



T. & R. Bulletin

Incorporating

The Journal of the Inc. Radio Society of Great Britain

(BRITISH EMPIRE RADIO UNION)



Vol. 8. No. 7. January, 1928 (Copyright)

Price 1/6

Read this Test Report.

Vide "Popular Wireless," Nov. 19th, 1927 (page 616).

A TRIPLE GANG VARIABLE CONDENSER

"That very desirable feature of compactness has certainly been achieved by Messrs. Ripaults, of King's Road, London, N.W.1. in their new lateral action triple-gang condenser. The lateral action movement of the Ripault variable condenser seems to lend itself to ganging, indeed, it appears to be ideal for the purpose.

As the name indicates, in this type of variable the moving plates move laterally in and out of the fixed plates. In this Ripault triple gang the three variables are mounted in line.

The moving vanes are linked together by two ebonite bearers which slide along two common runners, a single and centrally-placed cam movement supplying the necessary action. The front plate is of metal and provides the necessary shielding, while on the back ebonite plate are three vernier movements which can be independently operated to give a complete balancing. On the back plate are also seven terminals, two each for the condenser units and one for the front shielding metal panel.

A slow motion dial is fitted and the movement is excellent, smooth and absolutely free from back lash and harshness.

In general the design of this triple gang is very good. It is, as we mentioned, compact, and the movement is mechanically efficient.

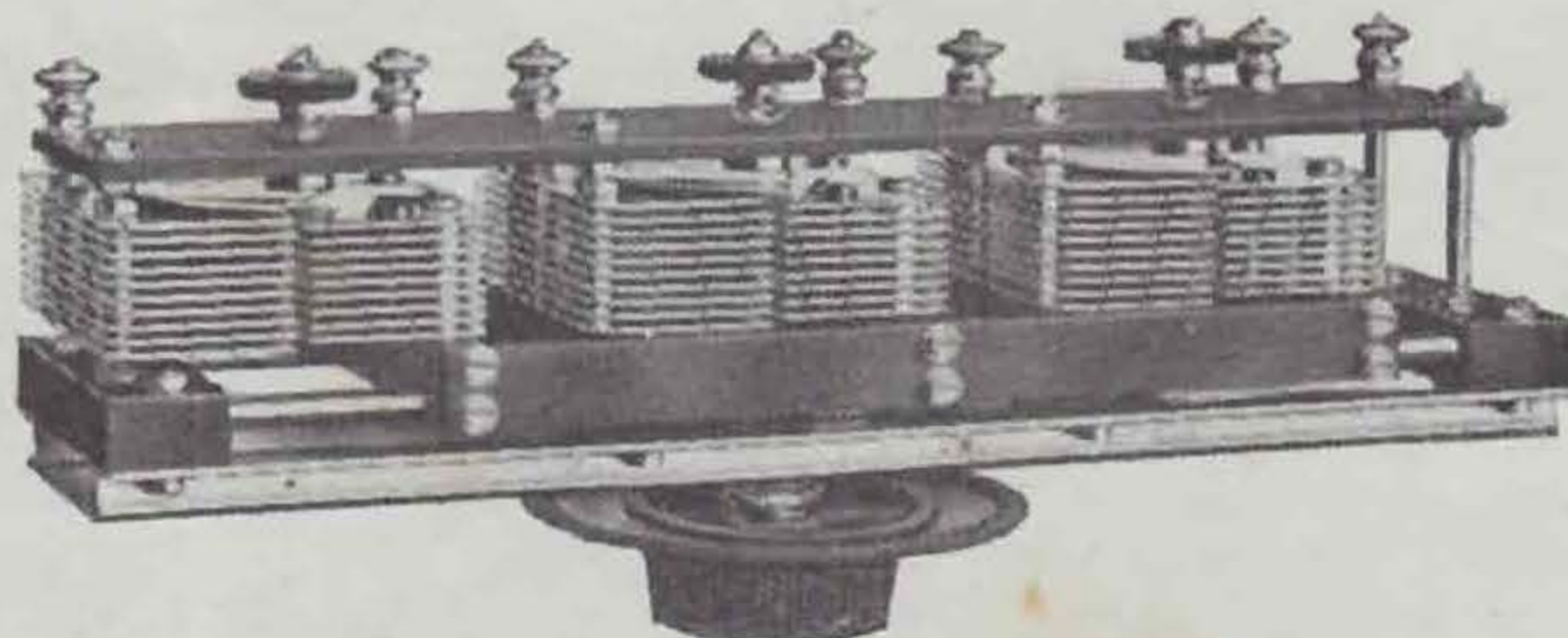
In some sets, where ganging is desired, it is necessary to provide shielding between the various sections of the ganged condenser. The design of this Ripault ganged condenser lends itself to such shielding, and we recommend the makers to consider the advisability of incorporating such in some of their models."

Prices:

DOUBLE GANG

.0005	...	...	47/6
.0003	..	...	45/-

Prices include slow motion dials. Obtainable from all Dealers.



Prices:

TRIPLE GANG

.0005	..	...	60/-
.0003	...	...	57/6

Prices include slow motion dials. Obtainable from all Dealers.

Illustrated Leaflets (DX) on Ripaults Variable Condensers and Ripaults Self-Regenerative H.T. Dry Batteries, Free on request.

RIPAULTS LIMITED, KING'S ROAD, ST. PANCRAS, LONDON, N.W.1.

GAMBRELL

Quality Products
are of real value to
every experimenter:

GAMBRELL TYPE "D" WAVEMETER

This Type "D" Wavemeter meets the needs of those experimenters requiring an instrument low in price and of a high degree of accuracy. The instrument is totally enclosed in its cabinet—a Battery is incorporated within same, and a switch enables the buzzer to be put in and out of operation without disconnecting the battery leads. The buzzer is the new Gambrell Buzzer—a great improvement over any other on the market.



PRICES: "WAVEMETER TYPE D" (as illustrated):

Complete with two coils and two Charts.
For 50 to 500 metres and 4½-volt Battery
£5 : 0 : 0

With Coils and Charts for 20 to 500 metres
£5 : 13 : 6

Can be calibrated up to 7,000 metres if
required.

THE GAMBRELL BUZZER

is a first-class component, embodying a high and constant note with simplest form of adjustment. Mounted on ebonite and complete with shunt and terminals. The best position is found by adjustment of the knurled screw. Complete with dustproof cover. **10/6**

GAMBRELL NEUTROVERNIA CONDENSER
The best because—It has the widest capacity range approx. 2/38 micro microfarads. It is ideal for use as a balancing condenser, a capacity reaction control, or as a vernier condenser. It cannot short—has ebonite dielectric. It is totally enclosed, and, therefore, dust and dampproof. It is a precision instrument throughout. It can, as supplied, be used for either baseboard, on panel or through panel mounting. Price **5/6**

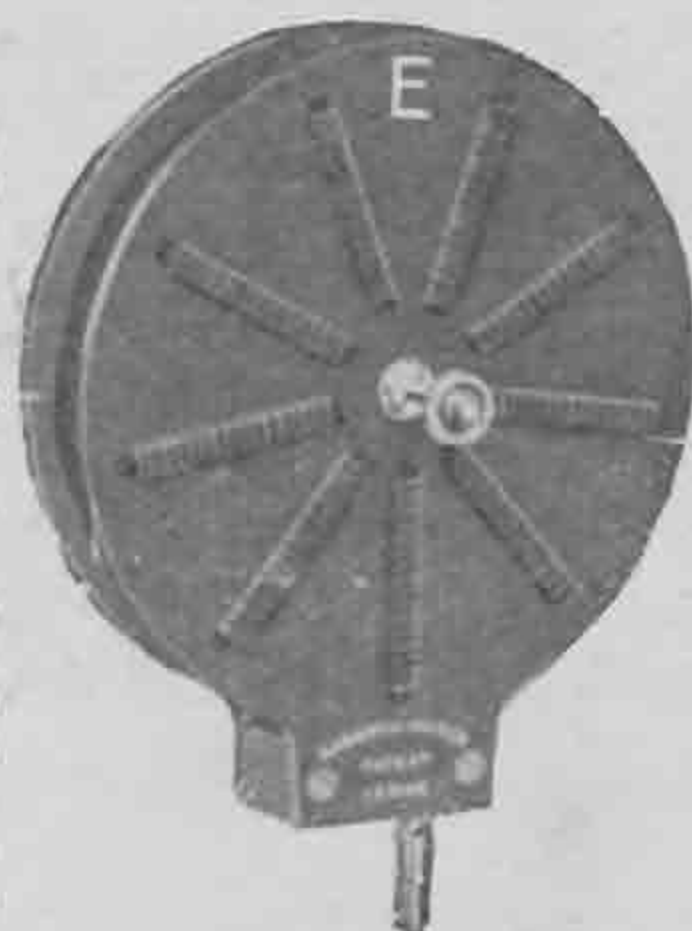


If you fit the **GAMBRELL DIRECT READING DIAL** to the Neutrovernium Condenser, it will enable you at any time to return to the **Exact** settings previously logged. This extremely useful Direct Reading Dial costs **1/8**

GAMBRELL CENTRE-TAPPED COILS

not only give the best results, but are unlimited in use, as they can be employed in any circuit, centre-tapped or otherwise. Standard fitting to all coil sockets, and occupy minimum baseboard space.

SIZE	PRICE	Approx. No. of Turns
a2	4/10	18
a	4/10	25
A	5/-	30
B1	5/3	40
B	5/6	50
C	5/9	75
D	6/3	100
E1	6/9	150
E	7/9	200
F	8/6	300
G	10/-	500



There is a Gambrell Coil Holder specially designed for use with the Gambrell Centre-tapped Coils which does away with all flexible leads. Price each **1/9**

Gambrell Mains Receivers. Leaflets on request.

GAMBRELL BROTHERS LTD,
76, VICTORIA STREET. LONDON, S.W.1

Wavebands.



The Washington Conference has now decided upon the wavebands which are to be used by amateurs in all countries.

It is hoped that our licensing authority will shortly issue a statement of policy, whether the change-over to the new band is to be made on a fixed date, or as the old licences expire.

We can supply crystals ex stock for the new bands as follows:—

To work with air-gap.

150-175 metres **65/-**

150-170 metres for frequency-doubling **100/-**

164.4-171.6 metres for frequency-quadrupling **110/-**

Adjustment to suit customer's choice, extra.

We also have in stock plenty of crystals to suit other circuits and other wavelengths, and others at lower prices.

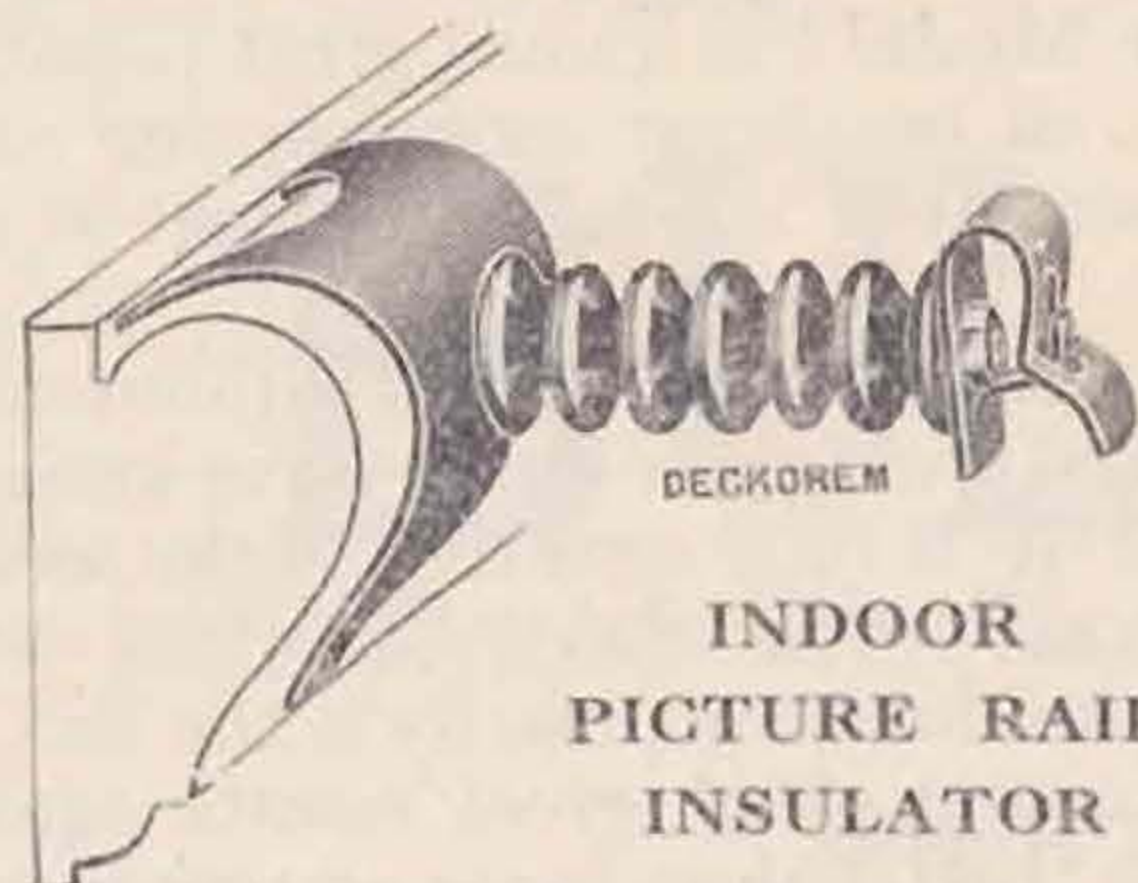


**Quartz Oscillators
LIMITED**
**1, LECHMERE ROAD,
LONDON, N.W.2.**

Telephone :
Willesden 2668,
England.

Cables :
Osquartz, Willroad
England.

A Useful and Efficient Component



THIS insulator clips neatly, quickly, and easily on to picture rail, making the erection of an efficient indoor aerial a simple matter. Strong spring grip contact. Oxy-copper finish, insulating rod highly polished and nickel-plated clip.

Price 9d. Each.

OUR FIVE 1928 CATALOGUES FREE ON REQUEST
Obtainable from all Dealers, or

A. E. BULGIN & CO.
9-10-11, CURSITOR STREET,
CHANCERY LANE, E.C.4.

High Class American Type WIRELESS CABINETS

FOR THE AMATEUR CONSTRUCTOR

The outstanding feature of these high-class cabinets is the ease with which the set may be withdrawn for alterations without interference to the wiring. Made from well-seasoned Mahogany or Oak and polished by hand.

Prices:	12	14	18	21	24	28 inches
Oak	17/-	17/6	18/6	19/6	20/6	21/6
Mahogany	17/6	18/-	19/-	20/6	21/6	22/6

Obtainable from all reliable dealers, if any difficulty write to the Manufacturer.

The 12-14 and 18 in. are 8 ins. wide inside.
The 21-24 and 28 in. are 9 ins. wide inside.

FRANK RIDDIOUGH & SON, Westgate, Bradford

Phone: 4300 Bradford.

ELECTRADIX for EFFICIENCY at LOW COST

THE DIX-ONEMETER

The Rolls-Royce of Radio

The Dix-onemeter is a Precision Instrument of universal use with an ingenious system of Multipliers which enable full scale readings of any value to be made over a wide range. 1 Millivolt to 2,000 volts, 50 ohms to 50 megohms, Mirror Scale, Jewelled knife-edge.

A £10 De Luxe Model for **55/-** Multipliers 6/6 Each.

Send 4d. Stamps for Interesting Electrical and Radio Catalogue.

LESLIE DIXON & CO., 218 Upper Thames St., London, E.C.4

HIGH TENSION

Your A.C. Mains can be used for all purposes through the medium of **Suprecision Power Transformers.**

Made in all sizes, for all Voltages.

200 volts 20 ma	4 volts .8 amp	..	12/6
200+200 v	20 ma 2+2v 1.6a	..	19/-
150+150 v	20 ma 2.5+2.5v 1.6a	..	17/6
200+200 v	50 ma 2.5+2.5v 4a	..	25/-
250+250 v	50 ma 2.5+2.5v 2a	..	28/-
250+250 v	100 ma 5+5v 3a	..	50/-
1,000+1,000 v	120 ma	..	90/-
3+3 volts	4 amps	..	12/6
2+2 volts	3 amps	..	8/4

POWER CHOKES:

50 henrys	25 ma	..	..	14/-
100	25 ma	..	..	20/-
50	100 ma	..	..	25/-
100	100 ma	..	..	30/-

FULL LISTS FREE.

F. C. HEAYBERD & CO.
8/9, Talbot Court, Eastcheap, E.C.3.

Distinctive

Q. S. L. CARDS

(as supplied to G.B. BT.)

A Style to Suit Every Taste.
SAMPLES FREE ON REQUEST.

100	..	5/6	500	..	15/6
250	..	9/6	1000	..	19/6

Let us quote for your Private Note Paper, Business Letter Headings, etc. We are Special sts in all classes of Radio Printing.

TERMS: Cash with Order.

PAUL & MATHEW
11, Butter Market, Bury St. Edmunds, Suffolk





"Beco"
Popular Model.

The outstanding quality of reproduction and the attractive appearance of the "Beco" Cone Loud-speaker command the admiration of all who see and hear one in operation.

"Clear as a Bell"

The "Beco" Popular Model has gained great popularity because it imparts to all broadcast reception the clarity and purity of tone essential to the full enjoyment of radio entertainment.

It is a "Cone" type speaker which handles without distortion the volume obtained from even multi-valve receivers, while at the same time it is fully sensitive to the weakest signals.

Another important reason for its popularity is the fact that it is a low priced instrument which gives results equal to and, in many instances, better than those costing twice as much.

Specification: The "Beco" POPULAR Loud-speaker is enclosed in a handsome well-finished mahogany cabinet, has a sensitive diaphragm control, and terminals for connections to receiver; is 11 in. high, 8 in. wide, and 4 in. deep; is fitted with rubber feet to prevent scratching of any highly-polished surface.

PRICE

47/6

Your local dealer will demonstrate a "Beco" Popular Model to you.

British Electrical Sales Org'n, 623, Australia House, Strand, London, W.C.2.

Green for safety!



For your transmitter, choose the Condenser preferred by the World's experts.

DON'T take a risk with the condensers for your transmitter. Buy those chosen by the leading technicians throughout the world—T.C.C. Condensers. The letters "T.C.C." on the case of a condenser are a hall-mark of extreme accuracy and utter dependability. Green—the colour of the T.C.C.'s case—is a symbol of the safety assured by the T.C.C. Your Dealer stocks T.C.C. Condensers for Transmitters in the range below.

Condensers for maximum working voltage of 1500 peak value.

4 mfd.	6" x 6" x 2"
2 mfd.	6" x 6" x 1"
1 mfd.	5" x 3" x 1"
.5 mfd.	5" x 3" x 1"

Condensers for maximum working voltage of 2500 peak value.

4 mfd.	6½" x 6" x 8½"
2 mfd.	6½" x 6" x 4½"
1 mfd.	6" x 6" x 2"

The type illustrated is the 2 mfd.—Max. Work. Volts 2500 D.C. Price £2 10s.

T.C.C.

Condensers for Transmitters

Advt. Telegraph Condenser Co., Ltd., Wales Farm Road, N. Acton, London, W. 3.

15.4.

THE BULLETIN.

The only British Wireless Journal Published by Amateur Radio Experimenters

Officers and Council for year 1927-28.

Secretary-Editor : J. A. J. COOPER, Member I.R.E., Grad. I.E.E.

OFFICERS.

President : CAPTAIN JAN FRASER, M.P., C.B.E.

Acting Vice-President : GERALD MARCUSE (2NM).

Hon. Treasurer : E. J. SIMMONDS, Member I.R.E., F.R.S.A. (2OD).

Hon. Secretary : H. BEVAN SWIFT, A.M.I.E.E. (2TI).

COUNCIL :

O. F. BROWN, M.A., B.Sc.; G. F. GREGORY, A.M.I.E.E., A.M.I.M.E. (5PZ); A. HAMBLING, Associate I.R.E. (2MK); J. F. STANLEY, B.Sc., A.C.G.I.; Flight-Lieutenant DURRANT, R.A.F.; K. ALFORD (2DY); E. DAWSON OSTERMEYER; Captain K. HARTRIDGE.

JANUARY, 1928.

Vol. 3. No. 8.

EDITORIAL

Useful Criticism.

A certain section of the popular technical press has during the past few weeks devoted a deal of attention to our Society and its apparent weaknesses. The notices which have appeared have voiced a candid criticism of the whole fabric of our organisation and whilst these were not always founded on fact, yet at the same time a considerable amount of truth was embodied in many of the statements.

The ultimate end of the series of articles was to point out that British amateur radio is not strong enough to be able to withstand a concerted attack on the liberties of the amateur. For a long time the trend of our Editorials has been to point out this weakness and to exhort our members to do their utmost to assist in the building of a strong amateur organisation as quickly as possible. The response has been good and it is apparent that our appeals have not fallen upon deaf ears. New members have been enrolled at an average of 35 to 40 per month for the past few months and most of these have been introduced by one or other existing members.

But this is not all that we wanted and still want. The rate of increase must be considerably greater before we can feel the first symptoms of satisfaction. It must be at least *double* this rate in order to make provision for a certain amount of wastage which is inevitable in any organisation such as ours.

Further, existing members are not always observant of the fact that our success and activities

depend upon the prompt remittance of subscriptions. Many seem to think that we are able to publish a magazine month by month and perform our many functions in a satisfactory manner without regard to our financial position. We have over 600 overdue subscriptions standing on our books at the present time and a considerable amount of work is involved in preparing statements and reminding these members which also in turn necessitates expenditure in clerical assistance which assistance would have otherwise been put to a more useful purpose. That is one of our weak spots which every member can easily strengthen.

Another weak spot is in our very own magazine. For a long time this magazine, which is the only one of its kind in the British Empire, has been nursed and produced month by month under extremely difficult conditions. The writer has experienced considerable anxiety in making the BULLETIN a sound financial proposition to the Society and amateur radio. No profit has been sought, for such is at present impossible, but expansion and increases in general usefulness have been longed for and hoped for ever since June, 1925. The odds against us were very great then and have not greatly decreased since. It is true that the BULLETIN is larger than our first issue but still there is much to be desired.

Outside members who know nothing about these little worries will naturally ask why we at Head Offices cannot remedy these difficulties. The answer is in everybody's hands including the writer's. In order to attain our desires we must increase our membership. Those of us who buy radio component parts should always give BULLETIN advertisers a first opportunity to satisfy their requirements. Without the advertisers we should have no BULLETIN and without the BULLETIN we should have no Society. The advertisers do not always pay money for space in our pages just to

encourage the Society; they want their money back in profits on sales and a little more besides. Do not be mistaken. Every member who buys his goods from anybody but a BULLETIN advertiser is not "playing the game." Every member who fails to send his subscription promptly when due is "letting the other fellows down." Every member who forgets that the existence of amateur radio depends upon the individual doing his bit should try to get right with his forgetfulness at once.

We are used to criticism, thoughtless kicking for imagined grievances and the like. We are thoroughly accustomed to disappointment and lack of useful support. These matters are part of our everyday letter bag. Also at times a few words of appreciation are like a ray of light in a darkened room to us and when they are substantiated by a solid, genuine show of help in one way or another we begin to feel that there is still hope for amateur radio in the British Empire.

We know that we are by no means perfect and we know that a lot has to be done before we can all meet together and congratulate one another on a splendid success. We also feel that the vast majority of our members are solid to the backbone in their desire to make amateur radio a national institution. We have petty difficulties and, in some cases, personal likes and dislikes but these should, and can, all take second place in our minds when the great issue at stake is contemplated.

In our booklet "What is Amateur Radio?" the writer defined amateur radio as a great collection of friends interested in radio experiments, bosom friends was one term used.

Some of our regular correspondents call them just "pals." Is this spirit of friendship to be gradually lost merely because of lack of active support? Is British amateur radio, now so promising in its growth, to be stunted and maimed because of sheer apathy, the ruination of many promising institutions? Apathy is the enemy of progress. We must get rid of it if we want to be able to hold our own. If we want the Society and all it means to prosper we must strangle apathy once and for all and get on with the task before us.

Once again, we are doing our bit—are you doing yours? Can you and will you help to make amateur radio strong, or is it to slowly die away? The answer is with every reader and the writer feels that this space has been well spent if it results in an avalanche of criticism and suggestions—and subscriptions.

A Happy New Year to everybody.

J. A. J. C.

R.S.G.B. Calendar.

January 18.—Meeting cancelled.

February 3.—Captain P. Hartridge, "Wireless in Armoured Cars."

February 15.—Meeting cancelled.

March 2.—Meeting cancelled.

March 21.—D. S. Richards, "Amplification and Reproduction at Audio-Frequencies in Conjunction with Electrical Pick-ups."

April 11.—No meeting.

Members are asked to note these on their fixture cards.

Developments in Quartz Resonators.

(Concluded from page 9, December issue.)

In the writers' opinion, only those crystals which oscillate easily without reaction, and with a comparatively large air gap, are suitable for transmitter control. Crystals which do not comply with these conditions may sometimes be made to control a transmitter for short periods, but in the long run they give trouble and are a source of bother and annoyance to the operator. This does not mean that one should always use a large air gap when mounting a crystal, but bear in mind that crystals which will oscillate under this condition without any form of reaction are really good specimens, and may be relied on to be satisfactory under working conditions. The radio enthusiast who is contemplating crystal control is therefore strongly advised to obtain a really good crystal to start experiments with, otherwise he will probably come to the conclusion that C.C. is a very difficult condition to obtain, and not really worth while. Many amateur transmitters have in the past come into possession of indifferent oscillators, often from foreign sources, and after weeks or perhaps months of wasted work have come to the conclusions mentioned above.

It is also important to be sure that the crystal obtained has only one mode of oscillation in the working range. Often, otherwise, good specimens have several modes of oscillation, and it is annoying to find that each time the transmitter is switched on the crystal may take control at any one of a number of different frequencies, sometimes very close together, sometimes separated by as much as 5 or even 10 K.C.'s. The above remarks are directed towards crystals that oscillate freely without any form of reaction. To use reaction on the crystal is fatal, and the crystal will invariably start oscillating at a slightly different frequency each time the transmitter is started up. Even worse the frequency may move from point to point during transmission.

As regards mounts, if great constancy of frequency is desired the crystal should be mounted so as to have as large an air gap as possible. This naturally reduces the output considerably, and for all ordinary purposes the crystal may be mounted with only a small air gap, or even directly in contact with the two electrodes. Some form of permanent dust and damp-proof mount is strongly recommended, otherwise the crystal will require frequent cleaning with the consequent risk of damage or even breakage. A 45-metre, or even a 90-metre crystal is of necessity a very thin plate, and should be handled with extreme care. A good crystal suitably mounted will oscillate continuously for days on end, and will never fail to start up and take control immediately the power is switched on. There is a general belief that quartz oscillators become "tired" after a time and refuse to work. This failing, in the writers' opinion, is due either to the use of poor crystals or to badly designed mounts. We have a number of mounted crystals in our laboratory which have been run for several hundred hours at a stretch and have been switched

on at least once, and often several times, almost every day for the past twelve months. These crystals still oscillate as well as the first day they were mounted, despite the fact that they have travelled from place to place by post and have received much rough handling.

It is hoped that these few notes will be of interest and will help readers to obtain the best results from their crystals.

In conclusion, the authors both wish to express their appreciation of the able assistance they have from time to time received from H. J. Lucas, Esq., A.M.I.E.E., especially with regard to some of the extremely accurate frequency measurements of the specially mounted resonators.

Irish Radio Transmitters' Society.

Headquarters: 5, Leinster Street, Dublin.

At the annual general meeting of Cumann Eireannach de Radio Sheoltoiri (The Irish Radio Transmitters' Society), held at the headquarters of the Society, 5, Leinster Street, Dublin, on Wednesday, November 16, 1927, the following officers were elected for the year 1927-28:—President, Col. M. J. C. Dennis, C.B.E.; vice-presidents, F. R. Neill (GI5NJ) and J. P. Campbell (GW14B); chairman, James Kitchen, A.M.I.R.E.; hon. secretary, Denis G. Kennedy (GW14C); hon. treasurer, W. Moran; executive committee, D. F. O'Dwyer (GW18B), D. M. O'Dwyer (GW18B), J. B. Scott (GW17C), J. Finlay, W. H. Benson (GW18C); auditors, R. D. Scott (GW17C) and R. Sadleir (GW13D).

At the same meeting certain alterations were made in the constitution.

All particulars of the Society as to membership, etc., may be had on application to the Hon. Secretary, Denis G. Kennedy, 21, Morehampton Road, Dublin, Ireland.

Trade Notes.

A New Condenser.

An interesting development in design and encouraging display of British enterprise is illustrated in the Ripault Lateral Action Condenser, which was advertised on page 13 of the December issue of the T. & R. BULLETIN.

This condenser is marketed either singly or as a "double gang model, or as a "triple gang" model, and the design is covered by Patent Specification No. 264598.

As the name implies, the moving vanes have a lateral action, that is they move bodily away from the fixed vanes and in a horizontal plane with the edge of the latter. The vanes are so shaped that cams of various shapes may be used in the mechanism to obtain straight line frequency, square law or exponential law characteristics throughout the range of the instrument at will.

Cam drive is used throughout in either the single or "gang" models, and the single type can be supplied fitted with either square law or exponential (logarithmic) cams. The condensers are very compact in form, and take up a comparatively small amount of space behind the panel. On test at high

frequencies of 45 metres and down as low as 15 metres they show a very high electrical efficiency, and deductions to this effect drawn from a study of the design were easily confirmed on test. Tuning with either model is extremely satisfactory and positive, there being no back lash. The principle of lateral action combined with an excellent slow-motion dial marked to 360 degrees, allowed for very critical adjustments, which, once obtained, could be logged and always repeated at will without "searching." It was found also that the cam principle gave a vernier movement of roughly 5 to 1.

One of these instruments was placed in a short-wave receiver, and it was found to give very selective tuning which had not been obtainable previously with a different make of variable condenser. It was found to be free of noise despite rough treatment, such as knocks, to make it otherwise.

This make of instrument can be confidently recommended either for reception purposes in a receiver or as a laboratory instrument where accurate calibrations are necessary. It will be found to be an invaluable asset to the short-wave wavemeter and for all other purposes where a minute adjustment is necessary to extreme accuracy.

T. & R. (General) Committee 1927-1928.

The following members were elected to the General Committee at the annual meeting held December 3, last: Sub-Committee No. 1, G. W. Thomas (5YK); Sub-Committee No. 2, R. L. Royle (2WJ); Sub-Committee No. 3, L. H. Thomas (6BQ and 6LJ); Sub-Committee No. 4, Gerald Marcuse (2NM); Sub-Committee No. 5, J. E. Nicklers (2KT) and C. W. Goyder (2HM); Sub-Committee No. 6, J. Clarricoates (6VL); Sub-Committee No. 7, C. A. Jamblin (6BT) (QRA Section) and F. E. King (5AD) (QSL Section).

The Committee was elected in accordance with the rules approved at the annual Convention, 1927, and these members are responsible for the consideration and maintenance of the following subjects: No. 1, Tests and Organised Experiments; No. 2, Membership and Register of Members; No. 3, Instruments and Calibrations; No. 4, Licences; No. 5, Publications and Papers; No. 6, Social Events; No. 7, QRA and QSL Sections. Each of the members has power to co-operate not less than three and not more than five members to form a sub-committee to deal with the particular subject which sub-committee will meet as required.

The main Committee meets at least three times a year, the first meeting being on January 29.

A.R.R.L. International Test.

A.R.R.L. is conducting an international test to open on February 6 next. Complete details of the test were given in December QST. Valuable apparatus is being offered as the prizes, and the competition will last for two weeks. Closing date for entries is February 1, and if you want to enter, a card should be sent to A.R.R.L., Hartford, Connecticut, U.S.A., asking for particulars, a set of official test messages and a serial number assignment. *Do it now!*

Washington.

The Position of the British Amateur.

As expected, the news from Washington so long expected did not arrive until a few days after the December issue of the BULLETIN had gone to press. In consequence, many readers already know, through the medium of other publications, the results of this long parley between those that rule the ether, and on the whole the information is not exactly cheering.

The following are the main results of the Conference so far as they affect amateur transmitters:—

- (1) Amateur wavebands granted near 160, 80, 40, 20, 10 and 5 metres.
- (2) Amateurs of every country to be in same bands.
- (3) The power of amateur stations will be fixed by each nation.
- (4) Each nation will be free to permit or prohibit amateurs as it desires; each nation free to withhold any or all bands.
- (5) International amateur message traffic forbidden except by special arrangements between nations.
- (6) New system of amateur calls to indicate nationality restoring intermediate "de" and abandoning international intermediates, prepared by I.A.R.U.

Width of wavebands agreed:—

149.49—174.9 metres, 74.96—85.66 metres,
41.07—42.83 metres, 20.82—21.42 metres,
9.99—10.71 metres, 4.997—5.354 metres.

The arrangements are not due to come into force until January 1, 1929.

What is the Result?

At first sight the results do not appear to be so bad as they might have been, for we British amateurs have grown accustomed to being closely confined to narrow limits, and we shall no doubt find ways and means of doing a great deal of useful work despite the increased QRM which is bound to be experienced.

We have also had experience in the past of being given wavelengths which "will do no harm" and have made good use of them. What was really intended when we were given "harmless wavelengths" was that these should also be "useless," and it took the amateurs to show those who knew better what could be done with "useless" wavelengths. Therefore we do not despair of doing good work even on what might be considered by some to be "useless wavebands," wavebands so narrow in many instances that only very skilled operators can hope to transmit accurately to three places of decimals on short waves!

Still Hope.

Nevertheless, we none of us despair for half a metre is better than no metre at all, and whatever we have lost we can regain by using selective receivers and sharply tuned transmitters. Wavemeters will also be extremely popular things, and we look for an outburst of enthusiasm as to who shall possess the most accurate wavemeter. Fortunately at Headquarters we have an instrument which can be used to measure up and check any station, including those run by the Government, and from time to time we shall not hesitate to give a "checking

table" on transmissions from various stations if this is necessary.

There should be no mistake as to the outcome of these new regulations. The fact that all the amateurs of the world are confined to these narrow limits will make it imperative that every amateur should use the best gear he can design and unrectified or partially rectified A.C. must be ruled out once and for all. If this is not done the wavebands will indeed be useless, and it is to be hoped that our Continental friends will take steps to see that some of their worst stations are cured of the disease which makes them give sounds like a saw-mill in full swing!

Many readers will wonder whether amateur radio is worth while after reading the new regulations and considering our self-imposed regulations as regards closing down during broadcast transmission hours. Many more will be inclined to "kick" and agitate for greater facilities. Just as many more will have a growl about the poor show which has been made in defending the rights of the amateur. To all of these there is only one reply. Whatever the difficulties imposed they all go to make amateur radio worth while. Whatever the results, whether they be considered as good or bad they are due to the amateur himself.

Our Own Fault.

We must not lose sight of the fact that this was an International Conference. It would appear from a description by K. B. Warner, of the I.A.R.U., who was present all the time, that the Conference resembled a gigantic dog fight, only that the dogs were gentlemanly creatures and did not bite with teeth but with words. The strength of the amateur lay not in his existence, but in the pressure which he was able to exert upon his own Government. Where the amateur was weak, in most cases the representative of his particular government was merciless in demanding his restriction or extinction. On the other hand the American delegation, representing a nation where the amateur is strong, supported him to the utmost and it is due in no small measure to the support of the American delegates that anything was left for the amateur after the big noises had taken the lion's share of the ether.

Action of British Delegates.

The British delegates, according to K. B. Warner, were responsible in the main for the ultimate restrictions imposed upon the amateurs. It is true that Japan (and Japanese amateurs might note this) came out with the cheerful proposal that amateurs should be limited to "dummy aerials!" But this was too much even for our delegates who had to remember that little clause in our Wireless Telegraphy Bill which reserves us a place in the ether. They simply could not agree to even so simple a method of extinction, because if they came home with a mandate for our disposal the House of Commons would have had quite a lot to say about it.

What the R.S.G.B. Did.

The R.S.G.B. was in the main responsible for the existence of that clause, and there is no doubt but what it helped to save the situation. The British delegation, which had great influence with the

Conference, effected a compromise and the amateur at last got International recognition. In the background was America with her thousands of amateurs pressing for their rights and the amateur was saved from extinction, *but it should be clearly understood that we have had a very narrow escape from the writing of the word "finis" at the bottom of this issue of the BULLETIN.*

Get Ready for Organisation.

Having finished the battle we have now to clear the debris. Stock must be taken of our position and a definite plan of action set for the future. It is very evident that an International amateur movement is essential to our well-being, for when an International Conference is on the offing nations are only units and the individual a pawn in the game. Our utmost strength is necessary at home so that we can unite with amateurs of other countries and use our pressure whenever necessary. There must be no weak link in the chain, otherwise it will snap at the weak spot and the result will be that the whole fabric will "crash." This time there were many weak links, for the amateur has rarely given a thought to an International Conference being his Waterloo. His attention has been devoted too wholeheartedly to his own particular conception of amateur radio, and the British amateur has been somewhat self-centred in himself rather than considering radio as a whole. The result was that the greatest nation in the world was unable to enforce its will on the Conference, for its amateurs are as yet still poorly organised and only partly mobilised.

Plain Talk.

Plain speaking is necessary at all times such as this and the writer knows that he will probably be called to account for many things he is writing, yet to flinch from an expression of the opinion of all active amateurs would be doing a bad service to the movement as a whole. Clearly we have to make good while there is yet time. Just as clearly severe disorders call for drastic treatment. We have to face the fact that we have a complaint which requires treatment—conservatism complicated by apathy. Both must be abolished by one and all. Our membership has got to be increased very considerably, and to do this we must welcome to our ranks all amateur experimenters receiving and transmitting.

Free Entry a Remedy.

The way for their entrance to our Society must be opened wide and we must gather them in. If we want to fix a place for the British amateur for all time we must expand and so regulate our ideas that we shall be prepared to welcome as fellow-members all classes of experimenters.

This is the only way we can secure what we want in these days of massed movements and conferences. We must be utterly representative of all grades of amateur experimenter instead of a mere handful of self-interested enthusiasts. The friendship of the ether must grow strong enough to make us exert our utmost to foster a spirit of freemasonry wherever a knob is twisted or a cat's-whisker adjusted.

Bravo, Warner.

This article would not be complete without a word of thanks to K. B. Warner, who so untiringly represented the amateur throughout the Conference. He was fighting a losing battle, but he made a grand

show. The amateur will be everlastingly in debt to him and the American and Italian delegates for their sympathetic assistance and help during the days when the fate of the hobby of thousands of enthusiasts hung in the balance. We are deeply indebted to them all and to Warner in particular.

Annual Year Book.

By force of circumstances we have been compelled to print and publish our own "Log Book and Diary" this year, and this will appear March 1st next under the title of "1928 Annual of the Incorporated Radio Society of Great Britain." It comprises over 7,000 QRA's of amateur transmitters, a simply-ruled log book section, wire tables, formulae and a host of other interesting matter useful to the amateur experimenter, including crystal control articles, etc. The list of QRA's is entirely up to date, thanks to the energies of C. A. Jamblin (6BT) and other kind helpers, such as Will Merriman, of *Wireless World* (through the courtesy of the proprietors), and is the most complete set of European QRA's ever published in any country.

In view of the fact that we have had to finance this undertaking entirely unaided, except for a small revenue from advertisers, we are compelled to charge the membership for the book, the price being quite a small one considering the usefulness of the work, and a further source of revenue is expected in sales to the general public, the price being higher in this case than to members. In view of this latter circumstance, and the fact that the book will be advertised to the general public, all members are warned that an early order with cash will alone ensure the securing of a copy, as all orders will be dealt with in strict rotation. For a long time we have wished for such a book, and now we have got it, please let it be a success from every point of view.

Stray.

5MQ wishes it to be understood that he has not effected any QSO's with the apparatus described in the November issue of the BULLETIN, and that the statement that a certain amount of successful work has been accomplished on 5 metres should not be read as a statement that transmissions have taken place.

Next Issue.

Including other interesting articles, the next issue will contain a description of a special sensitive and selective broadcast receiver.

WANTED.—A thousand or so members to advertise their surplus gear for sale in these columns.

Theory and Adjustment of a Transmitter.

By F. AUGHTIE, G6AT.

Part III.

Primary Turns.

Suppose that we have a valve supplying a definite power at a fixed frequency to the primary of a loosely coupled transformer. The E.M.F. generated will be constant, and hence also the output voltage will be constant, since (the load being constant) the voltage drop in the valve itself will be constant. Consider now the effect upon the circulating current of changes in the number of primary turns.

Let N be the Primary turns.

I be the Primary current.

Then the maximum field through the primary will be kNI , where k is some constant depending upon the size and shape of the coil.

$$\begin{aligned}\text{Maximum linkages} &= kNI \times N \\ &= kIN^2\end{aligned}$$

and since the primary supply voltage and frequency are both constant, the maximum linkages must be constant.

$$kIN^2 = \text{Const.}$$

$$\text{or } IN^2 = \text{Const.} \quad \text{—For a definite size of coil.}$$

$$I = \frac{\text{Const.}}{N^2}$$

$$\begin{aligned}\text{Primary field} &= kNI = \frac{kN \text{ Const.}}{N^2} \\ &= \frac{\text{Const.}}{N}\end{aligned}$$

Remember that the bulk of the primary current^t is supplied by the primary condenser. Thus, as the primary turns are reduced:—

- (1) The circulating current increases rapidly (proportional to the reciprocal of the square of the number of turns). This will cause increased loss unless the primary resistance is decreased in proportion.
- (2) The field through the primary increases (proportional to the reciprocal of the primary turns). This has two results:—

(a) If there are losses due to the presence of metallic bodies, etc., being in the field, these losses will increase.

(b) If the coil is kept in the same position in relation to the secondary the common field will increase. This means that THE COUPLING WILL BE TIGHTER. Hence if with existing coils sufficiently tight coupling cannot be obtained, reduce the primary turns. This result is contrary to that anticipated from casual reasoning. The coupling can also be tightened by increasing the secondary turns.

From a theoretical standpoint, if losses are small, there is no advantage in either a high or low L/C ratio. In practice, keep the primary inductance as high as possible, since this will reduce losses due to surrounding metal work. The coil should be wound with a spacing between turns at least equal to the diameter of the wire, and preferably more

to reduce losses caused by eddy currents in the material of the wire itself.

It should be noted that a circuit having the maximum inductance practicable will be much more susceptible to stray capacities—such as those due to the proximity of the operator—than one having a smaller inductance and a larger capacity which will mask out any changes due to such causes.

Hence for efficiency use large inductance; for stability use large capacity.

The secondary is best made of the correct size to tune the aerial circuit directly, since in this way there are no extra losses introduced.

THE VALVE.

For a valve to supply H.F. energy three fundamental conditions must be satisfied. (a) The filament must be at such a temperature as will give the necessary emission. (b) Power, in the form of a direct feed current at a suitable voltage, must be supplied to the plate. (c) The potential of the grid must be varied over a suitable range at the required frequency. This input to the grid is conveniently termed the excitation.

Grid Excitation and Bias.

When a valve is used for L.F. amplification care is taken: (a) to work only on the straight portion of its characteristic curve, and (b) to avoid running the grid so far positive as to cause grid current to flow. If either of these conditions is broken the wave form is distorted in such a way as to introduce harmonics not present in the grid input. In L.F. work these harmonics are audible and are classed as distortion. In H.F. work, however, they do not matter seriously, since they can be separated from the fundamental by the use of tuned circuits. They may at times be useful.

It can be shown that if condition (a) is adhered to, then the maximum H.F. output is half the D.C. input, i.e., the efficiency is not greater than 50 per cent. (neglecting filament watts and grid input power). If the grid is given a negative bias sufficient to bring the mean operating point down to the bottom of the straight portion of the curve, and the grid excitation is increased so that the positive half cycles swing over the straight portion of the curve, no current flowing during the negative half cycles of grid excitation, the efficiency rises to about 75 to 80 per cent. It will be found that a valve operating in this way will give a very small output. The output can be increased by increasing the grid excitation so that it swings positive. This will result in grid current flowing. The resultant distortion is of little importance, since the wave form is already distorted. A result of much more importance is that the grid now requires power for its excitation. It can be shown that, as the bias is increased and the excitation is increased in proportion, the anode efficiency increases, while the power for grid excitation increases slowly at first and then more rapidly. The result is that, if the valve is self-excited, its grid power being supplied from its anode circuit,

(Concluded on page 24.)

LET EVERYBODY JOIN!

FOR both financial and legislative reasons there is great need that the strength of our membership is increased almost immediately.

This Society is first and foremost a society having for its aims and object the assistance of the bona fide experimenter and therefore its constitution is framed in accordance with such objects. Entry to Corporate Membership is only possible if the applicant can show that he is in fact a bona fide experimenter, and therefore the form of application for such membership is based on lines which, if properly filled in, will assist the Council in deciding whether the applicant is entitled to term himself such. Therefore Membership or Associate Membership of the Society means something more than merely an interested person: it means that the holder of such membership has qualified as an acknowledged experimenter and that he has status as such. All Corporate Members (Members and Associate Members) are entitled to all notices issued by the Society, including the BULLETIN, and also are qualified to vote on business matters affecting the welfare of the Society, and to sit on Council or Committee if elected to such.

Non-Corporate Membership.

It is clear, however, that there is a great body of persons interested in amateur radio who have not yet reached the stage where they feel competent to make application for Corporate Membership and who are not therefore prepared to answer the questions asked on the form of application regarding their qualification,

although these are, in the main, perfectly simple and easy to answer. There is a grade of membership for these persons allowed for in our Constitution, and this is the Associate Grade, the yearly subscription being 5s. No technical knowledge is required of this membership, and the entry form is simple—all they need do is to fill in their name and address and accompany the form with the subscription named, no entrance fee being required of them. Such entrance fee is necessary, however, should they at any time desire to transfer to a corporate grade of membership.

Associates are not entitled to a vote or to sit on Council or Committee or to receive any notices, including the BULLETIN; but, with the object of encouraging entry into the Society, persons of this grade of membership may receive the BULLETIN on pre-payment of an additional 5s. per annum, thus making the inclusive subscription 10s. per annum. Associates may contribute to the BULLETIN and enjoy the use of its correspondence

pages, etc., and may also receive such publications as are published at reduced charges to the membership from time to time on payment of the necessary fees or subscriptions.

They may take an intelligent interest in the upholding of amateur radio and its traditions, and through the medium of the BULLETIN they will be kept in touch with latest developments in radio and enjoy participating in tests, etc., which are organised from time to time through its columns. They are represented, in common with the Corporate Membership, when matters of legislation are under discussion, and also on the Wireless Organisations' Advisory Committee, upon which Committee the Society has two representatives. The Society has also representatives on the British Electrical Standards Association Committees which is dealing with the standardisation of radio component parts and ebonite, etc., a matter of vital importance to the amateur.

It should be remembered that everybody interested in amateur radio, either as a transmitter or receiver, should join a society which will protect his interests. This Society is the only one which caters for the amateur experimenter, no matter what his grade of skill, and our BULLETIN is the only wireless paper which is free of all vested interests, and thus able to advise and fearlessly represent the amateur in an impartial manner.

You may have many friends who wish to enrol in the Associate Grade so as to become one of the great army of organised amateurs. The entrance form is simple to fill in and the fees are low. Will you assist us by bringing this to his notice? Then, we thank you.

JOIN NOW.

Associates paying 10/- a Year get:—

1. Representation in Legislative Matters.
2. The BULLETIN each month post free.
3. A B.R.S. number if required.
4. Access to all meetings free of charge (except Annual Meetings).
5. Membership of an Empire Organisation.
6. Right to wear Society Badge if desired.

No difficult entrance forms.

No entrance fees.

DO YOU REQUIRE ANY APPLICATION FORMS?

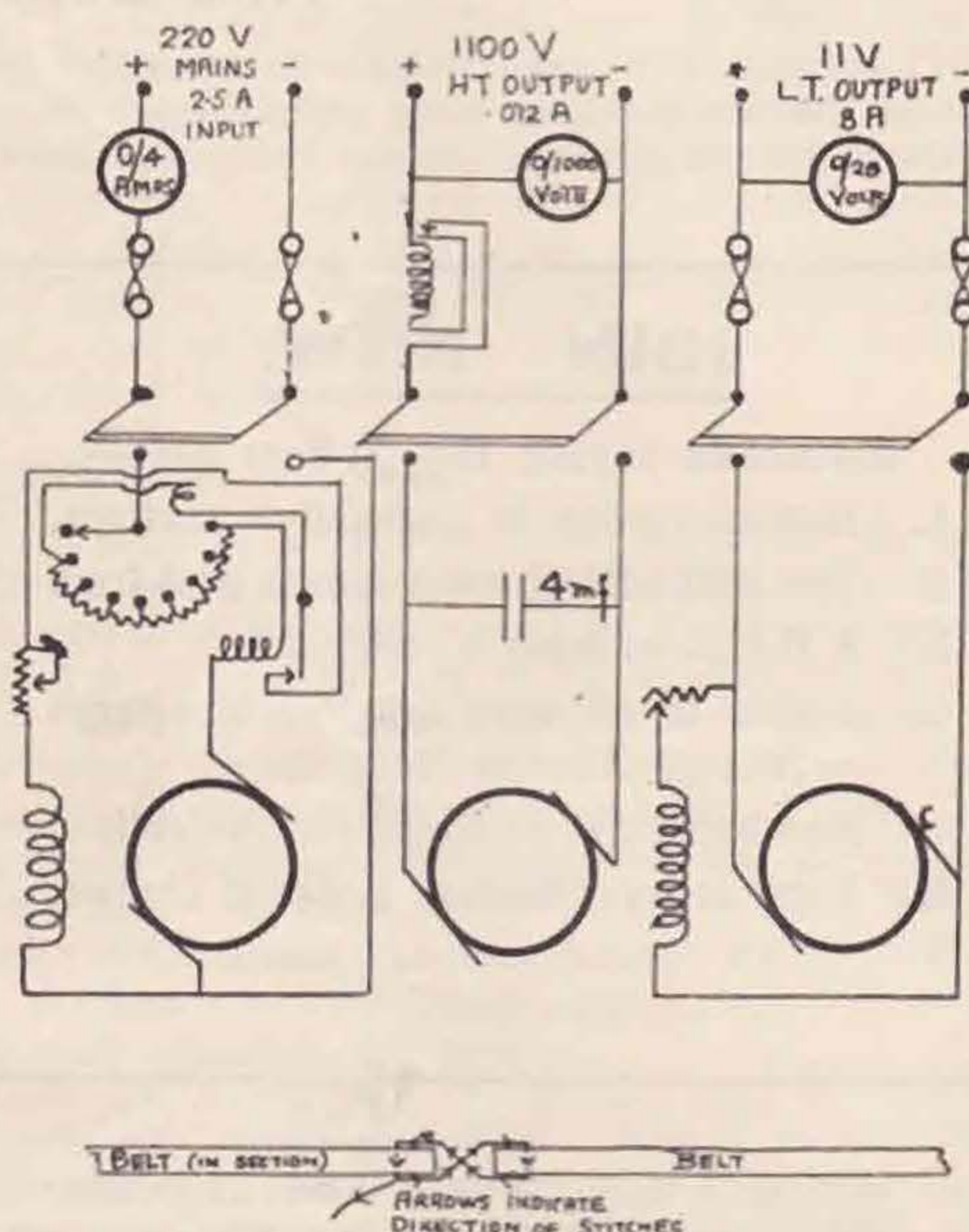
Power Supply.

By DENIS G. KENNEDY.

A short description of the apparatus installed at this station for power supply may be of interest to some T. & R. members who contemplate installing a similar plant. When the writer decided to install a motor working from the 220 volt D.C. mains and driving a Mackie double current generator for the supply of both high and low tension to the transmitting valves, he found a great dearth of literature on the installing of such small machines and had to install his by trial and error, so to speak, and finally decide on and install them in what was found to be the best way. In this respect the writer has to acknowledge, with many thanks, much helpful information from the makers of the machines, Messrs. W. Mackie & Co., Ltd., and the Metropolitan Vickers Electrical Co., Ltd.

The generator is similar in construction to that described in the September *Bulletin* by 5YM, but it is designed for driving from some external source of power and has its second commutator arranged to give a low tension supply at 11 volts, with a current of up to 8 amperes for filament lighting. The high tension commutator gives 1,100 volts at .072 ampere, but can stand heavier currents without damage or appreciable voltage drop. The frequency of the ripple on the high tension voltage is 5,600 cycles and may easily be smoothed with a small condenser. One microfarad would have been ample, but the writer, for safety's sake, has a 4mF Dubilier Mansbridge smoothing condenser across the high tension terminals. This is guaranteed to stand 2,000 volts as a working pressure and has been tested to 4,000 volts. It is necessary to use a condenser which will stand well over the maximum working voltage as on no lead the generator voltage may exceed 2,000 volts. The speed required is 4,800 R.P.M. and it was here that the first difficulty was met with, for no electric motor gives a very much greater speed than 2,000 R.P.M. and this means that it is necessary to provide a step up ratio of about 3:1. Since the general diameter of pulleys fitted to motors of the rating required to drive a generator of this type is not more than 3 in., the diameter of the pulley on the generator must be somewhere in the vicinity of one inch so as to get the proper speed in the generator. The thinnest balata belting is three-ply, and this will not go comfortably round a pulley of less diameter than three inches. Webbing of various kinds was tried, but this always slipped on the pulleys when a load was put on the generator. It was then obvious that balata belting must be used somehow or other, and a length of Silvertown belting was procured and an attempt made to use it on the machines. There were two alternatives open, one, to fit a countershaft, and the other, to cut off plies off the belting. In the first case a heavy countershaft would have to be mounted on the roof and fitted with 3 in. and 9 in. pulleys. It would have to be at least 1 in. diameter to carry a 9 in. pulley. A belt would then connect the 3 in. pulley on the motor to the 3 in. pulley on the countershaft and transmit a speed of 2,000 revs. to it. The 9 in. pulley would be joined to a 3 in. pulley on the generator. The pulley on the generator would preferably be made of wood as a heavy pulley is

liable to twist, or worse, snap off the shaft of the generator, which is only 5-16 in. diameter. This would undoubtedly have been the best way, but there were objections. First, the machines are fitted in the room in which the transmitter is installed, and it would be very undesirable to have such a large amount of iron in the vicinity of an S/W and especially a 23-metre transmitter. Secondly, the power wasted in the countershaft would have been excessive in proportion to the actual power used. Thirdly, the cost would have been excessive and the arrangement cumbersome when used in a room of the usual size available for a wireless shack. In spite of all these disadvantages, this arrangement would have been fitted if a separate power house had been available, but as this was not so, it was decided to attempt direct drive with a belt. One ply was removed from the belt by heating it in an oven and pulling and cutting the ply away when it was quite warm. The belt



was then cut about $\frac{1}{8}$ in. too short as measured around the two pulleys and then sutured together as in the diagram (Fig. 1). This method of joining the ends of a belt was found to give a very flexible and strong joint, whereas the usual belt joiners were found altogether unsuitable as they nearly pulled the generator to bits each time they went round a pulley. Using a fairly tight 2-ply belt, a wooden pulley of one and one-fifth inches diameter and a joint of this type, perfect coupling was obtained and the whole arrangement is working perfectly at 14C.

Having decided the method of coupling it is necessary to decide on a suitable mounting for both machines. The motor is a Metropolitan Vickers $\frac{1}{2}$ B.H.P. motor for 220 volt D.C. mains and it only takes 2.5 amperes from the mains when working on full load. This is an efficiency of 68 per cent., which is unusually high for so small a machine. Running from the power mains at 1 $\frac{1}{2}$ d. per unit, it costs approximately three farthings per hour on full load, a very different and vastly more economical

(Concluded on page 10.)

Special Offer to T & R Readers



The Dubilier Wavemeter

AN accurate wavemeter is essential to every experimenter.

This Dubilier Wavemeter is fitted with a special buzzer which retains its adjustment and gives a high clear note making sharp tuning an easy matter. The self-contained dry battery is controlled by an on-off switch and the case is of polished mahogany.

Readers of the T. & R. Bulletin are invited to write to us at once and avail themselves of this special offer, while it lasts.



Advt. of the Dubilier Condenser Co. (1925), Ltd.,
Ducon Works, Victoria Road, North Acton, W.3.

Price

45/-

Complete with
Calibration Chart
and Broadcast
Range Coil.

POST 1/6.

Modulation on 45-metre Transmission.

By P. JOHNSON (5IS).

Just lately much has been said discrediting the work of the transmitting amateur working telephony on 45 metres. It is true that some difficulty is experienced in putting out pleasant speech on short waves, but as our licences are granted us for purely experimental work and as no one experiments except with a view to discovering something or improving something, then surely the difficulties of short-wave telephony open up a field for experiment.

The writer claims no discoveries in the transmitter about to be described, but would point out that the transmitter is a combination of a simple method of holding constant frequency, a well-known oscillator, and a cheap and simple method of modulation. For the purpose of fixing the frequency a quartz crystal is used. This has a fundamental of 91.8 metres. A frequency-doubling stage follows the crystal oscillator. The feed to the two valves is 50 m.a. at 300 volts and is derived from 220 v. 50 r. mains through the circuit shown in Fig. 1.

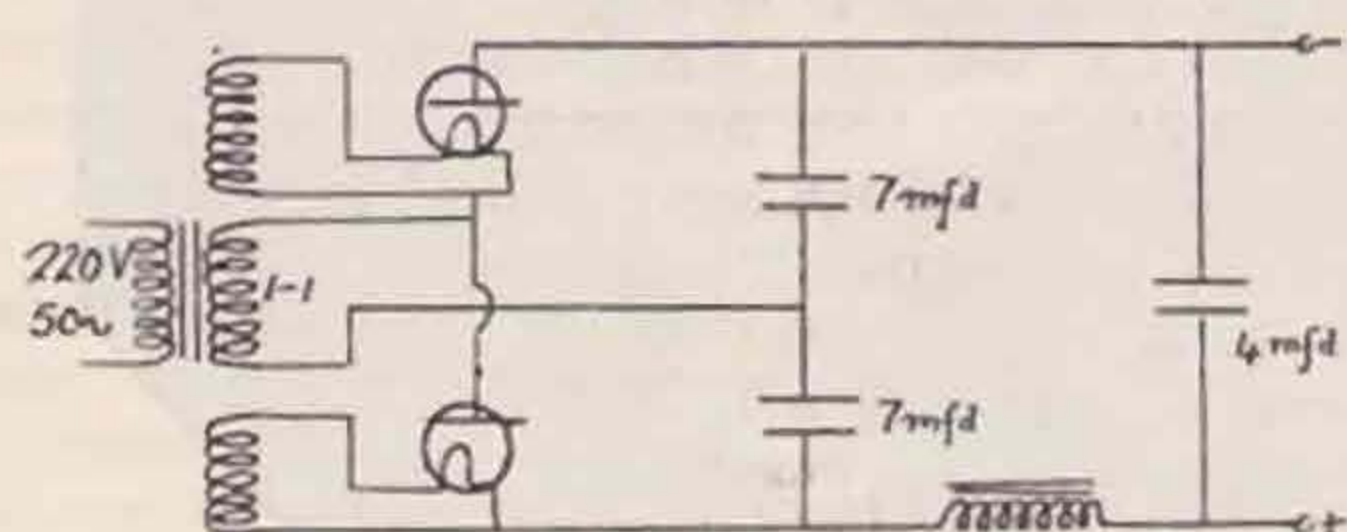


FIG 1.

The circuit employs a voltage multiplying device which deserves to be better known. By employing the two large condensers as shown voltages considerably higher than the main voltage can be obtained although the transformer ratio is 1/1.

The crystal stage and the frequency-doubler stage are shunt fed and the system has been previously described by others in the BULLETIN. The oscillator stage is tuned-grid, tuned-anode, employs a D.O. 40, and is coupled to the frequency-doubler by its grid coil. This method has been described by Mr. Goyder. The oscillations from the frequency-doubler do not actually "drive" the oscillator but only "hold" the frequency, and this only happens if the frequency to which the oscillator is tuned is fairly close to that of the crystal harmonic.

The modulation system is the "variable grid-leak" method or "grid direct-current modulation." A valve is connected so that the cathode-anode path carries the D.C. current flowing from the grid of an oscillator valve. The usual circuit is shown in Fig. 2.

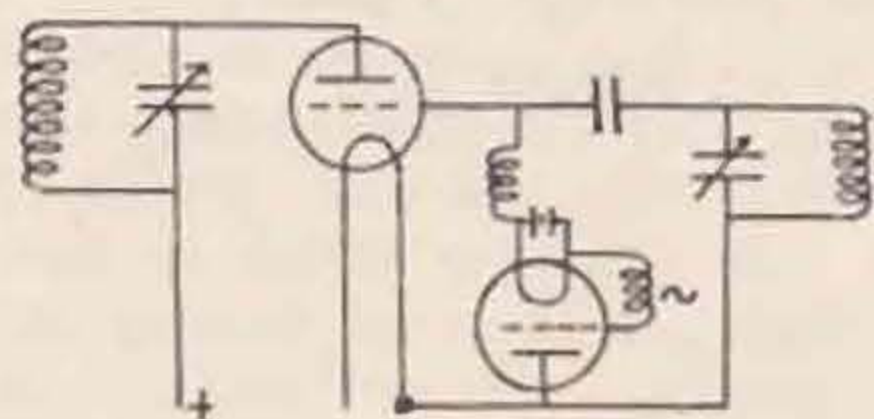
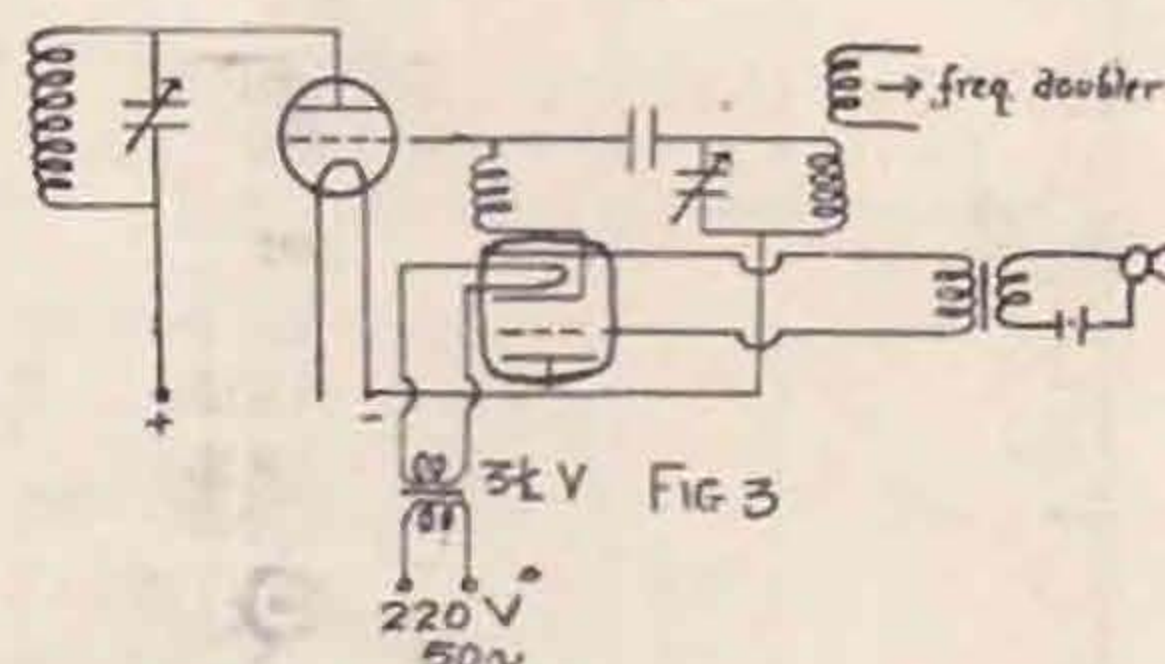


FIG 2

If the voltage on the grid of the modulator is varied, it will be seen that the modulator acts as a variable resistance across the grid coil. In practice, this would give rise to considerable frequency variation in a self-excited circuit. This frequency variation is the principal cause of the "spreading" so strongly condemned by those who suffer from jamming. Now in the case of the crystal controlled transmitter, frequency variation is so slight that it is negligible, and it is possible to modulate quite fully without objectionable "spreading."

There is a disadvantage in the grid-leak method as shown in Fig. 2.

The modulator filament battery and microphone transformer secondary winding are not at earth potential; they are at the oscillator valve's normal negative grid-potential. This means that they must be carefully insulated. The writer was able to partially avoid this complication by taking advantage of the "indirectly-heated cathode" type of valve known as the Osram KH1. In this valve the filament and the emitter are not in any way connected, and the valve was employed as shown in Fig. 3. It will be seen that the filament is heated by means of a step-down transformer connected in the house mains.



Now, the transformer secondary only is above earth potential.

Using this method the writer modulates 40 watts with the KH1 without the use of an amplifier. The microphone transformer secondary has a 100,000 ohm resistance across it to prevent peaking. As the impedance of the KH1 is high, too high for normal use as a grid-leak for the D.O. 40, a grid-leak of 50,000 ohms is used in the conventional position across the grid condenser.

Power Supply—(concluded from page 8).

proposition to that of 5YM who has to charge on 18 volt accumulator from which he has to supply in addition to the driving current for the generator, the filament current of his valves. Taken all in all, even though a motor has to be purchased for the writer's type of power supply it will come much cheaper in the end, for the cost of the motor will not exceed the cost of an 18 volt battery of sufficient size to stand the heavy discharge current.



A Danish Amateur Station.

By E. POULSEN (D-7MT).

6 Virginiavej, Copenhagen, Denmark (Member T. & R.)

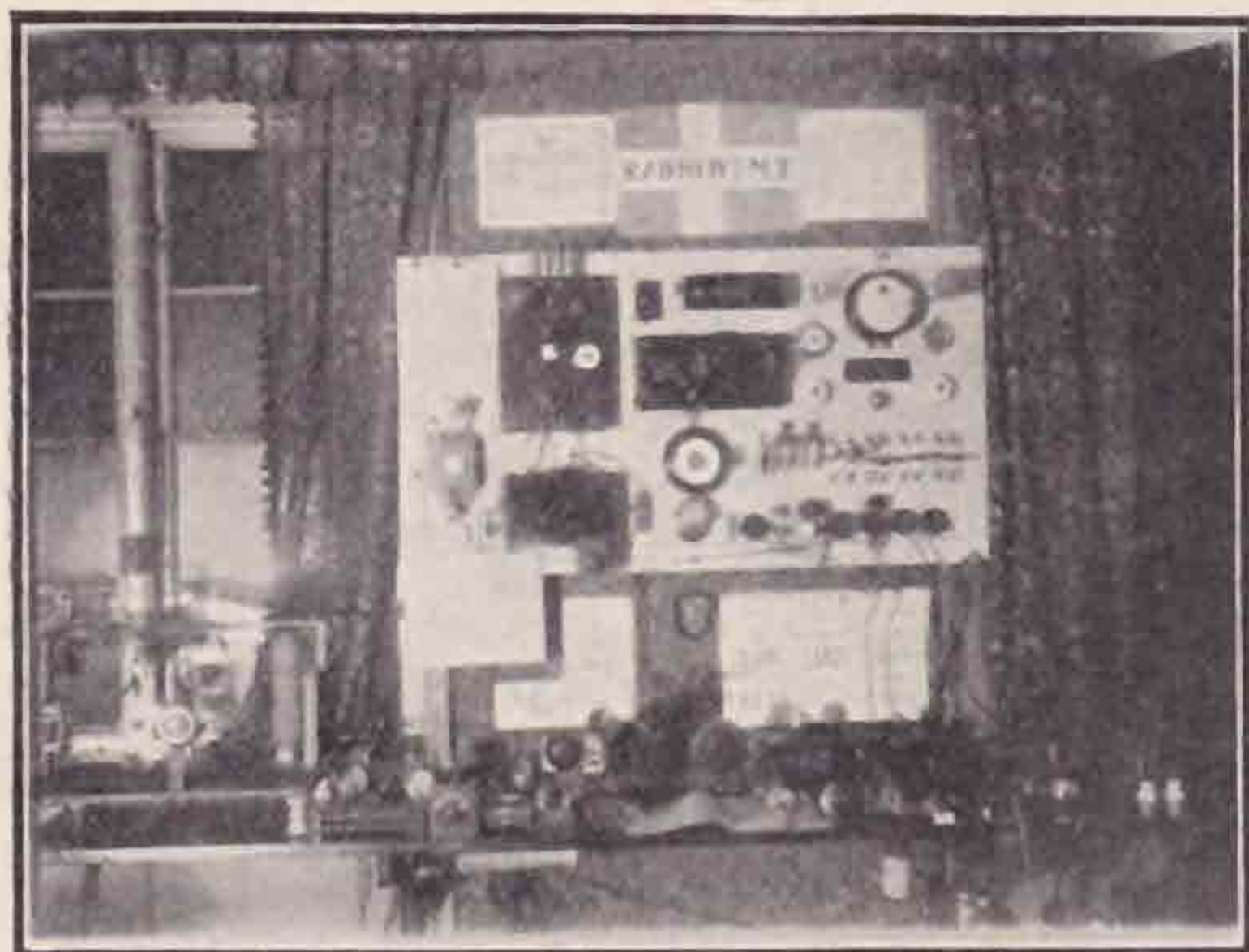
About 1½ years ago, D-7MT commenced transmitting on 75 metres.

The maximum input never exceeded 5 watts, and many European QSO's resulted.

I use three aerials:—

- (1) A large aerial for transmitting 80 m. long, 19 m. high, single wire, operated at 3rd harmonic. Counterpoise 2 waves, 23 m. long, 3 m. above ground.
- (2) A Hertz, with fundamental of 43.5 m., voltage fed, and 2 m. above the roof.
- (3) A small fan aerial of 3 wires, each 8 m. long, and 5 m. above ground, badly screened. Counterpoise as for No. 1.

Aerials 1 and 3 give the same results, as proved by schedule working and changing over from one to the other, and I always prefer working to schedule with old friends, although actually more than 350 different stations have been worked.



On a maximum input of 5 watts, my signals have been heard in Canada, U.S.A., 1st and 2nd districts, India, Brazil, and by SKTR and PA3A.

I find it quite easy to work all European stations on 44 watts.

In the accompanying photo the 5-watt transmitter will be seen at the left, in the middle is the S/W Receiver, and on the wall will be seen the heterodyne wavemeter, etc.

The circuit employed is the Hartley, and no grid condenser or leak is used, when using 5 watts.

The filament current is taken from the mains, and the various chokes for this will be clearly seen.

I am particularly interested in fading phenomenon, and I would like to thank all those "G" hams, who have so kindly co-operated with me in my schedules for studying QSS, and I am always pleased to assist in schedules from "G" stations, who are always so ready and willing to help everybody.

The receiver used is always an O-V-1 Modified Reinartz.

Contact Bureau Notes.

(By Gi6YW).

At the time of writing these notes almost a month has passed since the announcement of the formation of this Bureau was published, and the response up till now has not been encouraging. While this is so, we must say that what applications have been made confirm our view that such a service is needed by genuine experimenters. But, where are they all? Please look up your November BULLETIN and give us a little co-operation, as we hope to give you when you need it.

We have to acknowledge applications from the following since the last notes:—G5KZ, G6BW, G2NT, G5KU, G5AD, G6BB, BRS42, BRS79, BRS92, 2BRJ, BRS112, BRS103, making a total now of 22.

The problems already indexed range from the investigation of the electrical properties of the upper atmosphere to condenser-type microphones, from side-band telephony to absorption keying, from 5-metre reception to H.F. amplification on short waves.

We have a request asking for a station in North Scotland, Faroe Islands, or Iceland to help in a series of tests. Volunteers, please!

We have also a list of RX stations willing to QRX for tests, so send along your times of working, and we may be able to help.

The A.R.R.L. is going to run another International Relay Test for which valuable prizes are offered, and at least one of these prizes will be won by a British amateur. The idea is to show which station in each country is the best for making contacts with North America. British stations should work as many NU and NC stations as possible during the period 00.00 G.C.T. on February 6 to 00.00 G.C.T. on February 19, and take their test messages.

Replies to these may be sent to any NU or NC station except the originating one, but each American may handle only one message and one reply with any one station here. Each reply must be of at least ten words, and need only be addressed to the serial number or the original message.

You will be allowed one point for taking a test message and two points for successfully giving a reply through a *different* station.

All reports and logs must reach A.R.R.L. by midnight of April 21, 1928.

The test messages will be of a purely experimental nature, e.g., "What is the wave-length of your transmitter, please," and will not infringe any licence regulations. Indeed, the infringement of one's licence regulations in any way disqualifies one's station.

Space here does not permit of all the details, which will be found in the December issue of QST, which should be in every amateur's den.

Should any *transmitter*, who wishes to take part, not have this issue and be unable to borrow one (!), we will be glad to give him information on any point in question, as far as we can.

5KU suggests that stations which want to be kept informed of interesting tests taking place, should send, say three, stamped addressed envelopes to CB, and that we should keep them until we get information of such tests. We will give this scheme a trial.

Eliminating Interference to Broadcast.

By G. W. THOMAS (EG-5YK).

The object of this short article is to try to help stations who suffer from neighbours ringing their door bells just when a new country is being worked ; in other words, the elimination of QRM to the B.C.L.

A lot can and has to be done to the transmitter itself, but the final part is done at the receiver. Suppose we take the case of, say, a 20 to 30-watt transmitter working on 45 or 23 metres off a good R.A.C. supply. This will probably cause three types of interference to B.C., hum, wipe-out and key thump. The first duty of the station owner is to get a really good D.C. note ; get a good filter and then try some R.F. chokes in the H.T. leads. R.F. chokes or an R.F. filter in the 200 v. A.C. leads may also improve matters. Don't force the set, and use dull-emitter valves wherever possible. The same remarks apply to D.C. mains supply, and with modifications to generators. However, even after a lot of work has been done in this way the B.C.L. will probably still receive some hum if the station uses A.C. mains as its primary source of power. The question of wipe-out is, apparently, only to be cured at the receiving end. It seems possible though that when the receiver works on a horizontal aerial, a vertical one at the transmitter may reduce all kinds of interference to a certain degree.

Now about key thump ; there is little to be said about that, except to those who still key the H.T. on and off direct. Obviously a key thump filter will help matters, if it does not produce a "tail" to the keying. Avoid keying in a place that causes a spark at the key points, because that spark acts like a miniature spark transmitter. Where very bad key thump is received on a nearby receiver, the writer is of the opinion that the only method of eliminating same is to key a spacing wave. There are many who disagree with spacers, but during quiet hours surely it is worse to cause certain interference to many B.C.L.'s than possible interference to one or two other hams. There is, however, no excuse whatever for a spacer out of quiet hours.

Having reduced the Q.R.M. as much as possible from the transmitter, attention must be turned to the B.C.L. receiver. The B.C.L. naturally objects to being told his receiver is unselective and that he must either use H.F. or a loose coupled antenna. He doesn't want another valve or control ; nor does he need one.

Experiments were conducted at the writer's station some few months ago in an endeavour to cut out interference on a straight 2 tube set and a crystal set working on an inverted L aerial very close to the transmitting aerial, so that the two aerials formed a T with the leads about 20 ft. apart. The B.C. station on which tests were made was 5XX, as this was the "local" station for Cambridge. The transmitter was run at about 30 watts input, R.A.C., and keyed by an absorption system so that the strength of the spacer could be varied. A start was made with a very weak spacer, and interference of all three kinds was very bad on both receivers. An R.F. choke was tried in the aerial

lead to the receiver and not a trace of the transmitter could be heard. There was about .0003 mfd. across the tuning coil of the receiver and the choke consisted of about 200 turns of 36 D.C.C. wire wound on a 1 inch diameter glass tube. On the crystal receiver, using about .0001 mfd. parallel tuning, the choke removed all but a little key thump, and by radiating a little stronger spacer this disappeared. Neither the capacity across the coil of the crystal set, or the choke, taken separately, did any good ; they had both to be used.

On 5XX the tuning condenser has to be decreased a little to counteract the loading effect of the choke. On the lower B.C. waves the loading effect of a 200 turn choke is too great to work with on a full-sized aerial, though a 100 turn choke wound to a slightly smaller diameter will do well for 5GB. The loading effect is still too great though on 2LO's wave. Use as big a choke as possible ; a 100 turn choke is not quite so effective on 5XX as a 200 turn.

No more work has been done on chokes suitable for 300-400 metres, though undoubtedly a lot more could be done in this matter. Here the many hundreds of Londoners could continue with the work, while some of the provincials, who have more convenient wavelengths to contend with, can go and visit their B.C.L. neighbours armed with a small choke. There is really no reason why any B.C.L. should object to a choke in his aerial lead.

Book Review.

We have to hand the new anti-oscillation booklet published by the B.B.C., illustrated by H. M. Bateman, containing in concise form, hints not only to those operating sets, but instructions as to procedure for those who are suffering from the effects of similar interference from the activities of a nearby oscillator.

A few copies are already in the hands of area managers. Sub-area managers and society secretaries who require supplies may obtain them gratis on application to the B.B.C.

It will be seen that this is an expensive production, and is intended for reference purposes by the uninitiated, and for occasional presentation to individual owners of sets, or those who seek the advice of members.

Stray.

If owners of call signs 5QV, 2NH, 5YX, 6UT and 2OD will communicate with Mr. F. P. Adams, High Power Wireless Station, R.A.F., Ismailia, Egypt, that gentleman will be glad to provide reports on their daylight transmission on Christmas Day.

Contact Bureau Notes—(concluded from page 11).

Receiving stations sending information for filing need not send envelopes unless an acknowledgment of their letters is desired. Transmitters will be put in touch with them as occasion arises.

This Bureau is available to any amateur of any nationality, who is genuinely interested in experimental work, and it can only be successful if you give us your help. So send along the details of your work as required by the notice in the November BULLETIN.



LOW-POWER TRANSMISSION ANODE SUPPLY

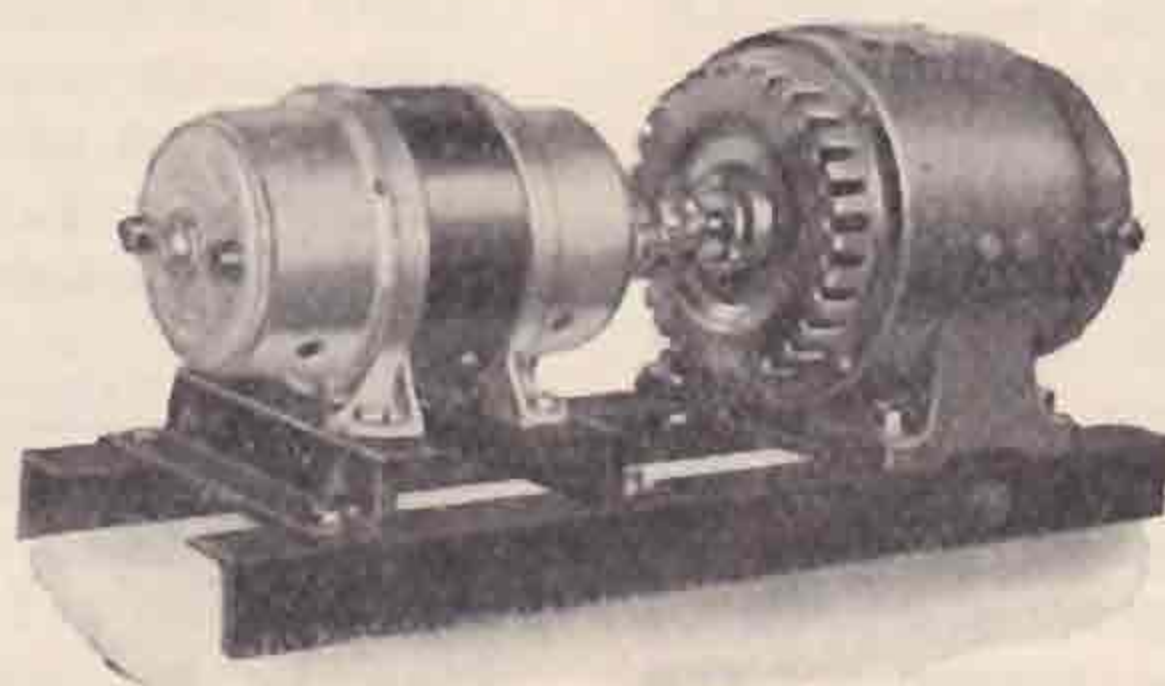
for
ALL TYPES OF TRANSMITTING SETS, ROTARY
TRANSFORMERS, AND MOTOR GENERATORS

UP TO 150 watts at 1000v.

" " 170 " " 600v.

EFFICIENT - SILENT - RIPPLE-FREE

"Excellent results are being
obtained from your Type
'E' machine."



"Machine is quite the
most convenient source of
anode current."

WRITE FOR LISTS.

M-L MAGNETO SYND., LTD., RADIO DEPT., COVENTRY.

URIAH BEATON'S BARGAINS

Morse Gramophone Records, cost 5/- new	£0	1	6
Large Marconi R.6 3-Electrode Valves ..	2	10	0
Reflecting Galvo Aperiodic Ballistic ..	2	10	0
Condenser in Tank for Oil, 1 mfd. Helsby	0	12	6
Brown's Micro Relay	1	0	0
Morse Inkers (used)	3	0	0

POSTAGE, PACKING & CARRIAGE EXTRA.

URIAH BEATON,
45, CHALK FARM ROAD, LONDON, N.W.1.

"T. & R. Bulletin." ADVERTISEMENT RATES.

Per insertion.		Per insertion.	
Full Page ..	£5 0 0	Half Page..	£2 10 0
Quarter Page	1 5 0	Eighth Page	0 12 6

Series Discounts—5% for 6 or 10% for 12 consecutive insertions.

Advertisements specified for Facing Matter Positions are not subject to series discounts.

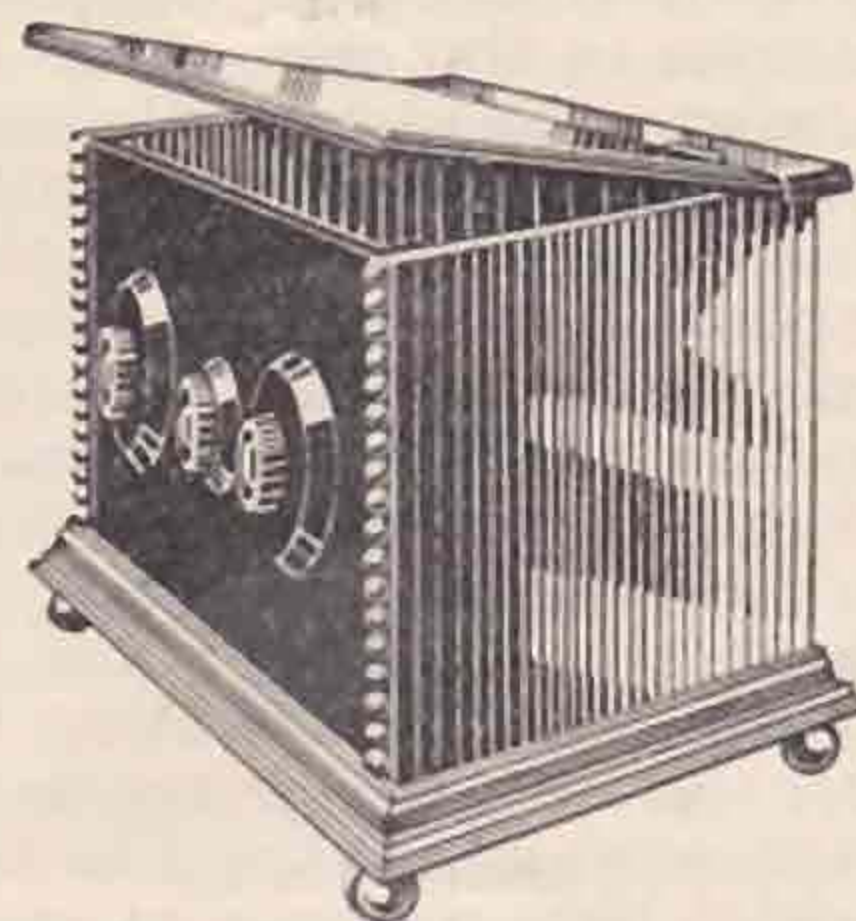
The T. & R. BULLETIN is published on the 14th of each month. Orders, Copy and Blocks should be received by us on the 25th of each month preceding month of issue.

All applications for space or specimen copies should, please, be sent to Advertisement Manager,

PARRS ADVERTISING, LTD.,

Craven House, Kingsway, W.C.2.

Telephone: Holborn 2494.



ARTCRAFT RADIO CABINETS.

Britain's Best Value—New 1928 Models.

AMERICAN POPULAR TYPE (as illus.)

Size.	Oak.	Mahogany.
9 × 6 × 6	8/-	12/-
10 × 8 × 6	10/-	14/-
12 × 8 × 8	14/-	18/-
16 × 8 × 8	17/6	22/6

Baseboards Free. Hinged Lids 1/6 extra. Add 1/- for crate. All Cabinets sent Carriage Paid.

PANELS FITTED AT STANDARD PRICES.

New Illustrated Catalogue Free. Obtainable from all dealers or direct from—

THE ARTCRAFT COMPANY,
156, Cherry Orchard Road, Croydon.

The Design of Short-Wave Transmission Aerials.

By ERIC MEGAW (GI6MU).

The object of this article is twofold: firstly, to deal briefly with the principles underlying the action of short-wave radiating systems, and, secondly, to indicate how these principles may be applied to the design of practical aerials.

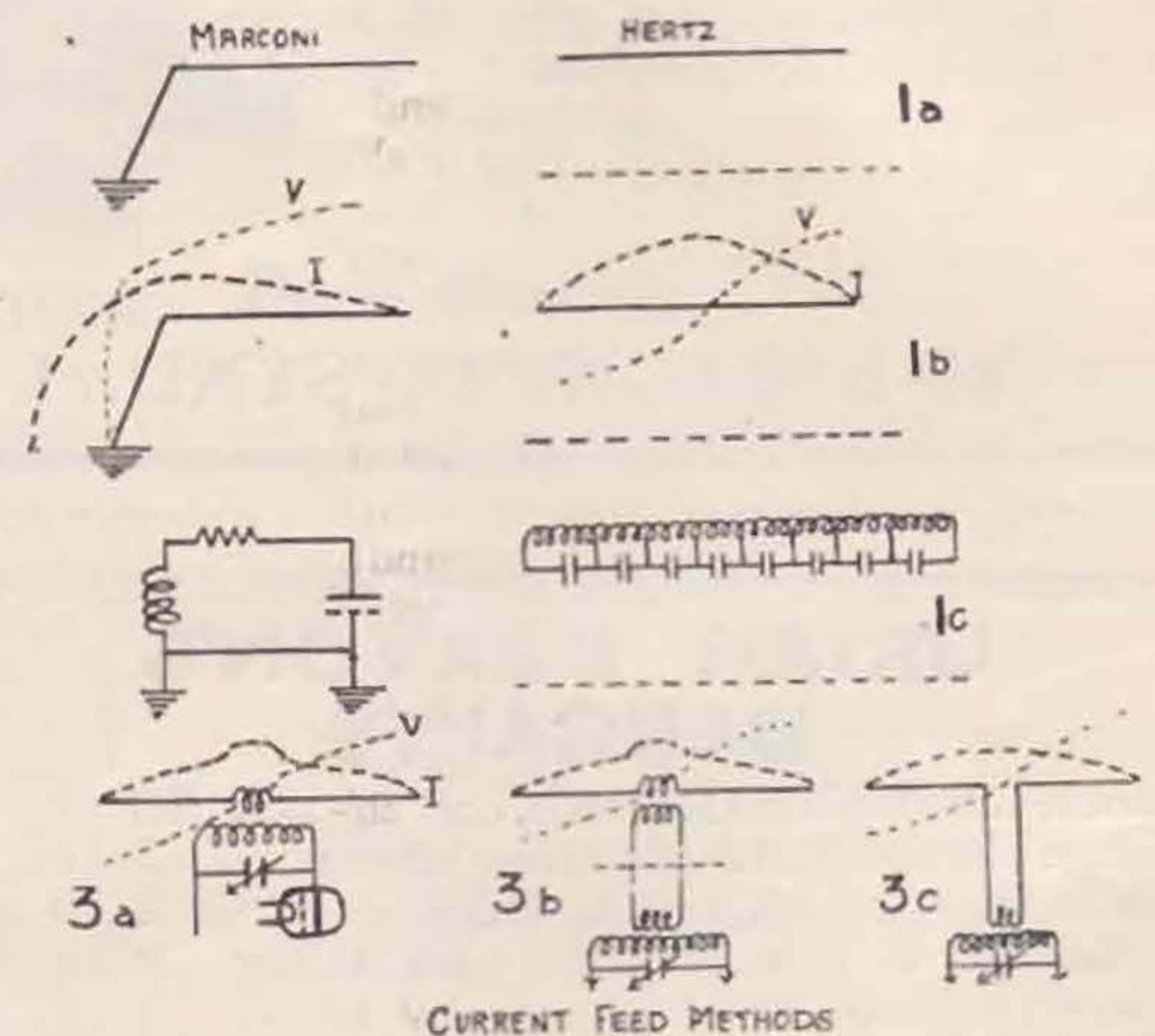
All aerial systems may be divided into two types—the type in which the earth is an actual part of the radiator proper and the type in which the radiator is independent of the earth. These are generally referred to as Marconi and Hertzian aerials respectively (Fig. (1a)). Fig. (1b) shows approximately the distribution of voltage and current for fundamental operation in each case, *i.e.* “ $\frac{1}{2}$ -wave” working for the Marconi and “ $\frac{1}{2}$ -wave” for the Hertzian. It is obvious that in both cases the free ends must be current nodes, and that in the Marconi aerial the earth terminal, being at zero potential, must be a voltage node. Hence it is evident that for harmonic operation the Marconi aerial may have a length of approximately $\frac{1}{2}\lambda$, $\frac{3}{2}\lambda$, $\frac{5}{2}\lambda$, etc., where λ is the operating wavelength. Similarly, the Hertz aerial may have a length of approximately $\frac{1}{2}\lambda$, $\frac{3}{2}\lambda$, $\frac{5}{2}\lambda$, etc. The reason for the approximation will be dealt with later.

Fig. (1c) shows the equivalent oscillatory circuits for the two types. It will be seen from Figs. (1b) and (1c) that the distribution of voltage and current, and therefore of the field surrounding the aerial is very symmetrical in the case of the Hertz, but just the reverse in the case of the Marconi aerial. Also it is possible in the case of the Hertz aerial to have an almost sinusoidal distribution of voltage and current, but this is impossible with a Marconi aerial, even if vertical and unscreened, since its capacity per unit length increases from minimum at the free end to maximum at the earthed end; it will be shown later that this is bound to result in distortion of the voltage and current distribution. Now it is a generally accepted fact, for high frequency work at least, that the more symmetrical the voltage and current distribution in an aerial and the nearer this distribution approaches to sine-wave form, the more efficient will be the radiation from the aerial. Here we have at once two very considerable advantages in favour of the Hertzian radiator. One should not, however, jump to the conclusion that the Marconi type is useless, for under ideal conditions there is very little difference in the effectiveness of the radiation from either, especially if the Marconi aerial is operated harmonically, but under normal amateur operating conditions the advantage lies obviously with the Hertz.

With regard to aerial systems employing a counterpoise, their action depends largely on the dimensions and design of the counterpoise; with a fairly small counterpoise of the usual amateur dimensions and at a fair height from the ground, it is safe to assume that the system operates as a “bent Hertz”; if the counterpoise is in the form of an “earth-screen” of large area and close to the ground we have a Marconi system. The advantages of using such an earth-screen with a Marconi aerial in place of a direct earth connection depend

largely on local conditions; in any case it is almost impossible to forecast accurately the current distribution in any sort of counterpoise.

The “bent Hertz” arrangement is not to be recommended; it is evidently subject to most of the disadvantages of the Marconi system if it consists of the usual aerial, down-lead and counterpoise. The most usual varieties of “bent Hertz” seem to be the “half-wave,” in which the aerial and counterpoise portions are each about $\frac{1}{2}\lambda$ in length, and the “full-wave” in which each part is about $\frac{1}{2}\lambda$. The “aerial” and “counterpoise” both being horizontal (or nearly so) will radiate principally in a vertical direction; thus the upward component of the radiation from the counterpoise will in general interfere with the downward component of the radiation from the aerial, the net



radiation being much the same as that which would be obtained from the upper half of the system by itself if excited in the same way, only the “bent Hertz” will involve considerably increased copper loss (due to the extra length of wire) and absorption loss (due to the proximity of the counterpoise to the ground). If the correct feed methods are employed there is no difficulty in exciting the upper portion of the system as required, and it is therefore difficult to see what useful purpose can be served by the counterpoise.

From the foregoing discussion on the different kinds of aerial system it is evident that the “straight Hertz” is likely to prove the most satisfactory. We will now proceed to investigate the action of this type of aerial in more detail.

Consider a straight horizontal wire whose inductance is L units per unit length and whose capacity is C units per unit length; if ohmic resistance is neglected it may be very simply shown that the velocity of a high frequency current wave in the wire is equal to $\sqrt{\frac{1}{LC}}$ (the unit of velocity will, of course, correspond to the units in which L and C are measured). (For proof of this

see Stainier's "Théorie de l'Antenne de Hertz," Journal des 8, Nos. 111-119.) This velocity is always slightly less than the velocity of the electromagnetic waves in the ether (3×10^8 metres per second, approx.). Since $V = n\lambda$, where V = velocity, n = frequency, and λ = wavelength, and we know that V is less in the aerial wire than in space, it follows that for a given frequency the wavelength in the wire will be less than the wavelength in space, and the greater L and C become the less becomes the wavelength in the wire. It is for this reason that a Hertzian radiator for fundamental operation on λ metres must have a physical length of slightly less than $\frac{1}{2}$ metres.

Suppose the horizontal wire under consideration to have a length equal to the length of the current wave in the wire; suppose, also, that the H.F. current is fed into the wire at one end (the end is only chosen for simplicity); if T secs. is the time for one oscillation, at the end of T secs. the current wave* will have reached the other end of the wire; if this end of the wire is perfectly insulated the wave will be completely reflected, and during the next T secs. it will return along the wire with the same velocity to its starting point. During the same interval of time the next wave will have travelled from the feeder end to the free end. Here we have two identical waves travelling with the same velocity in opposite directions, and this is the condition for the production of a standing wave (Fig. 2)†; since the process of reflection or oscillation goes on continually, standing waves are maintained in the aerial so long as power is fed into it; this power is dissipated partly as radiant energy, partly as heating losses in the wire and partly as absorption losses in surrounding objects.

Now, if we are to have sinusoidal distribution of voltage and current, one of our aims in aerial design, it follows that the capacity and inductance per unit length must be the same throughout the length of the aerial, because the velocities of the incident and reflected sine-waves must be constant, equal and opposite in order to produce standing sine-waves. If L and C vary from point to point on the wire, it is evidently impossible for the velocity of the waves to remain constant. The formula $V = \sqrt{\frac{1}{LC}}$ shows that if either L or C increase the velocity will decrease and the slope of the wave will become steeper. We saw that in the case of the Marconi aerial system C increases from the free end towards the earthed end; distortion of the voltage and current waveform is therefore inevitable, and the curves become lumpy towards the lower end. In the same way anything that alters the inductance or capacity of part or parts of the aerial will cause, to some extent, distorted distribution. Our problem is now to decide how to feed energy into the radiating part of the aerial at the same time producing the minimum asymmetry and distortion and keeping within the bounds of practical considerations. Fig. (3) illustrates the different methods of feeding the radiator, and we will proceed to discuss each in turn pointing out its merits and its disadvantages.

First, note a few points with regard to feeders in general. The object of a feeder is to transfer the H.F. energy from the oscillatory circuit of the

transmitter to the radiator, and it should do this with the minimum possible loss. As already indicated, energy may be lost by copper loss, dielectric loss and radiation. At high frequencies copper loss is usually small compared with the other two, provided a reasonable size of copper is used. Dielectric loss can be kept down by keeping the feeder clear of surrounding objects, and by careful design of the lead-in. Loss may also occur by leakage, but it is assumed that the insulation of the aerial is sufficient to prevent appreciable leakage occurring.

The question of radiation loss is not so simple. There are two ways in which the problem may be attacked: radiation loss may be prevented by (1) using a feeder system which does not oscillate, *i.e.*, the feeder carries a simple alternating H.F. current and no standing waves occur, or (2) using an oscillatory feeder system which is so arranged that the radiation from one part of it cancels out, as completely as possible, the radiation from the remainder. The first, although ideal in principle, is almost unattainable in practice; the main reason for this is that reflection is bound to occur to a greater or less extent at the point where the feeder joins the radiator. This produces oscillations and standing waves in the feeder with consequent loss of energy by radiation. What usually happens in such cases is that part of the energy travelling along the feeder is reflected and radiated from the feeder while the remainder feeds the aerial, as is desired, and is radiated from the aerial in the ordinary way. This point will be further discussed in the consideration of aerial (g) Fig. 3; the same sort of thing also occurs with aerials (b) (c) (e) (f) and (h) if the feeders are not of a definite length. Much has been said and written about so-called voltage feed methods, comparing the feeder to an H.T. transmission line and considering nothing but copper loss; in the light of the actual facts this is about as reasonable as designing an H.F. oscillation transformer on the lines of a 502 power transformer, and it is quite evident that the mere fact of using a feeder whose length is not approximately a multiple of $\frac{\lambda}{2}$ (or of $\frac{\lambda}{4}$ for a double feeder) is not going to prevent the feeder from radiating. The second method is, in general, much more satisfactory. If we have two parallel wires near each other carrying equal H.F. currents 180° out of phase (*i.e.*, when the current at a point in one wire reaches a +ve maximum the current at the corresponding point in the other wire is at a -ve maximum) it is evident that the electro-static field of one wire will cancel the electro-static field of the other and the electro-magnetic field of one will also cancel the electro-magnetic field of the other; under these conditions it is impossible for radiation of energy to take place from the system. In practice the fields do not cancel perfectly, but the radiation is reduced to a negligible quantity, and it is usually not difficult to arrange a double feeder to fulfil at least approximately the required conditions. For the design of a feeder system of this sort exactly the same principles hold as for the design of the radiating part of the aerial and a double feeder may be considered as a Hertz aerial fed from the oscillator at its centre, with the two halves bent through 90° so as to be parallel and close to each other; it follows that the currents in the two halves must be 180° out of phase. The

* Exactly the same reasoning may be applied to the voltage wave.

† See next issue.

correct length for a double feeder can be easily decided once the method of operation is clearly understood. Thus, the feeder of aerial (b) Fig. 3 may be regarded as two "Hertz aeriels" joined end to end, with common current nodes (i.e., points of zero current and maximum voltage) at the dotted centre line of the feeder. Each of these "Hertz aeriels" can therefore have a length (of double wire) of $\frac{\lambda}{4}$, $\frac{3\lambda}{4}$, $\frac{5\lambda}{4}$ etc., and so the whole feeder may have any of the following lengths: $\frac{\lambda}{2}$, λ , $\frac{3\lambda}{2}$, 2λ , $\frac{5\lambda}{2}$ etc. For aerial (c) Fig. 3 the whole system should be considered as a single "Hertz aerial"; the point at which the feeder wires open out and become the radiator must be a voltage node: hence the feeder length may be any multiple of $\frac{\lambda}{2}$ and the total radiator length will be $\frac{\lambda}{2}$ for fundamental working and any multiple of $\frac{\lambda}{2}$ for harmonic working; for harmonic working the feed point will not, of course, be in general in the centre of the radiator. For aerial (e) Fig. 3 the feeder by itself should be considered as a "doubled Hertz aerial," the point A being a common current node in both feeder and radiator; possible feeder lengths are therefore $\frac{\lambda}{4}$, $\frac{3\lambda}{4}$, $\frac{5\lambda}{4}$ etc. The feeder of aerial (f) is the same as that of aerial (b). Aerial (h) is not in the ordinary sense a double feeder system and will be explained later.

Now for a more detailed consideration of the aeriels shown in Fig. 3. The curves of voltage and current are in each case for fundamental working, and in all cases the radiator has a length of $\frac{\lambda}{2}$ (approx.) :—

(a) In the actual form shown this aerial is more suited to the laboratory than the average amateur station, since the oscillator itself must be in the centre of the radiator. If the whole aerial is limited to a few feet in height this system, slightly modified if necessary, may be used with surprisingly good results. It is also very suitable for ultra-short wave work. Many aerial-counterpoise systems are more or less equivalent electrically to this arrangement, but this has already been dealt with. The coupling coil in the radiator should be kept as small as possible (about 3 turns for the 40 metre band) in order to cause a minimum of distortion in the voltage and current distribution and also to obtain a large step-up of current. For a current feed system of this sort the coupling coil should never, under any circumstances, be tuned by a variable condenser. The coupling between the two coils should be tight and need not be variable.

(b) This is simply a more practical version of (a) with a feeder connecting the oscillator and the radiator. The coupling coils in the centre of the radiator present considerable mechanical and electrical difficulties in design. All three coupling coils should be kept small. The feeder length, as already shown, may be any multiple of $\frac{\lambda}{2}$. If the feeder is very short it may be regarded as a non-oscillatory transmission line without much error, as the amount of reflection will not be very great. This system has been used successfully for indoor aeriels. (See Simmonds, "Indoor Short Wave Antennæ," T. & R. BULLETIN, September, 1926.) The main objection to it is the fact that as good and better results may be obtained with less complication.

(To be concluded in our next issue.)



RADIO CONTROL
BOOKLET - Free!

Every radio amateur requires an authoritative guide to the correct electrical operation of his receiver. Here you have the opportunity of obtaining such a booklet entirely free. Just fill in and send the coupon below and a copy will be sent to you by return.

"Radio Control" has been prepared by the Weston Electrical Instrument Co., Ltd., who, for the past 30 years, have been universally acknowledged as the leading manufacturers of accurate electrical measuring instruments. Since the inception of radio the Weston Company have examined carefully every phase in its development and with each succeeding stage of progress have designed and produced appropriate instruments to assist the efforts of radio engineers.

Now the result of many years' radio experience is placed at your disposal. "Radio Control" will show you definitely how appreciable economies may be effected in the operation of radio receivers and how improved reception may be obtained at the same time.

To-day is not too soon—cut out and post the coupon now.

WESTON
STANDARD THE WORLD OVER
Pioneers since 1888

WESTON ELECTRICAL INSTRUMENT CO., Ltd.

15, GT. SAFFRON HILL, E.C.1.

Application for free copy of booklet "Radio Control" from

NAME.....

ADDRESS.....

T. & R.

COMING ON 1st MARCH

THE FINEST YEAR BOOK EVER PUBLISHED
IN GREAT BRITAIN OR EUROPE.

We have pleasure in announcing that we have decided to publish our own Annual Log Book and Diary this year under the title of

1928 Annual of the Inc. Radio Soc. of Gt. Britain

The Book contains, *inter alia*, the following interesting matter:

Tables of facts, formulæ and data.

Over 7,000 QRA's of European Amateurs and other Stations.

A simple Log Book Section ruled in an appropriate manner.

Articles on crystal control, short wave receiver design, etc.,
by Aughtie, Simmonds and Goyder, etc.

Lists of Short Wave Broadcasting Stations of the World.

List of Members, Etc., etc., etc., etc.

All the profits from sales will go towards the Society funds and we are the sole publishers and owners of the Book.

Over 110 pages with stiff cardboard cover, marker blotter, etc., size of page same as *Wireless World*, and embodying many items of interest to the amateur experimenter, it is well worth the price charged, 2/6 plus postage to Members, and 3/6 to non-members. (*Postage 6d.*)

As the Book will be on sale to the general public, it is anticipated that we shall have a great demand for it, so order your copy with cash at your earliest convenience to

PUBLICATIONS DEPARTMENT,

INC. RADIO SOCIETY of GREAT BRITAIN,

53, VICTORIA STREET, S.W.1.

Don't forget to secure your copy by ordering in advance.

Notes and News from the Areas.

Special Notice to Area Managers and Others.

In accordance with the unanimous decision of the Second Annual Convention of the Radio Society of Great Britain, held September 30—October 1, 1927, the following is the procedure to be followed in future when reporting for these columns:—

Each report furnished by a member will be written on one sheet of paper and shall consist of: (1) The call sign of the station reporting; (2) the programme of the station as regards lines of experiment and objects; (3) results of recent work. Special note: The total number of words is not to exceed 27 for each member, and such details as number of QSO's will no longer be published.

The object of the Notes is to keep in touch with one another members who are mutually interested in certain aspects of the work.

Those Area Managers who do not possess a typewriter are requested to write *clearly*.

Irish Free State Notes.

Area Manager: COLONEL M. J. C. DENNIS, C.B., Fortgranite, Baltinglass, Co. Wicklow.

I have received very few reports this month. Cannot you let me have a postcard just to say what you are doing, OM's?

12B.—On 45 metres, 5 and 10 watts. Observation of skip effect; good reports from European DX stations. On 23 metres seeking contact with NU between 16.40 and 19.00 G.M.T. daily.

14B and 16B have been off the air recently.

18B.—Getting out well on 45 metres, and is keeping a schedule with NX1XL at present.

19B.—What has happened to you, OM?

17C.—Usual 45-metre work. Keeping schedules with G6WQ and G6RB, and arranging further schedules. 23 metres, 9.3 watts; 12 transatlantic QSO's, 1, 2, 3 and 8 districts, and WNP.

11D, using tp-tg transmitter on 23 metres, has raised NU with about 7 watts input, and would greatly appreciate reports. Nothing special on 45 metres.

11B.—Nothing special to report. Still on "skip" investigations. Has recently been cutting and grinding quartz crystals with rather unexpected success.

All stations appear to find 23-metre work very uncertain at present.

We have to welcome a new GW station, call sign 13D; QRA: R. Sadleir, 1, Summerfield Park, Upper Rathmines, Dublin, who would welcome reports.

Northern Ireland Notes.

Area Manager: E. G. MEGAW (6MU), 3, Fortwilliam Drive, Belfast, Co. Antrim.

Although European conditions seem to have been fairly normal during the past month DX conditions, especially for the East and South Africa, have undoubtedly been worse so far this winter than they have ever been at the same time of year since the commencement of amateur long-distance work. 2IT suggests that this may have some connection with the sunspots, which I understand are at present at their maximum. They perform a complete cycle every 11 years, so if 2IT is right, we can look out for some QRP DX work in 1935! Seriously, though, there does seem to have been a steady decrease in "DX" during the last few years considering the enormous improvement in receiving and transmitting apparatus. It would be interesting to hear some other opinions on the subject.

I should like to draw the attention of GI's and other members to the T and F abbreviations for reporting on tone and telephony which appeared in "C.B. Notes" in the December BULLETIN. These abbreviations are much neater than the rather clumsy ones at present in vogue, and if all T. & R. members make a point of using them other amateurs will not be long in following their example.

There has been little activity among the GI's lately! here are the reports:—

5HN.—Getting Hartley circuit to function O.K.; trying various grid leaks and chokes; no definite results yet.

5HV has been effecting various improvements in his transmitter, particularly in the H.F. chokes. He has started on telephony.

6YW reports DX conditions very poor; grid modulation 'phone tests have brought in good reports from various parts of the British Isles. He finds Americans frequently good on 80 metres when conditions are poor on 40 metres.

5MO has got his chemical rectifier going well.

5WD is now permanently situated in Coleraine: he will be using accumulator H.T. for the present and wants reports. The new QRA is: W. S. Davison, 5, Captain Street, Coleraine.

6WG is understood to be still working Americans with the hand-gen.!

6TB has been doing a certain amount of bench test work, but has had very little time for radio.

2IT is installing single-phase and three-phase A.C. We have visions of several kilowatts of crystal-controlled R.A.C. appearing shortly!

6MU finds conditions very poor and very freaky for DX. Australia, India and Iraq worked during afternoon, but reliable contact impossible. Schedule with AI2KX recommenced after considerable difficulties.

6MG, 6MK, 6QD and 6HI have nothing to report.

The other GI's have not reported.

Channel Island Notes.

By A. M. H. FERGUS (2ZC).

The period October, November and December may be summed up as a general improvement of signal strength of stations to the south with a corresponding weakening of those to the north. This was noticed last year, and it will be interesting to see if the northern stations again come in strong in the early spring. This might prove an interesting problem for special research.

Fade out period has been getting earlier almost nightly, as a regular schedule shows.

5GW is home on leave and has been conducting experiments with aerials, on low power, mostly on 45 metres.

6PU and 6HZ have both been using 'phone on 45 metres.

2ZC has been having trouble with both Hertz and harmonic aerials on 23 metres, and would welcome dope. He gets radiation, but cannot work anyone. Power 6.6 and 8.0 watts. EC and EB are the only countries QSO in five months. Why?

Scottish Area Notes.

Area Manager: J. WYLLIE, Esq. (5YG), 31, Lubnag Road, Newlands, Glasgow.

Consisting of the whole of Scotland, including the Hebrides, Orkney Islands, Skye, and the other smaller islands on the coast of Scotland, the boundary on the South being formed by the River Tweed and the Cheviots. The town of Berwick is included in the Scottish Area.

Permit me, at the start, to wish you fellows "all the best" for 1928.

I had in November the great pleasure of meeting 6MU, 6YW, 5WD, 5MO, 5HV and 6TB in Belfast, also 6WG in Coleraine, and would like to take the opportunity of thanking all these gentlemen for their hospitality and warm welcome. I feel I have a lot of friends over there now, and I only hope some of the GI boys will give me the opportunity to reciprocate at an early date.

I have pleasure in welcoming a new friend to No. 4 District in the person of Mr. J. Bamford (5JB), 22, Walker Street, Edinburgh.

After some considerable time in hospital, it has been decided that 6KO will not require to undergo the operation feared, so that he is "back to the key" once more, and incidentally to the control of his district.

No. 1 District (by 2WL).

2WL.—QRW business.

5YG.—Some satisfactory work on Zepp aerials and good results on 23 and 45 metres. December will see a continuance of above work.

6NX.—Still pegging away, but has nothing much of special interest to report.

6WL found best period in November coincided with deep depression over Atlantic. December will see further work on aerials, including reflectors, on 23 metres. Eastern reports are desired.

No. 2 District (by 6IZ).

2AP.—Nothing can be done at this station until means are discovered of getting rid of QRM from GKR a few yards away. The delivery of copper sheeting is awaited.

6IZ.—Signals reported fairly consistent up to 3,000 miles. The change over to remote control of the transmitter is contemplated with a view to still further steadying the wave.

6VO.—QRW building generator.

No. 3 District (by 5YG pro tem).

2SR.—concentrating entirely on 23-metre work (CW and 'phone), and is "on the air" most week-days at 07.45 and 19.00 G.M.T. All reports welcome.

6KO.—Ill.

5NW.—Finding a little more time now, and expects to resume shortly.

No. 4 District (by 2TF).

5JB has just been issued with a radiating licence, and expects to make himself heard in a week or two.

2BFQ and BRS62.—Experimenting with flash-over voltages of radio insulators, also weather tests which will be continued in December.

Southern Division.

By 6PG.

Reports are very scarce this month. Please let us hear from you, OM's; a postcard will do.

2AI is testing on 90 metres at night. He is unable to raise anyone on 45 metres at night on 1 watt and would welcome reports.

5BQ.—Tests with different types of aeriels. On "third harmonic," NU1MO reported R6 on 3 watts when signals QRZ up to 300 miles. With "first harmonic" and 10 watts, all Europe worked with average R5-6. Schedules with NU2BDC and FMSSSR to study WX.

6HP.—Experiments as reported before, has had good month; crossed the pond twice and worked EU and NI2SH several times. First QSO Lithuania R7. On 23 metres, SMUK (R7) and FM8RIT (R8).

6BB.—Comparing full and half-wave V.F. aeriels, trying to find QRH of each. Using 6YQ's aerial, worked his first Yank on 5.2 watts. Reports wanted after dark.

6QB working on full and half-wave V.F. Hertz, the latter giving good results. Compared with old harmonic aerial, gives "more contacts and weaker signals." Best contacts FIICW several FM's, GLYK and one or two NU's on 23 metres. 90 metres going well, signals R6 at ED7JO (Faroes).

6LT (née 6QB) is a portable which won't port, evidently waiting for the Christmas spirit to ginger it up.

6AP testing with chemical rectifiers. Has been on the air several times and badly wants reports from anybody.

2BQH reports very FB conditions. Received all NU districts, including over 40 stations in the 6th district, strengths R3-R7, 75 per cent. over R5. Also heard 48 NU's in one hour, all districts except 7th. Receiver now Schnell in place of Hartley and has two 45-foot sticks up.

2BWR has scrapped his Tp-Tg receiver and has gone back to a modified Reinartz. He is busy swotting morse now.

BRS50 has been keeping a successful schedule with EARH, of Linz, and is fixing one up with NU2CXL. He will be pleased to QRV for any station requiring reports.

6PG has done a little work with a C.F. half-wave Hertz. Nothing startling in the way of DX, but some interesting tests have been made. Reports from any distance will be welcome.

South-Western District.

Area Manager: CAPTAIN G. COURTENAY PRICE, Associate L.R.E. (2OP), 2, St. Annes Villas, Hewlett Road, Cheltenham.

Consisting of the Counties of Cornwall, Devon, Somerset, Dorset, Wills, Gloucester, and the Scilly Isles.

Reports this month are very few and very far between and up to the time of reporting I have received only one reply *re* the suggested dinner and Conventinette. I hope this is only due to the RQM of Christmas.

The area has lost an old member. It is with deep regret that I have to report the death of Mr. M. Marshall, 6XZ of Newquay.

BRS28, otherwise C. R. Ponting, of Bristol, is now transmitting under the call of 6ZR. He is already on the air on 45.

2BFH (Weymouth) also hopes to be soon on the air with a two-letter call.

5VL (St. Columb Minor) has been marking time. Only a little fone. Best QSO on speech being Warsaw and EI-1DY.

Usual E. countries worked in November and NU1, 2, 3, 4, 8, on 45.

Very little luck on 23 EAR6 only station worked.

Southern Notes.

Area Manager: F. A. MAYER, Esq. (2LZ), "Stilemans," Wickford, Essex.

Consisting of the Counties of Essex, Suffolk, Bedford, Oxford, Hants, Sussex, Hertford, Buckingham, Berkshire, Hampshire, Surrey, Kent, Middlesex, and the Isle of Wight.

Last month's notes were, you doubtless noticed, OM's, conspicuous by their absence, the fact being that only two stations, 5UY and BRS42 reported, and both had ND in particular, so although they went up, they did not, you can see, merit insertion owing to the great pressure on space.

A few more this month, I am glad to say, but a very poor percentage. I have never worked out the number of hams in this district, but it must be over three figures, and six this month is a bad percentage.

5QV modulation tests Sundays (02.15-03.30) with Mr. C. H. Jervis, Ymuiden, Holland, as a receiving station. Always QRX for co-operation in test.

6FT is investigating the effects of WX, especially low clouds, on near sigs on 45 metres. Wants reports with barometric pressure, wind direction, and cloud observations.

5UY is working fone on 45 metres, and had rejoices that a BRS station has arrived for company near his QRA—BRS114.

2MI at last is going on 45 metres and has raised the Continent and working a pick-up and wants dope.

BRS91 experiments to reduce hum on receiver from mains as H.T. Finds set on metal plate fixed to counterpoise cures it.

BRS31 will soon be testing vertical aeriels for reception.

BRS42 visited 6WK and has got receiver (2 valve) rigged up in digs and has good log so far on 15 ft. aerial.

2ABK has rebuilt receiver and is attempting to make an O-V-O to oscillate on the 5-metre band without success. Got a new member, 6NW, of Southend. Please let me have reports early, OM's.

London Area.

Area Manager: G. A. EXETER (6YK), 142, Campden Hill Road, W.8.

Area: 25 miles of Charing Cross.

There is certainly something wrong with the members and their reports as these seem to get less each month. No doubt the new style of reporting has frightened some and perhaps others have been disheartened by the ugly rumours from Washington, but I do wish that the "gang" would stand up and do something to make a good show each month.

I was just a little disappointed in the amount of men who gathered at our last Area "do" and it seems that there were some who did not see the notices concerning the date, etc. However, things went off quite well, and I ask all members to make a point of watching these notes for the announcements concerning future gatherings, and the next will be very soon.

Western Division.

(6YK).

2AFL has now his full permit and has done good work on 45 ms. with 4 watts best DX being FM. Call sign 6JY, and would like reports.

6VP sends in a lengthy report which is beyond my efforts to reduce to the requisite amount of words. Nearly all 23 m. work here and he says there *are* a few countries he has not worked!

2NH is on sched with LA1S on 23 ms. studying skip distance, and has also been on 8 metres.

5MA reports via 2NH that he is working on 23 ms. and has found the full-wave Zepp very effective.

6YK has done a little 8 m. work and has also been busy on the R.K. speaker.

Northern Division.

Division Manager, 6CL.

The few stations who have reported all complain of the new ruling cutting reports to 27 words.

Several reports become almost devoid of interest if cut to the requirements.

Star Stations.

(G6PP.)

6P Preports patchy conditions with fade-out on 45 at 17.30 G.M.T. Apparently November 12 was best nite for EG's in N.U.

ES, ET, EX, EPP were new countries and AS35RA Siberia new continent.

LPJ Spitzbergen also QSO'd. Input 4 watts.

5GU is trying an indoor quarter-wave Hertz.

5UM is testing radiating systems on 170 metres and asks for reports. (6CL has logged you on 44 often!)

6UN has got his 45-metre set going. He is using D.C. mains with one 2mf. as filter-tone reported pure D.C. Testing Hertz systems.

2AX has had very good fone reports on 45 metres and several DX European QSO's with C.w.

5H5 has been QRW but worked AI-2KT just to keep the weeds from sprouting. He is "playing around with neons," and wants more QRP tests. He has now "WAC" on 23 as well as 45. (Phew!)

6PN has been inactive. A new crystal has arrived from NU and tests will recommence soon from a new QRA.

5AD and 5KU QRW booking orders!

6CL tried TP, TG and got to EE and EP, but QRO to five watts was necessary. The Hellesen dry batts are standing up well to 25 m/as.

East London Division.

By 6LB.

6LB is still working on his Zeppelin Feed Hertz and carrying out tests with various couplings to study QSS.

6UT is trying out the Zeppelin Hertz on 23 m. and would welcome reports on his QSB.

5PD is carrying on tests on aerial current and nodal points on 23 m. and is using an indoor system for the work.

2BXM is still testing on reception below 20 m.

Mid-Britain Notes.

Area Manager: CAPTAIN H. J. B. HAMPSON (6JV), 477, Earham Rise, Norwich.

Consisting of the Counties of Shropshire, Leicester, Rutland, Cambridge, Huntingdon, Northampton, Warwick, Worcester, Hereford, Stafford and Norfolk.

The new style of reporting is evidently less popular than the old one and I am afraid that members have not attempted to adapt

themselves to the new conditions, which were officially blessed at the Convention. Why? *

Shrewsbury (reports to 5SI).

5SI says that neither he nor 6TD have been active.

Leicestershire (reports to 6WW).

No report received.

Rutland (reports to 6NO).

6NO reports that 2MB has come to his area but has not yet taken to the air.

Cambridge (reports to 2XV).

5YK has been testing M.O.P.A. including separators and frequency doublers. Control obtained on 20 metres using 10m. amps at 300 volts to DE5B, which controlled 60 watts to non-oscillating DET! P.A.

2XV has now started on QRP at his new QRA

Northampton (reports to 6TR).

No report received.

Warwickshire (reports to 5GR).

5ML reports proceeding as last month. Conditions best on 20 metres from 12.00-18.00 G.M.T. Schedules proceeding with FO-A3Z, NU-1SZ, NU-9EFH and 9AUU between above hours.

2BCA has passed his Morse test. He is experimenting with grid leaks in transmitting circuits.

Worcestershire (reports to 6AT).

6AT has had little time to spare. [We appreciate his efforts to keep up his BULLETIN Series.—6JV.]

Staffordshire and Wolverhampton (reports to 5UW).

No report received.

Norfolk (reports to 6ZJ).

6JV finds total absorption of spacer possible by tuning absorbing circuit to resonance, thus stopping oscillation. Battery biasing of grid safeguards anode against excessive dissipation. Ultradion Circuit tested and recommended.

I cannot congratulate you this month, OM's. Try and put up a better performance next time. Is "DX" the only thing? One experiment is worth much QSO. After all, 2SZ, 2OD, 2LZ, 2NM, etc., did all the DX there was to do on this earth years ago, but they didn't finish all the experiments and that's why we have permits. 'Nuf sed.

* Editorial Note.—Does anybody want this again revised or should we revert to old style? Letters, please.—Ed.

Northern Notes.

Area Manager: S. R. WRIGHT, Esq., Associate I.R.E. (2DR), 14, Bankfield Drive, Nab Wood, Shipley, Yorks.

Consisting of the Counties of Northumberland, Cumberland, Westmorland, Durham, Yorkshire, Lancashire, Lincoln, Nottingham, Derby, Cheshire, and the Isle of Man.

Apparently the new style of reporting does not meet with the approval of many hams, for each month reports get fewer and fewer.

Even Yorkshire has failed to come up to scratch this month, and that is very unusual. It may be the Christmas feeling which has got hold of you badly and you are all too busy buying presents, but something is sadly wrong. If you have a grouse, fellows, let me hear about it, and we will have it put in order, but it is no use keeping it to yourselves, or it will never get straightened out. Allow me to thank those in my area who sent me seasonable greetings. They are heartily reciprocated.

Apologies are due to 6UO, who complains that his call-sign has been varied by various misprints. Sorry, OM, will endeavour to do better for you in the future.

Now for the reports such as they are:—

Yorkshire.

(Reports to 2DR by the 12th).

5US has got going in his new QRA and is continuing his aerial tests. He has collected some interesting details on various types and will publish when ready. Good co-operation is being given to him by both G's and Continentals.

BRS107 sends in his first report and is willing and anxious to report on 'phone transmissions from 8 to 90 metres. Hams, please note. Receiver re-build in progress here.

6DR is busy on 45 and 23 metres. Reports are wanted on 23 metre signals, and schedules with Asiatic stations on the above wavelengths. Will hams in that quarter of the globe oblige? He finds 23 metres excellent.

2DR has been engaged on testing commercial short wave receivers most of the month, and has had little time for key work.

The following did not report:—6OO, 5SZ, 6BR, 6XL, 6YR, 6WD, 5CX, 2YU, 6IG, 2XY and 6TY.

Lancashire.

(Reports to 5XY by the 12th).

For the second month in succession a complete absence of reports has to be recorded for this sub-area.

Isle of Man.

(Reports to 5XY by the 12th).

Same remarks apply here. What about it, OM's?

Derby, Notts and Lincs.

(Reports to 6MN by the 12th).

BRS103 is studying the effects of weather on reception. He finds that immediately after a thunderstorm reception is considerably improved. At full tide a similar effect has been noticed.

BRS34 has nothing to report. This station is closing down.

5BD.—Work on fading being carried out here, and skip distance

effect. An indoor C.F. Hertz about 12 inches high is being used in 1928 for these tests.

6AH is testing the effect of nightfall fading with 5KU, using 1 watt on a T.P.T.G. circuit.

6LI sends in his report from the Pyrenees! He is apparently studying mountaineering. Would like schedules on 23 metres ('phone).

6LN (ex 2ABA) has been busy with a local hamfest in Nottingham and has done little else.

6MN is studying Hertz aerials and finds the full wave much better than the half-wave type. He uses pure D.C. input, yet gets RAC reports. Hi! Furthermore, after nightfall he is blanketed.

6UO.—Aerials still being tested here. After checking results with a half-wave V.F. Hertz parallel with the ground is about to try the effect of tilting the aerial at various angles.

A hamfest was held at Nottingham, but no details have been forwarded to me for publication. A further meeting will be held on January 27, but again no details are to hand as to the meeting place or the time.

Cheshire and North Wales.

(Reports to 6TW by the 12th).

2SO has completed his aerial tests with a 5 watt input. These have been carried out on 45 metres, and he reports that by altering the aerial the skip distance can be altered to a desired amount up to 1,000 miles range. These results should be interesting. Best aerial tried was the V.F. Hertz.

BRS98.—Very few G stations heard during the month, although distant stations working G's have come through at full strength.

6TW.—A new transmitter has been installed here. T.P.T.G., and is being used on a half-wave C.F. Hertz aerial with good results on an input of 3.5 watts on 45 metres. A range of about 1,000 miles is obtainable. Some 'phone on the 150-200 metre band has also been done with stations up to 40 miles distant.

Northumberland, Durham, Cumberland and Westmorland.

(Reports to 2AIZ by the 12th).

6GC.—Experiments continuing with 6QT on 8 metres at 2300 G.M.T. each night. He would like to hear from anyone who is interested in ultra-short waves.

6YV is experimenting with horizontal Hertz aerials on 32 metres.

6QT is collaborating with 6GC on 8 metre experiments. 'Phone on 45 metres is used at week-ends.

German Notes.

By EK4CL—4AFA.

Reception and transmission conditions seemed to improve in Germany last month a good deal, as many more DX stations were heard here and also worked by several EK's. Especially on certain days the NU's and OZ's came in here at remarkable strength, whilst the South Americans were received here often but with extreme QSS.

The favourable times for reception of the British stations have changed again, as one can easily QSO now with the EG hams on the 45-metre band during nearly the whole day, whilst in most cases we find it difficult to receive here any E.G. after about 18.30 G.M.T. on that band. It should therefore be considered for European night traffic to use the higher band again, which is now nearly abandoned. What do the EG's think about it?

Here is a list of EK's using crystal control:—4YAE, 4XY, 4ACI, 4AEO, 4ABI, 4ABG, 4FV, 4CZ, 4CL. Several others will follow this month. (Next month, I intend to publish here the list of EK's using raw AC, but I hope that I shall not find any OM's!)

4ABR continues his scheduled transmissions concerning propagation and skip-distance investigations, and asks for reports on his signals via DFTV. Kindly state QRH, as it is often changed.

Fone QRM on "45" on Sundays is sometimes very bad indeed. Please, OM's, don't use the "mike," if you are not on crystal control! It is no use, and you trouble QRP stations and make them feel very cross with you, and I am sure that you don't want that!

Lists of EK calls heard are always very welcome, and they will appear in the "CQ" of next month, if you send them over to DFTV by the 15th of each month.

Dutch Notes.

Prepared by ENOCX.

Well, fellows, we will start this month by writing our notes in the 27-words-per-station report. What?! We will even try to make a record by comprising these lines in as short a space as possible.

ENOTK.—Cheerio! The first Dutch YL station!

ENONL2 worked Siberia on very low power.

ENOZE hooked up Madeira EP3FZ.

ENOLY.—Best DX EU35RA with 14 watts input.

ENOVN fell in love with 2.9 metres. Best DX some hundred metres. Input about 1 watt.

ENOAM.—Notling heard from this jolly old fellow. Don't get your "sunnh sweet peep" frozen, my boy!

ENOCX.—Best DX with 3 watts input Algerian FM8SSR. Noticed a complete fading-out of signals on 40 after 19.00 G.M.T. during last month.

Russian Notes.

By V. Vostriakov (EU05RA).

There are now in USSR more licensed amateur stations, their QRA's being as follows:—

EU29RA (Sverdlovsk), EU30RA (Tiumen), EU31RA (Vologda), EU32RA (Harcov), EU33RA (Ulianovsk), EU34RA (Ivanovo-Vosnesensk), AS35RA (ex-ASOVG) (Omsk), AS36RA (Tomsk), AS37RA (ex-AS2WD) (Tomsk), AS38RA (Tomsk), EU39RA (ex-EU1UA) (Nijni Novgorod), EU40RA (Moscow).

The most active Russian OM's are the following:—

O5RA (Moscow).—He has from October a new QSB RAC (240 v.), instead of old 470 v. pure A.C. Many reports are saying that this QSB is giving much better results than the old A.C., with the same input (7-9 watts). O5RA is using a rather high harmonic of the inverted "L" antenna (7th) and a ground direct. His QRH is about 41 metres, but a pair of stations have been worked also on the 30-metre band. He has now about 150 QSO; his best DX is AS (QSO) and FM (QSL).

In the end of October, O5RA went on business to AG (Baku, Azerlaidjan) and built there and successfully operated a 200-watt station of Azerlaidjan's Radioamateur Society—AGRANN, QRH of RANN—45.5 m., QSB A.C.

O8RA (Leningrad).—The conditions for short waves are in Leningrad much better than in Moscow, and our YL is doing plenty of nice work. Now she is testing the 20-metre band and reports some very good results on QRH 21 metres, although most of the work is done on 43 metres. Her QSO's on 21 metres are the first Russian QSO's on this band. The input is 12-16 watts, QSB RAC. The aerial is of the Hertz type. O8RA has now about 250 QSO's, best DX is AS (on both 20 and 40-metre bands).

In the end of September the YL had a visit from O9RA, who operated for some days her station. O9RA is very fond of the station. Hi!

O9RA (Moscow).—He is also now trying a new QSB RAC, instead of the old AC (600 v.). His QRH is still near to 43 metres, the input 10 watts. O9RA has a short vertical aerial (and counterpoise), and as this aerial is close to a long one, he is regularly heard in Leningrad on QRH 79 metres, although his real wave is 43 metres. On 79 metres he has an every-day traffic with O8RA, but on 43 metres he is heard seldom. His QSO work is very good. He had on one occasion 11 QSO's in one evening. The best QSO's are with AS, with EG6HP (12 QSO's, some with different tests) and with PGO (ex-RLK), government transmitter, which is situated in the far north of USSR (Novaia Semlia), and has no more contact possibilities than radio. O9RA helped to relay official messages to Nijni Novgorod, where PGO was not heard. The best QSL of O9RA is from FM.

10RA (Nijni Novgorod).—He has not very much time to work on QSO, but his tests are always successful. Now he is most of time on QRH about 42 metres, with QSB D.C. His input is 20-30 watts. Has QSL from Sahara, FE and some other African countries.

11RA (AS-Omsk).—He has a rather powerful transmitter and works on the 40-metre band mostly. His QSB A.C. had not long ago QSO with EW. Has many QSL's from Europe, Africa and India.

15RA (Moscow).—His knowledge in morse is now much better, and he has plenty of QSO's. He made the first Moscow contact with AS. The input is 30-50 watts and he is the best heard of Moscow transmitters. His DX is AS and all Europe. His QRH is 40-43 metres, QSB still A.C.

20RA (Moscow) is working nearly always on QRH, about 32 metres; very seldom on 42-5 metres. He has not very many QSO's, as on 30-metre band it is very difficult to work in Moscow. But he is persisting on his 30-metre band and wants to be the first USSR amateur having contact EUSB. As he works on 40-metre band, he is always successful. Now he is testing on QRH, 23 metres, and has already a first Moscow QSO on this band (with EM). The QSB is A.C., the input about 10 watts. The aerial is an inverted L operated on a harmonic, sometimes with ground, sometimes with counterpoise. His DX is all Europe and AS.

35RA (ex-ASOVG, Omsk) has now an input of 5-6 watts only. Although he had some contacts with EW, EF and other Europeans, he is the best AS heard in EU. He is working mostly on QRH, about 45 metres, his QSB A.C.

39RA (ex-EU1UA, Nijni Novgorod) is one of the oldest Russian short-wave amateurs. Has some different transmitters. For instance, ex-EU1UA has an input of only 1-2 watts. The operating of the last one has given quite good results. Now he is working with 10 watts on QRH, about 44 metres, QSB A.C. 39RA is operating from 1924, and he has a lot of QSO. His DX all Europe (including EE, which is very seldom heard in EU) and Mesopotamia.

The following EU and AS hams are successfully working, but the details of their present work are unknown:—EU—01RA, 12RA, 13RA, 23RA, 24RA; AS—36RA, 37RA, 38RA. EU—21RA, 26RA, 27RA, 28RA and 31RA are only just on the air. 26RA and 28RA have already some reports from different parts of EU.

The following powerful (100-300 watts) government stations are sometimes working with amateurs:—ASRAO3 (Vladivostok), RA19 (Tomsk); EU—RA58 (Kiev), RA62 (Moscow), RA65 (Nijni Novgorod), EURP (Nijni Novgorod), PGO (ex-RLK, Novaia

Semlia), RA65 (ex-LNN). The 200-watt transmitter of Radio-amateur Club of Nijni Novgorod, is the first USSR station having contact with SB. Its QRH is 46 metres and 37 metres, QSB A.C.

In the beginning of October there was the first USSR test on short waves. The chief points of this test were contact among different parts of USSR, especially between EU and AS, and the work on various wavelengths. The principal results obtained were first Russian QSO's EUAS (EU15RA, ASRA19, EU08RA, AS35RA and others) and a successful work on the 20-metre band (08RA and 20RA).

FO News.

A5Z has changed his QRA recently. Is now using 9 watts, with which worked "ZAOC," R. A. Logan, Aircraft Exp. Station, Nchanga, Ndola, N. Rhodesia, from George. ZAOC is pure D.C., on 36 metres.)

A5L is on fone, and is putting out good quality speech, too.

A4Z has just disposed of his A.C. H.T. gear, and is at present using 1,500 volts D.C. generator, with a particularly good D.C. note. His station is a perfect example of fine workmanship throughout. He is using a vertical pipe as antenna for transmission.

A9A is running schedule with F. Pugliese, of Italian ship "Peria," running from Ivory Coast to Mon Ravia. Call, XE11FP.

A3V, since September 4, 1927, has been QSO all Continents. OA5WH on October 16, 1927, completing list.

A3X, of Durban, owner of one of the finest stations in the world, has had his whole outfit destroyed by fire. Very tough luck, OM.

A3E has been QSO AO2JW, Siam, and NU.

AI2KT is being worked by many of the "FO brigade."

A3Z (Port Elizabeth) had AI2KT's fone over O.K., in a QSO during early September, and also was QSO, at 7 p.m., with AM3AB, on 39 metres, using R.A.C., and being received R5 (by A3Z).

A9A has worked with EI1AY and EI1DY, of the Europeans, R7 in each case, also was R7 at NU7CBZ. He has been having almost daily schedules with AI2KT; this station was heard for first time during schedule at 14.15 G.M.T., at R8, on O-V-2!!! It has been ascertained from AI2KT that darkness had already set in. Object of these schedules was to establish contact during full daylight both ends. Date of beginning of schedules was September 10, at 12.00 G.M.T.

A9M.—QSO AI2KT, and was R3 there, power being 19 watts. Transmitter is being rebuilt, and a Telefunken RS-288 tube being christened.

A3Q has been reported by Miss Betty Harker (NU8ZZZ). He was using only 4½ watts, during wipe-out season, and was reported R3 to R5. Date, July 18. We learn that all future correspondence from NU8ZZZ is being censored by A3Q's wife! Hi!!!

A7A.—His fone is top-notch; it is whispered that it is all done by kindness.

A5F on fone, but editor of "FO news" regrets that his carrier is like unto a mealie machine.

A3F has been QSO AI2KW.

A6V (Johannesburg).—On fone and C.W. every evening 18.30 to 19.00.

A6W has been received in Tokio at R7 (this station is jointly run by Hon. Sec. of S.A.R.R.L. and the Editor of "Radio," OM Lowe).

Nairobi Division.

From Hughes (FK1MS).

Hope to have several active members soon. FK2MS, of Mombassa, is using DE5 valve with 105 volts on plate, 3 watts. Contact with Nairobi could not be established on 33 metres; went up to 48 metres, and he was R5 by OM Fisher and at 3CR.

QRA of FK1MS is L. Hughes, Changamwe, via Mombassa.

Through OM Hughes, we hear that 50-150-metre band is reserved in Kenya for broadcasting.

Rhodesia.

4SR.—Busy mainly with his aeroplane at Buluwayo. This division is very dead at present, although we have 21 stations licensed to transmit at the present time.

1SR (Davidson, of Salisbury).—Star station is on 35 and 20 metres. Can change over from 35 to 20 metres in 15 seconds; timed by OM 5SRA. Is just opening up business on his own as an electrical and radio engineer, so pressure of business will, worse luck, keep him off the air for some time. His 20 metre very good; has been working lengthy daily schedules with NU6HM on 20 metres, during wipe-out period:—

July 23, QSO OH6CLJ at 16.35 G.M.T., reported R5.

August 29, QSO AI2KT at 17.35 G.M.T.; R6 schedules arranged (1SR on 20 metres, 2KT on 31 metres).

September 4, QSO EG5KU at 21.45 G.M.T. on 20 metres (first FOEG QSO of the season).

September 16, QSO AI2KX and AI2BG; given R7.

September 21, QSO EF8IX from 20.50 till 22.50 G.M.T.

(These are some examples from his log, by 5SRA.) Who raided his shack for news!!!

Ex-EG2BZT has been granted a transmitting licence; very extended privileges have been given as regards wavelength. Call sign not yet allotted. Power, 50 watts. Will be on 32.25 crystal controlled, and on 20. As station is 35 miles from a town considerable QRM over L.T. question is involved. Altitude above sea

level is 5,000 feet. Hope to get a low-powered transmitter working by Christmas.

Research will be entirely on antennae, two-wave propagation, high and low angle. Hope to arrange some special English schedules later, through the BULLETIN. On commencing transmission a $\frac{1}{2}$ wave C.F. Hertz, horizontal, will be used, in comparison with a low-angle radiator.

No further news available from this division. Eighteen transmitters apparently dormant. Salisbury and Bulawayo are the only towns in Rhodesia whose radio apparatus can be obtained in any shape.

S.A.R.R.L. now national section of I.A.R.U. An excellent exhibition has just been held at Johannesburg, containing much of interest to transmitters. A4V showed a fine crystal-controlled set, for telephony, in three units.

Any T. & R. members visiting S.A. should get in touch with A4Z in Cape Town, the S.A.R.R.L. secretary in Durban, or Hon. Sec., A6W, in Joburg. By doing this our gang will see that the visitors have a good look round, meet our members, and feel quite at home. A "Visitors' Committee" is being formed in Johannesburg.

No new transmitting licenses are being granted in the Union of South Africa for use of wavelengths below 50 metres. It is understood this is done to prevent interference with the Beam on 34 metres. In Rhodesia the G.P.O. are most considerate over wavelength facilities.

At the Johannesburg Exhibition telegraphy short wave working was demonstrated very ably by A8Z, A6W and A6S, using a couple of "Baby Burgess transmitters," with an exide 240 volts, 50,000 m.a. hour accumulator as H.T.

L. Lloyd, the distributing agent for Mullards, won 1st prize for his well-dressed stand of Mullard transmitting and receiving valves.

Danish Notes.

(By 7EW AND 7MT.)

During this winter activity has been rather little as regards the "old" hams. The cause is that many of them are working hard for their exams. Some of the "newer" are very active and the short-wave interest is increasing rapidly in this country. A good sign of this is that the number of members of "E. D. R." has now passed the first hundred. Almost all Danish stations are working on the 35m. band; only few have "discovered" the 20m. band. On this band 7CZ has had remarkable results, but now activity is increasing.

Now for the reports:—

7BB is now working with about 15 watts, using two RE504 valves and is getting out quite well. His note is often reported "like crystal."

7BX has only worked little, mainly on 20m. Using about 5 watts he is being received well in eg and ef. He finds that conditions for receiving nu-stations have been poor during November.

7EW is occasionally working on 20m. on Sundays. As he is trying different counterpoises detailed reports will be much appreciated.

7FP has done good work with 6.5 watts. He has made some tests on 85m., finding that QRH much more suitable for local work than the 45m. band.

7FR has increased the height of his Hertz aerial with 5m., which has improved his results to a very considerable extent. He has had numerous R9 reports from eg and ef.

7HM has rebuilt, which has resulted in a great improvement of his note. He has worked Fm in full daylight (1300 G.M.T.) and was reported R3 with only 15 watts.

7HP has been busy rebuilding his receiver, making wave-meter, etc. He will appreciate reports on his 45m. phone signals.

7LO hopes to be on soon with his new QRO Xmitter. He has erected a Zeppelin aerial.

7MT has increased his "low-power" (hi!) to 25 watts, using a Philips TB 04/10 tube; lovely note!!! The big Xmitter has not yet been finished. He will be working on 70, 45, 2, 33 and about 20m.

7NI is still doing good work on 20m. On the 45m. band he has worked fi-ICW and fe-EGEZ in Cairo. He is keeping a schedule with nx-1XL, "University of Michigan Greenland Expedition."

7ZG has done some nice QRP work with 1.6 watts. On 45 watts he has been reported R9 by eu-09RA.

H. RAFN. (E. PAULSEN.)

QRA Section.

C. A. JAMBLIN (6BT) 182, York Road, Bury St. Edmunds, Suffolk. I am still receiving lists of foreign QRA's from abroad, and in this connection I would like to thank the following:—

Miguel Moya (EAR1), H. Russell Boyle (OZ-2AS), A. W. Watt (OA-2WW), G. G. Livesey (FO-3SRB), K. E. Tarsala (ES-7NB), and A. C. de Oliveira (EP-3CO).

G. Anikin (EU-39RA) 51 Swerdlow's Str, Nijni-Novgorod, U.S.S.R., who has kindly sent me the complete list of Russian QRA's, asks that cards for Russian amateurs should be sent to his QRA, or to "Radiolubitel," Ohotnii Piad 9, Moscow. He also asks the following British amateurs to QSL their QSO's with him:—2DL, 2NT, 2RG, 2VQ, 5BD, 5BY, 5YN, 6DR, 6IA, 6OO, 6QH, 6TX, 6ZA and GW-18B.

H. Russell Boyle (OZ-2AS) ex GC-6YT hopes soon to get in touch with some of his old friends here. He has just purchased one of Leslie Dixon's famous Newtons. He does not however spend all

his time at wireless, as he tells me he has just won £20 on . . . No, I won't give him away!

At the time of writing these notes, I have no further news from headquarters as to when the 1928 Log Book is likely to appear, but no doubt the Editor will be making some announcement on the subject in this issue. (Now see other pages.—Ed.)

G. G. Livesey, who many members know personally, and who has just been issued by the Rhodesian Government with the call FO-3SRB, hopes to get in touch with some of them.

He must be working under great difficulties in establishing his station, as the nearest town where he can buy components, etc., is 250 miles away, and QRN and the rainy season now on, do not help matters. He is going to tell us all about his experiences out there in the BULLETIN soon.

Q.R.A.'s Found.

FO-3SRB.—G. G. Livesey, c/o Chapman, "Killarney," Lalapanzi, S. Rhodesia.

ED-7BB.—S. E. Henrikson, Post Box 183, Aalborg. (Inf. G6YL.)

FM-AL.—Ingenieur, Post Office, Algiers. (Inf. G6YL.)

OI-DGK.—D. G. Kennedy, Vaitupu, Ellice Islands, Central Pacific (via Levuka, Fiji Islands). (Inf. G6YL.)

FO-A9Z.—R. S. Perry, P.O. Box 28, Durban. (Works on 50 ms.)

FO-A9X.—Chief Engineer, African Broadcasting Co., Bree Street, Johannesburg.

FO-A9U.—G. A. Brickhill, c/o Studio, Durban Broadcasting Station. (Inf. re FO QRA's, FO-3SRB.)

OA-2RO.—R. W. Turnbull, 2, Ethel Street, Burwood, New South Wales. (Inf. BRS 42.)

EK-4ABV.—K. Haeske, Bären-Str. 23, Breslau 17.

EJ-7WR.—A. Orelov, Ecole Radio, Petrovaradin, Yugo Slavia. (QSL under cover.)

JXAX.—K. Kusama, 1581 Mikagecho, near Kobe, Japan.

JXBX.—T. Semba, 49 Sankochō, Yotsuya, Tokyo, Japan.

JXCX.—N. Eimura, 1101 Nakanobu, Ebaramachi, Tokyo, Japan.

JXDZ.—S. Akuzawa, 25 Katamachi, Maebashi, Gumakem, Japan.

JXEX.—H. Horikita, 597 Shimohehikubo, Ebaramachi, Tokyo, Japan.

JXFX.—M. Sumi, 1401 Mukaiyama, Shimoshibuya, Tokyo, Japan.

JXGX.—T. Seki, 33 Watauchi, Sakusabe, Tsugamura, Chibaken, Japan.

JXHX.—H. Takeuchi, 419 Taryo, Ikebukuro, Tokyo, Japan.

JXIX.—K. Kasahara, 880 Tennojicho, Sumiyoshiku, Osaka, Japan. (Japanese QRA's by SHIGEO SHIMA, J.A.R.L.)

"G."

2AAQ.—T. W. Pettifor, 15, Gunthorpe Drive, Sherwood Estate, Nottingham.

2ABL.—T. Brown, 24, Wellington Street, Gainsborough, Lincs. (Inf. G6UO.)

2BWT.—C. H. Ison, 47, Orford Road, London, E.17. (Is interested in short wave Duplex working, and would like to hear from other amateurs working on same subject.)

2OK.—C. A. Vandervell, "Maidenhatch," Pangbourne, nr. Reading.

2PM.—W. B. Bodemeard, 262, Philip Lane, London, N.15.

5AH.—A. Horton, 23, Glenfall Street, Cheltenham.

5BB.—E. W. B. Briscoe, Home Lea, The Fordrough, Four Oaks, Sutton Coldfield.

5FU.—E. G. Foulkes, 27, High Street, Rhyl, North Wales. (Correcting QRA given as 2FU in November BULLETIN.)

5JB.—J. Bamford, 22, Walker Street, Edinburgh. (Inf. G1-5YG.)

5TA.—A. C. Cossor, Ltd., Highbury Grove, London, N.5.

6AM.—W. N. Doble, 1, Pickwick Road, Dulwich, London, S.E.21.

6CY.—A. S. Clacy, 10, Melrose Avenue, Reading.

6FI.—F. G. Ingleton, 48, Grasmere Road, London, N.10.

6FM.—D. Milner, 64, Bury Street, London, N.9.

6KW.—R. Kirew, 11, Compton Road, London, N.21.

6LN.—E. P. Allen, "Meadowcourt," Cropwell Road, Radcliffe-on-Trent, Notts.

6SC.—S. H. Chapple, 115, Croydon Road, Caterham Valley, Surrey.

6ZR.—C. E. Ponting, 11, Woolcott Street, Redland, Bristol.

"GW."

12D.—S. Bourke, 11, Eglinton Road, Bray, Co. Wicklow.

13D.—R. Sadleir, 1, Summerville Park, Upper Rathmines, Dublin. (GW. Inf.: GW 11B and Wireless Society of Ireland.)

CHANGE OF QRA.

2AIN now 5, Drakewood Road, Streatham, London, S.W.16.

2OD after the 31st inst. will be:—

Barclays Bank House, West Drayton, Mdx.

5AU now Wellington Road, Enfield, Mdx.

5BM now "Mostyn," Beeston Field's Drive, Beeston, Notts.

5FR now 2, Fernhurst Road, Croydon, Surrey.

5LN now Crockley House, 213, Brentwood Road, Romford, Essex.

5PD now 59, Falmouth Avenue, Highams Park, London, E.4.

5XU. now "Hazelhurst," Goldsborough Road, Doncaster, Yorks.

6YR now 10, Claro Avenue, Harrogate.

OZ-2AS now c/o. 4, Madeira Road, Napier, New Zealand.

CHANGE OF CALL SIGN AND IDENTIFICATION NUMBERS.

2ABA now G6LN.

2ABL now G6AM.

2AWF now G6FI.

2BAX now G6SC under new QRA.

BRS28 now G6ZR.

BRS108 now 2AAQ.

Joint Committee R.S.G.B. Wireless League.

APPROVED WIRELESS TRADERS AND REPAIRERS.

Bedfordshire.

Norman Mickle, 37, Bromham Road, Bedford.
Griffin Bros., 63, North Street, Leighton Buzzard.
Borough Engineering Works, Ltd., 46, Castle Street, Luton.

Buckinghamshire.

A. S. How, 252, Berkhamsted Road, Chesham.
Wye Radio, 22, Oxford Street, High Wycombe.

Cheshire.

W. N. Lambert, Accumulator Charging Services, Hale Road, Bridge, Altrincham.
W. H. McMillen, 15, Rake Lane, Bromborough.
The Hilderley Radio Sales, 48, St. Petersgate, Stockport.
The Premier Electric Co. (Stockport), Ltd., 135, Castle Street, Edgeley, Stockport.

Cumberland.

L. R. Booth & Co., 4 and 6, Lonsdale Street, Carlisle.

Derbyshire.

The Radio Service Co., 16, Terrace Road, Buxton.

Devonshire.

A. C. Cann, Clifford Street, Chudleigh.
J. M. Jarvis, 16, King Street, Combe Martin.
T. C. Petherick & Co., Dartmoor Garage, Princetown.

Essex.

C. F. Bridge, Dagenham Wireless Supply, 6, Church Street, Dagenham.
C. Haddon Poupard & Co., 76, Mayfair Avenue and 82, Wanstead Lane, Ilford.
A. H. Silcocks & Son, 56, High Street, Romford.
S. H. Davis & Son, 154 and 156, Hamlet Court Road, Westcliff-on-Sea.

Gloucestershire.

Electrolines, Ltd., 5, Denmark Street, Bristol.
H. W. Smith, Smith's Radio Stores, 217, Hotwell Road, Bristol.
White's Wireless Emporium, 38-40, Victoria Street, Bristol.
A. G. Long, Electrical and Radio Engineer, Market Street, Wotton-under-Edge.

Hampshire.

A. Barnes, South End Depot, Droxford.
See & Burgess, 145, West Street, Fareham.
C. A. Porter, High Street, Hartley Wintney, Basingstoke.
Southsea Wireless Co., 12, Elm Grove, Southsea.

Hertfordshire.

L. G. Hosier, The Oakway, Watling Street, Radlett.
H. D. White, 146a, Chester Road, Watford.

Huntingdonshire.

C. E. Moore & Co., High Street, St. Neots.

Kent.

S. W. Bligh, 1 and 2, North Lane, Canterbury.
C. & O. Clark, Mill Road, Deal.
A. G. L. Acland, 147, High Street, Rochester.
Hall & Doggett, 67, Beckenham Lane, Shortlands.
H. Grensted, 31, Station Street, Sittingbourne.

Lancashire.

Grimshaw's Radio, 17-21, Market Hall, Bolton.
E. Pemberton & Sons, 875, Stockport Road, Longsight, Manchester.
Central Wireless Co., 52, Standishgate, Wigan.

London.

The Park Motor Co., Ltd., Wells Street, Jermyn Street, S.W.1.
Brega's Radio Service, 305, King's Road, Chelsea, S.W.3.
Jonathan Fallowfield, Ltd., 61-62, Newman Street, W.1.
Glanfield Lawrence (Motors), Ltd., 230, Tottenham Court Road, W.1.
W. E. Hull & Son, 136, Holland Park Avenue, W.11.
A. F. Archer, 121, Lee Road, Blackheath, S.E.3.
Wilfrid Neal, Neal's Radio Stores, 127, Dulwich Road, Herne Hill, S.E.24.
Ray's Service, 23, Norwood Road, S.E.24.
A. W. Frampton, 41, Queen's Road, Walthamstow, E.17.
East Ham Wireless Supplies, 429, Barking Road, East Ham, E.6.
Wheatley, Smith & Co., Electrode House, Wellington Road, Wanstead, E.11.
A.E.F. Manufacturing Co., Clarendon Road, Hornsey, N.8, and Thorold Road, Bowes Park, N.22.
Pugh Bros., 95-101, Holloway Road, N.7.
G. Scott Sessions & Co., Hill Top, Muswell Hill, N.10.
Palmer's Green Radio Service, Ltd., 15, Melbourne Green, N.13.
F. J. A. Hall, 91, Fore Street, Upper Edmonton, N.18.
E. J. Horaud, No. One Edmonton, N.18.
H. M. Pearce & Co., 68 and 89, Fore Street, Edmonton, N.18.
B.W.'s Garage (Robert Weller), Holland Road, Hornsey Rise, N.19.

Lincolnshire.

R. J. Robinson & Co., Brackenborough Road, Louth.

Norfolk.

White's Wireless Depot, Market Place, Fakenham.
C. J. Bayes, 7, Tower Street, King's Lynn.

Northamptonshire.

Turner Bros., 6, Kingsley Park Terrace, Northampton.
J. W. Rogers, Stanley Road, Wellingborough.

Northumberland.

A. W. Bridges, Bell's Court, Pilgrim Street, Newcastle-on-Tyne.

Nottinghamshire.

L. R. Moss, Toothill Street, Mansfield.

Oxfordshire.

Robinson & Co., Bridge Street, Bampton.
J. E. Traver, 33, Market Place, Banbury.
The Oxford Wireless Telephony Co., Ltd., 22 and 29, Queen Street and 11, New Road, Oxford.
The South Midland Wireless Depot, 111, St. Aldgate's Street, Oxford.

Suffolk.

Radio Supply Co., next Town Hall, Sudbury.

Staffordshire.

S. W. Meadows, Abbots Bromley, Stafford.
Ball Bros., Cambridge House, Cannock.
D. Ainsworth, 56, Britannia Street, Leek.
P. T. Bradley, 10, Church Lane, Stafford.

Surrey.

Ed. Weale, 25 and 25a, Church Street, Godalming.
Palmerston Ponder, Massetts Road, Horley.
Stirlings, Ltd., 17-19, Clarence Street, Kingston-on-Thames.
B. F. Stammers, 46, Malden Road, New Malden.
R. G. Wilson, 70, Lesbourne Road, Reigate.
Morley & Thuey, 31, Hill Rise, Richmond.
Edes Service, 82, Victoria Road, Surbiton.

Sussex.

Basil Marsh, 6, Victoria Road, Brighton.
Church Road Motor Works, Church Road, Crowborough.
County Garage & Engineering Works, 170, High Street, Lewes.
Midhurst Engineering & Motor Co., Midhurst.

Warwickshire.

C. H. Broad, 249, Ghristhorpe Road, Selly Oak, Birmingham.
S. Dagnall, Ltd., 420, Stratford Road, Sparkhill.
Radio Electro Stores, 31, Stephenson Street, and 31, Carr's Lane, Birmingham.
Chas. Payne, 26, Earl Street, Coventry.
Radio Supplies Co. (B. V. M. Salter), 37, Bedford Street, Leamington Spa.

Wiltshire.

Western Wireless & Electrical Co., 33, Fisherton Street, Salisbury.
W. Ross, High Street, Shrewton.
Tucker & Pearce, 96, Victoria Road, Swindon.
W. H. Winchcombe, 160, County Road, Swindon.

Yorkshire.

C. Pratt & Sons, Ltd., 33, North Parade, Bradford.
Tom Pratt & Sons, 125, Allerton Road, Bradford.
England Robinson & Co., Ltd., 34-36, Parliament Street, Harrogate.
Radio (Harrogate), Spa Hydro Buildings, Harrogate.
King & Co., Ltd., Trinity Church Side, Hull.
Parrs, Ltd., High Street and Market Street, Knaresborough.
Jas. Simpson, Church Street, Settle.
Christie & Hodgson, Ltd., 244-246, West Street, Sheffield.
Radio Installation Co., Telephone Buildings, West Street, Sheffield.
W. G. Kennings, Kilbourn, F.B.H.L., 341, Middlewood Road, Sheffield.
J. E. Wetherill, 16, High Street, Wetherby.
Driver Bros., 10, Ivygate, Yeadon.
W. H. Myers, 63a, High Street, Yeadon, Leeds.

Ireland.

Robert Hazelton, Woodhouse Street, Portadown.

Scotland.

Brown & Co., 116-118, West Nile Street, Glasgow.

Wales.

W. J. Nelson, 33, High Street, Ammanford, Carmarthenshire.
W. A. Craft, 46, Vergam Terrace, Fishguard.
North Wales Auto-Electric Co., 9, Madoc Street, Llandudno.
R. Jackson, 9, Queen Street, Rhyl.

TRADERS ONLY.

Lancashire.

King Orry Wireless Service Depot, Corner of Church Street and Bank Street, Blackpool.

London.

Economic Lighting Stores, 24, Fulham Palace Road, Hammer-Smith, W.6.

Middlesex.

O. V. Pogson, 3, South Street, Isleworth.

Sussex.

R. H. Pearson, Ltd., 134, Terminus Road, Eastbourne.

Scotland.

R. Clapperton, Meadow Cottage, Selkirk.

Theory and Adjustment of a Transmitter

(Concluded from page 6)

there is a point of optimum efficiency. This state cannot be predicted from theory owing to the large number of factors involved, and the impossibility of calculating the power required for grid excitation. It can be approximately determined in practice by the use of accurate meters in input and output circuits. In almost all cases the point of optimum efficiency will be quite different from that for maximum output. Whether the set is run at maximum output or maximum efficiency must be left to the choice of the operator.

Emission and Feed Current.

As a result of the conditions imposed for fair efficiency, coupled with reasonable output, the maximum emission required will be considerably more than twice the mean. The mean emission is, of course, the feed current supplied to the valve. The maximum emission may be as much as five times the mean. This explains why the input current is always much less than the known total emission. If the total emission is too little the output will be curtailed further, since a lack of emission is equivalent to an increased resistance, the losses in the valve will increase, and its plate will heat up.

The voltage necessary for grid bias is usually quite large, comparable with the value of high tension required on a receiver, and to avoid the need for batteries a common practice is to supply the bias by smoothing the grid current—which consists of pulses—and letting it flow through a resistance of suitable value. It is a fortunate circumstance that this gives a bias of the right kind, *i.e.*, negative with respect to the filament. The condenser used for smoothing, and the resistance across it, are commonly termed the grid condenser and leak, this latter term from the somewhat similar use of a high resistance in a receiver. The name grid circuit resistance would be better.

T. & R. Bulletin Accounts as at November 30, 1927

CR.				£	s.	d.
Cash at Bank "A" Account	...	...	...	1	0	7
" " " " "B" "	...	...	...	90	16	10
T. & R. Wavemeter	...	...	...	25	0	0
R.S.G.B. Circulation	...	...	...	17	0	0
Sales Dept.	...	...	...	2	1	3
Exhibition Sales	...	...	...	19	5	3½
Stocks on hand (estimated)	...	...	...	5	0	0
Sundry Debtors (less Reserve for Bad Debts)	...	...	...	161	2	6
Iliffe & Sons (Copyright)	...	...	...	25	0	0
Subscriptions due to Account	...	...	...	12	5	0
Cash Sales (November)	...	...	...	6	9	6

365 0 11½

DR.				£	s.	d.
W. R. Royle & Sons	...	...	...	20	6	8
Loxley Brothers	...	...	...	267	12	0
Cash on Loan	...	...	...	32	19	0
H. Pickering	...	...	...	8	0	0
Iliffe & Sons	...	...	...	6	9	0
Plaques	...	...	...	12	0	0
A.R.R.L. (Estimated Sterling) (Sales)	...	...	...	24	16	4
Printing Craft (Sales)	...	...	...	3	3	0
Econsign Co.	...	...	...	3	0	6
T. Wall (Sales)	...	...	...	13	6	0
Citizens' Radio (Sales)	...	...	...	12	6	0
Balance in Hand	...	...	...	10	10	8½

365 0 11½

(Sgd.) A. HAMBLING,
Hon. Advertising Manager.

Calls Heard.

DE38—Kassel—EK4ABN. 15-50 metres. 10.10 bis. Dec. 4, 1927.—EK—4aap, 4aar, 4abg, 4abv, 4aey, 4dbs, 4af, 4au, 4cl, 4cx, 4fn, 4hy, 4ka, 4ko, 4nx, 4qw, 4qd, 4qb, 4ua, 4uz, 4vl, 4vr, 4wx, 4xy; EA—kl, fk, mm, sp, wg; EF—8aod, 8btr, 8gi, 8kd, 8ku, 8dot, 8lt, 8mmp, 8nox, 8pd, 8ra2, 8rpu, 8sst, 8rdr, 8udi, 8ut; EB—e9, 4ar, 4bd, 4be, 4bu, 4bl, 4dg, 4el, 4ft, 4cn, 4ou; EG—2nh, 2st, 2sz, 2qv, 5ad, 5by, 5gq, 5jo, 5ma, 5ml, 6cl, 6dr, 6hp, 6ia, 6mn, 6mu, 6nf, 6pp, 6qb, 6rw; GC—6nx; GI—6mu; ED—7ni, 7bl, 7jo, 7im; EM—smua, smwr, smzy; ES—7nb; EL—lal, lals, lalx; EN—ogw, oez; EC—lco, lfm, lkx, luz, 1yl; EE—ear44, ear62; EP—laa, lag, 1bg; EI—lax, lea, lfo, lma, lml, 1xw; EJ—7fp; ER—5aa; EW—sh; ET—tpar; EU—o8ra, 15ra, 23ra, 39ra; AQ—bd; AU—rabs; FM—8vx, 8ssr; SH—bzl (Brit. Guiana); SB—umi, lah, 1cg, 2aj, 2ar; SU—2ak; NC—lbr; NU—lakz, lbxm, lka, 2ahb, 2alu, 2apd, 2bbx, 2crb, 2fw, 2tp, 3aee, 3aic, 6uf, nnt; DIVERSE—ap4, agj, anf, atc, gba, gib, glq, fl, kkee, lp1, lp3, ldw, pop, poc, sqcl, sqz, sgp, hk hav1, wbu (14 mtr.), 2uc, 6rb, f9c, c8l, yr, ir1.

Correspondence.

Instructions to Correspondents.

We are always glad to hear from members. Correspondence published in these columns should be written clearly on one side of the paper and marked "For Publication."

All correspondence should be addressed to the Editor, T. & R. BULLETIN, who reserves the right to refrain from publishing any material which is lacking in general interest or for other reasons. Correspondence for publication will not be acknowledged.

Correspondence must be kept reasonably brief.

PRINTING ERRORS IN CALLS HEARD.

To the Editor of T. & R. BULLETIN.

DEAR SIR,—In the November issue of the BULLETIN I have read a letter of Mr. A. S. Clacy (G6CY) where he says that he has never been QSO with me, although this was referred to in "EG calls heard by EU05RA" in the October issue of the BULLETIN.

Like G6CY, it was the first that I knew about this contact. I am very sorry, but the matter is due to a number of printing errors in this note.

Nearly all "C's" should be "B's." G6CY should really be G6BY. I had also never QSO with G6CC—that was G6BB, etc.

For the benefit of British hams, I enclose within a new list of EG calls heard.

Now, indeed, I would be also very pleased to meet G6CY and "discuss a number of matters," as he says.

I take this opportunity of thanking a number of British hams, especially G6HP, for their kind QRY for numerous tests between me and my good friend EU05RA.

Yours sincerely,

V. VOSTRIAKOV (EU05RA).

To the Editor of T. & R. BULLETIN.

DEAR OM,—Will you please let it be known through your columns that I am now licensed for transmission, using the call-sign G6LN, and that I shall greatly appreciate reports of my 45-metre transmissions; all such reports will be promptly acknowledged.

I should very much like to arrange schedules with the many good friends which I made when I was 2ABA.

With all good wishes and very 73.

Yours sincerely,

E. PHILIP ALLEN G6LN (ex-2ABA).

To the Editor of T. & R. BULLETIN.

YL WANTS QSO.

DEAR SIR,—Miss Bell (OZ4AA) asks G stations to listen for and report on signals from OIGDK. QRH 31.8 metres. QSB DC. Times of working about 07.30-08.30 G.M.T. OIGDK has OZ skeds on Wednesdays, and Saturdays at 20.00 N.Z.T. QRA: D. G. Kennedy, Vaitupu, Ellis Islands, Central Pacific (via Levuka, Fiji Isles).

Yours truly,

B. DUNN (G6LYY).

QSO WANTED.

To the Editor of T. & R. BULLETIN.

DEAR OM,—I have received a card from EC2YD and he says he will be working on the 20-metre band from December 1, 1927, and asks me to look out for him between 17.00 and 20.00 G.M.T. every night. As I cannot listen between these times will other

BRS's please QRX and QSL if they hear him and also for EC2UN who will also shortly work on 20 metres. Also EATX asks for the price of the loud-speaker "Audia" imported from South America. Can any member give me the information to pass on to him?

Yours sincerely,
E. C. TIBBITTS (BRS50).

MORE QSO's WANTED.

To the Editor of T. & R. BULLETIN.

DEAR SIR,—Radio OAIJK (Mr. Herd) asks if stations on the 30-40 metre band will look out for his signals each Sunday from 05.00 to 07.00 G.M.T., as he is very anxious to connect up with G's; his power is about 150-170 watts.

Thanking you,

Yours truly,
H. E. COOK.

QSO 7TH DISTRICT U.S.A. ON 20 METRES.

To the Editor of T. & R. BULLETIN.

DEAR SIR,—I think that the following item of news will be of interest to the "gang." At 17.20 G.M.T. on December 9, 1927, I heard NU7FE of Portland, Oregon, calling CQ Europe. Upon his finishing up, I gave him a short call, but unfortunately I didn't hear him reply. However, I had a schedule with FOA3Z at 17.30 G.M.T., so accordingly gave him a call as per usual. Imagine my surprise when, on changing over, I heard NU7FE calling me. His signals were R2-3 with QSS, and very hard to read. However, QSO went on for about half an hour, and although I had great difficulty in copying 7FE's message, he apparently was copying me OK. I'm glad that FOA3Z was late to schedule!!

73 and DX,

F. MILES (EG5ML).

QSO's WANTED.

To the Editor of T. & R. BULLETIN.

DEAR OM,—I have had a letter from my friend Mr. Le Roy W. Johnson, of NU3AFW, and he wishes to publish in the "BULL." the facts that his QRH is always between 37.5 metres and 38.5 metres, and he wants QSO's with European hams, and will answer by card all correct reports on his signals. He is on the outlook for European hams above the NU band, and also around 33 metres, and welcomes reports. He has answered CQ calls from EJ1AA, EJ7QQ, EL5TT es ET2AU, but has not succeeded in a QSO as yet, though his signals are R5 most times in England.

Yours sincerely,

C. E. HARWOOD (G2AYN).

P.S.—QRA of NU3AFW: Le Roy W. Johnson, 216, Irving Street, Allentown, Pa., U.S.A.
Erlesdene, Park Road, Hale, Ches.

"THRESHOLD HOWL."

To the Editor of T. & R. BULLETIN.

DEAR OM EDITOR,—I read with interest the above article by 6CJ, and must say that until about a fortnight ago I did not know of such a thing as threshold howl; at any rate, not on my short wave receiver. The reason I have just experienced this horrible howl is that I have recently replaced my old L.F. transformer with one of the best and most expensive transformers on the market. Prior to this I always used a "Croix" (4/6) transformer ratio 5 to 1, and I can only say from experience that it is excellent. Of course, I have replaced the "Croix" and, as far as oscillation is concerned, it is sometimes difficult to tell when the set has gone into oscillation; that is when there is no QRN and no signals at that moment. I thought I would just let you know my experience as it may interest some fellow members.

With best wishes,

Yours faithfully,
RALPH BATES (G5OD).

To the Editor of T. & R. BULLETIN.

DEAR OM,—I received the following on a QSL from OZ3AU:—
"Dear OM,—Could you please tell me what has happened to EG hams? I have only worked three and heard five during the last seven months. The time we listen is from 4 to 6 p.m. N.Z. time, but the EG's are very scarce. All the N.Z. hams listen for EG's from 30 to 34 metres, but I heard 20Q on 43 metres one day. Could you tell me what wave the EG's work on? Perhaps it is hard to get permission for 32 metres? I am on every night from 5 to 6 p.m. N.Z. time, so tell the gang to try and QSO on 32 metres."

"Cheerio nw,

"OZ3AU."

I wrote him explaining that most EG's work on 44 to 46 metres, and 23 metres, and that those few who have 32-metre permits are usually busy with other work. It should be fairly easy, though, for those working on 45 metres to arrange schedules with OZ's.

Yours faithfully,
D. W. HEIGHTMAN (2BRJ).

LPJ CALLS HEARD.

To the Editor of T. & R. BULLETIN.

DEAR OM,—At 13.10 G.M.T. yesterday (Sunday), I was in communication with LPJ, who gave his position as being in the island of Spitzbergen in the North Polar regions. He asked me to deliver the following message:—

"To R.S.G.B.—British stations heard by LPJ Radio Lab., Spitzbergen:—2FU, 2CX, 6BD, 5RA, 5MS, 6YQ, 2AN and 5AD.—LPJ."

I was using about 35 to 40 watts on 44.5 and LPJ gave me very FB at R6. His strength was R4-5 QSBACCW on about 44 metres. Yesterday was the first time my station has been in operation for four months.

I enclose a card for EAFK, at Vienna, for transmission via Radio-Welt, Vienna. I shall be much obliged if you will kindly hand this over to the QSL Bureau.

Best 73's,

E. W. GALPIN (EG5JG).

P.S.—I rather gathered from LPJ's remarks that mine is the first British station with which he has been in communication. I have not notified the QRA Bureau.

INSULATORS.

To the Editor of T. & R. BULLETIN.

DEAR SIR,—I was much interested in 6YZ's letter in October number, as I was reminded of some work done by H. Stuart and self three or four years ago. We were looking for a real insulator for reception work and carried out all tests on a gold leaf electroscope.

The only perfect insulator we found was solid P. wax (parc) supplied by Beckers, Hatton Wall. Ebonite was very unreliable. Wood soaked in P.W. in a steam oven for six hours was perfect for a week or two but rapidly deteriorated, especially with whitewood! The only other permanent insulator, suitable for supports, etc., was Radio Mahogany (Am. Hard Rubber Co.), which remained so after a fortnight on workshop floor.

I haven't tried any new ebonites. Since these tests I have used air as far as possible, using connecting wires as supports. Even now I don't use valve holders!

Will 6YZ re-test his whitewood now?

I am,

Yours truly,
D. M. ELY.

To the Editor of T. & R. BULLETIN.

DEAR SIR,—I have just been allotted the call sign 2ATA for A. aerial. I mention this, as I think this is the only licence of any kind to be held in Cumberland, and it might encourage others here to join the ranks.

I am pleased to say I managed to get to the Convention, and though three hundred miles to go, I am sure it was worth it. Best wishes for the BULL.—Yours faithfully,

HARRISON BACON.

69, The Headlands,
Keswick, Cumberland.

To the Editor of T. & R. BULLETIN.

DEAR SIR,—May we complain through the BULL. about those foreign amateurs who get you to send them a report and then casually leave you for the next victim? It is very bad manners to do this, and shows the very reverse of the amateur spirit which we do hope so much to maintain.—Yours sincerely,

A. B. WHATMAN (G6BW).

The Cottage, Twyford, Winchester.

E. Y. NEPEAN (G5YN).

"Loders," Andover Road, Winchester.

QTC DE ED7MT.

I am now back again in my own country and wish to express my very best thanks for the splendid hospitality, kindness and helpfulness with which I was encountered everywhere.

You may all rest assured that I am very thankful for all I have learned about ham spirit, ham life and ham work, also the experience I have got from my staying in your agreeable country.

I hope that whenever one of your hams should happen to come to Denmark he will receive the same hospitality from us. Very 73 and cheerio, OM's.

Yours thankfully,

E. POULSEN, ED7MT.

To the Editor of T. & R. BULLETIN.

DEAR SIR,—I should be glad if you would kindly note that 6YF is now on the air on 45 metres. Reports will be welcomed particularly as to keying chirp, QSS and QSSS, and will be acknowledged. My QRA is now:—

RADIO 6YF, 38, Barrow Hill Road, St. John's Wood, London, N.W.8.

C. P. ALLINSON.

38, Barrow Hill Road,
St. John's Wood, N.W.8.
November 7, 1927.

EXCHANGE & MART.

Many amateurs are on the look-out for second-hand apparatus at a moderate figure. Look through your junk and see what you have worth selling and turn it into money. This is your best medium for disposing of your surplus experimental gear.

Rates 1d. per word, minimum charge 1s. 6d.

TANTALUM.—Tantalum metal sheet for A.C. rectifiers.—Blackwell's Metallurgical Works, Liverpool.

WANTED, HAND GENERATOR, 600 volts 30 milliamps., Marconi preferred; must be perfect; state lowest price approval against cash.—G6NZ, 14, Silchester Road, Portsmouth.

PATENTS obtained, Trade Marks and Designs registered, British and Foreign.—GEE and Co., Patent and Trade Mark Agents (H. T. P. GEE, Member R.S.G.B., A.M.I.R.E.), 51-52, Chancery Lane, London, W.C.2. Telephone: Holborn 1525.

SEND US your dud valves; we guarantee to return them with their original characteristics at less than half the price of new valves.—Write for full Price List to NORTH LONDON VALVE CO., LTD., 22½, Cazenove Road, London, N.16.

SALE.—1,000volt 80-milliamp. D.C. Generator, £5; V.O. 50 "Mullard" Valve, £4 17s. 6d.; 230-volt 50-cycle ¼ h.p. Motor, £5; 230-volt 50-cycle ¼ h.p. Motor, £5; two Western M.A. Meters, 0—5 and 0—100, £3; Voltmeter, 0—1200, £3; also other surplus Transmitting Gear.—5LA, "The Hollins," Sowerby Bridge, Yorks.

MARCONI H.T. TRANSFORMER, 4,000—4,000 max., 1.5 kw., guaranteed in perfect condition and new appearance, £5 5s.; Mullard 250-watter, £3 5s.; 150-watter, £3; unused Spares; guaranteed O.K.; Empire Typewriter, standard size, guaranteed perfect order and appearance, £4.—Box 21, T. & R. BULLETIN, 53, Victoria Street, Westminster, S.W.1.

5-K.W. A.E.G. TRANSFORMER, 210 v. 50—3 phase, 5,000 v. £12 10s. or offer.—G5IS, 49, Carson Road, S.E.1.

FOR SALE.—Crompton Generator, 2,000-volt D.C., 100 m.a., coupled on bedplate to ½-h.p. 230-volt D.C. motor. Weston Combined Volt-ammeter, 0-7½, 30, 75, 750 volts, 3.30 amps. T.C.C. 4,000-volt .25 mf. Condensers, new. Mullard Rectifier valve, type U.150, new.—5P.Z., 3, Castle View Gardens, Ilford.

Piezo-Electric Quartz Crystals

FOR ALL AMATEUR WAVELENGTHS in stock for immediate delivery.

We GUARANTEE every Crystal to:

- (1) Oscillate easily without any form of reaction, with either high or low impedance valves.
- (2) Work with an air gap at least equal to the thickness of the crystal.
- (3) Be accurate to the wavelength required to within 1 part in 1,000.

ABOVE ALL, WE GUARANTEE YOU COMPLETE SATISFACTION IN ALL RESPECTS.

PRICES (unmounted).

200-101 metres ..	each	£3 10 0
100-75 metres ..	"	4 5 0

Above prices include for delivery by Registered Post.

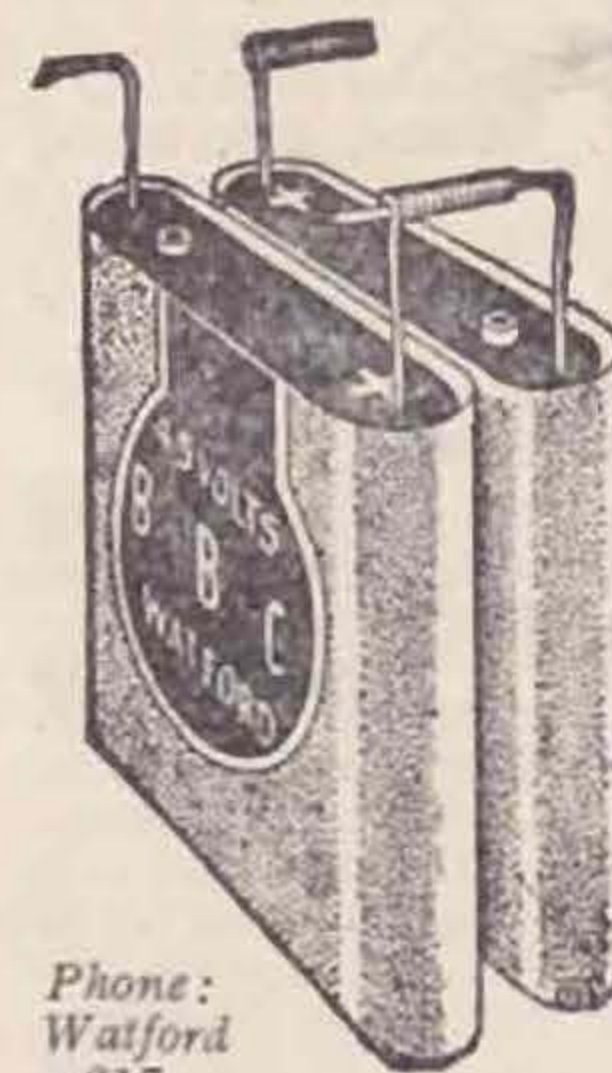
Any Crystal can, if required, be mounted complete ready for use in Special Dust and Damp-proof Holder at 25s. extra.

Prompt delivery is a feature of our Service. Advice without obligation.

R. A. WEBER,

Manufacturing Opticians and Quartz Specialists,

Works: 303, HITHER GREEN LANE,
LONDON, S.E.13.



Phone:
Watford
617.

BUILD UP

the voltage you need!

OUR No. 1 W Standard Pocket Lamp, Size 4½ volt Batteries with Patent Spiral Wire Terminals and Wander Plug Socket, ensures permanent connections without soldering. To connect in series insert straight terminal in spiral of next battery. (See illustration.)

7/- PER DOZ. WITH PLUG
(Carriage Paid.)

New Illustrated Price List now ready. Contains full details of our new DIAL CONTROL Battery and B.B.C. Cabinet Types.

(Guaranteed British made)

BRITISH BATTERY CO., LTD.,
Clarendon Road, Watford, Herts.

Q.S.L. CARDS

We have the best range
:: at cheapest Prices ::

100 for 5/-, 500 for 14/-, 1,000 18/-

Send for Samples.

Terms C.W.O.

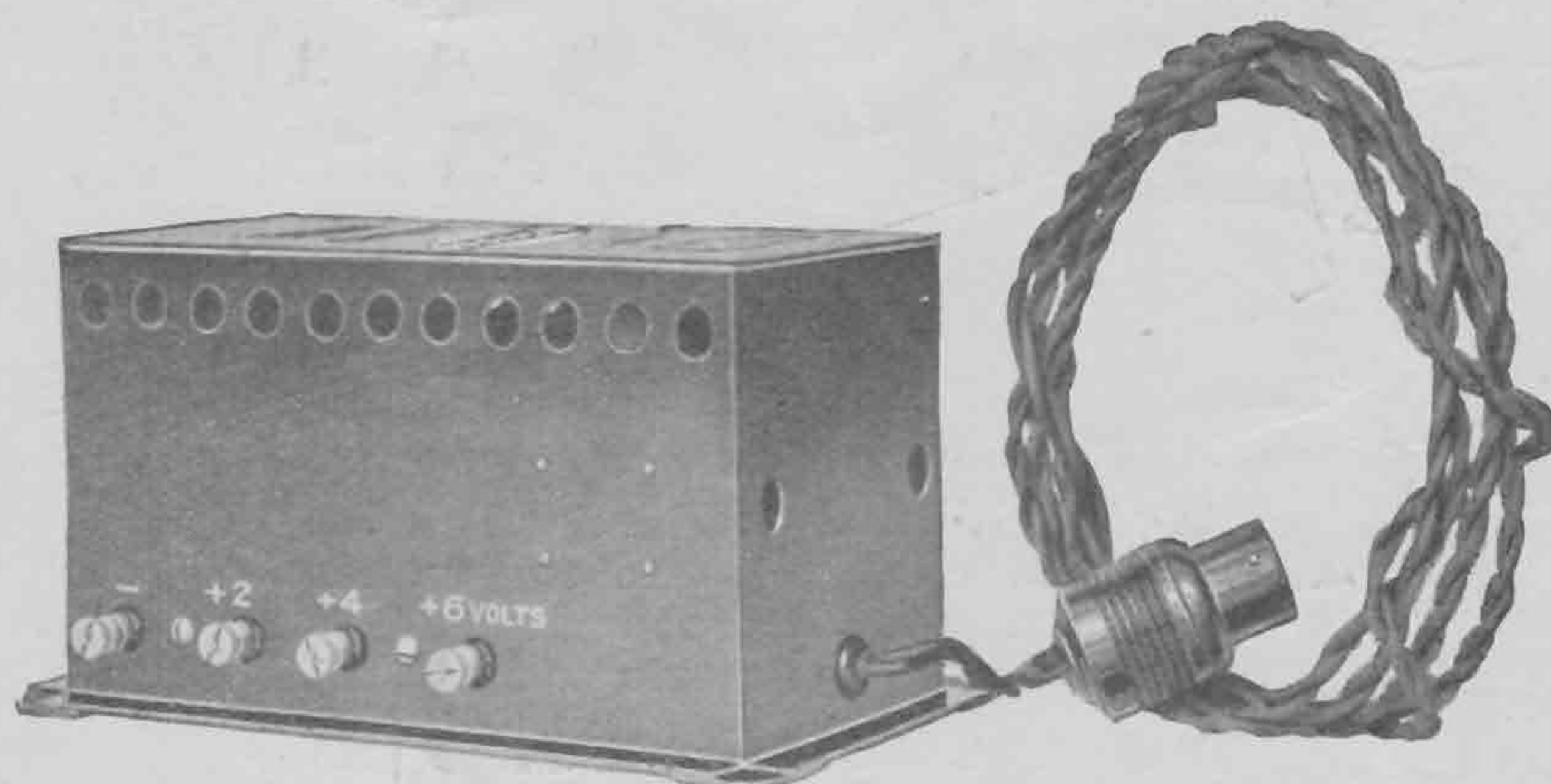
CORDWELL & EDDAS

HIGH CLASS PRINTERS,
STANLEY RD., ST. ANNES-ON-THE SEA.

THE FERRANTI TRICKLE CHARGER

(INCORPORATING THE WESTINGHOUSE METAL RECTIFIER
AND A FERRANTI TRANSFORMER)

*For charging L.T. Accumulators at home from
alternating current mains.*



PRICE - 55/-

- 1) Will charge your accumulator at home at negligible cost.
- 2) Eliminates the possibility of discharged and sulphated accumulators.
- 3) Eliminates the inconvenience of taking accumulators to be charged.
- 4) Is silent and safe in operation.
- 5) Costs nothing for upkeep.
- 6) Can be used at any time the set is not in operation.
- 7) Cannot charge accumulator above the specified rate.

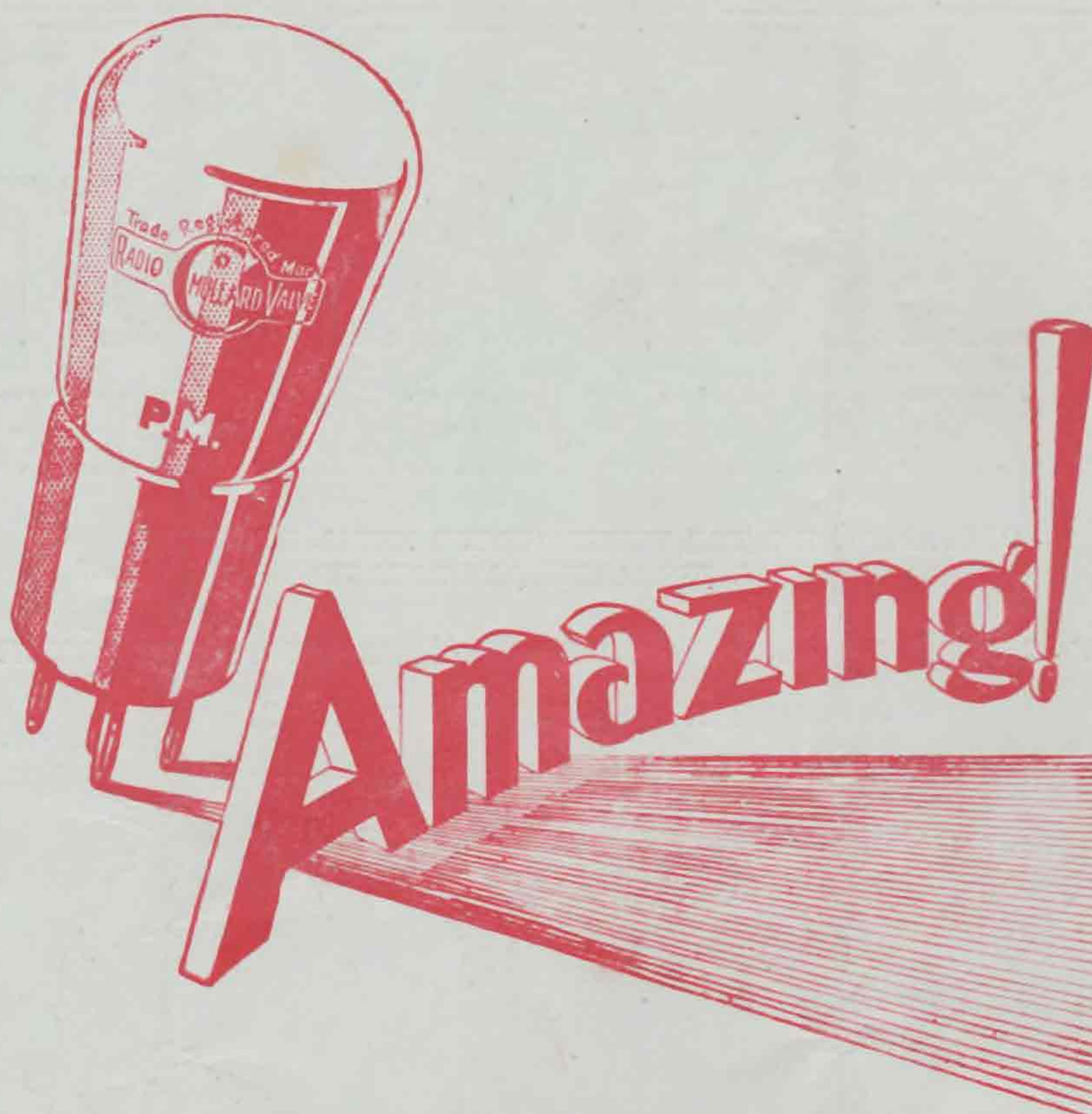
When ordering Radio Transformers—Specify FERRANTI.

FERRANTI LTD.

HOLLINWOOD.

LANCASHIRE.

BULLETIN ADVERTISERS ARE YOUR HELPERS.



THE difference Mullard P.M. Radio Valves make to wireless reception and the popularity they have achieved is amazing.

You will use Mullard P.M. Radio Valves eventually—so why not now?

Your nearest radio dealer stocks a complete range of them, each with the same tough, lasting, wonderful Mullard M.P. Filament.

Mullard P.M. Radio Valves are British made and carry the Mullard label of assurance.

When buying radio buy Mullard

Mullard
THE · MASTER · VALVE

Arks

Mullard Wireless Service Co., Ltd., Mullard House, Denmark Street, London, W.C.2.