

R.S.G.B.



BULLETIN

October 1951

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Incorporated Radio Society of Great Britain

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SHOWING THE BADGE

THIS Festival Year has provided the Radio Amateurs of Great Britain, and in particular members of the R.S.G.B., with many opportunities of bringing their hobby to the notice of the general public.

It would be unfair to single out any group for special recognition, but we should be lacking in courtesy if we failed to place on record the thanks of the Society to the Festival of Britain authorities in London for permitting an Amateur Radio station to be operated from the Land Travelling Exhibition. In spite of site difficulties—of which interference from local electrical machinery produced the biggest headache—the Exhibition station put up a fine performance at Manchester, Leeds, Birmingham and Nottingham—a tribute to the resourcefulness of those who were in charge of the arrangements. Large numbers of visitors to the Exhibition saw the station in operation and were enabled by means of monitor loudspeakers to listen to both sides of local and DX contacts. The excellent co-operation given by local members to those in charge of the Exhibition station permitted extensive operating schedules to be drawn up and maintained. Evidence from all four centres showed that the station was one of the most popular features of the Exhibition.

Of equal importance as a means of bringing Amateur Radio to the notice of the general public have been the many special Festival of Britain Exhibitions and Displays put on by local R.S.G.B. Groups and Affiliated Societies. Those who had the good fortune to visit any Exhibition where an amateur station was in operation will need no reminding of the great benefit which accrued to the movement locally as a result of these public demonstrations of our hobby. Of importance too have been the chances given to local groups to show ingenuity and resourcefulness in the preparation and completion of their plans. The high standard of workmanship displayed at these local exhibitions brought well merited praise from those best qualified to judge.

Throughout the summer the BULLETIN has attempted—perhaps inadequately on occasions—to record for posterity the part played by radio amateurs during this Festival Year. It is a record of which the Society can indeed be proud.

R.S.G.B. BULLETIN, OCTOBER, 1951.

Because of Festival activities the coming autumn and winter should witness a great upsurging of interest amongst R.S.G.B. Groups and Affiliated Societies throughout the land. The events of the past spring and summer will no doubt be reviewed and plans made for the year which lies ahead. In all these deliberations, Town and Area representatives would do well to remember that the hobby of Amateur Radio depends very largely for its future success upon the exchange of technical information. So often in recent months has this aspect been sadly neglected in some parts of the country.

The preparation of a comprehensive autumn-winter programme is no easy task, especially in the case of groups and clubs which are somewhat isolated from their nearest neighbours, but in London and other densely populated areas it should be possible to draw up a panel of speakers who are prepared to lecture to groups or clubs in their vicinity. The BULLETIN will gladly give publicity to all who offer their services in this connection.

The forthcoming R.S.G.B. Amateur Radio Exhibition will break from tradition inasmuch that a special section will be devoted to the display of home constructed equipment. That this section will arouse wide interest is a foregone conclusion. Maybe, the London example will provide food for thought at local group and club meetings when future programmes are under discussion. Already many clubs stage an annual Exhibition of home constructed equipment for which valuable prizes and trophies are awarded. The idea is worthy of wide extension especially in those towns where the display can be linked up with a Hobbies or an Arts and Crafts exhibition open to the public. Incidentally the value of these Exhibitions to the newer generation of amateurs is inestimable. By such means they will learn at first-hand how a job should be designed, planned and constructed.

J.C.

NEW LICENCE FACILITIES

London Gazette notices have now been published authorising U.K. amateurs to use Frequency Modulation in the 2 metre band and Pulse Modulation in the centimetre bands. Further details will be published next month.

HIGH-EFFICIENCY GRID MODULATION

Part 1 - The Taylor System

By L. A. MOXON, B.Sc., A.M.I.E.E. (G6XN)*

Much publicity has been given recently to the Taylor and Terman-Woodyard systems of high-efficiency grid modulation. In this important article, the author critically examines these new techniques, and after considering the claims made for "Super-modulation," concludes that the Terman-Woodyard circuit is deserving of more attention than it has hitherto received, since it is simple to adjust, in spite of deceptive appearances, and has a number of advantages over the Taylor system.

LOW efficiency is an inherent feature of ordinary grid modulation, and to some readers the title of this article may suggest something as improbable as the philosopher's stone, or perpetual motion. A combination of the cheapness and simplicity of grid modulation with the efficiency of anode modulation must have been the dream of many amateurs, yet not many have heard of the high-efficiency grid modulation system described by Terman and Woodyard as long ago as 1938. The objection to this system, hitherto, has been the use of delay lines, which give it an appearance of undue complexity; on the other hand, wide-spread interest is being aroused by the Taylor "Super-modulation" circuit, first described in 1946, which, to outward appearances, is much better suited to amateur requirements.

Fundamental Principle

The two systems share a common principle—namely, the use of a quiescent valve to supply extra power during the positive half-cycle, and at the same time to alter the load impedance "seen" by the P.A. in such a way that the overall efficiency is high except during the negative half-cycle, for which ordinary grid modulation is used. There is one important difference, however, between the systems—at the modulation peak in the Taylor circuit, the quiescent valve has to supply *all* the power, whereas in the Terman-Woodyard system, impedance-inverting networks are used to bring about an

equal sharing of the load between the two valves.

After much experiment, it has been concluded that the Terman-Woodyard circuit is not only practicable, but is in no way inferior to the Taylor circuit, and even has some important advantages. This is believed to be due, in part, to the new angle of approach. Others may continue to prefer the Taylor circuit, for there is no doubt that both systems have useful and interesting features.

What is "Super-Modulation"?

The term "Super-modulation" seems to refer to the practice (of doubtful value, though usually claimed as a virtue of the Taylor system) of allowing the upward modulation to exceed the downward modulation, but it has been used by certain writers to describe high-efficiency grid modulation systems in general. This is strongly deprecated by the author, since *any* system of modulation can be used in this manner, whereas the Terman-Woodyard circuit was evolved as a method of obtaining *ordinary* modulation; the Taylor circuit can be used in the same way.

In terms of total H.T. consumption, high-efficiency grid modulation is the least wasteful method of achieving ordinary amplitude modulation, further it has the advantage that the modulation transformer—a heavy and expensive item in anode modulation circuits—can be dispensed with. Other claims often made for the Taylor circuit include a reduction of the frequency spectrum occupied by the transmission, an increase

* Oaktree Cottage, Chase Lane, Haslemere, Surrey.

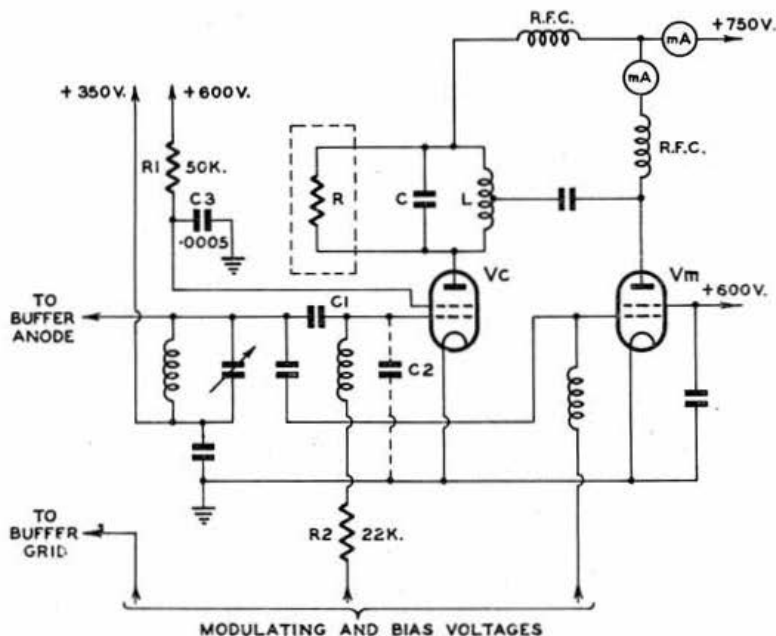


Fig. 1

Modified Taylor Circuit.

V_c is a normal P.A. and V_m the modulator or "peak" valve; C_2 is the valve capacity which, in conjunction with C_1 , forms a R.F. potential divider; R is the loading (normally produced by the aerial) on the output circuit (LC); L is centre-tapped, or alternatively a capacitive tap may be used; voltages and other values shown are as used experimentally with pairs of 807 valves for both V_c and V_m . Other component values are R_1 —50,000 ohms, R_2 —22,000 ohms, and C_3 —0.0005 μF .

of "useful audio," and avoidance of the need for speech clipping. It seemed to the author that there were possible explanations but no conceivable justification, for those further claims, and experience has added weight to this opinion, which is in line with very similar conclusions put forward by O. G. Villard Jr., W6QYT, in *QST* (Dec. 1950).

The Taylor System

This system (illustrated in Fig. 1) comprises a normal P.A. valve V_c supplying a carrier power P to a load R . A second valve V_m is excited in phase with the P.A. and supplies R.F. power to the load R during the positive half of the modulation cycle. The modulating, bias, and excitation voltages are so arranged that at the zero point of the audio cycle (*i.e.* carrier level) V_m is quiescent and does not affect the operation of the P.A., whereas at the positive peak of the modulation it is capable of supplying the whole of the required power, which for "normal" amplitude modulation is, of course, four times the carrier power. The actual delivery of this power to the load is ensured in the circuit of Fig. 1 by tapping V_m half-way down the anode circuit of V_c , so that it "sees" a load impedance of $R/4$. Alternatively, V_m could be run from twice the anode voltage applied to V_c , in which case no tap would be needed. It is assumed that V_c (at carrier level) and V_m (at the modulation peak) are both adjusted to operate at full Class "C" efficiency, so that their anode voltages swing down almost to zero at the negative peak of each R.F. cycle. Because of the 2:1 voltage step-up from the anode of V_m to the anode of V_c , the latter is driven negative for part of each R.F. cycle, during most of the positive half of the modulation cycle. Since these periods of negative anode voltage coincide with the positive swings of the grid excitation, the anode (but not the screen) current of V_c will be cut-off completely for part of the modulation cycle, and at the modulation peak V_c probably makes no contribution at all to the output power. The anode current waveforms of V_c and V_m are shown in Fig. 2b.

There are thus two points on the modulation cycle—the carrier level and the upward peak—where conditions can be adjusted independently for full efficiency. It is a little difficult to predict what

happens intermediately, but there will certainly be some "load sharing" between V_c and V_m which will tend to keep the efficiency from falling off unduly, and it might be expected that this would lead to a reasonably linear characteristic. The negative half-cycle is obtained by ordinary efficiency modulation of V_c , but this does not detract much from the overall performance, because the efficiency is only low while the input power is also low.

Most of this explanation had to be evolved with very little assistance from published articles on the subject, although it is virtually identical with that given in the article by Villard, to which reference may be made if a more detailed exposition, complete with all the theoretical waveform diagrams, is desired. Although this theory seems to be sound enough so far as it goes, it has a serious weakness in the failure to predict what happens at small positive values of audio swing. Although many variations were tried it was never found possible to adjust the circuit for the highest possible

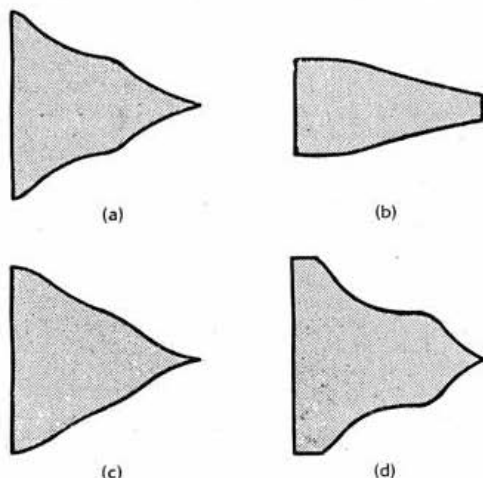


Fig. 3
Oscilloscope Trapezium Patterns—Taylor Circuit.

(a) Usual pattern when P.A. was adjusted for high efficiency. (b) Distorted modulation of buffer amplifier, used to compensate distortion of (a). (c) Combination of (a) and (b). (d) Typical pattern illustrating several of the more common defects.

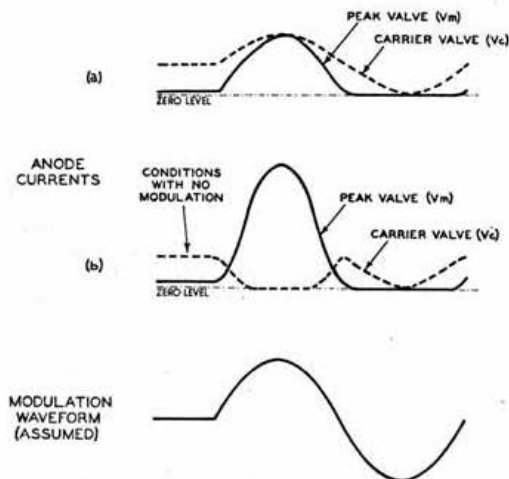


Fig. 2

Anode Current Waveforms at Full Modulation.

(a) Terman-Woodyard circuit; (b) Taylor circuit (both drawn to same scale). The same H.T. voltage is applied to V_c and V_m .

efficiency and still obtain a usable modulation characteristic. The trapezium pattern which usually resulted from this procedure is shown in Fig 3a. In practice it was only possible to straighten out the sides by increasing the bias or reducing the excitation on V_c , or alternatively by increasing the coupling to the load sufficiently to permit some degree of upward modulation of V_c at the price of a reduction in efficiency at carrier level. The explanation probably lies in the fact that it is only necessary for V_m to supply power slightly greater than the carrier power for V_c to be nearly cut-off—in other words, the positive half of the modulation cycle may be well advanced before there is an appreciable increase of R.F. power. Others may have been more successful, but unfortunately there seem to be no published records of oscillograph observations combined with R.F. power measurements, and it is, perhaps significant, that "tighter-than-normal" aerial coupling is usually recommended. It is possible, however, to bring about an appreciable improvement by the deliberate introduction of distortion of the opposite kind to that visible in Fig 3a—a point that will be explained in greater detail later in this article.

An important consequence of the negative anode voltage is the rise in the screen current of the carrier valve, so that (as pointed out by Villard—but usually overlooked) the screen dissipation will be excessive unless a dropping resistance is used. The time-constant of this resistance and the screen by-pass condenser must be small enough to allow the screen to follow the modulation—as in normal anode modulation. Another point is that the large current of the peak valve is best achieved by using a high screen voltage, as this avoids the need for driving the control grid positive; with more than a small amount of grid current there are bad effects due to poor regulation both of the exciting voltage and of the bias voltages, unless battery bias or special voltage stabilisation circuits are used, and plenty of “reserve” driving power is provided.

Because of the abnormal conditions existing in the peak valve, the usual valve ratings may not be applicable. With a dual voltage circuit, the voltage and peak current correspond to the peak voltage and peak current of the equivalent anode-modulated amplifier, but the *average* dissipation (assuming typical speech modulation) is probably rather less; in other words, an 807 valve could, in principle, be operated with at least 60 watts input at 600 volts, modulated by another 807 having 1,200 volts on the anode—but if a compromise has to be made between linearity and efficiency, the permissible ratings are reduced accordingly. It may perhaps be unwise to assume that a valve will withstand the continuous application of its peak voltage rating; also the continuous application of full modulation would increase the dissipation in V_m to about 60 per cent. above the zero modulation value for V_c . With single-voltage operation, the peak current in V_m is at least twice the normal maximum for the same valve used as an anode-modulated P.A. giving equal carrier power, and this *may* damage the cathode, even if the rated dissipation is not exceeded. Such risks may, however, be justifiable. As a matter of interest there have been no failures of any of the 807 valves used in the experiments to be described.

“Super-modulation”

So far only normal modulation has been considered, and it is interesting to see what happens if, as in “Super-modulation” the positive swing is allowed to exceed twice the carrier amplitude. In some instances, gains of 10 db. or more in useful audio power have been claimed. It should be noted that, in order to obtain a 10 db. gain, the amplitude swing of the modulation envelope must be increased by $\sqrt{10}$ or, in other words, the peak power and therefore the peak anode current must be increased by 10. If we start with an 807 running at an input of 50 watts (500 volts, 100 mA.) using anode modulation, then the current rises to 200 mA. at modulation peaks. In a single-voltage Taylor circuit, the peak valve would have to pass 400 mA. in order to modulate this carrier normally, and to obtain the supposed gain in useful audio power, the anode current would have to rise to 4 amperes! This is only the current averaged over the R.F. cycle, and the peak current will be even greater. Fortunately, long before the authorities start asking awkward questions, the 807 will probably have vanished in a wisp of smoke!

An alternative method would be to maintain the modulation peak at the maximum permissible value, the carrier level being reduced instead. This would not increase the “useful audio,” but on a receiver fitted with good A.G.C. it would make a strong signal sound even louder, due to a reduction in the effectiveness of the A.G.C. It would also produce severe distortion since the modulation

envelope would consist mainly of harmonics—mostly even, though the resulting speech might be intelligible and not too unpleasant—except to stations endeavouring to operate on adjacent channels! Possibly a marked increase in “apparent” audio may be obtained without serious distortion or spread, but for a given peak power the intelligibility will suffer under conditions of high noise level or interference.

“Super-modulation” can be regarded as a sort of controlled carrier action, with the advantage of instantaneous response to set-off against the increased distortion and spread. It is necessary to be very cautious in assessing the merits of all such systems on the basis of reception reports, because in addition to the A.G.C. effect mentioned above, there are important features of the detection process in the receiver which, though not always fully appreciated, must be taken into account. The function of the carrier wave is not merely to carry the modulation, but also to provide discrimination against unwanted signals and noise. In the case of the more-or-less linear detector, this comes about through the effect known as *modulation suppression*. The detector, whatever its nominal “law,” is always square-law in terms of the ratio of signal to interference—including some, but not all, of the noise background. Thus, doubling the signal input improves the ratio of wanted-to-unwanted signal strength at the output of the receiver by a factor of 4. This action is obvious enough in the case of a square-law detector, but rather more difficult to appreciate in the linear case. The usual explanations are lengthy and mathematical, but the effect arises because the weaker signal is in random phase relationship with the stronger; it can therefore not only add to, but also subtract from, or make no difference to, the output. In the presence of a stronger carrier, the weaker signal could only continue to be received at full strength provided it was of the same frequency and exactly in or out of phase with the other, otherwise its modulation envelope would become distorted and the general audio level reduced.

In practice this means that if we have a signal with no interference, a linear detector, and no A.G.C., then a drop of 2:1 in *either* signal amplitude or modulation percentage will cause a corresponding decrease of 6 db. in the receiver output. While modulation percentage is less than 100, the audio output of the receiver will depend only on the sideband power, and not on carrier level. If, on the other hand, the carrier is kept constant by the use of A.G.C., then the output will be proportional to the *percentage* of sideband power, regardless of the actual power received. If an interfering signal is present, the signal-to-background ratio will drop by about 12 db. when the wanted carrier is reduced by 6 db. at constant modulation percentage, but only 6 db. if the modulation percentage is halved. The stronger carrier is obviously going to be much better for “getting through QRM,” although if the receiver has A.G.C., the more heavily modulated signal (if received alone) would sound the louder, while with no A.G.C. both would sound equally loud. On the other hand, given a square-law detector with no A.G.C., the receiver output will drop by 12 db. if the carrier drops by 6 db., but will drop by only 6 db. if the modulation percentage is halved, whereas the interference is unaffected by changes in the level of the wanted signal. Therefore, from the point of view of effective selectivity, it does not matter very much which kind of detector is used in the receiver, although it will affect the aural reporting of signal strength.

It is consequently important that results should not be judged by loudness alone. Carrier power should be as high as possible for the most effective signal, regardless of whether or not there is sufficient audio available to modulate it fully. If, for example, there is only just enough audio power to provide full modulation for a carrier of 100 watts, then an increase in carrier level to 150 watts will frequently make the signal sound weaker—but it will nevertheless be easier to copy through the modulation of unwanted signals. Such a signal will be roughly comparable in effectiveness to a fully modulated 125-watt carrier, and will cause slightly less sideband, but more heterodyne, interference. Reversing this process, "Super-modulation" would be expected, as claimed, to reduce heterodyne whistles, but for a given signal-effectiveness (ignoring the generation of extra harmonics) the production of more sideband interference would be expected. Heterodyne whistles, though unpleasant, have in general the least serious effect on intelligibility, and can (in principle) always be removed without serious loss of essential frequencies by suitable filtering. The modulation-suppression effect in linear detectors is not operative against interference (such as heterodyne whistles and the more serious kind of "splash") which involve the carrier of the wanted station. Noise, due to the beating together of the various noise components, is suppressed, but that due to the beats with the wanted carrier (usually the more important effect) is not influenced.

The claim of narrower-than-normal bandwidth often made for the Taylor circuit have not been substantiated by anything in the experience of the author or of anyone with whom he has been able to discuss the matter. If anything the reverse has tended to be the case, as might be expected from the previous reasoning. Villard states that this claim is not included among those in the Taylor patent, and suggests that it may have arisen from comparisons with conventional rigs that have been less carefully tuned-up. Nor is "Super-modulation" any substitute for speech-clipping and filtering (at least on the negative peak), although harmonic generation in the modulation process may perhaps render the filter ineffective.

(To be continued)

In the second part of this article, which will appear next month, the author will analyse the Terman-Woodward circuit, and will make a final comparison between the two systems of high-efficiency grid modulation, indicating the trend of development for future experiments.

Bevan Swift Premium

THE Council have decided that a Bevan Swift Premium of £5 5s. (cash or medal) shall be awarded annually to the Corporate Member of the Society whose contribution to the preceding volume of the R.S.G.B. BULLETIN is considered by the Technical Committee to be the most meritorious.

The effect of this decision is to rescind the earlier resolution passed in November, 1950, and reported on page 265 of the January, 1951 issue of the BULLETIN. The Council have been advised by the Technical Committee that it would be extremely difficult to implement the terms of the earlier resolution.

LONDON MEETINGS, 1951/52

All meetings are held at the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London, W.C.2. Buffet Tea from 5.30 p.m. Meetings commence at 6.30 p.m.

Friday, October 26, 1951: J. R. Erskine, B.R.S.12381 and R. Grubb, G3FNL.

"PROBLEMS IN AMATEUR TELEVISION TRANSMITTER MODULATOR DESIGN."

Friday, November 23, 1951: D. N. Corfield, D.L.C. (Hons.), A.M.I.E.E.

"TECHNICAL ASPECTS OF THE AMATEUR SOUND AND VISION LICENCES."

Tuesday, December 18, 1951: Annual General Meeting.

Friday, January 25, 1952: Standard Telephones and Cables, Ltd.

"OVERTONE MODE CRYSTALS."

Friday, February 29, 1952: Mullard, Ltd.

"MODERN VALVES FOR V.H.F. WORK."

Friday, March 28, 1952:

Subject to be announced.

Norman Keith Adams Prize

THE Council has awarded the Norman Keith Adams Prize for the year 1951 to Mr. R. H. Hammans, G2IG, for his contribution "A Switched Wide-Band Exciter" published in the January and February, 1951 issues of the R.S.G.B. BULLETIN.

Mr. Hammans is Vice-Chairman of the Technical Committee, a Past Member of the Council and an outstanding contributor to the BULLETIN.

NOMINATIONS FOR COUNCIL 1952

In accordance with the Articles of Association the following Corporate Members have been nominated by the retiring Council to serve on the 1952 Council:

OFFICERS.

President: Mr. F. J. H. Charman, B.E.M., G6CJ.

Acting Vice-President: Mr. L. Cooper, G5LC.

Hon. Treasurer: Mr. A. P. G. Amos, G3AGM.

Hon. Secretary: Mr. A. O. Milne, G2MI.

Hon. Editor: Mr. W. H. Allen, M.B.E., G2UJ.

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*Mr. H. A. Bartlett, G5QA.

Mr. C. H. L. Edwards, A.M.I.E.E., G8TL.

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*Mr. H. McConnell, GM2ACQ.

*Mr. S. E. Vanstone, G2AYC.

*Mr. G. Webster, G5GK.

Mr. P. W. Winsford, G4DC.

*New Nominations as per Article 43.

Not later than October 31 next, any ten Corporate Members (but not more than ten) may nominate any other duly qualified Member, by delivering their nomination in writing to the Secretary, Inc. Radio Society of Great Britain, New Ruskin House, Little Russell Street, London, W.C.1, together with the written consent of such Member to accept office if elected, but each such nominator shall be debarred from nominating any other Member for this election.

A SIMPLE 144 Mc/s. EXCITER

By J. HUNTER (GM6ZV)*

The apparatus described in this article should interest those who are about to embark upon V.H.F. transmission for the first time, as well as those who require a simple exciter unit for experimental work. Sufficient output may be obtained to drive a conventional double-tetrode P.A. to an efficient 25 watts or more.

THIS exciter was originally built to provide a unit for general experimental work on the 144 Mc/s. band. The first consideration was to develop a circuit which would give the required results, using only components which were already on hand.

Since an output of 4 to 5 watts was desired it was decided that an 832 twin-tetrode was the most suitable valve to provide this level of power. To make the best use of the balanced circuit thus rendered possible, a push-pull tripler stage was indicated. The only remaining problem was that of furnishing the necessary 48 Mc/s. input to the tripler from the 8 Mc/s. crystal which was available. The arrangement finally adopted consisted of a tripler oscillator with the anode circuit tuned to 24 Mc/s. (this had previously been found effective), followed by a straightforward doubler stage to provide the required 48 Mc/s. output. 6V6GT valves were used, as these were available, but other types, such as the Mullard QV04-7 or EL91 would be equally or more efficient.

Construction

In order to allow ample space for experimental purposes, an aluminium chassis 10 x 8 x 2½ in. was employed, the valves being mounted in a row,

* 20 Mansfield Crescent, Clarkston, Glasgow.

2½ in. from the front edge of the chassis, with their associated variable condensers directly in front. The latter are small trimmer-type capacitors with extended spindles and two-hole mounting, to avoid the necessity for insulating the rotors, which are at H.T. potential. Clearance holes must be made for the spindles.

The valve holder and mountings for the 832, as also the R.F. choke and tank coil, were salvaged from the output stage of an SCR522 transmitter.

The layout of the main components under the chassis is illustrated in Fig. 3. The 832 grid coil is mounted directly on to the grid tags of the valve holder, thus eliminating unnecessary leads. The 1.5 µF. Philips trimmer is mounted as close as possible, its insulated fixing plate being supported from the end of the chassis on lengths of screwed rod. Access for adjustment of the trimmer is provided by a hole in the side of the chassis.

The output tuning condenser is mounted on a bracket 1½ in. high, which enables short leads to be wired to the anode pins of the 832. A stand-off insulator acts as feed-through and mounting for the R.F. choke. Two 1½ in. pillar insulators provide a termination for the output link coupling coil, and may also be used as terminals when it is desired to use open line, or 300 or 72 ohm

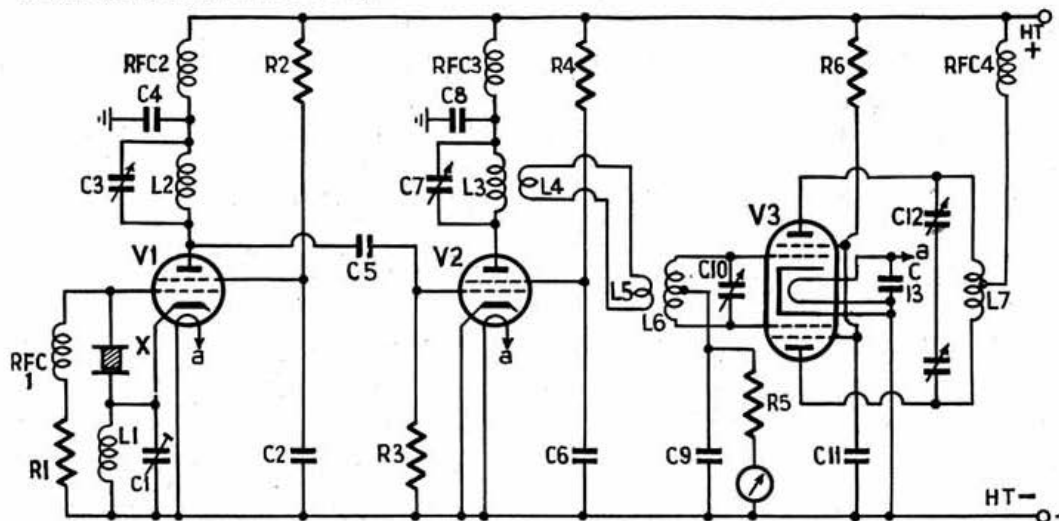


Fig. 1.

Circuit diagram of the 144 Mc/s. exciter, described in the text.

Resistors	
R1	100,000 ohms, ½-watt.
R2	15,000 ohms, 1-watt
R3, 5	100,000 ohms, 1-watt.
R4	22,000 ohms, 2-watt.
R6	25,000 ohms, 10-watt.

Condensers	
C1	60 µF. trimmer.
C2, 4	0.005 µF. mica.
C3, 7	60 µF. variable.
C5	100 µF. ceramic.
C6, 8, 9, 13	500 µF. mica.

C10	1-5 µF. Philips
C11	300 µF. ceramic.
C12	15-15 µF. split stator.

Inductances	
L1	15 turns No. 20 S.W.G. enamelled, close wound on ¾" diameter former.
L2	10 turns No. 18 S.W.G. tinned ¾" long, on ¾" diameter former.
L3	7 turns No. 16 S.W.G. enamelled, ¾" long, ½" diameter.

L4, 5	2-turn link.
L6	19 turns No. 20 S.W.G. tinned, 1½" long, ½" diameter.
L7	2 turns plus 2 turns, No. 14 S.W.G. ¾" diameter, spaced ¾" between.
R.F.C. 1, 2	Eddystone No. 1010.
R.F.C. 3	Eddystone No. 1011.
R.F.C. 4	Ohmite Z-O.

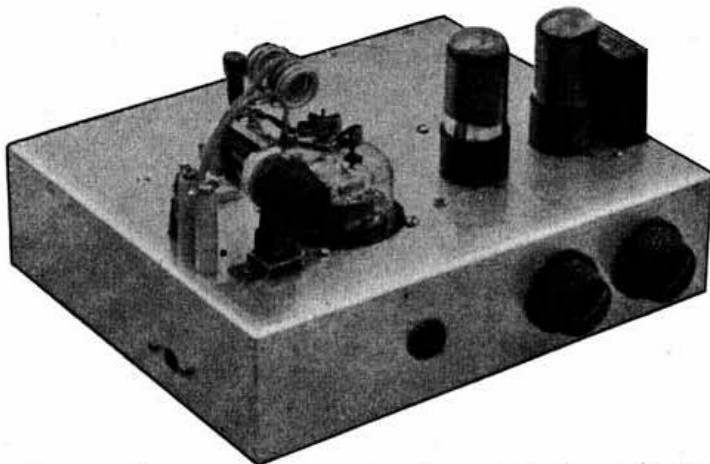
Valves	
V1, 2	6V6GT (and see text).
V3	832.

ribbon feeder. A Pye socket on the rear edge of the chassis provides alternative coaxial output.

Although the layout may appear to be a little congested, construction is easy, provided the less accessible parts are wired-up first. To prevent damage to the 832 grid coil during mounting, and to make it easier to handle, it will be found helpful to insert a short length of the former on which it was wound. While this is in place, the link coil can be positioned round the centre. After soldering has been completed, the former should, of course, be removed.

Fig. 2.

Front view of the 144 Mc/s. exciter chassis. The hole beneath the two pillar insulators is for the adjustment of C10. From left to right the controls on the front of the chassis are—meter-jack, C7 and C3.



The apparent waste of space at the rear of the chassis is intentional. Normally, the unit will be run from a power pack delivering a higher voltage than is necessary for V1 and V2, and suitable dropping resistors can be accommodated in the space between the tagboard and the connector socket. Resistance values will obviously depend on the actual voltages available.

Operation

A 6.3 V. source should be connected to the heater circuit, while, initially, the H.T. should be reduced to about 200 volts, none being applied to the 832 stage. A low-range milliammeter inserted in the jack in the tripler grid circuit is the best

indication that the unit is working properly. For the first rough tune-up, an R.F. test-loop (of about 1½ in. diameter) with a 60 mA. bulb should be constructed.

The anode condenser of the tripler may now be swung until an indication of R.F. is shown by the test-loop when held close to the anode tank coil. Care is necessary in the adjustment of C1, because, if too much regeneration is introduced, crystal current and frequency drift may be excessive.

The next step is to hold the loop near to the doubler anode coil, and swing the appropriate

condenser until, again, an indication of R.F. is obtained. Attention can now be given to the tripler stage. If grid current is not already showing on the milliammeter, then the grid trimmer should be adjusted. If still no indication is obtained, the grid coil probably requires a little adjustment, either opening or closing the turns, as necessary. When grid current is indicated, the tuning of the tripler and frequency doubler should be adjusted until the maximum reading is obtained (about 1.6 mA. with 200 V. H.T. on the first two stages).

H.T. may now be applied to the tripler stage, the anode tuning condenser being quickly rotated until a dip in anode current is obtained. While this stage is untuned, and therefore unloaded, H.T. should only be applied for a very short time to avoid risk of damaging the 832.

The use of an absorption wavemeter covering the required ranges is strongly recommended in order to make quite sure that none of the stages has been tuned to an incorrect harmonic.

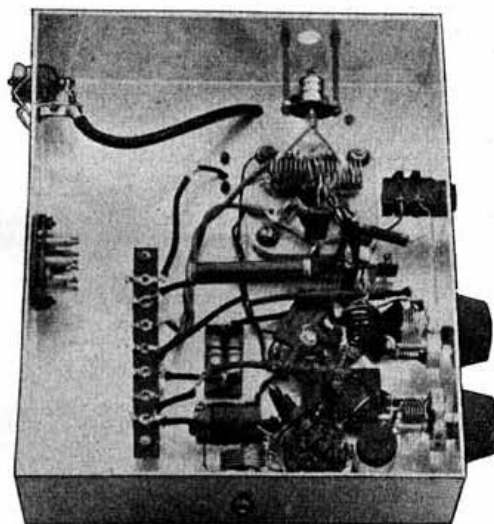
It is suggested that the H.T. to the first two stages be restricted to a maximum of 220 volts, which is sufficient to provide ample drive for the 832. If keying is required, it should be carried out in the screen circuit of the last valve, so that the 832 will not at any time be unbiased in the absence of grid current.

Valve Input Data

Valve	Anode Voltage (V.)	Anode Current (mA.)	Estimated Power Output (W.)
Crystal Oscillator	220	17 (anode & screen)	—
Frequency Doubler	220	24 (anode & screen)	—
Output 832	150	20	1
	200	27	1.25
	250	34	2
	300	50	3-4
	350	58	5

Fig. 3.

Under chassis view showing layout of components.



CLAPP v. COLPITTS

In the January issue of the "Bulletin," Mr. Alan G. Dunn, G3PL, described a V.F.O. unit for 7 Mc/s. operation, referring to the oscillator as a "modified Clapp circuit." Since then a great deal of correspondence has been received on the subject, some of which has already been published. This article is a symposium of subsequent opinion and argument on the topic of "Clapp versus Colpitts," and should appeal to members who welcome the open discussion of technical problems.

THE origin of the present controversy lies in the following extract from the article by G3PL referred to above: "A V.F.O. was required to operate on 7 Mc/s. without the need for a stabilised power supply. After poor results had been obtained from other circuits, a modified Clapp circuit was evolved. Usually, the heater and the cathode of the valve are at different R.F. potentials, which has always seemed a weak point. To avoid this difficulty the circuit was rearranged to permit of earthing the cathode (Fig. 1a).

"Tuning is accomplished by means of a variable condenser in parallel with one of the fixed 'tapping' capacitances. The screen of the valve acts as the anode of a triode oscillator, and the pentode anode is coupled to the grid of a cathode follower stage (not shown in diagram) which provides good isolation from succeeding stages."

Point and Counterpoint

Commenting on the above circuit in the April BULLETIN, Lt. D. Deacon, G3BCM, claimed that the G3PL oscillator was, in fact, a Colpitts—no more, no less (Fig. 1b). He outlined the essential differences between the Clapp and Colpitts oscillators, to which G3PL replied point-for-point in the May issue. Mr. S. F. Brown, A.M.I.E.E., G4LU, also joined in the debate, which took the following form.

(1). **G3BCM.**—In the Clapp oscillator R.F. voltages are developed between grid and earth, whereas in the Colpitts, high R.F. voltages are developed between anode and grid.

G3PL.—The Colpitts also develops R.F. voltages between grid and earth. However, under conditions of the same power input and efficiency, the R.F. voltage developed across the tuned circuit in a Clapp oscillator is considerably greater than in a pure Colpitts.

G4LU.—In both circuits, voltages are developed between grid and cathode, anode and grid, and anode and cathode.

(2). **G3BCM.**—In the Clapp circuit lower voltages are required, resulting in less strain on components. The Colpitts oscillator needs high voltages, so that best quality components have to be used.

G3PL.—See note in point (1) above.

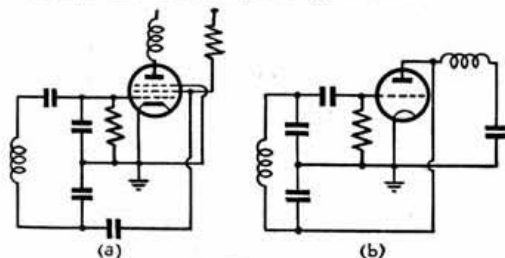


Fig. 1.

(a) The circuit described by G3PL as a modified Clapp oscillator. (b) The basic Colpitts circuit.

G4LU.—There is no reason why the two circuits, given the same valve and voltage supplies, should not operate with R.F. voltages of the same magnitude and therefore use similarly rated components.

(3). **G3BCM.**—The Clapp oscillator offers the advantage of low impedance output across cathode and earth, with small effect on the frequency-determining circuits. In the Colpitts, output from grid or anode results in external coupling to the frequency-determining circuit, affecting stability.

G3PL.—Taking the output from the cathode in the Clapp oscillator means that the output circuit

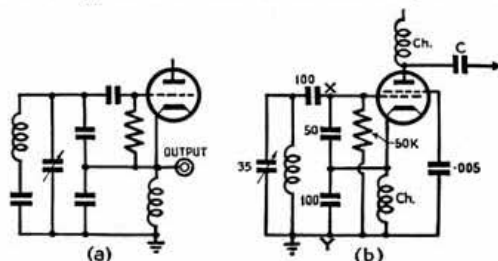


Fig. 2.

(a) The Clapp oscillator circuit. (b) The COMO (Crystal or Master Oscillator) circuit.

is connected across part of the tuned circuit, which is undesirable (Fig. 2a). In the case of the Colpitts, external coupling will only affect stability appreciably if a triode valve is used. See also point (4) below.

G4LU.—A "low" impedance output can be taken from the cathode of an earthed-anode Colpitts oscillator, as shown in Fig. 5b.

(4). **G3BCM.**—The Clapp oscillator provides high impedance output from the anode—well isolated from the tuned circuits.

G3PL.—This would apply equally well to the Colpitts circuit if a multi-electrode valve (pentode) were used.

G4LU.—In the case of the Clapp oscillator, this point is a little obscure, for if it is taken to its logical conclusion, then, when the anode of the valve is completely isolated from the tuned circuit, the oscillator will cease to function, since it is impossible to sustain oscillations by feedback from anode to grid circuit if only two electrodes of the valve are utilised. The circuit intended by G3BCM is surely as shown in Fig. 5b (1), with its anode by-passed to earth.

Comparisons

"The crucial difference between the two oscillators," wrote G3PL (May BULLETIN), "is that in the Colpitts the full R.F. voltage appearing across the tuned circuit is applied between grid and anode. But in the Clapp circuit, only a relatively small proportion of the voltage developed is so applied, because of the effect which the small series capacitor has in tapping the grid-anode circuit down the tuned circuit."

But G4LU states: "The only difference which exists between the Clapp and Colpitts oscillator is that the former employs a capacitance and an inductance in series for the inductive branch of the tuned circuit, whereas the latter employs a simple inductance. This difference is fundamental."

Mr. W. Lee, G6LZ, adds this comment: "The two main advantages of the Clapp oscillator over the Colpitts are the high stability of the series-tuned circuit (due to its high effective "Q"), and the isolation of this from large variations in shunt capacity. Another fact which does not seem to be generally realised is that the stability of the Clapp depends upon the mechanical construction of this series-tuned circuit, which should comprise good components having rigidity plus good temperature coefficients. The Colpitts or COMO cannot be put in the same category as the Clapp or Franklin."

The COMO (or Crystal or Master Oscillator) is shown in Fig. 2b, and was recommended by G3BCM as combining the virtues of both Clapp and Colpitts (April issue).

Mr. D. P. J. Meed, G3IDM, who has used a COMO circuit with considerable success, states: "I find the stability is excellent, and the band coverage is easy to obtain using ordinary surplus components. At present I use it on 1.7 Mc/s, but I see no reason why it should not be adapted for all bands on the fundamental." (Fig. 3a.)

Series or Parallel?

G3PL remarked in his letter in the May BULLETIN that the Clapp is often called a series-tuned circuit, which, he argued, is misleading, since it implies that oscillation takes place at the series resonant frequency of the coil and series capacitance. This is not the case. In an article entitled "Clapp or Colpitts?" published in June, 1949, G3PL pointed out that the series inductance and capacitance form a "crystal substitute" circuit, which is illustrated in Fig. 3b and 3c. Note that L and the self-capacitance of the coil, C_s , form the parallel oscillatory circuit, while C—the series isolating condenser—is of small value, comparable with that of C_s . The circuit will resonate at a frequency determined by L, with C_s and C and C_p in series, both paralleled across it.

A different viewpoint is presented by Mr. J. C. Young, G3ASA, who writes: "A distinctive feature of the Clapp circuit is the use of a series-resonant LC circuit, of high L/C ratio and "Q," as the frequency-determining element. This is loosely coupled to the valve by the series condensers C1 and C2 (Fig. 4a), which are chosen to have low reactance, so as to swamp valve capacity effects while having little influence on frequency. They mainly provide coupling and feedback. In the original Colpitts, on the other hand, a parallel-tuned circuit is used (Fig. 4b), the two series condensers forming its capacitance arm in addition to providing feedback. The component

values in G3PL's circuit seem to me to provide the above-mentioned features of the Clapp oscillator, and it therefore differs in this most significant respect from a Colpitts pure and simple."

The argument is further developed by Mr. T. G. Clark, BRS 6294, who states: "I view the Clapp circuit as merely an attempt to achieve the stability of a crystal using specific values of L and C. The electrical equivalent of a crystal is a series LCR circuit having a particularly high L/C ratio, which is the requirement for a high "Q" and therefore good stability. The appropriate formula is:

$$Q = \frac{1}{R} \sqrt{\frac{L}{C}}$$

and typical equivalent values are: $L = 3.3$ H., $C = 0.042 \mu\text{F}$, $R = 1,000$ ohms, at a frequency of 430 kc/s. This gives a "Q" of approximately 10,000. It is apparent that such high L/C ratios

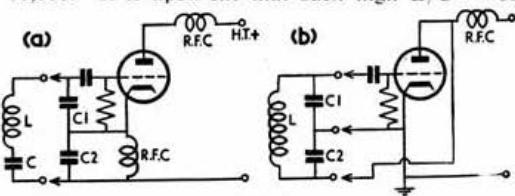


Fig. 4.

(a) Basic Clapp or Gouriet circuit, and (b) basic Colpitts, as analysed by G3ASA.

cannot be achieved by using ordinary components, due to the inevitably high shunt stray capacitance and series resistance of a suitably dimensioned coil.

"It is frequently a matter for speculation that a series LCR circuit should perform in a circuit known to require the parallel arrangement. The answer lies in the extension of the equivalent circuit to include stray capacitances. Neglecting the series capacitance of the crystal gap, which may be infinite, the equivalent circuit becomes as shown in Fig. 3b. Since C_p is greater than C, the resonant frequency is very nearly that of the series LCR circuit. Furthermore, the input impedance of the valve is effectively increased by the potentiometer ratio of the capacitances, and thus this cause of frequency instability is minimised.

"By splitting C_p into two parts, each of the value of $2C_p$, and connecting the centre point to valve cathode, and to earth via an R.F. choke, an inverted Colpitts circuit is produced. The similarity of this to a genuine Clapp becomes apparent if typical Clapp circuit values are considered."

Referring to the origin of the Clapp circuit, G3ASA comments: "It does not seem to be generally known that the Clapp was conceived and developed independently in this country by G. G. Gouriet about 1940, and is widely used by the B.B.C. in their transmitters (?). Perhaps, therefore, one should refer to the circuit as the Gouriet oscillator? The crystal version of the Gouriet is very similar to that of the COMO circuit shown in G3BCM's diagram." (Fig. 2b).

Stability

On the subject of stability, G4LU has this to say: "In both oscillators the best stability is achieved when the capacitances of the two condensers, C1 and C2 (Fig. 5a and 5b), are as large as possible, their maximum value being reached when C1 equals C2 and both are of such value that the valve is sufficiently coupled to the tuned circuit to supply its losses. Now in the Colpitts circuit, the values of the condensers C1 and C2 are determined not so much by consideration of

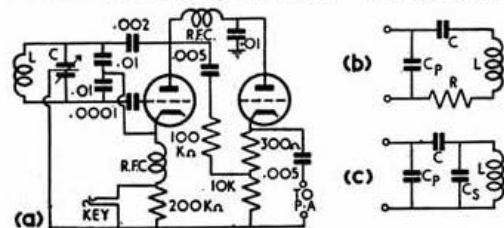


Fig. 3.

(a) 1.7 Mc/s. exciter incorporating COMO circuit (G3IDM). $L = 24$ turns on $1\frac{1}{2}$ " diameter former; $C = 0.0003 \mu\text{F}$, midget type cut down. (b) Equivalent circuit of quartz crystal. (c) Crystal substitute circuit.

the best stability, but rather by the value of the smallest inductance which can be used to tune a given frequency with C1 and C2 as the tuning capacitances. It will be found that if C1 and C2 are chosen for the best stability, the value of inductance required will be impracticably small. A comparison of values necessary for the same stability of a Colpitts and a Clapp type oscillator will be found in *Wireless Engineer*, April, 1950. The limitation on the value of the inductance is not found in the Clapp oscillator, the value depending on C3, and to an almost negligible extent on C1 and C2, which can now be chosen for best stability.

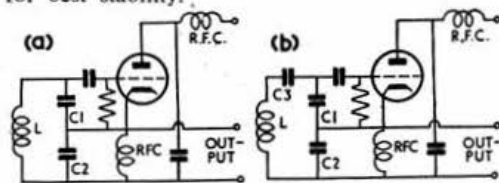


Fig. 5.
Earthed-anode versions of (a) Colpitts oscillator, and (b) Clapp circuit.

"The stability of an oscillator is also influenced by the phase changes produced by the inter-modulation of harmonic currents produced in the non-linear element of the maintaining circuit, and it can be shown that stability can be improved in this respect by using a high L/C ratio in the inductive branch of the tuned circuit, which criterion cannot be met in the Colpitts circuit.

"G3PL's circuit seems to meet these design requirements, and is therefore correctly designated as a Clapp oscillator, whereas G3BCM's COMO

circuit, using comparatively small values of capacitance for C1 and C2, would also seem to be described correctly as a modified Colpitts oscillator. It is probable that the values of C1 and C2, which are adequate when a crystal is the frequency-controlling element, could very well be increased in the M.O. application, with consequent improvement in frequency stability."

Finally, BRS 6294 adds this practical point: "The Clapp oscillator is similar to all other oscillators in that its overall stability is determined largely by the stability of its resonant circuit. In other words, L should be a first class component of extreme rigidity, while C should consist of two components, having opposing temperature coefficients. Finally, the whole frequency determining circuit should be mounted in a suitably lagged oven. There is no 'magic' about the Clapp any more than there is about the Franklin: both circuits must be designed with the fundamental theory in mind if good results are to be obtained."

And so—in the BULLETIN, if not elsewhere—the discussion ends for this month. In the meantime, members who have decided views on any of the points raised in this article are invited to write them down and send them to the Editor. Whenever the letters received on any subject of general interest threaten to swamp the correspondence columns of the BULLETIN, Technical Forum will endeavour to present an accurate cross-section of technical opinions expressed. *It all depends on you!*

(1) "QST," May, 1948—"High Stability Oscillator Circuit," by G. Grammar.

(2) "Wireless Engineer," April, 1950, page 105; and "Radio Engineering," by E. K. Sandeman, page 421.

Television Receiver Design

SOME months ago the Technical Committee of the Society drew the attention of the *British Radio Equipment Manufacturers' Association* to the number of complaints of interference arising on television receivers incorporating chassis produced by certain manufacturers. It was pointed out that these chassis incorporate an I.F. amplifier of which the pass-band included the 14 Mc/s. amateur band. The installation of such a receiver near to an amateur transmitter operating on frequencies in the 14 Mc/s. band results in more or less severe break through.

The Technical Committee inquired whether it is practicable for the manufacturers of such receivers to fit suitable I.F. rejector circuits to the input of any further receivers made and also whether such rejectors could be made available to the trade for attachment to existing receivers when this is essential.

The Association was asked to give an assurance that member concerns will not, in future, design receivers having I.F. amplifiers which include international amateur frequencies assigned at Cairo or Atlantic City.

As the reply received from the Association was not entirely satisfactory, the Technical Committee is pursuing the matter further.

Kite Aerial Tests

COINCIDING with Low Power Field Day on September 9th, G2NJ assisted by G3HJY, carried out a number of tests with kite aerials near Longhorpe, Peterborough. Various lengths of wire were used on 3.5 and 1.7 Mc/s., the results being carefully noted. Best results were obtained during the last hour when the wind freshened, and many good reports were received.

Prior to the war, G2NJ conducted similar experiments with box-kites on 1.7 Mc/s. near Hunstanton, and tests were resumed this year with smaller types of kites. Altogether much valuable experience and data were gathered from the tests, which will be continued in the near future.

AN ABSORPTION WAVEMETER (Contd. from Page 153)

drilled in the top of the cover, and is protected from shock by a rubber grommet.

For checking any apparatus which has a power output of a half-watt or more, the bulb will indicate resonance quite satisfactorily, but where the output is low, as in the local oscillator circuit of a receiver, a meter inserted in the grid-leak earth return will dip as the wavemeter is tuned through resonance. Alternatively, a milliammeter may be inserted in the anode circuit of the local oscillator valve, and this will give an increased reading as the wavemeter is tuned through resonance. The above method can also be used to check low power R.F. amplifier or multiplier circuits.

Coil Data.

Range Mc/s.	Tuning Coil Turns	Coupling Coil Turns	Wire Gauge S.W.G.
"A" 1.5-4	80	6	32
"B" 4-12	29	3	27
"C" 12-30	6½	2½	22

(Enamelled copper wire is used for all coils.)

AN ABSORPTION WAVEMETER for the Low Frequency Bands

By F. K. RAWSON (G3CWI)*

THE absorption wavemeter to be described is of the simplest type, its small size and direct calibration making it a most useful instrument to have in the shack. It covers all bands from 1.5 to 30 Mc/s.

It will be seen from the circuit (Fig. 1) that the wavemeter frame is connected to one side of the tuning coil, coupling coil, and tuning condenser. An ordinary 6 V. 0.3 A. bulb is used to indicate resonance. A smaller bulb would provide a more accurate indication, but the larger type is more robust and will withstand greater overloads, while showing a sufficiently sharp resonance point for all practical purposes.

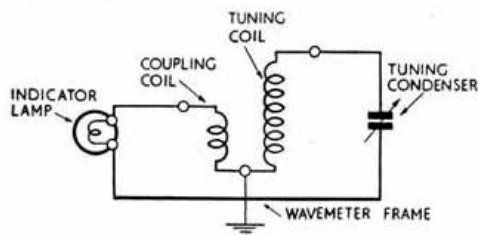


Fig. 1.

Circuit diagram of the absorption wavemeter described in text.

Construction

There are three ranges, calibrated as follows: range "A"—1.5 to 4 Mc/s.; range "B"—4 to 12 Mc/s.; range "C"—12 to 30 Mc/s. Fig. 2 and 3 illustrate the method of construction. The tuning condenser is mounted directly on the front panel, while the tuning coil holder (an international octal valve socket) is off-mounted from the front panel by the use of two tapped aluminium distance pieces. Two stiff lengths of copper wire attached to the coil socket support the bulb holder. This is better than a more rigid method of mounting, because the location of the bulb with reference to the metal condenser cover can be easily adjusted. The condenser cover is cut from No. 20 S.W.G. tin plate, bent and soldered as required.

The coil formers are made from international octal valve bases, turned down to force-fit into a bakelised paper tube $2\frac{1}{2}$ in. long by $1\frac{1}{4}$ in. in diameter (internal diameter $\frac{7}{8}$ in.). After fitting, the tube and socket should be cemented together.

The coils should be wound in accordance with the data given in the accompanying table.

Calibration

Calibration may be carried out with the aid of an oscillator, or a calibrated receiver. As most amateur stations have an accurately calibrated communications receiver, this method will be described.

With the receiver switched on and the aerial connected, a signal is tuned-in at the low frequency end of the band to be calibrated. A coupling coil, consisting of a few turns of sufficient diameter to slide over the wavemeter tuning coil, is connected to the aerial. The S-meter reading should be observed while the wavemeter is slowly

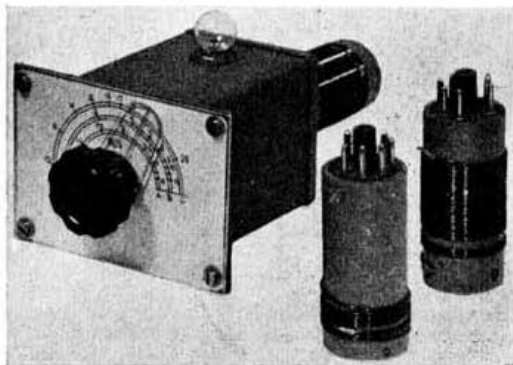


Fig. 2.

Front view of the wavemeter showing scale, cursor, resonance indicator lamp and spare coils.

tuned: at one point the reading will drop, indicating that signal frequency energy is being absorbed. This point can now be marked on the previously prepared dial of the wavemeter. The receiver is then tuned to the next signal higher in frequency, and the process is repeated until finally the whole dial is calibrated.

Some receivers are not fitted with an S-meter, in which case the B.F.O. should be switched on, an A.C. rectifier type voltmeter being connected to the 'phones terminals of the set. A signal is then tuned-in until the beat note provides a convenient reading on the voltmeter. As before, the wavemeter (coupled to the receiver aerial) should be tuned slowly until a dip occurs in the reading, indicating a calibration point.

When calibration has been completed, the dial may be removed and permanently marked with Indian ink, after which it should be replaced and covered with a protective sheet of $\frac{1}{16}$ in. perspex, held at the corners by 6 B.A. screws tapped into the front panel. Perspex of the same thickness is also used for the dial cursor—a central hair-line being engraved on it with a stylus.

The size of the front panel is $2\frac{1}{2} \times 3\frac{1}{2}$ in., and the condenser cover box is $2\frac{1}{2} \times 2\frac{1}{2} \times 3\frac{1}{2}$ in. The resonance indicator bulb is pushed through a hole

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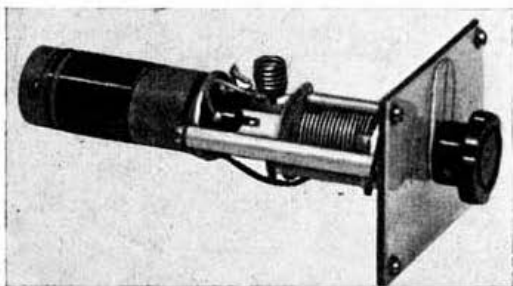


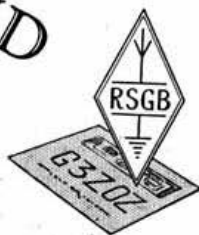
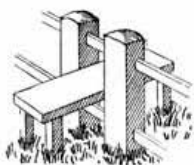
Fig. 3.

Wavemeter with cover removed, showing internal construction.

* 16 Mountcastle Road, Leicester.



THE HELPING HAND



TO AMATEUR RADIO

PART IV.—THE SUPERHETERODYNE RECEIVER

LAST month the operation and performance of "straight" receivers in simple applications was considered, but for modern communications work, the straight (or T.R.F.) set has been almost entirely replaced by the superheterodyne receiver, in which the incoming signal is mixed with a locally generated oscillation, resulting in the production of an intermediate frequency (I.F.), which is selected, amplified and passed to the detector stage.

By **B. W. F. MAINPRISE**
B.Sc. (Eng.), A.M.I.E.E. (G5MP)

The Superheterodyne Principle

A block schematic diagram of a typical superheterodyne receiver for communications work is shown in Fig. 1. Signals from the aerial are selected and amplified by one or more stages of radio-frequency (R.F.) amplification before passing to the mixer or frequency-changer valve. Here the output from a local oscillator is injected, producing in the anode circuit four frequencies: two being the original signal and oscillator frequencies, and the remaining two consisting of the sum and difference of these original frequencies. In practice the difference frequency (known as the intermediate frequency) is chosen for further amplification, and it is generally in the region of 450 to 470 kc/s. (though much higher and lower values are used in certain applications, and will be discussed later).

Two stages of I.F. amplification are normally used to ensure a high degree of selectivity, after which the signals reach the detector stage, where, after rectification, the R.F. component is filtered off and may be used to provide automatic volume control (A.V.C.), while the audio-frequency (A.F.) component is amplified and passed to the output valve, and thence to the loudspeaker or headphones. For the reception of unmodulated telegraphy (known as continuous wave—or C.W.), a beat-frequency oscillator is employed to inject a voltage into the I.F. section of the receiver,

providing an audible heterodyne note which the operator can adjust to a pleasing pitch.

Advantages

1. *High pre-detector gain.* As the I.F. is lower than the signal frequency, losses are reduced, stability is improved, and tuned circuits having pre-set tuning can be designed for optimum response. To obtain an equivalent gain at signal frequency, many more valve stages would be required, presenting serious design difficulties in order to avoid feedback and instability, and in order to secure accurate ganging of the various tuned circuits preceding the detector.

2. *High selectivity.* The use of a fixed I.F. permits six or eight tuned circuits to be used, each contributing materially to the overall sharpness of resonance of the receiver. The task of ganging such circuits in a straight receiver would be almost insuperable. Also the fixed I.F. permits a crystal filter to be employed.

3. *Variable selectivity.* A single panel control, varying the crystal action or regeneration in the I.F. amplifier, can provide such a degree of selectivity that even broadcast speech can be rendered unintelligible by removal of the upper register modulation frequencies; yet the selectivity can be instantly reduced when required. This facility, which enables faint signals to be received through heavy interference, is quite impossible in a straight receiver.

4. *Improved quality of audio-frequency reproduction* can be obtained, because the high pre-detector amplification permits a diode detector to be used, giving a more linear response than a leaky-grid or anode-bend circuit.

5. *Automatic Volume Control (A.V.C.)*—sometimes known as automatic gain control (A.G.C.)—is readily obtained, and is an aid to consistent reception of fading signals.

It is sometimes claimed as an advantage that the high selectivity of a superhet results in less background noise as compared with an equivalent straight receiver, but this effect is unfortunately masked by noise voltages generated by the local oscillator and the B.F.O., neither of which con-

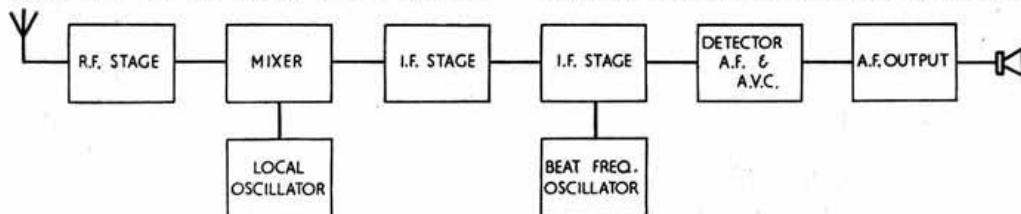


Fig. 1.

Block schematic diagram of a typical communications superheterodyne receiver.

tribute to actual amplification, so that in practice the superhet may be—for equal gain—noisier than its straight counterpart.

Disadvantages

1. *Radiation* from the local oscillator may interfere with nearby receivers, unless special precautions are taken, such as efficient screening and the inclusion of an R.F. stage between the aerial and the frequency changer.

2. *Tracking* of the oscillator tuned circuit (*i.e.*, keeping it at a fixed frequency difference from the signal circuits) involves the use of specially shaped vanes in the oscillator section of the ganged variable condenser, or the insertion of "padding" condensers of suitable value in series with this condenser section.

3. *Direct pick-up* of transmissions near to the intermediate frequency may occur. This type of interference may be identified by the fact that it cannot be "tuned out" by manipulation of the panel tuning controls.

4. *Harmonics* of the local oscillator may beat with unwanted signals to produce a heterodyne equal to the intermediate frequency, causing interference, and harmonics of the B.F.O. may appear as unmodulated carriers at certain points in the tuning range.

5. *Image signals* (to be discussed later) may make the higher frequency wavebands appear twice as crowded as they really are.

The factors governing the operation of each stage in a communications receiver may now be examined in outline.

The Radio Frequency Stage

It is not always realised that this stage has five separate functions in a short-wave receiver. It should, of course, be designed to provide as high a gain as possible. It also acts as a buffer—preventing voltage from the local oscillator reaching the aerial and being radiated. Conversely, it protects the local oscillator from variations in aerial loading, which might seriously affect the efficiency of the frequency-changer stage, due to oscillator damping. In addition it can be shown that the use of an R.F. stage improves signal-to-noise ratio, though this is more particularly applicable to U.H.F. receivers.

Finally, the R.F. stage reduces image interference—and this effect requires some detailed explanation. On frequencies above 12 Mc/s., a superheterodyne receiver will often be found to reproduce each signal at two points in the tuning range. The manner in which this phenomenon arises will be apparent from the following example.

Consider a receiver with an I.F. of 450 kc/s. tuned to a signal on 14,000 kc/s. The local oscillator will be 450 kc/s. above the signal frequency—*i.e.*, on 14,450 kc/s. Now as the receiver is tuned towards the lower end of the band, a point will be reached where the oscillator frequency is 13,550 kc/s. Because of damping and losses, the tuning of the frequency-changer grid circuit will be fairly flat, so that although now tuned to 13,100 kc/s. (*i.e.*, 450 kc/s. below the local oscillator), the signal on 14,000 kc/s. can still reach the grid to an appreciable extent. The difference-frequency produced between the incoming signal and the local oscillator is still 450 kc/s., and will be accepted by the I.F. amplifier. Thus, it will be appreciated that there are two settings of the local oscillator tuning at which any one signal may be received, but the incorrect tuning position will produce a signal of reduced strength, and this falsely generated signal

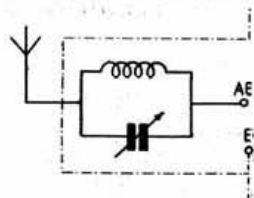
is termed an *image signal*. The separation between the true signal and the image is always equal to twice the intermediate frequency (since the oscillator settings will be equal to the signal frequency plus or minus the I.F.).

Images may be reduced by the provision of a sharply tuned R.F. stage. On 28 Mc/s. two such stages are preferable, though the absence of powerful commercial stations outside the band renders images less inconvenient than on 14 Mc/s. At lower frequencies, and in the M.W. broadcast bands, images are seldom encountered, because the separation of the image from the true signal constitutes a much greater percentage of the signal frequency, so that the receiver tuned circuits are able to select the required signal and reject the other. For instance, the percentage separation of a 13,100 kc/s. image from a 14,000 kc/s. signal is a little over 6 per cent.; whereas a 500 kc/s. image of a signal on 1,400 kc/s. represents a separation of approximately 60 per cent. Thus, an R.F. stage is not necessary in an ordinary broadcast receiver.

Practical Points

Care should be taken when using the receiver to check transmitter frequencies in the higher bands, since accidental setting to the image frequency will result in an error equal to twice the I.F. of the receiver. A check should always be made to locate the image at a point lower in the band, indicating that the original setting of the receiver tuning is the correct one. An "image" occurring at a higher frequency will be the true signal, as it is standard practice for superheterodyne oscillators to track above the signal frequency.

Fig. 2.
Rejector circuit for
image reduction.
Component values for
14 Mc/s. are given in
text.



A simple wavetrapp may assist in reducing images, and a typical circuit is illustrated in Fig. 2. It consists of a self-supporting, bunch-wound coil, $\frac{1}{2}$ -in. in diameter, comprising 10 turns of No. 20 S.W.G. enamelled wire, connected in parallel with an air-dielectric trimmer. To avoid direct pick-up, this wavetrapp should be shielded, preferably by mounting just inside the metal cabinet of the receiver. The receiver should be tuned to the fundamental frequency of the station producing the image, the trimmer being adjusted until the signal is at minimum strength. On retuning the receiver to the band, the image should be found greatly reduced, with little change in signals originating in the band.

Annual General Meeting

CORPORATE members are asked to note that the Annual General Meeting will be held at the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London, W.C.2, on Tuesday, December 18th, 1951, and not on Thursday, December 20th, 1951, as previously stated.

The I.E.E. regret that it has not been found possible to provide facilities on the date originally announced.

The 1951 V.E.R.O.N. Convention

Thirty-fifth Anniversary of Amateur Radio in the Netherlands Celebrated



The V.E.R.O.N. Conference Centre near Zeist.

It would be difficult to imagine a more ideal location for an amateur convention than the Conference Centre of "Woudchoton," situated in the heart of the forest of Austerlitz, some ten miles from Utrecht. Here on the morning of September 1, 1951, about 250 members of the Netherlands Amateur Radio Society (V.E.R.O.N.) gathered together, were duly "badged" and registered, shown to their dormitories and then summoned by loudspeaker to the Main Conference Hall. A group of television receivers in the hall enabled the assembly to see what was happening outside via a television camera. When the Director-General of the Netherlands Department of Posts and Telegraphs arrived to perform the official opening ceremony, he was televised before entering the hall to receive the official welcome and to give his address. On the platform were M. Roorda (President of V.E.R.O.N.), PA0DD (Vice-President), PA0ANI (General Secretary) and other officers of V.E.R.O.N.



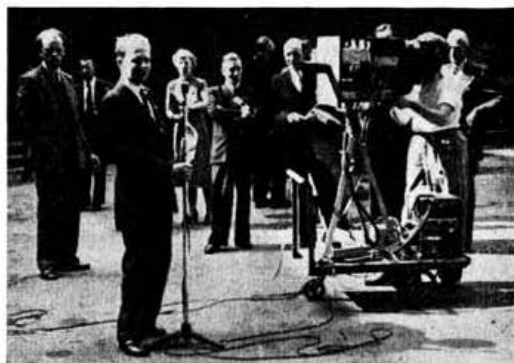
In this group are featured the President, Vice-President (PA0DD) and General Secretary (PA0ANI) of V.E.R.O.N., together with the President of R.S.G.B. (Mr. W. A. Scarr, G2WS).

Attending the meeting as guests were the President of the R.S.G.B. (Mr. W. A. Scarr, M.A., G2WS) and two members of the German Society (D.A.R.C.), DL1KV and DL3FM. Three Belgian amateurs arrived later. In a brief speech to the assembly, Mr. Scarr conveyed greetings from the R.S.G.B. and outlined the arrangements being made for the setting up of the Region I Bureau.

Moment Musical

The afternoon was taken up with technical discussions, but in the evening, after dinner at "Woudchoton," the assembly was conveyed by coach and car to a large restaurant in Zeist equipped with a concert hall capable of seating several hundred people. According to the programme, the Haarlem members (about eight in all) had planned a cabaret show, but probably few of those present were prepared for the first-class entertainment—lasting nearly three hours—which followed. Guitars, banjo and piano were handled with professional skill. Dances, sketches and comedy turns made up the remainder of this remarkable show.

Breakfast at eight next morning was followed by a special service in the Chapel of the Conference Centre. A V.H.F. conference then took place, including a demonstration of an amateur-built station for the 13 cm. band. Throughout the week-end the conference station—call PA0AA/A—was on the air on 3.5, 14 and 144 Mc/s., and many contacts were made.



Amateur Television was featured at the V.E.R.O.N. Conference. In this picture, H. de Waard, PA0ZX, is at the microphone.

Radio Hunt

Sunday afternoon brought the long-awaited "foxhunt"—a direction-finding contest on highly original lines. Thirty-two parties set off on foot to hunt the "fox" and to locate the "beacon," each equipped with a midget receiver and loop aerial. The sandy forest land made ideal territory for this event, as one could move in any direction without restriction.

Continuous musical tones of 500 and 1,000 cycles were radiated by the "fox" and "beacon" respectively, the former being in continuous communication with PA0AA/A on 144 Mc/s. By 6 o'clock, when the event ended, twenty-two of the competitors had tracked down the quarry.

Dinner in the evening was followed by the distribution of prizes and farewell speeches, which brought to an end a most enjoyable and successful week-end.

Amateur Radio and the Festival of Britain

Four Thousand Visitors to Camberwell Exhibition

The Camberwell Exhibition

ALTHOUGH an account of the Exhibition organised by the Dulwich and New Cross Group of the R.S.G.B. and held at the South London Art Gallery, Peckham Road, in August and September, appeared in last month's issue, the full story could not be told, as the *BULLETIN* went to press soon after opening day.

During the period it was open, the Exhibition was visited by approximately 4,000 people. The Borough authorities described it as one of the most successful shows ever held in the Gallery. Eighty-six visiting amateurs signed the visitors' book, including G6CL (the General Secretary), G8TL and G6HD (Members of the Council), VK6WF, EI3Z, GM2CHN, GW3EUS and G2W1-SU1NK.

The station—call G3ACC/A—which had been specially built for the occasion from various component units loaned by members of the group, was operated throughout the entire period of the Exhibition. Despite severe local interference (from unsuppressed fluorescent lighting and other sources) some 302 contacts were made with stations in 16 countries on the 1.8, 3.5, 7 and 14 Mc/s. bands. The noisy background was unfavourable to DX working, but a good QSO was had with ZB1BZ on 14 Mc/s. Best "Top Band" DX was a three-way daylight QSO with G6WF and G2YM/A (Wolverhampton). G2YV in Cannock was also worked at the same time.

When the final day arrived, the Technical Committee and all those who had worked to make the Exhibition a success felt that it had been well worth while. The Society's flag had been flown to some purpose, and many members of the public had received considerable enlightenment on the subject of Amateur Radio.

At the Londonderry Show

RELATEDLY it is learned that Amateur Radio played a part in the Festival Exhibition and Trade Show held at the Guildhall, Londonderry, last May. The exhibit—staged by the North-West of Ireland Amateur Radio Society—featured a station operating under the call G13CFA/A, and a display of commercial and home-constructed

apparatus, including a "museum" of very early radio equipment. Wall space was utilised to illustrate the QSL-card system.

Equipment used in the station included a 120-watt, 14 Mc/s. transmitter loaned by G13BVB (Clapp oscillator driving push-pull 807's in the final, modulated by two 807's in class "B" zero-bias); a surplus aircraft transmitter (ATB 52233 running 40 watts on 7 Mc/s.); an Eddystone S640 receiver, and an R107 and BC348 as stand-by receivers.

HEADQUARTERS STATION

AS members are aware it has not been found possible for some considerable time to maintain in regular operation the Headquarters Station, GB1RS. The station is at present installed at Headquarters, a site which is not at all suitable for either transmitting or receiving. For this reason the Technical Committee would be glad to hear from any qualified member who is prepared to install, operate and maintain the station on his own premises on terms and conditions to be agreed. Offers should be made in writing to the General Secretary.

The aerials were a half-wave dipole for 14 Mc/s., and a 180ft. long wire for 7 Mc/s.—slung over a main thoroughfare between the roof of the Guildhall and a nearby hotel. The installation caused much speculation on the part of the crowd which collected during the operation—possibly in anticipation of a display of "tight-rope" acrobatics!

G13CFA/A was on the air throughout the week of the Exhibition, but during the day heavy local electrical interference made contacts with other than S8/9 signals very difficult. GB3FB at Manchester was the first station to be worked.

The organisers extend their thanks to the Guildhall staff, the Round Table Club, the Exhibition Committee (G13ECD, G13GGY, G13EPI, G13HDC, G12DHB) and all others who helped to construct and man the stand.



The Dulwich and New Cross Group of the R.S.G.B. staged a highly successful Festival of Britain Year Exhibition at the South London Art Gallery, Camberwell, London. The photograph shows part of the exhibit with G3FD and G3FRF at the operating positions.

[Photo: E. W. Yeomanson]

THE WORLD OF RADIO

News From Many Quarters

Fifth Annual R.S.G.B. Amateur Radio Exhibition

THE Fifth Annual Amateur Radio Exhibition organised by the R.S.G.B. will be opened by Mr. Charles Ian Orr-Ewing, O.B.E. (Member for North Hendon in the last Parliament), at 12 noon on Wednesday, November 28th, 1951.

As in former years the Exhibition will be held at the Royal Hotel, Woburn Place, London, W.C.1, and will remain open for four days.

A special feature of the Exhibition will be a comprehensive Home Constructor's Section. A small Committee has been set-up by the Council to organise this Section, further details of which will appear in the November issue of the BULLETIN. The same issue will also contain a list of the Exhibitors with brief details of the material which they expect to display.

The Exhibition will open at 11 a.m. daily and close at 9 p.m.

A charge of 6d. will be made for admission, and no catalogues will be issued.

Members willing to assist on the R.S.G.B. stand or on the stands in the Home Constructor's Section are asked to communicate with the General Secretary indicating the times and dates they will be available.

London Members' Luncheon Club

THERE was an attendance of nearly 30 at a meeting of the Club, held on Friday, September 21st, when W. Cartledge, VE2FX, A. Bassouni, HZ1BA, and Harry Latt, HB9GA, were the chief guests. Also specially welcomed were Chaplain Lt.-Col. J. D. Andrew, W4EFG, and J. Taylor, GM2DBA, of Methilhill, Fifeshire. VE2FX brought greetings from the Montreal Amateur Radio Club, HB9GA spoke briefly on C.C.I.R. and I.T.U. affairs, and HZ1BA referred to the recent progress of Amateur Radio in Saudi Arabia.

The Club will meet again on October 19th at the Kingsley Hotel, Bloomsbury Way, London, W.C.1 (opposite R.S.G.B. Headquarters). Assemble 12.30 p.m. for luncheon at 1 p.m. Reservations to Mr. Frank Fletcher, G2FUX, 11a Ickenham Road, Ruislip, Middlesex. (Telephone Ruislip 2763), or to R.S.G.B. H.Q. by October 18.

Royal President for City and Guilds of London Institute

H.R.H. The Duke of Edinburgh, K.G., F.R.S., has graciously accepted the office of President of the City and Guilds of London Institute for the Advancement of Technical Education to which he was duly elected at a Special General Meeting of the Members of the Institute on September 21, 1951.

The Institute was founded by the Corporation and certain of the Livery Companies of the City of London in 1878, and received the grant of a Royal Charter in 1900. The office of President has remained vacant since 1901.

In his recent Presidential Address to the British Association, the Duke expressed his great interest in technological education and stressed its vital importance to the future strength and prosperity of the British Commonwealth.

Radio, Television and Models Exhibition

THE Junior Section of the Institution of Post Office Electrical Engineers is to hold a Radio, Television and Models Exhibition at Waterloo Bridge House, Waterloo Road, London, S.E.1, on Friday and Saturday, October 26 and 27, 1951. Emphasis will be on home-construction; radio controlled models and receivers being featured. There will also be a programme of technical films.

The Exhibition is being supported on behalf of the R.S.G.B. by Mr. C. E. Newton, G2FKZ, D.R. for South London, with the assistance of Dulwich and New Cross members. The R.S.G.B. exhibit will include, among other equipment, a demonstration of "the transmission of music over a beam of light."

Admission will be by programme (price 3d.) obtainable from The Hon. Group Secretary, I.P.O.E.E. J/S Radio Group, 28 Orchard Avenue, Heston, Middlesex. The Exhibition will be open from 5 p.m. to 9 p.m. on the Friday, and from 10 a.m. to 8 p.m. on the Saturday.

Audio Frequency Engineering Convention

DURING the second week of the National Radio Show, held last month at Earl's Court, the British Institution of Radio Engineers held a three-day Convention in Audio Frequency and Acoustic Engineering. This was the sixth session of the Institute's Festival Convention (referred to in the April issue) which was planned to demonstrate the British contribution to the development of radio, television and electronics. The sessions were attended by more than 1,000 engineers including very many from abroad.

Papers read during the sixth session covered the acoustic design of buildings, sound recording, stereophonic reproduction, electrophonic organs, micro-groove recording, and allied subjects.

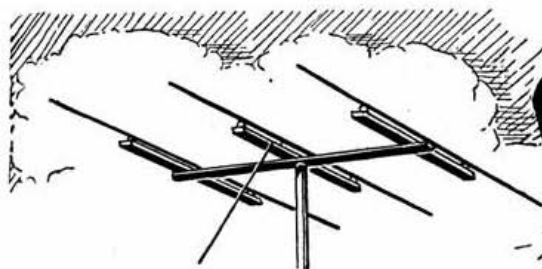
"Electronics" Photographic Exhibition

"ELECTRONICS—Profile of an Industry" was the title of a special Photographic Exhibition held this month at the Engineering Centre, Glasgow. The Exhibition—organised by Mullard, Ltd.—featured a series of photographs taken in the Mullard laboratories and factories, illustrating how numerous highly specialised techniques and processes have grown up within the electronics industry in recent years. Six separate sections dealt respectively with Research; Fine Wire; Magnetic Materials; Electronic Valves and Tubes; and Electronic Equipment.

The Exhibition was opened on September 4 by Major Jackson Millar, C.B.E., a prominent member of the Scottish Council and Chairman of the Engineering Centre.

Free Film Shows

MR. P. A. THOROGOOD, G4KD, states that the Central Office of Information, 70 Victoria Street, London, S.W.1, is prepared to arrange free shows of the radar film "All Weathers" and the semi-technical film "The Cathode Ray Tube." Films dealing with electricity and engineering measurement are also available. There is no charge for equipment and operators in the London area.



AROUND THE V.H.F.'s

First Cross-Channel 70 cm. Contact.

EI2W works ON4BZ on 2 m. 'phone.

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

THE first two-way contact on 70 cm. between this country and the continent of Europe took place on September 6 between G3DIV/A (Eastbourne) and F8GH (Beauvais). This was no short "hop" across the English Channel, but involved a distance of approximately 140 miles, half of which was over land on the French side.

G3DIV/A and F8GH have been regularly in QSO on 2 m. and an attempt on the 70 cm. record was proposed as soon as both stations were equipped for the higher frequency. The French station heard 'DIV during a cross-band test at 2130 B.S.T. On changing over to 70 cm., reports were exchanged of RST 599 and 579, the latter being F8GH's signals as heard in Eastbourne.

A five-element Yagi was in use at Beauvais, but G3DIV/A pinned his faith to an eight-element stack of dipoles 35 ft. above ground and fed between the two centre pairs with tubular 300-ohm feeder. The transmitter was the normal 2 m. rig with the addition of an 832 tripler stage running at 25 watts input, while the receiver comprised a 1N21 crystal mixer in a copper-tube cavity constructed to a design by F8OL. The local oscillator was crystal-controlled from a 4.55 Mc/s. crystal in a *Squier* circuit, using a multiplier chain to bring the injection frequency to approximately 409 Mc/s.

F8GH's converter employed a 6J4 e.g.t. R.F. stage preceding a 6J6 mixer, and was constructed by F9AE.

F8GH also heard G3DIV/A on the three evenings following their first contact, and F8OL (Meudon, S. of Paris), about 175 miles distant, heard the Eastbourne station at S6 fading to zero on the evening of September 9. Tests are being carried out with PAOPN, so far unsuccessfully.

As reported briefly last month, G2DD heard F8MX on August 23 when the latter was at St. Valery-en-Caux, near Dieppe, but this was not followed by a two-way contact. G3DIV/A was not able to hear F8MX at all on 70 cm., being badly screened by Beachy Head in that direction.

The Fourth 70 cm. Activity Period

As will be seen from the accompanying table only six reports were received for the Activity Period from September 1 to 9, and it is proposed, therefore, to rest this feature for the time being at least. No exceptional results were obtained, although G2FKZ heard a signal on approximately 432.1 Mc/s. at 1945 B.S.T. on September 7 coming from the north which was thought to be G3IS (Rugby). The signal was only RST 338 and positive identification was not possible.

G2HJD/A employed a four-element Yagi backed by a 60 deg. corner reflector and found that although reception with this beam indoors did not appear to be affected seriously, reports on his signals were as much as 4 to 5 S-points down as compared with the beam outside. He finds that a 6 Mc/s. crystal in a *Squier* circuit is ideal for

Fourth 70cm. Activity Period

Ref. No.	Call and Situation	Stations	
		Heard	Worked
1	G2AOL Otford, Kent	2, 3, 16	18
2	G2DD Stanmore, Middx.	*	
3	G2FKZ London, S.E.22	5, 6, 12	2, 7, 10, 11, 14, 15, 17
4	G2HJD/A Ashford, Middx.	3, 5, 8	2, 11, 13, 16, 17
5	G2QY Pinner, Middx.	*	
6	G2WS Beckenham, Kent	*	
7	G3BOB Hayes, Kent	*	
8	G3FP Thornton Hth., Sy.	*	
9	G3FZL London, S.E.22	*	
10	G4CG Wimbledon, Sy.	2, 7, 11, 14	3, 8, 9, 16, 17
11	G5CD London, N.W.11	10, 12	2, 3, 4, 5, 7, 9, 14, 17
12	G5KH London, S.W.15	*	
13	G5RD	*	
14	G5TP Stoke Row, Oxon	*	
15	G6HD Beckenham, Kent	14, 17	2, 3, 6, 8
16	G6YP London, S.E.5	*	9, 10
17	G8KZ London, W.10	*	
18	G8VR London, S.E.2	*	

* No reports received.

getting round the problem of T.V.I., even when the transmitter is well and truly over-modulated.

Other 70 cm. News

G2FKZ and G3FZL (London) have been keeping early morning skeds. on Saturdays and Sundays during August and September with G4LU (Pant, nr. Oswestry) and GW2ADZ (Llanymynech, Mont.), 7 a.m. being about the peak time for nocturnal cooling with consequent favourable bending conditions. GW2ADZ was heard on August 18 at S5 fading to S3 after a night of clear skies and a barometer reading of 29.92 ins. (falling). Shortly afterwards, on 2 m., G5YV (Leeds) was heard calling CQ at S7/8, but attempts to raise him failed. By 7.45 a.m. his signals had fallen to S5 and disappeared shortly afterwards. It is interesting to note that the temperature was rising fairly rapidly at the time, having increased from 55 to 58 degs. in 45 minutes.

Owing to rebuilding G3EHY has discontinued 70 cm. operation for the time being. He had some interesting reception reports on his regular transmissions beamed on London, and hopes to initiate tests of a similar nature early in the new year.

R.F. Amplifiers on the 70 cm. Band

G5CD recently had an opportunity of comparing results between the new RCA type 6BQ7 and 12AT7 valves as e.g. neutralised R.F. amplifiers on 432 Mc/s., and found that the former gave some 5 to 6 db. more gain. Similar to the 12AT7 in some respects, the 6BQ7 has a smaller structure, with a screen between the two triode sections, and was designed for the front end of 200 Mc/s. television receivers in the U.S.A. A long article on this interesting valve appeared in the March, 1951, issue of the *R.C.A. Review*, and *QST* carried a brief reference to it last August. Unfortunately

* 32 Earls Road, Tunbridge Wells, Kent.

this valve is not available in Great Britain at the present time owing to lack of commercial demand.

First EI/ON Contact on Two Metres

EI2W (Dublin) celebrated his return to the 2 m. band after a month's holiday by making a two-way contact on 'phone with ON4BZ (Brussels) at 0033 B.S.T. on September 21. ON4BZ had heard the Dublin station on several occasions in the past. The distance is approximately 475 miles. Congratulations to both operators on an excellent achievement.

The Two Metre Band

There is now a permanent station operating on 2 m. in the Isle of Man, GD3GMH (Douglas), who was worked by G3EHY at 1950 B.S.T. on September 19. He is situated at sea level and employs an SCR 522 transmitter on a frequency of 145.1 Mc/s.

Taking the month as a whole, G3EHY found conditions in quite good shape. During the last week in August the rainy weather with low barometer apparently caused a number of operators to forsake the band, but the few DX stations active were easily worked and signal strengths were good. The best plan to adopt on 2 m. is undoubtedly not to worry too much about the apparent conditions judged by the weather, but to put out a few calls and see what the band is really like. This applies particularly to operation during the winter months. 3EHY signifies his intention of regular operation during this coming period, and remarks that on looking through his log for last winter there was not a single month in which he failed to contact several stations over 200 miles away.



LATTICE WORK

A stage in the erection of G3WW's "5 over 5" 2-metre Yagi in Wimblington. The climber at the top is G2FQP.

GW3ENY/P (Colwyn Bay) is putting the county of Denbigh on the 2 m. map, while G6NB/A (Colwall) is doing the same thing for Hereford. His excellent signal has only 4 watts behind it, but the "take off" is 900 ft. a.s.l. Although surrounded by hills, no less than 25 stations were worked from this location on September 12.

GW3EJM has moved from Cardiff, and hopes to be active again in the near future from another county. G3YH (Bristol) is getting out much more consistently with a new 12-element beam, while G3FIH (nr. Bath) can now operate on 'phone. Those looking for a contact with Northern Ireland will be pleased to know that G13GQB (Newtownards, Co. Down) is active regularly on a frequency of 144.13 Mc/s. GW2DHV/A has been operating from both GW3ENY/P and GW5MQ and hopes to be on the band from

London shortly. G3EQS (Gorleston, Norfolk) is active on 144.138 Mc/s.

Probably the only station using a rhombic aerial on 2 m. is G3WW (Wimblington, Cambs.). One interesting thing noticed with this aerial, which is normally employed on 10, 20 and 40 metres, is that interference from charged rain has little effect on it compared with the "5 over 5" Yagi which is now over 60 ft. above ground. The real test for the "5 over 5" came at 2000 B.S.T. on September 5, after conditions had been getting steadily better for several days. Contacts were made with Yorkshire (G5YV with S9 plus on 'phone), Lancs., Lincs., Staffs., Hunts. and Wilts. On turning his attention towards the east, G3WW raised DL3FM at RS 58 followed by five PA0's.

On September 8 at 2115 B.S.T. a test transmission was made for G5IX (nr. Norwich) which resulted in calls from PE1PL (RS 55 on 144 Mc/s.) and PA0FC at RS 57, and last but not least OZ2FR (Baekke) at RS 56. The latter was at the other end of the first G/OZ 2 m. contact with G3WW last June. Things proceeded at this pace until the early hours of the following morning, during which time G2BTO/P (nr. Bolton, Lancs.) and GW5MQ were contacted. G3WW now has a CV53 e.g.t. pre-amplifier in operation and finds it of definite assistance in coping with weak 'phone stations which tend to fade into the noise.

European and North African V.H.F. Contest

As we go to press the first week-end of the European and North African V.H.F. Contest, organised by V.E.R.O.N., is taking place, and for once it would appear that a 2 m. contest has coincided with excellent DX conditions. The evening of September 21 produced strong and consistent signals from DL4XS/3KE, who was working British stations continuously from around 2100 B.S.T. onwards. They were still there when the contest commenced at 0001 G.M.T. on the 22nd and some G's got away to a good start in consequence. Dutch stations, with the exception of PE1PL, were not doing too well, although DL4XS said that there were plenty active. The same applied to DL, but only 3FM seemed to be "getting over" besides the residents of "Radio Hill." It is understood that one or more GM stations were worked from the Home Counties late on the evening of the 22nd and F8AA was heard at very good strength calling G6NB at 2250 B.S.T. On 70 cm. G2FKZ worked GW2ADZ and G4LU at S9 on 'phone both ways.

* * *

The closing date for contributions to "Around the V.H.F.'s" for the November issue will be October 20.

Late Flash

G2ANT (Loughton, Essex) heard HB1IV at 2125 B.S.T. on September 22. The Swiss station was calling CQ on a frequency of approximately 144 Mc/s., and was RS 53 on M.C.W. It is understood that G3DIV/A (Eastbourne) also heard and called HB1IV at 0015 B.S.T. on the following morning.

T.V.I. Trouble ?

If so, you need the latest technical booklet in the R.S.G.B. Amateur Radio series.

Available now from Headquarters.

TELEVISION INTERFERENCE 2/3

Post Free

TIME and time again we listen to the "pile-up" that takes place on the frequency of a rare DX signal, and say to ourself "unless something is done about it our long distance bands will become an etheric bear-garden." A big offender is the persistent "great man" type—"Stand aside you lesser mortals—this is G— calling the DX!"—but most of the trouble appears to be due to misunderstandings and faulty operating, as, for instance, the operator who spends five minutes calling a rare DX station at 10 w.p.m., during which time the DX has worked three contacts complaining all the time of QRM; or the DX station who signs SK when he is expecting a reply from his contact, with consequent uncertainty in the minds of others who want him. Then there is the chap who calls the DX station because someone else has been heard doing so, and the time-waster who plods along with station details which the DX has not asked for.

From a consideration of the above remarks a few simple rules have been drawn up which are now offered to the DX fraternity. (1) When the DX is working short snappy QSO's, don't send long calls; (2) SK should indicate "I shall send nothing further and shall not listen to you again." As a suggestion we recommend the use of a new procedure sign SKA meaning "I shall send nothing further, but will listen for your acknowledgement." No one hearing that signal would call until the DX station has indicated that he is once more ready for a QSO. The DX would then send "QRZ de . . ." Anyone interested would then transmit using the short call and intermittent listening technique. (3) Never call a station unless you are sure CQ has been sent. (4) Keep your QSO short and avoid idle chatter—think of the others waiting. (5) Don't try to work a rare DX station a second time just to show off. Keep off his frequency, and leave him alone unless there is some very good reason for calling him.

Notes and News

G2AHP, having forsaken 2 m. for a time, has worked VS6CG, a new one, on 14 Mc/s.

* 29 Kechill Gardens, Hayes, Bromley, Kent.

B.R.S.7594 says VK1ADS has QSL'd many of his listener friends. He also says Tangier stations are now using CN2, EK1 and KT1. CN2's are those who have paid the exorbitant £50 licence fee; KT1's are Americans; and EK's are those who won't pay the fee! B.R.S.7594 lists the following DX: EL9A, HSIUN (14155), HZ1TA, KG, VQ's, VU's, ZD4, CR6 and ZP. OE13CC is on S.S.B. If ZB2A sees this he is asked please to QSL G3GMH. A.1180 states that the F.C.C. has declared EK an illegal prefix—hence KT1. He offers VS9MA 14117 at 1745 G.M.T. G2FAY recommends ZS3E at 1820; VP5BL, 14070 at 2000; and CT2BO on 14080; he now has his 100 countries and needs one more for B.E.R.T.A. A.1193, whose best this month is XZ2SY (1532 G.M.T.), remarks on the large number of Spanish-speaking stations to be heard in the late evenings on 3.5 Mc/s. G4ZU says VP9G is on 14 Mc/s. 'phone only—his call is being pirated on other bands. VP6SD will be on "Top Band" this winter with 350 watts input. ZB1CH, now QRT, has plenty of cards left for both his ZB and VP9E calls. Man-made static is a big problem in Malta, and under present circumstances its cure is difficult due to the high cost involved.

G6XS reports ZS7C on 14040 at 1800 G.M.T. Many others have worked 3A2AD, who is HB9X. Incidentally, PX1AR was F7AR; we hope to publish his story soon. B.R.S.7594 of Yeovil mentions CR4AD, 14115 'phone at 2020; HZ1TA, 14200 at 1820, and UP5A on 14345. The latter is something of a mystery, speaking excellent English, and coming from the right direction.

After an interval of some weeks with no Russian signals audible, there are now a number active, but they appear to have new calls — UA2's for example, have been heard. Incidentally, no cards have come from Box 88, Moscow, since early May. Hard luck on those who are hoping for cards to swell their country totals.

We have now identified MD9BO (worked by G3CWL), and as cards originally sent to the Bureau were misrouted, will those who worked him please QSL again? GC3HFE gives the QTH

READY FOR THE "FOX HUNT."

A D/F Contest, known as a "fox hunt," was a feature of the V.E.R.O.N. Conference. Here are some of the competitors ready to set out in their quest for the hidden transmitter.



of OE13DC as A.P.O. 168. His 9-10 watts have brought him 57 countries all on 14 Mc/s., his latest being KL7PI, MD2PM, KH6IJ and 9S4AX. He has heard VP8AG at 559 on 14100 kc/s.

G6UT is the second British amateur to receive the Maritime Mobile certificate—well done O.M.! He says that TA3KA is a phoney. Cards have reached the R.S.G.B. Bureau for 7B4QF contacts from ON4QF, F7AR and W6SAI—all of which have been distributed. W2GT, who advises anyone working EA0AB to send very slowly, lists CR5AA, ZC4JS, CR5JB and EA0AD, and recommends SV9RP as worth following up.

B.R.S.19052 of Manchester is still greatly intrigued by the charming lady at CT1SQ who speaks English so perfectly. G5JL says VK3WL on 7030 is a good signal. 3A2AD has been active on 7 Mc/s., and must by now have worked all the regulars. 'JL has heard UF6KAG on 7048 and EQ3FM on 7030. G3CRK says W6CHY seems to be reasonably satisfied with his QSL returns from the British Isles, 87 out of 128 G contacts having QSL'd; GM—9 out of 14; GW—3 out of 5; GI—3 out of 4; GD—0 out of 1—all on 14 Mc/s. 'phone. GM3DHD reports that OY3IGO operates now on 14 Mc/s. C.W. only (incidentally, there will be another OY on 3.5 soon—'phone and C.W.). 'DHD has also received a card from AC3PT, who uses only 30 watts, but hopes soon to be on with 500 watts to a rotary beam. He has No. 3 'phone DX C.C. for Scotland, and has heard that IT is to count separately, but so far this has not been confirmed by the A.R.R.L.

G3ATU is one of the lucky ones to work FB8BB on 14050—the latter being particularly snappy in his contacts. In fact, you may even work him without realising it! G4AU, owner of one of the best Morse fists in Amateur Radio, heard that conditions were not too good, so came up from the wastes of 2 m. and proceeded to work OX3PM, the Danish expedition, only 700 miles from the North Pole; 3A2AD, HP3AZ, KV4AA, JY1AJ, VP9OO, FB8BB, F3AT/FF8, F18RO, EA9BA ZS1SD (14120), and PJ5RO. He lives in a flat, and uses the vertical 33 ft. mast supporting the 144 Mc/s. beam for an aerial. Even Bob Pybus, the redoubtable tin-eared man from Manchester, thinks conditions are poor, but between 1500 and 1730 managed to copy VU2AN, 2CA, 2JP and 2JU, KG6AAE, KG6AAY, Y13ECU, VS9MA (who QSL's), JA2CC, HSIUN, VS1EE, with various ZC, ZE and VS7's for good measure. In addition, he reports CX, PY and LU on 28 Mc/s., EA9CI, PY, CT and FC on 7 Mc/s., and FA9UP on 3.5. He heard CT1BW say that in his opinion this year had been excellent for DX—a sentiment with which we are inclined to agree—although we admit that if DX means W and VK, then it has not been good. But surely those ZK, ZM and FO signals were worth copying, to say nothing of some of the Asian and African DX.

G3EFY (Exeter) made a few additions to his score during the month, including EQ3B at 1650 G.M.T., W3GAU (Delaware), PX1AR, OY3IGO, and JY1AJ (R.A.F. at Amman). Ron Burden, B.R.S.18794 answers A.1193's query concerning PIILC—which is the Dutch weather-ship "Cumulus," whose usual position is around 59.30 N. by 20 W. QSL to Dutch Ocean-Station Vessel "Cumulus," 3 Kanaalweg, The Hague. He has received a card from VK1RB and states that the new OY will be OY2Z. W9AND handles cards for FY7YB, so if you have not had yours, drop him a line. AC4YN wants to purchase a complete

B2 outfit. If you can help, please write to G3EXE, 20 Hurst Grove, Bedford.

G8DR's best are VU7FK, EA6AM and VP8AO on 7 Mc/s. between 2200 and 0100 G.M.T.; OX5EL, TA3AB, 9S4AX and W7EOI (Montana) on 14 Mc/s. G6XS has had his card from W3IYE in Delaware, who runs 750 watts to a three-element beam. He heard EA0AB at 1825 on 14068 at 569, but he did not reply to anyone. Other choice items are: XZ2EM 14075, EA9AP 14085, VS7XA (son of G8VG), CR8EA 14100, FB8BB 14060, MD5PM 14084, ST2MN 14078, UM8KAA 14107, and AC3SQ 14108—all in the late afternoon.

EMPIRE DX CERTIFICATES

For the record the following is a complete list of Empire DX Certificate holders:

1. G6RH	22. G2FSR	43. GM6MD
2. G2PL	23. G8KP	44. G6GN
3. G6ZO	24. G8II	45. GM3CSM
4. G2MI	25. W2QHH	46. GM3AVA
5. G8IG	26. G2EC	47. G3CCO
6. G16TK	27. VK2DI	48. W3JKO
7. G6RB	28. GW4CX	49. G8FF
8. G2AJ	29. W3BES	50. Z56CT
9. G6KS	30. G4GI	51. HC2JR
10. PAOAGN	31. LA7Y	52. G3YF
11. G8IL	32. G2AKQ	53. G3AZ
12. G3DO	33. G6LX	54. VP9G
13. G6YR	34. G8QX	55. Z56G
14. G6WY	35. G2VD	56. GM2FHH
15. G4JZ	36. G5YV	57. G2ZF
16. G5BJ	37. G5BD	58. G3DCU
17. ZL1HY	38. G3ATU	59. G2BJY
18. G8TD	39. VK4HR	60. G5FA
19. G6QB	40. G5PP	61. G6TA
20. G6CL	41. G2LB	62. G6XS
21. G3BI	42. G5HH	

TELEPHONY ENDORSEMENTS

1. GM2UU	6. WINWO	11. G5QX
2. VQ4ERR	7. HB9DS	12. HC2JR
3. G3DO	8. G3CCO	13. VP9G
4. G2PL	9. VQ4SC	14. G2AJ
5. G8IG	10. G5PP	

Who's Who

VP8AO (ex-VP8AJ) is now in the South Shetlands. From the Central Radio Club in Sofia we learn that the licensed Bulgarian stations are LZ1AA, 1KAB, 1KSR, 1KEP, 1KDP (a students' station in Sofia), LZ1TPI and LZ1RF. As in Russia, all the K calls are club calls. LZ1 is South Bulgaria, and LZ2 the northern half. All other calls are unlicensed.

G2HDU—now ZD6HU—travels around quite a bit in Nyasaland, but can always be reached via R.S.G.B. He is running 20 watts on C.W., mainly on 14050 kc/s., his receiver being a BRT 400, and he asserts that from Zomba, European stations are difficult to contact but KH6's are easy. VS2CP will be leaving this month for a six-month stay in Australia. His remedy for those who "bust in" is to snap "RST 559 73," but not to QSL. VS1EF (ex-MD4GC/ZC6JG) still has a few cards left for both calls. QTH: G. A. Cuppleditch, 162 Mount Pleasant Road, Singapore 11. G3EGQ is now VS7GQ and hopes to be active on both 14 and 28.

G3HHC has drawn our attention to the fact that the radio operator on the Atlantic record-smashing "Canberra" was G3DHF, who two years ago was involved in a bad crack-up, but remains undaunted. He used to be active at Felsted, Essex, but is now at Bedford. DL4QD returned home last month. B.R.S.19312 of Hesse has been confined to his room for more than five years. Please make a note of this B.R.S. number and help to lighten this brave lad's burden by a QSL if you receive one of his reports. Many thanks to G3GWT for bringing this to our notice.



By H. F. Knott (G3CU)*



IT has often been heard said—"What is S.S.B.? Where are these stations to be found? What is it all about?" With these questions in mind this new feature—at present bi-monthly—is being introduced. Its aim is to provide details of single-sideband activity, operating experiences, and equipment in use, thus forming a topical commentary on this specialised field of Amateur Radio, which may help to recruit new adherents to S.S.B.

The single-sideband system was first introduced to amateurs in October, 1947, and so immense are its advantages that a complete change in equipment and operating practice is certain. Today there are approximately 150 stations using S.S.B.—seventeen in Europe. The first British amateur to adopt the system, G2NX (Oswestry), August, 1949, was quickly followed by G3CWC (Norwich), G3FHL and G3FDG (Ironbridge), G2CR (Lincoln) and G3CU. After a pause of some months, G3AIH (New Malden), and G8RC (Brentwood), made their appearance, and more recently G3BVA (Bromley). At least a dozen other U.K. amateurs are building equipment.

On the continent amateurs in seven countries (possibly more) are S.S.B. enthusiasts. These include: OZ7T, OZ7BO, SM5QV, DL4PA, PA0PVF, PA0KC, F8AJ and ON4CC.

Activity in the U.K. appears to be confined chiefly to the 3.5 Mc/s. band, where a number of stations—usually centred around 3720 kc/s.—can be heard most evenings. On Tuesdays at 2000 B.S.T., a regular weekly schedule is worked. Occasional excursions are made to 14 Mc/s. G8RC and G3BVA are doing a lot of good work on the "Top Band"—between 1900 and 1940 kc/s.

G3FHL reports that during September he, G2NX and G3CWC were working cross-band multiplex with G8RC on "Top Band." The experiments proved very successful. All three stations were radiating on 3720 kc/s. as usual, but were listening to one another via G8RC on about 1900 kc/s. G8RC was S5-9 in Ironbridge, in spite of not very favourable band conditions at the time. G3FHL also reports that a test meter is in the process of construction, the purpose of which is to set-up the correct ratios for the components of the audio phase-shift networks used in the "S.S.B., Jnr.," described in *G. E. Ham News*.

From Germany comes news that DL3JM and DL6WL have completed their excitors. DL3JM is now building a Class "B" R.F. amplifier, while '6WL, having carried out low power tests, will be on with QRO in a few weeks. Both stations are using crystal-filter rigs patterned on the W1JEO exciter (see *A.R.R.L. Handbook*, 1951). For the present, mimeographed circuits with text are available from G3FHL or the writer, but information of a practical nature is being compiled for publication.

Reports from active S.S.B. stations are welcomed, with details of equipment, activities, experiments, anecdotes, etc., and should reach the author by not later than the 25th of the month for inclusion in the next issue.

* 31 Batchwood Green, St. Paul's Cray, Orpington, Kent.

POWER cuts will soon be topical once again, and the following anecdote from the February, 1926, issue of the *BULLETIN* indicates one way of dealing with the situation. "G6TD reports that he is very much handicapped by a limited power supply. Just when he is on the point of creating a new record, the power fails. When this happens, the entire village community assembles at the local power station and spouts volubly in English, Welsh, and other unknown tongues to the apprentice in charge. The local flea-power outfit, as he calls it, is driven by a water-wheel which had the misfortune to bust recently—but, when working, the supply varies in voltage between 180 and 260, and his note suffers in consequence." While on the same theme, elsewhere, there is a warning that "if a paraffin stove is used to heat the shack, fumes may cause the nickel plated parts of the rig to corrode and become coated with a sticky green substance."

With the results of the first Low Power Field Day appearing on page 166 of this issue, it is interesting to note that the first Low Power Contest organised by the old *T. and R. Section* of the Society took place in November, '26, the rules being announced in the October issue. It was an international event, intended to provide data for the purposes of "scientific research," and took place at fixed periods on seven consecutive days. Power input was limited to five watts, H.T. was not to exceed 220 volts, and source of current had to be dry cells or D.C. mains only—no generators or A.C. supply were permissible. Prizes were to be awarded to the members showing the best number of contacts or other records. The winner (announced in March, '27), was Mr. T. Palmer Allen, then G6YW, of Belfast, who made eight contacts over distances exceeding 1,000 miles. A curious addition to the contest rules was the following: "Non-members can compete providing they can show sufficient reasons why they have not joined the *T. and R. Section*, and, if possible contribute a sum of 5s. towards the expenses of the Society. This sum will be deducted from the subscription due if membership is taken out within a year."

In the June, '26 issue, a new Technical Aid service for members was announced. For the nominal fee of 6d., members were entitled to submit their technical queries and problems to Headquarters for expert attention. "A feature of the Service is that the name of the inquirer will not be disclosed if it is placed on a separate sheet of notepaper." The London County Council addressed a letter to the R.S.G.B. stating that lecturers on radio were required, and offering financial remuneration. An earthquake at Santa Barbara in the U.S.A. destroyed all cables and land-lines, but within an hour of the disaster the outside world knew what had happened by means of Amateur Radio.

Elsewhere it was announced that "Mr. Bland Flagg will award a *Sifam* measuring instrument to the member who introduces the most new members during the year 1926. The instrument will be a milliammeter."

FOURTEENTH B.E.R.U. CONTEST - 1951

ONCE again this annual Commonwealth Amateur Radio event can be recorded as a success. A good entry was received, and nearly all who wrote commented on the pleasure of participation in spite of generally poor DX conditions. Last year, after a long struggle, the Senior C.W. Contest was won by a home station, G5WP, though it was clear then that a well-organised effort by some favourably located overseas station might gain the honours. And so it has proved for the glory this year passes to the West Indies.

Senior Telegraphy

Fred North, VP6CDI, after a year or two of practice, has won the Senior C.W. event. In spite of difficulties created by the demands of U.K. stations—137 of them were worked—he



**B.E.R.U. CONTEST
WINNER**
Fred North, VP6CDI
(ex-G2CDI) of Little
Kent, Christchurch,
Barbados.

knocked up a total of 380 contacts, using an input of 150 watts to three simple aeriels. He says he never enjoyed Amateur Radio so much, and he threatens us with better equipment next year!

Second place is taken by last year's runner-up, Raymond Joss, G2AJ, who, using a forest of beams of all kinds, made 250 well-selected contacts. Fred (Dud) Charman, G6CJ, finding simple aeriels better than thousands of feet of Vee beams, made third place, but because he is a member of the Contests Committee he stands aside to leave the honours of third position to last year's winner, W. E. Russell, G5WP. The latter, with his L.F. long-wire aerial and H.F. 8-JK beam, notched 193 QSO's.

Junior Telegraphy

The winner of the Junior C.W. event is Jac Van Wyk, ZS6QF, who on this occasion overshot his long record as a runner-up in contests. He made 158 QSO's using folded dipoles for three bands, obtaining a score which would have placed him high even in the Senior event. J. S. Nicholson, VU2JP, finished only one point behind. His aeriels comprised half-waves for 7 and 28 Mc/s., and a 3-element rotary for 14 Mc/s.

ZD4AB, a regular aspirant, with long wires and a 3-element rotary on 28 Mc/s., followed close on the two leaders with a total of 170 contacts. He gave eight G's their first ZD4 contact on 3.5 Mc/s.

Telephony

With propagation conditions so poor during the 'phone week-end, it is not surprising that the "aerial farmers" did best. Raymond Joss, G2AJ,

PLACINGS—SENIOR TELEGRAPHY SECTION

Pn.	Call Sign	Pts.	Pn.	Call Sign	Pts.	Pn.	Call Sign	Pts.	
1	VP6CDI	2,506	36	G8PB	1,148	71	VK2MT	573	
2	G2AJ*	2,435	37	ZS2Y	1,134	72	G3AJP	566	
3	G6CJ†	2,383		ZL1MQ	1,134	73	VE6MN	554	
4	G5WE*	2,239	39	VS6AC*	1,086	74	G8DA	553	
5	GW3ZV*	2,126	40	GW5SL	1,082	75	VE1EK	548	
6	MP4KW	2,072	41	VP8AI	1,012	76	GM3CIX	545	
7	ZL1MB*	2,048	42	ZL1HY	1,006	77	VE1HK	536	
8	G5DQ	1,928	43	VE1PA	1,000		VQ4HK	536	
9	VE3KE*	1,892	44	G3BDQ	980	79	GM6IZ	504	
10	VK6RU	1,724	45	G3FXB	978	80	VQ2RG	474	
11	VK3XK*	1,710	46	G8ON	939	81	VE1HG	460	
12	GW3FSP	1,604	47	ZS6BT	925	82	VE1DB	452	
	VE1BV*	1,604	48	VK3AZW	870	83	VE4RX†	437	
14	G6LI	1,572	49	VK2JX	869	84	G8QZ	417	
15	VE2BK*	1,544	50	VS6BP	867	85	G8KU	413	
16	VK2ANN	1,537	51	VE3BR	861	86	ZL3CP†	410	
17	ZL1AH	1,524	52	VE2OL	811	87	ZL3GR	409	
18	ZSSU	1,505	53	VE5QZ	795	88	G8JO	408	
19	G3AZ	1,432	54	VE3AP	788	89	ZL3AB	397	
20	VP7NM	1,428	55	G8IP	784	90	G2BW	340	
21	G6GN	1,419	56	G6OY	772	91	VE2IL	323	
22	G2DC	1,404	57	G3BTU	748	92	VK2TI	310	
23	VE7VO	1,382	58	VO1W†	740	93	VE5AT	307	
24	VK7JB*	1,306	59	VK9MR	723	94	ZE3JO	306	
25	G6XN	1,298	60	G5MR	722	95	GM3GDG	292	
26	VK2RA	1,280	61	VS6BJ	712	96	VE2CK	264	
27	G3DCU	1,268	62	G6BB	709	97	VQ8AF	258	
28	ZS6A	1,266	63	VS6AE	701	98	ZL1QW	225	
29	VE7EO	1,259	64	GM2FHH	689	99	G6NK	203	
30	VK2GW†	1,246	65	VQ2GW*	684	100	VK5KO	201	
31	G5PQ	1,257	66	VE1CU	668	101	VK7LJ†	195	
32	ZL4BR	1,235	67	VK4XJ	667	102	VK2AM†	172	
33	VE3ZW†	1,205	68	G5MY	658	103	G6ZT	44	
34	G2QT	1,187	69	VE1RP	621				
35	VE3AGX	1,180	70	VE3ADV	586				

JUNIOR TELEGRAPHY SECTION

Pn.	Call Sign	Pts.	Pn.	Call Sign	Pts.	Pn.	Call Sign	Pts.
1	ZS6QF	1,577	8	ZL4JA	797	15	VS9AA	617
2	VU2JP	1,576	9	VK3RJ	750	16	Y13BZL†	603
3	ZD4AB	1,550	10	ZC4TF	730	17	G5MP	601
4	VK4QL†	1,472	11	VS2CN	698	18	ZE3JL†	460
5	VP1AA	1,020	12	ZB2I	687	19	G3AIR	422
6	VS1DZ	943	13	VK5CO	652	20	VK3XB†	307
7	VK6LJ*	920	14	VK5RX	619	21	VK4SN	184

TELEPHONY SECTION

Pn.	Call Sign	Pts.	Pn.	Call Sign	Pts.	Pn.	Call Sign	Pts.
1	G2AJ	1,363	8	VE3KE	674	15	ZL1MQ	331
2	G2DPZ	1,350	9	VQ2HW	613	16	G2DC	320
3	VQ4RF	1,103	10	VS9AH	611	17	G6XN	291
4	G6RH	1,098	11	VK2DG	503	18	VP6SD	252
5	MP4KW	981	12	VU2JP	442	19	ZL1AU†	212
6	VQ4ERR	938	13	ZL1HY	407	20	G3DVM	103
7	ZS6JS	712	14	G3AOO	347	21	G3AS	30

with three "Lazy-H" aeriels on 14 Mc/s., together with a 6-element and a 3-element rotary on 28 Mc/s., made the highest score from more than 100 contacts in the 24-hour period. Following closely, with rotary beams on both bands, is J. Ellery, G2DPZ, with 113 contacts; and then, after a gap, VQ4CF, who nearly made his century. The latter evidently believes in big aeriels, for he used two 300ft. Vees and Taylor "Super-modulation" on his 140-watt final.

Receiving

It was intended to allow a choice of any one week-end of either the telephony or the telegraphy periods, but with conditions as they were, it is clearly impossible to make any fair comparison. It has therefore been decided to treat telephony

and telegraphy as separate receiving sections. In the telephony section the leader is B. Kendall, B.R.S.14261, while William Ely, an old champion, leads the telegraphy section. He is followed by another regular competitor, C. G. Allen, B.R.S.250. Eric Trebilcock, B.E.R.S.195, did not receive the full contest rules but, working as best he could, compiled two combined check-and-scoring logs with more than 500 C.W. entries alone. Two others also sent in comprehensive check logs in addition to their entries.

Conditions

If one were to study years of records in order to determine the best week-end for world-wide communication, the choice would probably fall in February. Yet this year conditions for the 'phone contest were so appalling that all over the world amateurs doubted if there was a contest in progress. Such signals as could be located were floating in a fog of noise. There was some improvement during the C.W. week-ends, and on the whole very good average scores were made. It was admittedly a low frequency year, reminiscent of the days when 28 Mc/s. was almost unknown, and 14 Mc/s. was the secondary band.

As usual, there was a fine crop of rare stations to be had—such as VP8AI and VP8AP on 7 Mc/s., ZM6AK and a couple of VK9's for Britain, or ZC4TF for the VK's and ZL's. In U.K. there was also the thrill of hearing ZD4AB and recognising the unmistakable fist of ZS5U on 3.5 Mc/s.

Entries: Logs

The total of 207 logs submitted represents a considerable advance on 1950, a good proportion being received from all parts of the Commonwealth, with the exception of South Africa. The appeal for tidy and uniform logs has borne little fruit, and it was still necessary to conduct surgical operations on some to make them usable!

If all the stations who appear on these logs had sent in a claim or a check log, the number of entries would have been more than double, but it is quite clear that many of the entrants had not seen the full rules, and this accounts for some of the "non-eligibles." A great deal of publicity is needed to produce a successful contest these days, but in spite of all that was done, the delay occasioned by last year's printing dispute

proved to be a serious handicap. All those who favour the contest could help by giving publicity to it over the air.

Correspondence

Many letters were received in or with the logs, containing a variety of comments and helpful suggestions. From VK and ZL comes a report of a shortage of ZS contacts, and a suggestion that closing time is too near to Monday work time. The time period was very carefully chosen, however, so that nobody would have to start on a Friday! The shortage of Africans was partly real and partly due to conditions. ZS6QF thinks a little extra zoning would bring in more South Africans. Competitors in remote places who are assailed by G-calls would like Great Britain to be zoned. G6LI sends his usual critical commentary on events, and offers a theory as to why some well-ordered stations suddenly developed bad notes during the contest. Generally speaking, comment on operating and quality of signals was favourable. There were some complaints about V.F.O. tactics: the only remedy would seem to lie in reversion to the days when there were about five stations where there are now 50.

The choice of dates is criticised, but the answer is that there is no choice. The DX season is limited, and is full of contests, some of which take up more than their fair share of time. Special sympathy must go to VK2DI who wrote to say that he was defeated by sickness, and to VE4MF, who was unable to obtain a single contact.

Judging

Apologies are offered for the lateness of this report. Normally B.E.R.U. results are published more quickly than any other DX contest, but some delay was caused this year by local circumstances.

Several anomalies arose, the most important concerning a log received from Y13BZL. Eligibility is limited to Commonwealth prefixes, but in this case his claim has been listed, and logs credited where necessary, thus giving the benefit of the doubt to those who worked him.

In many cases log totals were in error, and adjustments were necessary. It should be realised that the object of the analysis sheet is to eliminate such errors. An hour spent by the contestant in doing this for *one* log may save the Committee the task of having to do it for *200* logs. The declaration of fidelity was missing here and there, and since this is essential for the protection of other competitors, logs cannot be accepted without it. Entries failing in these ways, or posted later than specified under Rule 9, have been listed but marked "not eligible for award."

Acknowledgements

Thanks are extended to all those who have sent in suggestions and comments, and to certain members of the Slough R.S.G.B. group who, working under the direction of the Contests Committee, devoted many hours to the spade-work of log checking. Finally, thanks are recorded to those listed below who sent in check logs.

Check Logs

Telegraphy.—G2AJB, G2HOX, G2JN, G2UX, G3AIM, G3EFO, G3RB, G6AH, G6HD, G6YQ, VE1AE, VE3XY, VE6MZ, VK2DG, VK2DI, VK2OA, VK2PV, VK3ACW, VK3CX, VK3HT, VK4FJ, VK5LD, VQ3CF, VS2AA, ZB1CH, ZD4BD, ZE2JV, ZE3JQ, ZL1RD, ZL2AL, ZL2MM, ZL4GA, ZM6AK, ZS6ACD, B.R.S.1066, B.R.S.15961.

Telephony.—VE3RZ, VE8MJ, VK4HR, VQ2GW, VQ4BU, VS9AA, ZS1BK, ZS3S, ZS5KG, ZS6XK.

RECEIVING SECTION

(a) Telephony

Pn.	Name	Pts.
1	B. KENDALL, B.R.S.14261	768
2	L. SHEARLAW, B.R.S.15846	690
3	A. HERBERT, G2WI/MD5	550
4	A. M. SMITH	367
5	R. J. LINE, A.1122	343
6	E. TREBILCOCK, B.E.R.S.195	193

(b) Telegraphy

Pn.	Name	Pts.
1	W. L. ELY, B.R.S.1535	1,766
2	C. G. ALLEN, B.R.S.250	1,576
3	C. A. BRADBURY, B.R.S.1066	1,504
4	R. S. STOTT, B.R.S.18013	1,477
5	J. L. HALL, B.R.S.19107	1,412
6	JEAN HAYDON, B.R.S.15961	1,252
7	R. W. ROGERS, G6YR	1,136
8	R. W. F. THOMAS, B.R.S.15822	1,030
9	E. TREBILCOCK, B.E.R.S.195	809
10	W. J. C. PINNELL, A.1013	802

* Zone award; † not eligible for award.

The First Low Power Field Day

LOGS submitted show that 23 portable stations were active during the event, and of this number entries came from 14. There was one portable check log. Enthusiastic comments accompanied nearly every entry: there was no adverse criticism. Most competitors spent the whole of their operating time on 3.5 Mc/s., several even suggesting that 7 Mc/s. operation should not be permitted in future. G2WS proposed the use of 1.7 and 3.5 Mc/s. next year. G3GIZ thought that exchange of QTH (instead of QTR as in N.F.D.) was much more interesting to non-competitors. G6GH considered that the rules were fair to all, and suggested "no alteration." G3NA, who submitted his entry in order to strengthen interest in "The QRP Brigade," feels that all results should go in. It is a great pity more people do not share his view. Incidentally, G3NA was the only competitor to remain on 7 Mc/s. throughout his operating time.

The declared weight of equipment ranged from 16 lb. up to the maximum of 20 lb., the majority being over 19 lb. Oscillator-P.A. was the most popular valve combination, although several quite complex circuits were in use, some employing buffer stages, and valves in push-pull or parallel for the P.A. Home-constructed receivers—consisting mainly of 0.v.1. or 1.v.1. types—were in the majority. Three, however, were converted surplus receivers, and one was a six-valve superhet with an extra valve employed as a crystal calibrator. Most stations used a 100 kc/s. oscillator as frequency standard, in several cases one of the transmitter valves being switched for this purpose. A few stations were crystal-controlled, and equipped with absorption wavemeters.

Long wire aerials were popular, a few being supported by kites (one of which descended at an inopportune moment, thus losing its owner a contact!). The remainder were dipoles.

The winner of the contest is G3GYQ who operated from a hill 700 ft. high, using a transmitter consisting of a 1S4 V.F.O., 1S4 B.A. or B.D., and parallel 3A4's in the final with three watts input. The receiver was a T.R.F. 1.v.1., the aerial being a 140 ft. end-fed. This equipment, with batteries and a 100 kc/s. frequency standard, weighed 19½ lb., and brought 77 points from 33 contacts. Runner-up is G3BTP, who used an LP2 as crystal oscillator or V.F.O., and a pair of LP2's as a push-push doubler with 1½ watts input. An 0.v.1. receiver, a 136 ft. centre-fed

RESULTS

Pn.	Name	Call	Site	Pts.
1	C. J. Spackman (P. J. Naish)	G3GYQ/P G3EIX	5 m. S.E. Swindon	77
2	R. Young	G3BTP/P	Nr. Slough	72
3	J. J. Yeend	G3CGD/P	Nr. Swindon 1/11ge.	68
4	C. H. Walker	G3AZT/P	Barby Hill, Rugby	57
5	Chester and District A.R.S.	G3GIZ/P	Mollington, Nr. Chester	55
6	W. A. Scarr	G2WS/P	Westerham, Kent	43
7	Coventry A.R.S.	G2ASF/P	Finham, Warwks.	41
8	N. Bradshaw	G2NY/P	Beacon Fell, Lancs.	38
9	L. S. King	G4IB/P	Frant, Kent	36
10	W. N. Craig	G6JJ/P	Uxbridge, Middx.	32
11	T. F. Herdson	G6ZN/P	Kendal, Westmore'd	25
12	G. Hutson	G6GH/P	Skegness, Lincs.	14
13	B. Littleproud	G3AMK/P	Gorleston, Norfolk	4
14	E. H. Coates	G3NA/P	Breinton, Hereford	3

Check logs were received from G3BY/P and G2ZC.

aerial, a crystal check-oscillator, a Bug key, six rubber bands, a ball of string, an absorption wavemeter, a watch, and the log, weighed 19½ lb. in all, and collected 72 points from 32 contacts.

All competitors are congratulated for their ingenuity—many cleverly designed devices being employed. Thanks are due to those who made suggestions, all of which will be carefully considered at the appropriate time. So many entrants expressed appreciation for the organisation of this event that the Contests Committee feel quite overwhelmed. They hope it will bring as much pleasure to a greater number of people next year.

Members' Note Headings

DUE to increases in the cost of paper and labour, it has again become necessary to increase the price of members' Note Headings. The new price is 7s. per 100 sheets.

Silent Keys

With deep regret we record the passing of that Grand Gentleman of Amateur Radio, Dr. John R. Wortley-Talbot, G6WT, of Torquay. A pioneer of the movement, he helped to lay the foundations of the science. Dr. Talbot maintained an active station on most of the DX bands, as well as on 144 Mc/s., right up to the time of his illness, and his call was probably as well known overseas as it was in this country.

His memory will always be perpetuated in R.S.G.B. circles by the handsome Wortley-Talbot Cup which he presented to the Society many years ago, and which is one of the Society's most treasured trophies. To his widow and two daughters, we extend our heartfelt sympathy in their great loss.

The death has occurred under tragic circumstances of Squadron Leader Joseph C. Payne, G6JB, of Salcombe, Devon. His body was found floating in Salcombe Harbour, and despite efforts of resuscitation life was found to be extinct on admittance to Kingsbridge Hospital. At the inquest a verdict of death by misadventure was returned.

During the first World War Mr. Payne was twice torpedoed. Later he became a dispatch rider and served in France and India. He was a "founder" of Plymouth Aero Club, and while recuperating from a crash became interested in the Salcombe lifeboat, which he helped to "man" on many occasions. He was also their signals officer. Additionally he was second in command of the Bolt Head, Royal Auxiliary Air Force, Squadron. A staunch and loyal member of R.S.G.B., G6JB had operated slow Morse transmissions for some years. He will be sadly missed by all those who work on the "Top-Band."

His wife predeceased him six months ago, and to his daughter, who has suffered this very heavy blow, we offer our most sincere condolences.

G2GK.



The rig at G3GYQ/P, showing (left to right) transmitter on top of power supply box meter, 100 kc/s. standard and receiver, G3GYQ and G3EIX are at left and right respectively.

It's Topical

THE record for the **shortest-distance-ever QSO** (see this column last month), has been challenged and broken—by **G3GYT** and **G2BTJ** of Liverpool. These two active amateurs are brothers-in-law and live at the same QRA, but they have separate rigs in their respective bedrooms, and separate aerials—one a dipole on 40 m., the other a 270 ft. end-fed on 80 and 160 m. At one point the aerials are only a few feet apart. When 'GYT received his "ticket" his first QSO was naturally with 'BTJ, and even before he had signed-off he had received his QSL card duly made-out—with the ink still wet! In addition to the shortest distance QSO, they claim the **quickest-ever QSL**. Any challengers? Incidentally, 'GYT states that they often operate at the same time, but never cause mutual QRM!

One member who will not have to worry about power cuts this winter is **G5UP**, of Carnforth, Lancs, who for four years—with the exception of the summer 1950—has derived all his power for transmitter, receiver, and bungalow lighting from a **wind-charger**. This unit was made up from a 12-volt car dynamo and is successfully used to charge a 12-volt battery. He makes no claim to DX working, but has had 'phone contacts with all parts of the British Isles on 80 m., never running at more than 15 watts input to the P.A. It would be interesting to learn if there are any other British amateurs using wind-chargers to supply their power requirements.

The reception of **radio echoes** from the moon and nearer planets by amateurs operating on 2 m. and 70 cm. is a possibility suggested by a member interested in **astronautics**. There are, however, a number of really tough snags. Since the transmitter power required to produce a detectable echo increases as the **fourth** power of the distance involved, several megawatts would be needed to obtain sufficient reflected microvolts from Earth's nearest neighbours—Mars and Venus. Specially designed receivers are required—for instance, in recent moon-radar experiments carried out in the U.S.A. the receiver had a bandwidth of only 57 c/s. For accurate tuning, the velocity of the moon relative to Earth had to be known, since this factor caused a frequency shift (due to the Doppler effect) amounting at times to 300 c/s.—right out of the receiver's pass-band. Finally, the question of echo delay crops up—in the case of the moon 2.6 seconds. At their nearest points to Earth, Mars and Venus have delays of 8.4 and 4.4 minutes respectively—the time taken for the radio waves to travel there and back. The delay for Jupiter (630 million miles away), would be 70 minutes, and for the nearest star—*Alpha Centauri*—approximately eight years.

A full day's **U.S.A.** television programme (clipped by a member from a New York paper) starts at 9.30 a.m. and ends at midnight. Seven stations provide a wide variety of alternative programmes—including four shows in **colour**. . . Brighton, Hastings and Ramsgate are the sites of three new **B.B.C. transmitters** to improve Home Service coverage in South East England; they came into operation on September 16. . . The **Televisioners' Association**—who have been tracking down interference to television reception with the aid of "D/F vans"—have been asked by the G.P.O. to refrain from conducting these investigations.

Slow Morse Transmissions

THE following slow Morse transmissions, sponsored by the Society, are intended to assist those who aspire to obtain an amateur transmitting licence. More volunteers are still required for parts of the British Isles not already covered and to allow a temporary respite to those who have given their services for several years.

B.S.T. †	Call	kc/s.	Town
Sundays			
10.00 ..	G6MH	.. 1990 ..	Southend-on-Sea
10.00 ..	G5XB	.. 1950 ..	Reading
10.00 ..	G3AEZ	.. 1847 ..	Dorking
10.30 ..	G3GIO	.. 1915 ..	Guildford
11.00 ..	G2FXA	.. 1900 ..	Stockton-on-Tees
21.00 ..	G2FIX	.. 1812 ..	Nr. Salisbury
Mondays			
13.00 ..	G3AXN	.. 1870 ..	Southend-on-Sea
14.00 ..	G3ADZ	.. 1910 ..	Southsea
19.00 ..	G3NC	.. 1825 ..	Swindon
19.30 ..	G3AIX	.. 1760 ..	Birmingham
20.00 ..	G2AJU	.. 1900 ..	Stutton, Ipswich
20.00 ..	G3DSR	.. 1750 ..	Derby
21.00 ..	G3BLN	.. 1900 ..	Bournemouth
21.00 ..	G3BHS	.. 1820 ..	Eastleigh, Hants
22.00 ..	G3AEZ	.. 1847 ..	Dorking
22.00 ..	G3GIO	.. 1915 ..	Guildford
22.00 ..	G3EJF	.. 1810 ..	Bury, Lancs
22.00 ..	G3GCZ	..	
22.00 ..	G3DZU	..	
22.00 ..	G2AYG	..	
22.15 ..	G8TL	.. 1896 ..	Ilford
Tuesdays			
13.00 ..	G3AXN	.. 1870 ..	Southend-on-Sea
18.00 ..	G2FXA	.. 1900 ..	Stockton-on-Tees
19.00 ..	G5XB	.. 1905 ..	Reading
21.00 ..	G3EFA	.. 1855 ..	Southport
22.00 ..	G3ELG	.. 1772 ..	Rotherham
22.00 ..	G3GIO	.. 1915 ..	Guildford
22.00 ..	G2BND	.. 1890 ..	Dalston, E.
Wednesdays			
14.00 ..	G3ADZ	.. 1910 ..	Southsea
19.00 ..	G3ADZ	.. 1900 ..	Southsea
20.00 ..	G2NY	.. 1850 ..	Preston
22.00 ..	G3DLC	.. 1800 ..	Grays, Essex
22.00 ..	G3GIO	.. 1915 ..	Guildford
Thursdays			
18.00 ..	G3AXN	.. 1870 ..	Southend-on-Sea
18.00 ..	G2FXA	.. 1900 ..	Stockton-on-Tees
19.00 ..	G3NC	.. 1825 ..	Swindon
19.30 ..	G3BUJ	.. 1990 ..	Southend-on-Sea
20.00 ..	G3FVH	.. 1920 ..	Hull, Yorks
21.30 ..	G6DL	.. 1760 ..	Birmingham
22.00 ..	G3AEZ	.. 1847 ..	Dorking
22.00 ..	G3GIO	.. 1915 ..	Guildford
22.30 ..	G3OB	.. 1803 ..	Manchester
Fridays			
13.00 ..	G3AXN	.. 1870 ..	Southend-on-Sea
14.00 ..	G3ADZ	.. 1900 ..	Southsea
19.00 ..	G3BLN	.. 1900 ..	Bournemouth
20.00 ..	G5AM	.. 1900 ..	Witnesham, Ipswich
20.00 ..	G2AMV	.. 1870 ..	Wirral
21.00 ..	G3BHS	.. 1820 ..	Eastleigh, Hants
22.00 ..	G3GIO	.. 1915 ..	Guildford
Saturdays			
22.00 ..	G3GIO	.. 1915 ..	Guildford
23.00 ..	G2FXA	.. 1900 ..	Stockton-on-Tees

* Each station will operate in turn.

† G.M.T. from October 21.

Stations listed who find themselves unable to continue transmissions should immediately notify the organiser, Mr. C. H. Lamborn Edwards, A.M.I.E.E. (G8TL), 10 Chepstow Crescent, Newbury Park, Ilford, Essex.

NORTH OF THE BORDER

Glasgow and Aberdeen Meetings Well Supported

THE West of Scotland O.R.M., covering Region 14, was held in the Institute of Engineers and Shipbuilders, Glasgow, on September 15th, 1951. Seventy members were present under the Chairmanship of the R.R. (David Macadie, GM6MD), to hear Council members A. O. Milne, G2MI, L. Cooper, G5LC, T. L. Herdman, G6HD, W. N. Craig, G6JJ, and the General Secretary (John Clarricoats, G6CL), speak on a wide variety of topics. An interesting discussion followed.

During the meeting it was announced that N.F.D. had been won for the first time by a Scottish Group. The Falkirk T.R. (N. F. Holden, GM4MF), and those of his colleagues who were present, received warm congratulations.

Following a buffet tea, members and their ladies gathered for dinner at "The Rhul," Sauchiehall Street. The Chair was taken by the R.R. who had the support of the representatives from Headquarters and a number of his County, Town and Area Representatives. Specially welcome were John Douglas, GM2CAS (Region 12 Representative), and Walter Baker, G3AFL (Region 13 Representative). Whilst proposing a toast to the R.S.G.B. the Chairman referred to the prestige which had been built up around the Society during the past 30 years. Arthur Milne replied neatly. The Glasgow T.R. (Ron Eadie, GM4JO), warmly welcomed the visitors. Walter Baker, in his reply, "brought the house down" by remarking that just after dinner a well dressed gentleman gave him a cigar and then asked 3s. 6d. for it!

Highlight of the evening was the presentation of the Wyllie Trophy to the Rev. Walter Ferrier, GM3BDA, in recognition of his outstanding two metre work. The presentation was made by the General Secretary, who later spoke of the great debt which the R.S.G.B. in general, and Scottish Amateur Radio, in particular, owe to the work of the late Jack Wyllie. Mr. Clarricoats reminded the gathering that 25 years ago that day the first R.S.G.B. Convention took place in London. He was privileged on that occasion to meet Jack Wyllie for the first time. In later years a great friendship developed between them which continued until Mr. Wyllie's untimely death. Mr. Clarricoats



The General Secretary (G6CL), presenting the Wyllie Trophy to Walter Ferrier (GM3BDA), at the dinner which followed the Glasgow O.R.M.

referred to the fact that the Wyllie Trophy had been held in past years by men famous in the annals of Scottish Amateur Radio. The new holder had exhibited talents for experiment and research similar to those which had helped Jack Wyllie and others 25 or more years ago to pioneer the short waves.

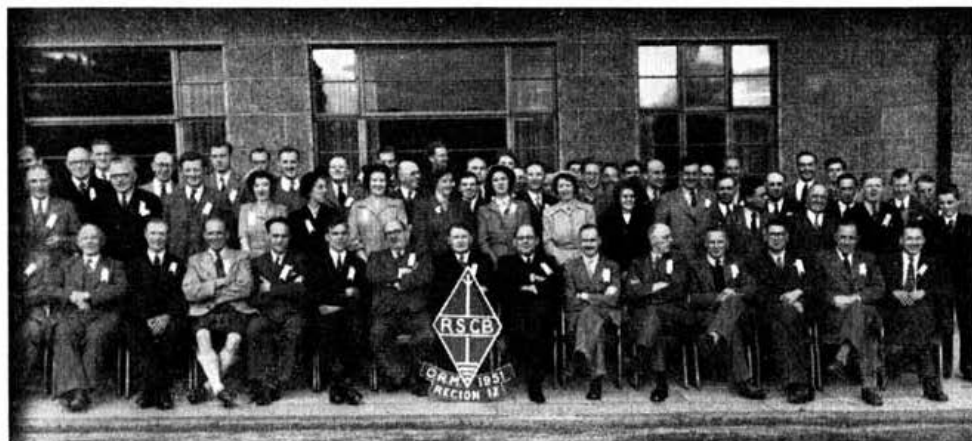
During the evening the Chairman made a presentation to each of the representatives from Headquarters, after which G6CL presented (on behalf of the Organising Committee) boxes of chocolates to each of the ladies, receiving in exchange an appropriate salutation!

One of the new R.S.G.B. car pennants was presented by G5LC to Dr. Gordon Grieve, GM3FQF, in appreciation of the outing made earlier in the day to Loch Lomond.

After a musical session the dinner was brought to a conclusion with the singing of "Auld Lang Syne."

* * *

The second post-war Region 12 O.R.M. was held in the Northern Hotel, Aberdeen, on Sunday, September 16. The Headquarters delegation, which included Messrs. W. N. Craig, T. L. Herdman, L. Cooper, A. O. Milne, representing Council, and the General Secretary (Mr. John Clarricoats,



Some of those who supported the Aberdeen O.R.M. The Region 12 Representative (GM2CAS) is in the centre with G6CL and G6HD on his right, and G5LC and G6JJ on his left. G2MI is third from the right. G3AFL is next to G6JJ.

[Photo by Harvey Grainger]

coats) travelled from Glasgow by road, having attended the Region 14 O.R.M. the previous day. A breakdown of the car about twenty miles from Aberdeen threatened to upset arrangements, but fortunately a rescue squad was able to pick-up the party at Stonehaven.

After lunch, at 2.30 p.m., the business meeting commenced. Mr. J. Douglas, GM2CAS, R.R., in welcoming the guests and members of the Society, expressed his pleasure at seeing such a strong delegation from H.Q., and also so large a number of members from outside the Region. The General Secretary briefly outlined past events and future activities of the Society, after which each Council member spoke on an appropriate subject. Following a general discussion, a unanimous vote of support for the Council was passed, and the meeting then concluded.

After tea, official (and unofficial) photographs were taken. Three films (*Atlantic City 1947*, courtesy G6LJ; *Glasgow N.F.D. 1951*, courtesy GM6MD; and *N.F.D. Aberdeen 1949-50-51* in colour) were screened by GM3BCL, who kindly supplied the projection apparatus.

The Official Programme ended with the usual free raffle (free in Aberdeen!)—highlights of which were the winning of a Handbook by G2MI, and boxes of chocolates by the ladies. A general rag-chew then took place until members finally dispersed. There was a feeling of regret that these meetings take place only once in two years. It has, however, been suggested that a Convention might be arranged at some central point for the Scottish regions—a prospect worth looking forward to!

Contests Diary

November 10-11	"Top Band" (1.8 Mc/s.)
December 1-2	} All European DX
December 8-9	

Dorset Hamfest

THERE was an attendance of 42 at the second Dorset Hamfest held on Sunday, September 23rd, at The Antelope Hotel, Dorchester. Headquarters was represented by Council member, W. N. Craig, B.Sc., G6JJ, and among the visitors was Herbert Bartlett, G5QA, the Region 9 Representative, who had the support of a number of members from his home town—Exeter.

The proceedings were opened by the C.R. (Mr. A. Barrett, G5UF), who outlined county activities, after which Mr. Craig spoke on Society matters generally. At the conclusion of his address, Mr. Craig answered questions on a number of matters including the matter of "cleaning-up" the amateur bands; the suppression of "breakfast-

clubs" and the like; and a proposal that any extra subscription levied should be used to improve the BULLETIN. The hope was expressed that the Society's transmitter would soon be on the air again. Mr. Craig also answered an enquiry regarding the use of amateur transmitters on pleasure craft.

A photograph was then taken after which the party settled down to enjoy a very satisfactory lunch. In the afternoon parties visited the Dorchester Beam station and the Rampisham Station of the B.B.C. The visits were so good that each party wished they could have attended both. After tea an excellent film show was provided by G3BKG. The meeting finally terminated at about 7.30 p.m. with votes of thanks to the organisers.



ON THE BANKS OF LOCH LOMOND

A photograph taken during the recent visit of Council representatives to Scotland. Left to right: Jim Sey (GM8MJ), Dave Macadie (GM6MD), Ron Eadie (GM4JO), Arthur Milne (G2MI), Ron Moir (GM3FPU), Dr. Crieve (GM3FQF) and Leslie Cooper (G5LC) (standing in boat).

Transfer Query

YEARS ago radio dealers sold sheets of label transfers for panels. Mr. E. Shackleton, G6SN, 53 Grafton Road, Handsworth, Birmingham, 21, would be glad to have the name and address of any firm which makes and sells transfers of this type. A post-card to Headquarters would be appreciated too, for a BULLETIN announcement.

Radio Servicing Certificate Examination, 1951

THE results of the Radio Servicing Certificate Examination held in May, have recently been announced by the Radio Trades Examination Board and the City and Guilds of London Institute.

A total of 290 candidates appeared for the examination, of which number 117 satisfied the examiners in both the written and practical tests: 46 candidates passed the written examination, but were referred in the practical test: 19 completed the examination, having been referred in the practical test in the May, 1950, examination.



DORSET HAMFEST, SEPTEMBER 23, 1951

Front row: Left to right, G3HMY (C.R., Devon), G3CVS, G2TZ (T.R., Dorchester), G2DCB, G5UF (C.R., Dorset), G6JJ (Council Member), G5QA (Region 9 Representative), G3EFY (T.R., Exeter), B.R.S.19224, G2HKQ.

Top Band Contest

THE second "Top Band" (1.8 Mc/s.) Contest of the 1951 programme will be held during the weekend of November 10-11.

The contest is open to all members who are licensed to operate on the band, wherever situated. The leading station in the British Isles (prefix zones: G, GC, GD, GI, GM, GW) will be recommended to Council for the award of the *Victor Desmond Trophy*. The leading overseas entrant will receive a certificate of merit. There are no changes in the rules since the January event.

Full use should be made of the entire band (1715-2000 kc/s.) to avoid undue congestion. Competitors are also reminded that the tone report T9 should only be given to stations whose notes are "Purest D.C."

A list of the counties which form the R.S.G.B. regions will be found on page 111 of the September, 1951, issue of the BULLETIN.

Rules

1. The contest is open to all fully paid-up members of the Society.
2. The contest will run from 2100 G.M.T. on Saturday, November 10, to 0800 on Sunday, November 11.
3. Entries will only be accepted if submitted on foolscap or quarto paper and set out in the form below:—

Top Band Contest November 10-11, 1951

Name Call Sign
Address Reg'on
Transmitter
Aerial System
Receiver

Contact No.	Time	Call Sign of station worked	Report			Points Claimed		
			Sent	Recd.	Reg.	3	4	5
1		G2—	599	599	06		4	
2		G3—	599	599	07	3		
Sub-Totals								
Total								

Declaration: I declare that my station was operated strictly in accordance with the rules and spirit of the Contest and I agree that the ruling of the Council of the R.S.G.B. shall be final in all cases of dispute.

Signed

4. Details at the top of the entry form must be completely filled in and the declaration signed, otherwise the entry will be disqualified.
5. Entries must be addressed to the Hon. Secretary, R.S.G.B. Contests Committee, New Ruskin House, Little Russell Street, London, W.C.1. No entry will be accepted bearing a postmark later than Monday, November 19, 1951.
6. Contest operation during local hours of restriction in the use of electricity for wireless which have been publicly announced is prohibited.
7. Proof of contact may be required.
8. Contacts with ships or unlicensed stations will not be permitted to count for points.
9. The contest is confined to two-way telegraphy contacts only.
10. Only the entrant will be permitted to operate his apparatus during the contest.
11. An exchange of RST report and Region number will be required before points for a contact can be claimed. The report and region number must be sent as a six character group, e.g. 579R07 or 579R11 for Regions 7 and 11 respectively. All reports must be acknowledged with "R."
12. Only one contact with a specific station during the contest will be permitted to count for points.
13. The system of point scoring will be as follows:—
(a) For entrants in the British Isles (G, GC, GD, GI, GM, GW)—
Three points will be scored for contact with a station in the entrant's own R.S.G.B. Region. Four points will be scored for contact with a station in any other R.S.G.B. Region.

Five points will be scored for contact with a station outside the British Isles (e.g. DL2).

(b) For entrants elsewhere—

Three points will be scored for contact with a station in the entrant's own country.

Four points will be scored for contact with a station outside the entrant's own country.

14. The power input to the final stage of the transmitter or to any preceding stage must not exceed 10 watts.

15. Any competitor frequently receiving tone reports lower than T9 may be disqualified.

16. Stations can also be disqualified for unethical operating procedure reported by the monitoring stations.

17. An award will be made to the station in the British Isles with the highest total score. Certificates of merit will be awarded to the stations placed second and third, and to the leading station outside the British Isles.

18. The Contests Committee reserves the right to alter or amend these Rules at any time prior to the commencement of the contest.

Bury Radio Amateurs' Examination Course

TO assist beginning amateurs who wish to qualify for a transmitting licence, the Bury group of the R.S.G.B. has arranged a course of six lectures covering the syllabus of the Radio Amateurs' Examination.

October 25—Radio Principles (G3GCZ); November 22—Valves and their Uses (G3DZU); December 20—Receivers (G3FIV); January 24—Transmitters (G3GCZ); February 28—Aerials (G3EJF); March 27—Measurements (G3DZU).

The lectures will start at 8 p.m. at the Y.M.C.A., The Rock, Bury. It is emphasised that the course is elementary in nature, and not intended for the active amateur. Enquiries should be addressed to the T.R.—J. E. Hodgkins (G3EJF), 24 Beryl Avenue, Tottington, Bury, Lancs.

Wireless World Diary, 1952

THIS popular diary—now in its 34th year of publication—is again on sale. Within its 80 pages of reference material will be found a diversity of information compiled by the staff of "Wireless World." The technical data includes formulae ranging from Ohm's Law to P.A. power requirements; Abacs for the graphical estimation of data such as coil windings and circuit constants; circuit diagrams varying from simple detector circuits to a 90 Mc/s. converter; and details of television and F.M. aerials. The reference section also includes base connections of some 670 valves.

There is in addition an abundance of general information and the addresses of radio organisations both in the U.K. and abroad. The diary is available from booksellers price 6s. (Morocco leather) or 4s. 2d. (rexine).

Fifth Annual R.S.G.B. AMATEUR RADIO EXHIBITION

ROYAL HOTEL, WOBURN PLACE,
LONDON, W.C.1

Wednesday, November 28,
to
Saturday, December 1.

Official Opening 12 noon, November 28,
by

MR. CHARLES IAN ORR-EWING, O.B.E.

Hours of Opening:

11 a.m. to 9 p.m. Daily.

ADMISSION 6d.

HEADQUARTERS CALLING

COUNCIL, 1951

President :

WILLIAM A. SCARR, M.A., G2WS.

Executive Vice-President : F. Charman, B.E.M., G6CJ.

Hon. Treasurer : A. J. H. Watson, F.S.A.A., G2YD.

Hon. Secretary : L. Cooper, G5LC.

Hon. Editor : Arthur O. Milne, G2MI.

Immediate Past President : V. M. Desmond, G5VM.

Members : W. H. Allen, M.B.E., G2UJ, A. P. G. Amos, G3AGM, W. N. Craig, B.Sc., G6JJ, C. H. L. Edwards, A.M.I.E.E., G8TL, T. L. Herdman, B.A., A.M.I.R.E., G6HD, P. A. Thorogood, G4KD, P. W. Winsford, G4DC.

General Secretary : John Clarricoats, G6CL.

August Council Meeting

Résumé of the Minutes of a Meeting of the Council of the Incorporated Radio Society of Great Britain held at New Ruskin House, Little Russell Street, London, W.C.1, on Tuesday, August 21, 1951, at 6 p.m.

Present.—The President (Mr. W. A. Scarr) in the Chair, Messrs. W. H. Allen, F. Charman, L. Cooper, W. N. Craig, C. H. L. Edwards, T. L. Herdman, A. O. Milne, P. W. Winsford and John Clarricoats (General Secretary).

Apologies for absence were submitted on behalf of Messrs. A. P. G. Amos, V. M. Desmond and P. A. Thorogood.

British Amateur Television Club.

Resolved:—

- to inform the above Club that the attention of the Council has recently been drawn to the similarity of the B.A.T.C. badge to the R.S.G.B. badge and to point out that, apart from the different lettering, the two badges are almost identical and cannot be distinguished except on close inspection;
- to suggest to the Club that it would be to the mutual benefit of both organisations that their badges should be clearly distinguishable;
- to suggest to the Club that they should consider the re-design of the B.A.T.C. badge to give it a more original appearance.

Membership.

Resolved:—

- to elect 78 Corporate Members and 20 Associates;
- to grant Corporate Membership to 7 Associates who had applied for transfer;
- to grant Life Membership to Mr. E. Valentine, B.R.S.6464.

Applications for Affiliation.

Resolved:—

- subject to the receipt of satisfactory reports from the appropriate Representatives concerned, to grant affiliation to:—
Barrow Amateur Radio & Television Society
Edinburgh Amateur Radio Club
Sanderstead & Purley Amateur Radio Society
Woolwich Radio Society;
- to grant affiliation forthwith to the Ariel Radio Group (Bush House section).

Representation.

Resolved:—

- to approve the appointment of Mr. R. Palmer, G5PP, as County Representative for Warwickshire;
- to approve the appointment of Messrs. W. L. Rimington, G2DVD, and A. W. Grimsdale, G3CJU, as Representatives for the Hailsham area of Sussex and the town of Newbury, Berks, respectively.

R.S.G.B. Amateur Radio Call Book.

It was reported that the 1st Edition of the Call Book was published on August 17.

Resolved to thank the South London Press Ltd. for their co-operation in producing the Call Book at such short notice and to extend to Mr. Tyndall the Council's high appreciation of the work he had done in compiling the book.

R.S.G.B. BULLETIN, OCTOBER, 1951.

Nomination of Regional Representatives.

Consideration was given to the matter of the nomination of Regional Representatives for the forthcoming period of office and a list of those to whom the Council decided to extend an invitation was approved.

Period of Office for Representatives.

Resolved to advise the membership that the next period of office for Regional, Town and Area Representatives will be two years as from January 1, 1952, subject to any revision that might be necessary in the light of alterations to the existing Articles of Association.

Amateur Radio Exhibition.

Consideration was given to various matters connected with the 5th Annual R.S.G.B. Amateur Radio Exhibition.

I.A.R.U. Congress, Paris, 1950.

The Final Report prepared by the French Society (R.E.F.) was submitted, together with a statement of account.

Resolved to apply to the Bank of England for permission to pay to R.E.F. the sum of £48, being the Society's agreed contribution towards the expenses incurred in arranging the I.A.R.U. Congress in Paris, 1950.

[Note: The total expenses incurred in arranging the Congress amounted to £120. The contribution to be paid by each Society is based on membership rolls at July 1, 1951.]

Analysis of Questionnaires.

Resolved not to proceed with the compilation of a further report setting out individual viewpoints put forward in the Questionnaire.

It was explained that a number of the suggestions concerning the BULLETIN, contained in the Questionnaires, had already been adopted, whilst other major suggestions will be considered during the examination of the Articles of Association.

Geneva, Extraordinary Administrative Radio Conference.

The Secretary reported that he had been reliably informed that the United Kingdom delegation to the Conference had been briefed to support:—

- a proposal that amateurs in Region I shall be allocated a band between 3500 and 3800 kc/s.;
- a proposal that amateurs in the United Kingdom shall be allocated up to 200 kc/s. between 1715 and 2000 kc/s.

He also reported that a circular had been issued by the Region I Bureau to all Member Societies in the Region urging them to seek the support of their Administration for amateur matters at the Geneva Conference.

Amateur Television Licence.

The Secretary reported that a draft of the Amateur Television Licence was received by the Society on June 12 and sent immediately to certain members of the Technical Committee for their comments. The views of these members would be discussed at a forthcoming meeting with representatives of the G.P.O.

I.A.R.U. Calendar No. 42.

Consideration was given to I.A.R.U. Calendar No. 42. [The Calendar was referred to in the September issue of the BULLETIN.—Ed.]

V.E.R.O.N. 35th Anniversary Conference

Resolved to authorise Mr. Charman (the Executive Vice-President) to represent the Society at the V.E.R.O.N. (Netherlands) 35th Anniversary celebrations.

Adjournment.

Due to the lateness of the hour it was resolved that this Meeting stands adjourned until 6 p.m. on Thursday, August 30, 1951.

The Council rose at 9.35 p.m.

The Council reassembled at 6 p.m. on Thursday, August 30, 1951, when the following were present:—

Messrs. W. A. Scarr, L. Cooper, W. H. Allen, W. N. Craig, C. H. L. Edwards, T. L. Herdman, P. A. Thorogood, P. W. Winsford and John Clarricoats (General Secretary).

V.E.R.O.N. Conference.

It was reported that, as Mr. Charman could not make the journey, the President had agreed to represent the Society at the forthcoming V.E.R.O.N. Conference.

Draft Amateur Transmitting Licence.

The Secretary reported that a copy of the licence for an Amateur (Sound) Wireless Telegraphy Station, which had been drafted by the G.P.O. to conform to the regulations of the new Act, had been sent to the Members of the Council during July with a request for their comments. A Special Report based upon the comments received had been prepared and was now before the Council for consideration.

The views set out in the Report were carefully examined and agreement reached on all points.

The Secretary was instructed to communicate the views of the Council to the G.P.O.

Convention, 1951.

Consideration was given to a financial statement prepared by the Hon. Treasurer of the Convention Committee and to a Report submitted by the Convention Committee. The Report showed that as the result of representations made to the caterers, after it became clear that the number of persons expected to attend the various functions would be much less than expected, the original guaranteed commitment had been scaled down.

Regional Representatives' Conference.

Consideration was given to the various Recommendations approved at the Regional Representatives' Conference held on April 28, as set out in the July, 1951, issue of the R.S.G.B. BULLETIN.

Recommendation A

It was agreed to examine this recommendation (which related to the Government of the Society) when considering the revision of the appropriate Article of Association.

Recommendation B.

It was agreed not to accept this recommendation on the grounds that (a) the present finances of the Society do not permit the appointment of a highly qualified professional Technical Editor; (b) the Council is already committed to make a further high-level appointment in the person of a qualified Assistant to the General Secretary and that when this appointment is made the General Secretary will be free to devote more time to Editorial duties than is possible at present; (c) an Assistant Editor was appointed earlier in the year.

Recommendation C.

It was agreed to refer back to the Society's legal adviser the question of the General Secretary's appointment to serve on Committees of the Council with voting power.

Recommendation D.

It was agreed to examine this recommendation (which related to the requisitioning of a Special General Meeting) when considering the revision of the appropriate Article of Association.

Recommendation E.

In connection with this recommendation (which related to

claims for postages made by T.R.s) it was agreed to amend the instructions issued to Town Representatives so as to permit them to make an "en bloc" entry for circulars sent at the cheap rate.

Recommendation F.

It was noted that this recommendation (which related to the publication of the Report of the Conference) had already been implemented.

Special Meeting.

Resolved to hold a Special Meeting of the Council on September 26, 1951, in order to continue the examination of the Articles of Association.

The Meeting terminated at 9.30 p.m.

Representation

The following is an alteration to the list published in the February, 1950, issue of the R.S.G.B. BULLETIN:—

District Representative

Region 7: London South-East:

A. V. Dyer, G6VV, 96 Bladindon Drive, Bexley, Kent.

Vacancies

Due to ill-health Mr. W. G. Rowlands, G6KF, has resigned as County Representative for Kent (outside the London Region). In addition Messrs. L. J. Fitzgerald, G4QL; B. Hayes, B.R.S. 9600 and G. W. Robertson, GM3FEU have resigned as County Representatives for Hampshire, Buckinghamshire and Angus and Perthshire.

Nominations for their successors should be made in the manner prescribed in the September, 1949, issue of the BULLETIN and sent to reach the General Secretary by October 31, 1951.

Region 3 Representation

THE Council has received with regret the resignation of Mr. D. A. G. Edwards, G3DO, from the office of Region 3 Representative. Mr. Edwards held office from January, 1947, until his resignation became effective last month.

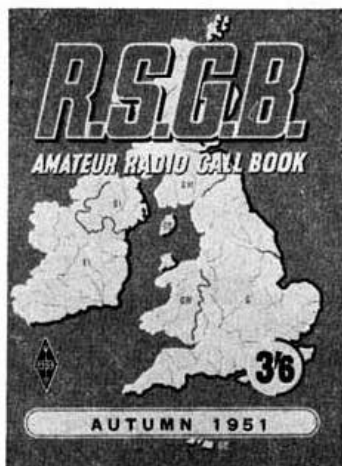
Around the Trade

Readers who wish to receive information at regular intervals concerning radio and electronic equipment currently available are invited to write to the *Mail Order Supply Co.*, 33 Tottenham Court Road, London, W.1, for their newly published broadsheet of postal bargains. Applicants will be placed on the Company's mailing list to receive future issues free of charge.

AN AMATEUR RADIO BEST SELLER

More than 3,000 copies of the first edition of the R.S.G.B. Amateur Radio Call Book were sold within a few weeks of publication. If your shack is without a copy get one at once. Stocks are running low.

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THE CALL BOOK YOU CAN RELY UPON

REGIONAL AND CLUB NEWS

Acton, Brentford and Chiswick

Members are welcomed to the newly formed meetings for Acton, Brentford and Chiswick area now being held every Tuesday at 7.30 p.m. in the A.E.U. Rooms, 66-68 High Road, Chiswick, W.4. Future plans include discussions on and practical construction of a TUSB V.F.O., "Top Band" transmitter, stabilised power supplies, a frequency meter, a speech amplifier, and a modulator, based on designs featured by E. J. Pearcey, G2JU, in his lectures of last season at the Brentford Institute. A period of Morse practice is a regular feature of each meeting.

Barnet and District Radio Club

At the North London Society of Model Engineers' Exhibition held in Barnet recently, the Club erected and operated an Amateur Radio station—call G3FFA/A—using equipment mainly loaned by G3GPB. Despite heavy local interference from electrically operated exhibits, 38 contacts were made on the "Top Band." Among the many visitors were G3AUU, 3EOH, 3HRH, 6CY and 6QI—the Barnet T.R.

Meetings are held at "Hopedene," The Avenue, Barnet, every Wednesday at 8 p.m.

Bradford Amateur Radio Society

The A.G.M. was held on September 11. About 30 members attended and the following Officers were elected for the year 1951-52: President, H. V. Found (G2AKU); Treasurer, J. J. Platt (G2VO); and Secretary, A. W. Walmsley (G3ADQ). Mr. Walmsley, who is also T.R. for Bradford, will be glad to get in touch with new members. For dates of meetings see Forthcoming Events.

Brighton and District Radio Club

Talks and demonstrations by a number of manufacturers are planned for future meetings. *Pye Ltd.* have chosen as their lecture subject, "New V.H.F. Telecommunication Equipment." The Club transmitter will be on 80 during open evenings. Morse classes are being arranged again for those wishing to improve their speed. The Secretary is R. T. Parsons, 14 Carlyle Avenue, Brighton 7.

Cambridge and District Amateur Radio Club

"Electronic Instrumentation in Nuclear Physics" was the subject of a talk given by C. Washell, G3CJY, at the last meeting. The Granfield Trophy Contest (an R.S.G.B. event open to all members in Region 5) has been won by S. Kharbanda, G2PU. The Club is organising a contest for the twelve best QSL cards received by transmitting or B.R.S. members during the year commencing October 1, 1951. Hon. Secretary: T. A. T. Davies, Meadow Side, Comberton, Cambridge.

Cheltenham Amateur Radio Society and R.S.G.B. Group

An Amateur Radio station—call G3GPW—was the main feature of an exhibit organised by the Cheltenham Amateur Radio Society and the R.S.G.B. Group as part of the Hobbies Exhibition held recently at Cheltenham Town Hall. The 150-watt transmitter was operated throughout the four days of the Exhibition, 105 'phone contacts being made on 80 and 40 m. Equipment on show, covering more than 200 sq. ft. of table space, ranged from an 0-v-0 to a 25-valve superhet, with an oscilloscope forming a centre of interest. A display board was used to exhibit nearly 100 photographs of local amateur activities, together with cuttings from the BULLETIN.

Approximately 11,600 visitors saw the Exhibition, the radio

stand being a main focus of attention. Large numbers of local amateurs and S.W.L.s turned up, as well as many from other parts of the country. A substantial increase in Club membership is anticipated.

Meetings are held at 7.45 p.m. on Fridays at St. Mark's Community Centre, Brooklyn Road, Cheltenham.

East Surrey Radio Club

An interesting programme of lectures has been arranged for the winter season. Meetings are still held monthly at the Barn Room, Lesbourne Road, Reigate. The Club would be glad to hear from anyone knowing of a room to let in the Redhill-Reigate area, suitable for permanent premises. Hon. Secretary: L. G. Knight, Radiohme, 6 Madeira Walk, Reigate.

Kenilworth Radio and Television Society

The new Hon. Secretary is S. Smith, 40 Stoneleigh Road, Kenilworth, Warwickshire.

Kingston and District Amateur Radio Society

An Exhibition of home-constructed Amateur Radio equipment will be held on Saturday, November 10, from 2 until 10 p.m., at Penrhyn House, 5 Penrhyn Road, Kingston. An amateur station will be operated using the call signs G2ACA/A, G3DHz/A and G3GVU/A on 3.5 Mc/s. and "Top Band." It is hoped that amateurs will co-operate in providing contacts for the interest of the visiting public.

The Exhibition will be officially opened at 2.30 p.m. by the Mayor and Mayoress of Kingston. Profits will be donated to the "United Appeal for the Blind," many prizes and gifts having already been promised for the benefit of this cause. It is believed that this is the first occasion on which an Amateur Radio Society or Club has organised an Exhibition for the benefit of a charity, and it is hoped that the event will meet with the success it deserves.

Medway Amateur Receiving and Transmitting Society

The new Hon. Secretary is C. R. Hawkins, 9 Sanctuary Road, Gillingham, Kent.

Midland Amateur Radio Society

At the A.G.M. held on September 18, it was fitting that for the forthcoming year—during which the Society celebrates its 21st Anniversary—Charles Young, G2AK, should be elected President. Mr. Young, who is a founder-member and Past President of M.A.R.S., has held a licence for 25 years. The Society also honoured Mr. Wilfred Butler, G5LJ, and Mr. Arnold Rhodes, B.R.S.16579, by electing them Vice-Presidents in appreciation of the valuable service they have rendered over many years.

Sheffield Amateur Radio Club

Two visits to the local G.P.O. will take place during November. A Club member (F. H. Martin, G2CDT) recently broadcast a commentary on a local football match in the North Regional "Sports Review" programme.

Slade Radio Society

On October 26 a talk entitled "Measuring Instruments" will be given by Mr. Collinge, of *Ferranti Ltd.* The Annual Dinner and A.G.M. will take place on November 9 and 23 respectively. A fortnight later, on December 7, Mr. G. P. Thwaites, of *Standard Telephones and Cables*, will lecture

COUNTY DURHAM SECOND ANNUAL HAMFEST.

Forty-two Region 2 members met at the Imperial Hotel, Darlington, on Sunday, September 2, 1951, under the chairmanship of the Durham C.R. (Mr. T. Orr, G3IV). Chief guest was the Region 2 Representative (Mr. C. A. Sharp, G6KU), who spoke on Society affairs. The arrangements were in the hands of the Darlington T.R. (Mr. P. Lucas, G3BQJ). G6KU is in the middle of the centre row seated, with G3IV on his right and G3BQJ on his left.



R.S.G.B. Direction Finding Field Days National Final - September 30, 1951

RESULTS

- (1) G. T. Peck, High Wycombe.
Time of arrival, 1451 B.S.T.
- (2) S. Phillips, Birmingham.
Time of arrival, 1453 B.S.T.
- (3) J. Frings, Southend-on-Sea.
Time of arrival, 1512 B.S.T.

on "The Manufacture of Cathode-ray Tubes." Meetings are held at 7.45 p.m. in the Parochial Hall, Broomfield Road, Slade Road, Erdington, Birmingham 23.

Southend and District Radio Society

A large attendance—including P.O. radio engineers and members of the local factories of *Ekco* and *Cathodion Ltd.*—supported the opening meeting of the Society's winter session at the Municipal College, when a coloured film-strip illustrating the function of a cathode-ray tube in television was shown. At the next meeting, a public lecture and demonstration by *Mullard* experts of projection television from the actual B.B.C. programme took place at the Southend High School for Girls.

In the National final of the R.S.G.B. Direction Finding Competition, held on September 30, three members of the Southend and District Radio Society located the hidden transmitter in a thick wood three miles north of Brentwood. Mr. G. T. Peck (an Honorary Member) was first, Mr. J. Frings third, and Mr. R. K. Seabrook ninth. There were 14 finalists from various parts of U.K.

Spenn Valley Radio and Television Society

The 1951-52 season opened on September 12 with a lecture on music, records and record playing by Mr. B. Marsden, of *A. R. Sugden & Co.*, Brighouse. Several new members were enrolled and two members have passed the R.A.E. On September 26 the club paid a visit to the Bradford City Police photographic studio.

At a meeting on October 24, J. Bateman, G6BX, will talk on "Experimental Television." A lecture on "The History of the R.S.G.B." will be given by C. Sharp (R.R.), G6KU, on November 7. Meetings commence at 7.30 p.m. and are held at the Temperance Hall, Cleckheaton. The Secretary is N. Pride, 100 Raikes Lane, Birstall, Nr. Leeds.

Sutton and Cheam Radio Society

Recent lectures included "Aerials," by G. A. Bird, G4ZU, and "Principles of the Cathode Ray Oscilloscope" by K. Derry, G3GKP. During the Rotary Club Hobbies Exhibition held at Sutton Public Hall from October 10-13, the Society operated an Amateur Radio station on all bands from 160 to 10 m. under the call G4DH/A. On November 6 there will be a talk and demonstration on "Long Playing Records" by Mr. Thomson of *Decca Ltd.*

Torbay Amateur Radio Society

The Society meets every third Saturday in the month at 7.30 p.m. in the Y.M.C.A., Castle Road, Torquay, and extends a welcome to visitors. Lecture highlights for the winter session include the *Mullard* film-strip "Cathode-ray Tubes and Valves" (October 20); "Principles of TV" (November 17) and "Basics of the Transmitter" (December 15). The Secretary is W. A. Launder, B.Sc. (Eng.), G3FHI, 15 Cambridge Road, St. Marychurch, Torquay.

Wirral Amateur Radio Society

A lecture and demonstration on "Quality Reproduction" sponsored by *Goodman's Industries Ltd.*, is planned for October 24. At the meeting on November 7, a *Mullard* film-strip will be shown. The Secretary is A. H. Watts, G3FXC, Woodend, 14 Grange Crescent, Hooton, Wirral.

FORTHCOMING EVENTS

(Continued from Page 141)

- Southgate.**—November 8, 7.30 p.m., Arnos Secondary Modern School, Wilmer Way (Geography room). (Five minutes from Arnos Grove Station).
Sutton & Cheam.—November 6, 20, 7.30 p.m., Sutton Adult School, Benhill Avenue.
Slough.—November 15, 7.45 p.m., "The Golden Eagle," High Street.
St. Albans.—November 7, 21, 7.30 p.m., Ottershaw, Upton Avenue.
Welwyn.—November 6, 8 p.m., Council Chambers.

REGION 8

- Brighton (B.D.R.C.).**—Tuesdays, 7.30 p.m., Eagle Inn, Gloucester Road. **E.B.S.W.C.**—Thursdays, 7.30 p.m., 27 Warren Avenue, Woodingdean.
Chatham (M.A.T.R.S.).—Mondays, 7.30 p.m., Co-operative Hall, Luton Road.
Eastbourne.—November 2, 7.30 p.m., Christchurch Club Rooms, Hanover Road.
Gillingham (G.T.S.).—Alternate Tuesdays, 7.30 p.m., Medway Technical Institute.
Petersfield.—October 18, November 15, 7.30 p.m., "Heroes of Waterloo," Waterlooville.
Portsmouth (P.D.R.C.).—Tuesdays, 7.30 p.m., Royal Marines' Signal Club, Eastney Barracks.
Reading (R.R.S.).—October 27, Main meeting, Abbey Gateway; November 10, Instructional, Abbey Gateway.
Southampton.—November 3, 7.30 p.m., 22 Anglesea Road, Shirley.

REGION 9

- Bath.**—November 19, 7 p.m., 12 Pierrepont Street.
Bristol.—October 19, November 16, Carwardine's Restaurant, Baldwin Street, Bristol 1.
Exeter.—November 2, 7 p.m., Y.M.C.A., 41 St. David's Hill.
Gloucester.—Alternate Thursdays, 7.30 p.m., Spread Eagle Hotel, Market Parade.
North Devon.—November 1, 7.30 p.m., Rose of Torrington Cafe, The Quay, Bideford.
Penzance.—November 1, Railway Hotel.
Plymouth.—October 20, November 17, 7 p.m., Tothill Community Centre, Tothill Park, Knighton Road, St. Jude's.
Stroud.—Wednesdays, 7.30 p.m., Subscription Rooms, Railway Hotel.
Torquay.—October 20, 7.30 p.m., Y.M.C.A., Castle Road.
Weston-super-Mare.—November 1, 7.30 p.m., Y.M.C.A.
West Cornwall (W.C.R.C.).—October 18, November 1, "Fifteen Balls," Penryn, Nr. Falmouth.
Yeovil.—Wednesdays, 7.30 p.m., Grove House, Preston Rd.

REGION 10

- Cardiff.**—November 12, 7.30 p.m., "The British Volunteer," The Hayes.

REGION 13

- Edinburgh (L.R.S.).**—October 18, thence fortnightly, 7.30 p.m., Edinburgh Chambers of Commerce, 25 Charlotte Square.

REGION 14

- Falkirk.**—October 26, November 9, 7.30 p.m., The Temperance Cafe.
Glasgow.—No October meeting at Elmbank Crescent.

G3DIT/A AT PORTSMOUTH

Amateur Radio was represented at the Portsmouth and Southsea Festival of Britain Trades Fair and Exposition held in July. On the stand, organised by the Portsmouth and District Radio Society, were exhibited numerous items of equipment constructed by members. An amateur station—call G3DIT/A—was operated throughout the period of the Exhibition. Using up to 130 W. on 20, 40 and 80 m., hundreds of contacts were made with stations in all parts of the world—the QSOs being heard by the many thousands of visitors to the stand.



NEW BOOKS

THE RADIO AMATEUR'S HANDBOOK (28th Edition—1951). By the Technical Staff of the A.R.R.L. 608 pages of QST size. Price 23/- (post free). Direct from R.S.G.B. Headquarters. Immediate delivery.

One of the two new chapters in this edition covers the design and construction of single sideband suppressed carrier telephony transmitters in 13 pages. This is an important section, and is all too brief. The other new chapter deals with mobile equipment: transmitters, converters and aerials.

Aerials and transmission lines are now treated in separate chapters, and increased attention is paid to proper matching for higher efficiency and lower harmonic radiation. The consideration of high-frequency receivers includes the latest in S.S.B. techniques, and much constructional material. It seems rather a big jump from a "one-tube regenerative receiver" to an "eight-tube superheterodyne," but there is nothing in this chapter one would wish to omit to provide space for an intermediate type receiver.

The latest methods of handling, or obviating, TVI are presented, and will be helpful to many British amateurs. Then there is the Valve Data section, with—mention only one thing—430 valve-base diagrams; how extraordinarily useful it is, and how it makes us wish that British manufacturers—but that is a different story.

This edition is the usual excellent job, and bang up to date. T.P.A.

TELEVISION EXPLAINED. By W. E. Miller, M.A. (Cantab), M.Brit.I.R.E. Page size 8½" x 5½"; 104 pages with 75 illustrations. Published by Iliffe & Sons, Ltd. 5/-. *

This book, now in its fourth edition, sets out to explain in simple non-mathematical language the fundamentals of television circuitry. There is a special chapter on receiver installation, and the latest available information about frequency allocations for planned television stations. A valuable feature is a series of actual photographs of picture faults, with a note of the appropriate remedy to be applied in each case.

The book will make a special appeal to those who already have some knowledge of radio techniques and wish to acquire a thorough grounding in T.V. circuit design. In particular, it will prove useful to technical students and radio servicemen who wish to transfer their attention to television.

RADIO VALVE DATA. Page size 11" x 8½"; 80 pages. Published by "Wireless World." 3/6. *

The new edition of this well-known reference book contains the main characteristics of more than 2,000 types of British and American radio valves and cathode-ray tubes. The data in the tables indicates the electrical characteristics of each valve, together with base connections, and includes obsolete, replacement, and current types. An index enables any valve to be found quickly and with the minimum of trouble.

The book is intended for engineers, dealers, and servicemen in the radio and television trade, and for experimenters and radio amateurs—in fact, all who use valves and require accurate and comprehensive information.

PRACTICAL WIRELESS SERVICE MANUAL. By F. J. Camm. Page size 7½" x 5"; 296 pages with 221 illustrations. Published by George Newnes, Ltd. 8/6. *

This book, now in its 9th edition, needs little introduction. Designed specifically for the serviceman, it covers the whole field of radio faultfinding and maintenance, providing a compact and useful source of information for all those engaged in the testing and servicing of wireless receivers. There are 37 chapters, which include the following headings: "Trimming and Aligning Receivers," "Checking Receiver Performance," "Tracing and Eliminating Hum," "Distortion—Causes and Cure." A book which should be included in the library of both the professional service engineer and the amateur fault finder.

GUIDE TO BROADCASTING STATIONS. Sixth Edition. Page size, 5½" x 4½", 94 pages, price 2/2 by post. *

The sixth edition of this useful pocket-size compendium lists about 250 stations known to be operating on authorised frequencies and nearly 200 which work on unauthorised frequencies. Details are also given of some 1,400 short-wave broadcasting stations operating in 117 countries.

The list of V.H.F. stations in Europe—nearly 50 in number—gives some indication of the growth of this form of broadcasting since the publication of the 5th Edition which listed only eleven. Details are also given of fourteen European television transmitters and a number of Consol and standard frequency stations.

Stations are listed both geographically and in order of frequency, and the details have been checked against frequency measurements made at the Tatsfield B.B.C. receiving station.

R.S.G.B. BULLETIN, OCTOBER, 1951.

THE WIRELESS AND ELECTRICAL TRADER YEAR BOOK 1951 (22nd Edition). Page size 8½" x 5½"; 292 pages. Published by Trader Publishing Co., Ltd. 10/6.

This invaluable reference book for the radio, television and electrical industries contains much new information relating to television, including specifications of current commercial receivers, valves used, I.F. values, valve and C.R.T. base connections. In addition there is a new section on television test equipment, designed to meet the needs of dealers in areas where television stations are to be opened later this year. Other data includes specifications of current wireless receivers, legal information, and a directory of trade associations. For ease of reference, directory sections are printed on distinctively tinted papers.

A COMPREHENSIVE RADIO VALVE GUIDE. By W. J. May. Page size 9½" x 7½"; 52 pages. Published by Bernard's (Publishers) Ltd. 5/-. *

This book, No. 100 in the series of Bernard's Radio Manuals, provides operating conditions, characteristics, and base connections for more than 2,000 British and American valve types, including cathode-ray tubes, stabilisers, rectifiers, etc. An alphabetical index enables quick reference to be made to any particular valve in the minimum of time. A useful feature is that the base diagrams appear on the same page as the valve data to which they relate—a great time-saver, as servicemen and others who use valve data charts will readily appreciate. This is a book that will be in constant use in professional and amateur workshops and service departments.

OSRAM VALVE MANUAL (Part I). Page size 9½" x 6"; 255 pages; profusely illustrated. Published by the General Electric Co., Ltd. 5/-. *

This manual is intended as a complete guide to the Marconi-Osram range of valves for the radio engineer engaged in the maintenance and design of wireless receivers and other electronic apparatus. Valve types listed include standard receiving valves (battery, mains and universal), cathode-ray tubes, photo-electric cells, current and voltage regulators, neon indicators, Geiger-Müller tubes, and crystal diodes. Full characteristics, operating data, and curves are given for the various types listed. In addition, the manual contains an interesting and concisely written historical section, together with a supplement containing typical valve circuits. Transmitting and industrial valves will appear in Part II to be published at a later date.

PRACTICAL WIRELESS ENCYCLOPAEDIA. By F. J. Camm (12th Edition). Page size, 8½" x 5½", 372 pages, 554 illustrations and tables. Published by George Newnes Ltd., price 21/-. *

This is a completely up-to-date and thoroughly revised edition of one of the very few comprehensive reference books in the literature of radio. New sections deal with Radar, Television, Remote Control, and Photo Electric Cells, whilst an entirely new series of modern circuits for receivers and amplifiers has been added. Car Radio, Electronic Multipliers, Quartz Crystals, Amateur Transmitters, Fault Finding, Aerials and Meters are all covered. The book has been reset and reillustrated throughout.

As a point of interest the Phonetic Alphabet published on Page 35 is largely the one used during and after the first World War, whilst the list of International Call Signs (Prefixes is the more correct word) given on Pages 158-160 appears to be the one which was agreed to by representatives of the R.S.G.B. and A.R.R.L. some years ago. The list is somewhat out of date—GD (Isle of Man) being a particularly important omission.

It is noticed that such well-known terms as "Frequency Doubler" (or Multiplier), "Speech Clipper," "Variable Frequency Oscillator" and "Germanium" are omitted. The latter is mentioned in the alphabetical list where the reader is referred to "Crystal," but no reference to germanium appears under the "Crystal" heading. Notwithstanding these small errors and omissions, the book lives up to the claim of the publishers "that it incorporates the accumulated knowledge of radio science."

THE GUILDS' ENGINEER. *

The Second Issue (dated 1951) of the Guilds' Engineer (Journal of the City and Guilds College Engineering and Radio Societies) contains a number of important contributions on Engineering, Radio and allied subjects. Of particular interest is the Student Paper read to the Radio Society by P. M. S. Hedgeland, M.B.E., entitled "Frequency Modulation Receivers." "Trend in the design of Small Power Transformers for use in Communication Equipment" contributed by E. S. Parkes, is the title of a further Radio Section Paper.

A valuable contribution to this issue sets out briefly an account of the Research work being undertaken in the College. The Guilds' Engineer can be obtained from the College, price 5/-. *



The Radio Amateur's Examination

DEAR SIR,—I have studied the latest question paper for the Radio Amateur's Exam. with very mixed feelings. It seems to me that the standard of technical knowledge required is no longer as high as it was when this exam. was first introduced. I realise that this may seem rather in the style of "things aren't what they were in my young days"—I took the exam. in 1947—but it does seem rather ludicrous to award 15 per cent. for describing how to rule lines on a sheet of paper to form a "log," with another 35 per cent. for an extremely simple application of Ohm's Law, a description of a triode, and a knowledge of a simple absorption wavemeter. Granted that we do not know the Pass mark for this exam., personally I would not consider that I possessed even an elementary knowledge of radio even if I obtained 95 per cent. in a paper of this kind.

Why is it that the standard has been lowered? Presumably because a high proportion of entrants were failing to obtain a Pass. This may or may not be a bad thing, depending upon one's viewpoint. If one is only interested in DX working, using a commercial rig, then by all means have a simple test of this sort. But for the chap who is interested in genuine research first, and only really goes on the air to try out his gear, an "exam." of this nature is an irritating formality. This is peculiarly so on the V.H.F. and microwave bands, where I know personally of many unlicensed experimenters who would like to take out a transmitting licence, but are held up by this exam.—rightly regarded as a waste of time—and also the Morse test. Consider the case of a man who has built a TV transmitter for the 13 cm. band: he is not in the slightest bit interested in going on any of the L.F. bands, and has absolutely no use for Morse. His technical knowledge, too, will obviously be of a higher standard than that required to pass the R.A.E., although he could quite easily fail due to an insufficient knowledge of L.F. techniques.

It seems that with our hobby in its present state of development there is a very strong case for two exams., and two licences: one, as at the moment, the other involving a very much stiffer technical exam., and no Morse test. This latter licence would entitle the holder to operate only on the bands above 400 Mc/s., say; passing the Morse test would permit the licensee to use the lower frequency communication bands. No one is going to say that a knowledge of C.W. is a necessity on 3 cm., for instance, in order to receive a Government message to close down! I should be delighted to think that the technique of communication on these U.H.F. bands had developed to the extent that the Government could cover the whole country with a C.W. signal to QRT.

Even if it is not possible to have an "Experimenter's Licence," could I put in a plea that the standard of the R.A.E. be not lowered any further, or it will become a mockery, and something that one is scarcely proud to have passed?

Yours faithfully,

M. BARLOW, G3CVO.

Gerrards Cross, Bucks.

T.V.I.

DEAR SIR,—From time to time I see descriptions of various methods of preventing amateur transmissions from interfering with the television picture, but I do not think such attempts are worth while in the case of amateurs who, like myself, live in densely populated areas.

The reason is that in such cases one finds that the broadcast receivers which are being used for the Home and Light programmes are in many cases of the type which contains an internal frame aerial, and these suffer from direct "break-through" of the transmissions on phone of any near amateur.

I have been unable to find any remedy in such cases, and the R.S.G.B. booklet, "Transmitter Interference," is discreetly silent on this point.

Obviously it is useless to go to the trouble of preventing interference to the television picture if in any case one will interfere with sound broadcast programmes received by flat dwellers using this type of receiver in circumstances which preclude the use of an outside aerial.

The only remedy seems to be to refrain from using phone on any band, or C.W. on 20 metres, during television hours. As regards B.C.I. outside those hours, one must make one's peace with any listener who complains by explaining

the limitations of the type of receiver in question and pointing out that one is deliberately refraining from transmitting during the hours of which broadcasting is enjoyed by most listeners. I should be interested to hear the views of other transmitting members of the Society.

Yours faithfully,

V. G. P. WILLIAMS, G3FYY.

(The Editor will be pleased to hear from any reader who has overcome B.C.I. to a broadcast receiver in circumstances similar to those reported by our correspondent.)

Friendship First

DEAR SIR,—I should like to express my full agreement with the remarks of G2UK on the subject of "nattering." Let those who wish to confine their discussions to purely technical matters do so, but surely those of us who prefer to put friendship first are no less worthy of our licence? In my opinion the question of whether the world can survive or not no longer depends on science; friendship is our only hope!

There are some who tend to abuse their privileges, of course, but these are found in every sphere of life. We can't all be professors, but we can all be friends.

Yours faithfully,

J. H. WOODWARD, G3GYR.

Stoke-on-Trent, Staffs.

Early Wireless Transmissions

DEAR SIR,—It would be interesting to read about the experiences of the early pioneers, and in this connection I think that perhaps I may lay claim to having constructed the first wireless transmitter in Ireland. I hope someone will contradict me, but if they do not then I may go further and state that I believe I constructed the first transmitter to be used for experimental work in these islands.

Away back in 1897 I was engaged on electrical work in Fintona, Co. Tyrone and subscribed to *The Electrical Review*. When Marconi's diagram of the original coherer was published in that journal, I decided (with the assistance of the late William Taylor—also of that town) to make one. It consisted of two silver pistons inserted in a short length of glass tube taken from a baby's feeding bottle. The pistons, which were separated by nickel filings with a trace of mercury added, were connected via a battery to an ordinary electric bell. That same night, after some modifications, and using a "transmitter" comprising a coil capable of giving a spark about an inch long, we did some excellent DX work from an upstairs room to the kitchen!

As I could not fix the date of *The Electrical Review* in which Marconi's diagram was published, I recently wrote to the Editor of that journal asking him for this information, and received the following reply: "We have searched our files and find that this appeared in the issue of *The Electrical Review* of July 16, 1897."

I shall be interested to know if this is a record in early radio experimental work of an amateur nature, and if there is any amateur older than myself active on the air. I was 77 last August.

Yours faithfully,

WM. J. WILSON GUY (G1JJP).

A Question of Power—and of Honour

DEAR SIR,—In the recently publicised remarks on behaviour and ethics in Amateur Radio, one point appears to have been overlooked, namely the "crime" of excessive power input. Although the offenders would doubtless deny it hotly, there are many who use power greater than that for which they are licensed. Within my own limited experience I have come across or heard of many instances, from which I offer the following (generously omitting call signs):—

1. Use of 350 watts for regular DX sked on 20 metres;
2. 750 watts to a 3-element rotary (with uncomplimentary remarks thrown in);
3. 600 watts on the 160-metre band, using a slightly modified ET-4336.
4. A GW phone station on 160 metres who came up and obliterated a very close local in Yorkshire (surely not with 10 watts?);
5. GW's who put into Yorkshire stronger signals between 1800 and 1900 kc/s. than West Regional on 1457 kc/s.

With ready-made or home-built high-power equipment available, it must be a great temptation to use it, and such an action is practically impossible to trace. When the G.P.O. inspector calls, the "Secret Switch" restores the rig to its licensed limits.

While I am not in favour of many rules and regulations, I consider it would be an excellent idea if the licence not only restricted the power input, as at present, but also forbade the use of equipment capable of more than the licensed power, whether it is so used or not. If this were done, I rather feel that many feats of DX would not get bragged about, because they would not happen so regularly, and the bands would get much quieter and more comfortable for those who stick to their licence conditions.

Yours faithfully,

W. FARRAR (G3ESP).

"Stanton," Hemsworth Road, Ackworth, Pontefract, Yorks.

NEW MEMBERS

The following have been elected to membership:—

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 G3DFE O. S. COULDWELL, 80 Alexandra Road, Newland, Hull.
 GW3FPE P. F. JONES, 20 Church Street, Rhyl.
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 G3IDB A. D. BROOKS, 7 Wiltshire Avenue, Swindon, Wilts.
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 G3IS †N. W. WHITE, 59 Eastlands Road, Rugby, Warwickshire.
 G3MT R. E. L. BLANCHARD, Lamorna, Coburg Road, Dorchester.
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- G2FLP †R. D. HORROCKS, Biddulph Road, Congleton, Cheshire.
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 G3ARI †L. N. CRAWFORD, 73 Deepdene, Potters Bar, Middlesex.
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 G3IFC A. BENSTEAD, 47 Parsons Lane, Alford, Lincs.
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R.S.G.B. BULLETIN, OCTOBER, 1951.

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 VS2CZ *LIM CHENG MIN, 229D Burma Road, Penang, Malaya.
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 W7GXA †J. NAEMURA, 16320 S.E. Division Street, Portland, Oregon, U.S.A.
 ZC4OR J. W. ROWE, P.O. Box 451, Nicosia, Cyprus.
 ZE3JY N. L. LACHENICHT, c/o Electricity Supply Co., P.O. Jumbo, Southern Rhodesia.
 ZE4JC A. P. DALE, P.O. Box 88, Causeway, Salisbury, Southern Rhodesia.
 ZS6VR DR. C. J. RABIE, Witrand Institution, Potchefstroom, S. Africa.
 MP4KAB E. P. POUT, c/o Kuwait Oil Co., Kuwait, Persian Gulf.
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 W3LVF C. O. BADGETT, 725 Garden Road, Glenside, Pa., U.S.A.
 W3NOH A. GENNARO, 4411 Wayne Avenue, Philadelphia, Pa., U.S.A.
 W8OPG G. E. ROOF, Harper Road, Solon, Ohio, U.S.A.
 ZB1BN A. E. HOWELL, H.M.S. "Tyne," c/o F.M.O., Malta.
 ZD2HAH H. A. HEARL, Radio Officer, Posts and Telegraphs Dept., Ikeja Airport, Ikeja, Lagos, Nigeria, B.W.A.

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- 800 A. S. GOUBADI, c/o 40 Fitzwilliam Road, London, S.W.4.
 801 *4013732 Cpl. Thomson, A.H.Q. Unit, R.A.F., c/o B.A.P.O., No. 1, Hong Kong, S. China.
 802 †E. V. WHISTECROFT, P.O. Box 260, Blantyre, Nyasaland, Central Africa.

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- 19266 F. W. GLOVER, 72 Ormerod Road, Priory Road, Hull, E. Yorks.
- 19267 D. H. WHEELER, 44 Rakesmoor Lane, Barrow-in-Furness, Lancs.
- 19268 G. L. BURROWS, 4 Dunster Road, West Bridgford, Notts.
- 19269 K. E. ARNOLD, 67 Norman Avenue, London, N.22.
- 19270 G. W. GARRETT, 7 Heversham Road, Bexleyheath, Kent.
- 19271 G. W. THEAKER, 193 Wingfield Road, Bilton Grange, Hull, E. Yorks.
- 19272 J. A. RIX, 6 Rowley Drive, Newmarket, Suffolk.
- 19273 W. L. COULTS, 2 Balgonie Place, Markinch, Fife, Scotland.
- 19274 A. JONES, Leslie Bldgs., Lower Street, St. Asaph, Flint, N. Wales.
- 19275 D. F. WILLIES, The Wilderness, Grove Road, Holt, Norfolk.
- 19276 R. BARNES, Staff Hostel, G.C.A. Radio Station, Sandridge, St. Albans, Herts.
- 19277 R. L. PERKINS, 29 New Church Road, Camberwell, London, S.E.5.
- 19278 A. V. WOOD, Meadowsweet, Bridport, Dorset.
- 19279 MISS S. M. GREEN, Thornleigh, St. John's, Darwen, Lancs.
- 19280 C. AULD, 42 Hunter's Avenue, Ayr, Scotland.
- 19281 L. WICKS, 8 Alexandra Road, Gloucester.
- 19282 J. R. INCHLEY, 16 Devonshire Road, Davenport, Stockport, Cheshire.
- 19283 D. T. HAYTER, 16 Becket Gardens, Worthing, Sussex.
- 19284 R. J. NEED, 56 Bulwer Street, Liverpool 5, Lancs.
- 19285 D. A. IMPORT, 3 Waterloo Crescent, Apperley Bridge, Bradford, Yorks.
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- 19291 J. J. FORBES, 12 Perham Road, West Kensington, London, W.14.
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- 19293 E. SHEPPARD, Thriftwood, Gt. Canfield, Dunmow, Essex.
- 19294 M. R. THOMPSON, 53 Hillside Avenue, Douglas, Isle of Man.
- 19295 B. A. PAYNE, 454 Kirkstall Road, Burley Wood, Leeds 4.
- 19296 B. MAY, Lasynys, Waun Gron, Glynneath, Glam., S. Wales.
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- 19300 J. W. HAMILTON, 32 Denny Road, Dennyloanhead, Stirlingshire.
- 19301 F. J. ANTLEY, 323A Edge Lane, Liverpool 7.
- 19302 P. A. BOOKER, 6 School Hill, Warnham, Horsham, Sussex.
- 19303 W. BAXTER, 9 Manver Street, Bath, Somerset.
- 19304 K. J. BIRCHMORE, Cousins Farm, The Haven, Billingshurst, Sussex.
- 19305 R. W. BETHELL, "Ourome," Caravan, St. Mary Well Bay, Lavernock, Glam.
- 19306 G. W. LAMBERT, 18 A.M.Q., R.A.F. Coltishall, Nr. Norwich, Norfolk.
- 19307 J. S. SLOAN, 4 Howden Avenue, Kilwinning, Ayrshire, Scotland.
- 19308 W. DUNCAN, 13 Caledonian Circuit, Cambuslang, Glasgow.
- 19309 S. HARLE, Ainsdale, 1 The Avenue, Birtley, Co. Durham.
- 19310 A. ATKINSON, 38 Derbyshire Street, Leeds 10.
- 19311 A. L. BRACHER, 9 Caravan Site, Blenheim Road, Maidenhead, Berks.
- 19312 H. LAWSON, 41 Salisbury Street, Hull, E. Yorks.
- 19313 F. BENDING, 108 St. Katharine's Road, Exeter, Devon.
- 19314 J. HINDE, The Bungalow, Martin Moor, Martin, Lincoln.
- 19315 D. F. E. WOODWARD, 4 Railway View, Charfield, Nr. Wotton-under-Edge, Glos.
- 19316 *F. V. GREENLEAVES, 39 Ashton Road, Newton-le-Willows, Lancs.
- 19317 *S. F. WEBER, 65 Combemartin Road, Southfields, London, S.W.18.
- 19318 *J. PENNINGTON, 5 Cedar Road, Ribbleson, Preston, Lancs.
- 19319 †E. H. JONES, Tudno View, Benellich, Anglesey, Wales.
- 19320 †L. O. JONES, Caridbrooke, Avenue Gardens, Horley, Surrey.
- 19321 C. T. VAUGHAN, Wrekin, Brook Road, Shanklin, Isle of Wight.

Corporate Members (British Empire Receiving Stations)

- 797 E. E. DAVIDSON, 125 Windsor Street, Paddington, New South Wales, Australia.
- 798 G. METCALFE, Green Hills, Skelton, Penrith, Cumberland.
- 799 W. SWALE, Block 4, 1 Wire'less Regt., R. Signals, B.A.O.R.12.

Associates and Junior Associates

- J. C. ATTARD, 22 St. Leonards Road, Zabbar, Malta.
- R. BISHTON, 82 Bedwas Road, Caerphilly, Glam., Wales.
- J. F. BLAMEY, The Corner House, Stoke Fleming, Dartmouth, Devon.
- W. H. BRAASCH, 22 Grotto Road, Rondesbosch, Cape Town, South Africa.
- D. F. BRYAN, 18 Queen's Drive, Finsbury Park, London, N.4.
- C. T. CALDERA, School of Infantry, Signal Wing, Hythe, Kent.
- B. L. CHAPMAN, 13 Wellington Hill West, Westbury on Trym, Bristol.
- S. F. COBB, 2 Dorritt House, Henry Dickens Court, London, W.11.
- S. D. CROWTHER, 108 West Park Road, Gillington, Bradford, Yorks.
- J. GIBSON, 132 Church Street, Tranent, East Lothian.
- P. GOODENOUGH, 34 Coldharbour Road, Redland, Bristol 6.
- J. GRANT, Mill House, Grandhome, By Woodside, Aberdeen.
- MISS J. M. GRISS, 21 Chatsworth Terrace, Darlington, Durham.
- J. D. HENDERSON, 1 Trelawney Road, Barkingside, Essex.
- J. S. KINGSFORD-HITCHINS, East Ridge, Totteridge Lane, London, N.20.
- R. JOHNSTONE, 35 Oak Drive, Ellesmere, Salop.
- K. R. LEWIS, 61 Alexandra Road, Chalvey, Slough, Bucks.
- C. H. MARSHALL, 358 Woolwich Road, Charlton, London, S.E.7.
- R. PEARCE, 73 Romsey Road, Winchester, Hants.
- MISS S. PEARSON, Uplands, Bridlington Road, Nafferton, Nr. Driffield, Yorks.
- E. PRITCHARD, 26 Cressingham Road, Stretford, Manchester.
- G. M. STOWELL, 155 Harestone Valley Road, Caterham, Surrey.
- R. E. TURNER, 179 Branstone Road, Burton on Trent, Staffs.
- D. J. URE, 1 Orchard View, Lent Rise Road, Burnham, Bucks.
- F. L. WEATHERDON, 4 Sturdee Road, Soko, Devenport, Devon.
- D. J. WILLIAMS, Cwmlehyrd, Pontyberem, Llanelli, Carmar, Wales.
- G. W. APPREY, 39 Penywern Road, Earls Court, London, S.W.5.
- B. J. CAPEY, 5 Broomhill Street, Tunstall, Stoke on Trent.
- G. DAVIES, 28 Harebreaks, Watford, Herts.
- P. W. DAVIES, 22 Edwalton Avenue, Peterborough, Northants.
- L. E. HOLLIS, 156 Bexley Road, Erith, Kent.
- G. J. JACKSON, 90 Dunbar Road, Birkdale, Southport, Lancs.
- R. JOHNS, 4 Ladywood Road, Grimethorpe, Nr. Barnsley, Yorks.
- E. N. MADEY, 248 Honeysuckle Road, Swaythling, Southampton.
- A. G. MARTIN, 135 Nightingale Road, Edmonton, London, N.9.
- N. J. SALKELD, 716 Lordship Lane, Wood Green, London, N.22.
- K. K. SMITH, 77 Bronson Road, Raynes Park, London, S.W.20.
- D. G. STEVENSON, High Trees, High Roding, Dunmow, Essex.
- A. H. TRIGELL, Lynwood, Everton Road, Hordle, Lymington, Hants.
- F. H. ATKINSON, 715 Park Avenue, New York 21, New York, U.S.A.
- V. ELLIOTT, 76 Church Street, Heywood, Lancs.
- J. I. EVANS, 13 Newall Road, Skewen, Neath, Glam.
- P. W. FEAR, 12 Pine Avenue, Gravesend, Kent.
- K. FRANKCOM, 216 St. Helier Avenue, Morden, Surrey.
- R. D. HARKESS, 6 Duddington Square East, Portobello, Midlothian.
- G. HOBBS, 10 Park Road, Lower Compton, Plymouth, Devon.
- A. J. ISAACS, 18 Cranmer Close, Morden, Surrey.
- R. M. ISAACS, 40 Firby Road, Stamford Hill, London, N.16.

* Denotes transfer from Associate Grade.

† Denotes re-elected.

COUNCIL NOMINATIONS, 1952

Apologues the announcement published on page 147 of this issue, Mr. S. E. Vanstone, G2AYC, has, on doctor's orders, withdrawn his name from the list of persons nominated by the retiring Council. His place has been taken by Mr. F. G. Lambeth, G2AIW.