and heard MX3A (14250), MX3B (14100) and worked VK9VG. G5ZT contacted ZZ2AC at 21.20 G.M.T. on October 2, who claimed to be an American operating on the Tirriman Islands, Galapagos Archipelago. 350 watts into a rhombic were supposed to have been used and QSL's were requested via W2EF. 5ZT was assured that cards would be sent to all stations worked when he returned to Boston in two months' time. G2YV using 10 watt 'phone had a contact with Algiers with S8 both ways on 7 Mc. G3IH agrees with GM6JD and does not call "test" on 14 Mc. but waits his man. His results show that this procedure has paid and contacts with QRP (350 v.) were made with PK3EM, XU6TL, ZE, TF and VK. G5HH worked KA1BC, ZE1JL and VK6ZO for new stations.

W5ACA writes to give us the true story of the mysterious "VP3TEST." He has received a letter from one of the operators who told him that as the natives run amok occasionally and tear up the communication lines from Georgetown into the interior, small QRP outfits are available to take care of such an emergency. When traffic is slack they tune these transmitters to 7 or 14 Mc. and

sign VP3TEST. Cards should be sent via VP3BG, J. S. Kerr, 1, Wellington Street, Georgetown. W5ACA is in Louisiana on 14380 or 14396 with 800 watts input, and is a 100 per cent. OSL station.

800 watts input, and is a 100 per cent. QSL station. G3PS worked 38 countries in his first month on the air, and both WAC and WBE. His aerial is interesting, being a 70 ft. top fed by a doublet, 16 ft. 5 ins. each half, and this doublet is vertical and is in turn fed by a 72-ohm line. Results speak for themselves. BRS1066 of Burton-on-Trent reports VP5BR, K6MTE, K6PDQ and XU7CM, and he has now heard 136 countries with 95 confirmed, while U9AC obliged with a card.

If you observe any peculiar fade-outs or conditions of abnormality on any band, we shall be pleased to publish details of such occurrences.

THE 28 Mc. BAND

By NELLY CORRY (G2YL)

THE general impression among regular "Ten Metre Addicts" seems to be that conditions last month were not so good as those of October, 1937. Certainly more DX was heard than ever before in the history of the band, and at times QRM was terrific, especially among the 'phones, but on the whole QRKs were lower, and QSB more prevalent than a year ago. G6DH reports that his graph of the highest frequency heard daily is keeping well below that of 1937, and it seems quite possible that we have already passed the peak of 28 Mc. conditions in the present solar cycle. The impression a casual listener on the band gets is that it is "all W 'phones," but BRS3179 proved that there is plenty of activity all over the world by logging 90 different DX stations during the month, exclusive of North America and Europe.

Altogether stations were heard from 65 countries, and all continents were audible on October 2, 9, 15, 16, 18, 19, 22, 23, 24, 29 and 30. G6DH was W.A.C. on the 9th and 23rd, and G2DH worked all continents except Africa on the 9th. Oceanic signals came through daily from October 13-24 and on five other days, and included 23 Australians in VK2, 3, 4, 5 and 6. Stations in ZL2 were heard by G6DH and G6YL, and ZL1CC and KA1AP by BRS3179. On October 6, 18.30-19.30 G.M.T., several K6 'phones were audible at good strength, viz.: K6MVV, worked by G2PL, K6MVX worked by G6DH, and K6BAZ heard by BRS3179. PK1VY was heard on seven days after the middle of the month, and was worked on 'phone by G6DH on October 16.

Stations in Asia, heard on 19 or more days, included VU2AN, who had ten QSOs with G6DH during the month, and VU2DR, 2ED, 2EU, 2FS, 2FV and 2FZ. G6DH made First Contact with Burma when he worked XZ2EX, and later XZ2DX, on 'phone on October 20; XZ2DY was also heard active. Other interesting signals were HS1BJ, heard by BRS3179; J2CD, heard by 2DQS; VS6AF, worked by G5ZT, G2WS and G6KS; and VS6AG, heard by G6QZ. About 40 stations in Africa, the majority of whom used 'phone, were heard on at least 24 days, from CN, CR7, FA, FB, SU, VQ2, VQ3, ZE, ZS1, 2, 4, 5 and 6. CR7AG was reported active for the first time by G6YL.

North Americans were audible on every day in the month except October 1, 7, 17 and 27. G5LI worked all W districts on 'phone on October 4, and G6KS completed his W.B.E. by QSO's with VE5, and worked all W districts except the 5th on c.w. on October 18. W mobile stations logged by BRS3179 were W9BHP, a new ship station, and W2COB, aircraft over New York.

Signals from Central America and the West Indies were also heard nearly every day, and included 24 stations in CM, FM, HH, HI, HR, K4, K5, TG, T1, VP6 and VP9. HI7G was the most consistent signal from this part of the world, and was heard on at least 22 days. As in North and Central America, phones predominated in the South, and included 2 dozen or more stations in CE, CX, HC, HK, LU, PY, VP3 and YV.

Signals from Eastern Europe were often up to S8, and on a few days skip was short enough to enable Ds, Fs, HBs, etc., to get through at good strength. Pre-skip signals from GM, GW, EI, ON and PA were also audible in England on many occasions, stations about 100 to 200 miles away sometimes being heard up to S6. The "hiss" was heard on October 11, 14 and 17 for short periods.

Many thanks to G2DH, 2XC, 5ZT, 6DH, 6KS, 6QZ, 6TG, 6YL, 2DQS, BRS25, 3003, 3179, for their useful reports. The latest date for receiving reports is the 28th of the month, and not the 18th, as published last month through a misprint.

THE 56 Mc. BAND

By J. M. R. SUTTON, B.Sc. (GW2NG).

WING to the change in direction of these notes and the fact that none were published in the September issue, there are a number of reports covering July, August and September to be dealt with this month. From the December issue on, however, it is hoped that this feature will revert to normal and will consist of reports of activity covering the previous month.

Contest Results from U.S.A.

W9NY sends in his eighth and ninth monthly reports for August and September. August proved a very bad month for him, for no DX stations were heard or worked and no DX reports received. He missed thirteen days of operation owing to holidays, but it appears the month was very poor. He is hoping for real DX l—now the "domestic "DX is over, and will be on at 14.00 G.M.T., 18.15 and 19.15 G.M.T., on week-days. He will also transmit on Sundays between 15.00 and 17.00 G.M.T., which is the best time for DX. He is contemplating some changes to the transmitter and receiver and hopes to work G in November. In September he was transmitting every day but three, with no DX results.

British Reports

There are two reports from G8LY who has proved a very consistent contributor to these notes, despite the handicap of being in a locality where 56 Mc. activity seems very low indeed. This station has one faithful listener, 2DUT, eight miles away, who keeps a constant check on the transmissions. From August 2 to 5 only 2DUT's reports were received, but G2OD and 5NF were heard on the 5th and 6th, with 8MG (?) on 'phone on the 6th also. On

August 7, 8MG, 6XM and 5MAP were heard and 5MAP was worked. G2OD was heard at S2 on August 8, with very thundery rain and poor conditions. August 9, 10 and 11 were dead except for 2OD, but conditions improved on the 12th, 13th, and 14th with 2OD, 5NF, 6XM and 8DF who was worked with deep QSB on 8LY on the four-wave aerial, but no QSB when 8LY was using the half-wave aerial.

August 14, 15 and 16 proved blank, but 5NF was contacted on the 18th and 19th. From then to the end of the month conditions were average, with no new contacts. 8LY comments that the band was very devoid of signals during August and questions whether this was due to holidays or "short-skip" lengthening out.

Activities at this station were curtailed on September 14, due to emergency crisis work, but the month was very average. The usual stations were heard and worked, including G6XM, 5NF, 5RD, and 5MAP, but a good report was received from G8OS, Sussex, who received 8LY at 549. A queer phenomenon occurred in October. 2DUT has always been able to receive 8LY very well, using practically no aerial, but at 21.00, on October 3; at 23.00 on October 5, and at 15.15 on October 8, no signals were received. Signals reappeared at 19.00 on October 11. Both receiver and transmitter were checked and found to be working normally. Perhaps this will be another mystery of the "Cinderella" band!

While on the subject of mysteries, here's another! GISTS has sent in an account of events which happened on September 24. He was portable, with GISSJ, on Scrabo Tower, Newtownards, Co. Down, and so was G8LIP in the Lake District. The two stations were about 90 miles apart, with no intervening natural obstacles, yet neither station received the other! Numerous reports on this day gave bad conditions. Indeed, the Irish station could not contact a station six miles away, while 8LIP could not QSO a station three miles away. A listener's report from Bolton gave the usual S9 police signals as S5. Did anyone else notice particularly bad conditions on this date!

A very interesting and lengthy account, both of his station and activities, has been received from 2BIL (ex-BRS3322). Although there is too much detail to include here, a few "high-lights" will be set out. From April to the second week in September, on Sundays, he was portable at various places in the South Sussex Downs, with 2DFG and 2DGR. It was noticed that signals were affected by the nature of the soil. Various aerials were tried, being mainly of the W8JK, Reinartz Rotary Beam, folded doublet, etc., types.

Activity in April and May seemed confined to G6VA, 2HG, 2MG and 8SK. At this period these stations were received far better than in any succeeding month when activity was greater.

Activity in June was at a minimum. N.F.D. conditions were poor but very many semi-local stations were received. Although Sunday, July 10, was a bad day climatically, with heavy rain and a Scotch mist giving visibility of only ten yards, conditions were excellent. It appears that moisture and mist do not absorb 56 Mc. waves! An extraordinary number of stations was heard at remarkable signal strength. Very few fell below S7 and many were S8, 9. Conditions were again good on

July 24 and the hissing noise was heard on July 31 at the same time that G6YL heard it on 56 Mc., and VU2AN on 28 Mc. The only station heard was G6FU.

September 9, 10, 11 saw an attempt to maintain sixty hours' continuous listening on Ditchling Beacon. Except for one period of sleepiness the attempt was well carried out! September 9 gave commercial harmonics and 8KZ, who proved the best signal of the whole period. 6XM was heard in QSO with 6FO and 6FL (Cambs.) was heard on low power at S5. On September 10 no station commenced testing until 19.07, when 5BY was heard. Various tests were heard from then on but at 20.00 the band was quite dense with signals. 6FO was heard from 23.18 on with monotonous regularity. Activity persisted until 02.03 but from 02.00 to 02.30 a Liverpool police transmitter was heard. 6FO was again received in the morning and so was 5JU and 5RDP, who was at Oxford.

On August 8 an F8 call (full call unidentified) was received calling CQ, and this coincided with a rise in mush level similar to the hissing noise. G5MA was the most consistent portable station during the summer. He seemed to be active nearly every week-end. The writer must sincerely thank 2BIL for this splendid effort and is sure that he will be willing to give detailed reports to any station interested in his summer listening. The numerous stations listed in his report cannot be given here on account of space limitation.

Here are two notes from BRS2601. On September 30 at 21.30 on 59 Mc, a commercial was heard sending information about the International situation. No call was given and the signal was 567. On October 16 conditions were very queer. All stations were exceptionally weak up to 13.00, when a rapid improvement began. There must have been a local change in conditions, for other stations recorded an increase in QRK. G5HA was only S6, while usually S9 plus, and 5BY, usually 589, was 548. There appeared to be no climatic or atmospheric changes to account for the sudden improvement.

G6DH sends an interesting account of gear and schedules and also some very interesting comments. With a very fine receiver he can depend on consistent ground-wave reception up to 60 miles. He wants to know of Cambridge activity to complete his circle of radiation. On September 13 he was OSO 6OZ (60 miles) at 21.50 and heard him at 20.30 on September 15, but was not heard. On September 14 he was part QSO with 2AO (80 miles) and 2HG (65 miles). On September 30, testing a new beam, he heard 5BY at R3 'phone. From then to October 24 he heard 2HG, 5BY, 2LC (QSO, 30 miles), 6VX (60 miles, S5) and 6LL (60 miles, S4). No one within 30 miles of 6DH is active on five! G6DH thinks DX contacts rather remote this year. The peak was in 1936-37. The upper frequency limit is considerably down on the same period last year. Last October we had already reached 48 Mc., but this month have barely touched 38 Mc. !

G2HG sends in some interesting observations. The only days he observed conditions to improve were July 2 and 19. On July 2 he was heard in HB and harmonics of HBH, DKF and ICE were logged. On July 19 two commercial harmonics were heard between 09.55 and 10.30 B.S.T. at

S5/6. One was believed to be IBE, but no calls were given. Conditions for 60 miles' working were better in July, and the best night for short-skip working was July 6. Some thirty G's were heard working on the band.

Suggested Schedule Scheme

The writer must record his complete disappointment with the support accorded to this scheme. Eight stations, mainly receiving, have sent support for the scheme. It would be redundant to outline the advantages of such a scheme which would, at least, ensure that a station could hope for some activity on the band when he wished to operate. He is very doubtful whether to continue but does not like to disappoint those who have written in, so he will set out the scheme here. Please send the following details, together with a halfpenny stamp, by November 25. (a) Name, call, ORA. (b) Exact schedule times, or approximate and likely times when transmission or reception can take place, (c) Type of transmissions (reception), e.g., plain C.W., I.C.W., 'phone, and also whether these signals will be frequency stabilised or otherwise. (d) Details (precise) as to whether these transmissions (reception) will be beamed, or from a rotating array, or from an omni-directional aerial. (e) Whether reports are required and where they should be sent (direct or via R.S.G.B.). All members interested who wish for a copy of the circular (if enough answer to warrant its circulation), but who have not contributed to it, are asked to send stamp and QRA. We wonder if there are fifty stations interested enough in 56 Mc, to support this scheme!

British Isles Calls Heard

At sea by G6WQ, July 28 to August 22:—
600 m., N.E. Panama: g5nd (569). Canal Zone: g2xn (589), g2vd (569), 2pu (56f), 2xv (57f), 2oc (56f), 2xy (57f), 5nd (559), 5rv (57f), 6vr (58f), 6wy (569), 6gh (579), 8ms (559), 8mj (58f). 400 m., N.E. Panama: g5tg (569), 6ks (569), 8oc (568), 200 m., W. Panama: g5tg (569), 6ks (569), 8oc (568), 200 m., W. Panama: g6ux (56f), 6wx (57f), 6wy (58f), 8dv (589). 200 m., S.S.W. San Francisco: g8pl (559), 8qz (559), 4beam San Francisco: g2km (579), 5li (563), 100 m., off Oregon Coast: g2oc (563), 3ah (569), 3bs (569), 3mg (567), 3gr (558), g15wd (579), 5rv (579), 5il (449), 6ks (579), 6kp (559), 6an (559), 6 mc (564), 8hh (578), 8ww (579). S. of Vancouver: g2up (559), 3bs (569), 5iv (559), 5lj (549), 5uy (549), 5wp (589), 5my (579), 5qa (569), 5li (566), 5il (579), gm6hz (559), 8al (559), 8ga (559), 8ww (569), W. of Vancouver: g5iv (558), N. of Vancouver: g2hx (449), 5li (566), 6qx (579), 6lb (449), 6td (449), 8pl (449). Englewood, Vancouver: g2cy (548), gw3qn (559), 6bt (449).

The above list was sent in by G2CD, who will be glad to give further details if a stamp is enclosed

with the enquiry.

VP4TO, Pointe-a-Pierre, Trinidad, B.W.I. August 31 to September 30, 1938 :

G2ik, 2iu, 2lb, 2lk, 2ou, 2pn, 3hh, 3ih, 5an, 5km, 5mv, 5mv, 5ns, 5sg, 5sr, 5su, 5to, 5yu, 5zt, 6bi, gm6hz, g6ko, 6ku, 6qx, 6td, 6yp, 8ax, 8dv, 8fi, 8go, 8ii, 8ik, 8js, 8un, 8wc.

The B.E.R.U. Contests, 1939

THE Rules for the 1939 Contest which appear in this issue, present no change so far as scoring is concerned, the only major alteration being the introduction of a six figure serial number scheme for the purpose of claiming a contact. The arrangement is already familiar to most of our members and consists of the R.S.T. report on the other station's signals with the addition of three figures indicating the number of the contact. Thus 569004 means R5 S6 T9 and the entrant's fourth contact in the contest.

The outstanding change is in connection with the dates and duration of the two sections of the Contest. For some time it has been felt that it is unfair to, and unpopular with, the rest of the world for the British Empire to monopolise four weekends during the height of the DX season. It is also a fact that the week-end system tends to favour the high-power station, or at any rate those who manage to work certain parts of the world which only come in for a very short time each day.

High Spots of the 1939 B.E.R.U. Contests

- I. SERIAL NUMBERS WILL BE USED.
- SENIOR AND JUNIOR CONTESTS WILL RUN OVER TWO 4-DAY PERIODS (96 HOURS).
- OPERATING TIME IN EACH CONTEST WILL BE LIMITED TO 30 HOURS,
- 4. ENTRANTS IN THE RECEPTION EVENT WILL BE LIMITED TO 15 HOURS' LISTENING IN THE SENIOR AND JUNIOR TRANSMITTING CON-TESTS (TOTAL 30 HOURS).
- ENTRIES MUST BE POSTED NOT LATER THAN SEVEN DAYS AFTER EACH CONTEST FINISHES.

Further, it is very much of an endurance test, involving continuous operation over 24 hours at a time of the year when, for many, such strain is

hardly relished!

The R.S.G.B., after considerable discussion and sifting of the views of a large number of members, have decided to try a scheme which is a modification of the American DX Contest plan, namely, a Contest period of several days with an operating time limit. Each of the two Transmitting Contests will extend over 96 hours and competitors may operate their stations during each section for not more than 30 hours. This limit of 30 hours will give everyone a chance to pick his own peak periods when opportunities for scoring are greatest. The time may be made up in any way convenient to the individual operator, and each spell must be recorded on the log sheet, in accordance with the Rules.

With regard to the Receiving Contest, a competitor will be allowed to select his operating period in the same manner, but his total must be composed of not more than 15 hours' listening during the Senior Transmitting Contest and not more than 15 hours during the Junior.

Although the above plan is in the nature of an experiment, it is thought to embody the advantages of week-end and period contests, whilst avoiding

the difficulties of both.

Now that the Empire Air Mail scheme is an established fact, the Contest closing dates have been advanced. It will be seen from the rules that all entry forms must bear a post mark of not later than seven days after the close of each contest, and no entry will be accepted later than March 20, 1939. Competitors who disregard this ruling or who fail to complete the analysis form will be disqualified. This decision will be most rigidly adhered to. An entrant who by his own carelessness finds himself disqualified will have only himself to thank.

It will be noted that the Contact Serial Numbers have been printed on the entry form, and take the place of the column hitherto designated "Contact

No."

The usual appeal is made for care in making out the entry forms. After all our efforts at persuasion, some of the entries are often a disgrace and are scarcely legible. If a competitor is interested in his entry, the least he can do is to prepare it in a

neat and orderly manner.

We again appeal to the sporting spirit of the telephony enthusiasts to limit their activities to a minimum during the period of the contests, especially in view of the fact that they will now extend over two week-ends instead of four. We should also like to ask everyone to send in a log, however few the contacts made, as this is invaluable for checking purposes.

Certain stations have, in the past, refused to work contacts with a zone when once they have reached the "one point per contact" stage. Whilst this is manifestly unfair to the other stations in that zone, it is also a very unwise procedure to adopt, for it often happens that a few "single point contacts" have made the difference between a place and "also ran."

The best of DX to everyone and may all the layers and cosmic "whatnots" combine with the good behaviour of King Sol to produce real bumper

conditions during the Contest.

A.O.M.

Southend and District Radio and Scientific Society

Mr. J. M. Watson (G6CT), hon, secretary of the above society, informs us that a new venue has been obtained for their meetings. This is situated in Southend High Street, within a hundred yards of the terminus, to which transport comes from all over Essex.

Some 50 members and friends recently attended a very successful all-night field meeting. The transmitter was concealed in a ditch near extensive woods at Woodham Walter, and was remotely controlled from a tent in the middle of the wood. Mr. L. Pugh (2BNR), the only successful competitor, found the transmitter in three hours and 23 minutes.

The R.A.F. Civilian Wireless Reserve

In view of the interest being shown in this Reserve, we have requested the Air Ministry to supply us each month with official information concerning its progress,

S a preliminary to the further extension of local training, it was decided early in October to appoint twelve Regional Controllers with stations located in the following areas :-

Group A (Regional Controllers)

Berkshire. Fifeshire. Blackheath. Glasgow. Hertfordshire. Breconshire. Cheshire. Kent. Devonshire Leicestershire.

Yorkshire.

The Controllers, most of whom are R.S.G.B. members specially recommended by that Society,

The R.A.F. Civilian Wireless Reserve Badge.

will eventually allotted control of 20 or more C.W.R. stations within their region. Their stations will operate on a No. 2 frequency to the No. 1 or Main Control frequency, and they will be responsible for maintenance of the No. 1 frequency for exercises with main station, which is for the moment located at Cranwell, Lincolnshire. The No. 2 frequency will be used for inter-communication between Regional Control

stations, and substations. Thus a C.W.R. W/T relay system will be organised throughout the British Isles.

Group A communication tests and exercises on a frequency of 2580 kc. have been carried out satisfactorily with the R.A.F. Main Control station, and the ability of the members taking part in the exercises has been so good that the main station has frequently been heard working at full speed in order to compete with the standard of transmission and reception developed.

Group B

A second group of stations (defined as Group B) has now been being organised, and their training commenced on November 7. The allotment of Group B is intended to cover areas at present not included in the Group A organisation.

Experimental Section

An Experimental Section is in process of active formation. C.W.R. members are being carefully selected for their ability and experience, and a small efficient nucleus is already co-operating. The programme of activities is modest at present, but the members concerned are already concen-

trating on some preliminary research work. Much depends upon the results submitted as to what extent further co-operation with the Signals Technical Departments will develop. All members of the Experimental Section must be competent W/T operators.

Air Ministry Station It is understood that the installation of a C.W.R. station at the Air Ministry is almost complete, and that operation will commence as soon as members of the Experimental Section have solved local interference problems.

Badges Badges are now ready for issue: each badge is numbered upon the back and is of a button-hole type to wear in the lapel of the coat. The design, which is illustrated, represents a two bladed axe cleaving space with Hertzian waves radiating

Regional Controller Badges will carry the distinctive letter "C," whilst Deputy Controllers will be identified by the letters "D.C." In both cases the additional letters are to be superimposed on the top of the badge.

The Executive of the C.W.R. have already been asked if members of the Reserve could man and control a series of mobile Auxiliary Service stations at various points around the British Isles. Although the training is in its earliest stages the progress made justifies the statement that the Reserve organisation will be able to take over such a scheme.

Golders Green and Hendon Radio Scientific Society

The following lectures have been arranged by the above Society

Nov. 9.—Television Transmitting Equipment, by

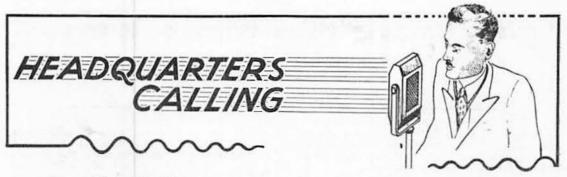
H. A. M. Clark (G6OT). Short Waves, by E ., 23.-Short by E. L. Gardiner (G6GR)

Dec. 14.—High Fidelity Reproduction, by P. G. A.

Meetings take place on the second and fourth Wednesday evenings in each month at the Regal Cinema, Finchley Road, Members of the R.S.G.B. are always welcomed.

"Physical Properties of Sun Spots"

Mr. D. Tomlin, of Sheffield, has kindly pointed out that the intensity of the earth's horizontal field is .18 gauss instead of 1.8 gauss, as quoted by Mr. Baldwin, 2CBL, the author of the above article, published in our last issue. Mr. Tomlin also suggests that it is more academically correct to use the term "Oersted unit" instead of "Gauss."



I.E.E. Meeting

The next London meeting will be held at the Institution of Electrical Engineers, on Wednesday, November 23, when Mr. K. Frost, of Messrs. Standard Telephones & Cables, Ltd., will deliver a lecture on Recent Valve Developments.

The I.E.E. will be open from 5 p.m. Tea will be

served free of charge from 6 p.m., and the lecture will commence at 6.45 p.m.

It is hoped that good support will be given to this meeting.

Honorariums

The Council have pleasure in announcing that Honorariums have been awarded to the following members who contributed outstanding articles to

Volume 13 of The T. & R. Bulletin :— Mr. J. E. Bryden (2BOL). "Remote Control by Radio," page 75, August, 1937.

Mr. H. A. M. Clark (G6OT). "The Reduction of Interference due to Radiation of Third Harmonics.' page 235, November, 1937

Mr. F. W. Garnett (G6XL). " Experiences with a

Simple Directive Aerial, "page 355, January, 1938.

Mr. I. B. Clark (2BIB). "A Review of Multi-Valve Amateur T.R.F. Receivers" page 662, June,

Mr. W. H. Allen (G2UJ). " Four Years and No Signals," page 688, June, 1938.

District 18 Representation

Due to pressure of private business, Mr. W. A. Clark (G5FV) has tendered his resignation from the position of District 18 Representative. This opportunity is taken of thanking Mr. Clark for his past services.

It is hoped to appoint a successor at an early date.

B.E.R.U Contest Contacts

A New Service to Members

As an experiment, Council have agreed to allow members who have been unable to obtain confirmation (in the form of QSL cards) of contacts made with British Empire stations during recent B.E.R.U. Contests to apply to Headquarters for a

The following conditions govern this arrange-

1. Members may only apply for confirmation

from stations in Dominion Districts and Colonies from which they have had no previous QSL.

2. Members must themselves ascertain, examining the contest report, that an entry was accepted by the Society from the overseas station

3. Members must prepare a card worded in the

following manner:

This is to confirm that your station was in contact with (name of station) at G.M.T. 193...... when your signals were recorded on his B.E.R.U. Contest log as RST.....

This postcard must be self-addressed and stamped and forwarded under cover to the Secretary, who will, if the contact is confirmed, sign the certificate.

The postcard will additionally carry an impression of the Society's seal.

4. Contacts can only be checked back for a period of two years, e.g., during 1938 a member may ask for contacts made in the 1937 and 1938 Contests to be checked.

R.S.G.B. Slow Morse Practices

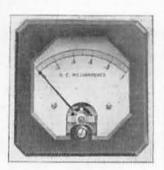
Details appear below of the slow morse practices organised by the Society for those members wishing to learn or improve their code. As usual, test matter will be taken from recent issues of the T. & R. BULLETIN. The page number and month of issue will be given at the end of each test-by telephony. A telephony announcement will also be given at the commencement of each test to assist those interested in tuning in the sending station. It is emphasised that reports will be appreciated and are desired in order to ascertain useful range and numbers utilising the service. If, however, a reply is desired, a stamp should be sent. Will stations in areas not at present served offer their services to Mr. T. A. St. Johnston (G6UT), "Normandale," Little Hallingbury, Essex (Telephone: Bishop's Stortford 785). A sending station G3GH, of Knowle, near Brunton, N. Devon, is included in the schedule below for the first time.

	G.M.T.	kc.	Station.	Location.
undays	0900	1755	GSNF	Manchester
	0930	1792	G8AB	Loughton
	1000	1080	G8PR	Staffordshire
	1300	1920	G6VC	Northfleet
	1230	1850	G6VD	Leicester
	1500	1887	G3GH	N. Devon
londays	2315	1741	GIGXS	Bangor
uesdays	2215	1792	G8PZ	Colchester
Vednesdays	2315	1741	GI6XS	Bangor
hursdays	2215	1792	G8PZ	Colchester
Iondays uesdays Vednesdays	0930 1000 1300 1230 1500 2315 2215 2315	1792 1080 1920 1850 1887 1741 1792 1741	G8AB G8PR G6VC G6VD G3GH GI6XS G8PZ GI6XS	Loughton Staffordsl Northflee Leicester N. Devor Bangor Colcheste Bangor

PREMIER

1938

RADIO



PREMIER MOVING COIL METERS

Guaranteed Accuracy within 1-2 per cent. Model No. 2 (as illustrated), Bakelite Case, 3 ins. by 3 ins. square, with Zero

-l m.a.	Land	1644	544	200 3
-10 m.a.	***		444	2
-50 m.a.		200		2
-100 m.a.	0.00	***	***	2
-250 m.s.	400			2

Model No. 311. Model No. 21. 31-in, diameter 3-in, square case. round case, 0-1 m/A. 22/6

0-10 m /A... 17/6 0-50 m /A... 17/6 0-100 m /A.. 17/6 0-250 m /A. 17/6 0-10 m/A. 0-50 m/A. 20 /-20 /-0-100 m /A. 0-250 m /A. 20 /-Model 311. 0-1 m/A. movement, with calibrated scale volts-ohms-m/A., 25/-.

VOLTAGE MULTIPLIER RESIST-ANCES, guaranteed accuracy ±2 per cent. All standard ranges, 1/3 each.

TAPPED SHUNT to provide readings of 5 m/A., 25 m/A., 250 m/A. and 1,000 m/A., 5/6.

PREMIER SHORT-WAVE KITS

are all sold complete to the last detail. All valves and coils are included, as well All valves and coils are included, as well as theoretical and wiring diagrams, and lucid instructions for building and working. Thousands are giving excellent results all over the world. Each Kit uses plug-in Coils and the Coils supplied tune from 13 to 170 metres. All Kits are supplied with a steel chassis and panel.

1	Valve Short-Wave Receiver or	
.21	Adaptor Kit	17/6
- 1	Valve Short-Wave Superhet Con-	
	verter Kit	20 /-
1	Valve Short-Wave A.C. Superhet	237
	Converter Kit	22/6
2	Valve Short-Wave Receiver Kit	25 /-
3	Valve Short-Wave Screen Grid	
	and Pentode Kir	50 14

ALL POST ORDERS to: Jubilee Works, 167 Lower Clapton Road, LONDON, E.5 Amherst 4723

BATTERY VALVES, 2 volts, H.F., L.F., 2/3. Power, Super-Power, 2/9. Var-mu-S.G., 4- or 5-pin Pentodes, H.F. Pens., V-mu-H.F. Pens., 5/-, Class 8, 5/-, Freq. Changers, 7/6.

Section 2 Proc. Changers, 19. AC., 19. 7/6 : Triode Hex. Freq. Ch., 8/6 : Tri. Grid Pen., 10/6: 3!-watt D.H. Triode, 7/6.

UNIVERSAL TYPES. 20v. 18a., S.G., Var-mu-S.G., Power, H.F., Pen., Var-mu H.F. Pen., 4/6 each. 13v. 2a. Gen. Purpose Triodes, 5/6; H.F. Pens. and Var-mu H.F. Pens., Double Diode Triodes, Oct. Freq. Changers, 7/6 each. Full-Wave and Half-Wave Rectifiers, 5/9 each. 24-v. and 35v. Pentodes, 7/6.

AMERICAN VALVES. We are sole British Distributors for TRIAD High-grade American Valves. All types in stock. Standard types, 5/6 each, All the new Octal base Tubes at 6/6 each, 210 and 250, 8/6 each, 81 and 2A3, 8/- each.

NEW TAYLOR TUBES T.40. T.Z40. NOW IN STOCK, Price 24/- each. Prices now reduced on

866 Rectifier, now 10/-: 866 Junior, 7/6; T55, 45/-: 203Z, 52/6; 745, 65/-: T.20 and TZ.20, 17/6 each,

PREMIER MAINS TRANSFORMERS Screened primaries, 200-250 volts, Fully guaranteed. Wire-end types,

guaranteed. Wire-end types.
S.P. 250, 250-250 v. 60 m/A. 4 v. 1-2 a.,
4 v. 2-3 a., 4 v. 3-4 a., all C.T., 10/*.
S.P. 300. 300-300 v. 60 m/A. 4 v. 1-2 a.
4 v. 2-3 a., 4 v. 3-4 a., all C.T., 10/*.
S.P. 351. 350-350 v. 150 m/A. 4 v.
1-2 a., 4 v. 2-3 a., 4 v. 4 a., all C.T., 13/*.
S.P. 352. 350-350 v. 150 m/A. 5 v. 2 a.,
6-3 v. 2 a., 6-3 v. 2 a., all C.T., 13/6.
The above can be supplied fitted with
Panel and Termipolis at 1/6 evers Panel and Terminals, at 1/6 extra. S.P. 500. 500-500 v. 150 m/A., 15/-S.P. 501. 500-500 v. 150 m/A, 4 v. 2-3 a., 4 v. 2-3 a., 4 v. 2-3 a., 4 v. 3-5 a., all C.T., 21/all C.T., 21/-S.P. 502. 500-500 v 150 m/A, 5 v. 3 a., 4 v. 2-3 a., 4 v. 2-3 a., 4 v. 3.5 a., all C.T.,

5.P. 503. 500-500 v. 200 m/A., 5 v. 3 a., 6.3 v. 3 a., 7.5 v. 3 a., or 2.5 v. 5 a., all C.T., 25/-5.P. 1,000. 1,000-1,000 v. 250 m/A.,

21/-. S.P. 1,250. 1,250-1,250 v. 250 m/A., 27 /6.

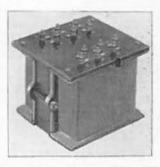
S.P. 2,000. 2,000-2,000 v. 150 m/A., 50/--The above can be supplied fitted with

Panels and Terminals, at 2/- extra. Details of complete range available. Special Transformers wound to order. PREMIER SMOOTHING CHOKES

60 m /A. 40 hy., 6 /6. 150 m /A. 40 hy., 11 /6 80 m /A. 30 hy., 7 /6 250 m /A. 40 hy., 15 /-PREMIER SWINGING CHOKES 150 m /A. 160 ohms, 3,000 v. insul., 10/6 250 m /A. 80 ohms, 2,000 v. insul., 15/-

500 m /A. 100 ohms, 4,000 v. insul., 18/-

PREMIER RADIO



PREMIER MATCHMAKER UNIVERSAL MODULATION TRANSFORMERS

Will niatch any modulator to any R.F. Secondary Load, Triodes, Tetrodes and Pentodes, Class A. Single or Push-Pull Class "ABI" and "B" in Push-Pull or 500 ohms line input, can easily be matched to any of the following Radio Frequency final stages requiring modula-

Triodes, Tetrodes or Pentodes operating under Class "A," "B," "BC" and conditions, either Single or Push-Pull.

Push-Pull.
Totally enclosed in cast cases with
engraved Panel, and full instructions.
Ratings are based on R.F. inputs.
50 Watt, 17/6. 150 Watt, 29/6,
300 Watt, 49/6.

A new range of " Matchmaker " Universal Output Transformers which are designed to match any output valves to any speaker impedance, are now ready.

5-7 Watt, 13/6. 10-15 Watt, 17/6.

20-31 Watt, 29/6.

PREMIER 1939 AMPLIFIERS

A complete range of High Fidelity P.A. Amplifiers for A.C. or A.C./D.C. mains operation. With the exception of the two 3-watt models, all Premier Amplifiers two 3-watt models, all Premier Ampliners are supplied in Black Crackled steel cases, and incorporate the new Premier "Matchmaker" output Transformer, enabling any single or combination of speakers to be used. 6, 8/10 and 15-watt systems are provided

with two separate input channels, which can be mixed to any level. The built-in Pre-Amplifiers ensure that the gain is sufficient for any low-level crystal or velocity microphone. The actual gain of the 6- and 15-watt amplifiers is over 100 decibels. Tone controls are also incorporated.

£2 15 £2 15 £6 15 3-watt A.C 3-watt A.C. D.C. 62 6-watt A.C. 66 8/10-watt A.C. D.C. 66 0 15-watt A.C.

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

For Accuracy

1939 FREQUENCY



and Reliability.

CONTROL UNITS



units are ready mounted in the type Ú holder illustrated, and are supplied to within 5 kc. of your specified figure in the 1.7, 3.5 and 7 Mc. bands. The actual frequency is given on the Frequency Certificate to an accuracy of 0.025 per

Type S5. The Standard X Cut Crystal. Temp. Co-efficient 23 cycles per Mc. Max. R.F. crystal current 100 m/A.

PRICE ... Type S5 unit Type \$5 Crystal, unmounted 15/-Type P5. The well-known Q.C.C. Power-cut Crystal Temp. Co-efficient 20 cycles per Mc. Max. R.F. Crystal current 140 m/A. Recommended for

use in Tritet and similar circuits.

PRICE ... Type P5 unit Type Q5. An entirely new low-temperature coefficient Crystal, the drift being less than 4 cycles per Mc. per degree Cent. change. Max. R.F. crystal current 150 m/A. Suitable for use in

adjustable air-gap holders. PRICE ... Type Q5 unit ... Type Q5 Crystal mounted

in Type AG adjustable airgap mount, with base ...

Type Q5 Crystal, unmounted 22/6 Type B100. An improved version of our wellknown 100 kc. bar. Ground and calibrated to within 25 cycles of 100.0 kc., and supplied in a modified type U mount with a fixed air gap.

PRICE ... Type BI00 unit 32/6
Type U Mount. A Plug-in Mount (3 in. centres). Fitted with stainless steel electrodes and a smart nickel and black enamel cover plate. ... 6/-A Baseboard Fixing Mount for the Type U Holder is available at 1/3.

THE QUARTZ CRYSTAL CO., LTD., 63 & 71, Kingston Rd., NEW MALDEN, Surrey Telephone: Malden 0334.

WODEN TRANSFORMERS

'The Best that Money can Buy!" IN YOUR NEW MAINS - PACK Individually constructed by skilled engineers.

WODEN TRANSFORMERS ARE BUILT TO LAST THEY LOOK BETTER-THEY ARE BETTER-YET THEY COST NO MORE.

WODEN TRANSFORMERS are stocked by Messrs. WEBB'S RADIO of London and Birmingham-

Manufactured by

WODEN TRANSFORMER CO. ST. JOHN'S SQUARE, WOLVERHAMPTON, Tel.: 22829

BARGAINS ELECTRADIX

The Dix-Mipanta Vest Pocket Tester. The Dix-Mipanta Vest Pocket Tester, A compact vertatile moving-fron multi-range meter for A.C. or D.C. circuits. No projecting terminals. THREE ranges of volts: 0.75, 0.150, 0.300. MILLIAMPS: 0.12½ mA and 0.75 mA. In black bakelite case. 2½ ins. by 2½ ins. with pair of test leads and plugs. Leaflet "L.H." gives full information. 19/6 Moving Coil Panel Milliammeters, 5 mA. to 500 mA., all sizes by Western

to 500 mA., all sizes, by Weston, Elliott, Turner, G.E.C., Butler, etc., at bargain prices.

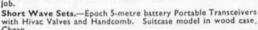


Moving Coil Micro-Ammeter. Flush panels 21 ins. Detects backlash grid current in valves : locates distortion. Reads I m/mA. per div., 0 to 50 microamps., full scale, 50 mV. moving coil, 1,000 ohms, flush panel, 21-in. dial, 40/-.

Micro Relay. Moving coil as above. Fitted platinum contacts to close at 50 m/mA., 60/-.

If you just want a cheap back of panel D.C. meter for 8 mA., or a circuit tester with plain scale, 1-in. needle, mica panel and back lamp as tuning indicator, illustration shows this, 3/9 post free.

Transmitters Aerial. Radiation Meters show what you are putting out and whether it is I amp, or 50 amps. R.F. we can supply the Hot Wire or Thermo Mc. meter for your



It Metre. One only. Portable 10-watt type with modulator, Lecher copper-tube aerial and separate A.C. power pack or batteries can be used. £9 16s. 0d.

Come to us for Dynamos, Rotaries and Switchboards.

ELECTRADIX RADIOS 218, UPPER THAMES STREET, L LONDON, E.C.4

Just Published

A SIMPLE GUIDE TO TELEVISION

By SYDNEY A. MOSELEY & H. J. BARTON-CHAPPLE. Wh.Sch., B.Sc.(Hons.), A.C.G.I., D.I.C., etc.

You should get this book at once. It is intensely interesting and enlightening. tells the simple facts about Television and answers the questions that ordinary people are asking. It explains in understandable, non-technical language how Television originated and how it works, and concludes by describing some of the developments which may be expected in the future. 43 pages. 1/- net (by post 1/3).

Order from a bookseller or direct from

SIR ISAAC PITMAN & SONS, LTD. Parker St., Kingsway, London, W.C.2

NEW MEMBERS

HOME CORPORATE
K. Arbott (G3JY), 79, Marsden Road, S.S. Blackpool, Lancs,
F. Jackson (G3NJ), The Cottage, Crookhill Hall, Conisborough,

A. CRAPLIN (G3NK), 75, Knightscliffe Avenue, Glasgow, W.3.
T. R. Barlow (G3QX), "King's Halt," Dawstone Road, Heswall,
Wirral, Ches.

Wirtal, Ches,
J. H. Parkin (G3OU), 29, Gregg House Crescent, Sheffield, 5.
T. Griersson (GMSSA), Altyre Forres, Morayshire, Scotland.
P. Anderson (G3TQ), "West View," Caledonian Road, West Hartlepool, Co. Durham.
L. G. Paiman (GMSUA), Ailsa View, Mary Street, Duncon, Scotland.

APPLEGATE, Junt. (2ANN), 70, Frome Road, Trowbridge,

F. J. GRUNDY (2BGI), 3, Clarence Street, Folkestone, Kent. G. P. Millar (2DGW), 8, Hermitage Gardens, Edinburgh, 10, Scotland.

Scotland.
A. J. Mitchell (2DLX), 25, Garden Close, Addlestone, Surrey.
E. Kestin (2DPR), 55, St. Mary Street, Weymouth, Dorset.
W. Humphreis (2DQV), 68, Green Lane, Small Heath, Birmingham.
R. B. Holman (2DYM), Ashfield, Kingsbridge, South Devon.
F. A. Harsis (2FCG), 23, Kingsbridge Road, Parkstone, Dorset.
M. A. Crouch (2FHC), Watering Hill, Manea, Cambs.
WM. Hill (2FKK), 32, Winsford Street, Stapleton Road, Bristol, 5G. G. Eastwick-Field (BRS3423) (now 2FNM), Prior's Hatch,
Godalming, Surrey.
D. W. Evans (BRS3424), 87, Ashford Avenue, Hayes, Middlesex.
W. F. Thomson (BRS3425), 23, Hutton Grove, North Finchley,
London, N.12.
A. M. R. Mallock (BRS3426), Royal Signals Mess, Catteriol Cambridge, 1987), 2016.

A. M. R. Mallock (BRS3426), Royal Signals Mess, Catterick Camp. Yorks.

G. W. Parks (BRS3427), "Troon," Burrill Avenue, Cosham, Hants.

Hants.
K. C. King (BRS3428), 41, Lakeside Drive, Bromley, Kent.
P. E. Gully (BRS3429), 6, Osborne Avenue, Ashley Down, Bristol.
E. Beckwith (BRS3430), 5, Tey Road, Coggeshall, Essex.
J. A. EASTERBROOK (BRS3431), "Marfield," Cadewell Lanc,
Torquay, Devon.
R. JONES (BRS3432), 118, North Road, Clowne, near Chesterfield.
G. Sainsrupy (BRS3433), Locking-Trowle, Trowbridge, Wilts.
N. H. MEANWELL (BRS3434), 7, Palegrave Road, Great Yarmouth.
S. MEADOWGROFT (BRS3435), 29, Shakespeare Drive, Cheadle,
Cheshire.

Cheshire.

A. E. POYNTER (BRS3436), 18, Raines Avenue, Carnon Worksop, Notts.
A. P. CRETTON (BRS3437), 349, Copnor Road, Portsmouth, Hants.
T. Noblet (BRS3438), 21, Woodlands Avenue, Preston, Lancs.
F. G. SHEPPARD (BRS3439), 149, Waverley Avenue, Twickenham, Middlesex.

[BRS3440], 21, Powis Square, London, W.11.

D. DEVEEN (BRS3440), 21, Powis Square, London, W.11. J. S. SNOWBALL (BRS3441), 1st A.A. Bde. Signals, Blackdown, near Aldershot, Hants.

J. S. SNOWBALL (BRS3441), 18t A.A. Bde. Signais, Blackdown, near Aldershot, Hants.

S. McKay (BRS3442), 8. Ashgrove Road West, Aberdeen.

F. R. May (BRS3443), Hillcrest, Birmingham Road, Water Orton, near Birmingham, Wares.

A. Attwater (BRS3444), "Woodlands," Follaton, Totnes, Devon. G. K. Haley (BRS3445), "Ingleton," 31, Bernadette Avenue, Anlaby High Road, Hull.

B. A. Wheatley (BRS3446), 4, Cann Hill, Taunton, Somerset.

S. G. Rayner (BRS3448), 21, South Park Drive, Hord, Essex.

P. R. Chappell. (BRS3448), 24, Elm Road, Beckenham, Kent.

E. Davies (BRS3449), 8, Chatham Street, Rotherham, Yorks.

F. Hill. (BRS3450), "Dingley," Oxford Road, Tilehurst-on-Thames, Berks.

J. Jacksox (BRS3451), 2, Milford Grove, Stockport, Cheshire.

J. S. Scott (BRS3452), 91, Gallowgate, Aberdeen, Scotland.

R. D. Warren (BRS3453), St. John's House, Alverton, Penzance, Cornwall.

Cornwall. WM. S. MURRAY (BRS3454), "Rockfort," Tannock Drive, Miln-

gavie, Glasgow. T. McAvenna (BRS3455), 50, Boydfield Avenue, Prestwick, Ayr.

Scotland. P. M. Bradley (BRS3456), Croxton Kerrial, near Grantham,

Lines, P. DAVIE (BRS3457), "Falkeners'," Liphook, Hants, Dominion and Foreign

G. R. Mounce (VE11W), Newport Land, Hants Co., Nova Scotia, Canada.

W. A. Bock (VK4KC), Pandora Crescent, Port Moresby, Papua, T. W. J. Homewood (BERS453), Rinella W/T Station, Malta, J. Haw (BERS454), H.M.S. Egret, c/o G.P.O., London.

The Utility Two-Valve Transmitter

It is regretted that C13, mentioned in the caption under Fig. 3 (page 71, August issue) was omitted from the circuit diagram. It should be fitted close to the neutralising condenser C4, and on the grid side of the latter.

F.O.C. NOTES

By R. Webster (G5BW)

It is with considerable regret that we have to announce the resignation of two of our Committee members. Mr. W. G. Gillan (EI5M), who was stationed at Spike Island and later at Berehaven, has had to close down owing to the withdrawal of the English garrisons from Eire. He is now stationed at Bulford Camp, but hopes to be active again as soon as circumstances permit, possibly with a G call. Mr. E. F. Baker (G5OQ) has decided to devote his future activities almost exclusively to 56 Mc., and consequently has had to give up Committee work. We tender to them both our sincere thanks for their invaluable work, especially during the early days of the Club, and note with pleasure that they still wish to retain their Club membership.

In consequence of these resignations the work of the Executive has been rather disorganised, but despite this we have accomplished a fair amount, and have enrolled six new members during the month. We are fortunate in being able to fill the Committee vacancies with Mr. A. C. F. Dearlove (G2QO) and Mr. J. M. Davie (G2XG), both of whom have had extensive amateur and commercial experience in various parts of the world.

The F.O.C. proposed Associate scheme has now been discussed and approved by the Executive, and the majority of members are in favour. The "outside" response, however, has been disappointing and only a few letters on the subject have been received. We shall see what eventuates during the next month, at the end of which period the scheme will be dropped if the support is considered inadequate. Perhaps we should explain here that the proposed scheme does not involve the indiscriminate admission of each and every applicant to the Club. Prospective Associates would have to prove a minimum morse speed of 15 w.p.m., and also show definite promise not merely by their general technique but by their willingness to accept and act upon the advice of those qualified to give it. If the scheme is not wanted we have no wish to press it, and are content to leave the decision to members themselves.

The production of Club certificates is now well under way. Of the several excellent designs submitted, that of Mr. B. W. W. Oliver (2DRM) was finally chosen, and the block has just been received from the engravers. Printing will begin as soon as certain alternative propositions have been investigated. We hope to have the certificates ready for distribution in the near future.

Members elected during the month are: G5RX, GSIY, G6DK, G6LF, ZB1R and GW2NG. The total membership is now 47.

Please address correspondence to Radio G5BW, Willingdon, Eastbourne.

Strays

Mr. G. Sykes, G2JC, informs us that he works exclusively on 14 Mc. therefore contacts with a station using his call on 3.5 and 7 Mc. must be regarded as being with a pirate.

Mr. Patrick Lebail, F3HK, Villeneuve, par Brion, Marne-et-Loire, France, would like to correspond with a British amateur who is interested in syncopated music.



A.R.P. AND THE AMATEUR

The Editor, T. & R. BULLETIN.

DEAR SIR,-May I intrude a few comments on recent correspondence in the Bulletin on the

above subject

I am sure that nearly all of us will uphold the expressions of opinion given in the last two paragraphs of Mr. Jackson's letter, and look forward to the time when reason, consideration for others. and a spirit of international co-operation, will result in the removal of many of the degrading influences of present-day national life—among them air-raids and the associated precautionary measures they involve.

Meanwhile, until that happy era arrives, let us have realism, for only by facing up to the conditions as they exist to-day can we hope for their eventual

improvement.

Many who have had long experience of intercommunication arrangements are convinced that the only sound principle under abnormal conditions (and conditions during air-raids would be very much so) is to make use of all known methods, individually, or in combination, according to circumstances and local requirements, To withhold one method on ethical grounds would be absurd.

If this is admitted it is evident that pressure towards the inclusion of the amateur network within the national communication system is best initiated and sustained by a representative body such as the R.S.G.B.; individual efforts to this end cannot hope to receive the same consideration in high places, nor put forward such complete and

comprehensive proposals.

Members holding Mr. Jackson's views, as expressed in the earlier portions of his letter, as a result of which they would, presumably, agree to use their apparatus to summon a fire-engine to a neighbour's house if on fire owing to carelessness, but not to obtain an ambulance for the succour of human beings injured in an air-raid, would have to examine their consciences as to the extent to which they could agree to participate in any national scheme, which must, in any case, be organised on a voluntary basis.

The recent crisis has brought into the light of day much of the partial A.R.P. organisation which has been so slowly and laboriously built up during the last three years. It would perhaps be not unfair to say that the picture as a whole is not one which has produced a feeling of security nor a conviction that arrangements are sufficiently complete. It is evident therefore that a great deal of pressure is required from many quarters to ensure complete efficiency, and I urge that our Society should not relax theirs on the subject under discussion.

An incomplete A.R.P. scheme is an open invitation to attack; the converse gives every hope that it may never have to be brought into use.-Yours

faithfully,

H. LEE-WRIGHT (BRS3417). The Editor, T. & R. BULLETIN.

DEAR SIR,-The last issue of the BULLETIN contained an interesting editorial comment regarding the possible use of the ultra high frequencies for local communications in connection with Air Raid Precautions. A few days ago a national daily newspaper stated :-

Offers to assist in A.R.P. communications work by amateur wireless enthusiasts who operate short-wave transmitting and receiving sets are being received in large numbers by Northern

A.R.P. authorities.

So far the authorities have not decided to utilise short-wave radio operated by amateurs, but the possibility is being considered."

For some time British amateur transmitters have been eligible for service in the Royal Naval Wireless Auxiliary Reserve and the new wireless reserve of the Royal Air Force will probably attract quite a large entry. Nevertheless, there must be a large number of amateurs in the country who are not members of the reserve organisations and who would like to assist the civil authorities in A.R.P.

The responsibility for the A.R.P. schemes has bee placed to a great extent on the Local and County authorities. These Authorities have been advised by the Home Office that the telephone service, supplemented by messengers, must be regarded as the normal means of communication for A.R.P. and it is stated that whilst telephone cables may be damaged by bombs serious dislocation of the service on this account is not anticipated.

Naturally the Post Office has many alternative cables available so that the breaking of a few lines would probably not seriously affect the system as a whole, but it seems reasonable to assume that by reason of their strategic importance the main telephone exchanges will be the very buildings which an enemy bomber will attempt to destroy. Moreover it would appear that damage to a telephone exchange made up of local, toll, and trunk switchboards will paralyse telephone traffic over a wide area. In this regard it is interesting to recall that during the last war the Central Telegraph Office in London was bombed in an air raid.

In times of emergency the American amateurs have repeatedly demonstrated their ability to maintain radio communication long after telegraphs, telephones, and even the broadcasting stations have been put out of action. In this country we do not have to face floods and storms anything like those experienced in the U.S.A. but it is not improbable that we may have to face an emergency far greater than any natural agency could cause.

Radio could be so useful in A.R.P. schemes that it is difficult to understand why the Govern-ment has not launched an A.R.P. Radio network. It may be argued against the idea that by listening to the stations concerned an enemy could obtain information useful when compiling reports on the result of each raid, but the use of C.W. and a frequently changed cipher would obviate this danger.

In larger cities it might be useful to arrange for one of the better equipped local amateur stations to operate on the broadcast band should it be necessary to broadcast messages to the civilian population; the B.B.C. stations would probably broadcast information of a national rather than local nature.

Many months have passed since the possibility of utilising short-wave radio for A.R.P. was mentioned. According to the trade magazines, in one or two towns radio communication has been used in A.R.P. exercises (whether authority for the experiments was obtained is not clear), but if amateur radio is to be brought into the A.R.P. scheme it will require some organising work which must of necessity take some time. Rather than offer their services to the local authorities which can do no more than Home Office instructions allow, would not it be best for the amateurs willing to assist in A.R.P. to get in touch with the Home Office Air Raid Precautions Department? Whatever the answer of the Home Office may be, the authorities will at least be able to form some idea of the number of amateur stations available.

Yours faithfully, A Lancashire Member.

MODIFIED W8JK BEAM

The Editor, T. & R. BULLETIN.

DEAR SIR,-I was very interested to read Mr. J. N. Walker's article in the September Bulletin concerning his modification to the W8JK beam aerial; but I would appreciate an explanation of the following points. Firstly, I fail to see how the true "out of phase" operation of the 8JK is arrived at by his method, since, while feeding at a current point the two elements to one side of the aerial would appear to be in phase. Secondly, it would seem that the arrangement could be resolved into a simple dipole-at least on the lower frequencies.

If you could spare me a little more of your valuable space-in order that my criticism may not be wholly destructive, I should like to suggest a method which in actual operation at my station

has given very effective results.

The trouble, when using a matching stub, is to match a low impedance feeder into it. As Mr. Walker has pointed out, the impedance at the bottom of a stub is far removed from 80 ohms, so that an impedance mis-match will result should the feeder be connected at that point. In order to overcome this difficulty, and to do away with the use of a stub, which is a nuisance to erect, and has an uncanny habit of getting hitched up in other things, a coil was substituted.

This coil was made to act as a resonant halfwave on the band for which the aerial was to be used, and care taken to make it self-resonant, since the use of a tuning condenser in parallel, though easier, has distinct disadvantages. Under these conditions, the two opposite ends of the coil will be at high and opposite voltage. This is exactly the condition required at the top of a stub. A correct impedance match to this "transformer" from the line may be had by putting a one or two turn link round the centre, and connecting the two ends of the coil to the feeding points in the aerial. The adjustment of the coil is critical, and to bring the resonance peak to the required frequency (in the writer's case to 14,300 kc. approx.), the turns must be adjusted to the nearest half turn. The arrangement has been found to be as aperiodic as a stub.

For those who would like to try out the above scheme, some details may be of use. The coil consists of 171 turns approximately of No. 14 gauge single enamelled copper, close wound, on a former of exactly 2 ins. O.D. A two-turn link round the centre was used, and, after adjustment, the whole was dipped in molten paraffin wax. aerial is a two-section W8JK for use on 14 Mc. The final resonating of the coil is best carried out by two people-one at the transmitter while the other adjusts the turns for maximum current at the centre of any of the four half waves. The very able assistance of G8HA made the determination of the coil size considerably easier than it might

Such a method need not be confined to the W81K. but has been used in similar form for phasing up other voltage-fed arrays. The increase in power in the aerial with the phasing coil, over the stub, is most marked, and has the added advantage that it is very light, and the 80 ohm feeder can be taken

right up to the aerial.

Yours faithfully, R. W. Addit (G8LT). IN REPLY

The Editor, T. & R. BULLETIN.

DEAR SIR,-I thank Mr. R. W. Addie for his criticism of the aerial system shown on page 143 of the September Bulletin, and, after consideration of the point he raises, I agree that the elements of the aerial shown in Fig. 3 are actually in phase. The operation is, therefore, different to the original Kraus aerial, but the results are, nevertheless, very similar.

It has been proved by practical tests that the radiation is a maximum broadside, and, further, that the beam is one of narrow angle. It would appear that the aerial is really of the Barrage or H type, and it is probable that the results would be better if the aerial was erected in a vertical plane.

On further consideration, there appears to be no reason why low impedance feeders should not be connected directly in place of the stub shown in Fig. 1 when, under certain conditions, the correct out-of-phase excitation would be obtained. These conditions can best be explained if we label the arms of the aerial in Fig. 1 as follows: top element A and B; lower element C and D; centre point E. If now the length AEB is made a resonant half wavelength, low impedance feeders will match-in properly at E. Again, they will match-in at the second half wavelength formed by CED, but due to the cross-over, the latter will be excited in opposite phase to the top element.

It should be pointed out that the system as shown in Fig. 1 is a voltage-fed one, and elements AEB and CED must be full wave for the band in use. Mr. Addie's system of using a coil in place of the stub is to be recommended, but it must again be noted that it applies to a voltage-fed aerial. If two single half-wave elements are used, this means that end feeding is necessary—the coil can only be connected in at the centre if the aerial as a whole is full wave. As Mr. Addie finds it necessary to adjust the coil very carefully to the resonant frequency, it can hardly be said to be aperiodic.

Yours truly, *
J. N. Walker (G5JU).

OLYMPIA GEAR

The Editor, T. & R. BULLETIN.

DEAR SIR,-As one of the members who loaned apparatus for display on the Society's stand at Radiolympia, I should like to reply to the remarks of Mr. G. C. Oxley, G8MW, which appeared in the October issue of the BULLETIN.

His question as to whether any of the transmitters could get down to 10 watts is, I feel, worded rather strongly, and I should like to point out that in my apparatus the input to the anode of the valve delivering power to the aerial circuit has not yet exceeded 10 watts. The transmitter in question was used at District 13 N.F.D. on the 1.7 Mc. band under the supervision of the D.R., and has also been used by G6IO when portable at Westerham Hill, Kent. When used at G6IO, a 60v. battery (normally used for fixed bias) was in use as the H.T. supply. The input at this time was 480 milliwatts, and an "HA" was raised on 14 Mc. C.W. and the report received was 579x. I think that settles the point of efficiency! Conditions on the band at the time were extremely bad, only three or four stations being audible.

I am not acquainted with the "well-known amateur" who uses a valve of 1.7 Mc. with a 50-watt filament, but I should like to point out that when my transmitter was being used with an anode input of .48 watt, the filament wattage was still

5.5. watts.

With reference to the third paragraph of Mr. Oxley's letter, I would suggest that the majority of British licensees have not the fat bank balance which is mentioned, and also that the majority use C.W. telegraphy as well as telephony. Anyone who can read code will know that the speed of sending on the various amateur bands, including 7 Mc., is invariably higher than 12 words per minute, and I feel that the statement "scraping through the telegraphy test" is a very uncalled for exaggeration.

With reference to the remarks regarding "Fancy QSL cards," I should like to say that I have yet to see a G QSL which really deserves that title.

I am in full agreement with G2JK's 1921 statement that "wireless experimenters" should design and build their own apparatus, though it is, of course, quite essential to purchase certain components.

The membership may like to know that the half-dozen amateurs in my district (not District 13, but Charlton) all construct their own apparatus, including receivers.

Yours faithfully,

GEORGE G. CHIFFEY (2DKZ).

CO-OPERATION REQUIRED

The Editor, T. & R. BULLETIN.

Dear Sir,—Recent observations taken in America have shown that 56 Mc. DX during the summer months is associated with abnormal ionisation of the E layer of the ionosphere. The question naturally arises, "Is the lack of long-distance contacts on 56 Mc. in Europe due to lower values of ionisation in the E layer or to lack of activity at suitable distances?"

In order to find an answer to this, and also to obtain some idea of the occurrence and distribution of abnormal E ionisation in Europe it is proposed to undertake an investigation similar to that carried out by Pierce in the U.S.A., but on 28 and 14 Mc. Short skip conditions on these bands have been given careful study at this laboratory during the past summer, but very many more observations are urgently needed. May I appeal to those members who made short skip contacts on 10 or 20 metres between the beginning of April and the end of September to send me details? Reports

should give the date, the exact time of the QSO, and the signal strength reports exchanged. Correct identification of the stations concerned is of course essential. Reports from BRS members would also be very welcome, particularly if not only the station heard is mentioned, but also the call-sign of the station with which it was in contact.

As an indication: short skip on 14 Mc. would cover the British Isles, France, Belgium, Holland, Denmark and Southern Norway, and on 28 Mc.

the whole of Europe.

I hope that as many members as possible will co-operate by looking through their logs and sending along the necessary information. All reports will be acknowledged.—Yours faithfully,

L. G. Stoodley (G8DM).

The Physical Laboratory, University College, Southampton.

PUBLIC SCHOOLS EXPLORING SOCIETY

The Editor, T. & R. BULLETIN.

DEAR SIR,—Referring to our last expedition to Newfoundland, I think you will be interested to hear that Mr. Stansfield (VO4Y), of Corner Brook, one of your members, rendered us very valuable assistance.

He listened in for us every night during the whole expedition, and in that way served as a valuable link between the expedition and various people in Newfoundland.

This is the second time that Mr. Stansfield has helped us in this way, and I want to record our appreciation of all the trouble which he took for us.—Yours very truly,

G. MURRAY LEVICK, Chairman and Hon. Leader.

A FINE RECORD AND A COMPLIMENT

The Editor, T. & R. BULLETIN.

Dear Sir,—Having just contacted my 1,000th G station, this calls for comment that I believe will be of general interest to British operators. While appearing at first glance as a mere operating stunt the real reason here has been the enjoyment I have obtained in working such good operators. In my opinion, taken as a whole the G's are "tops," their radio manners are very nearly perfect and they are models for correct procedure and operating practices. I have yet to identify as coming from them any of this unnecessary testing which is unfortunately so prevalent on this side of the water. They excel in "rag chewing" and their QSL record exceeds all other nations. Now you can understand why I go after G contacts in preference.

Incidentally, a few figures on these 1,000 G's may be of interest. They were contacted in 1,939 QSOs with G's beginning with G5BY on February 16, 1928, and ending with G3FS on October 6, 1938. Seventy-three were in Scotland, 31 in Wales, 22 in Northern Ireland, three in Channel Islands, one in the Isle of Man and the remaining 870 in England proper. In the 54 shires of England and Wales, including Isle of Man and Channel Islands, stations have been contacted in all but five; Brecknock, Cardigan, Hereford, Rutland, and Westmorland. Although I have a record of over 200 additional

stations called but not contacted I have never heard one from these shires. Only 14 of the 38 Scottish shires have been contacted but there I feel sure many districts have no operators. First W contacts were made with 61 of these and two. G3BS and G3JX, actually made their first QSO with me

Again let me express my appreciation and thanks to all these operators for the many enjoyable contacts and now that I have attained this numerical goal I hope to see them all more often and for even more enjoyable chats. 73.

MILES W. WEEKS (WIWV). 91 Marion Street, Brookline, Mass., U.S.A.

DISTRICT 10

The Editor, T. & R. BULLETIN.

Dear Sir,-I feel I cannot let certain remarks in last month's District 10 Notes pass without some comment. I refer to the paragraph complaining of lack of "Ham spirit" among Swansea members.

I resided in Swansea until recently, for a considerable time, and in my opinion the "Ham spirit" exists as strongly there as anywhere else.

I know most of the Swansea group very well indeed, and I received any amount of help from them-in fact whenever I requested it. They were all most willing to place their knowledge and experience at my disposal, for which I thank them.

I was only an observer at the 3.5 Mc. N.F.D. Station in that district, but I can well imagine that a lively post-mortem has been held. I wish I could have attended the meeting.-Yours truly, CARL BROWN (G3OL).

AN OLD TIMER LAMENTS

The Editor, T. & R. BULLETIN.
DEAR SIR,—When an "Old Timer" reflects on the mania of present-day amateurs to outshine each other with the collection of QSL cards, certificates, etc., shed a tear for the passing of real experimental work in our hobby.

Time was when call signs meant that the holder was one from whom serious co-operation might be anticipated in radio experiments, but alas, the trend of our movement seems to be towards rubber stamp QSO's, the use of childlike phraseology, and the indiscriminate use of signals meant for C.W.

inappropriately applied to telephony purposes.

Consider the degradation that a "Test Call Fiend" must experience to learn that someone has worked a new country, and the hours that are spent cluttering up our bands with chatter which has no reference to the science of radio, but invariably deals with so and so and his latest blonde, or has loud reference to DX, with abundant self-glorification.

The writer feels that the time has come for the R.S.G.B. in conjunction with the licensing authorities, to take measures to clean up our bands and thereby ensure that both old-timers and newcomers are able to carry out understandable communication in morse. If you doubt the necessity for such action, try listening to the utter rubbish that masquerades for International Morse. [We have listened !—ED.]
"Brass Pounders" are not the only offenders,

however; listen any Sunday morning to the absolute

drivel which passes as the conversation of rational and sane people, and explain the need for saying "Hi, Hi," "Wheel it away," etc.

Surely it is still possible to obtain pleasure from our hobby without recourse to such senseless procedure. With deepest lamentations,

Yours very sincerely, L. W. HOOKE (G5XH).

A "Ham" Holiday in Holland

By H. H. Myers (G6HF).

The recent paragraphs in the BULLETIN concerning the Holiday Exchange Scheme sponsored by D.A.S.D., with the collaboration of N.V.I.R. and E.D.R., prompted the writer to record his ex-periences in Holland last summer in the hope that others will take advantage of the facilities offered to exchange visits with overseas amateurs.

The holiday to be described was fixed up with the direct co-operation of PA0JA, but if members are unable to make arrangements for themselves in this way a card to R.S.G.B. headquarters will ensure that they are put into touch with the appropriate official in the country they wish to visit.

PAOJA (Mr. van der Weele) and his wife came to England for a holiday at Whitsun, and by invitation of the writer spent the time with him at his home in Bingley, Yorks. Although their stay was short, visits were made to a number of local amateurs, including G2SU, G6MC and G6QS. Trips to the historic parts of the county and its capital also added to the enjoyment.

In July the writer and his wife began a return trip to Holland, and, after crossing from Hull, where GSUL was waiting to meet them, they were greeted by PA0JA, who had travelled from Velsen to Rotterdam.

During a most pleasant stay at Vlesen a number of visits were made to neighbouring amateur stations, and in every case a warm and enthusiastic reception was accorded. PAONP, who had just returned from a mobile 3.5 Mc. Field Day, showed off his very fine receiver and several G's were tuned in. Arrangements were then made for a visit to the A.V.R.O. broadcasting studios at Hilversum, a trip (Continued on page 316)



G6HF on the right with the operators of PAONP

NOTES



BRITISH ISL ES

DISTRICT REPRESENTATIVES.

NEW MEMBERS ARE CORDIALLY INVITED TO WRITE TO THEIR LOCAL DISTRICT REPRESENTATIVE.

DISTRICT 1 (North-Western).
(Cumberland, Westmorland, Cheshire, Lancashire.)
Mr. J. Noden (G6TW), Fern Villa, Coppice Road, Willaston, near Nantwich, Cheshire.

DISTRICT 2 (North-Eastern).

Yorkshire (West Riding, and part of North Riding). Mr. L. W. Parrey (G8PY), 13, Huddersfield Road, Barnsley, Yorks.

DISTRICT 3 (West Midlands),
(Warwick, Worcester, Staffordshire, Shropshire,)
V. M. DESMOND (GÖVM), 199, Russell Road, Moseley, Birmingham.

DISTRICT 4 (East Midlands). (Derby, Leicester, Northants, Notts.)

Mr. W. A. SCARR, M.A., (G2WS), What'edule, Heanor Road, Ilkeston, Derbyshire.

DISTRICT 5 (Western).

(Heretord, Wiltshire, Gloucester.) Mr. J. N. WALKER (G5JU), 4, Frenchay Road, Downend, Bristol.

DISTRICT 6 (South-Western).

(Cornwall, Devon, Dorset, Somerset.)
Mr. W. B. Sydenham (GSSY), "Sherrington," Cleveland Road, Torquay.

DISTRICT 7 (Southern).
(Oxfordshire, Berkshire, Hampshire, Surrey.)
DEDMAN (G2NH), 75, Woodlands Avenue, Coombe. New Maiden, Surrey.

DISTRICT 8 (Home Counties).

(Beds., Cambs., Hunts and the towns of Peterborough and Newmarket.)

Mr. S. J. GRANFIELD (G5BQ), 47, Warren Road, Milton Road Cambridge.

DISTRICT 9 (East Anglia).

(Norfolk and Suffolk.)

Mw. H. W. Sadler (G2XS), "The Warren Farm," South Wootton, King's Lynn, Nortolk,

DISTRICT 10 (South Wales and Monmouth).

MR. A. J. FORSYTH (G6FO), 29, Stow Park Avenue, Newport, Mon

OISTRICT 11 (North Wales).

(Anglesey, Carnarvon, Denbighshire, Flintshire, Merioneth, Montgomery, Radnorshire.)

Mr. D. S. Mitchell (GW8AA), "The Flagstaff," Colwyn Bay,

Denbighshire.

DISTRICT 12 /London North and Hertford).

(North London Postal Districts and Hertford, together with the area known as North Middlesex.) Mr. S. BUCKINGHAN (GÖQF), 41, Brunswick Park Road, New

Mr. J. B. Kershaw (G2WV), 13, Montpeller Row, Blackheath S.E.3.

DISTRICT 14 (Eastern)

(East London and Essex.)
MR. T. A. St. Johnston (GGUT), "Normandale," New Barn Lane,
Little Hallingbury, Bishops Stortford.

DISTRICT 15 (London West).

(West London Postal Districts, Bucks, and that part of Middlesex not included in District 12.)

MR. H. V. Wilkers (Gew.N.), 539, Oldfield Lane, Sudbury Hill,

Greenford, Middlesex.

DISTRICT 16 (South-Eastern),

(Kent and Sussex).

Mr. W. H. Allen (G2UJ), 32, Earls Road, Tunbridge Wells.

DISTRICT 17 (Mid-East).

(Lincolnshire and Rutland.)
Mr. W. Grieve (G5GS), "Summerford," New Waltham, Lincs.

DISTRICT 18 (East Yorkshire).

(East Riding and part of North Riding.)
To be appointed

DISTRICT 19 (Northern). (Northumberland, Durham, and North Yorks.) Mr. R. J. Bradley (G2FO), "High Crest," Yarm Road, Eaglesclife,

Co. Durham.

Co. Durnain.

SCOTLAND.

MR. JAMES HUNTER (GMSZV), Records Office, 51, Campbill Avenue, Langside, Glasgow.

NORTHERN IRELAND.

Mr. A. J. Sang (GI6TB), 22, Stranmillis Gardens, Belfast.

DISTRICT 1 (North-Western).

BIRKENHEAD.—No reports are to hand this month, although there activity in the area. Congratulations are extended to 2CVK, now G3QX. 2FZ, 3QX, 6HQ, 8NH, 6GL and 2AHG are known to be active. 6GL regrets that he will be unable to carry on as T.R. for the ensuing year owing to pressure of work. He thanks members for their past support.

Blackburn.-The local group is holding its first annual dinner at 9 p.m. on Saturday, November 19, at The Vee Cross Café, Blackburn, at a cost of 2s. per head. Will those who intend to be present please notify the T.R. on or before November 16? Visitors will be welcomed.

Congratulations are offered to 2DAD and 2DKL on receiving the calls G3TU and G6WH, respectively. Both stations would like reports on their CW and telephony transmissions.

Burnley.—G8TD is having remarkable success on 28 Mc. with 137-ft, Zepp, whilst 5ZN finds the W3EDP aerial very good on 3.5 Mc. 2BFB reports and other members are known to be active.

Bury.-Two meetings were held during October, the first at the ORA of the T.R. and the second at GSNL. It was agreed that future meetings should be held on the third Tuesday in each month, but a permanent meeting place has yet to be decided upon. The T.R. would like members who are interested to send him a card and he will then forward full particulars in reply as soon as arrangements are completed.

Bury members would like to congratulate the Blackburn Group on their anniversary and propose to support the dinner to the best of their ability.

G2GA is now W.B.E. on 10 watts. He is active on 1.7 Mc, and would like reports (telephony or C.W.) from any distance. Other active stations submitting reports are 3CJ, 8QS, 8NF, 8NL and 2BGF, who is shortly taking his morse test.

Manchester.—An attendance of 27 was recorded at the September meeting when G5YD gave an interesting talk on the London Convention and reviewed the Radio and Television Show.

A welcome is extended to G2KZ from Liverpool, also to BRS 3355. 2DGV is congratulated on his new call sign. It is understood that the call 2BC is being pirated and members are asked to look out for the offending station.

G2OI would welcome schedules with any stations on 56 Mc., either CW, ICW or 'phone-his frequency

is 57,152 kc. CC.

An attendance of 29 was recorded at the October meeting, when a sale of disused apparatus occupied the whole of the evening; the sum of £1 8s. 10d.

was received towards the group fund.

A suggestion vital to all those who have the interest of this section at heart was made by G3SP, seconded by G5HF that this group should obtain permanent headquarters somewhere in or about Manchester, where members could meet at any time, day or night, and where constructional and testing apparatus could be kept and used for the benefit of all. A radiating permit could, perhaps, be obtained so that the group would have its own "official" transmitting station. Classes for code practice could be arranged, whilst other ideas of interest would no doubt suggest themselves. Will all those who are interested in this scheme but who did not attend the October meeting please write immediately to G2OI, 25, Boothfield, Winton, Eccles, stating whether they will support it? If they can suggest a suitable address in or on the outskirts of Manchester please let him know the charges for rent and rates.

The following stations are active on 56 Mc. and would welcome reports or schedules: G5YD, 20I, 8BI, 6TL, 5CH, 2RA, 3DA, 2ARC, and 3228. The following are active on other bands: 5HF, 6OM, 2BDA, 2CDY, 2PM, SPW, 5OL, 5OZ, 3BY, 3YG, 2DRR, 3IR, 3MR, 2FMG, 2LK, 2HW, 2AH, 5PX,

3SP, 2918, 5WR and 3JZ.

Preston.—Active stations include G3JR, 3PJ, 3PS, 3QP, 3TN, 5AX, 5RU, 5UG, 6FC and 6SQ.

DISTRICT 2 (North-Eastern)

District Representative: L. W. Parry (G6PY), Huddersfield Road, Barnsley.

District Scribe: C. A. Sharp (G6KU), 316, Poplar Grove, Great Horton, Bradford.

Town Representatives :

Barnsley: T. Malkin (G5IV), 5, White Hill Terrace, Dodsworth Road.

Bradford: C. A. Sharp (G6KU), as above. Halifax: R. P. Pohlmann (2DOR), 138, Skircoat

Moor Road.

Huddersfield: J. Dale (G5VD), 12, Langley Terrace, Crosland Road, Oakes.

Ilkley . J. W. Hemingway (G8ID), 17, Thwaites Avenue, Leeds Road.

Leeds: W. F. Wilson (BRS2317), 4, Stratford Street, Leeds, 11.

Sheffield: A. H. B. Cross (G3FN), 51, Masefield

Wakefield: W. L. V. Parker (G6WJ), Chalfonte, Thornes Road.

The Scribe regrets that owing to lack of time

during the crisis notes were not forwarded last month. T.R.'s are asked to send in a short report of the month's activity in their area in the form set out in the circular sent to them by Headquarters with the calls of active stations listed in alphabetical order. This should reach the Scribe not later than the 25th of the month. T.R.'s are also asked to see that a meeting of their members is held before the end of November, for the purpose of electing a T.R. or confirming the tenure of office of the existing one. Forms for this purpose were sent to all members last month.

Barnsley.-The winter season opened with a hamfest at the D.R.'s house. We welcome to the area Mr. Dixon, 2DQL, from Northern Ireland. Active stations include G2BH, 2WX, 5DW, 5IV, 5KM, 6LZ, 6PY, 6XG, 8NM, 8WF, 2DOL, BRS3068 and 3207.

Bradford.—The Bradford Radio Society opened the winter session with a very successful lecture and demonstration on latest television developments given by Mr. Betteridge, of the Marconi Co. An invitation is extended to all members to attend any of the local meetings which are held at Cambridge House, 66, Horton Lane, Bradford. The T.R. (G6KU) will be glad to meet the BRS or A.A. members there, as they are not so well known to him as the transmitting members. The syllabus up to the end of the year is as follows :- November 23, Mr. Garnett (G6XL), Short Wave Work, Film Illustrated : December 6, Mr. G. A. Briggs (Wharfedale Wireless Works), High Quality Reproduction; December 20, Mr. Bateman (G6BX), A.C. Practice and Theory (Elementary).

G6MC and 6XL are erecting rotating beam aerials for 28 Mc. G6QS has now W.A.S. and is a member of the DX. Century Club. G6XL scored

3,735 in the VK/ZL contest with 52 contacts.

There will be a meeting of R.S.G.B. members at the T.R.'s QRA, 316, Poplar Grove, Great Horton, on Saturday, November 19, at 7 p.m. Please send a card if you are coming.

Halifax.-Local members are asked to forward reports to the new T.R., Mr. R. P. Pohlmann and to give him their support.

Sheffield.-At a meeting on October 6, G2JY resigned from the position of T.R., and G3FN was appointed in his stead. Best thanks are recorded to the retiring T.R., who has worked hard for the last three years in keeping his area active. We welcome to the town G3OK, who is second operator to G5YC. Stations active include: G2AS, 2JY, 2JI, 3FN, 5TO, 6LF, 8JP, 2BXA and 2DTJ.

Huddersfield .- At the last meeting at G5VD, it was decided to form a local QRP 1.75 Mc. circle. Will all interested write to 5VD? (G6KU, Bradford, will QSO any Sunday morning on 'phone or c.w. 1100 to 1300 G.M.T.). G8FO has worked VOIY on 7 Mc. using 4 watts. G8GU, 8TM and 8OF report active.

Leeds .- The T.R., who is back in the town again, after spending the summer in District 9, reports that no notes have been received by him, whilst no interest has been shown in the scheme published in the June Bulletin. Local members are asked to send him details of their activities.

Ilkley and Wakefield .- What about some notes, please? Several stations are active.

DISTRICT 3 (West Midlands)

Coventry.-The C.A.R.S. have started their winter programme, and the Committee would like to call local members' attention to this fact, as the attendances at the weekly meetings are not as

good as they should be.

Attention is also drawn to the C.A.R.S. Annual Dinner which is to be held at the King's Head Hotel, on Wednesday, November 23. As it was felt in previous years that 5s. was a little on the expensive side tickets this year will be 3s. 6d. The T.R. invites all members of R.S.G.B. in Coventry to attend this function.

At the meeting on December 6 a talk will be given by G2LU on " Amateur Radio as a Hobby.

G6YV and 5PP are both operating on 56 Mc.

with crystal control.

Cannock.—G6SW has a new 40-foot lattice mast from which he intends to support a Johnson" Q beam for 14 Mc. 2YV has received S8 from Algiers on his 7 Mc. 'phone, but is dissatisfied with his rig and intends rebuilding with a 53-59-46's for all bands. 2FAP has built a new transmitter (47-46-46) and is now waiting for his full call. 2FAH is rebuilding.

The Cannock and District Amateur Radio Club has made good progress and new members will be cordially welcomed. A slow morse practice was

held on Sunday, October 9.

Staffordshire.-G8FQ is active and has W.A.C. on 14 Mc. He uses 6L6-6L6-T20 with a W81K beam. Congratulations to 5L I of Sutton Coldfield. who has WAC and WBE on 14 and 28 Mc. 'phone. He finds a Johnson "Q" superior to an extended Zepp for omni-directional transmitting.

Stations active include G2AK, 2LB, 2WD, 5BJ, 5SS, 5VM and 6DL, and reports from them

would be greatly appreciated.

A meeting of Staffordshire amateurs is being considered. Those interested should please com-municate with the Scribe: G. M. Whitehouse, G2YV, Trumwyn House, Cannock.

DISTRICT 4 (East Midlands).

The meeting at Nottingham on October 23 produced an attendance of 30 members and most parts of the District were represented. After tea and a short business session, G8MW opened a discussion on QRP versus QRO and many different opinions

were expressed.

It was decided that the next meeting should be at Leicester and arrangements have now been made for this to take place on Sunday, November 20, at the Royal Hotel, Town Hall Square, at 3.30 p.m. It is particularly hoped that this meeting will attract members from Northampton. A Junk sale will take place and everyone is invited to bring surplus gear for disposal. A talk is also to be arranged.

FORTHCOMING EVENTS

Nov. 16 District 14 (East Essex Section), 8 p.m., at G2KH, "Emrick," Hampton Gardens, Prittlewell.

District 6 (Torquay Section), 8 p.m., at G5SY, "Sherrington" Cleve-17

land Road, Torquay.

18 District 12, 7.30 p.m., at the Orpheum Cinema, Temple For-tune, N.W.11. Lecture by tune, N.W.11. Lecture by G2NO: "Modern Communication Receivers."

District 14 (East London Section). 7.30 p.m., at 2D II, 23, Mornington

Road, Chingford, E.4. Scotland "E" District, 7.30 p.m., in Fleury Meng's, 48, Newmarket Street, Ayr. Lecture by D. Lamb, Esq. (GM2UU); subject, " Aerials."

District 3 C.A.R.S. Dinner, 7.30 p.m., at the King's Head Hotel, Coventry. Tickets, 3s. 6d. each.

London Meeting at the I.E.E. Commence 6.45 p.m. Tea at 6 p.m. Lecture and Demonstration by K. Frost, Esq., Standard Telephones and Cables, Ltd. Subject, cent Valve Developments.

24 District 14 (Brentwood Section), 8 p.m., at G3JW, 44, Weald Road,

Brentwood.

District 13 (Central Areas), 8 p.m., at Brotherhood Hall, West Nor-

District 6 (Exeter Section), 8 p.m., at 3, Dix's Field, Exeter.

Nov. 27 District 11, 6.30 p.m., at GW5FU, 27, High Street, Rhyl

27 District 9. Meet at 2.15 p.m. outside Norwich G.P.O.

30 Scotland "A" District, 7.30 p.m., in Room "A," Institution of Engineers and Shipbuilders, 39, Elmbank Crescent, Glasgow, District 14 (Colchester Section), 7.30

Dec. 1 p.m., at G8PZ, 19-21, Artillery Road, Colchester.

District 8, meeting in Cambridge. District 14, 3 p.m., at G6UT, "Normandale," Little Halling-

bury, near Bishops Stortford. 7 * District 1 (Manchester Section), 7.30

p.m., at Brookes Café, 1, Hilton Street, off Oldham Street, Manchester. Talk by G6OM. S.L.D.R.T.S., 8 p.m., at Brother-hood Hall, West Norwood.

District 6 (Exeter Section), 8 p.m., at 3, Dix's Field, Exeter.

District 7, 2.30 p.m., at G2YL, "Redholm," Walton-on-the-Hill, Tadworth, Surrey. Display of R.S.G.B. Films. Display of

14 * District 15, 7.30 p.m., at 2DF J. 259. Ladbroke Grove, North Kensington, W.10.

15 District 10, 8 p.m., at Globe Hotel, Duke Street, Cardiff.

15 District 6 (Torquay Section), 8 p.m., at G5SY, "Sherrington," Cleveland Road, Torquay.

Sale of disused apparatus at these meetings.

Preliminary arrangements are in hand for the December meeting, which will take place at

Mansfield.

Mansfield.-Regular monthly meetings are being convened by G8SA, the T.R. At the October meeting, held at the Swan Hotel, Mansfield, 15 members were present and a further meeting was arranged to take place on November 6. G8SA will supply details of future arrangements to any member residing in this area.

The D.R. will be glad to receive any further nominations for T.R.'s. Forms may be sent direct to him or handed in at the Leicester meeting.

DISTRICT 5 (Western)

The chief item of interest during October was the Conventionette held at Weston-super-Mare, the attendance at which was very good, everything considered. A full account appears elsewhere.

OH1WW was a visitor welcomed to the October meeting in Bristol, an autographed copy of the "Helping Hand to Amateur Radio" being pre-

sented to him as a record of his visit.

Later in the month a party visited Grid House, Bristol, the south-west headquarters of the Grid System. The method of communication between the various stations, whose "call signs" consist of audio notes of different frequencies, was particularly A visit has been arranged for interesting. November to Broadcasting House, Bristol.

Although few reports have been received, the usual stations in and around the town are active.

The T.R. for Gloucester, G5 JH, reports that there are a number of prospective new members in the town. A station using the call G3WD, who gives his ORA as Gloucester, is active on 1.7 Mc. but is probably a pirate. Will the owner of this

call please write G5JU?
G8JQ of Bath had his beam aerial blown down recently but is again active on 28 Mc. and, in common with 8DX, is obtaining good results. 2IW has applied for a 28 Mc. licence. 8HW has returned to Bath and is active. The peculiar noise reported in last month's notes has been less in evidence. Can any member supply an explanation concerning its origin?

Is there any activity in Cheltenham?

DISTRICT 6 (South Western)

North Devon .- Congratulations to GSUS who, with the receipt of one more verification, will be able to claim his W.B.E. 14 Mc. C.W. certificate. A piece of good operating resulted in a QSO with PK3EM recently, during one of his tea-time sessions on 14 Mc. 6GM has finally discarded dry H.T. for a supply via wind-generator and motorgenerator. 3GH and 3BO have been granted their 25 watt permits. G3AM, 2ID, 2DOW, and 2FKF report active.

Taunton.—No meeting was held last month owing to the Conventionette at Weston taking place on the date chosen. Congratulations to 2BXZ, now G3SB, on obtaining his full permit.

BRS2027 is expecting his A.A. licence.

Exeter.-It has been decided that all future Exeter meetings will be held twice monthly on the second and fourth Thursdays, at No. 3, Dix's Field as before. All stations report active and the usual Morse classes are held at each meeting following an hour's discussion of queries raised by members and sent to the T.R. a few days earlier. This gives time for any necessary reference to text-books, so that the queries, when they come up for discussion, can be satisfactorily settled. Will Exeter

members please note?

Plymouth.-Those present at the first winter meeting of the Plymouth area, held at G8PN, were G2HX, 3TX, 8HF, 8PN, 2DLJ, BRS2932, 2997 and Mr. Kendall, a prospective member. Discussion took place regarding activities since the last meeting, and G8PN and BRS932 described their efforts at mast erection. Congratulations to G3TX on receiving his full call. G2HX is considering the purchase of a commercial receiver. (That would be a fall from grace !- D.R.) 8HF is working a number of regular schedules, and BRS2997 is still having trouble with his receiver.

The next meeting will be held at GSHF on Monday, November 14, but as the BULLETIN will probably be issued after that date, the D.R. hopes that in future the dates of meetings can be arranged for two months ahead, so that a notice may be inserted under "Forthcoming Events."

Torquay.-The first meeting of the winter season was held at G5SY on October 20. Those present were G3ID, 3JD, 3HW, 5SY, 5YR, 6RF, BRS3171, 3392, 3401, and a prospective member from Totnes. A number of subjects were discussed, and in particular, members were urged to make proper use of the various nomination and ballot forms sent out from time to time in the Bulletin. Improper use of the DX bands was also discussed, and those present agreed that it should be considered bad form to use these for purely local tests and contacts.

It was decided that at forthcoming meetings members should, in turn, prepare one particular topic for discussion, not necessarily in the form of a lecture, but for general consideration after a

preliminary introduction.

G3HW was presented with the G2CI 56 Mc. Challenge Cup in recognition of his good work on 56 Mc. during the past year, and especially for his contacts with G6FO in South Wales. This cup has, until this year, been awarded on the results of one or more 56 Mc. field day contests, but as there were so few members this year holding 56 Mc. portable permits, it was decided to award it for the year's work.

It is hoped to hold a combined meeting of the Torquay and Exeter membership, at Torquay, in January, at which the latest R.S.G.B. films will

be shown.

DISTRICT 7 (Southern)

There is an important change for the December meeting. The N.F.D. films are to be shown and as these are not available for the first Sunday in the month, the meeting has been postponed until the second Sunday, i.e., December 11. This will be at G2YL's QRA, (nearest station Tadworth, S.R.)

Guildford.—G3HH, SIX, SUG, are active on 14 Mc., and 6GS, 6LK, 5WP on 28 Mc.

Kingston.—Congratulations to 2DOP who is now G3VK. G5LC hopes to be on the air shortly. GSHA has taken an appointment with the G.P.O. and now becomes GMSHA. The following are known to be active-G2GK, 3AV, 3BF, 3DZ, 3MF, 3OR, 3VK, 5LC, 5MA, 6MB, 6PK, 8HA, 8HY, 8SM, 8TX, 2CXI, 2DOK, BRS3297. Portsmouth.—The programme of lectures for the

South Hants R.T.S. had to be slightly changed owing

to unforeseen circumstances, and 2CBL came to the rescue by giving his lecture on "Sunspots" at the October meeting. This proved to be of great interest to all present; a short discussion followed W3HQA, who was present at the meeting, also visited 2AWC, G8WC, and the T.R. during his stay at Portsmouth. 2CBL has passed his morse test, and now awaits his call. Most local stations are active.

DISTRICT 8 (Home Counties)

A very successful District Meeting was held at the Waffle Café, Petty Cury, Cambridge, on Monday. October 3, when sixteen members were present. The change of meeting place seemed to meet with general approval. During the evening the D.R. asked Mr. Gerald Jeapes (G2XV) to accept a Ferranti 0-1 milliamp, meter (subscribed for by the District membership) in recognition of his untiring service on their behalf.

A most interesting talk on Transformer Winding was given by Mr. H. W. Scott (G5DR), who was warmly congratulated on getting these monthly

talks going.

Reports are scanty, especially from the Bedfordshire area. In Cambridge G51O has been testing on 28 Mc., 2XV reports satisfactory results with his new three-element beam, while 5OV, still using his rhombic, works eastwards with regularity. 5DR is applying the finishing touches to his rotary beam, 5BO has now W.A.C. on phone. 8SY is also active.

The R.S.G.B. films will be shown at the Chesterton Senior School, Gilbert Road, Cambridge, on December 2, when an invitation is extended to XYL's, YL's and friends. There will be ample accom-

modation for all.

DISTRICT 9 (East Anglia).

A District Meeting will be held in Norwich on Sunday, November 27, which the D.R. asks all members to try and attend. The meeting-place is

Norwich G.P.O., 2.15 p.m. sharp.

Ipswich.—Activity generally has been on the wane. 8MU has been concentrating on 28 Mc. with considerable success; 6T1 will shortly be heard on that band. 3OJ has migrated to 1.7 Mc.; 2JD reports better DX with higher masts; 3NO has completed a separate transmitter for 14 Mc. 8KB is using a single 6L6 while rebuilding. 8IS has not been heard lately, but is presumed active. 2AN is to test on 28 and 56 Mc.

Local members congratulate their T.R. and his

wife on the birth of a junior Op.

Great Yarmouth.-Activity is generally very high. The local club is going ahead well and lectures are given every Friday night. G3RW is active on 7 Mc. BRS3256 has applied for an A.A. licence.

Lowestoft Area.—G5QO is now testing daily on 3.5 and 7 Mc. telephony. These tests are solely concerned with propagation and reports from all quarters will be very welcome. 3RK, of Beccles, is now on 7 Mc. telephony and would welcome contacts and reports. Congratulations to Mr. Leader, of Bungay, who is now G3UT and testing

Scribe's Note.—It is some time since reports were received from G2UT, 2XS, 31N, 5UF, 5UD, 8FL, and many A.A. and B.R.S. members. inform your T.R. of your activities, so that he may let the Scribe have a report by the 25th of each

month. In cases where there is not a T.R. appointed reports may be sent direct to G500.

DISTRICT 10 (South Wales and Monmouthshire)

The outstanding event of the month was the Western Districts Meeting, held at Weston on October 9. The meeting drew nearly sixty members from all parts of Nos. 5, 6 and 10 Districts and was a great success, attributable in no little degree to the efforts of the Weston group and G5JU, D.R. of No. 5 District, who made themselves responsible for the arrangements.

Those present from No. 10 were 2BG, 2JL, 2NG, 2UH, 2XZ, 3AJ, 5BI, 6FO, 8AM, 8NP, 8UH, 8WU, 2BQB and 2BUF, some of whom travelled from Cardiff to Weston by air. This turned out to be a very convenient way of making the journey and may be one reason why the South Wales people supported a proposal from the other side that Weston be recognised as a regular centre for Provincial District Meetings, though they will normally be held at a more convenient time of year. We missed some expected Swansea faces, but it is

only fair to say that it would have been a very difficult journey for them.

T.R. nominations have come in from several areas and the official announcements will be made in due

Cardiff.—The regular R.S.G.B. meeting was held on October 13, attended by 2BG, 2UH, 2XZ, 3AJ, 5XN, 8AM, 8NP, 8UH, 8WU, 2BQB, 2BUF, 2CPA, 2DHM, 2DOZ, 2DSD and 2DXS. A new call in this group is G3VL (ex-2CPA), whom we

Blackwood .- Activity keeps up here and G6BK will be arranging regular meetings during the winter at which it is hoped to see other members from outside the area.

Newport.—Some new membership applications are pending and when they materialise, G2 IL must take the credit. He has been most active in encouraging newcomers and his station is invaded

every Sunday morning.

The D.R. looks forward to attending meetings in all centres in the District, with a successful season for everyone. In particular, it is hoped to see more activity on our lesser-used bands, 28 and 56 Mc. We need not mention 1.7 Mc. in this connection, as District 10 has always been strong for this band and several of the DX men can be heard working locally at the week-ends-which is all to the good and as it should be.

DISTRICT 11 (North Wales).

There was an attendance of 14 at the meeting on October 23. The T.R. scheme was discussed, but it was decided that the district had no town in which the number of members merited the election of a T.R. It was therefore decided that County Representatives be appointed for Caernarvonshire, Denbighshire, and Flintshire. The following were proposed and unanimously approved as representatives of their respective counties: J. W. B. Evans (GW3GL), W. Jones (GW6OK) and E. G. Foulkes (GW5FU).

The new R.A.F. Civilian Wireless Reserve is creating considerable interest in the district. D.R. has been appointed a Regional Controller in connection with the scheme. At the next meeting he will give a short talk explaining the objects of the Reserve, and will be pleased to give any advice

he can concerning enrolment.

GW6OK has been having 56 Mc, contacts with G5MQ (40 miles), receiving S8-9 reports. This is particularly meritorious in view of the fact that 60K is practically at sea level and in a very badly screened location. 6AA has been in regular 56 Mc. communication from his home station with G6SO (65 miles) and G2IN (50 miles). Both 60K and 6AA would appreciate schedules on this band. They are able to receive CW in addition to phone and MCW.

Will members endeavour to bring to future meetings any new valves and apparatus they may have purchased in order to promote discussion.

DISTRICT 12 (London North and Hertford)

The October meeting was held as usual at the Orpheum Cinema, but the talk by Mr. Parr did not take place as he was unable to be present. The D.R. took the chair and invited discussions on any subject of interest.

There has been some doubt as to whether we shall be able to continue our meetings at the Orpheum, but arrangements have been made to hold the November meeting there and, should it be necessary to change eventually, due notice will be

The November meeting should be of special interest to all members as Mr. H. R. Adams, G2NO. of Webb's Radio, will be bringing along some of the

latest communication receivers

G6LL has been active on 56 Mc. and has received an S4 report from Clacton. He was using a 6L6 doubler with an output of 4 watts. 8NY lost the 30-ft, mast from his roof during the recent gale. Fortunately no damage was done and he says now that it is rather a good thing as he will be able to

put up a new beam array !

Welwyn.-The first meeting of the Central Herts group during the present season was held on October 7 at the QRA of G6XN, eight members being present, including G8TK, who cycled 7 miles from St. Albans. XN demonstrated the " Murphy" A52 push-button receiver, claimed to be the only commercial broadcast set with band-spread tuning. Activities: GSTK, St. Albans, works U.S. on 7 Mc., while 2DW, an old-timer in that city, is heard again after many years. 8VJ is believed to have moved there but no details are available. In Harpenden G3JX has W.A.C. with 10 watts, but his RME69 tempts him to call more than he can work! His next-door neighbour is G6VS, but as the latter is inactive no problems of mutual QRM have yet arisen. In Welwyn Garden City "Old Ireland." G2CN, starts up after a long QRT. G6XN, a hundred yards away from him (and a hundred watts!) compares 8JK beam and 133-ft. end-on. G2YN puzzles over an aerial in the back garden that has to be fed from a room at the front of the house, and GM8PM is welcomed from Scotland. At Welwyn village G5UM, aggrieved at the frivolous 'phone QRM on 3.5 Mc., concentrates on 1.75 Mc. break-in work with C.W.

DISTRICT 13 (London South)

The District meeting held at Norwood on October 27 was a great success and there was an attendance of 44. It is truly encouraging to see such an excellent turn-out and we do most sincerely thank all those who were present. Owing to an unfortunate mistake the date of the meeting appeared in the BULLETIN as October 20 and the D.R. was therefore obliged to send out over 100 postcards rectifying the error. However, the large gathering seemed to indicate that the cards had not been sent in vain! A very reasonable sum was added to the District Fund and it is hoped to dispose of some of the surplus junk at a later date.

Various reports have been received this month but nothing of outstanding interest. G5GH is busy erecting his gear and was interested to hear VS6AO on October 18; 3CT is experimenting with a 14 Mc. band variable directional aerial and reports that there are now three amateurs in the R.A. Mess. 2GZ is obtaining excellent results from his new "doublet" and has now worked ZEIJI. 3GU is engaged in constructing gear for the 28 Mc. band. 2ZQ still finds time to work DX in spite of his C.W.R. activities. 2WV was pleased to contact OO5AO on 14 Mc.

2BMH is working hard to organise some local gatherings in the Wimbledon area and we hope that all those in that neighbourhood will give him their support. Details of the next meeting will be circulated in due course.

May we conclude by requesting that all reports be forwarded to the T.R. each month. Each T.R. is supposed to report every month to the D.R. and the reports would thus be automatically tabulated under their respective areas.

DISTRICT 14 (Eastern)

East Essex .- At the October meeting held at G6CT Westcliff-on-Sea the attendance was 18, including ex-VU2FT. G5XI was nominated T.R. for the coming year in succession to G2LC, who wished to be relieved at once owing to pressure of work in other directions. A vote of thanks was passed to G2LC for the good work he has done for the area since he took over the work from G5UK two years ago. The R.A.F. Civilian Wireless Reserve was the subject of much discussion. This area has now four members enrolled and others are likely to join.

Due to the success of the last QRP contest, it has been decided to hold another in the near future. G5VQ will be active again shortly after a long

spell of silence. 3TS has been on 7 Mc, with one

watt input and has been doing well.

Brentwood,-G3LA has been nominated to take over as T.R. for Brentwood in place of G3MV. Congratulations to 2CRJ now G3VD who is already active on 7 Mc. 3JW is using a new Class "A" modulator. 8RC and 3MV are active on 7 Mc. 2ATU has been grinding crystals.

Chelmsford.-G5RW is again on 3.5 Mc, 'phone. 3BS is taking a Candler course with a view to 30 w.p.m.! 5RV has received his DX Century Club certificate. 2KG is working on a beam aerial. 8AD active but has not reported. 6LB is shortly to be [married.

East London.-The October meeting was held at G5AR, Woodford, when the C.W. Reserve was discussed. G3KZ attended his first meeting. 2DJI has applied for his full call. G3NF (XZ2EM) of Snaresbrook expects to return to Burma in



CHATS

(No. 2 of a series).

Articles appear from time to time in the various "ham "magazines giving instructions for re-grinding crystals. When you find that the frequency of your favourite crystal is covered by a high-power phone carrier, the temptation is very strong to make a dive for the plate elass and knife powder.

the temptation is very strong to make a dive for the plate glass and knife powder, or whatever else it was you saw in that article last month. If it is a 1.7 Mc. or a 3.5 Mc. plate on which you intend to operate you will probably be lucky, but if you are trying to re-grind a 7 Mc. plate, the chances are a hundred to one that your crystal will eventually be returned to the manufacturers with a tearful letter asking them to do what they can to retrieve its oscillating properties, but with the best will in the world the manufacturers cannot do much with a crystal that has been inaccurately re-ground and is already within a few kilocycles of the H.F. edge of the band!

Honestly, re-grinding a 7 Mc. crystal is a specialist's job, and perhaps the following figures will explain why this is so. A 7 Mc. X cut crystal is approximately 16 thousandths of an inch thick, and to obtain the maximum output must be ground to an accuracy of better than one ten thousandth part of an inch. To move the frequency 6kc, higher the amount to be rubbed off the crystal is less than one-hundred thousandth part of an inch. (J0001 in.) If you take only a fraction more off the edges of the crystal than the centre, the crystal will stop oscillating altogether, and I can assure you that to grind this amount off accurately is not easy, even for an expert. So please do take my advice, and, if you must have the frequency altered, give the manufacturers a chance to do it properly, and return the crystal to them before you have ruined it yourself.

It will be cheaper in the long run, as the charge will be quite small. For example, Q.C.C. charge 2/6 for re-grinding a crystal to a higher frequency in the same band, and this charge includes recalibration and the issue of a new test certificate.

E. A. DEDMAN (G2NH).

Advertisement of the QUARTZ CRYSTAL CO., LTD., New Malden, Surrey

GW3GL

Everything in Radio for the Amateur.

WE SPECIALISE IN SUPPLYING COM-PONENTS FOR SHORT-WAVE WORK.

> Call or send us your enquiries, LARGE STOCKS CARRIED.

Orders by post promptly attended to.

THE APIARY, CONWAY, N. WALES

Ex-2BGG...Now G2 CR

... by way of a thank-offering has a few variable air-gap crystal holders, suitable for frequency variation with AT & BT cut crystals, at 10/-

AT & BT cut crystals are available at the usual price, as are pressure-type holders.

RADIO CONSTRUCTION SERVICE

293. ROTHBURY TERR., NEWCASTLE-ON-TYNE, 6.

CRYSTAL CONTROL

FOR ALL-

(a)	BAND. 1.75 Mc.		***	16/6	± 1 kc.
	3.5 and 7	Mc.	***	15/-	± 2 kc.
,,	14 Mc.	***		30/-	± 5 kc.
	100 kc.	***	***	15/6	± 0.1 kc
3.3	Temp	. Coef	f. (a)—	$-(23 \times 10^{-1})$	(*)

Temp. Coeff. (a)— (23×10^6) (b)— (5×10^6)

Enclosed Holders, plug-in type, suitable all bands, 12/6
BROOKES MEASURING TOOLS,
51-53, Church Street, Greenwich, London, S.E.10
Tel.: Greenwich 1828

TO KEEP IN TOUCH-

with all the latest developments in short-wave radio,

take RADIO

the World's finest Ham Magazine.

Don't be disappointed. Subscribe to-day.

Annual subscription, 10 issues ... 14/6

Two years, 24/6.

European Agent :

N. E. READ, 24, Church St., Oswestry.



TUNING COILS

I. F. TRANSFORMERS

L. F. TRANSFORMERS

L. F. CHOKES

MAINS TRANSFORMERS
VARIABLE POWER RESISTANCES
THERMAL DELAY SWITCH

Write for Catalogue No. 13 giving free information of Varley components.

VARLEY (Oliver Pell Control Ltd.), ! CAMBRIDGE ROW, WOOLWICH, LONDON, S.E.18

January. Members attending the meeting at GeUT, Little Hallingbury, will be met by a car at Spellbrook, the Green Line stop.

DISTRICT 15 (London West, Middlesex and Buckinghamshire).

A highly successful meeting of the District Committee and T.R.'s was held on October 12, when details of the forthcoming season's meetings were worked out.

The District Dinner and Social evening was fixed for January 7, 1939, when dress will be option-Ladies of course are invited, and tickets costing 5s. 6d. each can be obtained from any T.R. or the Social Committee. The venue, which is to be the Park Royal Hotel, can be reached quite easily from any part of the district. It is hoped that everyone will make a very great effort to be there. It is necessary for T.R.'s to be nominated for all

parts of the District and the D.R. would like to see extra ones put forward for the extreme north part of Middlesex (around Edgware), the south part of West London, Hounslow and Slough. This would help in keeping members in those parts together. Please see to it that you are represented for the forthcoming year by sending nominations to the D.R. at once.

It is hoped that district meetings will be spread round the district in future and offers of help in finding suitable places to meet would be welcome. Talks and short papers are required, and assistance would be appreciated by all T.R.'s

South Middlesex,—G3BQ and 3JG report. Also active are G2KI, 2NN, 2VV, 3BQ, 3GQ, 3JG, 6GB,

North Middlesex.-G5SR and G6WN active, the latter, who is using a temporary aerial, works W well on 28 Mc. Good results are obtained in spite of an east-west aerial only two feet off the ground at the far end.

Bucks.-G6JK, 2BAO and 2BVX active.

Some complaints have reached the D.R. regarding duplex telephony working within the area which goes on for considerable periods. This is to be deplored if it interferes with other members.

New members who have joined the district recently are welcomed, and we shall be pleased to see them at meetings in the near future. We were pleased to have VK5RN with us at the last meeting and hope he has a good voyage back home,

DISTRICT 16 (South Eastern)

The D.R. has been pleased to receive several T.R. nominations and trusts that the District will have a full complement of T.R.'s in 1939.

Brighton and Hove.-The Annual General Meeting of the local Society was held on October 6, and the Secretary's report showed that good progress is being made. After the usual business had been concluded the R.S.G.B. films were shown, and much appreciated. 2CTO, the T.R., now awaits his full call. The following report active: G2RU, 3HP, 3JF, 3KJ, 6CY, 6RM, 8AC, 8OQ.

Bromley and District.-The first meeting of the season was held on October 21 at 2BSO, and a very enjoyable time was had by all. Arrangements were made to hold monthly meetings during the coming season, and a program of discussions was prepared. The next meeting will be on November 25, at 8.15 p.m., at the ORA of 2AVI, 75, High Street, Bromley

Eastbourne.-The following stations report active: G2AO (1.7, 28 and 56 Mc.), 3AT, 3CX, 5BW and 5IH (1.7 and 3.5 Mc.).

Gravesend.—The D.R. opened the lecture season on October 10 with a talk on 56 Mc. The meeting was well attended, and considerable interest was shown in 2UJ's receiver and three-stage transmitter which were on view. As far as possible, lectures will be given once a month during the coming season, and among those already booked is one by Mr. Nixon, of G.E.C., on "Speech Amplifiers." Activity: G2IZ, 2KL, 2TN, 5IL, 5SU, 6BQ, 6PG, 6VC and 2BDL.

Chichester and District.—Thirty members of the Sussex Short Wave and Television Club visited Murphy Radio on October 12. Activity is mostly on 28 and 56 Mc., and an interesting receiver test was recently carried out on the latter band at 2ZV. On signals from 2OD a 1-v-1 proved to be most satisfactory, being 3 to 4 "S" strengths better than either an 0-v-1 or a resonant lines model. 2ZV reports good conditions on 28 Mc. during October. The following are active: G2PF. 5PF, 8RO, 2CIX, 2DDD, and 2DVO. 2BBB, who is in Egypt, hopes soon to be on with an SU call.

Tunbridge Wells and Tonbridge.-G60B is testing an ESW20 on 7 and 14 Mc., and is pleased with the valve. 2UJ is obtaining good results from his T 20 PA on 56 Mc., and has at last managed to work 2AO in Eastbourne on C.W., getting a report of S6. All reports on 56 Mc. transmissions will be acknowledged. Also active: G5KV, 50Q, 8NO, 2AKQ, 2CUS, 2CUX and 2DIC.

Whitstable.-Congratulations to 2CMI on passing his Morse test, for which 2BJM is also in the running. G5CI, the T.R., states that he is discontinuing the local meetings due to lack of support. (This seems most unfortunate. The subscription to the W.R.A. is nil, thanks to the generosity of 5CI, who pays all expenses out of his own pocket, and, moreover, used to provide supper after each meeting.-D.R.)

DISTRICT 17 (Mid-East).

Boston.-All licensed members in Boston have enrolled in the C.W.R. Congratulations this month go to BRS3154, who has just received his H.B.E. certificate. This appears to be the first to be awarded to a BRS in District 17. 8BO has now completed his rebuild and is well satisfied with the results, a new communications receiver is contemplated. 2DTU also has transmitter on test. 6GH worked a few stations in the VK/ZL contest. Regular meetings are held in Boston on Thursday evenings and all are welcome. Apply to 6GH for details of venue, etc.

Brigg.—G8AP is fully active on 3.5, 7, and 14 Mc. The erection of a 50 feet high lattice mast and a special 14 Mc. aerial has worked wonders.

Lincoln.-G5XU has just completed a brick shack but is having difficulty with power wires which run across his garden. 2CFT has applied for his full licence. We are sorry to lose an active member in 2CMN who has now left Lincoln. 5XL is completing a new transmitter and hopes to be active on the District 17 schedules.

Mablethorpe and Sutton.-All stations are known to be active although no report is yet to hand. 5BD has received 56 Mc. signals from 5GS in Grimsby. 5BD, 5CY, 5LL are working together

regularly on 56 Mc.

Grimsby Area.—The winter schedules have commenced and most stations are taking part. 2BXG is awaiting his full call and several new-comers are applying for membership to R.S.G.B. Meetings continue to take place on Tuesday evenings and the winter programme is now in operation.

A District meeting was held at the Queen's Hotel, Lincoln, on Sunday, October 30. Twenty-six members attended and helped to make it a great success. The D.R. wishes to thank all those who assisted in the transport arrangements, and also 5XL who was responsible for the excellent catering arrangements.

DISTRICT 18 (East Yorkshire)

Scarborough.—It is a pleasure to record that Mr. Cooper (6CP), who is making excellent recovery with his broken thigh, expects to leave hospital in

the near future.

G2CP recently returned from training afloat with the R.N.W.A.R., 8KU was also warned to be in readiness. He is now testing 'phone on 7155 and 14,310 kc., and would appreciate reports. He is using QRP battery-driven 6L6 rig. 5MV is at present constructing a new exciter unit to drive his present PA on 28 Mc., and intends to erect a W8JK aerial in the false roof. 6TG is active of 28 and 56 Mc. 'phone and C.W., and busy with R.E.S. groups. He finds this work very interesting. Also listening on 56 Mc. with Super Skyrider, but unable to hear any signals yet. He would appreciate hints for improving VHF performance. All suggestions acknowledged. Congratulations to 2BGO upon his "Matching up." We sincerely wish him all happiness and luck. Has commenced a re-build to celebrate the occasion and hopes to be active soon. 2AHN recently joined R.S.G.B., but is well known locally, having held A.A. permit three years—intends to apply for full ticket shortly.

A suggestion has been made to institute a local "rag chew and news" schedule on Friday

evenings. Views will be welcomed.

The T.R. regrets the absence of notes for the past three months, but this has been partly due to business and absence from town for training. He hopes that his successor will have better luck in

obtaining notes from members.

Bridlington.—G5VO active on 14 Mc. had D4DLC staying with him recently. G6OO has entirely scrapped his old transmitters and is now rebuilding with AC4 Pen Tritet-'47 Doubler and T61D as P.A. pending the purchase of a T55 as final. He has had a visit from a very old-timer, G2VC. G6UJ, active on 14 Mc., had visits from G3DW and G2VC. G3DW is interested in 56 Mc. and wishes to have co-operation from others as well as G6OO on this band.

Hull.—At the last monthly meeting a general talk took place on conditions. Those present decided to make notes of stations heard in October and to pool their reports in order to obtain a résumé of conditions on all bands at various times.

Stations active include G5MN, who is making some good contacts with an unusual aerial; 5HA, who is putting out a good C.C. signal on 56 Mc. and would appreciate reports; and 3PL, 2QO, 2KM, 8IM, 8UL, 6OS and 6UV.

The next Hull meeting will be held on Wednesday, November 30, at the Broadway Hotel.

DISTRICT 19 (North-Eastern)

It is proposed by G5WZ that if sufficient support can be obtained, a No. 19 District "Hamfest" be held in either Sunderland or South Shields, and that all expenses be shared (including travelling expenses) so that everybody attending will pay the same. Will all members willing to support this please drop a card to G5WZ, "High Dock House," West Holborn, South Shields. The D.R. wishes to point out that South Shields possesses the only official T.R. in No. 19 District. Will other towns with five or more members please send in the form enclosed in last month's issue as soon as possible?

South Shields.—G5WZ is again active on 3.5 Mc. 5SB has completed new rig 6L6-T20 and tests on 7 Mc. promise well. 6VG is rebuilding. 8IF has received 25-watt permit. 8VV is rebuilding PA and anticipates 25 watts. 8JO is busy with aerial problems at new QRA. 8AO has new superhet receiver. 6XO, 8KK and 5TG are also known to

be active.

Sunderland.—G6TR is operating 1.7 Mc. phone and CW. 6CV is working 7 Mc. phone, while 6HV and 5HC are active on 14 Mc. 3IV and 8AR are also active.

Stockton-on-Tees.—G2FO is building unit to double from 7 Mc. to 56 Mc. 6ZT has new receiver. 5QU is active on 28 Mc. and is concerned about very strong ground wave. 2CZO has at last got his transmitter performing satisfactorily. 2BNZ is now 3UG. Congrats, O.M.! Other active stations are 5XT, 6DR, 8CL, 8PS, 8OH.

Northern Ireland

The quarterly District meeting which was held in Belfast on September 30 was very well attended. After tea GISTS opened a discussion on 56 Mc. portable work with an account of the GISTSP-GW6AAP contact earlier in the summer. STS, who has since transferred his QRA temporarily to Cambridge, says that, before leaving, he was getting out quite well on 28 Mc. C.W. and phone, using the T20 PA as a frequency doubler at very low efficiency. 5TK is now WAC on 10 watts with a hand generator, and reports his 58th country on 14 Mc. Using a 66-ft, Windom. 2KR continues active, and has raised HP2 for the first time on 14 Mc. 6TK has found 28 Mc. very poor recently as compared with the same time last year. He is also active on 3.5 Mc. C.W. and phone, and hopes to have an 81K beam erected shortly. 5UO is leaving GI for G, and, like STS, has the good wishes of all N.I. members. 8PA is still "wiggling the ether" and working an odd W on phone. He is rebuilding for 28 Mc. Several others report active,

but have nothing of interest to communicate.

Particulars of the next District meeting will appear in the December issue. The date is Friday, January 13, but some Ulster folk say that is lucky!

Transmitting members are asked to keep the local records up to date by sending to the D.R. before November 30 particulars of their present:—

(1) Crystal frequencies.

(2) Licensed bands and power, stating whether for C.W. only or for phone.

 Applications, outstanding but not yet granted, for other bands or increased power.

(4) Full particulars of any frequency meters in use.

Scotland

"A" District.—The 1938 R.S.G.B. Films were displayed at the October meeting, and a large audience enjoyed them, despite the hitches caused by the state of the films. The D.O. would appreciate any offers to give short lectures. Several Morse Instructors are also urgently required. It is likely that regular transmissions on 56 Mc. will commence in the district soon, GM6MS has already started, whilst other stations are making preparations for activity. GM6MS and 6ZV will appreciate hearing from members in a position to receive 56 Mc. signals, stating whether able to receive both C.W.

and telephony or telephony only.

" B" District.—Since these notes last appeared the Aberdeen members have enjoyed two of the most interesting meetings of the season. On September 30 E. G. Ingram (GM6IZ) gave a talk on "Amateur Radio in the Past." 6IZ is an old-timer, and no one in the district is more capable of talking on that subject. His remarks about the old days on 90 metres and the troubles experienced with apparatus, were a revelation to most of the 15 members present. It is hoped that other members will follow 6IZ's example by giving talks. On October 14 a debate took place on the power question. The motion was "That this Society considers that high power is necessary for modern amateur experi-ments." A. Fowler (GM8SV) supported the motion, and D. Simpson (GM6VO) opposed. Two hours of good constructive argument was had by all present, and when the vote was taken there was a solid majority against the motion. The motion was a difficult one to support, as neither 8SV or any other member in the district can speak with experience on the high-power question.

General activity has been very mild of late, and no reports of outstanding interest have been received. Four members await their A.A. calls. The visit to the B.B.C. station at Burghead was

greatly enjoyed.

"C" District.—Last month's notes were missed because they did not reach Scottish Records Office in time owing to delay in the mail. At the district meeting held on September 20, discussion centred around the Scottish Convention and several suggestions were made for the next. One is that a more central venue, such as Perth, be chosen. Mr. Watts' good work at Cairo was deeply appreciated.

"D" District.—The meetings continue to be well supported. All licensed members are active, but with nil to report.

"E" District.—The usual monthly meeting took place on October 19, when the 1938 R.S.G.B. films were displayed. Thanks are again due to Mr. A. Fairbairn (BRS2474), who was responsible for their screening. The morse class continues its weekly meetings and considerable progress falls to be recorded. The next District meeting takes place on November 23 at 7.30 p.m. at Fleury Meng's, 48, Newmarket Street, Ayr, when Mr. Douglas Lamb (GM2UU) will deliver a lecture on Aerials. Indicative of the enthusiasm of the District is the fact that at the October meeting two of the members attending came from QRA's eighty miles apart. Reports are to hand from GM2UU and BRS1295. The latter reports that on October 16 he had the unusual experience of hearing signals on all amateur bands between 5 and 160 metres.

"F" District.—Meetings are being well supported. It was decided to hold fortnightly meetings, but it was later discovered that this would be inconvenient to several members, so the idea has been dropped for the present. The date of meeting is to be altered in the near future, from the first Sunday to either the second or third.

"G" District.—Meetings are being well attended and a "Question Bee" is holding great interest-Congratulations to Mr. Anderson (2CXC) on obtaining full call GM3TD. The masts at GM6RG suffered damage during the recent gales. A fine job was carried out in replacing a 10-ft. section at the top of an 80-ft. mast. Will members please report on activities to the D.O.

"H" District.—With the advent of winter, most stations are active, and several new calls appear on the list. 2CXY is now GM3LO, 2DIL—GM3SR, 2CWG—GM3NH and BRS2693—GM3ND. Further new calls are expected in the near future. We have pleasure in welcoming Mr. Arthur Dyer, B.E.R.S. 379, to the district, and to whom we have to thank for giving a very interesting talk on R.A.F. transmitters at a recent meeting. We also thank GM3NH, who, at a later meeting gave a talk on L.F. Class B Modulation accompanied by diagrams. Further talks or lectures would be much appreciated, and any member willing to oblige should notify the D.O.

The District transmitter will have reached com-

The District transmitter will have reached completion by the time these notes appear in print, the call being GM3DR. Co-operation, concise and pertinent reports will be appreciated, QRA, 3a,

Bank Street, Kirkcaldy.

Arrangements for the District's Annual Dinner in January, 1939, are now in hand, but fuller information will appear in the next issue. It is hoped that the N.F.D. films will be shown in a few week's time, but members will be notified individually in due course. GM8MQ is now WAC, WBE.

British Calls Heard

Eric W. Trebilcock (BERS195), Powell Creek, North Australia. September 15-October 12, 1938.

7 Mc.—CW: g2nj, 8fc. 14 Mc. 'Phone: g2hk, 3ln, 5jo, 6jl, 6tz. 14 Mc.—CW: g2cg, 2fi, 2fz, 2gk, 2hw, 2io, 2km, 2kq, 2la, 2nn, 2sy, 2xu, 3ad, 3ap, 3bu, 3cw, 3cy, 3db, 3fz, 3hh, 3ih, 3iq, 3jr, 3pg, 3pw, 5an, 5dy, 5hh, 5ms, 5my, 5nd, 5ns, 5pc, 5pr, 5py, 5rv, 5sg, 5ug, 5vb, 5vu, 5wp, 5yu, 5zt, 6bq, 6dl, 6cj, 6cw, 6dt, 6gt, 6lb, 6mk, 6nb, 6pr, 6qm, 6ti, 6ui, 6vx, 6wb, 6wr, 6wy, 6xl, 8ab, 8cz, 8gd, 8go, 8ii, 8ip, 8it, 8iw, 8ja, 8jb, 8jv, 8my, 8nv, 8sy, 8po, 8ug, 8uy, gm2jf, 2kp, 3ba, 5rh, 6bm, 6hz, 6is, 6rv, 8fr, 8hp, 8kq, gw3ax, 5lv, 8uh.

Strays

Mr. W. D. Oliphant, 2FLQ, "Jaraeldo," Burkitt Road, Woodbridge, Suffolk, will be pleased to cooperate with any 'phone station desiring listening schedules.

We are informed by G2SU that Mr. D. C. Derry, G8PQ, sailed for India on October 25. He hopes to contact British amateurs as soon as his station is built.

The West at Weston

The difficulties which preceded the West of England and South Wales Conventionette held at Weston-super-Mare on Sunday, October 9, were such that at one time it seemed likely that the meeting would have to be cancelled. The arrangements locally were in charge of G6LQ, who, being a member of the R.N.W.A.R., was, with many others, called up during the crisis. In addition, owing to structural alterations at the original meeting place a fresh venue had to be found. Fortunately, Huntley's Beach Hotel was able to provide suitable accommodation at somewhat short notice: the cuisine and arrangements turning out to be excellent.

A party of 54 sat down to dinner in a room singularly appropriate to the occasion. From its windows could be had a fine view of the Bristol Channel, with Brean Down on the one hand and the islands of Steep Holm and Flat Holm on the other. Between these points the late Senator Marconi conducted many of his early wireless

experiments.

The gathering, drawn from far and near, included the D.R.'s of Districts 5, 6 and 10 and seven or more T.R.'s. In addition, we were glad to have with us our Secretary, G6CL, and Squadron Leader St. John, Chief Instructor of the R.A.F. Civil Wireless Reserve. Mr. V. M. Desmond, G5VM, D.R. of District 3, who had intended flying from Birmingham, was prevented from attending through the rough weather which prevailed. One party, however, did fly over in an air liner from South Wales and we believe enjoyed the experience; another from Wales and Monmouthshire travelled by steamer.

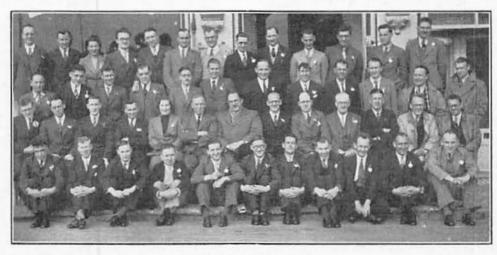
The afternoon proceedings commenced with the chairman, Mr. J. N. Walker, G5JU, officially welcoming the members and expressing the organisers' appreciation of their co-operation in making the meeting so successful. Mr. Austin Forsyth, G6FO, and Mr. Walter Sydenham, G5SY, followed and pointed out the advantages and disadvantages possessed by Weston as a centre for such meetings. On the whole, the choice appeared to be a popular one, and it is hoped to hold either a P.D.M. or Conventionette there next year.

Next followed the presentation of the G5FS Memorial Challenge Trophy to Mr. L. E. Crabbe, G6VF, in recognition of his outstanding work on the "ultra-shorts." Mr. Clarricoats in making the presentation, paid tribute to the services rendered in many ways to the Society by the late Mr. W. A. Andrews (G5FS), and noted with pleasure the reason for the award of the Trophy to G6VF.

"Clarry" then produced his famous little black book and got down to "brass tacks." Despite a severe cold from which he was suffering, and which, incidentally, had considerably hampered the scope of his visit, he held the interest of his audience in his usual inimitable fashion while dealing with the many and various matters appertaining to amateur radio.

Sqdn.-Ldr. St. John took the opportunity to inform the members of the progress being made by the C.W.R. It was apparent that many present were greatly interested. Hearty thanks were accorded to both speakers.

A buffet tea was followed by a display of society films, which were very fine, both from a technical as well as an entertainment point of view. Some members had to leave early to fly back to South Wales—undoubtedly a fascinating experience on such a fine, moonlight night. The others formed into parties to visit local amateur stations before finally wending their way homeward after what, all were agreed, was a very pleasant day.



THE WEST AT WESTON

Seated from right to left: G6AC, 6RB, 5QA, 5LM (Mayor of Taunton), 6FO, 5#U, 6CL and Sq. Ldr. H. W. St. John, R.A.F.

BRITISH EMPIRE NOTES AND NEWS

Australia (Western)

By VK6WZ.

CONDITIONS for the most part have been poor since our last notes were written. 14 Mc. has suffered particularly and DX has been very hard to obtain. The band was dead on September 20, and during the worst period even VK signals were inaudible.

The 28 Mc. band seems to be picking up and on October 15 signals were heard during mid-afternoon for the first time since last summer, but strangely enough they were from VK3 only. Mornings still remain best periods for 28 Mc. work here. VK6LW, 6AF and 6MW operate on this band from time to time.

time.

VK/ZL Contest scores are not yet known, but VK6AF put in much time on the Senior Event and ran up a total of 16,000. VK6MW, 6LJ, 6FL and 6SA were also known to be competing.

New licensees include VK6FK, 6EL and 6LR (ex-3TQ and ex-6LR of many years ago), all of whom are active on 7 Mc., which remains the popular "local" band.

VK6LJ's rotary beam, mentioned last month, is now working satisfactorily after a preliminary spasm of end-fire operation instead of, as intended,

broadside.

The VK6 DX Contest proposed by the T.D.S. Committee of W.I.A. will take place on November 19-20 and November 26-27, commencing at 1000 G.M.T. on Saturdays and finishing at the same hour on Sundays. It is hoped that other parts

of the Empire will support this event.

Eire By EI9D

At a meeting of I.R.T.S. held recently in Jury's Hotel, Dublin, the N.F.D. 1.7 Mc. replica was presented to EI6F and the station personnel. We hear that, encouraged by this success, EI6F has already on test new portable gear. Having taken it far into the wilds for a real try-out, however, the power output proved disappointing. It was then found that the 6-volt car battery in use did not line up very well with the generator, which had a 12-volt input! Here in the West we think that things happen much more satisfactorily when the figures are transposed. Anyhow it is a fact that 6F is installing a battery charger!

BRS2032 reports from Bray. He is hard at work on code, and hopes soon to qualify for full licence.

The usual activity continues, but there is nothing of special interest to report.

Malaya and Borneo By VS2AG.

The writer for two reasons offers no apologies for the lack of notes since VSIAA went on leave. First, heavy official duties and flying training have not permitted much personal activity at the transmitter; secondly, and more important, only one report has been received, and only one acknowledgment of regular distribution of QSL cards. However, and unfortunately, these conditions do not appear to apply exclusively to Malaya! VS2AL using only 9 watts to an RK25 on 14 Mc., has been getting very good DX, using at choice one of two half-wave doublets. Restricted operating time permits only W6, VK's, J's and VU contacts as a general rule, but an average report of 569 from W6 is very good.

VS2AE active in his new location is getting out well. 2AK has gone on leave to England, and judging by the pile of QSL cards which arrive by each mail, he was very busy before he left us.

VS2AS is active, but volunteer wireless duties take up most of his time and energy. 2AR is also active, and although skip renders him inaudible to 2AG, stations have been heard calling him. 2AG now in Kuala Lumpur, is using 6L6's to a W.E. 242B final, which gets the same reports as the old rig. Propagation observations have been fairly continuous since 1934, and certain facts are beginning vaguely to appear from out of the welter of reports. The systematic analysis of results often takes twice as long as the actual QSO.

VSIAA is expected back next month, and being fresh from leave, he may be able to wring reports

from Malayan members!

Malta

By ZBIE

After a long spell of silence, broken only by an occasional European signal, the 28 Mc. band opened up for patchy periods during October, and W's came in both on C.W. and phone at S7. Mainly because of these relatively few good periods the 28 Mc. band has been sadly neglected in ZB1.

28 Mc. band has been sadly neglected in ZB1.

All stations are active. ZBIE is conducting a series of experiments with various crystal oscillators and frequency doublers, while 1H is rebuilding for telephony in the rack and panel style. 1J is back from his holiday in G and active on 14 Mc. 1L has been trying out his new modulator with excellent results and is now waiting for a new "mike." IR is very busy on 14 Mc.; and 1S and 1W are both building their transmitters, while 1X is overhauling for an increase of efficiency.

With regard to the query by 56 Mc. experimenters in G, the writer wishes to state that after enquiries made at the last general meeting it was found that, at present, no member is prepared to take part in scheduled listening or transmitting on this band owing to other activities in hand.

New Zealand

By ZL3AZ

The return to warmer weather has brought an improvement in conditions on the higher frequencies. Another welcome piece of news is the fact that several amateurs are taking an interest in 56 Mc. A Wellington listener, Mr. P. Morrison, has heard W6ENC and VK2NO on this band, although a QSO between ZL and VK has not yet been established.

The Auckland Group continue to lead in the matter of DX on 14 Mc. Rumours have it that ZL1MR has at last worked the 40 zones. This is certainly very fine work, and confirmation is awaited. ZL1GX has not been as active as in the past but recent QSO's have included VR6AY, 17AA and VO3X, all hard contacts for us in ZL.

Judging by the number of stations on the air in the VK-ZL Contest it was a complete success. Conditions were fairly good, and although the writer amassed 30,000 points, by the way, some of the 1st and 2nd district stations were knocking them off, their scores should be around 250,000! One South African only was heard, this was ZS2F. He was really the only outstanding DX station logged. All the usual European countries were audible, the rarest probably being ES1E.

Dunedin seems to be a good spot for DX, as ZL4DQ reports hearing among others, EL2R and ZC6NX. He operates on 28 Mc, quite frequently so stations desirous of a contact with this country on 28 Mc, should keep a look out for him.

An event of local interest was the departure of ZL3JU for Winnipeg, Canada. He will be in that city for at least 12 months, and hopes to be on the air with a VE call before long. The writer has been keeping in touch with him through VE4RO and many very enjoyable OSO's have resulted.

South Africa

Division 6.—The Jubilee of Wireless was celebrated in Johannesburg on August 25 by an exhibition staged in the Physics Laboratory of the Witwatersrand University, by the South African Institute of Electrical Engineers in conjunction with the University. The object of the exhibition was to show the development of wireless from the very beginning. An attempt was made at the exhibition to reproduce as nearly as possible the apparatus used by Hertz fifty years ago when establishing the existence of wireless waves.

The many interesting features displayed included a portable transmitting and receiving set loaned by the Union Defence Department, an aeroplane set combining transmitter and receiver, with direction finding facilities, visual and aural, lent by South African Airways, and an exhibit by the South African Broadcasting Corporation, including an early type of military transmitter and speech amplifier.

It is perhaps interesting to mention that South Africa, especially the Transvaal, is to-day leading the world in the lightning investigations which are being conducted in the Bernard Price Laboratory of this institution.

The Postmaster-General's new regulations are expected soon, and it is rumoured that the use of 100 watts has been granted. We hope to substantiate these premature remarks with more concrete information, in the next issue of the BULLETIN.

The following stations report active: ZS6BL on 14348 kc. is looking for Empire contacts, 6BT is working on 14014 kc. with his new "stream-lined" transmitter, 6DM finds plenty of DX on 14 Mc., 6EM has a new RME69, 6SC is on 28 Mc. with 'phone using a full wave Zepp, 6DZ pleased with his initial B.E.R.U. Contest results is now on 28552 kc.

ZS6DZ.

West Africa

By ZD2H.

Sierra Leone.—ZDIGT, the only licensed amateur in this Colony, is off the air at the moment owing to a transformer burn out.

Nigeria.—ZD2G has transferred his aerial system to a new QRA. ZD2H notes varying conditions, with erratic spasms of DX. Terrific QRM is caused by a commercial station on 14 Mc. signing IBS (RST591). BERS440 is on leave.

Gold Coast.—Pressure of work has caused ZD4AB to be rather inactive of late, but a Sunday schedule on 7 Mc. with ZD2H (S9 both ways) promises a reliable communication channel in spite of the high noise level.

"T. & R. Bulletin."

ADVERTISEMENT RATES.

Per insertion.

Pull Page . £6 0 0 Half Page . £3 0 0
Ouarter Page 1 10 0 Elghth Page 0 15 0
Series Discounts—5% for 6 or 10% for 12 consecutive
insertions. Full-page type area 7½ × 5½.

Advertisements specified for Covers and Facing Matter
Positions are not subject to series discounts.

The T. & R. BULLETIN is published on the 15th of each month.
Orders, Copy and Blocks should reach us by the 25th of
each month for the following month's issue.

All applications for space or specimen copies should,
please, be sent to Advertisement Manager,

PARR'S ADVERTISING LTD.

PARR'S ADVERTISING LTD., Craven House, Kingsway, W.C.2. Telephone: Holborn 2494.

INDEX TO DISPLAYED ADVERTISEMENTS

Automatic Coil Winder & Electrical Equipment Co., Ltd Cover is ment Co., Ltd	/10 1 mil.				-	1200
Automatic Coil Winder & Electrical Equipment Co., Ltd	A.C.S. Radio	546	444	444	991	iv
ment Co., Ltd	Automatic Coil Winder	& E	lectric	at Equ	ulp-	
British Mechanical Productions, Ltd. (Clix)cover Brookes Measuring Tools 30 Brown, S. G., Ltd. 30 Candler System Co. 31 Electradix Radios 29 Evrizone Radio & Television, Ltd. 40 GSNI (Birmingham), Ltd. (Radiomart) 31 High Vacuum Valve Co. 57 His Master's Voice 27 Oliver Bell Control, Ltd. (Varley) 30 Pitman, Sir Isaac & Sons 29 Premier Supply Stores 29 Radio Construction Service 30 Radio Construction Service 30 Read, N. E. 307, 31 Short-Wave Radio 31 Stratton & Co, Ltd. (Eddystone) Television and Short-Wave World Back Cove	ment Co., Ltd		494	9.19	Cove	
Brookes Measuring Tools Brown, S. G., Ltd	British Mechanical Produ	uctio	ns, Ltd	. (Clis	cove	r ii
Brown, S. G., Ltd Candler System Co	Brookes Measuring Tool	s	***			308
Candler System Co. Central Radio & Television, Ltd. 31 Electradix Radios 29 Evrizone Radio & Television, Co., Ltd. 29 Evrizone Radio & Television, Co., Ltd. 31 GSNI (Birmingham), Ltd. (Radiomart) 31 GW3GL 31 High Vacuum Valve Co. Front Cove 32 11 His Master's Voice 32 12 Oliver Bell Control, Ltd. (Varley) 30 13 Pitman, Sir Isaac & Sons 32 14 Premier Supply Stores 32 15 Premier Supply Stores 32 17 Quartz Crystal Co., Ltd. (Q.C.C.) 32 18 Addio Construction Service 33 18 Radio Construction Service 30 19 Read, N. E. 307, 31 Short-Wave Radio 31 Stratton & Co., Ltd. (Eddystone) 32 Television and Short-Wave World 32 31 31 31 31 31 31 31 31 31 31 31 31 31				10.0	***	٧
Central Radio & Television, Ltd. 31 Electradix Radios				***	411	٧
Electradix Radios				444	***	316
Evrizone Radio & Television, Co., Ltd. GSNI (Birmingham), Ltd. (Radiomart) GW3GL				***	***	296
GSNI (Birmingham), Ltd. (Radiomart) GW3GL High Vacuum Valve Co. Front Cove "His Master's Voice" Oliver Bell Control, Ltd. (Varley) Pitman, Sir Isaac & Sons Premier Supply Stores Quartz Crystal Co., Ltd. (Q.C.C.) Radio Construction Service Read, N. E. 307, 31 Short-Wave Radio 31 Stratton & Co., Ltd. (Eddystone) Television and Short-Wave World Back Cove					***	vi
GW3GL						111
High Vacuum Valve Co					Van	308
"His Master's Voice"	High Vacuum Valve Co.		***	Fre	ont C	over
Oliver Bell Control, Ltd. (Varley) 30	" His Master's Voice"		***	***	494	279
Pitman, Sir Isaac & Sons 29 Premier Supply Stores				***	***	308
Radio Construction Service				444		296
Radio Construction Service 30 Read, N. E 307, 31 Short-Wave Radio 31 Stratton & Co, Ltd. (Eddystone) v Television and Short-Wave World Back Cove	Premier Supply Stores	***	444	166		295
Radio Construction Service </td <td>Quartz Crystal Co., Ltd</td> <td>d. (Q</td> <td>.C.C.)</td> <td>100</td> <td>296</td> <td></td>	Quartz Crystal Co., Ltd	d. (Q	.C.C.)	100	296	
Short-Wave Radio				14941		308
Stratton & Co., Ltd. (Eddystone) v Television and Short-Wave World Back Cove	Read, N. E		***	266	307	
Television and Short-Wave World Back Cove	Short-Wave Radio	***	***	444	869	316
Television and Short Trans Trans	Stratton & Co , Ltd. (E	ddyst	one)			
Webbis Bedie	Television and Short-W	ave '	World	В	ack C	
TYEDD 5 RAUIO	Webb's Radio			2885	117	267
Westinghouse Brake & Signal Co., Ltd	Westinghouse Brake &	Sign	al Co.,	Ltd.	***	vi
						iv
				022	***	296

QRA Section

By H. A. M. WHYTE (G6WY).

When sending in new, or changes of QRA, members are requested to print their names and addresses in block letters, as frequently signatures and names of streets are illegible. This necessitates reprinting the corrected address in the next issue of the BULLETIN.

New QRA's

E.15.].—Dermot Tableny, "Rockview," Albert Road, Sligo. GM2AP.—F. Adams, Wickradio (House), Wick, Calthness, Scotland. GM2AP.-F.

Scotland.
G2DT.-F. L. NUSS, 8, Blinco Grove, Cambridge.
G2KL.-F. N. Evass, "The Wood Wardens," 462, Maidstone Road, Wigmore, Rainham, Kent.
G2LT.-E. WALKER, 2, Harbord Road, Sheffield, 8, Yorks.
G2UU.-S. Whitte, 43, Kenilworth Avenue, Derby.
G2US.-C. C. MORTIMER, 340A, London Road, North Cheam,

G2US.—C. C. MORTININ, 340A, London Road, North Cheam, Surrey.
G2VZ.—H. W. Dally, 161, Limpsheld Road, Sanderstead, Surrey.
G3FA.—H. BIBKINSHAW, Dore, Sheffield, Yorks.
G3FB [ex-VE5H]).—A. LEONARD-CUSDEN, "Hollyburn," Eynsham Close, Eynsham Avenue, Bitterne, Southampton, Hants.
G3FW.—G. W. Risley, Newtown, Uppingham, Rutland.
G3IK.—C. Davies, 24, Richville Road, Shirley, Southampton.

Hants GSLC -H. CHAMBERLAIN, 66, Baker Street, Burton on Trent,

Gal.W.—J. R. Mears, 30, Elm Road, Grays, Essex.
Gal.W.—J. R. Mears, 30, Lyons Street, Sheffield.
Ganl.—F. Jackson, The Cottage, Crookhill Hall, Conisborough,
near Doneaster, Yorks.
GM3NK.—A. Chaplin, 75, Knightschiffe Avenue, Glasgow, W.3,

Scotland.
G3NT.—R. OLIVER, Hilton Grange, Northallerton, Yorks.
G3OC.—R. J. HUNTING, St. Luke's Rectory, Cheetham, Manchester.
G3OC.—R. WILSON, "D3" Flight, "D" Squadron, No. 2 Wing,
E. & W. School, R.A.F., Cranwell, Lines.
G3OU.—I. H. PARKIN, 29, Gregg House, Cresent, Sheffield, 5.
G3PA.—W. J. PAGE, 172, Venner Road, Sydenham, Londou, S.E.26.
G3PG.—D. W. FLAVELL, Brampton Road, West Melton, near
Rotherham, Yorks.
G3PZ.—RAY WAITE, 61, Broadway, Northampton.
G3OC.—C. H. Edlin, "Gambetta," 10, Pembury Road, Wollaton,
Notts.

AOUS.
G3QY.★F. S. GELL, 113, Red Hill Road, Arnold, near Nottingham.
G3RH.—R. T. Hewson, 52, Openshaw Road, Abbey Wood,
London, S.E.2.

GM3SA.—T. GRERSON, Altyre Forres, Morayshire, Scotland, G3SL.—E. Leslie Wright, Mill End House, Thaxted, Essex. G3SN.—R. P. Ellis, No. 1, Station View, Fern Hill, North Fawton,

Devon. G3SP.--I. Machent, 17, Lincoln Avenue, Levenshulme, Man-

chester.

GSSU.—R. N. Newhan, "Trofts," Byworth, Petworth, Sussex.

GSTC.—R. C. Cooper, 62, Ringstead Crescent, Crosspool, Sheffield, 10.

GM3TD.—A. Anderson, 45, Shawburn Road, Selkirk, Scotland.
G3TF.—T. GATIS, 38, Wrottesley Road, Tettenhall, Staffs.
G3TJ.—H. A. TAPSPIELD, 7, Orchard Avenue, Finchley, Loudon,
N.3.

G3TK.—R. E. Wood, 25, Kenwood Avenue, Leigh, Lancs. G3TM.—E. Malinos, 269, Liverpool Road, Warrington, Lancs. G3TO.—A. R. Donald, 77, Ashgrove Avenue, West Hartlepool, Co. Durham.

G3TO.—P. ANDERSON, "West View," Caledonian Road, West Hartlepool, Co. Durham. G3TS.—A. G. L. Schoffeld, "Highfield," Inverness Road,

Hartlepool, Co. Durnam.
G3TS.—A. G. L. Schoffeld, "Highfield," Inverness Road,
Laindon, Essex.
G3TT.—W. G. Lee, 17, Stirling Road, Hayes, Middlesex.
G3TV.—H. S. W. Trim, "Lyncroft," 26, Park Avenue, Caterhamon-the-Hill, Surrey.
G3TX.—John Eddy, 55, Greenbank Avenue, Lipson, Plymouth,
Devon.

31M.—J. T. Maxton, 24, Fraser Road, Greenford, Middlesex.

G3UH.—L. T. MANTON, 24, Fraser Road, Greenford, Middlesex, G3UK.—C. V. WHITTAKER, 12, Terry Street, Dudley, Worcs, GM3UM.—G. P. Millan, 8, Hermitage Gardens, Edinburgh, G3UP.—ALBERT LESSE, 12, Sherwood Road, Lightwood, Stoke-

on-Trent, Staffs. G3UQ.—G60, A. Tissirrs, 70, Wormholt Road, Shepherds Road, London, W.12.

G3UT.-L. J. LEYDER, 40, Lower Olland Street, Bungay, Suffolk. GM3UU.-A. S. McNicot, "Airlle," West Park Road, Cupar, Fife, Scotland.

G3VD, B. A. PETTT, "The Laurels," Worrin Road, Shenfield,

Essex.
G5HZ. N. I. Bowen, Rusbyford Manor, near Darlington, Yorks.
G5LB.-L. G. BLENDELL, 113, Tower View, Shirley, Croydon, Surrey

G5QG. M. HOLLINSHEAD, 1026, Pershore Road, Selly Oak, Birmingham, 29.

G5RC R. C. CRISP, 10, Elm Grove, Whitby, Wirral, Ches. G5SG N. A. Enwards, Radiopole House, Stanton Road, Shirley,

G5SG. N. A. EDWARDS, Radiopole House, Stanton Road, Shirley, Southampton.
G5UD. C. D. S. UNDERWOOD, 17, Roseberry Avenue, Gaywood, King's Lvin, Norfolk.
G5XD. Dr. B. C. Christian, 8, Woodkind Hey, Bebington, Ches. G5XY. J. Davis, "St. Magnus," Eastern Road, Havant, Hants. G6BP.—H. G. G. Chandler, "Headley House," Weybourne Road, Farnham, Surrèy.
G6HL (ex.ST2D, SU6HL).—F/Sgt. J. E. Hill, R.A.F. Detachment, Black Lion Fields, Gillingham, Kent.
G6HY.—R. Healey, 94, Ingram Road, Bulwell, Nottingham, G6OS.—J. W. Ghill, 95, Parkfield Drive, Hull, Yorks.
G6WH.—W. Ghillandenston, 96, Bold Street, Blackburn, Lancs.
G6WR.—W. H. Rohertson, 25, Thwaiteville, Arrowthwaite, Whitehaven, Cumberland.
G6VG.—A. B. STARRS-FIELD, 51, Brierdene Crescent, Whitley

Whitehaven, Cumberland,
G6YG.—A. B. Starks-Firld, 51, Brietlene Crescent, Whitley
Bay, Northumberland,
G6ZY.—S. S. C. Isaacs, 5, Stanway Gardens, Acton, London, W.3.
G8DC.—H. M. Tre, 104, Rectory Road, Burnley, Lancs.
G8DD.—R. Tunkey, 37, Meadow Road, Beeston, Notts.
G8LG.—L. H. Gray, "Four Winds," Devenish Road, Sunningdale,

G8PM.

Derby.

GSTJ - A. Garnock-Jones, 32, Hogarth Road, London, S.W.5.

2AFO - N. A. Owen, 12, Brading Road, Brighton, 7, Sussex.

2AIJ. - I. Oswald Dykes, 15, Incheape Road, Broadgreen,

2AU,—I. Obward Cristian College Colleg

2BDR. J. R. Burtos, Swan Street, Seagrave, near toward borough, Leics.
2BMK. Ww. H. Thompson, Flat 1, Fire Station, Paradise Street, West Bronwich, Staffs.
2BQS. A. Stacev, "Moreott," Gosforth Lane, Dronfield, 2BRO. – I. A. Douds, 80, Die Royd Crescent, Sheffield, 2CMN. N. Wityvir, 245, Geneva Road, Darlington, Co. Durham, 2COA. – C. Whight, 7, Brocklebank Road, Manchester, 14, 2CWB. – F. Jones, The Cottage, Crookhill Hall, Conisborough, near Dougsster.

Donicaster, Joses, "Lyndhurst," Warren Lane, Chapeltown, near Sheffield. 2CZC.—J. Warr, 130, Catmell Road, Sheffield, 8, 2DGZ.—K. Moony, 96, Churchdale Road, Frecheville, near Sheffield.

2DHL -- NEVILLE COLEMAN, 213, Bedford Hill, Streatham, Lon-

don, S.W.16. 2DIQ.—A. R. J. Youse, Chilton Polden Vicarage, Bridgwater,

2DNV.-G. Jones, 46, Hobart Street, Sheffield. 2DOW.-A. E. Cornisu, Crowbear Cottages, near Torrington,

N. Devon.
2DPH.—H. R. BRUNDRET, Bennington, Dean Row, Wilmslow,

Ches.
2DPI.—Sheffeld S.W. Club, Club Rooms, Ebenezer Street, Shalesmoor, Sheffield, 3.
2DSF.—N. Booth, 98, Didsbury Road, Heaton Norris, Stockport,

Ches.

2FDN. G. LIDSTONE, 18, Chalton Drive, London, N.2.

2FFN.—S. C. FISHER, Thame View, Hillside Road, Billericay,

ESSEX.

2FHV.—F. E. Rose, 14, Parkway, Raynes Park, London, S.W.20.

2FHZ.—Mrs Marjorie K. Creasy, 73, Fore Street, Salcombe,
S. Devon,

2FIM.—J. B. Roscoe, 59, Croham Road, South Croydon, Surrey,

2FKM.—D. P. L. May, 223, Thornton Road, Thornton Heath, Surrey.

Surrey.

2FKV.—A. A. Peders, 5, Broom Crescent, Ochiltree, Ayrshire, Scotland.

2FLK.—T. L. Dekvin, The Greyhound Hotel, High Road, Chadwell Heath, Essex.

2FMC.—S. W. Punnerr, 65, City Road, Norwich, Norfolk.

2FMN.—F. P. Bramisy, Oakleigh, Moira, near Burton-on-Trent, Count.

Statis.

2FNM.—G. G. EASTWICK-FIELD, Prior's Hatch, Godalming, Surrey, 2FNU.—J. A. EASTERBROOK, Marfield, Cadewell Lane, Shiphay,

2PNC — J. A. EASTERMANN, The Elms, Owston, Oakham, Rutland, Camelled.—G3DN, 2AAO, 2AFQ, 2ALH, 2ATI, 2AXG, 2AXV, 2BNB, 2BVB, 2BXZ, 2CBB, 2CBB, 2CCB, 2CGD, 2CRJ, 2CRJ, 2CRN, 2CSF, 2CXC, 2CXD, 2CYJ, 2DBH, 2DGQ, 2DGV, 2DGW, 2DHA, 2DHA, 2DIL, 2DKL, 2DNX, 2DNY.

AUTOMATIC BREAK-IN SYSTEM - (Cont. from p. 273).

5 milliamperes, a cheap H.T. battery will operate it for months. Alternatively another relay similar to No. I can be used if desired. There is no reason why the same battery should not supply the energising voltage for both relays if they are of the same

Adjustment

The adjustment of the system is almost selfexplanatory. No. 1 relay must be adjusted so that the contacts for the receiver are closed when the relay is not energised. Apart from this, no further adjustment should be necessary, except for the receiver filter condenser value.

When the receiver, transmitter and monitor are switched on and adjusted, the receiver should go dead, providing all connections have been made correctly, when the key is pressed. A C.W. signal should then be heard in the 'phones with no appreciable clocks at all.

When high-power transmitters are in use it may be necessary, for the further protection of the receiver, to instal a relay in the aerial lead near to the aerial terminal of the receiver, so that the aerial is also disconnected when the key is depressed. For powers up to 50 watts this is not considered necessary.

A few hours' operation with this system will prove without doubt that it is very satisfactory. For not only does it remove the need for switching while the station is in operation, but it also allows the operator to do other things as well. In the first place he can transmit a "Test" call signing "BK" frequently and tune over the band without experiencing bad clicks or thumps anywhere. Secondly, it is possible to reply to a "Test" or "CQ" call, and to continue to do so until the station answers, or is heard to answer some other station, when transmissions can at once stop, thus saving much time. In the third place, it makes possible a contact which can be continued at will, and which can be broken into at any monent if a word is missed owing to jamming. Finally, it can be used on any frequency for which the station is licensed without any alteration whatever.

A "HAM" HOLIDAY IN HOLLAND-(Cont. from p. 301).

that proved to be most interesting, and one which should not be missed by anyone having the oppor-

On other occasions time was spent with PA0PB, PA0JM, PA0XF, and with the Haarlem section of the N.V.I.R. 56 Mc. activity in Haarlem is considerable, and very good work on this frequency has been done in this and many other parts of the country.

At last the time came to say good-bye to the Dutch friends who had done so much to ensure the success and enjoyment of the holiday, and it was with the greatest regret that leave-takings were made. After leaving Mr. and Mrs. PA0JA at Rotterdam, G6HF and his wife sailed for Hull with the firm determination to be back again in PA as soon as opportunity offered.

VALVES T20, TZ20, 17/6. T40, TZ40. 24/-. 866, 10/-. 866, jnr., 7/6. RCA 955 acorn, 25/6.

IMPEX First grade American. 5Z3, 53, 59, 79, 89, 46, 83, 5/6. 616, 6V6, 25L6, 6A6, 6K7, 6N7, 6C5, 6/6. 80, 4/6. 50, 10, 8/6.

S.W.R. STANDARD 19-in. RACKS AND PANELS.

Racks are of heavy gauge 13-in, section angle iron. Chassis are 17 ins. x 10 ins. x 2 ins. All are finished hard stove enamel. Panels are heavy-gauge steel, crackle finished. A complete Rack to take three [0]-in. panels and one 3]-in. meter panel, with three chassis, all brackets, bolts, etc. £2 14s. 0d. Carriage Extra.

All parts can be supplied separately.

35-in. Racks £1 2 6 7-in. Panels 101-in. Panels 46 31-in, Panels 1 6

Chassis and Brackets, 5/6

Authorised Stockists of HALLICRAFTER RECEIVERS

Super Sky-Rider, £32; Challenger SX18, £25; Sky Champion, £15 15s.

H.P. Terms available.

All EDDYSTONE COMPONENTS in stock. Send for lists.

SHORT WAVE RADIO. LTD. 97 PARK LANE, LEEDS I. Tel. 24689.

AERIAL WIRE!!!

Have you tried the G6US DX Aerial Wire ! Dozens of testimonials

Cut lengths or any special length to order.

14 gauge enamelled. Semi-hard drawn. 34 ft., 1/9 : 68 ft., 3/- : 134 ft., 6/-,

12 gauge. 34 ft., 2/3; 68 ft., 4/-; 134 ft., 8/-.

PYREX INSULATORS

Genuine Pyrex glass. 31 ins. long. 450 lbs. breaking strain. Price 9d. each. Post 2d.

Pyrex Lead-in Bowls. Small pattern. 1/3 each.

N. E. READ, 66US, 24 Church St., Oswestry.

-UNIVERSAL-MODULATION TRANSFORMERS

PRESSED STEEL CASES

50 WATTS, Ratios .92, 1.04, 1.18, 1.30, 1.47 100 WATTS, 6 ratios to requirements -

TAYLOR TUBES

T40, TZ40, T20, 866, and 865 JR. JOHNSON Transmitting Valve-holder: 4-pin or Octal, 1/4; 6-pin, 1/-STAND-OFF INSULATORS, 1 in., 3d.; 3 in., Unbreakable Base, 1/-THROUGH PANEL INSULATORS: 1 in., 6d.; 1‡ in., 8d.; 1‡ in., 10d.

Central Radio & Television Ltd. 70, OTLEY DRIVE, ILFORD, ESSEX Trade and Overseas Supplied

EXCHANGE AND MART.

RATES.

Members' private advertisements 1d. per word, minimum 1s. 6d, maximum 10/-. Trade advertisements 2d. per word, minimum 3s. First line, if desired, will be printed in capitals. One inch Semi-Display, 10s. per insertion. Terms: Cash with Order. All copy and payments to be sent direct to Advertising Manager, Parrs, 121, Kingsway, London, W.C.2, not later than the 30th of the month for the following month's issue.

A SSISTANT required, Development Department. Send details experience, salary required, etc.—INVICTA RADIO, LTD., Parkhurst Road, N.7.

BARGAINS from G8AR, Sunderland. Tobe, as new, £7 10s. Also 10 to 100-watt Modulator with VM3 output, complete with 500/500-300 mill pack, 9 gns. This job has just been completed; components cost £13 11s. 6d.—G8AR, 10, Angrove Gardens, Sunderland.

CLEARANCE OF SURPLUS GEAR, mostly TX components. Several Tungsram valves in original cartons, also various American valves. Mains and Audio Transformers, Condensers, etc., to clear, cheap. State wants. I require 7 Mc. Crystal; state price.—Box 55, "Parrs," 121, King way, London, W.C.2.

DB20 PRESELECTOR. 12 months use, as new, £10 cash.—Ref. L/G, New House, Hatton Garden, E.C.1.

POR SALE. — Eddystone Kilodyne Four. Battery model in Cabinet, with coils 10-160 meters, £4. Evershed 1000 v. 30 m/a Generator, with 230 v. D.C. Driving Motor, direct-coupled or separate. Offers. Various other gear for disposal. Particulars, stamp.—G2NV, Stourton, Stourbridge.

G 5CP disposing of the following gear:—2000-0-2000, 250 M/A 4V. SA, 12V, 6A, input 230/50, 50 Cycles, 30s.; L.F. Choke for above, weight 15 lbs., 10s.; 4 Mfd. 2,000 Volt wkg., 10s. All carriage forward.—33, Manley Road, Sale, Cheshire.

GDS.—Known the world over for quality.

QSL Cards and Log Books. Send for samples.—QRA, 14, Lambley Avenue, Mapperley, Nottingham.

75KT.—ATTRACTIVE NEW DESIGNS QSL's.
Finest quality, lowest prices, samples will convince.—State G, AA, BRS, SWL.—33, Howard Road, Westbury Park, Bristol, 6.

HALLICRAFTER, Sky Chief, March, 1938. Extras fitted include electrical bandspread. Provision for using extension speakers. Hardly used, absolutely as new, real bargain £8 5s.— G3NQ, 7, Deben Avenue, Martlesham, Suffolk.

"Ham-AID" QSL's are best for design and colour. Samples from G6XT.—TILLOTSON BROS., Commercial Street, Morley, Yorks.

MPROVE the efficiency of your Transmitter by fitting the coils used by the leading British "Hams." Air spaced and rigid. Diameters 2" to 4", 12 or 14 SWG. 2d. per turn. Write GM3OM, "Gowanhill," Drip Road, Stirling, Scotland.

MOVING COIL MILLIAMMETERS, 15/- each, worth 22/6. Instrument wire half ordinary prices. 25 watt Transformers 10/20/40v. output 7/6, leaflet free. Complete Electrical Catalogue 4d.—WILKINSON'S 204, Lower Addiscombe Road, Croydon.

OLD-TIMERS.—Have a special QSL. First Grade QSL's, new designs. State G.AA, BRS, SWL.—Samples from G6MN.

OSL's.—250, 4s. 6d. 1,000, 9s. Post free Samples gratis. State whether BRS, AA.— G. Atkinson Bros., Printers, Elland.

RME 69 with noise silencer and DB20 preselector, perfect condition, cost £54, sell £38. Taylor Tubes, complete with filament transfs. 756, 25s., T55 40s. Xtal Mikes, Astatic T3, £3. DIO4, £2. H.T. transf. 1100-0-1100, 250 mas. £1. Chokes, 250 mas. 12-25H, 12s. 6d., 30H 12s. 6d. 70 watt speech amp. and modulator, 57. 57. 2-2A3. 4-46. Thordarson transfs, modulation transf. T6699, Ferranti 0-500 MC. meter, with complete power supply, cost over £16, sell £7.—GM2UU, 29, George Street, Stranraer.

SINGLE SIGNAL SUPER-HETERODYNE 2
Volt Battery Model, comprising pre-selector, 1st Det., E.C. Oscillator, Regenerative I.F., 2nd Det., B.F.O., and Pentode output (switched). Circuit and Chassis as shown in A.R.R.L. Handbook, page 134. Aluminium Panel and Screening Boxes by Paroussi, Hammarlund I.F.'s, and Oak Cabinet to fit. Coils for 1.7, 3.5, 7 and 14 Mc. Also B.T.H. Transverse Current Microphone with stand and transformer. Must be sold. What offers?—GM5IM, 361, Brook Street, Broughty Ferry, Dundee, Argus.

"T & R. BULLETINS" for sale. Volumes 1 to 9, complete and in good condition. 40/- or near offer.—Box 79, R.S.G.B., 53, Victoria Street, London, S.W.1

VARIMATCH 1 TRANSFORMER, 20s. AF5C, 10s. Genuine sealed R.C.A. lubes, type 43, 4s. 6d. 53 5s. 6d. Many others, all unused.—G6QJ, 49, Clifton Road, Liverpool, 6.

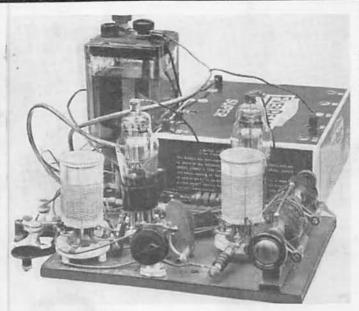
WHAT OFFERS? New perfect commercial-made 230 v. A.C. 350 v. D.C. at 100 M/a, 550 v. peak smoothed, metal Rectifiers 6 v-7. 5 v., 2.5 v., 2 amps. C.T. metal case.—7, Beddington Road, Seven Kings, Essex.

\$25 OR EXCHANGE LIGHT CAR.—50 watt 230v. 50 cycle Transmitter. Professionally built to "ham" requirements. Cost \$75. Standard P.O. Rack and Panel C.W.—'phone—entirely band switched 20m. to 40m. in 5 seconds, M.C. meters in every circuit. Crystal Selector switch. Speech amplifier plug and jack input for crystal or carbon mike and gram. Three power packs. Remote control for send-receive.—GRIFFITHS, 296, Thorold Road, Ilford.

Patents and Trade Marks.

CEE & CO. (Established 1905). Patents and Trade I Marks throughout the world.—H. T. P. Ger, Mem. R.S.G.B., A.M.I.R.E., etc., 51-52, Chancery Lane, London, W.C.2. (Two doors from Government Patent Office). 'Phone: Holborn 4547 (2 lines). Handbook free.

A simple transmitter which provides an output of approx-mately 1.5 watts.



Conventional components are used with standard H.T. battery and a c c umulator.

A PT7 Battery-operated Transmitter

FULL DETAILS IN THE NOV. ISSUE OF

"TELEVISION AND SHORT-WAVE WORLD"

OTHER FEATURES IN THIS ISSUE INCLUDE:

The Television Picture and Interference

Simple Television Transmission with a Disc

New Miniature Cathode-ray Tubes Mechanical-optical Film Transmitter

A 2-channel Pre-amplifier
Improving Performance of Communication Receivers
Modern Transmitter Construction
R.A.F. C.W.R. Transmitter

PUBLISHED BY

NOW ON SALE

PRICE From and

From all Newsagents and Bookstalls Bernard Jones Publications Ltd.

Chansitor House,
37/38 Chancery Lane, London, W.C.2