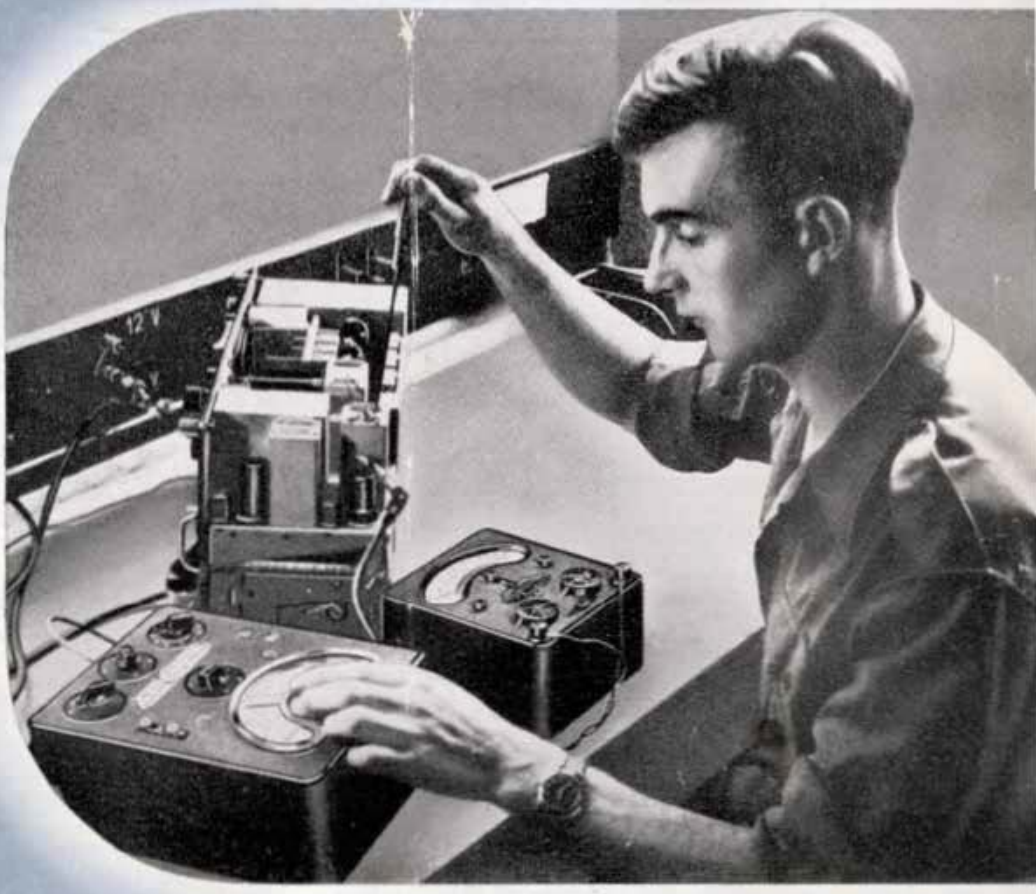
R·S·G·B AMATEUR RADIO

BULLETIN



JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

VOLUME 24 · No. 6 PRICE 1/6

DECEMBER, 1948

The Incorporated Radio Society of Great Britain

COUNCIL 1948

President	V. M. Desmond
Acting Vice-President	W. A. Scarr, M.A.
Immediate Past President	S. K. Lewer, B.Sc.
Honorary Secretary	K. Morton Evans, O.B.E.
Honorary Treasurer	A. J. H. Watson, F.S.A.A.
Honorary Editor	A. O. Milne

I. D. Auchterlonie	C. H. L. Edwards, A.M.I.E.E.
F. Charman, B.E.M.	R. H. Hammans
D. N. Corfield, D.L.C.(Hons.), A.M.I.E.E.	J. W. Mathews

Auditors

Edward Moore & Sons

Solicitors

Rule & Cooke Stanley Johnson & Allen

Bankers

Barclays Bank Ltd.

REPORT OF THE HONORARY TREASURER

THE annexed copies of the Society's Audited Accounts for the year ended September 30th, 1948, dispel to some extent at least the somewhat gloomy forebodings contained in my Report for the preceding year.

I hope the following comments will assist members when they read through the accounts.

INCOME.

Subscriptions.

It will be seen that the revenue has remained "buoyant," so buoyant in fact that the credit for Subscriptions shows an increase of almost £1,000. It is really this factor which has saved the situation. We budgeted for a decrease of about £1,000 (*i.e.* about a 10 per cent. decrease in membership) but the expected decline in membership did not begin until April, 1948, since when, each month, with the exception of August, has shown a fall when compared with the same month of the preceding year.

From Sales of Publications Etc.

Due to delays in printing, the various technical booklets were not available for sale as quickly as was hoped; hence the fall in revenue therefrom.

In spite of considerable increases in the prices of the various popular American productions the demand has fallen only slightly and the Society's share of the profit is only £5 less than it was in 1946/47.

EXPENDITURE.

The following table shows how the net increase of £432 in expenditure is arrived at :—

	Increases	Decreases
	£	£
Rent, Rates, Light, Heat, Water and Cleaning	21	
Salaries, Staff Pensions and National Insurance	398	
Telephone Charges		2
Printing and Stationery	11	
Postages	79	
Travelling, Entertainment and Meetings		128
Representatives' Expenses		20
London Meetings	22	
QSL Bureau Expenses	108	
R.S.G.B. Bulletin	286	
Service Valve Equivalents Booklet		371
Amateur Radio Exhibition, 1947	72	
Membership Certificates & Badges		25
Awards and Trophies	107	
Repairs and Replacements		147
Sundry Expenses	53	
Legal Expenses		21
Audit and Accountancy		1
Depreciation—		
Furniture and Fixtures		99
Headquarters' Station	89	
	£1,246	£814
Less Decreases	814	
Net Increase in Expenditure	£432	

The following comments may help members to understand how the above variations in expenditure arose.

(*continued on page* 4)

Incorporated Radio Society of Great Britain, New Ru

(COMPANY LIMITE

ACCOUNT OF THE SOCIETY'S INCOME AND EXPENDITURE
for the Year ended 30th SEPTEMBER 1948

1946–47 £	£	£		£	£	£
			INCOME			
	10,140		Subscriptions		11,136	
			From Sales—			
805			Technical Publications	638		
539			American Publications and Sundry	534		
—	1,344			—	1,172	
			Interest—			
345			From Trustee Securities (Gross amount before deduction of Income Tax)	342		
12			On Bank Deposit Account	19		
6			*On Tax Reserve Certificates*	–		
—	363			—	361	
	–		Premium received on Conversion of £1,000 3% Defence Bonds into £1,000 2½% Defence Bonds		10	
		11,847	Total Income			12,679
			DEDUCT EXPENDITURE			
	506		Rent, Rates, Light, Heat, Water and Cleaning		528	
	1,957		Salaries, Staff Pension Premiums and National Insurance		2,356	
	42		Telephone Charges		40	
	708		Printing and Stationery		719	
	322		Postages		401	
	616		Travelling, Entertaining and Meetings		488	
	138		Representatives' Expenses		118	
	127		London Meetings		149	
	318		QSL Bureau Expenses		425	
			R.S.G.B. Bulletin and Technical Booklets distributed free to members—			
6,370			R.S.G.B. Bulletin	6,831		
463			*Service Valve Equivalents*	–		
6,833				6,831		
1,108			Less Advertising Revenue	1,191		
—	5,725			—	5,640	
			Amateur Radio Exhibition, 1947—			
			Exhibition Expenses	875		
			Less Revenue	803		
					72	
	98		Membership Certificates and Badges		73	
	–		Awards and Trophies		107	
	210		Repairs and Replacements		62	
	26		Legal Expenses		5	
	111		Accountancy and Audit Fees		110	
	82		Sundry Expenses		135	
	10,986				11,428	
			Amounts written off Equipment for the year—			
117			Furniture and Fixtures	18		
80			Headquarters' Station	169		
—	197			—	187	
			Income Tax—			
			Deducted from Interest received	128		
			Chargeable on Trading Profits for the year ended September 30th, 1948, and assessable 1949–50	55		
				183		
			Balance of Income Tax to September 30th, 1947	46		
	128			—	229	
		11,311	Total Expenditure			11,844
		£536	**SURPLUS OF INCOME OVER EXPENDITURE FOR THE YEAR RETAINED IN THE SOCIETY AND ADDED TO THE ACCUMULATED FUND**			£835

skin House, Little Russell Street, London, W.C.1.

BY GUARANTEE)

BALANCE SHEET as at 30th SEPTEMBER 1948

1946–47						
£	£		£	£	£	£
4,845		**CURRENT ASSETS.**				
		Cash in Hand and at Bank			5,112	
		Debts due to the Society—				
420		For Sale of Publications	504			
196		„ Advertising	241			
238		„ Excess Profits Tax Refund	214			
854				959		
77		**Expenses Prepaid**		46		
		Stock of Publications, etc.				
616		(as certified by the General Secretary)		1,896		
75		**Tax Reserve Certificate**		75		
	6,467	Total Current Assets				8,088
		FIXED ASSETS.				
		Investments in Trustee Securities (at Cost)—				
11,274		Quoted (Middle Market price £10,985)	11,274			
2,000		Unquoted (Defence Bonds)	2,000			
13,274				13,274		
		Furniture and Fixtures—				
		Net Book Value at October 1st, 1947	1			
		Expenditure during year	18			
			19			
		Less Amount written off	18			
1				1		
		Headquarters' Station—				
		Cost to September 30th, 1947	80			
		Expenditure during year	170			
			250			
		Less amounts written off— £				
		Year to 30/9/47 80				
		Year to 30/9/48 169				
			249			
				1		
	13,275	Total Fixed Assets				13,276
	19,742	Total Assets				21,364
		DEDUCT.				
		Current Liabilities—				
		Sundry Creditors—				
205		American Publications	752			
730		Printing Bulletin	1,110			
248		Expenses	456			
382		Income Tax 1948/49	62			
1,565				2,380		
6,012		**Subscriptions paid in advance**		5,936		
	7,577					8,316
	£12,165	**Surplus of Assets over Liabilities representing Revenue Reserves (below)**				£13,048
	11,000	**General Development Reserve Fund**				11,000
		Accumulated Fund—				
2,034		Balance at October 1st, 1947		1,158		
536		Add Surplus Income for the year ended 30/9/48 per account annexed		835		
2,570						
1,412		*Less Cost of Representation at Atlantic City Conference* ...				
	1,158					1,993
	7	**Reserve for Income Tax 1949/50**				55
	£12,165					£13,048

V. M. DESMOND, *President.* A. J. H. WATSON, *Hon. Treasurer.*

W. A. SCARR, *Vice-President.* JOHN CLARRICOATS, *General Secretary.*

REPORT OF THE AUDITORS TO THE MEMBERS OF THE INCORPORATED RADIO SOCIETY OF GREAT BRITAIN

We have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purposes of our audit. In our opinion proper Books of Account have been kept by the Society so far as appears from our examination of those Books. We have examined the above Balance Sheet and annexed Income and Expenditure Account, which are in agreement with the Books of Account. In our opinion and to the best of our information and according to the explanations given us, the said Accounts give the information required by the Companies Act, 1948, in the manner so required, and the Balance Sheet gives a true and fair view of the state of the Society's affairs as at 30th September, 1948, and the Income and Expenditure Account gives a true and fair view of the Excess of Income over Expenditure for the year ended on that date.

Thames House,
Queen Street Place, London, E.C.4.
7th December, 1948.

EDWARD MOORE AND SONS,
Chartered Accountants.

REPORT OF HON. TREASURER—*continued.*

Salaries.

An Assistant to the General Secretary has been engaged and in addition there are the normal annual increments to existing staff.

QSL Bureau.

An ever-increasing number of cards are being handled. Steps have been taken to economise as far as possible.

Bulletin.

The increase of £286 represents about one-third of a penny per copy.

Amateur Radio Exhibition and Awards and Trophies

Both these items arise for the first time.

Headquarters' Station.

The charge in these accounts represents the final effort to get GB1RS on the air.

Travelling and Entertainment.

Fewer meetings were held and in particular there was no Regional Representatives' conference.

" Service Valve Equivalents " Booklet.

This excellent and popular production—of which some 14,000 copies were supplied free to members last year—can now only be obtained on payment.

GENERAL.

The result for the year is a net profit which, although at first sight appears to be very good, leaves little margin for contingencies. For example, an increase of 1d. per copy in the cost of the R.S.G.B. BULLETIN would add a further £750 to the Society's expenditure—a Regional Representatives' Conference would add about £200—Regional notes another £1,200—a Technical Manager about another £600. Sufficient examples have been given, it is hoped, to show that our margin is far too small and that the Society should have power to vary the subscription rates if the occasion demands.

The wording of the alterations of the Society's Articles of Association has been now agreed with our lawyers and the draft resolutions have been submitted to the Board of Trade for approval and in due course it is hoped to be able to submit them to a Special Meeting for the consideration of members.

Balance Sheet.

It will be seen at once that the Society's position is very strong and that the total assets amount to nearly £21,400. Against this total there are outside liabilities of almost £2,400, leaving a surplus of £19,000 of which nearly £6,000 is accounted for by prepaid subscriptions.

The Pilot Officer Norman Keith Adams Prize Trust Fund

No prize was awarded during the year and the income of £4 10s. 0d. has been carried forward to next year.

Form of Accounts.

The coming into force on July 1st, 1948, of the Companies Act, 1948, has not necessitated any alterations worthy of comment. It has been decided, however, to present the accounts in an unconventional form as an experiment, as it is thought that this form may be easier for members to follow. The accounts as presented, of course, still give all the information that is required by the Companies Act, 1948.

Financial Year.

In order to be able to hold the Annual General Meeting in December in each year in compliance with the Articles, it is proposed to change the accounting date from September 30th to June 30th and the next accounts will be for nine months to June 30th, 1949.

A. J. H. WATSON,
Hon. Treasurer.

THE PILOT OFFICER NORMAN KEITH ADAMS PRIZE TRUST FUND
BALANCE SHEET—30th SEPTEMBER, 1948

	£ s. d.		£ s. d.
Trust Fund	150 0 0	**Investment £150 3% Defence Bonds**	150 0 0
Undistributed Income for year to date ...	4 10 0	**Cash at Bank**	4 10 0
	£154 10 0		£154 10 0

V. M. DESMOND, *President.*
W. A. SCARR, *Vice-President.*
A. J. H. WATSON, *Hon. Treasurer.*
JOHN CLARRICOATS, *General Secretary.*

REPORT OF THE AUDITORS

We have audited the Balance Sheet as set forth above and have obtained all the information and explanations we have required. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of affairs of the Prize Trust Fund as at 30th September, 1948, according to the best of the information and explanations given to us.

Thames House,
Queen Street Place, London, E.C.4.
7th December, 1948.

EDWARD MOORE AND SONS,
Chartered Accountants.

INCOME AND EXPENDITURE ACCOUNT for the Year ended 30th SEPTEMBER, 1948

	£ s. d.		£ s. d.
To Undistributed Income for year, carried forward ...	4 10 0	By Interest on Investment	4 10 0
	£4 10 0		£4 10 0

R.S.G.B. BULLETIN

OFFICIAL JOURNAL OF THE INCORPORATED RADIO SOCIETY OF GREAT BRITAIN

Published on or about the 15th of each month. Issued free to members.

Editor:
JOHN CLARRICOATS

Editorial Office:
NEW RUSKIN HOUSE,
LITTLE RUSSELL STREET,
LONDON, W.C.1
Telephone: Holborn 7373

Advertisement Manager:
HORACE FREEMAN

Advertising Office:
PARRS ADVERTISING LTD.,
121 KINGSWAY,
LONDON, W.C.2
Telephone: Holborn 2494

Honorary Editor: ARTHUR O. MILNE

VOL. XXIV **DECEMBER, 1948** **No. 6**

The President, Council and Headquarters' Staff send Christmas and New Year Greetings to Members Everywhere.

NEW AMATEUR BANDS

JUST before this issue closed for press the Society was informed by the G.P.O. that a number of new bands would be made available to U.K. amateurs as from January 1, 1949.

All bands currently in use, will continue to be allocated. In addition the bands 144–145 Mc/s., 1,215–1,300 Mc/s., 5,650–5,850 Mc/s., 10,000–10,500 Mc/s. become available.

Frequency modulation as well as Amplitude Modulation will be permitted on all bands from 420 Mc/s. upwards and on all of these bands as well as on the 144–146 Mc/s. band an input power of 25 watts will be permitted.

Licences will be officially modified by a notice published in the *London Gazette* around the middle of December, 1948.

The band 58·5–60 Mc/s. will continue to be assigned—probably until March 31st, 1949.

Members are asked to note very carefully that the 144–145 Mc/s., 420–460 Mc/s. and 1,215–1,300 Mc/s. bands will be available on a non interfering basis. It is essential that other services using these bands shall be protected against undue interference from amateurs.

National Convention

THE Society's Regional Representatives have been requested by the Council to discuss with their County and Town Representatives a suggestion that a National Convention be held in Belle Vue, Manchester, during 1949.

The Council realises that this venue may not be fully acceptable to those resident in southern parts of England and Wales, on the other hand they believe it would be convenient for Members living in North Wales, Northern Ireland, Isle of Man and the North. Furthermore facilities exist in Manchester for the holding of such an event which, at the moment, appear to be lacking in London, at least at a comparable cost per head. As far as members living in the Midlands are concerned there would be very little financial difference between attending a Convention in London or Manchester.

Those who have not attended a recent local meeting and who wish to express a view on the suggestion are asked to communicate with their T.R. or C.R. as soon as possible, and in no case later than January 1 next.

If the Council decides to go ahead with the project a great deal of preparatory work will be needed, and the haphazard method adopted by some members in pre-war days, of turning-up unexpectedly at the Convention Dinner, would have to give way to a rigid system of reservations.

Bevan Swift Memorial Fund

THE Council has decided to perpetuate in some suitable form the name of the late Mr. H. Bevan Swift, G2TI—a tribute to whose memory appears elsewhere in this issue.

Many hundreds of Old Timers who were associated with Mr. Swift in the early days of the Society, as well as others who had the pleasure of his friendship, will no doubt wish to subscribe to this Fund. Among the suggestions already considered is one that a Bevan Swift Memorial Lecture should be delivered annually at the Institution of Electrical Engineers, London.

Donations should be forwarded to the General Secretary and the envelope marked "Bevan Swift Memorial Fund."

Remittances should be made payable to the Society but all such should be kept separate from those intended to cover Society subscriptions, etc.

In this issue

A MODERN MODULATOR WITH PRE-AMPLIFIER—PART II

By J. N. WALKER (G5JU) *

Pre-Amplifier Construction

IT will be clear from the circuit diagram Fig. 2 that many components are housed on and in the *Eddystone* chassis and cabinet. The larger items (mains transformer and smoothing choke) are above the chassis, leaving ample room for the four valve holders. The lay-out is indicated in the photograph Fig. 5. The components beneath the chassis (Fig. 6) appear to be somewhat crowded together but, in actual fact, no constructional difficulty will be experienced if the following hints are observed.

Dual section electrolytic condensers, employed to save space, are mounted alongside each other on one of the short sides of the chassis. The filter choke (CH2) is fitted on the rear long side with the output gain control to one side of it. The output transformer is just below the V.3 valveholder. Nearby, on the same side, is a group board which takes R.14, R.15 and R.16. On the under face of the chassis is another group board holding various other resistors. On the front of the chassis are the three switches and the pilot lamp. Near S.3 is a tag strip to take the small filter components. Alongside this strip are C.4 and C.6, flat against and bolted to the side of the chassis. Thus all wiring associated with the filter is kept short, minimising static pick up.

- In Part I, published last month, the author dealt with the design features of the modulator and pre-amplifier.
- Part I also gave lists of components and reproduced the circuit diagrams of both the modulator and pre-amplifier.

When all holes have been made and all major components mounted in position, the electrolytic can condensers and the output transformer should be removed. The wiring can then be carried out, leaving suitable lengths of wire for subsequent connection to the tags of the removed components. The filter condensers and Westectors are left to the last. Finally, the condensers and the transformer are replaced and connected up.

The chassis is not relied upon for earth returns and all earth points are connected together by copper leads.

The input gain control and the screened socket are fitted on to the front of the cabinet and ¾ in. clearance holes made to take the switches and pilot lamp. A flexible lead is run from the chassis to the earthy sides of the input socket and gain control. The screened lead to the top cap of V.1 is unduly long as purchased but nothing is gained by attempting to reduce it. Two 2BA screws fix the cabinet to the chassis, the latter being tapped to take them.

Modulator Construction

The accompanying photograph, Fig. 7 makes clear the lay-out and construction of the modulator unit. All components can be conveniently mounted on a standard chassis, using a 10½ in. panel. It is immaterial whether the transformers and chokes are mounted with their terminal tags above or below the chassis. Although it entails more work cutting out holes, the below chassis method is preferable, as the wiring is then much shorter and the appearance improved.

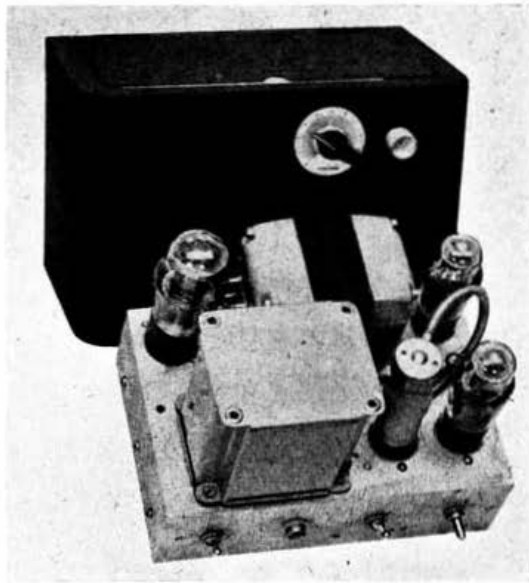


Fig. 5.
Upper view of the pre-amplifier. Rectifier valve is on the left. Switch S2, extreme right, is of the rotary type, to distinguish it from the other switches.

The lay-out shown, which should be closely adhered to, enables the valves to dissipate the heat generated, keeps the input and output circuits well apart and prevents interaction between the various iron-cored components. In the latter connection, it was found necessary to orientate the input transformer T.4. To this end leads to the transformer tags should be flexible and long enough to enable it to be turned, during testing, to the clearly defined position at which no hum is induced into it.

The paper condensers (C.21 and C.22) are fitted above the chassis, the other smoothing-cum-decoupling condensers (C.19 and C.20) being below the chassis, one on each side.

Nearly all the resistors and condensers associated with V.5, V.6 and V.9 are mounted on a 10-way group board fitted centrally beneath the chassis. The stopper resistors must, of course, be soldered close up to the valveholder tags. R.31, which runs fairly hot, is mounted well away from other components.

Resistors R.27 and R.28 are supported between the top caps of the QVO5/25 valves and miniature standoff insulators, the latter being bolted through the holes conveniently available on top of the driver transformer. Thence leads run through chassis insulators to the modulation transformer. The output is taken to two substantial lead-through insulators fitted at the rear of the chassis. Also at the rear are the fuseholder and the coaxial input socket, the latter being placed near the transformer T.4. Leads

* 333 Rednal Road, Birmingham, 31.

running through the chassis from the mains transformer are P.V.C. flex enclosed in additional P.V.C. sleeving, but rubber grommets may be used if desired.

As with the pre-amplifier—and more important in the case of steel—the chassis is not relied upon for earth returns but all earth points are interconnected with copper leads.

There is adequate but not overmuch room for the anode current meter between the mains and modulation transformers, and the panel hole should be marked out carefully.

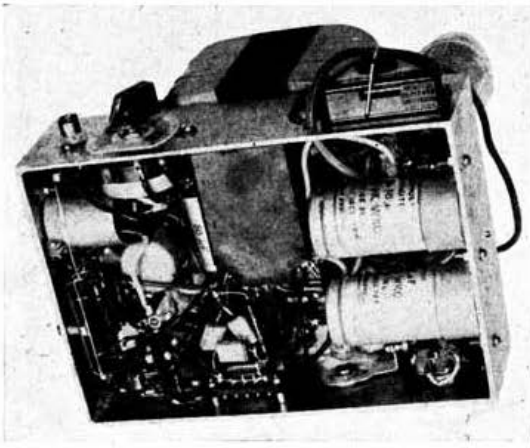


Fig. 6.
Layout of the components inside the pre-amplifier chassis.

Modulation Transformer Connections

The writer has occasionally come across a misapprehension relative to output transformers whereby it has been believed that a stated impedance is a built-in and unalterable quantity. This is, of course, not the case. The particular value of impedance connected across the primary is transformed, according to the turns ratio between the two windings, into a different value of impedance across the secondary, and the output load must equal the latter value if maximum output and efficiency with minimum distortion are to be secured. If, keeping the turns ratio constant, a variation is made on either the primary or secondary sides, an equivalent variation occurs on the other side.

With a multi-match modulation transformer, such as the *Woden* UM3 used in the present instance, one adjusts the turns ratio (not any inherent impedances) to secure a proper match between the load impedance actually called for by the valves and that presented by the transmitter.

The correct load required by the QVO5/25 output valves, in the present equipment, is approximately 6,600 ohms (less if a lower anode voltage is employed). An average amateur transmitter will have an anode voltage of 1,000 and a current of 150 mA., giving the permitted 150 watts maximum input. This represents a load value of 6,600 ohms and so a 1 to 1 turns-ratio is required. In this case, the proper connections will be :—

Modulator anodes to tags numbered 1 and 6.

H.T. to tags 3 and 4 (connected together).

P.A. anodes to tags 9 and 10 (connect 8 and 12 together).

The connections for other values of transmitter load can be ascertained from the data sheet which accompanies the transformer.

It is important to maintain a correct output load when lower transmitter inputs are used. This means that the ratio of anode volts to anode current must be constant. For instance (following the above example) for lower inputs, anode voltages and currents should be :—

750V. 112 mA. (84 watts).
500V. 75 mA. (37·5 watts).
400V. 60 mA. (24 watts, *e.g.* 60 Mc/s. band).
250V. 37 mA. (9 watts, *e.g.* 1·7 Mc/s. band).

Grid Bias Voltage

The grid voltage specified by the valve manufacturers for an applied anode voltage of 600 is 30 volts and a lower value should not be used. In practice, it has been found that a grid voltage of 32, resulting in a standing anode current of about 55 mA., has given optimum performance, probably due to an improvement in the output matching.

Testing

The matter of testing the complete modulator is a difficult one as it depends on the test equipment available. The writer carried out most of the experimental work on a prototype, using a fair amount of test gear for the job, before the amplifier illustrated was finally put together. The reader can be assured that, if the design is followed without making any drastic alterations, an equivalent and entirely satisfactory performance will be secured.

The simplest method of testing the pre-amplifier is to connect a 3 ohm speaker to the output transformer—preferably running the leads into another room to prevent howl between the microphone and speaker. The undistorted output is of the order of 120 milliwatts and reasonable but not high volume should be obtainable. Hum and noise should be conspicuous by their absence (but remembering that at full gain the microphone will pick-up some noise). It will be instructive to notice the effect of switching the filter in and out.

In the case of the modulator, the output can be roughly measured by adjusting the output transformer taps to suit a 600 ohm load and connecting up a 100 watt lamp. This is not altogether satisfactory because the lamp resistance varies with the wattage absorbed but the method will serve in an emergency.

A better method is to connect two resistors, of adequate wattage, in series and measure the volts developed across the smaller resistor, as shown in Fig. 8. A valve voltmeter is to be preferred but a

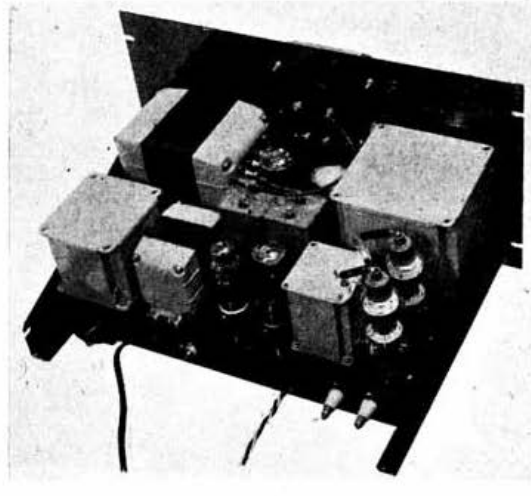


Fig. 7.
View of the modulator unit. Flex lead on right connects to the bias batteries, which, in use, lie on top of the modulation transformer.

high impedance A.C. voltmeter is also suitable. The combination used by the writer consisted of a 6,000 ohm resistor in series with one of 1,000 ohms. It

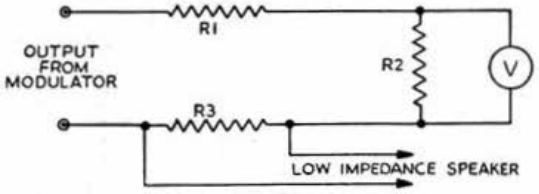


Fig. 8.
Circuit for testing the modulator. See text for values of resistors, etc.

should be remembered that the total voltage developed across both will range up to 800 or more volts. The power developed can be read off the voltmeter, using the usual $W = \frac{E^2}{R}$ formula. For example, a reading of 100 volts (with the above combination) will represent a power of 10 watts in R.1. Six times this power will be dissipated in R.2, giving a total of 70 watts.

The output can also be monitored on a speaker (remotely situated) by inserting a further resistor (R.3 in Fig. 8) of about 20 ohms, and connecting a low impedance speaker across it.

Adjustment of Gain Controls

With R.1 set about half advanced, the rear gain control (R.12) should be adjusted to give 100 per cent. modulation on normal speech. To accomplish this properly, an oscilloscope showing a trapezoidal pattern is desirable but, in its absence, the usual type of modulation meter will serve. Failing both instruments, the assistance of another amateur transmitter must be called in. The latter should report when the "S" meter on his receiver begins to kick slightly, this being a fairly reliable guide to a heavy depth of modulation. It will be found unnecessary, in the majority of cases, to have R.12 more than one-third advanced when using the full output of the modulator and the gain required will be less for lower output. The setting of the input gain control R.1 will depend on the sensitivity of the particular type of microphone employed.

Appendix

It is interesting to note that the *Mullard Co.* have recently introduced a new pentode valve specially designed for audio frequency power applications. It is the type EL31 valve, with a 25 watt anode dissipation. With an applied anode voltage of 600, the maximum output from a pair of valves is about 80 watts, or up to 120 watts can be obtained when the anode voltage is raised to the permitted maximum of 800.

The EL31 operates under Class AB conditions and no grid current flows at any part of the input cycle. No power is required from the driver stage, the design of which is thereby simplified, and a peak-to-peak grid swing of only 36 volts is necessary for full output. Also, the degree of distortion at high outputs is comparatively low.

Whether one chooses QV05/25 or EL31 valves is a matter of preference, governed largely by components which may already be to hand.

Tests have been carried out with a pair of EL31 valves, which are fitted with standard octal bases. The modulator unit described was used, the following alterations being made:

1. EC31 driver valve cut out. Screens of EL31's and anode of 6J5 fed from a separate 400 volt supply possessing inherently good regulation. (The total screen current is liable to vary between 7 and 56 mA.). Stabilovolt omitted.
2. Primary of driver transformer inserted in anode circuit of the 6J5 valve, with an additional dropping-cum-decoupling resistor of 15,000 ohms (2 watts).
3. Modulation transformer connections altered to give the 7,500 ohm load called for by the EL31 valves.
4. Fixed grid bias reduced to 26 volts.

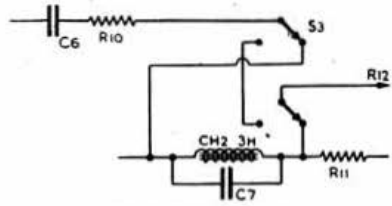
Under these conditions, the maximum output exceeded 80 watts, the distortion at full output being definitely less than with the QV05/25 valves.

A further experiment was made using a separate power supply, giving a well regulated 700 volts, for the anodes of the EL31's. The power output increased to something over 90 watts, into a load equivalent to 10,000 ohms.

Side Slips

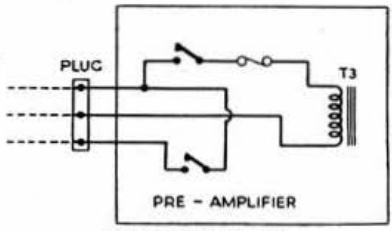
The author of this article (Mr. J. N. Walker) regrets that a number of errors occurred in the diagrams used to illustrate Part I published last month. The following is a list of corrections:

Fig. 2.—Take connection shown going to lower right-hand contact of S3, to top right-hand contact. Connect lower right-hand contact to junction of CH2 and R11. Note that CH2 has a value of 3 Henries.



Corrections to Fig. 2.

Fig. 3 (*b*).—Left-hand (socket) side in order. Ignore connections shown in right-hand block. Take centre lead of plug to T3. Connect lower plug contact through one pole of switch to top plug contact. Connect top of T3 to top plug contact through second pole of S1.



Corrections to Fig. 3b.

Fig. 4.—Reverse screen and control grid connections to V8.

High Speed Communication Developments

A revolutionary system of high-speed radio communication was demonstrated recently in Washington D.C. Known as the "Ultrafax" the system, developed by *R.C.A.* and *Kodak*, employs a combination of facsimile, television and high-speed photography techniques and is reported to be capable of handling more than 1,000,000 words per minute. At the transmitter a television camera scans the messages at the rate of 30 per second. The resulting impulses are sent over V.H.F. link and then recorded on microfilm which can be developed within 45 seconds. During the demonstration the complete 1047 page text of "Gone with the Wind" was transmitted over a distance of 3 miles in 2 minutes 21 seconds.

A NARROW BAND F.M. ADAPTER

By EDWARD W. NIELD (GW3ARP)

- This is an adapter to enable a normal communications receiver to be used either for A.M. or Narrow Band F.M. at the turn of a switch.
- The particular A.M. receiver with which the adapter is used was described in the October, 1946, Bulletin.
- No trace of car interference on 28 Mc/s. is the writer's report on the adapter when used for receiving narrow band F.M. amateur transmissions.

THE growing popularity of narrow band F.M. revealed itself during the last 28 Mc/s. season, when an ever-increasing number of amateur stations was heard using this system of modulation. There are indications that an even greater number of N.B.F.M. stations will be operating this winter. It was for the purpose of coping with this situation that the unit to be described was built. However, before dealing with the adapter itself, it is proposed to consider briefly why such a unit is necessary.

Deviation Ratio

If the already crowded state of the bands is not to be aggravated by the use of frequency modulation, the deviation used (that is to say, the bandwidth occupied) must not exceed that of an amplitude modulated signal. Commercial practice is to use a greater bandwidth than would be practicable in the crowded amateur bands. Nevertheless, the improved signal-to-noise ratio which F.M. can produce is still worth while with deviation ratios (*i.e.* maximum carrier deviation divided by maximum modulating frequency) as low as 1 : 1. If 4 kc/s. is set as the highest useful modulation frequency for speech, and the widest permissible carrier deviation is ± 5 kc/s., then the deviation ratio is 5/4 or 1·25 : 1. It can be shown mathematically that with a deviation ratio of 1 : 1, the signal-to-noise ratio which may be achieved is roughly twice as good as that obtained by A.M. methods, this improvement being further increased with increased deviation ratio. The value of 1·25 : 1, however, is about the best compromise between signal-to-noise ratio and bandwidth, and it should not be exceeded. In order to take advantage of this improved signal-to-noise ratio, an F.M. receiver is essential.

When using an A.M. receiver to receive an F.M. signal, the detuning necessary to place the mean

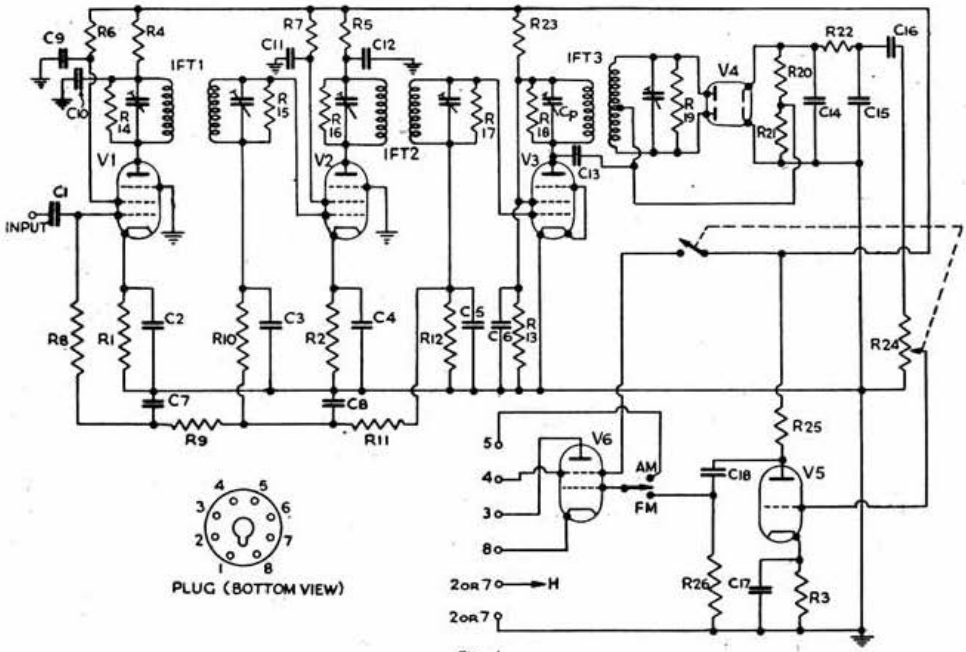


Fig. 1.
Circuit Diagram of F.M. Adapter.

C1, 13, 14	50 μμF	R3	5,000	R24	500,000
C2, 4, 6, 9, 10, 11, 12	0·1 μF	R4, 5.	1,000	V1, 2	EF39
C3, 7, 8, 15	·001μF	R6, 7, 9, 10, 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 25	100,000	V3	6J7G
C5	100 μμF			V4	EB34 (or 6H6 with separate cathodes.)
C16	0·05 μF		100,000		
C17	1·0 μF	R8, 11, 26	470,000	V5	6C5
C18	0·007 μF	R13	9,400	V6	That used in A.M. receiver
R1	400	R23	45,000		
R2	300				

To use the Adapter, the output valve of the receiver is removed and inserted in the Adapter (V6). The plug is then inserted in the vacant valve socket in the receiver, and the input terminal is coupled to one of the receiver I.F. stages as described in the text.

carrier frequency on the slope of the response curve of the receiver not only introduces distortion, but often brings up a heterodyne whistle from another station which is occupying a neighbouring channel. This detuning, and the recommended removal of the A.V.C. voltage, also renders the S-meter inoperative. With an F.M. receiver, the carrier is tuned centrally into the pass-band of the receiver (as with normal A.M. reception) and these effects are avoided.

Much more could be said about noise, deviation ratios, adjacent channel interference, etc., but this would be somewhat irrelevant to the purpose of this article.

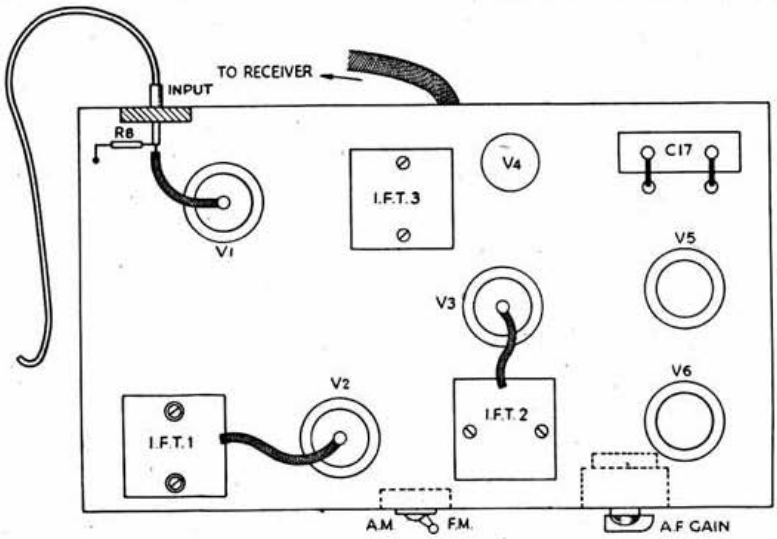


Fig. 2
Chassis layout of the Adapter.

The F.M. Adapter

The unit to be described consists of two stages of I.F. amplification, followed by a limiter stage. A phase discriminator stage provides the frequency-amplitude conversion, and the audio output from this is amplified by two further stages of A.F. amplification.

Once the unit has been built and aligned, its incorporation into the station receiving system is extremely simple, and is accomplished as follows. The output valve is removed from the receiver and placed in the unit (V6). The connecting lead from the unit is terminated in an octal plug which is inserted into the vacated socket. A single wire lead from the input terminal of the unit is hooked around the grid cap of the second I.F. valve, the capacity between the latter and the lead (approximately 2 to 10 pF) being sufficient to provide the necessary input coupling. With receivers using only one I.F. stage, or fitted with single-ended I.F. amplifier valves, connection will have to be made below the chassis—in the former case to the signal diode anode pin, and in the latter to the second I.F. valve grid pin, the end of the connecting lead being wrapped once round the appropriate pin or tag. Alternatively, an extension lug can be made on the pin of the valve itself so that when the valve is inserted, the lug is available above the chassis. The switch on the front of the unit changes the circuit from A.M. to F.M. reception by connecting the grid of the output stage to the appropriate signal source. An audio gain control is provided for use during F.M. reception. The switch incorporated in this control is used to remove the H.T. from V1 to V5 inclusive when receiving A.M. signals.

Circuit

V1 and V2, the two stages of I.F. amplification (at 465 kc/s. approximately) follow the normal I.F. amplifier design, save that the primaries and secondaries of the transformers are damped by means of 100,000 ohms resistors in parallel with the windings. This has the effect of increasing the pass-band, and is necessary because too much I.F. selectivity causes distortion of the modulation. If the windings are over-damped, then the pass-band is too wide, and adjacent channel selectivity suffers. Because of the reduction in stage gain due to the damping, any tendency towards instability or self-oscillation in the additional I.F. stages is reduced.

V3 is the amplitude limiter stage, the function of which is to remove any amplitude modulation from the carrier and to pass on a pure frequency modulated signal of fixed amplitude to the discriminator. This is accomplished by applying very low voltages to the anode and screen (about 20 volts) so that the valve becomes easily "saturated"; that is to say, above a certain low value of input voltage, the output voltage remains practically constant. In operation, the stage is run in a manner very similar to that of a Class C amplifier, the bias being developed across the grid resistor, R13, by the grid current. This bias is used for A.V.C. purposes to control the gain of V1 and V2. The anode tuned circuit of the limiter, and the following discriminator tuned circuit are also damped by 100,000 ohms resistors.

The third I.F. transformer has a centre-tapped secondary, and forms, together with V4 and its associated circuit, the discriminator stage, of the type known as the Foster-Seeley discriminator. Discussion of the functioning of this circuit is omitted and the reader is referred to the many standard works on the subject. It will be sufficient to say that an audio signal appears across the two load resistors R20 and R21 when the carrier is varied about its mean value by the modulation. When the I.F. signal is constant in frequency (*e.g.* during the reception of an A.M. signal or an unmodulated F.M. transmission) and tuned into the centre of the pass-band, no voltage appears across the load, and hence the reception of an A.M. signal on an F.M. receiver gives much the same effect as does the reception of an F.M. signal on an A.M. receiver, showing a "dead spot" in the centre of the tuning.

Construction

Fig 1 is the circuit diagram and Fig. 2 a plan of the chassis layout. The chassis measures 10 in. × 6½ in. × 1½ in. and has a metal cover 5 in. in height. No trouble due to instability or hum should occur if the recommended layout is followed. Screened

wiring should be employed for the following:— grid and anode leads of V1, V2 and V3; the lead between C16 and the audio gain control; the lead between the slider of the latter and the grid of V5; and the A.M. grid lead to the changeover switch as far as the octal plug which connects the unit to the receiver.

The metallising and/or shield pins of V1, V2, V3 and V4 are connected directly to chassis, along with the suppressors (in the case of V1, V2 and V3), the cathode (in the case of V3) and one side of the heaters, at the appropriate valve base. In the writer's case, the heater supply of the A.M. receiver was earthed on one side, and only one lead was therefore required by the unit for heater supply (pin 2). The other (pin 7) was used as the earth return lead for both H.T. and heater currents from the unit. If this is not the case it is a simple enough matter to make the necessary modification, making sure before doing so that the heater winding has not an earthed centre-tap, which, if found, should be disconnected.

In the writer's receiver, V6 is a KT 61 high-slope tetrode which provides about double the gain of, say a 6V6. If the adapter is to be used with a receiver fitted with an output valve of the lower gain type, it is desirable to increase the gain of the first audio stage by using a 6F5 in place of the 6C5. In this case, the resistor in the cathode would be 2,000 ohms. The bias for the output valve is developed across the bias resistor already in the A.M. receiver, and so none is included in the unit.

The normal working of the S-meter is unimpaired, and since the signal is tuned in normally and the A.V.C. left on, readings are just as reliable when receiving F.M. as when receiving A.M.

Alignment Procedure

The alignment of the unit is quite straightforward, but it is a process which takes longer to describe than to perform, and which sounds much more involved than it actually is. The apparatus required is a modulated (A.M.) signal generator and some means of measuring the relative audio output from V6. (An A.C. voltmeter with a condenser in series across the primary of the speaker transformer is ideal). Also required is a voltmeter or milliammeter, as described below. The stages are aligned as follows:

(1) After the A.M. receiver, the F.M. adapter and the signal generator have been running for about 30 minutes, tune the signal generator to the receiver I.F. and apply its *unmodulated* output to the frequency changer grid, adjusting the output voltage so that the S-meter reads about S-9. The frequency of the signal generator is then adjusted for maximum response on the S-meter.

(2) Without altering the frequency of the signal generator, transfer its output to the input of the adapter. A voltmeter is placed across R1 or R2, giving a fairly full-scale deflection with the 3 volts cathode bias. (Alternatively, a 0–5 milliammeter may be placed in series with the cathode lead of V3). The primaries and secondaries of I.F.T.1 and 2 are adjusted to give a minimum reading on the voltmeter (or a maximum on the milliammeter). V1 and V2 are now aligned, and may be forgotten about from now on.

(3) Check that the frequency of the signal generator has not drifted by peaking it up on the S-meter of the receiver. Re-connect its output to the adapter as before, this time using a *modulated* signal. The output meter is connected across the primary of the speaker transformer, and the trimmer of the secondary of I.F.T. 3 is adjusted so that a minimum is registered on the meter, rising to a maximum as the trimmer is moved either way. At this stage, the output of the signal generator will, if tuned across its original setting, indicate a maximum reading on the output

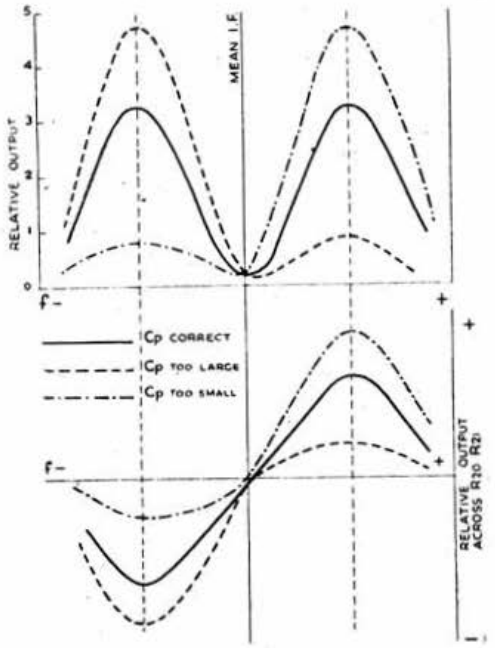


Fig. 3

Curves showing the effect of the setting of *Cp* on the output when an A.M. signal is tuned in (upper) and corresponding discriminator characteristic curves (lower). The unbroken line indicates the response when *Cp* is set correctly. The curve –·–·–·– indicates that *Cp* is too small, and the curve – – – – – – indicates that *Cp* is too large.

meter on either side of the mean frequency. The amplitudes of these maxima may differ widely, as shown in Fig. 3, and the value of the primary trimmer of I.F.T. 3 (*Cp*) must be adjusted to such a value that the maxima are equal in amplitude. If component values as shown are used, there should be no tendency for the separation of the maxima from the mean frequency to be unequal.

(4) Tune the signal generator either side of the mean I.F. and note the relative amplitudes of the maxima. If they differ, adjust *Cp* slightly in one direction.

(5) Re-set the signal generator to the mean I.F. (check on A.M. receiver) and re-adjust secondary trimmer to minimum output. Re-examine the maxima, as in 4. If *Cp* has been adjusted in the right direction, the "humps" will be more nearly equal; if not, the difference will be more pronounced. Adjust *Cp* accordingly.

Repeat stage 5 until the maxima are equal in height, remembering that the last adjustment is always made to the secondary trimmer with the signal generator tuned to the mean frequency. This is important, and on no account should this trimmer be adjusted when the signal generator is tuned to any other frequency.

After alignment, the adapter is ready for use and may be left plugged in to the receiver so that it is available, if wanted, at any time.

Performance

The adapter has been in use at GW3ARP for some months now, and has proved eminently satisfactory, rendering readable weak F.M. signals which were quite unreadable on the A.M. receiver alone. It has been assumed, of course, that the power supply for the receiver is capable of supplying the extra 1 amp. or so for the heaters and the extra 10 mA of H.T. current when the adapter is in use.

THE UNIVERSAL SHUNT

By L. MURPHY (B.R.S. 6187)*

THE article on a multi-range testmeter in the September, 1948, issue of the BULLETIN mentions the use of the Ayrton universal shunt (to quote its full name). The resistance values used by the author, all being in ratio to that of the meter used, may lead to the idea that this is necessary, and hence that "awkward" meter resistances require similar "awkward" values in the shunt. This is not so, and it is proposed here to describe the action of the shunt and to give some further notes on its use.

Theory

A simple method to illustrate the theory is the circuit shown in Fig. 1. That the current distribution is as shown can be proved by applying the Ohms Law formula, $V = I.R.$, to each combination. In parallel combinations of two resistors, if the total current is divided into a number of "units" equal to the sum of the resistors, then the current in each resistor is equal to this "unit" value multiplied by the other resistor value. This general rule is illustrated as a formula by combination "D" in Fig. 1.

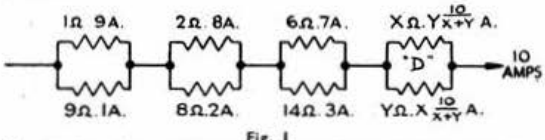


Fig. 1
Showing how the current in each branch is proportional to the resistance of the other branch.

Next consider Fig. 2. This is also a parallel combination consisting of a meter and tapped resistor in series. As the total resistance is constant, the "unit" of current as described above will be constant also, and independent of the tap into which the total current is fed. As this "unit" is constant, then the current flowing through the meter branch becomes directly proportional to the resistance of the other branch, to the left of the tap. Hence, in the figure, the meter current for the three taps shown will be (1 ohm) 1 "unit," (10 ohms) 10 "units," and (100 ohms) 100 "units" respectively.

Practice

In the following, the term "unit" of current will be used in the sense described above. Although universal shunts are made as separate units for use with measuring instruments, it is convenient to make the "unit" of current into a precise value.

* *35 Ecclesall Avenue, Litherland, Liverpool.*

This is done by making the resistance of meter and shunt into a round figure such as 1,000 ohms. Considering this having been done in Fig. 2, then the

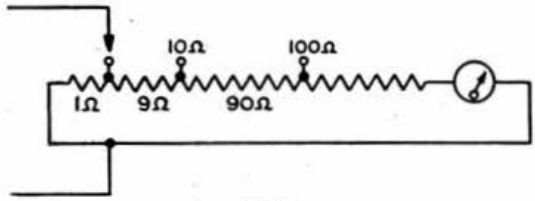


Fig. 2
Making use of the theoretical result of Fig. 1 to provide a meter-shunt of the "Ayrton" type.

"unit" of current becomes 1/1,000 of the total, and the three taps shown then correspond to meter currents of 1/1,000, 10/1,000, and 100/1,000 of the total respectively. Note, however, that these are fractions or dividing factors, as opposed to the more commonly required multiplying factors. The latter are obtained simply from the reciprocals, and the formula then becomes:

$$\text{Multiplying Factor} = \frac{\text{Total Resistance}}{\text{Resistance in opposite branch to meter.}}$$

As an example, if the meter in Fig. 2 is of the 1 mA Full Scale Deflection (F.S.D.) type, the tap for 300mA. F.S.D. would be at $3\frac{1}{3}$ ohms.

Meter Calibration for D.C. Ammeters

Provided that a number of accurate resistors are available, the shunt can be very useful for making or checking the calibration of a meter.

It should be remembered that meters do not always have precisely linear scales, and from the writer's experience, sub-standard meters are usually checked at individual points only. The method to be described makes use of another meter for comparison purposes, but any errors in its scale are not duplicated. The comparison is made from a fixed current value, and the accuracy of the calibration depends on the accuracy of measurement of the resistors used. The circuit used is as in Fig. 3. Numerical values are quoted in order to aid description. The monitor meter used for comparison is set to a fixed known current value, and kept at this value at each calibration point by adjustment of the variable resistor R. This keeps the total current in the meter and shunt circuit constant. In the example, the total resistance of meter and shunt is 500 ohms, and hence the "unit" of current (as described above) will be 1/500 of the monitor current, that is 1/100 mA.

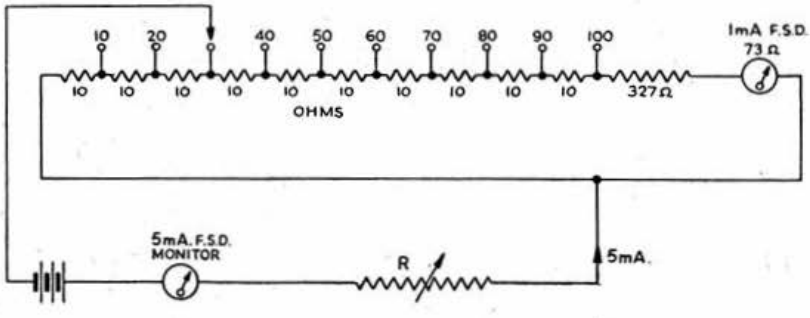


Fig. 3
Design of shunt for use in meter calibration.

With the tap at point 10 ohms, the meter current will thus be 10 times 1/100 mA. or 1/10 mA. Similarly at tap 20 ohms it will be 2/10 mA., and at 30 ohms 3/10 mA., etc.

If the meter being calibrated has a known correct F.S.D., then the tap in Fig. 3 could be set at 100 ohms and the circuit adjusted to give this F.S.D. The total resistance of meter and shunt need not be known in this case. If the monitor current is noted for this condition, and kept at this same value, the lower taps will automatically provide the proportionate calibration points. If the meter being calibrated is unscaled, all resistances in the meter and shunt must be known to determine the values of the calibration points. To measure meter resistance, a

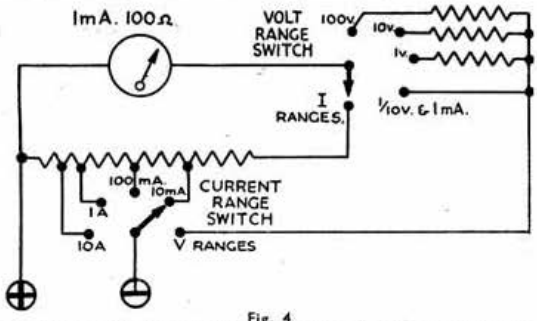


Fig. 4

The skeleton circuit of a multi-range meter. The important features are that the resistance of switch contacts is of little or no importance, and that protection is afforded to the meter when the range-switches are operated.

common method is to pass a current through it and then shunt it with an equal resistance to halve the meter current. This shunt is then measured. The same procedure can also be used to help here. In this case it is used first to mark the meter being calibrated at a nominal F.S.D. with the tap at say 100 ohms. Next, with the tap at 50 ohms, the meter can be marked with the exact half of the previous current value. From these two points, the equal shunt method can then be used to find the meter resistance.

It should be noted that this method of calibration cannot be used to check one meter by comparison with another of equal F.S.D. Also, to check by comparison with a meter of lower F.S.D. requires the use of more involved values of resistance. The obvious answer in both these cases is to arrange a shunt for the comparison meter to give a higher value F.S.D.

General Notes

(1) The resistors used need not be based on any particular value, so long as the correct ratios are used. In Fig. 3, for example, each 10 ohms resistor could be of any other value, equal but unknown, provided that the total resistance is made 50 times as large.

(2) With the more common form of individual shunts for different ranges, the F.S.D. voltage drop remains constant. In the universal shunt, this voltage varies, as is pointed out in the "theory" section.

(3) To use the meter without the shunt requires it to be open-circuited at one point. A suggested method of arranging this in a multi-range meter is shown in Fig. 4. As a point of design, the open circuit should always be arranged in the meter branch, to ensure that it is not left unshunted except when required. In switching to various tappings, the whole combination is out of circuit at any break between switch contacts, and no overloads can occur from this cause. No error is introduced by switch contact resistance at the tapping points, or any variation in it, and any switch can be used within reason.

TWENTY YEARS BACK

TO many of us, the appeal of Amateur Radio lies chiefly in the ever-present opportunity it offers to share in new developments in the field of radio communication. There is always something fresh—new frequencies to explore, new circuits to try, new ideas to exchange, new discoveries to make—or at least to read about. With such a kaleidoscope of changing values we seldom seem to have time to look back, to note what we have gained or lost and to observe which aspects of our hobby have remained constant throughout the years.

But recently, with perhaps just a touch of nostalgia, we picked up an early volume of the "T. and R. Bulletin"; incidentally we wonder how many of our younger members can place the flesh on those two famous initials. Old-timers, however, will recall that our journal owes its existence to the "Transmitter and Relay Section" of the Society. The volume selected bore the date of 1928, and we eagerly skimmed through the age-yellowed pages to discover what events were reflected in the comments of twenty years ago.

First impression was of the simplicity of the equipment. These receivers and transmitters, we thought, could easily be built in a single evening. But, reading further, we soon began to realise that although the basic designs were simple, the care expended on achieving optimum results would put to shame many of our current "hit or miss" practices. Each component was treated with patient, almost tender, care until the individual valve or condenser began to take on a distinct personality in the eyes of the constructor. The owner of a LS5A would have been horrified at the casual manner in which 807's are treated to-day.

The big event of the year was undoubtedly the first England–North America contact on 10 metres (this was long before our bands were designated by the more precise but less homely term of megacycles). The exact date was October 1 and the British station none other than that of J. W. Mathews, G6LL—still as active as ever and a member of the present Council.

Other amateurs who remain as well-known to-day as in 1928 contributed many of the articles to the "Bull" of 20 years ago. Beneath the intriguing title of "Measuring H.F. Resistance with a Tape Measure" we found the name of "Dud" Charman, 6CJ, while, even then, Ernie Dedman, 2NH, was probing into the uncharted region of 5 metres and below. The shadow of a future GB1RS was cast by the "calibration waves" transmitted by 5YK on 46, 45 and 44 metres. Judging by the number of articles on quartz crystals, there was quite a rush that year to change over to stabilised oscillators. An "all-screened" 2-v-2 receiver was hailed as the latest in amateur design. Preparations were also being made for the introduction of the new International prefixes and Q signals on January 1, 1929.

Several of our present problems were already making themselves felt. We find references to the "45 metre QRM fight" and even to one station "transmitting test calls without either wavemeter or *receiver*"!

J.P.H.

THE SECOND AMATEUR RADIO EXHIBITION

ANOTHER OUTSTANDING SUCCESS

FOR four hot hectic days between November 17 and 20, 1948, the Royal Hotel, Woburn Place, London, became the focal point to which radio amateurs flocked from all parts of the United Kingdom. Enthusiasm reached its peak during the afternoon of the last day when the crowd became so great that a queue had to be formed in the main thoroughfare.

The 1947 attendance figure of 5,000 odd was easily eclipsed, in fact more than twice as many non-members paid at the door this year than last—a tribute to the excellent publicity given to the Exhibition by our contemporaries. It will be remembered that admission was by catalogue and that every member received a copy free of charge. The fact that more than one third of the total membership of the Society visited the exhibition is a matter of gratification to the Council.

Exhibitors went all-out to present attractive displays and, as the photographs show, the lay-out of the stands was excellent. The recent spring cleaning to which the Royal Hotel has been subjected resulted in improved lighting and enhanced decorative effects. First-class technical salesmen were on duty throughout the exhibition—a point favourably commented upon by visitors. Although it was not possible to erect efficient aerial systems there was abundant evidence that visitors appreciated the opportunity of testing the numerous receivers on display.

Several firms operated sound recording equipment—wire and disc—and numerous excellent recordings were played-back to appreciative audiences.

In another page will be found a review of the stands with notes concerning some of the outstanding exhibits. A description of the specialised equipment shown on the G.P.O. stand will be published next month.

Luncheon

Prior to the opening ceremony, which took place at 2.30 p.m., on Wednesday, November 17, the President and Council entertained a number of distinguished guests as well as representatives of the companies who had booked space. The following were among those present: Dr. R. L. Smith-Rose (Director of Radio, *D.S.I.R.*), Col. Sir Stanley Angwin, K.B.E., D.S.O., T.D. (Chairman, *Cable & Wireless Ltd.*), Col. Eric Cole, C.B.E. (Chairman, *British Joint Communications Board*), Mr. T. G. Haldane (President, *I.E.E.*), Capt. C. F. Booth (*G.P.O. Radio Branch*), S./Ldr. C. K. Street (*B.J.C.B.*), Messrs. Leslie McMichael and Rene Klein (Founder Members), Messrs. A. D. Gay, E. L. Gardiner, G. Marcuse, E. D. Ostermeyer (Past Presidents), Mr. F. Smith (Chairman, *Radio Section, I.E.E.*), Capt. H. Donisthorpe (Chairman, *Radio Industries Club*), and Mr. G. D. Clifford (Secretary, *British I.R.E.*).

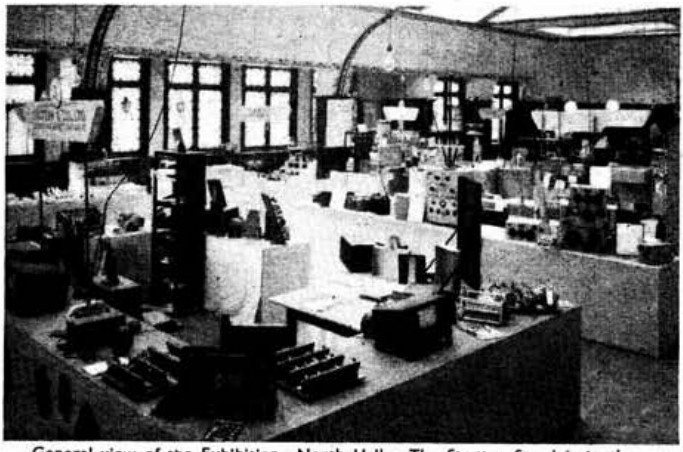
The President, Mr. V. M. Desmond at right greets Dr. R. L. Smith-Rose (second from left) at the Luncheon prior to the opening of the Exhibition. Others in group are the General Secretary (left), Mr. Geoffrey Parr (Editor, *Electronic Engineering*), next to Mr. Desmond.

Dr. R. L. Smith-Rose at the opening of the Exhibition. *Left*: Mr. John Clarricoats (General Secretary). *Right*: Mr. W. A. Scarr, M.A. (Executive Vice-President).

After extending a welcome to the trade representatives the President (Mr. V. M. Desmond) recalled that most of the prominent firms supporting the Exhibition had been founded by radio amateurs. Mr. Desmond drew attention to the importance of the Amateur Radio market saying that "whilst the importation of American communications equipment remains checked, British manufacturers have a unique opportunity to extend their hold on the Amateur Radio market." He expressed the view that the Exhibition would pave the way for a great extension of that market.

Mr. Desmond referred to a suggestion that the Society should organise a National Convention in Manchester next year. "If this project matures," he said, "it is possible that we shall be in a position to invite the radio industry to support an Amateur Radio Exhibition in that town." The President commented on the high prices charged by British manufacturers for transmitting valves and invited the representatives of the valve industry present to give serious and urgent consideration to this matter. "The Society has tried for many years," said Mr. Desmond, "to persuade its members to 'Buy British' but it is not easy to pursue this policy when we know that British valves cost four, five or even six times more than their American counterparts." Mr. Desmond also appealed for more technical data.

Mr. T. E. Goldup, a director of *Mullard Electronic Products Ltd.*, responded on behalf of the trade and assured the President that the Companies represented at the Exhibition were most anxious to assist the Amateur Radio movement to the best of their ability. He regretted that the price of transmitting valves was high, but promised, on behalf of his own Company, to give careful consideration to the question.



General view of the Exhibition—North Hall. The *Stratton* Stand is in the foreground with the G.P.O. Exhibit immediately behind.

The health of the Distinguished Guests was proposed by the immediate Past-President, Mr. S. K. Lewer, B.Sc., G6LJ. (Mr. Arthur Watts, had been invited to propose the toast, but was indisposed.) Col. Sir Stanley Angwin, who responded, congratulated the Society on the publication of the booklet *Transmitter Interference*, and upon the steps which had been taken to give technical advice on the subject to members. Sir Stanley referred to the new W/T Bill and to the fact that the President of the I.E.E. (who was present) would, if the Bill is passed, be the person responsible for nominating persons to serve on the Government Advisory Committee to deal with suppression problems. Sir Stanley also stressed the value of mass observations by amateurs, particularly in connection with propagation problems.

A toast to the representatives of the Contemporary Radio Press was proposed by the General Secretary. Mr. Clarricoats referred to the debt the Society owes to *Wireless World* which Journal for many years published Society notices and the texts of lectures delivered to the Society. Mr. Clarricoats recalled that it was just 25 years since *Wireless World* gave publicity to the tests which culminated in the first trans-Atlantic contacts during November, 1923. Mr. Geoffrey Parr, A.M.I.E.E., Editor *Electronic Engineering*, replied.

Opening Ceremony

In the presence of a large and distinguished gathering, estimated at more than 500, Mr. Desmond introduced Dr. Smith-Rose who he recalled had served on the Council of the Society some 20 years ago and who had been elected an Honorary Member in 1946.

Dr. Smith-Rose said :

" To-day is an occasion for congratulating our Society in having organised this Exhibition for the second year in succession.

" I am sure we shall find that the Exhibition is a show worthy of a Society which in the course of some 35 years has attained a membership of nearly 15,000, and which will continue in the future, as it has done in the past, to play an important part in the life of the country. I hope that the Exhibition will prove an outstanding eyent which will form a regular feature of our activities for many years to come.

" There is, of course, no need to justify the need for the existence of our Society ; but if I were asked to do so, I think I should emphasise three points. First, that like many other organisations, it provides for the needs of those who seek relaxation from their business life in a most absorbing hobby ; secondly, it stimulates an activity which contributes in no small degree to one of the major light industries of this country ; and thirdly, it provides a most useful source of technical material and personnel which has already served the nation during two world wars and may well do so again. At various stages during the past war I remember being impressed by the frequent encounters in both Service and civilian activities with individuals who had gained their first introduction to the radio field from the amateur movement.

" I hope that those in authority will remember these contributions, and that they are taking the appropriate steps by the training of a civilian reserve or equivalent organisation ; so that should the need arise, the full technical ability of the country in this field can be brought into action with the minimum of delay, for the installation, maintenance and operation of the large variety of radio applications which are in existence or in contemplation at the present time.

" But I wish to concentrate in these few remarks on more peaceful activities, and to draw your attention to one or two directions in which amateurs can be of considerable assistance in the scientific study of radio phenomena. In previous years it was possible to do much useful work in exploring the communication or reception possibilities of the various frequency bands available ; and such achievements as the various ' historic first ' DX records, or the ' working of all continents,' have done something to add to our knowledge of the characteristics of different wavebands. There is, however, a limit to the usefulness of this type of pioneer work unless it is directed and carried out systematically. And this brings me to an important activity of the Society, which has been introduced during the past year.

" The possibility that amateurs might be organised and encouraged to carry out useful scientific observations on various radio occurrences was recognised by the International Radio Scientific Union (U.R.S.I.) some years ago. And in the past year or two, the various constituent national committees of that body have approached the

Another view of the Exhibition.

amateur organisations in various countries. The Radio Society of Great Britain has been one of the first to respond to this invitation and, as many of you are probably aware, your Council has formed a special Scientific Observations Committee to organise and operate a programme suggested by U.R.S.I. The general arrangements were described in an editorial in the Society's BULLETIN for last April; and this was reproduced in the U.R.S.I. International Bulletin to serve as an example and stimulant to the amateur movements in other countries.

"One of the most fundamental measurements required is that of frequency, and in this connection it is a matter for congratulation to note that the Society has recently inaugurated its own programme of standard frequency transmissions, from the station GB1RS which, at regular intervals during some 15 hours every day provides a constant frequency of 3,500·25 kc/s. It is possible that this station will also prove very useful as a known source of constant radiation for study during the variation with time of the strength of the signals received from it.

"It is a well-known fact several leading members of your Society have worked very hard at International conferences to ensure that the amateur retains an adequate share of the radio frequency spectrum. But there are also many professional applicants for a share of the available channels in which to operate the multifarious and ever-growing radio services; and I would suggest that it is up to the members of this Society to exert themselves to justify the amateurs' allocation. Accordingly, I seriously recommend to you that an important contribution to this justification will be by showing a willingness to undertake some simple scientific work to supplement the professional radio engineers and physicists who are so badly in need of all the help they can obtain. To some extent the future prestige and life of the nation depends upon our efforts in the radio sphere, and I would appeal to all amateurs to combine with their hobby, a sense of duty as citizens."

A vote of thanks to Dr. Smith-Rose was moved by Mr. W. A. Scarr, M.A., G2WS (Executive Vice-President and Chairman, Scientific Observations Committee).

Following the formal opening Dr. Smith-Rose and the President, accompanied by other officials, inspected the Exhibition.

The Visitor's Book on the Society's stand bore witness to the large number of members who supported the Exhibition. Among the many old timers who signed were Jack Partridge, G2KF, Gerald Marcuse, G2NM, Kenneth Alford, G2DX, Maurice Child, Marcus Samuels, G4FX, Walter Sherratt, G5TZ, and Basil Davis, G2BZ.

Throughout the period of the Exhibition the

(*Continued on Page* 142).

General view of the Exhibition—South Hall

THE R.S.G.B. STAND.
Left to right: Mr. John Clarricoats (General Secretary), Miss May Gadsden, Miss H. Lightfoot (H.Q.), Mr. C. T. Wakeman, G4FN, Mr. H. Freeman (Exhibition Manager), Mr. J. P. Hawker (H.Q.), Miss G. Thomas (H.Q.), Mr. P. Bond, G3BEG. *Seated*: G./Capt. H. W. Evens, G6CH.

DID YOU CALL?
A view of the Society's stand early on the second day. By the time the Exhibition closed more than 1,000 QSL cards had been pinned on the wall.

OLD TIMERS FOREGATHER.
Founder Member Leslie McMichael, G2FG (left), with Reg Hammans, G2IG, Gerald Marcuse, G2NM, and Miss May Gadsden (Assistant Secretary).

Mr. Denis Heightman, G6DH, emphasises a feature of the new Denco Television receiver to Dr. R. L. Smith-Rose.

AROUND THE STANDS

A BRIEF REVIEW OF SOME OF THE MORE OUTSTANDING AND INTERESTING EXHIBITS

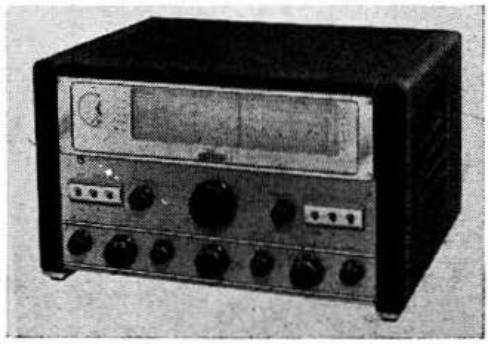
PERHAPS the most remarkable feature of the second Amateur Radio Exhibition was the fact that manufacturers contrived to show so much fresh equipment. Visitors who expected to see only a repeat of last year's display were pleasantly surprised to find that within the short space of 12 months many completely new products and techniques have emerged to tempt the amateur away from long-established favourites. The smaller, but more specialised firms, have a great advantage over their rivals: their equipment can pass rapidly from drawing-board to prototype with full production following often in a matter of weeks. The variety of 144 Mc/s. equipment provides a perfect illustration of this feature when it is recalled that only 2½ months had elapsed between the opening of the band and the exhibition.

Receivers

The heart of an amateur station remains the receiver. New sets remove the last vestiges of the old suggestion that it is necessary to go overseas to find manufacturers who understand and appreciate the peculiar requirements of the amateur. The popularity of the moderately priced "Hambander" (*Radiovision*) and Eddystone 640 (*Stratton*) remains unchanged but, in addition, this year the amateur who insists on almost every possible technical refinement has been catered for most lavishly. The new "Commander" (*Radiovision*) employs double-conversion "Q-Fiver" technique in order to utilise the extremely sharp selectivity characteristics of a 100 kc/s. I.F. stage without sacrificing the high image rejection of the first 1·6 Mc/s. I.F. Separate electrical bandspread on the amateur bands and a general coverage of 1·7 to 31 Mc/s. with a clearly marked directly calibrated dial are among the other good points of this set.

The *Denco* DCR 19 communications receiver, the outcome of a long period of close collaboration between engineers and amateur operators, is the type of set which every amateur secretly wishes he could find time to build. It contains so many "gadgets"—essentials under modern conditions—that the comparatively small dimensions (16¼×10¼×11¼ inches) and light weight (30 lbs.) present a puzzle until an examination discloses the use of miniature high-slope R.F. pentodes. Built around the CT4 coil turret (available separately) the set possesses a 340° calibrated amateur bandspread dial (including 21 Mc/s.), almost constant gain over the entire tuning range of 175 kc/s. to 36 Mc/s. with none of the usual variation in sensitivity at opposite ends of the tuning condenser, a 20 db. gain R.F. stage, a built-in crystal calibrator which gives 500 kc/s. check points and provides accurate resetting positions for the electrical bandspread, 5 selectivity positions with crystal filter and 800 cycle (100 c/s. bandwidth) audio filter, delayed A.V.C. for c.w. reception and an S-meter which really indicates something.

Another high-grade receiver shown for the first time was the new *Stratton* Eddystone 680, a 13 valve set with continuous coverage from 30·4 Mc/s. to 490 kc/s. The two R.F. stages should provide an extremely high signal-to-noise ratio. Selectivity, with two 450 kc/s. I.F. stages and a phased crystal filter is stated to be of the order of a 50 db. drop, 1 kc. off resonance. The H.T. supply to the separate oscillator, frequency changer screen, and B.F.O. is stabilised. The 680 has a similar attractive appearance to the 640.



The G.E.C. BRT 400 Receiver for amateur and commercial use.

Yet another communications type receiver, the BRT 400 was shown by *G.E.C.* Built for the most exacting commercial as well as amateur service, the set is suitable for use in all climates and meets the official specification K.110. Particular attention has been paid to ease of operation and a large sectional perspex dial is combined with a mechanical bandspread logging scale to provide an effective scale length of some 16 feet. There are six selectivity positions and the image rejection is claimed to be better than 30 db. at 31 Mc/s. and 45 db. on other bands. Sensitivity is of the order of 1 microvolt for a 20 db. signal-to-noise ratio for telegraphy reception. Frequency coverage is 150 kc/s. to 31 Mc/s.

V.H.F. Equipment

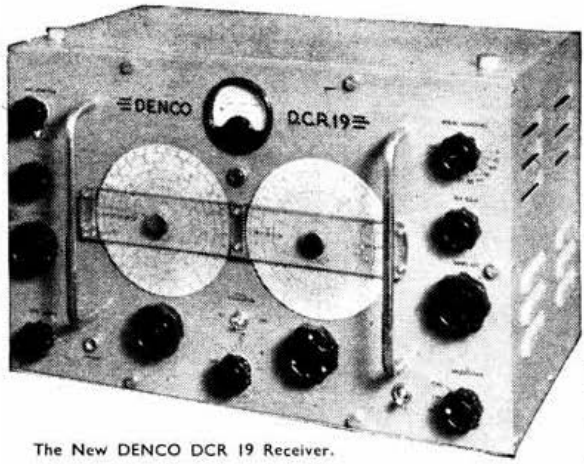
V.H.F. equipment for the new bands was featured on a number of stands. *Stratton* showed several transmitters suitable for home construction including a 5 stage crystal controlled 144 Mc/s. rig using 6V6 C.O. 3×QVO4/7 multipliers and QVO4/20 twin beam-tetrode final. A four-element wide-spaced 145 Mc/s. beam with folded dipole radiator also attracted considerable attention.

Several transmitters for the 144 Mc/s. band were also shown by *Webb's Radio*. The line-up of their "8012" transmitter is 6V6, 2×832, p.p. 8012 with the popular parallel lines output. A low-power version of this transmitter without the 8012's and with built-in modulator was also shown. *Tele-Radio* exhibited a 145 Mc/s. self-contained F.M. transmitter (15 kc/s. deviation) with an 829B final operating on 27 times the crystal frequency. An A.M. transmitter was also displayed as well as equipment designed for the commercial V.H.F. frequencies. Mobile apparatus included a midget personal transmitter-receiver capable of being carried in a normal pocket.

R.S.G.B. Stand

Despite reduced space, the Technical Committee again staged a display of home-built apparatus covering many aspects of amateur activities. Emphasis was given to equipment described in recent issues of the BULLETIN. G2NH's 145 Mc/s. trans-

mitter (August) had been modified for parallel lines output. The original version, incidentally, was on show on the *Mullard* stand. A miniature C.C.C.W. 145 Mc/s. transmitter only 9×4×14 inches employing a 36 Mc/s. vacuum mounted crystal and 832 output was the work of G5RV who also exhibited some television interference suppression equipment. G2UJ showed a 144 Mc/s. convertor using EF91–6AK5–EAC91 valves, with the band-width of 2 Mc/s. spread over 50 degrees of the one-dial control. A low power self-excited transmitter for the 420 Mc/s. band (G2WS) employed an ECC91 and featured simplicity of construction. G5JU's 80 watt modulator described elsewhere in this issue could also be examined at close quarters. Amongst other equipment was a neat scale model of G2MI's rotary beam, a crystal calibrator built by BRS13864 and a 144 Mc/s. test oscillator, the work of G8TS.



The New DENCO DCR 19 Receiver.

Transmitters

General coverage transmitters were again prominent among the exhibits. They ranged from the moderately priced R.A.M. types 44 and 44P (*Radiocraft*) and "So-Rad" series (*Southern Radio*) to the "Ambassador 100" (*Tele-Radio*) and the 150 watt all-band transmitter of *Odeon Radio*. It was interesting to note that the decision to manufacture the "flat-dweller's" miniature transmitter—first reported in last year's review of the Show—has duly borne fruit and the completed production model was to be seen on the *Odeon* stand.

The *Imhof* range of chassis, racks, handles and instrument cases—a welcome addition to the Exhibition—are eminently suitable for the constructor who wishes to give his equipment a finished, commercial appearance as well as a rigid foundation.

Many exhibitors have introduced special test equipment for the amateur. In particular the ubiquitous grid-dip meter is now firmly established and a number of models were on show. A new frequency meter specially designed for the amateur is the Windsor Model 35A (*Taylor*). Covering all bands up to 60 Mc/s. with an accuracy better than ·1 per cent., the equipment comprises a variable frequency oscillator (calibrated from 1·7 to 2·0 Mc/s.) a 100 kc/s. crystal and a detector valve, to enable beats to be monitored in the 'phones, and a self-contained power pack.

Two items of non-amateur equipment that have aroused great interest during the past 12 months could be inspected on the *Electronic Engineering* stand; the well-known "Home-built Televisor" and a receiver employing the "Synchrodyne" circuit.

Several firms showed recording equipment including a compact wire recorder (*Odeon*), magnetic tape (*Salford*) and high-fidelity commercial equipment suitable for broadcasting (*E.M.I.*). Some extremely interesting equipment was shown by the G.P.O. and it is hoped to publish a technical description of the apparatus at a later date.

The lasting impression of the exhibition—which must again have proved of almost equal benefit to manufacturers, distributors and the thousands of visitors—was of the remarkable achievement of the trade in overcoming post-war difficulties. There can be little doubt that in the field of amateur equipment we have arrived at the stage of a "buyer's market." The amateur today has plenty of choice and can demand high standards in design, reliability and versatility of apparatus before parting with those odd pound notes upon which the industry finally depends.

AFFILIATED SOCIETIES

The following Societies and Clubs have been granted affiliation to or have renewed their affiliation with the Incorporated Radio Society of Great Britain since the previous lists appeared in the June and August issues.

AMATEUR RADIO CLUB OF H.M.S. MERCURY, East Meon, Petersfield, Hants.

CITY OF BELFAST Y.M.C.A. RADIO CLUB, c/o Mr. R. J. Boal, Sexton's Cottage, Black's Bridge, Ballylesson, Belfast.

MURPHY RADIO SPORTS CLUB, c/o Mr. R. B. Green, Murphy Radio Ltd., Broadwater Road., Welwyn Garden City, Herts.

RADIO SOCIETY OF N. IRELAND, c/o Mr. W. Caughey, 109 Locksley Road, Finaghy, Belfast.

THAMES VALLEY AMATEUR RADIO TRANSMITTERS SOCIETY, c/o Mr. A. Mears, 4 Broadfields, East Molesey, Surrey.

• • •

The follow changes of address have been notified to Headquarters:

DERBY AND DISTRICT AMATEUR RADIO SOCIETY, c/o Mr. F. C. Ward, 5 Uplands Avenue, Littleover, Derby.

EDGWARE AND DISTRICT RADIO SOCIETY, c/o Mr. R. H. Newland, 3 Albany Court, Montrose Avenue, Edgware, Middlesex.

YEOVIL AMATEUR RADIO CLUB, c/o Mr. D. L. McLean, 9 Cedar Grove, Yeovil, Somerset.

• • •

The undermentioned Society has been granted Honorary Affiliation:

MALTA AMATEUR RADIO SOCIETY, c/o Mr. F. Hague, Edelweiss, Ramel Buildings, Isouard Street, Sliema, Malta.

THE SECOND AMATEUR RADIO EXHIBITION—

(*Continued from page* 140)

stand was manned by a number of volunteers in addition to members of Headquarters' staff. Especial thanks are due to Group Captain H. W. Evens (Ret'd.), G6CH, who was on duty throughout the exhibition, Mr. Peter Bond, G3BEG, Mr. A. R. Kerr, BRS.9936, Mr. A. J. Rolfe, BRS.6856, Mr. R. V. P. Loughrey, BRS.15380, Mr. W. H. Allen, G2UJ, Mr. T. L. Delvin, G2FLK, and Mr. C. T. Wakeman, G4FN. In addition Council Members C. H. L. Edwards, J. W. Mathews and A. O. Milne, rendered very valuable assistance.

Organisation

The success of the Exhibition was largely due to the careful planning undertaken by the Exhibition Manager (Mr. H. Freeman, *Parrs Advertising Ltd.*), who received great help from the Manager of the Royal Hotel (Mr. W. E. Mills) and his staff.

The construction of the stands was in the hands of *Display & Exhibitions Ltd.*, floral decorations were undertaken by Muriel Riches (*Royal Hotel Flower Shop*), whilst Mr. F. G. S. Wise again undertook the duties of official Exhibition photographer. Copies of all Exhibition photographs may be purchased from Mr. Wise, Abbey House, 5 Victoria Street, London, S.W.1, price 5/– each.

ANNUAL REPORT

THE Council has pleasure in presenting the following Report covering the activities of the Society during the year which ended on September 30, 1948.

Amateur Radio Exhibition

The period under review will be remembered for several events unique in the history of the Society of which the Amateur Radio Exhibition held in London during November, 1947, was one of the most important. This project was supported by a number of prominent manufacturers of equipment designed especially for radio amateurs and was attended by about 5,000 members and friends. In view of the success achieved the Council had no hesitation in approving plans for the holding of a Second Exhibition during November, 1948.

Scientific Observations

The British National Committee for Scientific Radio, which is a joint Committee of the Royal Society and representative of various British institutions interested in this subject, was recently invited by the *International Union for Scientific Radio* (*U.R.S.I.*) to undertake the organisation in the United Kingdom of co-operation with Amateur Radio observers.

The Council were gratified to learn during the year that the *British National Committee* had formed the opinion that observations by amateurs could best be organised by the R.S.G.B., and they suggested that the matter be referred to the Society by Dr. R. L. Smith Rose (Director of Radio Research, *D.S.I.R.*) who is a member of the B.N.C. and an Honorary Member of the Society.

Discussions between Dr. Smith Rose and Council representatives followed, and these led to the formation of a Scientific Observations Committee under the Chairmanship of the Executive Vice-President, Mr. W. A. Scarr, M.A., G2WS. The Committee has set up groups to study the following four major problems :

Ionospheric Propagation (M.U.F. and " Skip " effects).
Solar, Meteor and Auroral effects.
Tropospheric Propagation.
Wave interaction.

The steps being taken by the R.S.G.B. were favourably commented upon at the recent *U.R.S.I.* Conference in Stockholm.

Headquarters' Station

Through the co-operation of the *General Post Office*, *Electric and Musical Industries Ltd.*, the *Air Ministry*, and a number of good friends within and without the Society, it became possible on September 1 to commence a standard frequency marker service —the first to be inaugurated by an Amateur Radio organisation. The transmitter, which operates on 3,500·25 kc/s. under the call sign GB1RS, is located at New Ruskin House, and the marker signal which it radiates at hourly intervals for some 15 hours a day is accurate to a few cycles per second. It is hoped that it will become possible later on to operate the station on amateur lines using the distinctive call sign GB3RS.

The Council records its thanks to the G.P.O. for the loan of the drive unit and to all other organisations and individuals who contributed in any way to the bringing into active service of GB1RS.

Work on Six Metres

As the result of representations made by the Society, the G.P.O. agreed in November, 1947, to permit a limited number of British Isles amateurs to use frequencies between 50 and 52 Mc/s. The granting of this facility coincided with a period when the M.U.F. (maximum usable frequency) was extremely high, with the result that for the first time United Kingdom amateurs were able to establish two-way communication on these very high frequencies with their colleagues in North America, South Africa and other distant countries. This work was watched with great interest by scientific and professional bodies interested in M.U.F. predictions.

New Frequency Bands

Although the new V.H.F. bands allotted to amateurs at the Atlantic City Conference were not due to become available until after January 1, 1949, the Council successfully negotiated for the release of the 145–146 Mc/s. band on September 1 and for the release of the 420–460 Mc/s. band one month later. Input power is at present restricted to 25 watts in the case of the 145 Mc/s. band and to 10 watts in the case of the 420 Mc/s. band, but the Council anticipates that more liberal figures will be shown in the new amateur licence which is expected to be issued early in 1949.

Television Interference

The Council has been greatly concerned with the problem of interference to television reception caused by transmissions from amateur stations. Several important technical articles dealing with this problem have appeared in the Society's Journal and a booklet on the same subject has recently been published in the Society's " Amateur Radio " series. The Council trusts that the information contained in these publications will enable members who are affected by television interference to effect satisfactory cures.

The *General Post Office*, the *British Radio Equipment Manufacturers' Association*, and the *Radio and Television Retailers' Association*, all recognise that certain television receivers are installed at sites well outside the service area for the London station. Such receivers are prone to severe interference if an amateur transmitter is operated in the vicinity. Interference under such conditions is extremely difficult to suppress ; in fact it is probably incapable of suppression when the field strength from the London station is very low. The authorities agree that, generally, in such cases the amateur should not be blamed.

The Society has suggested to the G.P.O. and to the Radio Industry that in the interests of all concerned a protection field strength figure should be established below which the amateur will not be expected to carry out suppression. It is hoped to announce an agreed figure shortly.

Licences

As at September 30 the number of Licences in force was approximately 6,750 representing an increase of about 1,200 during the year. If the present rate of increase continues it seems probable that a figure of 10,000 may be reached within the next three or four years. Even with the present figure the Council feels it desirable to emphasise once again that the maximum use should be made of all amateur frequency allocations.

New Amateur Licence

During the year the G.P.O. produced a draft of a new Amateur Licence which was carefully examined by the Council. The new licence is designed to remove certain anomalies which exist at present and its terms are more in keeping with the status of amateur as distinct from experimental stations.

Station Inspections

In order to achieve greater uniformity in the methods of inspection and in the interpretation of licence conditions by G.P.O. inspectors, the G.P.O. have agreed to issue general instructions to all regions.

Radio Amateurs' Examination

A total of 700 persons sat for the Radio Amateurs' Examination held in May, 1948, and of this number 528 were successful, a marked improvement over last year when only 120 passed out of 326.

The Council is glad to learn that several Technical Institutes are now arranging special courses of lectures to prepare candidates for the examination.

As a service and to assist members to pass the Morse Code examination for an amateur licence the Society has again sponsored regular slow Morse transmissions on frequencies in the 1·7 Mc/s. band.

Band Planning

In an attempt to provide for a more orderly distribution of frequencies, and bearing in mind the great increase in the number of amateur stations, the Council requested the Codes of Practice Committee to develop a tentative Band Plan and to submit the plan to the European I.A.R.U. Societies for their consideration. The plan was duly published in March and a copy sent to every European I.A.R.U. Society. The plan has been severely criticised in some quarters chiefly on the score that provision was made therein for certain frequencies to be shared by both telegraphy and telephony stations. Sometime after the plan was published the Codes of Practice Committee decided to invite all R.S.G.B. Town Groups to comment on the plan, and to submit their suggestions for improvement. The Council hope that a final plan will be ready for presentation to the membership and to the European I.A.R.U. Societies at a very early date.

Membership

The Council is pleased to report that a further—if slight—increase in membership has taken place. The Finance and Staff Committee budgeted for a 10 per cent. reduction over the year, the fact that an increase of nearly 600 has occurred is a matter for satisfaction bearing in mind the turn of events. The following table shows the strength of the membership at the stated date over the past four years.

Class.	1944–5	1945–6	1946–7	1947–8
Home Corporate ..	8,876	11,446	12,105	12,336
Overseas Corporate	330	380	546	651
Associates and Juniors	396	675	1,132	1,354
Life	38	62	79	90
Honorary	6	7	8	8
Totals	**9,646**	**12,570**	**13,870**	**14,439***
Nett Increases	1,902	2,924	1,300	569

* *For the information of new members the Society had a Membership of* 3,500 *in* 1939.

The turn-over has again been considerable. During the year about 2,700 persons were elected and in the same period about 2,150 failed to renew their subscription. An examination of the relevant record cards shows that the majority of those who allowed their membership to lapse were war-time members who joined whilst on active service. Domestic difficulties, such as the shortage of housing accommodation, are no doubt responsible for the failure of a number of young persons to renew their membership.

It will be noticed from the above table that 1,354 members, or nearly 10 per cent. of the whole, are Associates. Prior to the war there were not more than 30 Associates. This great increase appears to be due in some measure to the fact that candidates unacquainted with a Corporate Member are unwilling to submit references. It is also a fact that certain Corporate Members urge young candidates to join as Associates in order to gain experience of the work of the Society.

The Council is pleased to report that a further increase has occurred in the Overseas Section, the present figure of 651 being the highest ever recorded. More spectacular increases in this Section are likely to occur once the present irksome currency restrictions are eased.

The Society's Journal

A very small improvement in paper supplies has been reflected in slightly larger issues of the Society's Journal. It is hoped that before long it will be possible to increase the size still further and at the same time make more pages available for advertisers announcements. The continued use of 6 pt. type for certain regular features, *e.g.* "The Month on the Air" and "The Month on the V.H.F.'s" is regretted, but is necessary in order to compress more words into each issue.

The decision of the Council to purchase the copyright of technical articles has resulted in an improvement in the standard of contributions.

A new design of front cover introduced in July was well received by the membership.

To provide members with additional reading material, the *Proceedings of the R.S.G.B.* has again been published at regular intervals. This publication has, however, proved expensive to produce because of the reluctance on the part of advertisers to take space therein, a difficulty which does not arise in the case of the R.S.G.B. BULLETIN, an established monthly journal.

The Council records its thanks to the Technical Committee for valuable assistance to the Editorial Staff and to all contributors. The co-operation extended by *Sir Joseph Causton & Sons, Ltd.* (the Society's printers), is also gratefully acknowledged.

Technical Booklets

Three technical booklets in the "Amateur Radio" series were published during the year. *Microwave Technique* appeared in November, and this was followed a few months later by *V.H.F. Technique* and *Valve Technique*.

Due to persistent demands it became necessary to reprint *Service Valve Equivalents* for the third time, and to produce a revised edition of *The Transmitting Licence*.

Members of the Technical Committee are at present preparing material for further booklets in the series, one or two of which may appear during the coming year. The Council records its thanks to the co-authors of the booklets so far published. The hope is expressed that Representatives will do everything within their power to bring these publications to the notice of local members by ordering bulk supplies from Headquarters.

Affiliated Societies

The Council has again been pleased to grant affiliation to a number of local Societies, thereby bringing up the total in affiliation to 65. Steps are being taken to organise a Contest for Affiliated Societies and in this connection the Council records its thanks to Mr. Frank Barlow, G5IW, who has offered to present a Trophy for annual competition.

Arrangements have been made to supply Affiliated Societies with bulk quantities of R.S.G.B. publications at trade prices.

Representation

As from January 1, 1948, all Representatives were elected for a period of two years thereby giving practical effect to a decision reached at the 1947 Delegates Conference. In general the new arrangement can be considered a success, although it seems doubtful whether any real advantage has been gained by allowing the membership to elect the Regional Representatives.

It appears to the Council that certain Regions are functioning more effectively than others due, perhaps, to the fact that in such cases a closer liaison exists between a particular Regional Representative and his County Representatives. It is recognised that travelling difficulties are largely responsible for the inability of some Regional Representatives to keep in close personal contact with their County Representatives.

The Council appreciates that as far as the average member is concerned the scheme of Representation centres around his 'Town Representative. For that reason it is pleasing to record that the majority of T.R.'s are performing their duties with great diligence and enthusiasm. From the support given to local meetings it would seem that members, generally, appreciate the opportunity of getting together at regular intervals.

The Council thanks all Representatives for their co-operation during the year and wishes them success during 1949.

Official Regional Meetings

The Council decided in January to hold O.R.M.'s in eight Regions during 1948 and in the remaining seven Regions during 1949.

The following is a list of venues which were chosen for meetings, together with approximate attendances and the names of the Representatives of the Council who attended.

Region.	Venue.	Approximate Attendance.	Representation.
1	Manchester	300	The President, Messrs. Auchterlonie, Edwards and Scarr.
2	Newcastle ..	120	Mr. Edwards.
5	Chelmsford	70	Messrs. Charman and Mathews.
7	London ..	250	The President and Members of Council.
9	Bristol ..	80	The President and Mr. Auchterlonie.
11	Rhyl and Bangor	60	Messrs. Hammans and Scarr.
13	Edinburgh ..	85	Messrs. Charman and Scarr.
15	Belfast ..	50	The President.

The General Secretary attended and delivered an address on Society affairs at every Official Regional Meeting.

The Council thanks the Regional Representatives concerned and all others who were responsible for arranging the meetings.

London (I.E.E.) Meetings

In accordance with usual custom a series of lecture meetings took place during the autumn, winter, and spring, at the Institution of Electrical Engineers. Although the attendance at certain meetings fell below expectations the Council is of the opinion that the lectures were much appreciated by those present.

A list of lectures and speakers follows :

1947.

Oct. 10 S. K. Lewer, B.Sc. (G6LJ), and John Clarricoats (G6CL), "American Journey."

Nov. 14 E. A. Fielding, "Quartz Crystals." *

1948.

Jan. 9 J. N. Walker (G5JU), "The Design and Construction of Amateur Transmitters." *

Feb. 13 W. Hartley (G8UY), "Interference—Its Cause, Effects and Cure."

Mar. 12 D. N. Corfield, D.L.C.(Hons.), A.M.I.E.E. (G5CD), "The Practical Use of Frequency Modulation on Amateur Frequencies." *

April 9 M. Ryle (G3CY), "Radio Signals from the Sun." *

May 14 H. A. M. Clark, B.Sc.(Eng.) (G6OT), "The Suppression of Interference to Television Caused by Amateur Transmitters."

* *Published in the Proceedings of the R.S.G.B.*

QSL Bureau

The R.S.G.B. QSL Bureau has again been managed with great success by Mr. Arthur Milne, G2MI, who has had the able assistance of a number of keenly enthusiastic sub-managers. The Bureau which in recent months has assumed almost an Empire status, is now handling nearly 2,000,000 cards a year from amateurs in all parts of the world.

To the Managers, Sub-Managers and their assistants, the Council records its thanks for a job well done.

Contests

The Council has sponsored a wide variety of Contests ranging from National Field Day and B.E.R.U., to the Low Power and "Top Band" events. Support for all Contests has been greater than in past years with the result that a heavy burden of work has fallen upon the Contests Committee. The Council records its thanks to the Committee for their work in drawing up the Rules for these Contests and for judging and reporting upon the results.

The Council is sorry to learn from the Committee that in one or two instances entrants have indulged in practices which were outside the rules and spirit of the Contests.

Committees of the Council

The following is a list of the Committees of the Council which were constituted during the year :

Codes of Practice.—Chairman, Mr. I. D. Auchterlonie, G6OM.

Contests.—Chairman, Mr. W. H. Matthews, G2CD.

Finance and Staff.—Chairman, Mr. A. J. H. Watson, F.S.A.A., G2YD.

G.P.O. Liaison.—Chairman, Mr. A. E. Watts, G6UN.

Membership.—Chairman, Mr. S. K. Lewer, B.Sc., G6LJ.

Scientific Observations.—Chairman, Mr. W. A. Scarr, M.A., G2WS.

Technical.—Chairman, Mr. H. A. M. Clark, B.Sc. (Eng.), G6OT.

Headquarters

The staff position has improved very slightly, although the need for juniors is still acute. Because of this deficiency, it has been necessary on many occasions for senior staff to deal with minor routine matters. The fact that such tasks have been undertaken without complaint is a tribute to the excellent spirit prevailing at Headquarters'.

The Council records its best thanks to the General Secretary and to his staff for the conscientious and highly efficient manner in which they have carried out the decisions and instructions of the Council and for the able manner in which they have executed the administration of the Society's affairs under difficult conditions.

The fact that the General Secretary found himself able to attend every O.R.M. held during the year is a matter of satisfaction to the Council, who realise that these week-end engagements intruded quite severely into his private life.

Conclusion

It is not possible in this Report to refer to many other matters which were dealt with during the year, but a perusal of the Resumes of the Minutes of Council Meetings will show that they were diverse in character.

The Council feels sure that the solid progress reported this year will continue and that members will, as hitherto, give their full support to the new Executive when it takes office.

Council Meeting Attendances

The following is a list of attendances at Council Meetings for the year ended September 30, 1948.

Name.	Possible Attendances.	Actual Attendance.
Desmond, V. M.	14	13
Scarr, W. A.	14	10
Lewer, S. K.	14	14
Watson, A. J. H.	14	11
Milne, A. O.	14	14
Evans, K. Morton	14	13
Auchterlonie, I. D. ..	14	12
Bloomfield, G.	14	12
Edwards, C. H. L. ..	14	14
Hammans, R. H.	14	10
Mathews, J. W.	14	14
†Charman, F.	10	7
†Corfield, D. N.	10	10
*Clark, H. A. M.	4	4
*Gardiner, E. L.	4	1

* *Retired December* 31, 1947. † *Elected January* 1, 1948.

The G.P.O. Liaison Officer (Mr. A. E. Watts) was present at 12 of the 14 meetings.

H. BEVAN SWIFT, G2TI

THE death of Mr. H. Bevan Swift, A.M.I.E.E., G2TI, recorded briefly last month, severs a link with the earliest days of the Society and deprives many members of a friendship, the memory of which they will always cherish.

Mr. Bevan Swift's association with the Society dated back to before the first world war—he was present when the late A. A. Campbell Swinton was elected first President in January, 1914—but it was not until after the war that he began to take a close personal interest in the management of its affairs.

Shortly after he became licenced as 2TI, Mr. Swift joined the old Transmitter and Relay Section of the Society, and it was largely as the result of his earnest endeavours as Chairman that a fusion occurred between the Section and its parent body. At the time fusion was under discussion, Mr. Swift, in collaboration with Mr. J. A. J. Cooper, conceived the idea of issuing a BULLETIN to members of the T. and R. Section. It gave him—and those who knew him—great satisfaction to record in the July, 1946 issue of the Society's Journal how the BULLETIN came into being 21 years earlier.

It was Mr. Bevan Swift who first suggested that an Annual Convention be held in London. Members who were present at those early gatherings remember how skilfully he handled the business proceedings and with what charm he officiated at the Convention Dinners.

During his long and virile association with the Society Mr. Bevan Swift held practically every administrative office at one time or another. He was Honorary Secretary in 1928, Executive Vice-President in 1929 and 1930, President from 1931 to 1933, and Honorary Editor from 1934 to 1940. In 1939 he was elected an Honorary Member.

On very many occasions Mr. Bevan Swift presided over lecture meetings of the Society held at the Institution of Electrical Engineers. On such occasions he could always be relied upon to relate some personal anecdote concerning the early days of radio. He had a very long memory and in his time he had met and been associated with many leading electrical and radio engineers.

Traditionally, until illness prevented him from attending last December, Mr. Bevan Swift proposed a vote of thanks to the President and Council of the Institution of Electrical Engineers at each Annual General Meeting of the Society. Mr. Swift was an Associate Member of the Institution.

Mr. Swift's wisdom and understanding will long be remembered by those who worked with him during the years between the wars. So often he was called upon to resolve acute differences of opinion and to make decisions of far-reaching importance. His judgment was seldom at fault.

To the newer generation of members Bevan Swift is only a name but Old Timers will always remember him as the Grand Old Man of British Amateur Radio.

The internment was at Streatham Park Cemetery, London, on November 9. The Society was represented by Mr. Arthur E. Watts, G6UN, Past President; Mr. John Clarricoats, G6CL, General Secretary, and Miss May Gadsden, Assistant Secretary. Mr. L. Blanchard, BRS3003, represented the Surrey Radio Contact Club of which club Mr. Bevan Swift was President.

TELEVISION INTERFERENCE SUPPRESSION

ADVANTAGES OF SINGLE SIDEBAND TUNING

By DONALD W. THOMASSON *

THE discussion at a recent R.S.G.B. meeting on the effect of interfering harmonics from the amateur bands on television reception left no doubt in the minds of those present regarding the seriousness of this form of interference. The examples of the resulting picture distortion showed the necessity for effective cures for all cases.

The interference is especially serious in areas of low signal strength; not only because that part of it which is due to local transmitters is at a relatively high signal level, but because the interference may originate from a much greater distance. At exceptionally long ranges, in South-West England, for example, appreciable interference may be caused by transmitters which are fifty or more miles away. It would be an irksome task to have to check all stations within this radius.

In such cases the usual rule; that the trouble should be traced to its source; cannot apply. The fault is still at the transmitter, but a cure must be sought in the receiver. One of the best available cures is the use of single sideband tuning for the receiver.

Single Sideband Reception

The so-called "single sideband" technique, as applied to television reception, amounts to a modification of the response curve of the R.F. stages. A more correct term is "vestigial sideband," for, as it will be seen, the response covers the whole of one sideband and a small part of the other.

The response curve used for double-sideband reception is symmetrical about the carrier frequency, and has a total width of about 6 Mc/s. between the –3 db. points. The single sideband response, on the other hand, is asymmetrical, and extends upwards from the carrier to about 48 Mc/s. The response at the carrier frequency (45 Mc/s.) is 6 db. below the maximum level.

The first advantage gained from the use of single sideband tuning is that the response of the vision receiver to the sound signal on 41·5 Mc/s. is greatly reduced. With double sideband working, the response at the sound channel is, at most, 20 db. down, whereas it can be reduced to –70 db. by single sideband tuning. It is worth noting that the effect known as "sound on picture," which is due to the vision receiver picking up the sound signal, is very similar to the interference caused by amateur transmissions.

Another advantage gained is that the noise level is reduced, owing to the smaller bandwidth. This is very valuable in areas of low signal strength, and is also useful in some cases where the general interference level is high.

Thirdly, the reduction in bandwidth makes an increase in gain possible. This is offset to some extent by the fact that the response at the carrier level is –6 db., but an increase in overall gain can be obtained in most cases.

The main disadvantage which has been quoted is the difficulty of correct alignment. It will be shown that there is, in fact, no real difficulty.

* *Ayton Cottage, Matford Avenue, Exeter.*

Amateur Interference

Interference from amateur transmissions is due to the generation of harmonics by a faulty transmitter. This should be understood clearly; the responsibility rests with the man who causes the interference, and the true cure is in his hands. It may be, however, impossible to locate all faulty stations, as has been pointed out. Fortunately, the use of single sideband tuning does much to suppress such interference.

The improvement to be expected may be summarised:

Signal Frequency in Mc/s.	Order of Harmonic	Frequency of Harmonic in Mc/s.	Suppression with Single Sideband relative to Double Sideband
3·5 – 3·59	12th	42·0–43·0	More than 40 db.
3·59– 3·68	12th	43·0–44·2	25 - 40 db.
3·68– 3·72	12th	44·2–44·6	10 - 25 db.
3·72– 4·00	12th	44·6–48·0	Negligible Suppression.
3·50– 4·00	13th	45·5–52·0	No Suppression.
7·00– 7·30	6th	42·0–43·8	More than 25 db.
14·0–14·40	3rd	42·0–43·2	More than 30 db.

The lower order harmonics are considerably reduced, and some of the higher harmonics are also cut down. The practical result is that the interference becomes very much less, since there is little trouble from the higher harmonics in any case. Where the offending transmitter is very close, interference will still be caused, but that is very different from transmitters within 50 miles.

Conversion of Existing Receivers

Many modern commercial receivers use single sideband tuning, and are, therefore, relatively free from interference. There are, however, many receivers in existence which use double sideband tuning. The problem is to convert these to the other type of tuning.

The possibility of this depends to a large extent on the circuit used. The conversion is easier when a superheterodyne circuit is used, because the carrier can then be adjusted exactly to the –6 db. point on the response without altering the shape of the response curve. Nevertheless, there are a number of commercial sets of the "straight" type which use single sideband tuning, so this must not be taken as a hard-and-fast rule.

The retuning process requires that the response should be reduced to half the total bandwidth. If damping resistors are used across the tuned circuits to increase bandwidth, these may have to be removed to obtain the smaller width. This will increase the gain, and instability is likely. If staggered tuning is used, the reduction may be obtained by simple adjustment of the trimmers, but instability is still to be expected. One cure is to reduce the gain by lowering voltages, but the precise course of action must be determined by the particular set in question.

In general, conversion is possible. Some very successful experiments were made on the pre-war version of the set now known as the *Cossor* 900, and the work proved to be quite straightforward. Nevertheless, it should only be undertaken by an experienced television engineer.

Alignment Procedure

As really experienced television engineers are rather few and far between, some notes on alignment technique will be useful. The method given is based on observation of the alignment work on commercial receivers. While the initial adjustments are made with signal generator and output meter, the final trimming is often carried out by the method known as " trimming on picture." This involves adjustment of the trimmers with a picture on the screen, the settings being altered until the picture quality is at its best. In theory, this should be quite unnecessary, since the settings given by the initial alignment should give a good picture. The method is, therefore, viewed with some disfavour by designers.

Curiosity prompted an examination of the response curve produced by this method. At first, it seemed to be quite unreasonable, having various odd peaks, and always one peak near the carrier frequency. The answer was found when the overall video response was examined. If a signal of constant carrier frequency modulated to a constant depth by a video signal was applied, the resulting video frequency output remained constant over a wide range.

The explanation is that the variations in the R.F. response compensate for variations in the response of the video amplifier, so that the overall video response is flat.

It is of interest to note that this compensation is more complete with single sideband tuning, providing yet another point in favour of the method.

The alignment procedure suggested is, therefore: Set up the response roughly for a pass band running from –6 db. at 45 Mc/s. up to about 48 Mc/s. Then apply a 45 Mc/s. signal with constant depth modulation, the modulation frequency being variable through the video range (up to about 3 Mc/s.). Trim until the output is constant over as wide a range as possible, and finish by aligning for best picture quality.

The ideal method is to use a Panoramic Display, which consists essentially of an oscilloscope whose sweep is synchronised with the frequency variation. The output is displayed on the other axis, and the video response curve is plotted on the screen. Even without this, however, the alignment should offer little difficulty.

Television DX

The technique which has been described was originated in the course of experiments on long distance television reception. It has been found very useful in this connection, not only because of reduced interference from transmitted harmonics, but also because of the lower noise and increased gain.

Television DX is gaining considerable interest these days, and it may be expected that complaints of interference will increase and spread to areas where they have been unknown.

Tests in South-West England have shown that reception in low signal strength areas is greatly improved, if not made possible, by the use of the single sideband technique.

Conclusion

It has been shown that the single sideband technique has great advantages for television reception. The advantage of interest to amateurs is the suppression of interference, but the others are indirectly of interest, because the acceptance of the technique will reduce the number of complaints from irate " viewers."

Most manufacturers recognise the advantages offered by the technique, and many have made it a rule in their products. It is to be hoped that the others will soon follow suit.

A last word. It must be emphasised that this is not a cure for interference, since it does not remove the cause. It should only be applied in areas of low signal strength, where other methods are ineffective.

* * *

[In our opinion the installation of existing commercial types of television receivers outside the normal service area will inevitably bring trouble due to interference from amateur transmitters, and should be strongly discouraged. This article is published, however, in the hope that the technical information given may be of value in ameliorating interference in existing cases.—ED.]

Interference in the 3·5 Mc/s. Band

A complaint has been received that amateurs are interfering with experiments which the Netherlands Posts and Telegraphs Administration are carrying out in the 3,635–3,685 kc/s. band. Although it is not thought that British amateurs are concerned, it is important that they should remember that this portion of the 3·5 Mc/s. band is not open to them.

The Medway Towns' Radiolympia

The Medway Amateur Receiving and Transmitting Society last month presented to the public of the Medway Towns their own Radiolympia in the New Corn Exchange, Rochester, Kent. Two thousand people visited the exhibition during the four days it was open, and the Society enrolled many new members.

The show was opened on November 24 by Miss Sylvia Peters, of the B.B.C. Television Service, supported by the Mayors of the Medway Towns, Mr. John Clarricoats, General Secretary and Mr. A. O. Milne from R.S.G.B. Headquarters.

The exhibitors included Mullard Electronic Products, Automatic Coil Winder, Decca, Denco, Philco, Standard Telephones, Butler Radio and local traders. The M.A.R.T.S. stand displayed transmitters for all bands and a variety of receivers. The Admiralty displayed W/T equipment and radar gear, including the Decca Navigator.

At the conclusion of the show an Eddystone 640 receiver, donated by Butler Radio Co., Faversham, Kent, was presented to the Society. Further presentations were made to the President, Mr. Nutton, G6NU, and the Secretary, Mr. S. Howell, G5FN, in appreciation of their efforts in promoting and organising the exhibition.

Llapdudno Get Together

At a dinner-meeting of North Wales members held on November 24, an attendance of 36, including 24 with full call signs, was recorded. The chief purpose of the meeting was to give the new T.R. for Llandudno (GW4MZ) a good start off, and it was successful in that from now on monthly meetings will be held in the town. Mr. F. Southworth, GW2CCU (Region 11 Representative) described his visit to the Amateur Radio Exhibition after which GW3DGZ gave a talk on Amateur Radio conditions in VE3. The chairman of the meeting was GW6OK and the organiser, GW3KY, who had the full co-operation of GW3QN and the new T.R.

Radio Control of Models

Members interested in the radio control of models should communicate with the Hon. Secretary of the Radio Controlled Models Society, Lt. (L) G. C. Chapman, R.N., Pine Corner, Heathfield, Sussex.

An interesting list of pamphlets on the subject has been prepared by the Publicity Secretary Mr. J. A. Jeffs, 25, Meadway, Hough Green, Widnes, Lancs.

Radio Amateurs' Examination 1949

Students who propose to enter for the above examination should make application through their local technical college or the office of a Local Education Authority not later than March 1, next.

THE STATION BEHIND THE CALL

THE BULLETIN invites members to submit photographs and descriptions of their stations. Not only elaborate installations but rigs that show ingenuity and a fresh approach to operating techniques will be featured.

All material published will be paid for at the rate of £2 2s. per 1,000 words.

Contributions should be addressed to the Editor, R.S.G.B. Bulletin, New Ruskin House, Little Russell Street, London, W.C.1.

THE MONTH ON THE AIR

By A. O. MILNE (G2MI)*

" Spitch "

THIS expressive word, coined many years ago by " Uncle Tom " (G6QB) may be defined as " that type of transmission which no other word can adequately describe ! " Our reason for mentioning it now is to draw attention to the mounting number of stations which clutter up our bands with noises which are *supposed* to be telephony. Except for a very rare lapse, this phenomenon is of foreign extraction. It was at one time mainly centred in France but has recently spread to Italy and Spain.

It is now quite common to hear EA and I transmissions which occupy more than a hundred kilocycles of one of our precious bands with a noise so fearsome as to frighten little children !

We appeal to amateurs in all countries to keep the bands clear of such signals, and to do what they can to suppress any wilful offenders.

" Ham Spirit—New Style "

A three letter G3 was recently heard to remark over the air " S.W.L. visitors have no need to call on me, since they will not be welcome." The picture of a long queue of S.W.L.'s anxious to gaze at the great man's rig, brings tears of sympathy to our eyes ! What fame can do to a man—and he wasn't even a *two letter* G3 ! !

" Post-War "

Just in case anyone still thinks there is a " post-war cards only " catch in R.S.G.B. certificate rules we should like once again to draw attention to the fact that *Amateur Radio did not die in this country during the war, whatever it did in America*! We could never see the sense in this " post-war " business. Why not make everyone start again every year or after each Presidential election ? As someone said the other day, " I have AC4YN's pre-war card for Zone 23 and it doesn't count." Why discount all the good work done before the war ?

Apparently there are now no old timers in the U.S.A.—the first lot will qualify in 1965 ! !

Notes and News

From Ken Jowers we learn that all licences in Pakistan have been cancelled except for British Service and Diplomatic personnel who are trying to keep AP on the map.

BRS1066 has logged ZD9AA at 21.45 G.M.T. working W1KLY on 7 Mc/s. C.W. BRS11494 of Manchester has logged VP2AC, CR7AH, ZS3D, C7MT and HI6EC on 28 Mc/s. and AR1RJ, VP5AX, ZP2AE, CP6FB and ET3AB on 14 Mc/s. which ought to satisfy anyone for one month.

G6RH mentions the D4 recently heard to remark, " Input here is 600 mA at 2,500 volts." For the benefit of any XYL's who may read this column, this comes out at 1½ kW ! 'RH has heard CR10FU on 14050. Other good ones are ZD9AA on 14000, KP6AE, 14060, VP2GE, 28180, HH1HB, 28360, phone, and CZ2AC on 14080.

John Dain, ex-G2FMM, active as ZS1MM (QTH 10 Park Avenue, Camps Bay, South Africa), is looking for G's. HZ1AB is now being operated by W2OHN who promises 100 per cent. QSL. He apologises for the omissions of his predecessor who kept no proper log and was very remiss over QSL's.

BRS15822 has heard C4YU/C7 (Box 52, Peiping), EL5A, CT3AA and KP6AE, all on 14. VS7MM is looking for G contacts. He is using a 6V6/807/807's P.P. rig on 14 Mc/s. The series VP8AJ–8AQ on 14 Mc/s. belongs to the Falklands Survey Expedition who work between 23.00 and 24.00 G.M.T.

Cards for the following calls are held at the R.S.G.B. Bureau : VS7FF, VS7GM, D2GO, AP2D, AP2H and VU2LR. Envelopes please !

VQ4CUR (28258 kc/s.) wants some QSO's with Leicester. OY8LA has returned to Denmark, OY5WS has been licenced but is not yet active, OY3IGO is still active on 14.

G6WF reports working W7ILE/KX6 whose very fine QSL inaugurates the recipient into the " Royal Order of International Dateliners." QSO on 28540 at 10.30–11.30 G.M.T. VS1CX has worked a station who uses the call CAR and he says he is on Car Nicobar Is. and awaiting " a proper call-sign." GI4NU has come across with a card from HV1AD. This has now been sent to the A.R.R.L. and it looks as if another country will have to be added to the list. BRS17097 gives the QTH of AR1AJ as Box 35, Damascus, Syria. GM3AVA, ex-VU2WP, says VQ8AE wants GD, GC, GI and EI. He works mostly on 28450 every day from 14.00–16.00 and is also on 14 Mc/s. This is Zone 39. At present there is no activity in FB8, FR9 or VQ9.

BRS10789 is at the R.A.F. station at Shubra, M.E.F., and has heard VR6PU at 569 on 14 Mc/s. New one on us ! MC1A is still the only licenced MC and asks for QSL's to Cable & Wireless Ltd. (Mr. Maurice Hanson), Bengasi, Cyrenaica.

Mobile Mariners

G3ZR sends a list of " M.M " stations he has contacted, most of whom are regular traders between the Persian Gulf and Southern U.S.A. :—W2LDH, s.s. " Steel Voyager " ; W3KIF, s.s. " Robin Wentley " ; W1PHV, s.s. " Alabama " ; W2EO, s.s. " Milton " ; W3NCV, s.s. " South Star " ; W7RNT, s.s. " John McDonogh " ; W7FS, s.s. " Nathaniel Crosby " ; W0LNX, s.s. " Robert Neighbours " ; W2VJW, s.s. " Greeley Victory " ; W2IBZ, s.s. " Mount Davis." W7RNV, W2KEZ, W2VZE and W5OCN are also working " M.M."

" Dud " Charman—G6CJ explains Circular Polarisation

Snippits

G3EKN, ex-BRS13603, made his first CQ after receiving his licence and raised G3EKM, an otherwise complete stranger over 250 miles away. Welcome to G3EGR, ex-BRS15940, who takes out his first ticket at the age of 62 !

We are now in a position to QSL to YU7KX who has just sent in a long list of G's and Empire stations from whom he requires QSL, so what about it chaps ?

Ex-G2AIS now in New York asks visiting G's to contact him by telephone on ATwater 9–5700. He is one of the regular volunteer operators of K2UN which operates every Saturday evening mostly on 14 Mc/s. phone and C.W. He says 4UN is an official United Nations station operated by members of the radio division attached to the Palestine truce commission in Rhodes. There are two others, ZC6UN in Haifa and ZC6UNJ in Jerusalem.

" The Amateur is a Gentleman " . . .

A letter comes from G8IJ at present in Iraq. He recently visited MP4BAB—ex-VS9GT. We quote : " I spent a day with him on 14 Mc/s. and when the G's and W's started coming in, it was like a madhouse. The number of stations who persisted in barging in on our QSO's was appalling.

" A station using the call-sign W6FU actually floated his V.F.O. backwards and forwards across the station we were working, to make sure we should hear him ! After each contact we had to shift frequency and wait for someone to call CQ. Four times this W6FU swooped down on us and broke up the QSO."

The transmitter at 'BAB is a modified T1154 working into a Windom. His receiver is an AR88. Cpl. Johnson QSL's 100 per cent.—spivs excepted!

Easier than Ever!

The following changes in nomenclature have recently been announced by *Mullard Electronic Products Ltd.* :

QVO4-20 becomes QQVO4-20
QVO7-40 becomes QQVO7-40

This modification has been introduced in order that the type numbers may be brought into line with the *Mullard* system of nomenclature as applied to transmitting and industrial valves.

How much easier it would be if they were called the 420 and 740.

Offers

Mr. A. Fletcher, BRS11379, 6 Maple Avenue, Beeston, Notts., has instruction manuals for the SCR-729-AZ, AN/ARN-5, SCR-718-A, SCR-695-AZ, AN/ARN-7, SCR-522-A, BC-348-Q. In exchange he requires the manual for the BC-348-R.

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

AROUND THE VHF's

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

The " Royal " Show

THAT there is considerable and growing interest in V.H.F. operation in this country, no one who visited the recent Amateur Radio Exhibition at the Royal Hotel, London, would be prepared to gainsay. Most of the stands held something designed for, or applicable to the higher frequencies, be it valves, components, measuring instruments or complete transmitters and receivers. Furthermore the G.P.O. showed that they are in a position to take an interest in our transmissions—even on the 2,350 Mc/s. band—with the intricate panoramic receiver and frequency measuring apparatus there displayed for the first time.

Another exhibit, on the same stand, which took the fancy of amateurs generally, and of the V.H.F. fraternity in particular, was the super " rubber crystal " circuit—30 kc/s. shift at 5 Mc/s.—derived from the standard G.P.O. frequency modulated transmitter. This idea certainly opened up intriguing possibilities of enormous C.C. frequency coverage on 2 metres and higher with only one or two crystals, but as the exhibitors pointed out, the greatest care would need to be exercised to guard against spurious emissions and unwitting off-frequency operation.

A further expression of V.H.F. interest among members was provided by the excellent attendance at the London meeting held on November 26 at the I.E.E. when Mr. E. A. Dedman, G2NH, lectured on the subject of " Equipment for the 145 Mc/s. Band." Many examples of members' home-constructed apparatus were on view, including a Type 26 R.F. unit which had been converted by G2FMF to operate on 145 Mc/s. in the short space of two hours !

Five Metre Activity

G3EHY of Banwell, Somerset, licenced at the end of September, has worked stations in 14 counties, his best DX being G6OS in Yorkshire. He beams his signals eastwards each evening between 2230 and 2245 GMT. G3EHY reports that GW3EJM and G3HW/A (Teignmouth, Devon) are active.

We learn from EI8P of Dublin, that the first EI/GI 5 metre reception was made during the tests on October 17, when his station was heard by GI5SJ and GI3BIL. Signals were only S3/4 during the period 15.00/18.00, but by 20.00 they had peaked to S6. Unfortunately GI5SJ was not heard in Dublin by EI8P or any of the four monitor stations listening. EI8P intends to operate on 59 Mc/s. each Sunday according to the following schedule :—

Beam NE at 15.30 and 19.30 G.M.T.
" E " 16.30 " 20.30 "
" SE " 17.30 " 21.30 "

and it is hoped that an EI/G QSO will result.

Five Metres in Retrospect

The opening of the two metre band has undoubtedly led to some decrease in five metre activity, but there are still quite a number of stations working on the lower frequency. This our first V.H.F. allocation, has served us well from the time when with the crudest of self-excited oscillators and super-regen. receivers 5 miles was real DX, up to the present era of crystal controlled transmitters and double superhets. with 100 to 150 mile contacts being regarded as a more or less normal state of affairs. It is possible, *but by no means certain*, that this band will cease to exist as an amateur allocation on December 31, 1948 and with that possibility in mind several members have suggested arranging a " final fling " week end some time during this month. We have previously mentioned on this page that R.E.F. are holding a five metre contest during the week end December 18–19 and it seems appropriate, therefore, for us to have our " party " at the same time. This event is not in any way a competition, but a chance, and maybe the last chance, for the devotees of this interesting band to effect QSO's with friends old and new. So let us have as many stations active as possible between the hours of 12.00 and midnight on the Saturday, and 08.00 and midnight on the Sunday—the times of the French contest—and if you care to send a list of stations heard and worked, together with any interesting details, we shall be pleased to prepare a report for publication in a future issue.

Two Metres During November

Conditions on this band were exceptionally good on several occasions during the month, one of the best openings occurring during a persistent temperature inversion on the 10th, 11th, and 12th. On the 12th a number of Dutch stations were active and many contacts with this country were made. What is almost certainly the longest distance QSO yet made on this side of the Atlantic on two metres was that between G5BY at Bolt Tail, South Devon, and PA0PN situated in the west of Walcheren, on November 12. The Dutch operator was heard to remark that the C.W. and 'phone QRM made the band resemble 14 Mc/s. ! G6DH (Clacton), has the distinction of having made the first contacts with the three European countries so far worked from G : PA0PN, ON4FG and F8OL (Meudon, 6 miles SW of Paris). The G6DH/F8OL contact took place at 20.30 G.M.T. on November 10.

* *32 Earls Road, Tunbridge Wells, Kent*

420 Mc/s Group Schedule

IN order to increase the possibility of contacts on the 420 Mc/s. band, G2WS suggests that Wednesday evenings from 8 to 10 p.m. shall be regarded as a time at which all operators on that band will be active whenever possible. Will all who have transmitters working on the band endeavour to put out signals during this period each week ?

G2WS (Beckenham), using a 5 element beam, is getting satisfactory results, and despite a poor location has been successful in working G5BY as well as stations in the Isle of Wight. He complains that far too many 'phone operators carry on long conversations followed by the rapid mumbling of a call-sign once only, which is usually lost, and never sign on C.W. This criticism is also made by a number of other correspondents. Have a heart, O.M.'s—there are quite a number of BRS's on the band, and this sort of thing is no encouragement for them, nor to those who are trying to assess the performance of a new receiver.

Seventy-Five Centimetres

From what we hear there would appear to be considerable activity within several isolated groups, but no contacts over a greater distance than about six miles have so far been reported. G2FKZ, 2VJ and 3CU (London SE 24), are putting in some intensive work and run a nightly schedule on approximately 436 Mc/s. with set times for listening for five minutes past the hours of 20.00, 21.00 and 22.00, followed by the transmission of a CQ call for the next five minutes. Skeds would be welcomed, likewise listeners' reports. 2FKZ employs an 18 element beam without reflectors, while 3CU has a 16 element uni-directional array.

G2RD (Wallington, Surrey), has been heard by 2FKZ at a distance of 6½ miles, and it is hoped that improvements now being made in his aerial and receiver will enable a two-way QSO to be effected. His frequency is 435·5 Mc/s.

G2BRH and 8TL (Ilford, Essex), are keeping the following schedule :—

G2BRH (435·24 Mc/s.) Wednesdays 23.50, Fridays 23.00.
G8TL (436·05 Mc/s.) Mondays 22.00.

Reports from any distance will be welcomed.

G2WS reports that the 420 Mc/s. Group now numbers 7 members, with G2BVN as Secretary. 'WS is operating with low power 'phone and C.W. and a 5 element indoor beam, and is ready to co-operate in tests.

Vertical Polarisation

Vertical polarisation is in use at most stations operating on the band as it has been found that not only is this easier from the point of view of aerial construction, but there is less chance of interference with aircraft radio altimeters, which operate in the lower end of the band with horizontal polarisation. For the information of those who live on or near regular air routes, the signal produced by these altimeters occupies a band some 20 Mc/s. wide, and audible for many miles on a sensitive receiver. It has been noticed by the South London operators that 420 Mc/s. signals tend slowly to increase in strength for some two hours after darkness falls, although this effect has so far not been mentioned by others.

New 2,350 Mc/s. Record

It is again our pleasure to record a further achievement on this band, this time by G8DD of Beeston, Notts., who, operating portable from Beacon Hill (800 ft.) 3 miles SSW of Loughborough was received by G6CW/P at Burbage Moor (1,392 ft.), 5 miles WSW of Sheffield, *a distance of* 45 *miles*. Extremely bad weather almost certainly accounted for this being a one-way contact only, as it was during a short period when the prevailing low cloud lifted and visibility increased to several miles that signals got through—at S7/8. According to available data, the absorbtion due to the existence of cloud between the two stations would not seem to be sufficient to cause a complete cessation of signals, and it is possible that bending of the beam from the line of sight by the cloud was mainly responsible. Any authoritative information having a bearing on this matter would be welcomed by 8DD and his collaborators 3CZV, 6CW and 8QZ.

We should like to take this opportunity of wishing all our friends the compliments of the season, and to remind them that owing to the Christmas holidays this page will close for press on December 22.

Congrats

● To C.P.O. R. G. Brunskill, G3BAM, and his wife, of Liverpool, on the birth of a son on November 20.
● To Mr. W. S. Hall, G2AOL, and Mrs. Hall of Otford, Kent, on the birth of a daughter—Elizabeth—on October 17.
● To Mr. Desmond Clift, G3BAK, on his marriage to Miss Marjorie Booth—October 26, 1948.
● To Mr. Alex. Cross, BRS6, and his wife, of Dundee, on the birth of a daughter, Barbara.

Bon Voyage

● To Rowland Beardow, G3FT, who sails on December 20 for Ontario, Canada.

HIC ET UBIQUE

COUNCIL, 1948

President:
VICTOR M. DESMOND, G5VM.

Executive Vice-President: W. A. Scarr, M.A., G2WS.
Hon. Secretary: K. Morton Evans, O.B.E., G5KJ.
Hon. Treasurer: A. J. H. Watson, F.S.A.A., G2YD.
Hon. Editor: Arthur O. Milne, G2MI.
Immediate Past President: S. K. Lewer, B.Sc., G6LJ.

Members: I. D. Auchterlonie, G6OM, F. Charman, B.E.M., G6CJ, D. N. Corfield, D.L.C.(Hons.), A.M.I.E.E., G5CD, G. H. L. Edwards, A.M.I.E.E., G8TL, R. H. Hammans G2IG, J. W. Mathews, G6LL.

General Secretary: John Clarricoats, G6CL.

G.P.O. Liaison Officer: Arthur E. Watts, G6UN

October Council Meeting

Resume of the Minutes of a Meeting of the Council of the Incorporated Radio Society of Great Britain held at New Ruskin House, Little Russell Street, London, W.C.1, on Tuesday, October 19th, 1948.

Present.—The President (Mr. V. M. Desmond) in the Chair, Messrs. Auchterlonie, Corfield, Edwards, Hammans, Lewer, Mathews, Milne, Scarr, Watson and John Clarricoats (General Secretary).

Apologies.—Apologies were submitted for the absence of Messrs. Charman, Evans and Watts.

Annual General Meeting.

Resolved to hold the 22nd Annual General Meeting of the Society on January 28, 1949, and to include the notice convening the meeting, together with a copy of the audited accounts and the Report of the Council, in the December issue of the BULLETIN.

(A statement dealing with this Resolution appeared in the November issue of the BULLETIN).

National Convention, 1949.

Resolved to invite the Regional Representatives to obtain the views of members concerning a suggestion that a National Convention be held in Manchester during 1949.

Council Meetings.

Consideration was given to a Resolution passed at a recent East London meeting that members "would like by some means to have fuller information of the business carried on at Council meetings."

Resolved to recommend the East London District Scribe to apply to his Regional Representative for an advance copy of the Resume of the Minutes of Council Meetings. (An advance copy of every Resume is issued to R.R.'s immediately after it has been approved by the Council.—ED.)

Headquarters' Station.

It was reported that the call GB3RS had been issued to Headquarters for use when the equipment is operated as an amateur station.

Membership.

Resolved to elect 156 Corporate Members, 33 Associates and 12 Junior Associates, and to grant Corporate Membership to nine Associates who had applied for transfer. Total elected 201.

Finance.

Resolved to accept and adopt the cash account for the month ended 30th September, 1948.

Technical Manager.

Resolved to accept a recommendation of the Finance and Staff Committee not to re-advertise for a Technical Manager until members have had an opportunity of expressing their views on the question of increased subscriptions.

The meeting closed at 9.25 p.m.

London (I.E.E.) Meeting

An attendance of nearly 150 was recorded at the meeting held at the Institution of Electrical Engineers on Friday, November 26, 1948, when Mr. E. A. Dedman, G2NH, delivered a paper entitled "Equipment for the 145 Mc/s. Band." Following the lecture, Messrs. W. H. Allen, G2UJ, P. J. H. Matthews, G3BPM, F. J. Rutter, G2FMF, and C. E. Newton, G2FKZ, gave short talks on items of 145 Mc/s. equipment which they had brought along for display. In addition *Webbs Radio*, through the good offices of Messrs. Pickard, G6VA and R. B. Brett, G4IG, showed two transmitters which had been on display earlier at the Amateur Radio Exhibition.

An interesting discussion followed, after which Mr. D. N. Corfield, G5CD, voiced the thanks of all present to Mr. Dedman and others who had contributed to the programme. The Chair was taken by Mr. W. A. Scarr, M.A. (G2WS), Executive Vice-President.

Mr. Dedman's paper will appear in a future issue of the *Proceedings of the R.S.G.B.*

Official Regional Meeetings

The Council has decided that the statement published in the July, 1947, issue of the BULLETIN that members may attend the business portion of an Official Regional Meeting without payment requires modification.

At the recent Region 1 meeting at Belle Vue, Manchester, a member was refused free admission to the business meeting. On that occasion the Belle Vue authorities made a charge for the hire of the room for the business meeting, and for that reason the organisers could not permit members to attend the meeting free of charge.

The Council recognises that the organisers of an O.R.M. must be allowed to decide upon the conditions of entry.

Associate Numbers

As announced in the June, 1948, issue of the BULLETIN, identification numbers in the series A1000 will be issued on request to Associates and Junior Associates who wish to make use of the QSL Bureau. Recently our attention has been drawn to a QSL card bearing the imprint B.R.S. A1065. It should be emphasised that the letters B.R.S. are reserved for *Corporate* (British Receiving Station) members. The Associate concerned has been requested to modify the wording of the misleading card.

R.C.M.F. Annual Private Exhibition

The Sixth Annual Private Exhibition of British components, valves and test gear for the radio, television, electronic and telecommunication industries will be held in the Great Hall, Grosvenor House, Park Lane, London, W.1, during the period Tuesday, March 1 to Thursday, March 3 1949, daily from 10 a.m. to 6 p.m.

Admission is by invitation only as in previous years. Applications for tickets and further information can be obtained from the Secretary, *Radio Component Manufacturers Federation*, 22 Surrey Street, Strand, London, W.C.2.

Region 5 Representation

Due to pressure of private business, Mr. Stan Granfield, G5BQ, of Cambridge, has asked to be relieved of his duties as Region 5 Representative. Mr. Granfield has been Regional Representative for the past two years and for eight years previously he was District 8 Representative. Last May he was appointed Headmaster of a very large school in Cambridgeshire and his extra responsibilities in that connection make it impossible for him to devote as much time as he would like to Society affairs.

The thanks of the Council and Headquarters staff are extended to Mr. Granfield for his past services. By his resignation the Society loses the services of a most reliable and experienced officer.

Corporate members resident in Region 5 are invited to submit to the General Secretary nominations for his successor. Each such nomination must be supported by five Corporate Members and accompanied by a letter from the nominee agreeing to serve if elected. Closing date for nominations December 31, 1948.

Representation

The following are additions or alterations to the list of Representatives published as a Supplement to the February issue.

Town Representatives

Region 5.
Essex—
Chelmsford ... Mr. H. H. Lowe, G2HPF, 29 Mobrams Lane, Gt. Baddow.

Region 7.
London East—
East Ham ... Mr. W. Hayes, G3CJQ, 129 Altmore Avenue, E.6.

Region 12.
Forfar ... ... Mr. J. A. Clark, GM2HIK, 30 North Street.
Montrose ... Mr. R. Pearson, GM3CAP, 17 St. John's Cottages.

* * *

Vacancies

Messrs. E. C. Grafton, G2CGL, and B. A. M. Herbert, G2WI, have resigned as Town Representatives for Hull, and Bromley and Beckenham, respectively. Nominations for their successors should be made in the prescribed form and sent to reach the General Secretary by December 31, 1948.

North London District Representation

Mr. S. J. Pendrey, BRS12530, having relinquished his membership, a vacancy now exists for the office of North London District Representative. Nominations in prescribed form should reach the General Secretary, by not later than December 31, 1948.

* * *

Ballot

Mr. A. Barber, G5WA, Nanpantan, Windmill Road, Minchinhampton, Nr. Stroud, and Mr. R. Sharp, BRS7961, 112 St. Michael's Hill, Bristol, 2, having been nominated for the office of Gloucestershire County Representative, a ballot becomes necessary. Corporate Members resident in Gloucestershire are invited to record their vote in favour of one of the above candidates, and to forward same on a postcard addressed to the General Secretary, by not later than December 31, 1948.

S.A.R.L. DX Contest 1949

The South African Radio League announces that its first post-war DX Contest will be held in January. The contest, which will be confined to C.W. operation, is open to licensed amateurs throughout the world. Certificates are to be awarded to the three leading DX stations and also to the leading station in each zone from which at least three entries are received. Entries must be received not later than April 30, 1949, and should be addressed to S.A.R.L. DX Contest, P.O. Box 462, Port Elizabeth, South Africa. The decision of the S.A.R.L. DX Contest Committee will be final. Only one person is allowed to operate a specific station during the contest.

Rules.

1. The Contest will extend from 00.01 G.M.T. Saturday, January 22, to 24.00 G.M.T. Sunday, January 23, and from 00.01 G.M.T. Saturday, January 29, to 24.00 G.M.T. Sunday, January 30, 1949.

2. Stations in the Southern Africa zone will exchange six figure groups with stations in the rest of the world. The first three figures will be the signal report and the last three the self-assigned serial, *e.g.* 569333; 559807, etc.

3 (*a*) For the purposes of the Contest Southern Africa is divided into the following prefix zones: (1) ZS1; (2) ZS2; (3) ZS4, ZS7, ZS8; (4) ZS5; (5) ZS6, ZS9; (6) ZS3, ZE1, ZE2, VQ2, VQ3, CR7.

(*b*) The rest of the world will be divided into zones according to the official country prefix list, except in the case of: (*a*) U.S.A. and Canada, where each call district will be a separate zone, *e.g.*, W1, W2, VE1, VE2, etc., and (*b*) Australia, where the zones will be (1) VK2, (2) VK3, (3) VK4 and 7, (4) VK5 and 8, (5) VK6 and 9.

4. *Bands.*—The 3·5, 7, 14 and 28 Mc/s. amateur bands may be used.

5. *Scoring.*—20 points for the first contact, 19 for the second, 18 for the third and so on down to 1 point for the twentieth contact, and 1 point for each contact thereafter, *in each zone.* The same method applies to each band used.

6. Only one contact with a specific station may be made on each band during each weekend of the Contest; stations worked during the first weekend may be contacted again during the second weekend.

7. Band monitoring stations under the auspices of the S.A.R.L. will be active and any station reported off frequency will be disqualified.

8. *Logs.*—Should show the following: (*a*) Date, (*b*) Time (G.M.T.), (*c*) Band, (*d*) Serial in, (*e*) Serial out, (*f*) Station worked, (*g*) Points claimed. An analysis sheet for each band should accompany entries: (*a*) Prefix zone, (*b*) Contacts (number), (*c*) Points.

14th A.R.R.L DX Competition Results

Results of the 1948 A.R.R.L. DX Competition held in February and March emphasise the vigour and enthusiasm of the many participants throughout the world. Good sportsmanship and clean-operating tactics prevailed in general although carelessly set V.F.O.'s resulted in a number of disqualifications for off-frequency operation. Top C.W. score was again compiled by XF1A (formerly XE1A) with an average of just over 55 contacts per hour to give a total of 765,000 points. W2GWE also repeated his 1947 performance in leading the American entrants by making 422 contacts with 104 different countries to give him a total of 302,574 points. XF1A also led the field in the telephony section with 314,364 points while the highest American score was 141,840 points recorded by W2AFQ.

Leading British scores included:—

Telegraphy Section.

Call Sign	Contacts	Multiplier	Points
GI6TK	634	64	121,728
GW3ZV	486	37	53,946
G6BQ	373	48	53,568
G2EC	327	47	45,308
G2PL	205	46	28,198
G8JJ	231	37	25,049
G6RB	187	39	21,606
G3AZ	206	33	20,130
G3PZ	182	37	19,314
G2MI	182	34	17,816
G2VD	154	36	15,948

Telephony Section.

Call Sign	Contacts	Multiplier	Points
G2PU	583	39	67,431
G4JZ	600	37	64,232
G6PD	601	32	57,696
GW2UH	264	21	42,786
GM2UU	376	36	40,176
G8QW	351	29	30,537
G5CP	367	27	29,349
G2AIN	335	27	26,649
G2XV	389	26	21,970
G3ZI	304	24	20,880

The 1949 A.R.R.L. DX Competition will take place during the periods February 11–14 and March 11–14 (telegraphy), February 18–21 and March 18–21 (telephony).

Slow Morse Transmissions

Day	*G.M.T.*	*kc/s.*	*Call*	*Town*
Sundays	20.30	1802	G2DLJ	Derby
Mondays	20.00	1900	G2AJU	Stutton, Ipswich
Mondays	20.00	1800	G2DJS	Bradford
Mondays	20.00	1750	G3DSR	Derby
Mondays	20.00	1900	G3DDM	Petersfield
Mondays	21.00	1900	G3BLN	Bournemouth
Mondays	21.00	1850	G8VR	London, S.E.2
Tuesdays	22.00	1896	G8TL	Ilford
Tuesdays	22.30	1820	G6JB	Salcombe, Devon
Tuesdays	23.00	1820	GM4AN	Kirkcaldy
Wednesdays	20.00	1783	G3AFD	Southampton
Wednesdays	20.00	3625	PAOAA	Hilversum
Wednesdays	22.00	1800	G3DLC	Grays
Thursdays	22.00	1896	G3BCX	South Woodford
Thursdays	22.30	1803	G3OB	Manchester
Fridays	19.00	1900	G3BLN	Bournemouth
Fridays	20.00	1900	G2AJU	Stutton, Ipswich
Fridays	20.00	1860	G3AKW	Wirral
Fridays	20.00	1900	G3DDM	Petersfield
Fridays	20.30	1868	G8LZ	Gravesend
Fridays	22.30	1820	G6JB	Salcombe, Devon
Fridays	23.00	1820	GM4AN	Kirkcaldy

The organiser, Mr. C. H. L. Edwards, G8TL, wishes to thank all amateurs who, during the past year, have so willingly given their time and skill on behalf of non-licenced members eager to learn Morse. It is suggested that all who use these transmissions should send a card to the amateur concerned acknowledging his efforts on their behalf. Other stations can co-operate by noting the frequencies and times listed above in order to avoid causing interference. Further volunteers should send details to Mr. Edwards, 10 Chepstow Crescent, Newbury Park, Ilford, Essex.

Can You Help?

Mr. C. E. Bridgewater, G3BKU, 19 Bernard Avenue, London, W.13, is anxious to obtain information to on U.S. Navy wavemeter, type LM7.

Mr. J. Warrington, BRS17656, 51 Church Street, Stanground, Peterborough, would appreciate details of the A.M. TR1460 which comprises the receiver 81B, transmitter 54A and modulator 77B.

Mr. S. H. Feldman, BRS5704, Mullion, Oak Way, Southgate, London, N.14, requires particulars of the American aircraft receiver type RU19.

Mr. R. Rogers, BRS12710, Wayside, Bratton, near Westbury, Wilts., would like to contact a member who has converted the receiver type 1132a to cover 58 Mc/s.

Mr. J. K. Brynildsen, LA9N, Gladsvei 17, Grefsen, pr. Oslo, Norway, wishes to obtain a circuit diagram for the MCR1 midget receiver.

Mr. E. S. Stainthorpe, BRS8898, 72 Granville Road, Morecambe, Lancs., requires data on the CV67 Klystron and the R.A.F. tuning unit type 207A.

Mr. J. Rayl, BRS17504, 7 Elm Avenue, Wednesfield, near Wolverhampton seeks details of the modulator type 64.

Mr. R. Whittaker, BRS17581, 194 High Street, Bloxwich, Walsall, Staffs., needs information on the power plug connections and suggested modifications for the W.D. Set 78.

Television News

Television News, a new monthly magazine published by *Amalgamated Short Wave Press Ltd.* (price 1s.), contains articles of interest to keen televiewers. Concentrating on the programme rather than the technical side, the journal should provide interesting reading for those who wish to keep in touch with the topical ideas and personalities in this rapidly expanding field of entertainment.

Can You Help ? and Congrats.

Due to increasing demands on space these two features are being discontinued.

OUR FRONT COVER

THE photograph on our front cover this month depicts adjustment of the I.F. stage of a Receiver being carried out with the aid of an " Avo " Oscillator, with a Model 7 AvoMeter being used as output meter.

The picture, which was awarded first prize in the " Avo " photographic competition for R.S.G.B. members, was submitted by Capt. A. Juniper of the 2nd Div. Sig. Regt., B.A.O.R., and the prize money was paid, at Capt. Juniper's request, to the Royal Signals Benevolent Fund.

FORTHCOMING EVENTS

REGION 1

Accrington.—January 12, 7.30 p.m., at Cambridge Street Schools.
Ashton-u-Lyne.—January 2, 3 p.m., New Jerusalem Schools, Katherine Street.
Bolton.—January 11, 8 p.m., at Y.M.C.A.
Burnley.—January 5, 7.30 p.m., Mechanics Institute.
Bury.—December 23, 30, January 6, 7.30 p.m., Club Room, Spring Mills, Tottington, Nr. Bury. January 30, 6.30 p.m., Atheneum, Market Street.
Darwen and Blackburn.—January 7, 7.30 p.m., at Weavers Institute, Darwen.
Manchester.—January 10, 7.30 p.m., Reynolds Hall, College of Technology, Sackville Street.
Oldham.—December 29, January 12, 7.30 p.m., Civic Centre, Clegg Street.
Rochdale.—January 2, 3 p.m., Drill Hall, Baron Street. January 16, Film Show.
Wirral.—December 22, January 5, Y.M.C.A., Birkenhead.

REGION 2

Bradford.—December 28, January 11, 7.30 p.m., Cambridge House, 66 Little Horton Lane.
Catterick.—Tuesdays, 7 p.m., Loos Lines, Catterick Camp.
Doncaster.—Wednesdays, 7.30 p.m., 73 Hexthorpe Road.
Harrogate.—Wednesdays, 7.30 p.m., rear of 31 Park Parade.
Hull.—December 29, 7.30 p.m., Imperial Hotel, Paragon Street.
Middlesbrough.—December 20, January 3, 7.30 p.m., 400 Linthorpe Road.
Newcastle-upon-Tyne.—December 27, 8 p.m., British Legion Rooms, 1 Jesmond Road.
Sheffield.—December 22, 7.30 p.m., "Dog and Partridge," Trippet Lane, Business Meeting and Smoking Concert. January 12, 8 p.m., Albreda Works, Lydgate Lane.
South Shields.—Thursdays, 7.30 p.m., Trinity House, Laygate.
Spenborough.—December 22, January 5, 19, 7.30 p.m., Temperance Hall, Cleckheaton.
York.—Wednesdays, 8 p.m., 29 Victor Street.

REGION 3

South Birmingham.—January 2, 16, 10.30 a.m., at Stirchley Institute.

REGION 4.

Derby and District Radio Society:—December 22, 7.30 p.m. at 67B London Road. January 5, Annual General Meeting. Venue to be announced later.

REGION 5

Southend-on-Sea.—December 22, 7.45 p.m., at G5UK, 19 Meadway, Westcliff-on-Sea. Films and Demonstration.
Southend and District Radio Society.—January 21, 7.45 p.m., at The Municipal College.

REGION 7

London.—December 30, 6.30 p.m., Institution of Electrical Engineers, Savoy Place, Victoria Embankment. Discussion "Equipment for the 420 Mc/s. Band."
Barnes and Putney.—December 14, 7.30 p.m., 28 Nassau Road, S.W.13.
Brentwood.—January 6, 7.30 p.m., at 27, Mount Crescent.
Croydon (Surrey Radio Contact Club).—January 11, 7.30 p.m., "Blacksmiths Arms," South End.
Chingford.—December 23. At G4GA, 1 Templeton Avenue, E.4. January 6. At G3DGM, 21 Mornington Road, E.4.
East London.—December 19, 2.30 p.m., Lambourne Room, Ilford Town Hall. A.G.M. "Measuring Instruments," by P. Woodhouse, G2BQY.
Edgware and District Radio Society.—December 15, 22, 29, January 5, 12, 19, St. Michael's School, Flower Lane, Mill Hill.
Enfield.—December 19, January 16, 3 p.m., at George Spicer School.
Hoddesdon.—First Thursday every month, 8 p.m., at Salisbury Arms Hotel.
Holloway.—Every Monday, Wednesday and Friday, 7.30 p.m., at Grafton Radio Society, Grafton School, Eburne Road, N.7 (one minute from the "Nag's Head.")
Peckham.—January 3, 7.30 p.m., at "The Kentish Drover," Rye Lane.
Southgate.—January 7, 7.30 p.m., at The Merry Hills Hotel, Nr. Oakwood Station.
St. Albans.—January 12, 8 p.m., at "The Beehive," London Road.
Welwyn Garden City.—January 4, 8 p.m., at Council Offices.

REGION 9

Exeter.—First Friday, 7 p.m., at Y.M.C.A., 41 St. David's Hill.
Plymouth.—Third Saturday, 7 p.m., at Tothill Community Centre, Tothill Park, Knighton Road, St. Judes.
Torquay.—Third Saturday, 7.30 p.m., at Y.M.C.A., Castle Road.

REGION 13

Edinburgh.—December 16, Supper-Dance, 6–11 p.m., at Peacock Hotel, Newhaven. Tickets 7/6 each.

REGION 14

Ayrshire.—December 29, 7.30 p.m., at Royal Hotel, Prestwick. Annual General Meeting. January 15, Annual Social.
Glasgow.—December 29, 7 p.m., at Institute of Engineers and Shipbuilders, 39 Elmbank Crescent.

Bradford Amateur Radio Society

Mr. A. R. Land (G2UY) recently gave a lecture on "Disc Recording" with demonstrations on apparatus kindly made available by courtesy of his employers, *A. C. Farnell, Ltd.*, of Leeds. During the evening a recording was made in which members of the Society expressed thanks for the generous gifts of food parcels from their friends "down under." The record was despatched to the Wireless Institute of Australia so as to be there for Christmas.

Enfield Radio Society

As a result of the recent decision to reform the Enfield Radio Society, an inaugural meeting will be held at the King's Head Hotel, Enfield Town, at 8 p.m., on January 12. Interested members should get in touch with the Acting Secretary, Mr. B. C. Lowing, G2FDO, 98 Myddleton Road, Hornsey, N.8.

Loughborough Group

Mr. L. Philpott, G4BI, the T.R. for Loughborough, appeals to members for more support for local activities. The group is co-operating with several model engineering societies and an active programme has been arranged for the coming months. During business hours G4BI can be contacted at *E. J. Philpott Metalworks Ltd.*, Chapman Street, Loughborough, 'phone 2864.

Midland Amateur Radio Society

Weekly classes for members of the above Society who desire to acquire knowledge of radio to a standard which will enable them to sit for the Radio Amateurs' Examination in May next, commenced on December 6. Further particulars can be obtained from the Hon. Secretary, Mr. A. W. Rhodes, 135 Woolmore Road, Birmingham 23.

Meetings of M.A.R.S. are held on the third Tuesday of each month at the Imperial Hotel, Birmingham.

Sheffield Activities

On the afternoon of October 24 members of the Sheffield Group were entertained at a demonstration of the new *Western Electric* sound equipment installed in the Hippodrome Cinema. Thanks to Mr. Aitchison, local W.E. representative who organised the event, and Mr. Kirkham, manager of the theatre, members had a most enjoyable and instructive outing.

The local Technical Committee has completed arrangements for the winter programme of monthly lectures at Albreda Works. Morse classes continue to be held on Mondays and Fridays, 8 p.m., at 26 Crescent Road, and show results in that one member has passed and others are taking the test in the near future.

Slade Radio Society

In his report presented at the 14th A.G.M., Mr. C. N. Smart, (Hon. Secretary) gave details of further progress. The Society now has a membership of 74—its highest post-war total. The increase in the cost of its services to members has, however, meant an adjustment in subscriptions and the annual rate is now 10s.

A full programme of lectures and demonstrations is already in outline, and, with the usual summer series of Direction Finding tests and other outdoor events the Society will continue to proceed along lines best calculated to serve the needs of Amateur Radio.

Silent Keys

It is with deep regret that we record the passing on November 18 last at the age of 75, of Captain Joseph Withers, M.C., D.C.M. (G3TW), after a painful illness borne with great fortitude. Joe was a grand old gentleman with a wonderful background, having had an ancestor with Nelson at Trafalgar. He served for 38 years with The Royal Leicester Regiment, his later work for the Territorials, making him thousands of friends. After his retirement he was one of the regulars on 7 Mc/s. He was a man of great understanding and kindness, whom to know was to gain a glimpse of true greatness in humility and see qualities that bring real peace among men. To his wife and family we express our most profound sympathy and reserve to ourselves a lasting and fragrant memory. . . So long, Joe.

* * * G2RI.

We also record with deep regret the death of Mr. Douglas R. Hooper, G2HDC, of Cheam, Surrey, after a long illness following a motor cycle accident. Mr. Hooper was a keen member of the Sutton & Cheam Radio Society.

LETTERS TO THE EDITOR

Future Low Power Contests

DEAR SIR,—I would like to support the suggestion made by Mr. J. N. Roe, G2VV, that in future contests there should be a time limit. A contest lasting for seven continuous days appears to make greater demands upon the operator than upon the battery! I would like to ask the Contests Committee to allow contestants to choose their own operating hours up to a certain maximum. There are many members whose working week includes Saturdays and Sundays and who are therefore at a disadvantage in any contest limited to the week-end period.

Yours faithfully,
L. C. HODGE (G6LH).

Stickney Rectory, Boston, Lincs.

The TR1143A

DEAR SIR,—I have recently been called upon to investigate a number of cases where TR1143A's have been reported as very noisy. The result of my investigations may be of some interest to amateurs who have purchased these sets on the surplus market.

The trouble has been traced to a modification which calls for the replacement of certain decoupling condensers by those of the metal-cased *Sprague* 0·01 μF type. The modification was carried out in such a way that the earth lead from the condenser decoupling the anode of the last I.F. valve passes over a tagboard on the wall of the chassis. This board carries the heater line of the crystal multiplier valve from the last I.F. valve and the two leads are in very close proximity. Since the I.F. of the receiver is 9·72 Mc/s. and the input frequency of the multiplier in the region of 19 Mc/s. feedback occurs at twice I.F. and the I.F. stages go into oscillation. This is heard in the receiver output as a harsh background noise.

The cure has proved to be quite simple. All that has been done is to re-route the condenser earth lead to the earth tag beside the second detector when all noise vanishes—the feedback having been eliminated. Decoupling condensers are fitted in the receiver either side of the multiplier heater but are situated so as to be ineffective in this particular case.

Yours faithfully,
J. BRADBURY (G3AUR).

R.A.F., Benson, Near Oxford.

BOOK REVIEWS

ANTENNA MANUAL. By Woodrow Smith. Editors and Engineers. Santa Barbara, Calif. (Available from R.S.G.B., 20s. Delivery 4–6 weeks.) 300 pp., well illustrated.

This book, by the editor of the pre-war "Radio" Handbook, is the most extensive of its type so far published. Yet, in spite of its size, it does not attempt to be a treatise. Essential theory is given in a form which can be followed by all readers, together with a wealth of practical information concerning the design, construction, and use of all types, old and new.

It is not merely intended for amateurs—though it is comprehensive in this direction—but is also a manual for the field engineer. Thus, medium-wave broadcast aerial systems precede the familiar "hamband" types, whilst amongst the V.H.F. "ground planes" and "corner reflectors" we find F.M. Broadcast turnstile towers.

Since a knowledge of the propagating medium is essential to the full use of aerial technique it is not surprising to find a section devoted to the subject. It is, in fact, considered so important that the first quarter of the book is occupied in giving up-to-date information about radiation and propagation of waves, covering all frequencies from 16 kc/s. to 1,000 Mc/s. This work alone is probably unique.

The next quarter of the book is devoted to the theory and practice of transmission line circuits and basic aerial types. The reader, thus armed, then enters a course of chapters which cover the entire range of practical application from low to very high frequencies. In this section is a mass of information covering all the familiar amateur systems, and a few quite original ones. The field of waveguides, horns, etc., is not entered; the writer feels (as we do) that this subject is so large and distinct as to require separate treatment.

The book concludes with a few short chapters dealing with receiving aerials, interference reduction, coupling circuits, measurement and navigational applications. Mast design and construction is not attempted.

The theoretical part is "without tears" and carried through in descriptive style with the aid of lucid diagrams, and the writer's homely style. He makes a notable attempt to bridge the chasm between the current in the aerial and the wave in space, but finally collapses (as we all do) and asks us to accept the retarded field in the same way as we accept the Creator! One is struck by an almost complete absence of "polar diagrams" of the familiar sort: presumably they waste space; the information is given in more compact form in a series of graphs of the kind which show gain and beam-width against number of elements.

There is a small error in the contents list, where two chapters start on page 153, whilst there is a slip on page 83, where the velocity, wavelength and surge impedance of a cable are stated to be inversely proportional to the dielectric constant of the insulation: it is, of course, the square root of this constant which is involved.

Of the hundreds of illustrations, the many half-tone pictures have suffered a little from the use of a coarse surface paper, but the line diagrams have been arranged to allow for this and are very clear. The exponential series of chapter lengths leads to a somewhat unbalanced effect: it is always difficult to break down transmission line theory, but the long first chapter might with advantage be made into two or three.

The book is recommended to all those who want to know how to "make aerials work." F.C.

Around the Trade

The trend towards simplification of radio manufacturing processes by the grouping of components for pre-fabrication prior to assembly into receivers has been carried one step further by the newly designed coil-pack introduced by *Messrs. Wright and Weaire Ltd.* Instead of the normal coil assembly which requires 90 soldered joints, the switch, trimmer condensers and all the wiring are pressed out at one blow of a tool. Apart from the saving in production costs and materials, there are the added advantages of elimination of dry-joints, exact reproduction and, by virtue of its construction, each pack is totally enclosed and thereby rendered comparatively dustproof.

* * *

Messrs. Erie Resistor Ltd. have submitted details of four of their latest products. These are a high stability resistor Type 100, miniature vitreous enamelled wirewound resistors, and two varieties of silvered ceramic condensers.

The type 100 resistors are obtainable in the usual values and the rating is $\frac{1}{4}$ watt at 71°C. The test data given shows that even after the most stringent treatment they maintain their values to well within ± 1 per cent. They are completely sealed in a ceramic case which not only insulates them, but also protects them from damage. They are available with the standard tolerances of ± 1 per cent., ± 2 per cent., ± 5 per cent. and ± 10 per cent. although they can be supplied in any value and tolerance.

The vitreous enamelled range (series SKC 2410 and 2420) will interest constructors of compact gear, since a 4 watt resistor of this type measures only $\frac{3}{8}$in. long by $\frac{3}{16}$in. dia. A 10 watt type is $1\frac{1}{2}$in. long. They are extremely light, have a low noise factor, and are obtainable in various values in ranges according to their wattage.

In the condenser range, type 410 is of the double cup, silvered ceramic construction and is especially designed for high voltage work, the maximum applied volts being quoted as 15kV. The capacity is 500 $\mu\mu$F $\pm$ 20 per cent. and the dimensions are $1\frac{3}{8}$in. dia. by about $\frac{3}{4}$in.

The Types 2336 triple-feed post-type silvered ceramic condensers should appeal to V.H.F. enthusiasts since they permit more compact decoupling and bypass circuits. The idea of 3 condensers, with a common grounding point (which is also the mounting bush) measuring little more than an inch in height and a quarter inch in diameter, and with various capacity ranges up to 4,500 $\mu\mu$F, should appeal to all constructors of gear for the 144 Mc/s. and 420 Mc/s. bands. The working voltage is 350 D.C. in each case.

Full details of all these components are contained in a booklet of "Application Data" issue No. 3, and obtainable from *Messrs. Erie Resistor Ltd.*, Carlisle Road, The Hyde, Hendon, London, N.W.9.

* * *

The need for a compact and stable voltage reference tube has now been met by the 85A1 introduced by *Mullard Electronic Products Ltd.* Working in a self-regulated, constant-current circuit, this tube provides a voltage of extremely high stability and will normally replace a standard cell as a built-in source of voltage reference. It should thus prove of particular interest to designers of communications, scientific and industrial electronic instruments. The ignition voltage of the tube is 125V. and the normal operating voltage is 85V. After an initial ageing period, the short-term stability is better than ·1 per cent. or ·2 per cent. over a period of 1,000 hours. This high degree of stability is maintained even under intermittent switching conditions. The tube, which has a loctal type base, operates as a regulator over a current range of 1–8 mA, but for optimum performance it is recommended to operate the tube at 4·5 mA. The list price is £1 15s. 0d.

Panel of Lecturers

The suggestion has again been made—this time by Mr. T. Martin, G2LB, of Birmingham—that a panel of lecturers should be drawn up by Headquarters for the benefit of Affiliated Societies and others who may wish to enlist the services of lecturers at meetings. All expenses would, of course, be borne by the Affiliated Society or group extending the invitation.

A similar suggestion was put forward about two years ago but as only a very small number of members responded no further action was taken. As conditions may have changed the Society again invites members interested in the proposal to forward their names and addresses to Headquarters for inclusion on a panel of speakers. An indication should be given as to the distance a member would be prepared to travel, the scope of subjects to be covered and availability.

If a satisfactory response is received further publicity will be given to the matter.

THE B.E.R.U. CONTEST, 1949

General Rules.

1. The Event will be divided into three sections, namely:—(*a*) Senior (High Power) Transmitting Section; (*b*) Junior (Low Power) Transmitting Section; (*c*) Receiving Section. The three sections will be run concurrently.

2. The Contest is open to all British subjects living within the British Empire and British Mandated Territories and to British Occupational Forces operating properly authorised stations, who are fully paid-up members of either the R.S.G.B. or one of the British Empire Societies listed overleaf. All entrants agree to be bound by the Rules of the Contest.

3. Entrants who are not members of the R.S.G.B. must certify in the declaration overleaf that they were fully paid-up members of their local society at the time of the contest.

4. An entrant not located in one of the prescribed Prefix Zones shall be considered as being in the Prefix Zone nearest to his station.

5. Contacts with, or reports from, ships or unlicensed stations located in countries where licences are obtainable will not be permitted to count for points. The decision as to whether a station is to be classed as unlicensed will rest with the R.S.G.B. Contests Committee.

6. Only the entrant will be permitted to operate his apparatus for the duration of the contest.

7. A trophy will be awarded to the fully paid-up member of the R.S.G.B. scoring the highest number of points in each section of the contest. Certificates of merit will be awarded to the first three stations in each section and also to the leading station in each Prefix Zone, providing at least three entries have been received from the zone in question. In addition a second certificate will be awarded to each zone provided ten or more entries are received from that zone.

8. The declaration at the foot of the Entry Form must be signed by the operator, who will be recorded as the competitor.

9. Entrants must provide their own log sheets which, together with the analysis sheet, must be legibly written or typed as set out overleaf. Incomplete entries will be disqualified.

10. All entries must be posted within seven days of the close of the contest. No entry will be accepted at R.S.G.B. Headquarters, New Ruskin House, Little Russell Street, London, W.C.1, later than June 13, 1949.

11. The judging of entries will be carried out by the R.S.G.B. Contests Committee. The President's decision will be final in all cases of dispute.

12. No correspondence can be entered into regarding any decision made by the President or Contests Committee.

13. The contest will extend from 00.01 G.M.T., Saturday, March 5, 1949, to 23.59 G.M.T., Sunday, March 6, 1949.

14. Contest operation during local hours of restrictions in the use of electricity for wireless which have been publicly announced is forbidden. The duration of any such restrictions will be recorded on the entry form.

Rule for the Transmitting Section

1. Fifteen points will be scored for the first contact on a specific band with a British Empire station located in any Prefix Zone outside the competitor's own zone. Fourteen points will be scored for the second contact on the same band with the same zone, thirteen points for the third contact, and so on, to the fifteenth contact, which contact will score one point. All contacts with that particular zone on that band thereafter will count one point each. This scoring procedure will be repeated on each band to encourage multi-band operation.

2. Only one contact with a specific station may be made on each band during the contest.

3. The contest is open for two-way A.1. (C.W.) contacts only, on the following frequency bands, viz.: 3·5, 7, 14 and 28 Mc/s., providing the input to the valve or valves delivering power to the aerial is not in excess of that specified on the competitor's licence and in no case more than 150 watts in the Senior (High Power) Section and 25 watts in the Junior (Low Power) Section, and providing the entrant has permission to operate his station on the band or bands in question.
(This rule excludes the use of the 27 Mc/s. band.)

4. The conditions laid down in the entrant's transmitting licence shall be observed.

5. A serial number consisting of six figures must be exchanged before points may be claimed. The serial number is made up of RST and three numerals denoting the number of the contact, the first contact being 001, and so on.

6. Entrants receiving consistent tone reports of less than T8 will be disqualified.

7. Specially appointed Band Monitoring Stations, under the auspices of the R.S.G.B., will be active during the contest. Any station reported off frequency by these checking stations will be disqualified without appeal.

Rules for the Receiving Sections

1. The scoring system will be the same as for the transmitting sections, viz.: fifteen points will be scored for the first station heard on a specific band within any Prefix Zone outside the competitor's own zone. Fourteen points will be scored for the second station heard on the same band in the same zone, and so on. This scoring procedure will be repeated on each band to encourage multi-band operation.

2. Before points can be claimed, the following information must be logged: (*a*) Call of station heard; (*b*) Call of station being worked; (*c*) Entrant's report on the signals of the station heard (RST); (*d*) The Serial Number given by the station heard to the station being worked.

3. CQ and Test calls will not count for points.

4. The same station may only be logged once on each band during the contest.

Warning

Last year 8 competitors were disqualified for late entries.
3 competitors were disqualified for late entry and no analysis sheet.
10 competitors were disqualified for no analysis sheet
2 competitors were disqualified for no signed declaration.
3 competitors were disqualified for no declaration or analysis sheet.
1 competitor was disqualified for log inaccuracies.
1 competitor was disqualified for excess power.

Continued overleaf

FORMAT OF THE B.E.R.U. ENTRY FORM

B.E.R.U. Contest, 1949.....Section

Name (Block Letters).....Callsign.....

Address .....

Transmitter .....

Input Power to last valve.....

Receiver.....

Aerial Systems used.....

Date (1)	G.M.T. Contact Established (2)	Band Used Mc/s. (3)	Callsign of Station Worked (4)	Serial Numbers Sent (5)	Serial Numbers Received (6)	Points Claimed (7)
				001 002 etc.		
			TOTAL			

DECLARATION :—

I hereby certify that my station was operated strictly in accordance with the rules and spirit of this Contest, and I agree that the decision of the President, R.S.G.B., shall be final in all cases of dispute.

Date..... *Signed*.....

If an entrant is a non-member of the R.S.G.B., he must sign the following additional Declaration :—

I hereby certify that at the time of the Contest I was a fully paid-up member of.....

Date..... *Signed*.....

• • •

Receiving Contest

The entry form for this contest should be prepared on the lines set out above with the following amendments :—

Column 2 : G.M.T. station heard.
Column 4 : Station heard.
Column 5 : Entrant's report on station heard.
Insert new Column : Station being worked.
Column 6 : Serial number given by station heard to station being worked.

Prefix Zone Chart and Specimen Score Analysis Sheet

Prefix Zone.	.....Mc/s. Contacts	.....Mc/s. Points	.....Mc/s. Contacts	.....Mc/s. Points	.....Mc/s. Contacts	.....Mc/s. Points
AP, VU2..						
D2, EI, G, GC, GD, GI, GM, GW ..						
J4, VS6						
MB9, SV0						
MD1, 2, ZB1, 2						
MD3, 5, ST, VQ6 (MD4)						
MD6, VS9, VU7 (VS8) ..						
VE1						
VE2						
VE3, 4						
VE5, 6						
VE7, 8						
VK2, 3, 7						
VK4, 9						
VK5, 6, ZC2, 3 ..						
VO1, 2, 3, 4, 5, 6, ..						
VP1, 5, 7, 9						
VP2, 3, 4, 6						
VP8						
VQ1, 3, 4, 5, ZD6 ..						
VQ2, ZE						
VQ8, 9 .. .. VR1, 2, 3, 4, 5, 6						
ZK1, 2, ZM						
VS1, 2, 4, 5						
VS7						
VU5, XZ2						
ZC4 (MD7)						
ZD1, 2, 3, 4, 8, 9 ..						
ZL1, 2, 3, 4						
ZS1, 2, 3						
ZS4, 5, 6, 7, 8, 9 ..						
TOTALS						

NOTE.—Some of the above prefixes may be out of date at the time of the Contest.

MAKE SURE YOU HAVE READ THE RULES CAREFULLY AND DO NOT FORGET TO SIGN THE DECLARATION AT THE FOOT OF THE FORM.

SUGGESTIONS FOR FUTURE CONTESTS ARE INVITED.

Empire Societies

Canadian Amateur Radio Operators' Association.
Canadian Section A.R.R.L.
Hong Kong Amateur Radio Transmitters' Society.
Irish Radio Transmitters' Society.
Jamaica Amateur Radio Club.
Malta Amateur Radio Society.
Montreal Amateur Radio Club.
Newfoundland Amateur Radio Association.
New Zealand Association of Radio Transmitters.
Northern Rhodesia Amateur Radio Society.
Radio Society of East Africa.
South African Radio League.
Wireless Institute of Australia.

EXCHANGE AND MART SECTION

Due to paper restrictions advertisements are only accepted "for insertion when space is available." No advertisement must exceed 50 words. Rates: Members Private Advertisements 2d. per word, minimum charge 3/-. Trade, 6d. per word, minimum charge 9/-. Use of Box number 1/6 extra. Send copy and payment to Parrs Advertising Ltd., 121 Kingsway, London, W.C.2.

AR77 almost as new, cabinet speaker, 10 spare valves and manual, £30. Crackle cabinet 10" x 7" x 6" with unmarked Raymart Eco type dial, £1.—G3DLU, 545 Newark Road, Lincoln. [470

A.R.77 Realigned and perfect, £29; also two full kits of H.R.O. R.B.J.4 National spare parts. Offers.—SMITH, 82 Framingham Road, Sale, Manchester. [510

AR77E for sale. Overhauled and realigned. Best offer about £30.—G6JA, 46 Bellevue Road, West Cross, Swansea. [442

AR77E receiver in perfect working condition, £30.—Write 2 Coln Road, A.E.R.E., Harwell, Didcot, Berks. [465

A.R.88 Receiver, new, perfect working order, £35.—Box 492, PARRS, 121 Kingsway, London, W.C.2. [492

A.R.88LF.—New condition as supplied by Makers, in original carton and packing case; opened only for testing receiver. Nearest £40 secures.—BROOKES, AMDGW, Station Engineer, R.A.F., Tangmere, Near Chichester, Sussex. [488

ASB8 receiver for 420 Mc/s. 12 valve double superhet with lighthouse R.F. stage. New and unused with details, £6. Two 10" morse practice records, 12s.—G2BVN, 51 Pettits Lane, Romford, Essex. [481

AMATEURS.—Free copy of Coil Inductance Tables, recommended by VS2AA, for your pal, given with first twelve orders after this date.—TECHNICAL INSPECTION, 14 Silverston Way, Stanmore, Middlesex. [459

AMERICAN Valves, new, boxed. 6SH7, 6H6, 7193, 1625, 1626, 1629, 12SK7, 12K8, 12J5, 12A6, etc., 6s. each. Hewlett Packard audio signal generators, indicator units type 6.B, etc., etc. Mains suppressor units, 4s. 6d. each. Send S.A.E. for list.—LAW, BRS17310, 20 Jennings Road, Totton, Hants. [453

AUTO transformer 230/115V 50-c.p.s. suitable BC342, 25s.; Acorn valve holders, 1s. pair, post free.—BRS3514, 8 Church Lane, Mellor, Blackburn. [451

BARGAINS.—HRO senior; bandspread coils power pack, £40 complete. American all-mains Pilot 4 waveband 6 valves domestic receiver, £14. HRO spares including 4 gang condenser with dial, ditto 2 gang, HRO I.F. crystals 456 kc/s. "S" meter. Offers. Transmitting and receiving valves, power transformers, chokes, condensers, etc. State requirements. S.A.E. please.—Box 487, PARRS, 121 Kingsway, London, W.C.2. [487

BC342 for sale, good condition, auto transformer, cheap.—G3DYA, 129 Moseley Road, Bilston, Staffs. [480

BC342 (A.C. mains) and speaker, £15, or offers. Write for list of other gear.—Lesley Cottage, Elm Park, Stanmore, Middlesex.

BRAND New.—1154 with all connecting plugs in original transit case, £7. R103A 1·8–7·5 Mc/s, connected A.C. mains, £6.—SHARPLES, Gentleshaw Vicarage, Nr. Rugeley, Staffs. [456

BRS5102 offers 3 amp. R.F. meters. Frequency effect below 2% at 65 Mc/s.: 5s. 6d. each, 3 for 15s. 6d., post free. S.A.E. for other items.—MASON, 42 North Bar, Banbury. [509

B2 Transmitter (only) wanted, preferably with coils. Collect London Area.—G2HCZ, 10 Albion Street, Romford, Essex.

CALL BOOK.—Complete list of HAMS throughout the world, 10s., plus 9d. postage; Radio Handbook, latest edition, 17s. 6d., post paid. Order now; the above are in stock. C.Q.—The Amateur magazine published in the U.S.A., subscribe now, only 20s. for 12 large monthly issues.—DALE INTERNATIONAL PUBLICATIONS, 105 Bolsover Street, London, W.1. [206

COMPLETE Transmitter and Receiving Station for £45 the lot, comprising, Brand new T.1145 transmitter, AM power unit, output 1,200V, 200 mA, Class D wavemeter, BC.348 receiver with brand new 30V. Exide battery and 6V 72. Ah. battery for transmitter.—W. T. AKED (G5DC), St. Georges Road, St. Annes on Sea. [424

COSSOR double beam oscilloscope, £30. Evershed safety ohmeter, £7. Both in first class condition.—F. COOPER, "Northview," Chichester Road, Southbourne, Emsworth, Hants. [486

COSSOR double beam oscilloscope wanted, must be perfect and untampered with.—G6CU, 18 King Street, Maidenhead. [478

EDDYSTONE "640," £27 10s. 0d. Order from SMITH'S RADIO, 98 West End Road, Morecambe. Official Eddystone Dealer. All short wave components. Send for lists. Quick service. [324

FOR SALE.—Hallicrafter S20 Sky Champion, 43 Mc/s. to 550 kc/s.; perfect condition, revalved, £20 or nearest offer.—G3CIL, 21 M.Q., R.A.F., North Coates, Grimsby. [476

FOR SALE.—150W. C.W. transmitter 14 and 28 Mc/s., pair 35T's final, several spare valves, 40W. 80M. phone transmitter, both rack mounted, BC348 receiver less power unit; nearest £120 or separately.—G5JY, 81 Woodbridge Road, Guildford. [444

FOR SALE.—R. 1155, Several 18 sets, one 58, Loudhailer; Taylor 90A meter and miscellaneous valves. Offers.—BRS14020, White Hart Inn, Stevenston, Ayrshire. Telephone: Ard-Salt 1164. [440

HALLICRAFTER "Sky Buddy," 540 kc/s.–43 Mc/s. perfect, recently realigned, £10. Buyer collects.—BRS5297, 49 Nelson Road, London, N.8. [425

HALLICRAFTERS SX27 and SX24. Neither new but both in good condition. £25 each or offers.—HAIGH, 21 Top Row, Huddersfield. [433

HALLICRAFTERS S.36A AM/FM receiver, 27–143 Mc/s., 145 Mc/s. obtainable. Excellent condition, laboratory aligned. Offers £40 or exchange SX28A or AR88.—T. KNIGHT, Caxton House, High Street, Hoddesdon. [463

HR.O. Senior 8 Coils all Ham bands with bandspread, in glass door case, output filter and jack panel, speaker in cabinet, phones, power pack, beautiful condition. One owner; not ex-Government. Demonstration any time. Best offer over £50. Books, other gear and components. S.A.E. for list.—FORBES, 58 Thornton Avenue, W. Croydon, Surrey. [427

HR.O. Senior power pack, phones 14–28 Mc/s. band spread coil, £27 10s. 0d.; Avo Model "D," £9; American crystal oscillator, new, £4 10s. 0d.; S.A.E. List, other gear.—G2FZ, Skerries, Grange, West Kirby, Cheshire. [448

LICENCED Amateur seeks unfurnished accommodation for self, wife and two children, in or near Surbiton. Willing to share his station with any interested enthusiast having rooms to spare. Good rent offered.—Write J. L. Danks, 34 Waverley Lane, Farnham, Surrey, or telephone Elmbridge 2286. [474

MARCONI 10V communications receiver 2HF, etc., 4-range turret 1·5–22 Mc/s. Rack mounted with Parmeko power pack, 500 kc/s. and 1,750 kc/s. crystal calibrator. Feeds metered. Instruction book, £20 (including 5-ft. rack). R208 modified 6/40 Mc/s. excellent 28 Mc/s., £10.—G2SF, 44 Highfield Road, Chelmsford, Essex. [452

MARCONI RS5 receiver, crystal filter, motor and hand bandspread operation, power supply, valves, one band needs attention, £10.—PETERSEN, 67 Baddow Hall Crescent, Great Baddow, Chelmsford, Essex. [490

NATIONAL NC-44 A.C./D.C. communications receiver complete, covers 540–30,000 kc/s., crystal filter, bandspread.—Offers to HUGHES, 101 Grove Street, Glasgow. [491

NATIONAL 81X receiver for sale 1·715 to 30 Mc/s. Crystal gate, A.V.C., B.F.O. 10 valve with auto transformer. U.S. Navy 45 watt Phone/C.W. transmitter CRV52233, 3 to 9 Mc/s. containing (2) 6N7, (2) 815, 1625, VR150. A.M. 1196 Transmitter/receiver. 29 copies *Practical Mechanics*, 95 copies *Practical Wireless*, and 37 copies *Wireless World*.—Offers to Box 482, PARRS, 121 Kingsway, London, W.C.2. [482

NEW unused BS348 wired for 220 volt D.C. input, very easily convertible A.C., bargain £10.—Box 443, PARRS, 121 Kingsway, London, W.C.2. [443

NEW Hammarlund HQ129X, with speaker handbook, £90. New W/S 58 transceiver with vibropack accumulator, all spares, handbook, £11; 100TH, new, 25s. (3); Avo Model 7 in leather case, new condition, £15; R103 MkII receiver, £5 10s. 0d.; Hallicrafters S27, £25; Miniature camera, F3·5, £15.—Details, offers, GW3ECH, 28 Rectory Road, Treewn, Pembrokeshire. [461

QSL cards G, BRS, SWL, from 7s. 6d. 100. Printed notepaper, 3s. 6d. 100 sheets. Samples free.—G2DJA, 137 Randall Avenue, London, N.W.2. [472

QSL's and log books (P.M.G. approved); samples free; state whether G or BRS.—ATKINSON BROS., Printers, Elland. [483

Q5R9 Rotary Beams, 2½ to 20 metres. Masts, chimney lashings, bearings, rotators. S.A.E. for most comprehensive list.—E. M. D. O. LTD., Ace Works, Staines. [426

RELAYS.—Constructor kits of relays suitable for radio, remote control and switching, complete with circuit diagrams and descriptive booklet, 18s. 6d., post free.—ELECTRO METHODS LTD., 220 The Vale, London, N.W.2. [457

RESISTORS: ¼, ½, 1 Watt, assorted 200Ω to 10MΩ. 10s. 6d. hundred. Acorns 4671, 4672, 4674, 4675, 4676, 10s. each. Wanted, Magnavox 66 speaker.—BRS7228, 7 West End Gardens, Esher, Surrey. [469

ROTARY converters 24V. D.C. input: 230V 50 c.p.s. 100 Watts output, Brand new, £3 10s. 0d.—M.O.S., 3 Robert Street, London, N.W.1. [446

R.1155 in working order, D/F. valves removed. R.1224A, 5 valve battery superhet, 1–10 Mc/s. As new.—Offers to R. E. MORLEY, 129 High Street, Cottenham, Cambs. [494

R103A, 250 A.C. mains, £5 10s. 0d.; MCR1, £5; R1147, 30s.; R.S.G.B. BULLETINS Vol. 9–21 (1933–1946), 5s. Vol.; 2½" speaker, 15s.; Crystal 8020 kc/s., 5s. S.A.E. please.—SHANKLAND, BM/Shank, W.C.1. [477

R1155A perfect, power-pack, output-stage, phones-plugs, circuits, £15 or offers.—Box 432, PARRS, 121 Kingsway, London, W.C.2. [432

R1155A internal A.C. pack. Output stage external speaker and 12V battery converter. R103A as new, 1·7–7·5 Mc/s. 6V D.C. or 230 A.C. Bargain, £15 lot. Delivery Wiltshire.—Box 454, PARRS, 121 Kingsway, London, W.C.2. [454

R.208, 10 to 60 Mc/s., "S" Meter, built-in speaker, spare set valves. R.103A, 1·6 to 7·5 Mc/s. Both receivers mains or 6 volt battery operated. Provision for using R.208 and R.103A as double-sup-het or separate operation. Offers.—W. WHITTINGHAM, Court Lane, Clevedon, Somerset. [511

SALE.—Hallicrafters Sky champion 550 kc/s.–43 Mc/s. Spare valves, instruction book, £18 or offers. Ex-Army R103A, £6 10s. 0d. PT15's, 8s.—G3BJQ, 29 Wheatfield Road, Old Bilton, Rugby. [455

SALE.—Serviceable T1154 and T1154B. Complete valves and meters. Keyed without relays, £3 10s. 0d. each. Two 832's, 5s. each. Wanted: Loop aerial type 1, 10B/8478.—Write G3COY, 48 Prince's Gardens, S.W.7. [447

SALE.—D.B.20, Preselector, £12; Canadian 58 set complete, £10; W & B, 12 in. P.M. speaker, £3; Rola 10 in. energised, £2. Wanted: TN17/APR4, TN18/APR4, TN19/APR4, TU57A or B, TU58A or B, TN2/APR1, TN3/APR1 and AN/APA10, also 5Y3GT valves. Exchange or cash.—ELLETT, G3ARJ, Meppershall, Shefford, Beds. [441

SALE.—B2 transmitter and receiver; all coils, new condition, no P.P. £10 or swop BC348 or similar receiver.—G2DBW, Meal Hill, Slaithwaite, Huddersfield. [473

SALE.—40 watt C.W. transmitter 80M crystal, key, coils, power pack, co-axial cable, £20 or offers; R1116 receiver, needs slight attention, £4.—MCCRAE, More Crichel, Wimborne, Dorset. [475

SALE.—R1155, internal power pack, output stage; transformer 350–0–350, 6V 3 amps, 5V 2 amps; single gang ·0005 1 mA M/C. 3" meter; 6 valves, 6 Wcarite P.H.F. coils, commercial 3½" C.R.T. and base, some unused, £12 the lot or offers.—Details Box 471, PARRS, 121 Kingsway, London, W.C.2 [471

SELLING combined signal generator wavemeter type W1649 140–255 Mc/s., £5. 7,600V, 80 milliamp normal 50-c.p.s. transformer, £3. Want R1481 or R1132 receiver.—COOKE, 584 Ashley Road, Parkstone, Dorset. [489

SENIOR and Junior Sales assistants required. Please apply in writing, stating full experience, age and salary required, to HRS.—BERRY'S (SHORT WAVE) LTD., 25 High Holborn, W.C.1. [497

SKY Challenger. Crystal 550 kc/s.–38·1 Mc/s., recently overhauled, £22; 6V6–807 transmitter with 3 M/C meters. Coils for 160 crystal. Needs power supply, £8. Exchange 10H. 650 mA 100 ohm Partridge choke 34 lbs. for new T55 or equivalent. —WOOD, 25 Kenwood Avenue, Leigh, Lancs. [435

SURPLUS to requirements.—(3) 805, (3) 845, 15s. 6d. each; (3) 801, 5s. each; 35T, £1; 100TH, 25s.; 830B, 10s.—BRS8161, 7 Beverly Court, Old farm Avenue, Southgate, N.14.

SUPER Pro 200 series, power pack, good condition, nearest £32. Marconi CR300, 8 wavebands, A.C. mains, speaker, £14 10s. 0d. U.H.F. frequency meter, 375–750 Mc/s., £6 10s. 0d. Power supply PE–110, 500V. 450 mA., 250V. 120 mA., L.T.S., etc., £4 10s. 0d. BC603, 10 tube F.M. receiver, £4 10s. 0d. Wanted: SX28, AR88, HQ120 or similar; any condition.—TAYLOR, 75 Edgehill Road, Winton, Bournemouth. [493

SUPER Station. Independent Units. 2 stage pre/amplifier, R.1155 "S" Meter, etc.; M/C phones; 12 watt amplifier P.P. and speaker input; R.1155 pick-up, etc., only £39 17s. 6d. lot, or offers separate. A.C. Motors 1/40 H.P., 14s. 6d.; 1/20, 27s. 6d. M.E. Speaker, 8s. 6d. Handmicrophone, 7s. 6d. Valves, 6J7, 25Y5, Y220, VP/4B, IW4/350, 4s. each.—Box 431, PARRS, 121 Kingsway, London, W.C.2. [431

TAYLOR testmeter, 40 ranges, £8; Latest Taylor signal generator, mains, £11.—4 Granville Road, Old Hill, Staffs.

THE Ideal Present.—A Kaynite wave wound coil winder. Winds I.F. transformers, R.F. chokes, etc., price 50s. (carr. 2s. extra).—Stamp brings particulars from RICHARD SHEARGOLD & Co., Sunbury-on-Thames. [485

TU6B, TU7B, TU9B, all new, unused, 11s. (carriage 2s. 6d.). The 3 units, 30s. (carriage, 5s.). Multi-match modulation transformer. Match push-pull audio amplifier. 250 mA maximum into power amplifier 425 mA maximum or reverse, 70 different ratios; particulars supplied. 14½ lbs. heavy lugs, 30s.—KNIGHT, 82 Fairfield Road, Widnes, Lancs. [438

T1154B complete with valves and meters. Mechanically sound, untested electrically. Surplus on present location, £7 (including transit case and carriage).—Box 468, PARRS, 121 Kingsway, London, W.C.2. [468

V.F.O. (Clapp), EF50 buffer, covers 80 metre band, exceptional stability T9x note, £3 10s. 0d.—G13CHX, c/o Radio Station, Bushmills, Antrim. [450

WANTED.—12" Electrostatic short-persistance tube. Would exchange for two 6" new tubes.—EDMUNDS, 131 Elgin Road, Ilford, Essex. Seven Kings 8521. [462

WANTED.—Handbook for AR88-D, and 455 kc/s. crystal for same; also dial gearing.—G3DUV, 64 Belvedere Road, Erdington, Birmingham. [467

WANTED.—Loctal Valves, 7W7, 7C7,7A8, 7C5. State price and condition.—BRS12126, 56 Bury Street, Ruislip, Middlesex. [439

WANTED.—Top band coil for HRO. Cash or swop for 3·5 to 7·3 Mc/s. coil. Also have post-war QST's, will swop for pre-war.—G8UA, 406 Higher Brunshaw, Burnley, Lancs. [445

WANTED bandswitched transmitter 150W or over, Collins, etc., cash. For Sale: Hallicrafter S20 F.B. condenser, preselector, valves, Handbook, first £20, or part exchange transmitter.—8 Arbory Street, Castletown, Isle of Man. [437

WANTED.—B2 Transmitter/Receiver complete with coils and P/P, must be in perfect condition. State price, etc.—J. R. SMITH, 6 Ascot Road, Blackpool, Lancs. [429

WANTED.—Ribbon mike, preferably R.C.A. with stand, also BC348 components, coil packs, I.F's, etc.—Box 479, PARRS, 121 Kingsway, London, W.C.2. [479

144 Mc/s. Brand new transmitter/receiver type 1430, comprising a 9V superhet receiver, 7V transmitter, 5V amplifier and modulator. No power pack. What offers?—P. H. SMITH, 196 Baddow Road, Chelmsford, Essex. [484

145 Mc/s. Valves: S32's, 30s.; 955's, 6s.; 9004's, 3s. 6d.; 2C26's, E1192's, also 12SG7's, 12SR7's, 12SQ7's, 12J5GT's, ECH35's, 6S87's, 6SH7's, 12AH7GT's, 6G6G's, 1629's, KT63's, KTZ63's, BL63's, V110's, MHLD6's, EL32's, at 5s.; 12SK7's 12K8's, 12A6's, 12C8's, 6B8G's, IN5G's, 6s.; 12SH7's, 12H6's, KTZ41's, EBC33's, 4s.; Guaranteed, other types.—G3DS7, 218 Bohemia Road, St. Leonards-on-Sea. [449

1000 kc/s. crystals, standard mounting, brand new, 9s. 6d. each. 6C4 Valves, perfect, with screening cans and ceramic holders, 5s. each.—EDWARDS, Clontinaglare, Saintfield, Belfast. [460

358 Eddystone Receiver with Coils, £14; RCA. AVT15 transmitter £5; power pack for oscillator 145, £4; R.1155 (Internal power supply), £9; BC221, brand new, all spares and phones, £15; New 832's, TZ40's, offers. Pullin 10,000 o.p.v. test meter, £10. S.A.E. enquiries.—R. STOKES, 673 Scott Hall Road, Leeds, 7. [434

832A.—All glass twin beam-power tetrodes, full rating 22 watts phone, 36 watts C.W. to 200 Mc/s. Boxed, new, 35s., post free.—Post orders only to BARKER, 44 Talgarth Road, London, W.14. [428

832A, Boxed, new. Ideal for 145 Mc/s., 22s. 6d. post free. Unrepeatable offer.—KEAN, 46 Castletown Road, London, W.14. [496

Printed in Great Britain for the INC. RADIO SOCIETY OF GREAT BRITAIN, New Ruskin House, Little Russell Street, London, W.C.1 by Sir Joseph Causton & Sons, Ltd., 72 Fleet Street, London, E.C.4.

IF UNDELIVERED Return to :- R.S.G.B. NEW RUSKIN HOUSE LITTLE RUSSELL STREET, W.C.1