THE T. & R. BULLETIN

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CONTENTS.

GOOD NEWS

WE have on many occasions, both through the columns of this Journal and orally at District Conventionettes, intimated that the authorities responsible for the issuance of amateur licences are friends of the British amateur. Proof of this assertion has been evident during the past few weeks, and in presenting on another page a summary of revised licencing conditions, we take this opportunity of acknowledging our appreciations to those who have been responsible for granting the improved facilities.

It should be fairly obvious to every full licence-holder that tolerances have been reduced because we, as a body, have accurately controlled the frequency of our transmissions within the old bands. To prevent the possibility of amateur transmissions infringing into adjacent bands used by other services, tolerances or guard bands were introduced in most countries immediately the Washington Convention became operative, and for two years our own bands were seriously curtailed, until a slight reduction in tolerances was authorised in the autumn of 1930. As a result of articles and lectures, backed up by a first-class calibration service, our members have become the most " frequency conscious " group in the world, and for many years our stations have been amongst the best operated. A further important argument in favour of reducing the tolerances was found in the fact that all high power stations (and practically all of the low power ones) use frequency stabilising devices of some type.

With this knowledge in mind no great difficulties were experienced in convincing the G.P.O. that if the bands were widened, transmissions would, as hitherto, be confined to the band widths allotted.

During Mr. Watts' talk at Convention, he outlined the regulations which are being used by the G.P.O. when deciding whether an amateur has justified his application for more power. These are clear and to the point, and if carefully studied, members will see that the G.P.O. are willing to grant extra facilities, providing they are satisfied that the lines of experiment given by the applicants are of such nature as to warrant an increase.

The good news that television permits may be obtained is but a further example of the foresight shown by the Post Office. We believe that these new facilities will go a long way towards providing the urge to tackle seriously the problems surrounding short-wave television practice. To the best of our knowledge, British amateurs are the first to receive television facilities.

This occasion is opportune to state that the President and Council are actively engaged in a study of the proposals prepared for the forthcoming C.C.I.R meeting at Lisbon. This will be

(*Continued on page* 122.)

AN ELECTRON-COUPLED TRANSMITTER.

By J. MacIntosh (VS2AF).

Some Reminiscences and a Description of a New Transmitter.

In this article the author gives a description of his new E.C. Transmitter, and some personal reminiscences. The results obtained by this overseas member with low power demonstrate the advance in technique which has taken place in recent years.

THE writer had his introduction to radio in the summer of 1916, when he was transferred from the Army Signal Depot at Newport Pagnell to the Wireless Training Centre at Worcester. Three years on Interception and Direction Finding in the Near East were full of interest, and at times long hours and hard work. The reading of Turkish *en clair* soon became second nature, and the only morse, which was almost unreadable, was the type indulged in by operators attached to a certain Russian Army operating near the Black Sea. That particular type of morse was indescribable; I understand the operators sent with their toes! Anyway, it sounded like that!

The Marconi MK.16 Tuner, fitted with the "Round" valve and a carborundum crystal and utilising reflex A.F. amplification was "the" receiver in those days, and with 400 volts on the plate of the "Round" and about 2 amps. at 4 volts on the filament, some very excellent DX results were obtained—on 450 to 1,500 metres! Little was known about the high frequencies, although I can well remember winding a large solenoid to receive Horsea Press (BYC) in Upper Egypt—the wavelength being somewhere about 15,000 or 17,000 metres.

The aerial used was insulated wire buried a little beneath the earth's surface, a real A.O.G. Here a little transmitting was done on 850 metres, the transmitter being a captured Telefunken spark set of about 2 kw. Playing about foolishly, I got a shock of one of the coils, and I can still feel the tingle in my arm!

I should, perhaps, make it clear that an error crept into the Malayan Notes in the May, 1934, T. & R., in that while I was for some time in charge of the captured transmitter, I had no hand whatsoever in its capture. The credit for that must go to a certain New Zealand corps.

Came demobilisation—the B.B.C—receiving records across the Atlantic on 250 to 550 metres, and an orgy of experimenting in reflex circuits. One receiver made provision for reflexing no less than 3 H.F. valves, rectification being by a carborundum crystal. It worked well when compared with the average receivers of those days, but I should not like to try the circuit now with modern triodes.

In 1927, the lure of the East eventually brought me to this tropical clime—Malaya. Curiously enough, the transmitting urge did not win until recently, and so, on January 27, 1934, the new VS2AF came on the air. The old VS2AF, as many will doubtless remember, was owned and operated by the late Mr. G. W. Salt, of Glenmarie Estate, Selangor, F.M.S. Salt attempted to fly home with a planter friend in July, 1932, and after leaving Moulmein, his plane was never seen or heard of again, and so passed on the original VS2AF.

Using the broadcast receiving aerial (a Marconi), Igranic receiving coils, and a receiving valve—the indomitable Triotron K.435/10 (a 4-volt directly-heated valve)—a T.P.T.G. was rigged up. Power supply was obtained from a Ferranti B.E.M.1 unit, and the filament was fed from A.C. The output to the antenna was 4.6 watts, not much these days, but I had hopes. Despite negligible previous practical experience of valve transmitters, it was my ambition to W.A.C. with 5 watts on 7 mc.

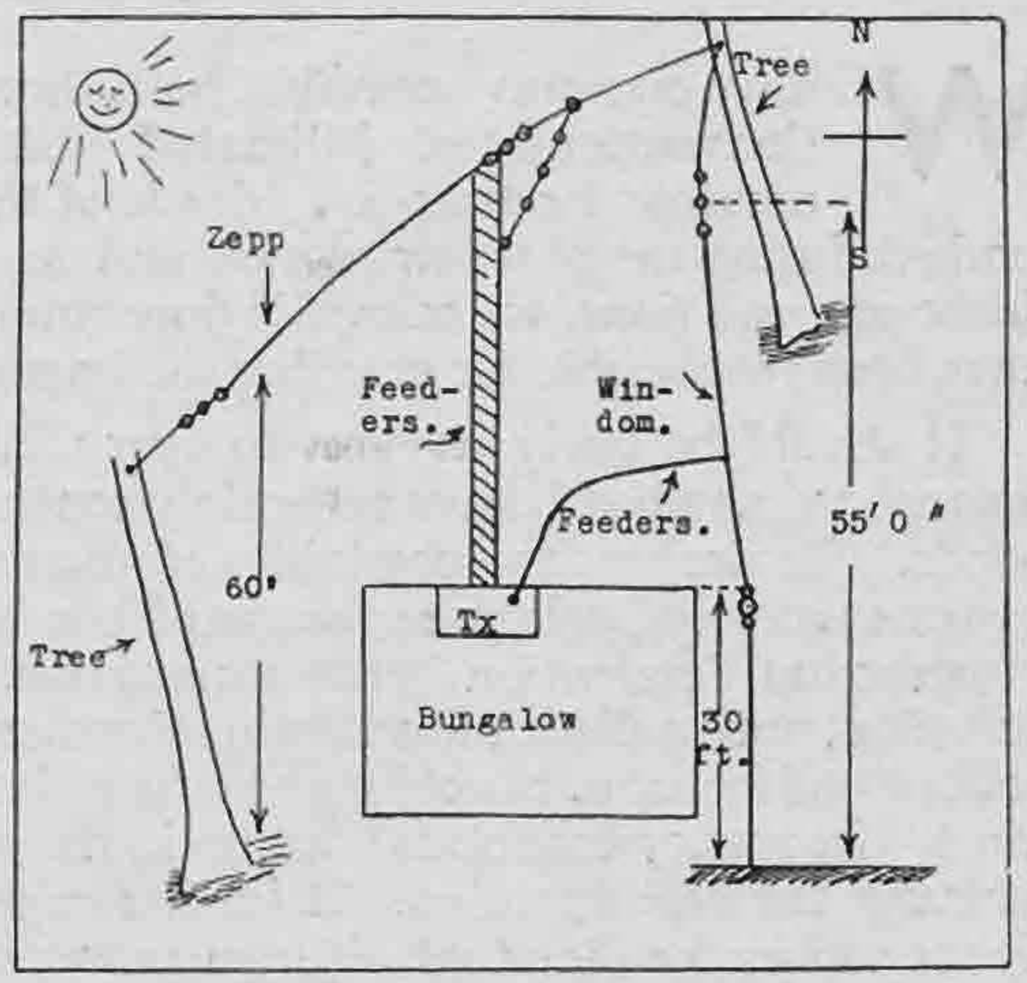


Fig. 1.
Aerial array at VS2AF.

Here it must be recorded that I failed, but two-way working was established with five out of the six continents in exactly 30 days—all on 7 mc., and never using more than 5 watts. The missing continent was South America, and in that month I had not heard one single South American, and curiously enough, not one Canadian. In fact, I had almost given up hope of ever hearing either a South American or a Canadian when hark—who is this—on 14 mc.? Cheers, VE5KZ; a Canadian at last. A long call and—no reply. Contact failed. That was on 20.5.34. Then on 25.5.34 at 12.45 G.M.T., a fading DC note was heard calling CQ; HC2JM. Ye gods, a South American. A quick change of aerials—a new V.F. end—on Hertz had been going through its trials—and the Zepp was quickly tuned to 14 mc., the note checked, and a long answering call made. Over to the receiver—a breathless instant, and "VS2AF de HC2JM"

WAC! I was amazed to find I could still get a real thrill from DX. VS2AF using about 18 watts in an electron-coupled transmitter was reported QSA3, R4, by HC2JM, and the longed-for contact with South America was made. HC2JM was R4, QSA 2/3.

Being curious to see if " W.A.C." could straight-away be worked, and in what period, I followed up the HC2 contact by contacts with W6, OH5, and SU1 (the first SU) on 14 mc., and J2 and VK2 on 7 mc. Time occupied=5 hours 35 minutes. Power throughout, 18 watts. Now for that VE5!

A curious point which I must leave to others to solve is that while W6's and occasionally W7's can be heard and worked from here at times QSA4/5, R4/5 both ways on 14 mc., as already stated, only one Canadian has been heard during the past four months. You cannot work what you do not hear, obviously, and after much consideration, I incline to the view that Malaya is most unfavourably situated for either W.A.C. or W.B.E. It would be interesting to know the number of Malayan amateur transmitters who have obtained W.A.C. and/or W.B.E. W6's and W7's are also worked on 7 mc., but at the moment, QRN is so terrible that little serious DX work can be carried out on that band.

Aerials.

Quickly realising that the A.O.G. was not good enough for serious DX work, within a few days of starting off, a 67 ft. Windom was erected of No. 14 S.W.G. top and feeder, the latter tapped on 9 ft. 4 in. from the centre. This aerial proved very good indeed on 7 mc. Then experiments were carried out with No. 10 top and No. 12 feeder, and various tapping points, but the original Windom remained unbeaten. This aerial is about 60 ft. above ground, and is surrounded more or less by trees. The feeder was about 58 to 60 feet in length.

This Windom was not tried on 14 mc., as the writer remained on 7 mc. for almost three months before venturing on to 14 mc. The Windom was then replaced by a Zepp-fed Hertz, the original No. 10 top being used—now cut to 66 ft. 6 ins. The feeders are spaced 6 ins. apart, and are 58 ft. in length, parallel tuning being used on both 7 and 14 mc. This aerial, which is slightly higher at the " free " end, and is erected at a height of about 55 to 60 ft., gives good DX results. It lies due N.E. and S.W., the aerial being fed at the N.E. end. It appears to give non-directional results on both 7 and 14 mc., although on the latter band there may be slight directional effects, since consistently good signal strength is reported by W6's. On 14 mc., G stations worked report R3/4/5, OK R4/5, OH R4/5, SM R5, PA R4, D4 R5, and SU R4. Only one Australian has been heard on 14 mc., and he was worked in the day-time. No South Africans have been heard on 14 mc. The best time at this end is generally from 14.00 to 16.30 G.M.T. on 14 mc. A second aerial (a Windom) was then erected, as shown in Fig. 1; the Zepp being left in position.

This Windom is about 55 ft. high at the far end, and 35 ft. high at the house end. The top is of No. 10 S.W.G., the feeder of No. 14 S.W.G., being tapped on 9 ft. 4 in. *from the centre*. The feeder is about 45 ft. long. Although the effective height is much less than that of the Zepp, quite good DX results are obtained with Europe—W6 and J on 14 mc., possibly due to low angle radiation. In fact, with W6's, the reports have at times been R5, QSA5. On 7 mc. J reports R5. I hold the opinion that the Windom Hertz has a decided advantage over the Zepp-fed Hertz in that during tropical rain, or even during damp nights (and most tropical nights are damp!) the losses in the Windom are less than in the Zepp. In the latter, it would appear that the long transmission lines must become unbalanced through leakage, etc., between them, thus causing losses. The Windom has the merit of being easily erected, but I must admit that fairly accurate dimensions must be worked to for good results. The 67 ft. top of No. 14 S.W.G., with a feeder of No. 14 S.W.G. tapped on 9 ft. 4 ins. *from the centre*, works well on or about 7,100 or 14,200 kc. Loose coupling is always used with the Windom Hertz; the feeder may be connected direct on to the tank coil, but I do not favour this method.

When the feeder wire is made thicker (it is inadvisable to make it thinner), the impedance is affected, and the tapping point altered, thus throwing the whole system out. It will work quite an appreciable distance out either way, as I have proved, but results fall off. [Since writing the foregoing, a No. 6 S.W.G. 67 ft. Windom has been rigged up; the feeder of No. 14 S.W.G. being tapped on 9 ft. 3 in. from the centre. Results are promising, but I am not satisfied that the tapping point is correct.]

Transmitters.

After about one month, the T.P.T.G. was scrapped, and an experimental electron-coupled transmitter was rigged up, using first an old P.T.4 Audio Pentode and then an M.P.T.4. Results were so promising that a P.T.25 Audio Pentode was acquired, and the electron-coupled transmitter thoroughly investigated. Fig. 2 gives the circuit

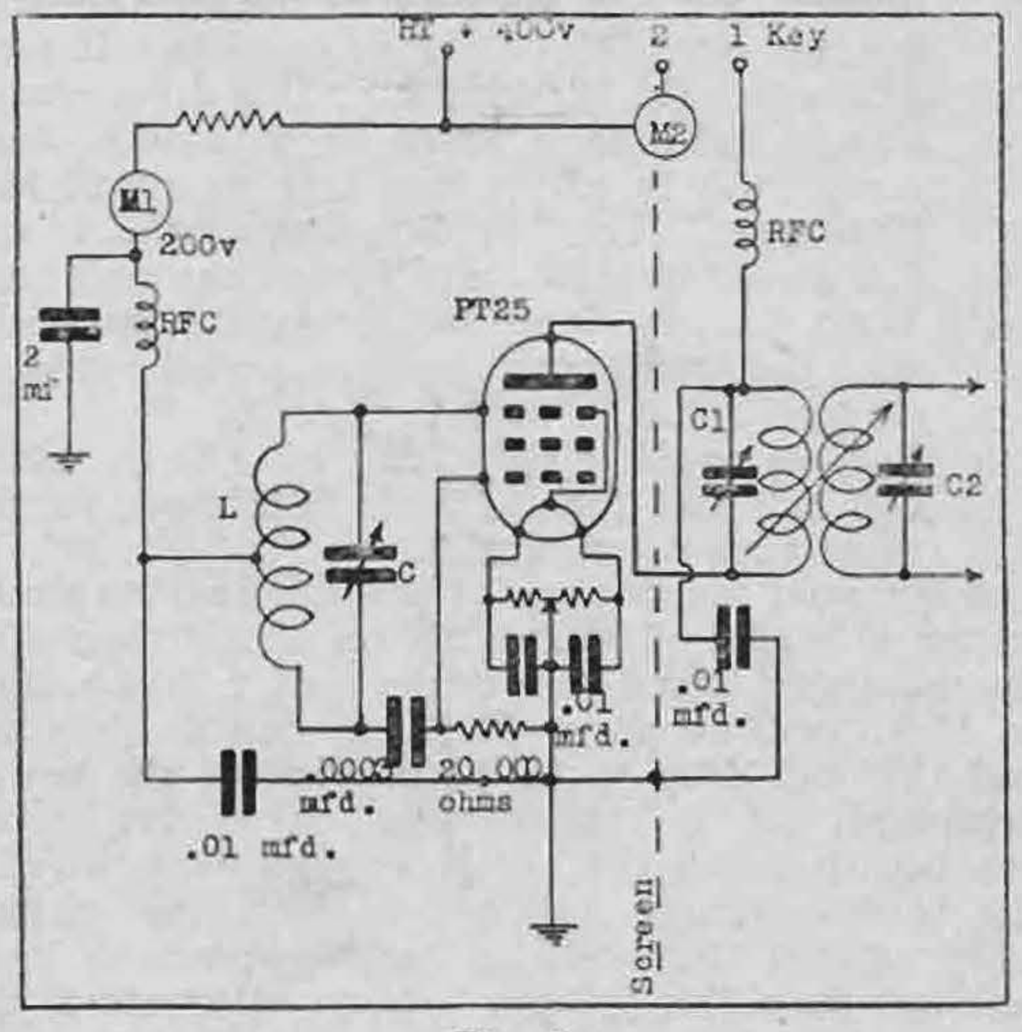


Fig. 2.
Electron Oscillator Circuit used by VS2AF.

diagram. It is simple to rig up, but not as simple to operate as the T.P.T.G., owing to the unsuitability of the audio pentode for R.F. work. Once it is thoroughly understood, it gives quite good results. Screening between the drive and the tank circuit should be thorough, although the writer uses only

an upright earthed screen. The grid leak should be low in value, and different sizes, varying from 15,000 ohms to 50,000 ohms, have successfully been used. To obtain the least draw between the drive and the tank circuit, the drive circuit should be tuned to $\frac{\text{Frequency}}{2}$, *i.e.*, to twice the fundamental wavelength required. This gives generally a better note, but slightly less output than when tuning the driver to the fundamental. If a high value of grid leak, say 50,000 or 75,000 ohms, is used when the driver circuit is tuned to the fundamental, a large number of harmonics are generated, the tuning becomes critical, and a bad note results. Reports on the note vary between NDC, DC, T6, T7, T8, and T9. With careful tuning and a check of the note on a receiver or a monitor, it should be possible to get P.D.C. or T8 consistently. Some trouble was experienced with key thump and clicks. As a metal rectifier (H.T.11) is not an ideal source of power for a rapidly varying output, a balancing resistance was arranged, as shown in Fig. 3, and this proved fairly successful—an occasional T7 only being received. There is little doubt in the writer's mind that if a suitable R.F. Pentode was obtainable with the suppresser grid brought out to a separate pin, not only would much better CW results be obtainable, but modulation would then be practicable, using the suppresser grid; thus giving a one-valve phone and CW transmitter.

Practical Operation.

These experiments with the E.C. transmitter were conducted in order to decide the suitability or otherwise of this circuit for driving, say, an F.D. thence on to a P.A., using an ordinary 7-pin R.F. Pentode as the driver valve. The simplest and the best method I have found of tuning the E.C. transmitter is to:

(*a*) Tune L.C. to the transmitting frequency desired, ×2, and ensure that the note emitted by the drive is as clear as possible. It may prove to be as good as T.9. This drive circuit should light up a small 2½ v. 2-amp. flash lamp bulb in a one-turn coil to about half brilliancy. The coupling between L.1 and L.2 should be loose—say 3 in. or as found best.

(*b*) With the key depressed, bring C.1 into tune with the *fundamental required*, and the reading on M.A.2 will be seen to dip.

(*c*) Loosely couple a flash lamp bulb to the aerial coil L.2 and tune C.2 for best glow, at the same time retuning C.1.

A few final touches on C.1 and C.2 and the transmitter is ready. The reading on M.A.2 should be the maximum, less about 10 per cent. The reading on M.A.1 will be about 20 m.a., with the key up, and this will drop to 12/15 m.a. when the key is depressed. It is realised that it is not sound practice to break the anode voltage while leaving the screen voltage applied—in fact, the makers warn against this—but no harm appears to have resulted from this misuse. As an alternative, the screen plus anode voltages may be broken simultaneously by keying in the negative or in the positive lead. Before going on the air, needless to say, the frequency should again be checked, because with this type of transmitter, the fundamental output frequency does not generally agree with the frequency ×2 of the driver circuit, LC.; it is generally higher in frequency, and one may either be above or below the frequency ×2 of the driver circuit. This would not matter if the fundamental frequency desired was in the centre of the band, but if one decided to set the driver on, say, 3,505 kc. for transmission on 7,010, the result of being below the 3,505×2 frequency would possibly put one outside the 7,000 kc. end of the band. Therefore, check carefully the frequency before putting the transmitter on the air. It is possible to shift frequency with ease when QRM is present by moving C either up or down by a degree or so, as required, and returning on C.1 and C.2. In all cases, however, it is recommended that the note be checked before transmitting.

This type of transmitter works well with both the Zeppelin and Windom types of aerials, and no trouble was experienced in getting it to work well on 14 mc., provided the driver circuit was tuned to $\frac{\text{Required frequency.}}{2}$ On 7 mc., the driver may be tuned to the required frequency, although generally speaking, this is not recommended. The writer—for convenience sake and speed in changing frequency—keeps the driver tuned approximately to 7,080 kc., and to change from the 7 to the 14 mc. band, or *vice versa*, it is necessary only to retune C.1 and C.2. Home-made close-wound ¼ in. copper tube coils are used as L.1 and L.2, the turns being respectively L.1 four turns, and L.2 four turns, and the outside diameter is 4 ins. These coils were made specifically for 14 mc. use, but they proved so efficient on 7 mc. that they have remained soldered in position! To tune L.1 to 7 mc., the condenser C.1 is used all in, *i.e.*, about .0003 mfd. L. is a 6-turn Igranic receiving plug-in coil—tapped about the centre. This centre tapping position is not critical.

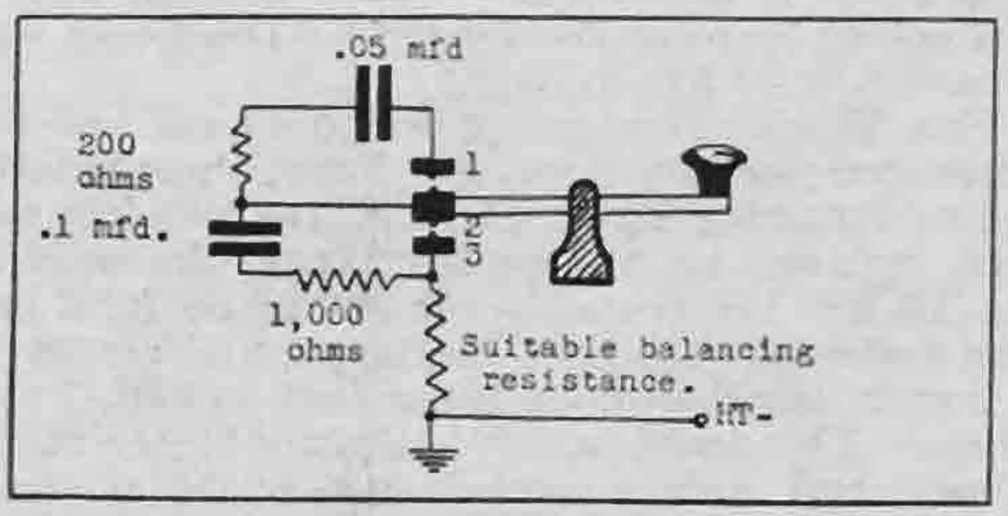


Fig. 3.
Keying arrangements in use at VS2AF.

Notes on Operating.

Having received his morse training in the British Post Office, and after three years of steady wireless work under all conditions on active service, the writer, despite his comparative newness to the transmitting ranks, feels competent to pass on a little advice to the newcomers, and—whisper it not to Uncle Tom—perhaps the old hand might spy a word of wisdom. First and last, I hate the fellow who calls "CQ" over fifty times—signs three times—perhaps—and goes on to call "CQ" twenty more times. No, I am not exaggerating! I have counted the "CQ's". On one occasion I counted over sixty, and then declined to listen further. As Uncle Tom would say, that's Rotten Operating! Being new to the game, I had to find out for myself—no other amateur transmitter being within 100 miles—the exact procedure adopted by amateurs. Generally speaking, I have a hunt round, and if I

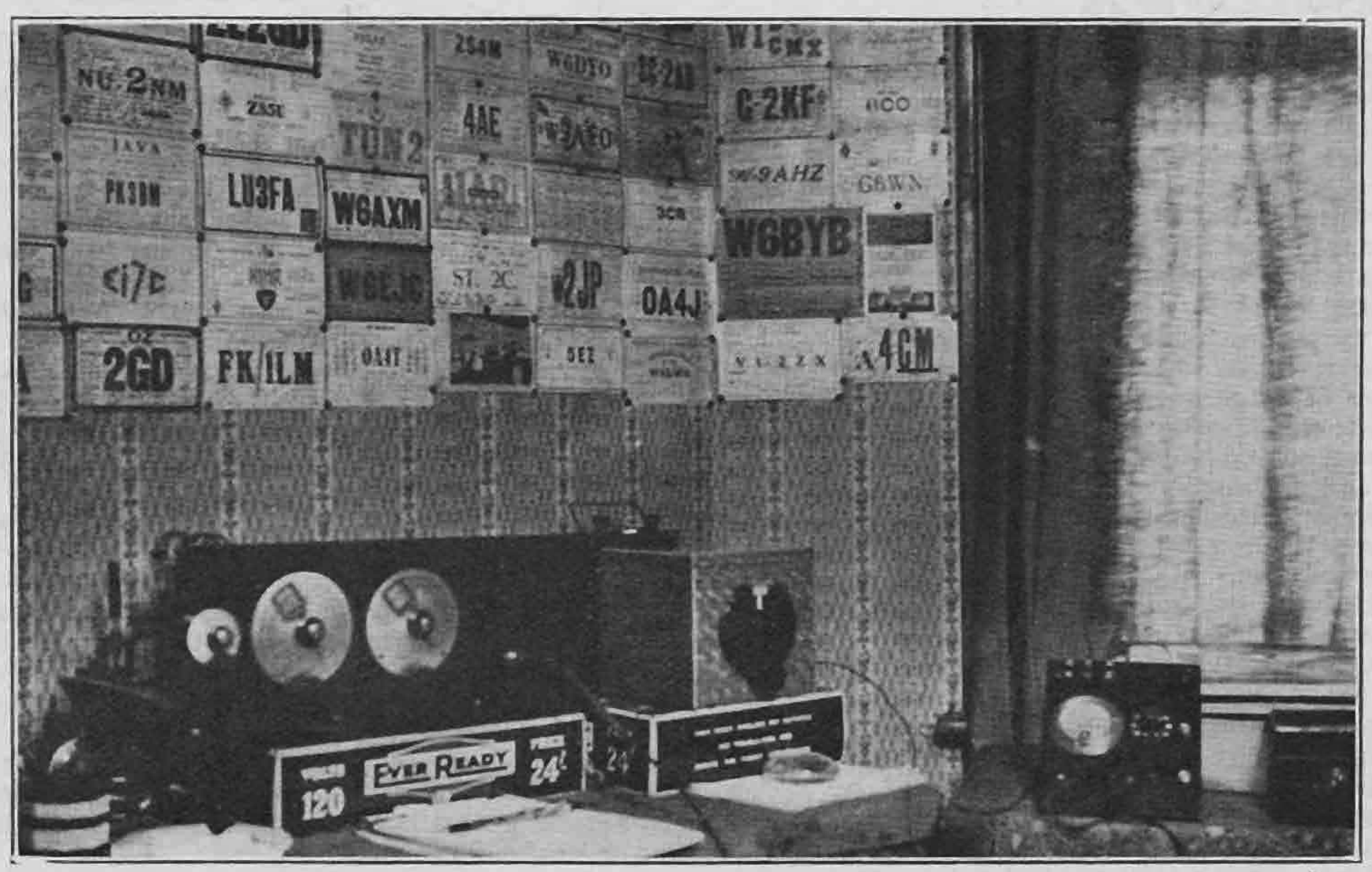
hear a station I want to work, I answer him. Failing contact, I try another and the third time I put the key down, it is usually for " Test DX de VS2AF." Call three or four times, sign the same, and repeat say three times. Then search, and mark you, search well, and examine the weakest of signals with meticulous care. You may want one of them for WAC or WBE! One may start by calling " Test DX de . . . . " and then answer two or three calls. On another night your first test (or CQ if permitted) will raise a distant station who gives you QSA5. R5. You are getting over well, obviously, so you give another test call. For perhaps an hour you continue to receive answers to your test calls. Again, on another night, you answer calls and send no tests. One must U C.S. —use common-sesne, and for heaven's sake do send clearly. None of that 30 W.P.M. stuff, one letter falling over another. It's a perfect nightmare to read, even without QRM and QRN! The KA crowd, by the way, possess at least one rotten operator. He apparently uses that abomination of all things, the Bug Key. I won't give this KA fellow away, but despite my years of training as an expert morse telegraphist, I find extreme difficulty in following his morse. There is no necessity to rush matters, and if you can't send fast, don't try to. It requires skill and patience to handle a QSA 2/3 R3 signal, but it can be done. In logging weak signals, it goes without saying that one's receiver must be above suspicion, and the reaction control must be perfect—very good is not good enough.

THE RECEIVER.

The writer uses his short-wave broadcasting receiver—specially designed and built for this climate—with a small band-spread condenser. The 14 mc. band is spread over 50 degrees on a Utility 100/1 ratio S.M. dial, while the 7 mc. band occupies about 130 degrees. A screened grid high frequency valve is used, generally untuned. The output of this receiver is 10 watts undistorted A.C.s but this amplification is cut down for use on phone, by a volume control across the primary of the first A.F. transformer (a Ferranti A.F.7), and a resistance of about 3,000 ohms placed across the primary of the second A.F. transformer (a Ferranti A.F.5). This enables phones to be used with adequate signal strength available, and an absolute minimum of hum. Indirectly heated 4-volt A.C. valves are in use in all stages but the output, which employs two directly-heated P.P. 5/400 Mazdas in pushpull. The quality on telephony is excellent, while the receiver is also occasionally used to reproduce gramophone records.

In conclusion, I have gratefully to acknowledge reference to many interesting articles published in the T. & R. BULLETIN, and feel that if I have stimulated the efforts of a few of the newcomers to our ranks, my small efforts will have not been wasted. No small measure of thanks is also due to Mr. T. G. Laver (VS3AC), who has been most encouraging and helpful.

By the way, a point is made of forwarding QSL cards to *all* amateurs worked, and also to all listening stations who report, and if by any chance any reader has not received a card due to him, the writer will be very pleased to forward another on receipt of a postcard or a request *via* amateur radio.



BRS250.

This is Mr. G. C. Allen's station at South Bermondsey, London, and it was on this receiver he heard sufficient stations to win the B.E.R.U. Receiving Contest last February. Volume control is varied by means of a 50,000 ohm resistance across the 'phones. The panel on extreme right is used for rough signal strength indications.

THE NEUTRALISED TUNED PLATE TUNED GRID POWER AMPLIFIER.*

By Ian Auchterlonie (G6OM).

THE writer does not claim anything original for the circuit to be described, but he has attempted to put down on paper the results of his experiments with it for the benefit of others.

So far as is known, nothing has appeared in the Bulletin regarding it, and only in the most recent A.R.R.L. Handbook has the circuit been discussed.

Many times he has seen, heard and read discussions between the two camps; the capacity coupled driven amplifiers and locked TPTG's, and, as a consequence, he has endeavoured to disclose a circuit which has the merits of both without any of the disadvantages.

It should be made clear here that, although the circuit is discussed mainly from the angle of its use in push-pull circuits, it can equally well be used in a single ended circuit.

The most prevalent trouble with Goyder Lock is the danger of the circuit going out of " lock," and if the operator does not constantly monitor his transmission, the result is, well—rather terrible. The capacity coupled amplifier man says, of course, " That can't happen to me," and the locked oscillator man replies, " Look at the drive you require," and so it goes on.

The Neutralised TPTG Amplifier.

The advantage of the neutralised TPTG is that much less drive is required than with a capacity coupled amplifier, and yet if the drive fails the circuit will not self excite.

As an instance, at the writer's station two SW5O's with only 1,100 anode volts (which valves, by the way, are not the easiest in the world to drive) can be driven to 150 watts by a single LS5B running at 10 watts.

Cries of " Fancy a man like him using such old type valves." But wait ! You will see that this has a power ratio of 15 to 1, which is a larger figure than is usual with a capacity coupled amplifier.

These figures are for 7 mc., but the efficiency goes up progressively as the frequency falls. The second point in favour of the circuit is that a change of wave does not mean a change of neutralisation. Having neutralised on, say 3.5 mc., one can go straight down to 14 mc. by changing coils and nothing more. If any reader doubts the efficiency of this circuit, his attention is drawn to " Short Wave Communication " by Ladner and Stoner, wherein the best examples of commercial circuits use the inductive method of coupling. except in the very early stages.

A further advantage of this circuit is the fact that the power amplifier working at high anode potentials is completely isolated from the rest of the set, and further, the amount of drive to the P.A. can be adjusted to any required value by simply adjusting the coupling between the anode coil of the driving valve and the grid coil of the power amplifier. This is of particular advantage when using telephony and modulating on an intermediate stage, or varying the power output.

*This is the first R.E.S. contribution received under the new regime.

Description of Circuit.

It is now proposed to describe the circuit in detail, and for this purpose two transmitters, both designed and constructed by the writer, will be described.

The first consists of a straight conventional C.O. which uses an LS5B valve feeding a further LS5B which is employed either as a frequency doubler or neutralised buffer amplifier, according to the frequency in use.

The anode coil of this valve is centre tapped in the usual way, and the connections to it are flexible so that it may be slid along two glass rods in order to vary the coupling between it and the grid coil of the P.A. These coils are tightly coupled, and are mounted as shown in Fig. 1; the distance between them being 4¼ inches centre to centre.

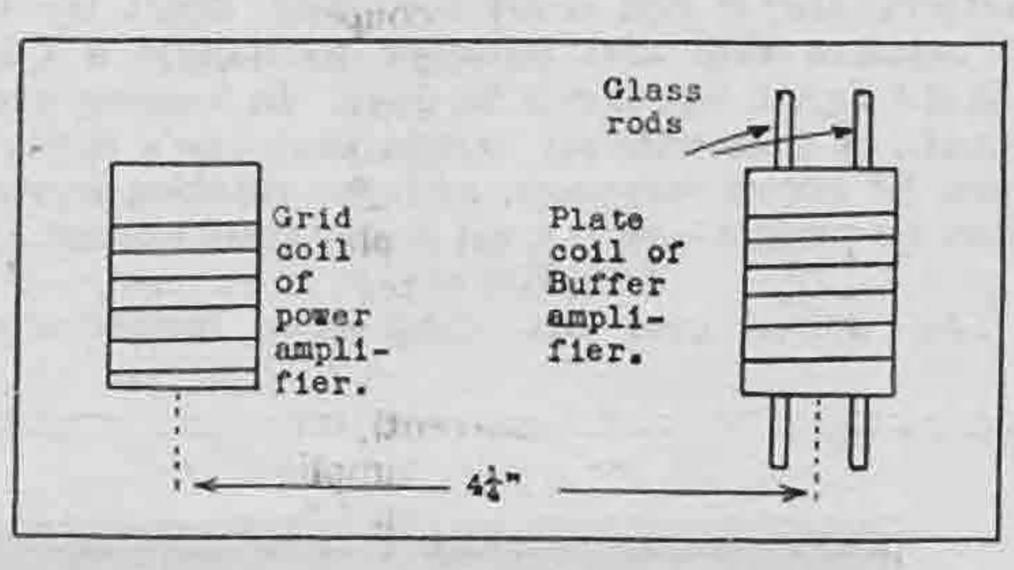


Fig. 1.
Method of Mounting Anode and Grid Coils.

The procedure in tuning up is exactly the same as with any other circuit. The C.O. is brought to oscillation, and the buffer is neutralised in the ordinary way by use of a lamp and coil, plus eyes on the C.O. milliameter.

The buffer having been properly neutralised, the lamp and coil are coupled to the grid coil of the P.A. and the P.A. filaments switched on. The grid condenser of the P.A. is then swung till the anode current of the buffer rises to the maximum value, showing that the grid coil of the P.A. is absorbing energy from the B.A.

A concrete example is quoted. At the writer's station when working on 3.5 mc. a rise from 10 ma. to 48 ma. occurs, using 400 volts on the buffer amplifier. The plate condenser is then rotated until the circuit is in resonance as shown by a kick in the B.A. ma. needle and the coil and lamp test on the P.A. plate coil. The two neutralising condensers are now rotated together until there is no H.F. in the plate coil. Everything is then correct. It is, of course, essential to rotate the plate condenser as one neutralises, to make sure that the circuit is neutralised properly.

On switching on the H.T. to the power amplifier, it will be found that if it is in resonance and properly biassed to " cut off," the actual anode current will be fairly low (on 3.5 mc. it is about 15 ma. to the

two SW5O's) and if the power amplifier plate condenser is detuned out of resonance, the anode current will be about 170 to 200 ma. This indicates that there is ample drive from the preceding stage. Naturally, the current should not be kept on this stage for long, or the power amplifier valves are liable to suffer. The aerial may now be coupled in the usual way and tuned to resonance, when the transmitter is all ready for working. It will be found that in final adjustments there is an optimum coupling position between the B.A. plate coil and the P.A. grid coil giving the greatest efficiency of drive power ratio.

The circuit in a theoretical state is shown in Fig. 2, which gives all the necessary details.

Modulation Method.

The writer, for economy reasons modulates on the buffer amplifier with choke control. The modulator valve is a Mullard DO6O which is fed through a choke; and the buffer valve and LS5B is fed through a separate choke, the two ends being connected by a 2 mfd. condenser as in Fig. 3. The DO6O is preceded by a speech amplifier.

The procedure for telephony is as follows:— Having observed the plate current on the P.A. with the aerial coupled, the coupling between the B.A. and P.A. is reduced until this plate current of the P.A. falls to half its original value. This is, of course, to reduce the excitation to the power amplifier, so that when the buffer is modulated, upward modulation will take place in the power amplifier. If the excitation is kept at its maximum, downward modulation will take place.

Using a DO6O modulating an LS5B (the DO6O gives 10 watts AC speech current), it is quite possible to fully modulate the power amplifier when it is running at 60 watts. This is on 3.5 mc.

To get the very best out of the transmitter when going over to telephony, all tuned circuits should be carefully examined to make sure that they are exactly in resonance.

Naturally, this method is not so effective as modulating the P.A. itself, but it is a very good compromise where cost is an item.

In order to show the flexibility of the circuit, it is now proposed the describe the second transmitter, using this system in its final stage with more modern types of valves.

Another Transmitter.

In this case an LS5B is again used as the crystal oscillator. This is capacity coupled to a *Cossor* 68OHF working as a frequency doubler, and the plate coil of the 68OHF frequency doubler circuit is centre tapped in order to feed the penultimate stage, which is a push-pull circuit. Coupling condensers of .003 capacity are wired between the outer ends of the frequency doubler plate coil and the grids of a push-pull buffer amplifier.

In this stage two *Mullard* T25D valves are used. They were neutralised without difficulty after two 1,000 ohm grid stoppers were included, but without these resistances parasitic oscillations took place, even after great care had been taken to keep the circuit symmetrical. The inclusion of the grid stoppers completely cleared the trouble.

The plate coil of the push-pull buffer stage is coupled to the grid coil of the push-pull P.A. which uses two *Osram* DET6 valves. Here a split stator condenser is used for efficiency, but is not deemed necessary in the earlier stages. The buffer stage current when the grid coil of the P.A. is not coupled is 15 ma. with the valves biassed to twice cut off.

With the grid coil of the P.A. tuned to resonance, the current rose to 90 ma. on the buffer stage at 450 volts. The P.A. is normally drawing 120 ma. at 1,000 volts, which on the particular aerial system in use gives an aerial current of 3.2 amps. The P.A. is then choke modulated by two *Osram* DA100 valves in parallel, each drawing 100 ma. at 1,000 volts. This suffices to modulate the P.A. to an extent that gives an increase of aerial current to 4 amps.; the actual percentage modulation at a

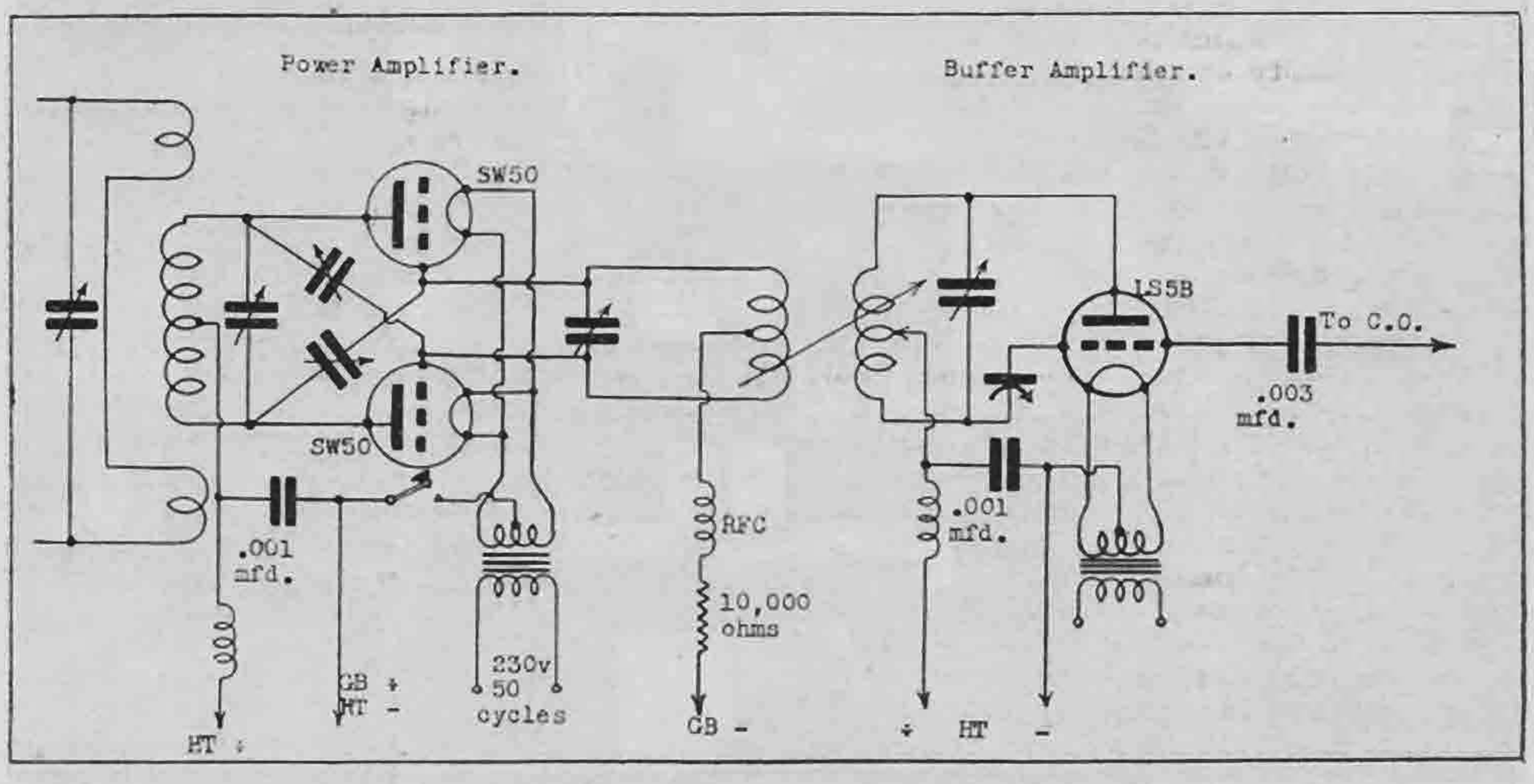


Fig. 2.
Circuit of Neutralised Tuned Plate Tuned Grid Power Amplifier.

rough calculation being 90 per cent. The DA100 valves are preceded by one stage of speech amplification.

Finally, it may be said that the above transmitters are very stable in use and have given the writer no trouble at all, once everything was put in good order.

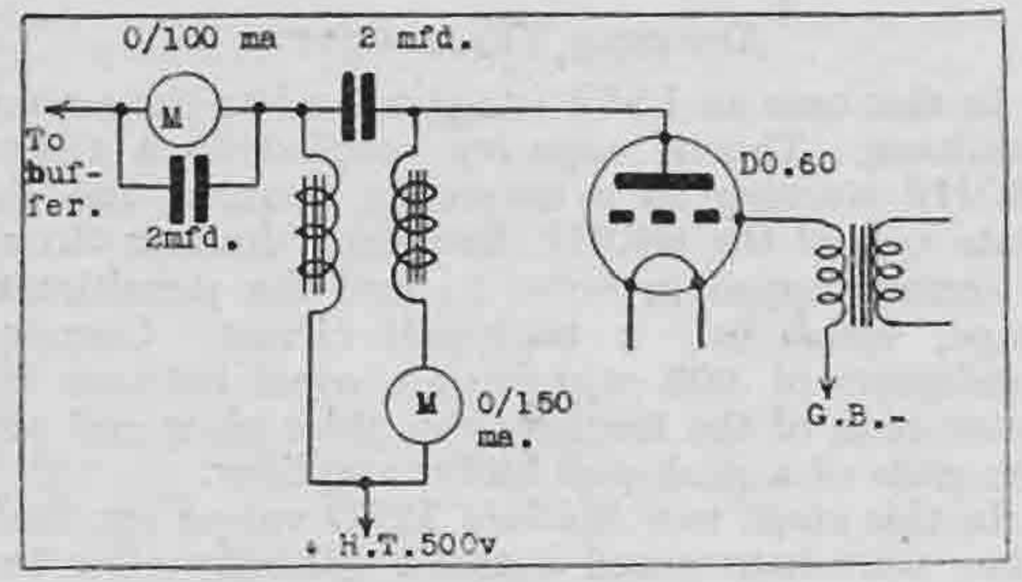


Fig. 3.

Modulation Arrangements suggested by G6OM.

The earlier one described has been used on all bands from 1.75 mc. down to 14 mc. by simply changing the coils and crystals, and has come up smiling each time.

The writer hopes that in putting down these few lines, he has enabled others to benefit by his experience, and that they in their turn will test this circuit.

In conclusion, tribute is paid to Mr. Kellett (G5KL) who first introduced this circuit to the writer, and who has actively co-operated in the development of same. He also kindly read the proof copy of this article.

STATION DESCRIPTION No. 43.

OZ7Z

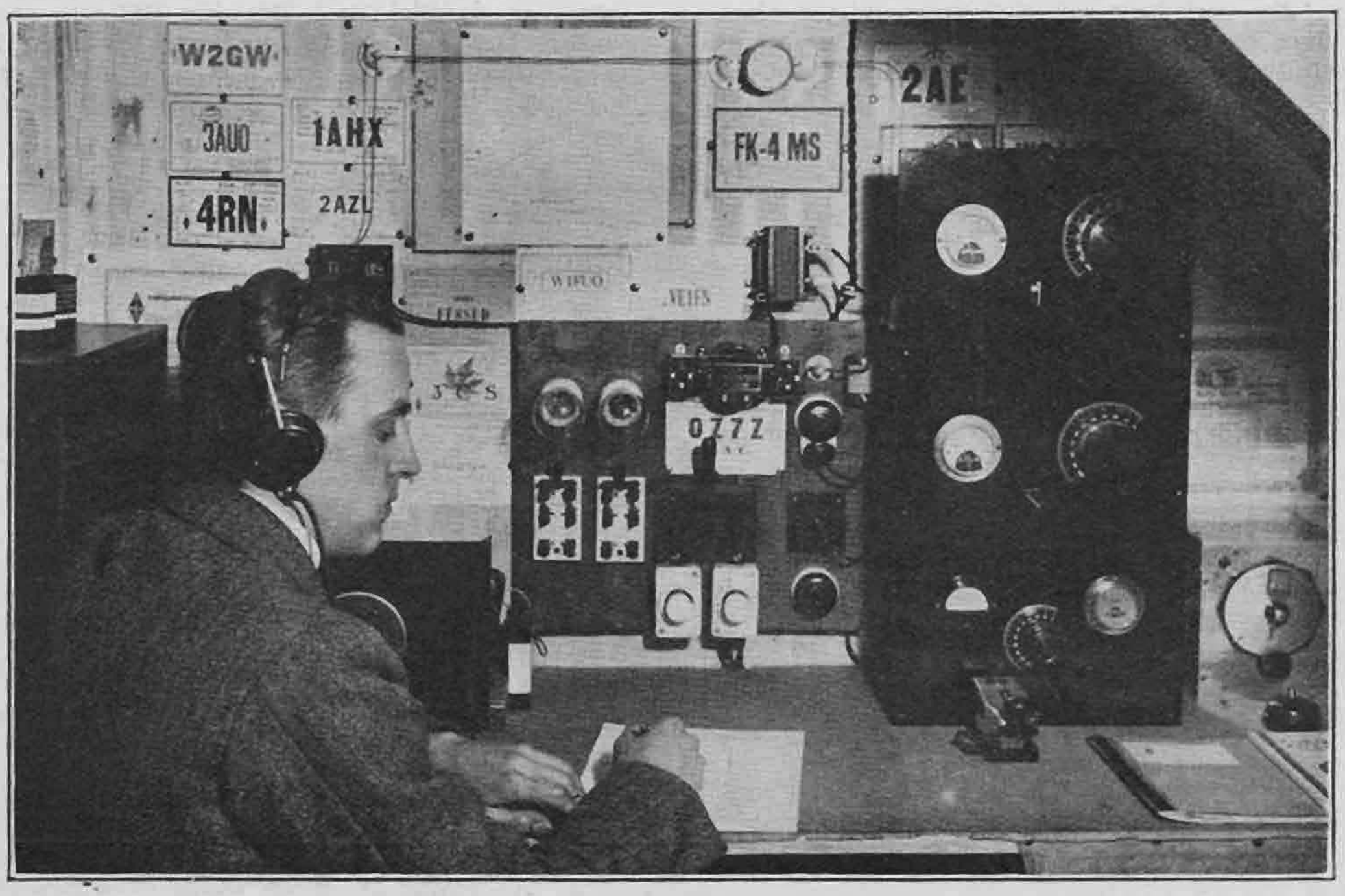
Radio OZ7Z can make the unusual claim of having been born in London. Mr. H. T. Petersen, the man behind that call-sign, was an operator with the Great Northern Telegraph Co. in London in 1924, and at that time he built his first short wave receiver. The " radio bug " bit him well and truly when he heard not only G2OD, but his fellow countrymen D7ZM and D7EC on telephony (for the benefit of the newer amateur it should be added that " D " was the prefix used by Danish amateurs in those days). This was on 80 metres. Later on, 40 metres was tried, and an interesting tale can be told of how that band changed from a deserted waste to a hive of telegraphic activity.

In due course, Mr. Petersen built a transmitter, which made its bow to the world in 1926 from Norresundby, Denmark. It was a Hartley, used with what was novelty in those days—a single wire-fed Hertz. Many enquiries were received from other amateurs anxious to try out this new idea!

By 1928 all continents had been worked.

At present a crystal control transmitter is used, with a maximum input of 40 watts. Excellent DX is obtained on 14 mc.

Mr. Petersen extends a real " ham welcome " to British amateurs travelling to Aalborg. Norresundby is the other side of the river from that city.



Amateur Radio Station OZ7Z.

ALTERNATING CURRENTS AND E.M.F.s.

By J. C. Runge (G2RJ).

WE are all familiar with alternating currents and E.M.F.s, whose behaviour plays such a prominent part in radio. A theoretical study of them, besides being of great interest, is rendered of the utmost importance by their application in wireless telegraphy. We will therefore start at the beginning, and consider the nature of an alternating E.M.F. and how it is formed. To assure simplicity and ease of comprehension, heavier mathematics have been purposely omitted throughout, but are dealt with in the appendix at the end of this article for those interested.

We learn by experiment that when a coil rotates in a uniform magnetic field, an E.M.F. is produced across the ends of the coil whose value alternates between a positive and negative extreme, depending on the velocity of rotation of the coil. When the coil is rotated with constant angular velocity the E.M.F. produced is found to vary according to a sine-law, i.e., the E.M.F. at any moment is proportional to the sine of some particular time quantity. If we denote this quantity by Q and the E.M.F. at any specified moment by E, we may therefore write $E = E_\bullet \sin Q$, where $E_\circ$ is a constant. Drawing the graph of this, we obtain the form of Fig. 1, in which we see that the E.M.F. alternates between two extremes, $E_\circ$ and $-E_\bullet$, which represent the maximum and minimum values which it attains. The quantity Q is actually found to be equal to pt where p is the angular velocity of the coil and t the time counting from the moment when E=O. (See App. I.) Since the coil executes p radians per unit time, it therefore makes $\frac{p}{2\pi}$ revolutions per unit time, i.e., the frequency of alternation of the E.M.F. is $\frac{p}{2\pi}$.

Hence we see that $E = E_\circ \sin pt$ where $p = 2\pi \times$ frequency of alternation.

This represents the simplest general form of alternating E.M.F., and has maximum value $E_\circ$ and frequency $\frac{p}{2\pi}$.

The next point is to establish a relation between the current and voltage in an alternating circuit. We know from Ohm's law that in a D.C. circuit E=RI where I is the current; in dealing with A.C., however, a new factor enters, namely, the inductance, L. Now we all know that when the current varies in a circuit containing inductance, a back E.M.F. is induced in the circuit. This induced E.M.F. is proportional to the rate at which the current is varying, and acts in a direction such as to oppose the motion of the current (hence the "time-lag" effect of chokes and their consequent adaptability in smoothing circuits and key-thump filters).

The inductance, L, is defined as the coefficient of proportion between the induced E.M.F. and the rate of change of current, and so we may write

$$\text{Induced E.M.F.} = -L.\frac{dI}{dt},$$

a minus sign being used since, as mentioned above the induced E.M.F. tends to *oppose* the motion of the current. Hence, including the effect of the induced or "back" E.M.F. and thus modifying Ohm's law to suit A.C., we get

$$E - L.\frac{dI}{dt} = RI.$$

$$\text{or } L.\frac{dI}{dt} + RI = E = E_\circ \sin pt,$$

which, when integrated (see App. II), gives the so-called "Ohm's law" equation for alternating circuits containing resistance and inductance, namely

$$I = \frac{E_\circ}{\sqrt{L^2p^2 + R^2}}. \sin(pt - \varphi)$$

From this we see that the current has a maximum value $I_\circ$ equal to $\frac{E_\circ}{\sqrt{L^2p^2 + R^2}}$, and that it lags behind the voltage by an angle φ (Fig. 2). The analogy between D.C. and A.C. is now apparent, for whereas in the case of D.C. $\frac{E}{R} = I$, for A.C. $\frac{E_\bullet}{\sqrt{L^2p^2 + R^2}} = I_\circ$, $E_\circ$ and $I_\circ$ being the maximum instantaneous values attained by the voltage and current respectively. The quantity $\sqrt{L^2p^2 + R^2}$ is called the "impedance," Lp the "reactance," and L the "inductance" of the circuit. It can be seen that when either L or p is zero the impedance becomes equal to the resistance, and when L^2p^2 is large compared with R, the impedance equals the reactance.

We now come to the question of measurement of A.C. We know from experiment that an ordinary direct-current meter is useless for measuring A.C.

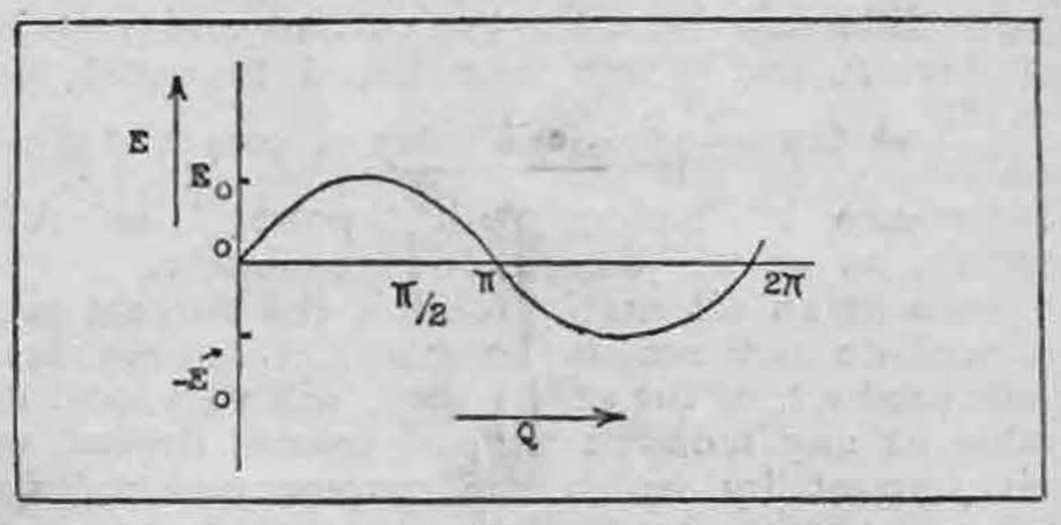


Fig. 1.

This is due to the fact that this type of meter indicates the mean value of the quantity to be measured, which in the case of A.C. is zero, since the effects of the negative and positive halves of the cycle exactly cancel out (see also App. III*a*), so that the meter indicates no deflection. It is therefore necessary, for measuring alternating currents, to use an instrument whose pointer is always deflected in the same direction regardless of the direction of the current, i.e., one whose deflection varies as the square of the current, which, of necessity, is always positive (Fig. 3). As can be deduced from the graph, its mean value over one cycle is

$\frac{1}{2}$ × its maximum value, or $\frac{I_o^2}{2}$ (see also App. III*b*); but since the scale of the instrument is graduated to read current, and not (current)^2, the indicated value of the A.C. will be $\sqrt{\frac{I_o^2}{2}}$ or $\frac{I_o}{\sqrt{2}}$. This is called the " Root Mean Square " value, and is represented by the dotted line in Fig. 3. Instruments of this class are mainly those whose deflection is proportional to the heat generated, which in turn is proportional to the square of the current. Such an instrument is necessary for measuring R.F. current in aerial feeders, and indicates the R.M.S. value.

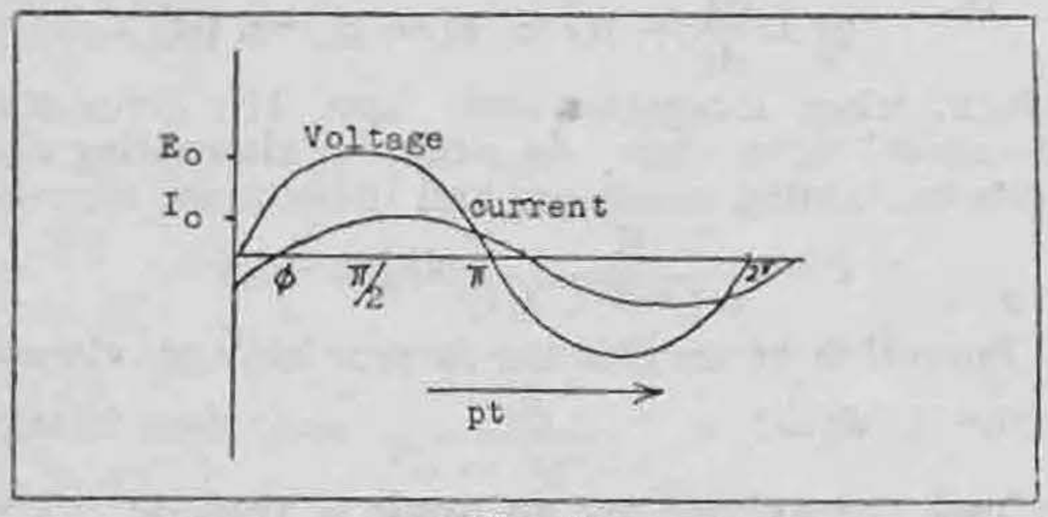


Fig. 2.

As has been previously mentioned, when R is negligible, $I_o = \frac{E_o}{Lp}$ or $E_o = LpI_o$. The E.M.F. in this case is 90° ahead of the current; for since $I \propto \sin pt$, $E \propto \frac{dI}{dt} = \cos pt$ or $\sin (pt + 90°)$. The circuit comprising an inductance and resistance in series can therefore be represented graphically by Fig. 4. A^1B^1 represents the E.M.F., RI_o, across the resistance AB, while B^1C^1 represents LpI_o, the E.M.F. across the inductance BC, and is drawn at right angles to A^1B^1 since they differ in phase by 90°. The resultant maximum E.M.F., E_o, is indicated by the line A^1C^1 which is seen to equal $I_o\sqrt{L^2p^2 + R^2}$ as confirmed by our preivous result. The angle $C^1A^1B^1$ corresponds to the resultant phase difference between the current and voltage (cf. Fig. 2), and is seen from Fig. 4 to equal $\tan \frac{-1 C^1B^1}{A^1B^1} = \tan \frac{-1 Lp}{R}$. The value of $\cos\varphi$ is of great importance in dealing with " power " in A.C circuits, so we will discuss it immediately.

Since in an alternating circuit the current and voltage do not remain constant, it follows that their product, or the power used, will vary, and its value at any moment will, of course, depend on the amount by which the current and voltage differ in phase. In dealing with power, therefore, just as in dealing with current and E.M.F., we have to be content with a mean value.

In order to find this value we must refer back once more to the expressions obtained for the instantaneous values of voltage and current in an inductive circuit, and then find the mean value of their product. It was seen above that

$$E = E_o \sin pt$$
$$\text{and } I = I_o \sin (pt - \varphi)$$

where φ is the phase angle by which the voltage leads the current. Thus the power at any instant is

$$EI = E_oI_o \sin pt \,.\, \sin (pt - \varphi).$$

Now the mean value of $\sin pt \,.\, \sin (pt - \varphi)$ is $\cos\varphi$ (App. IV), whence the mean power consumed is equal to $F_oI_o \cos\varphi$. The term " $\cos\varphi$ " is called the " power factor." Since " $\cos\varphi$ " has its maximum value of 1 when $\varphi = O$, and its minimum value of O when $\varphi = 90°$, it follows that the greater the phase difference between current and voltage the less the power consumed. The phase difference, φ, is always increased when the inductance is made greater as can readily be seen from Fig. 4, for if C^1B^1 were drawn very large compared with A^1B^1, φ would approach 90°, and if C^1B^1 were negligibly small (i.e., if the circuit had no inductance), φ would equal zero, or, in other words, the current would be in phase with the voltage. In the former case, where $\varphi = 90°$ whence $\cos\varphi = O$, the current is known as " wattless " or " idle," since no power is being wasted in the circuit.

So far we have been considering circuits containing resistance and inductance only. In almost every case in radio telegraphy there enters a third factor—capacity. Capacity in an alternating circuit has the same effect as inductance, in that it causes a phase difference between the voltage and current, but whereas inductance causes the voltage to lag behind the current, capacity causes the reverse. This may be deduced quite readily as follows.

Assuming the formula $Q = CE$, where Q is the charge in coulombs, C the capacity in farads, and E the applied voltage,

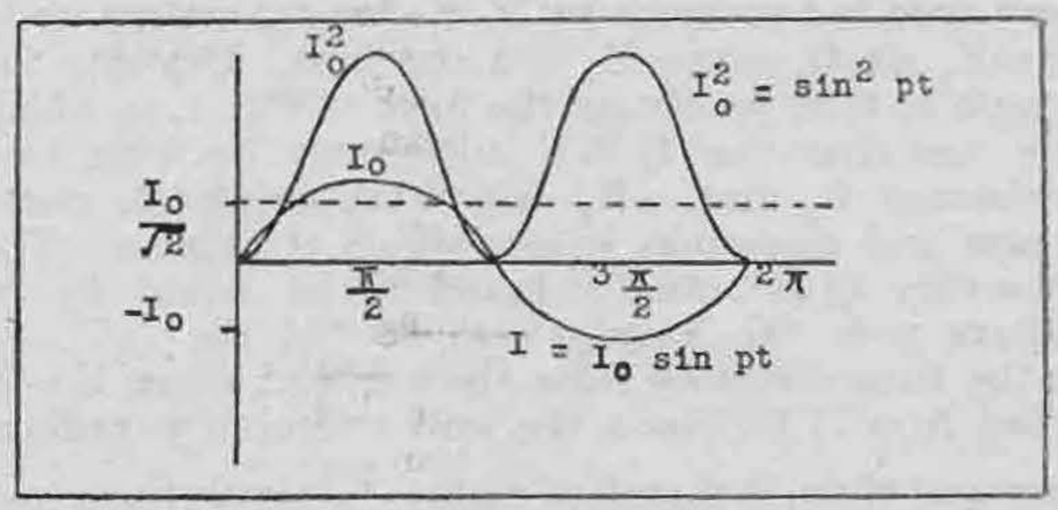


Fig. 3.

$$CE = Q = \int I\,dt.$$
$$= \int I_o \sin pt\,dt$$
$$= -\frac{I_o}{p} \cdot \cos pt$$
$$\therefore E = -\frac{I_o}{Cp} \cdot \cos pt = \frac{I_o}{Cp} \cdot \sin (pt - 90).$$

Thus for capacity alone in a circuit the E.M.F. is 90° ahead of the current, and has a maximum value $E_o = \frac{I_o}{Cp}$. We hence see that the back E.M.F.s due to inductance and capacity differ in phase by 180°, and therefore act against each other. Thus referring again to Fig. 4, the line B^1C^1 must be drawn equal to $LpI_o - \frac{I_o}{Cp}$ when capacity is introduced into the circuit, which makes the resultant

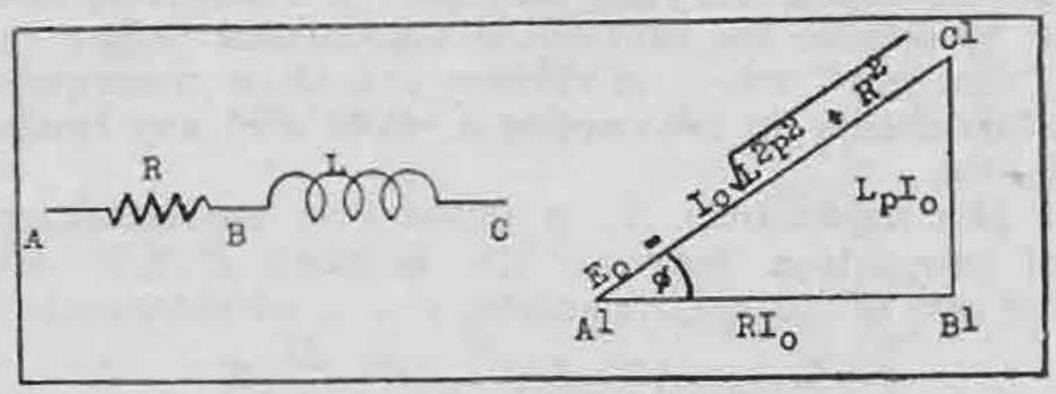


Fig. 4.

A^1C^1 equal to $I_\circ\sqrt{R^2+(Lp-\frac{1}{Cp})^2}$. So we arrive at the result that when a circuit contains resistance, inductance and capacity,

$$I_\circ=\frac{E_\circ}{\sqrt{R^2+(Lp-\frac{1}{Cp})^2}}$$

$$I=\frac{E_\circ}{\sqrt{R^2+(Lp-\frac{1}{Cp})^2}}.\sin(pt-\varphi)$$

where $\tan\varphi=(Lp-\frac{1}{Cp})/R$. (Fig. 4).

This formula expresses in the most general form the so-called " Ohm's law for A.C."

In concluding, it would not be out of place to mention the application of the latter formula in finding the necessary values of chokes and condensers for suitable dropping of current in A.C. work. It will be seen that when $Lp=\frac{1}{Cp}$ the current lags behind the voltage, and *vice-versa*, and in the case where $Lp=\frac{1}{Cp}$ resonance occurs, i.e., the current and voltage are in phase. It is therefore evident that for economic reduction of current in an alternating circuit, $\cos\varphi$, and hence the total power used, can be made small by inserting either a choke or a condenser (in favour of a resistance, in which energy is always wasted in the form of heat), but not both together. The choke is employed mostly in dropping current for arc-lamps, stoves and the like, and the condenser chiefly in low-power electric light bulbs where economy of space is an important factor.

Appendix.

I.

$$E=-\frac{dN}{dt}$$

where E is the induced E.M.F., and N is the flux linked with the coil when its axis is parallel to the magnetic field. Hence when the axis of the coil makes an angle α with the field, the flux is $N.\cos\alpha$, and

$$E=-\frac{d}{dt}.N.\cos\alpha$$
$$=-p.\frac{d}{d\alpha}N.\cos\alpha \text{ (putting } p=\frac{d\alpha}{dt})$$
$$=pN.\sin\alpha$$
$$=pN.\sin\int p.dt$$
$$=pN.\sin pt \text{ (counting time from when } \alpha=O)$$
$$=E_\circ\sin pt.$$

II.

$$L.\frac{dI}{dt}+RI=E_\circ\sin pt \quad \ldots \quad \ldots \quad \ldots \quad (i).$$

Let current lag behind voltage by an angle φ, then

$$I=I_\circ\sin(pt-\varphi)$$
$$=I_\circ(\sin pt.\cos\varphi-\cos pt.\sin\varphi) \quad \ldots \quad \ldots \quad (ii).$$
$$\text{and } \frac{dI}{dt}=pI_\circ\cos(pt-\varphi)$$
$$=pI_\circ(\cos pt.\cos\varphi+\sin pt.\sin\varphi) \quad \ldots \quad (iii).$$

Compounding (i), (ii) and (iii),

$$LpI_\circ\cos(pt-\varphi)+RI_\circ\sin(pt-\varphi)=E_\circ\sin pt. \quad (iv).$$

When $t=O$, $\sin pt=O$ and $\cos pt=1$.

When $t=\frac{\pi}{2\rho}$, $\sin pt=1$ and $\cos pt=0$.

Substituting these values in the expanded form of (iv), we get

$$Lp.I_\circ\cos\varphi-RI_\circ\sin\varphi=O \quad \ldots \quad \ldots \quad \ldots \quad (v).$$
$$\text{and } RI_\circ\cos\varphi+LpI_\circ\sin\varphi=E_\circ \quad \ldots \quad \ldots \quad (vi).$$

From (vi),

$$I_\circ=\frac{E_\circ}{R\cos\varphi+Lp\sin\varphi}.$$

Put $R\cos\varphi+Lp\sin\varphi=\sqrt{Z}$, then

$$Z=R^2\cos\varphi+L^2p^2\sin^2\varphi+2LpR\sin\varphi.\cos\varphi.$$

And $O=R^2\sin^2\varphi+L^2p^2\cos^2\varphi-2LpR\sin\varphi.\cos\varphi$ (from (v).)

Adding, $Z=R^2+L^2p^2$.

$$\therefore I_\circ=\frac{E_\circ}{\sqrt{L^2p^2+R^2}}.$$

and from (ii), $I=\frac{E_\circ}{\sqrt{L^2p^2+R^2}}.\sin(pt-\varphi)$.

III. (*a*).

Mean value of E for one cycle is given by

$$E\sim=\frac{\int_\circ^{2\pi}E_\circ\sin pt.d(pt)}{\int_\circ^{2\pi}d(pt)}=-\frac{E_\circ}{2\pi}.\Big[\cos pt\Big]_\circ^{2\pi}$$
$$=O.$$

(*b*).

Mean value of the square of the current over one cycle is given by

$$I\sim=\sqrt{\frac{\int_\circ^{2\pi}I_\circ^2.\sin^2pt.d(pt)}{\int_\circ^{2\pi}d(pt)}}$$
$$=\frac{I_\circ^2}{2^\circ}\int_\circ^{2\pi}\frac{(1-\cos2\beta)d\beta)}{2\pi} \text{ (writing } \beta \text{ for } pt)$$
$$=\frac{I_\circ^2}{4\pi}\Big[\frac{\beta}{2}-\frac{\sin2\beta}{4}\Big]_\circ^{2\pi}=\frac{I_\circ^2}{2}.$$

IV.

$$\text{Power}=EI=E_\circ I_\circ\sin pt.\sin(pt-\varphi)$$
$$=E_\circ I_\circ\sin pt.(\sin pt.\cos\varphi-\cos pt.\sin\varphi)$$
$$=E_\circ I_\circ\sin^2pt.\cos\varphi-\tfrac{1}{2}E_\circ I_\circ\sin2pt.\sin\varphi$$

From III (*b*), mean value of $\sin^2pt=\frac{1}{2}$, and that of $\sin2pt=O$,

Hence mean power $=E_\circ I_\circ\cos\varphi$.

Stray.

Mr. C. Harrisson, well known to many members under the call VK7CH, is now located at Shepparton, Victoria, and is using the call VK3CN when his duties at the Bank of Australia allow.

THE R.E.S. SINGLE SIGNAL BATTERY SUPER-HETERODYNE.

By S. A. Taylor (G5TL) and E. N. Adcock (G2DV).

Part 2.

THE first step in tuning up this receiver is a careful alignment of the intermediate frequency stages, which can only be accomplished to any degree of accuracy by means of a small modulated local oscillator tuned to the I.F. frequency. To allay any misgivings as to the complications of this, let us immediately say that this consists of nothing more than a one-valve oscillator with sufficient feedback to produce secondary oscillation, and hence the required modulation for audible tuning.

The parts for such an oscillator (Fig. 2) will be found in most " junk boxes." L1 consists of seventy turns of thirty-two d.c.c. wire wound on a two-inch former, with the reaction winding L2, consisting of forty turns of the same wire, scramble-wound on the filament end of L1. L3 is a single turn of insulated wire dropped in the coil-former, and continued in a convenient length of wire sufficient to reach the I.F. transformer cans in the receiver.

When the oscillator is completed it may be tested in a very simple manner by coupling the free end of L3 to the aerial terminal of a broadcast receiver tuned to approximately 600 metres. On swinging C1 to resonance, an A.C. type of note will be audible in the speaker. Having ascertained that the oscillator is working correctly, the I.F. stages of the super-het. may now be tuned up.

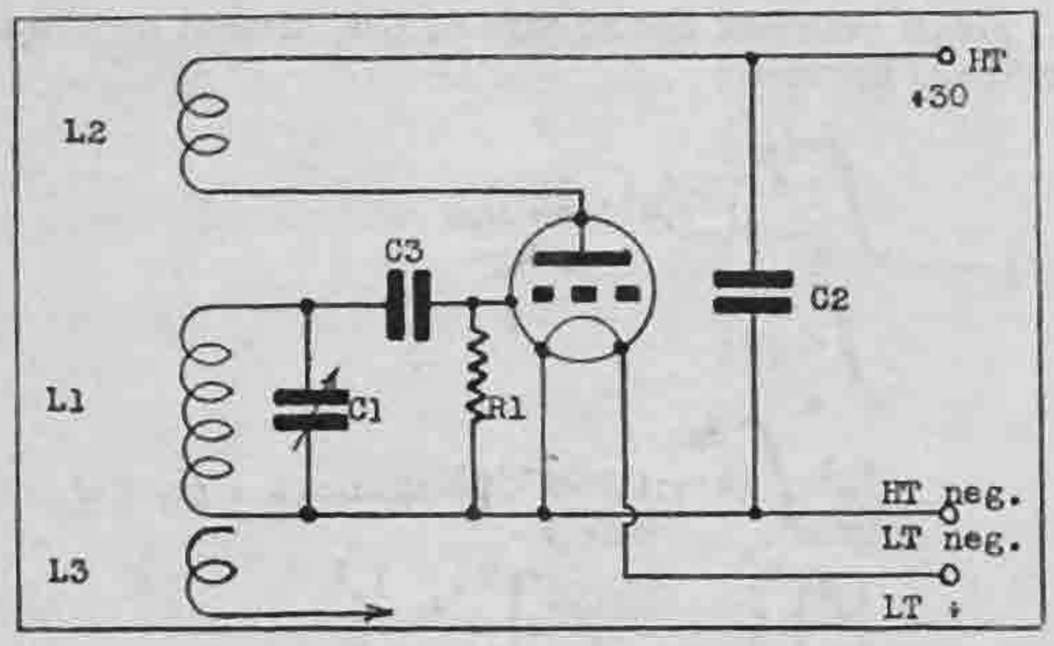


Fig. 2
Local Oscillator Circuit for lining up I.F. stages. C1 .0005 mfd. C2, C3 .0003 mfd. R1 3 megohms.

With all valves and a set of coils in circuit, the set may be switched on, but with the beat oscillator switch in the off position. The insulated lead from the oscillator should be slipped inside the I.F. transformer L10 L11, and C10 adjusted (by means of a piece of wooden dowelling with the end shaped like a screw-driver) until the note is audible at its loudest in the phones. The lead from the oscillator should then be looped round the anode of V4 and C9 adjusted in similar manner. This procedure is continued in tuning up C8 and finally C7, for which the wire from the oscillator should be looped around the anode of V2. All trimmers should then be given a final touch to obtain the greatest audible output. While making these adjustments the regeneration control (R6) should be kept well backed off, to prevent regeneration.

The beat oscillator may now be switched on and C12 adjusted until a beat with the output of the local oscillator is obtained.

All is now in readiness for receiving signals. The station monitor, crystal oscillator or regenerative receiver tuned to the required band should be switched on and the H.F. oscillator padding condenser (C5) rotated until a signal is heard in the phones. C3 should then be adjusted to resonate, and finally C1 brought into tune. C3 and C5 should then be moved to obtain convenient bandspread on the main tuning control (C2, C6).

The selectivity control R6 may now be advanced until the I.F. stage is nearly " spilling over," and true single signal effect should be obtained. The reaction winding L8 on the first I.F. transformer may with advantage be moved a little away from L8 until maximum signal strength coupled with smooth regeneration is obtained.

The results obtainable with this receiver will fully justify the time and trouble expended on its construction. The sensitivity, selectivity, and low background level are most satisfactory, and no doubt will be a revelation to those who have previously only operated an orthodox autodyne receiver.

Power Supply.

Although the current drain from the high-tension battery feeding this receiver is comparatively small, being in the order of 10 ma.'s at 120 volts, it is essential that a good-quality battery, preferably of the *Pertrix* super-capacity type, be employed.

Correction.—August Bulletin, page 52, column 2, line 4. For 3 inches read ¾ inch.

Coil Winding Details.

Winding ...	14 mc.	7 mc.	3.5 mc.	1.7 mc.
L1	6 t	8 t	10 t	12 t
L2	6 t	12 t	30 t	56 t
L3	6 t	8 t	20 t	30 t
L4	6 t	12 t	30 t	56 t
Tap to C2, turns from ground end	2½ t	5 t	—	—
L5	6 t	12 t	30 t	56 t
Tap to C6 ...	2½ t	5 t	—	—
Tap to filament ...	2 t	3 t	9 t	18 t

L1, 32 dcc. in all cases, wound in slot at bottom of former.

L2, L4, L5, 22 enam. for 14, 7, and 3.5 mc. and 32 dcc. for 1.7 mc.

L3, 32 dcc., wound between turns of L4, at bottom end of winding.

The New Guide is Ready

NEW LICENCE CONDITIONS.

A Statement made by Mr. Arthur Watts at Convention.

IT is highly probable that most of our transmitting members have been aware for some time that the Society has been negotiating with the G.P.O. with a view to obtaining better facilities for British amateurs.

It is my pleasant duty to report that, as a result of these negotiations, we are to be given extra facilities as from September 1.

I propose outlining each of the different items which have been revised commencing with the most important, that of frequency allocations. Under the Madrid Convention it will be remembered that six frequency bands are assigned to amateurs. The first between 1,715 and 2,000 kc. is defined as a shared band, and may be used by either amateurs, fixed or portable stations. Our allocations up to now have been between 1,730 and 1,985 kc., and in passing I feel that I should mention that we are fortunate in having permission to use this band, as its use is debarred in most European countries owing to demands by other services.

The next band, as internationally allotted, falls between 3,500 and 4,000 kc., but this is also a shared band, and in this country is used to a large extent by H.M. Forces, consequently restricted use has to be made of our allotted frequencies, which to date have covered the band 3,520 to 3,730.

We come now to the international DX bands, 7 and 14 mc. These are allocated to us exclusively, and up to the present the British band widths have been 7,025 to 7,275 and 14,030 to 14,370 kc.

The fifth and sixth bands which we know as the 28 and 56 mc. bands are shared with those who are licensed to carry out experiments (i.e., commercial organisations), and our present limits are 28,050 to 29,950 and 56,070 to 59,930 kc.

It will be noticed that throughout the G.P.O. have reduced the international allocations by some definite amount. These reductions have been regarded as tolerances, and were introduced in order to safeguard our stations from infringing into adjacent bands used by other services.

Five years ago we were prepared, perhaps, to agree that such tolerances were desirable, even if they were not put into force by other Governments, but as time has progressed and our knowledge of frequency measuring and frequency stabilising methods has increased it has become apparent that our bands were being unnecessarily curtailed. Armed with evidence to support our case, we approached the G.P.O. with a request that our bands be made the full Madrid width.

After very lengthy negotiations, I am pleased to say that the G.P.O. have met us almost completely, and from now on our bands will be as follows :—

1,720— 1,995	kc.
3,505— 3,730	,,
7,005— 7,295	,,
14,005—14,395	,,
28,005—29,995	,,
56,005—59,995	,,

There is, however, an important point in connection with this matter I have to draw attention to. I refer to the necessity of preventing our transmissions from wandering into adjacent territory. With the present state of technique it will, I think, be generally admitted that British manufacturers can produce crystals to limits equal to, and, if necessary, better than, 0.1 per cent., but even this percentage might possibly produce a carrier outside the international bands if the fundamental were set, for instance, on 7,005 kc., that is to say, the crystal manufacturer would be within his limit if a crystal ordered as 7,005 was found to be 6,998. This would become doubly serious if the carrier were modulated, for the fringe of the wave might conceivably fall as much as 7 kc. below the band (6,993 kc.).

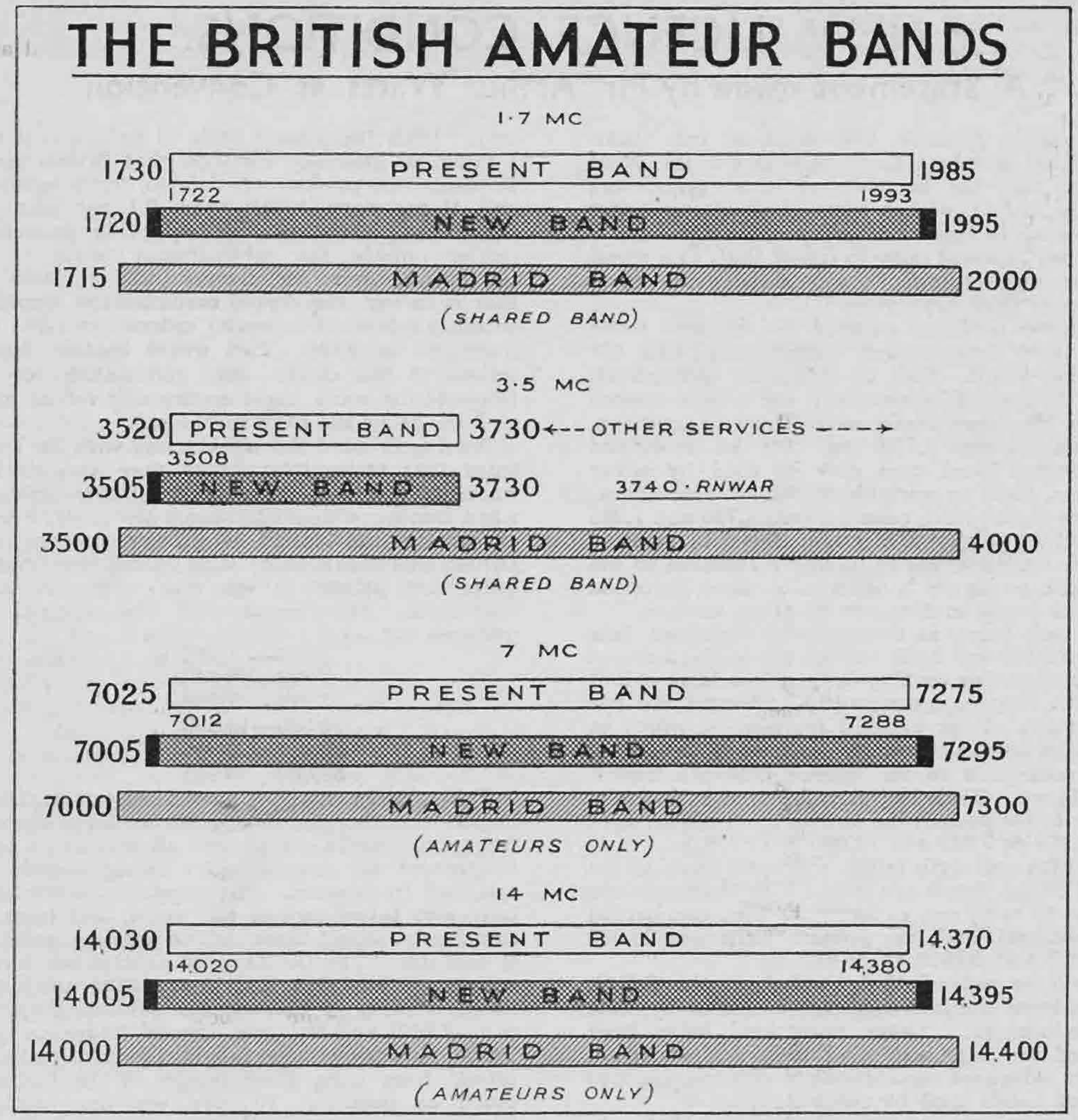
Bearing in mind these facts, and with the knowledge that transmitter design may also produce fractional variations in nominal frequency (especially when frequency doubling stages are used), I have, on behalf of the Council, agreed to recommend that British amateurs should, when buying new crystals, order them at least 0.1 per cent. inside the bands mentioned. This means that the nominal frequencies are :—

1,722— 1,993	kc.
3,508— 3,730	,,
7,012— 7,288	,,
14,020—14,380	,,
28,035—29,965	,,
56,060—59,935	,,

This requirement, I feel, should cause no hardships, because for the past five years we have specified frequencies inside our present allocations in order to prevent our transmissions falling outside the specified frequencies. The crystal manufacturers have also taken care of this point, and from the commercial aspect alone the 0.1 per cent. tolerance is desirable. The G.P.O. have assured me that no action will be taken if a transmitting amateur is heard working in between the nominal frequency (e.g., 7,012) and the new licensed frequency (e.g., 7,005), but they wish me to emphasise that we should refrain from using these fringes of the bands as much as possible. To give you one example. If you buy a crystal of a frequency of 7,012 kc., the crystal manufacturers' permissible error and slight transmitter variations may place your carrier wave on 7,005 kc., and if this carrier is modulated, the fringe of modulation may go to 7,000 kc. In this case the G.P.O. would not consider the station to be off frequency, but you would be expected not to remain there permanently. You will thus see that we have, as far as is possible at the present state of efficiency, very nearly the full extent of the international bands. How much greater accuracy we can obtain is, I think, a matter for us to study carefully.

You will notice that the band limit on 3.5 mc. at the high frequency end remains at 3,730 kc., and the nominal frequency I referred to earlier is the same, 3,730 kc. The G.P.O. could not extend here, because the R.N.W.A.R. are using 3,740 kc. ; on the other hand, they did not want to reduce us below 3,730 kc.

The next improvement concerns aerials. We approached the G.P.O. with a view to their deleting the 100 ft. limit altogether, but for reasons connected with B.C. interference they are unable



at this juncture to accede to our request. I am pleased, however, to report that the clause relating to this matter has been changed to read : " The length of the aerial (including the external part of the lead-in or transmission line, if any, *unless this is non-radiating*) shall not exceed 100 ft." The G.P.O. are willing to grant permission for longer aerials to be used in special cases providing application is made direct. The reasons for requiring the extra length must, of course, be specified.

The third point refers to hours of working. At present a limit of two hours per day is mentioned in the licence. The G.P.O. have doubled this to four hours, and have pointed out that this represents actual operating time, and should enable an amateur to put in at least 8 to 12 hours work on his station per day.

The G.P.O. have agreed to review the question of hours at a later date, but at present they feel that four hours is sufficient for all normal purposes.

The fourth improvement is in connection with B.C. interference. At present the licence clause throws the whole onus on the amateur. The new clause will read : " The arrangement employed for keying the transmitter must be such as to ensure that the risk of interference due to key click being produced in neighbouring apparatus has been reduced to a minimum."

The next, and possibly to some the most important new facility, relates to television experiments. For some while we have considered the desirability of obtaining facilities for those members wishing to conduct television tests, and I am pleased to announce that, at our request, the G.P.O. have agreed to accept applications from amateurs interested in this subject. I believe I am correct in saying that the British P.O. are the first to assign definite bands of frequencies for this purpose. Television permits will be issued for work in the band 30 to 32 mc., whilst the present 28 to 30 mc. channel will be used for sound. Quoting from the G.P.O. regulations dealing with this matter it is stated that :—

" (1) All conditions laid down under the terms of a licence for experiments in wireless telegraphy shall apply equally to licences for experiments in television.

" (2) Sending will ordinarily be limited to the band 28,005-32,000 kilocycles per second. The band 30,000-32,000 kc. only shall be used for vision and the band 28,005-29,995 for sound or control. [It must be understood that these frequencies are not at present included in the International Convention allocations, and therefore this can only be regarded as a temporary arrangement and may be altered by the Cairo Conference in 1937.]

" (3) The clause 7 of the conditions of the licence for experiments in wireless telegraphy shall be amplified as under.

" Subject-matter of entertainment value shall not be transmitted. Transmissions shall be limited to test objects, such as geometrical designs and diagrams or three dimensional objects. In addition, a test length of film occupying not more than two minutes in transmission may be used. Only one such film may be transmitted during the course of a day, although this film may be repeated.

" (4) Radiating facilities will not be granted until the applicant has produced evidence to show that the system proposed or apparatus employed possesses technical features equal to or in advance of existing systems, or that the experiments will be of scientific value."

My final remarks refer to applications for increased licence facilities, i.e., high power and 3.5 mc.

For the past 10 years the Council of the Society have been privileged to recommend members for such privileges, and whilst no member has been recommended except on technical grounds, no well-defined set of requirements has been laid down.

As a result of the recent negotiations we have been supplied with a copy of the instructions used by the G.P.O. in deciding whether an amateur should be given increased power, and I have obtained permission to give extracts from this document.

" (1) *Transmitter and Receiver Design.*

" Experiments conducted on transmitting or receiving circuits, modulation, components, etc., do not in general justify facilities for high aerial power. Such experiments can be conducted just as usefully on an artificial aerial, or, if some radiation is essential by a shunted aerial arrangement. Tests on special equipment for mobile work, such as aircraft, police, mines, etc., would be exceptions to the above.

" New systems of transmission involving both transmitting and receiving equipment can be developed without radiation, but in special circumstances long-distance transmission with reasonably high power may be necessary as a final proof of the efficacy of the system. Such special circumstances would include those in which the system may be affected by propagation conditions, or where the receiving equipment needs to be tested under such conditions. Typical systems of this class might be single side band, quiescent carrier, privacy, special modulation systems, picture transmission, etc.

" (2) *Aerial Design.*

" Experiments on transmitting aerials can be conveniently carried out with low power or by using the aerial for reception. If transmission is used polar diagrams can be obtained by local measurement, or, if long-distance measurements are necessary, by comparison between the aerial under test and a standard omni-directional aerial.

" There will always be exceptions in which new types of array having highly directive properties are undergoing test, and it is desired to check polar curves by local or remote measurement for comparison, say, with theoretical curves. In such cases the licensee would normally have to obtain permission for the use of an extensive aerial system prior to applying for high power.

" (3) *Propagation Research.*

" Amateurs are now restricted to particular wavebands, and thus their research into the propagation of waves is limited to a comparison between those bands and to diurnal and annual variations therein, etc. For the collection of reliable data on such work it is necessary to employ some form of measuring apparatus at the receiving end. The usefulness of the information collected will depend entirely on the sensitivity and accuracy of this apparatus. Increase in power at the transmitting station will decrease the sensitivity necessary, and so should enable more reliable information to be obtained with simple apparatus.

" One qualification for the use of high power for this work should be the possession of such apparatus. All stations, co-operating together in such tests and possessing such apparatus, should not need high power. In such cases it is assumed that an applicant is working in association with amateurs abroad who have corresponding facilities. Evidence of this fact is desirable.

" In addition to such work, research workers are studying the physical aspects of propagation phenomena, and for this work high power may be essential. In addition, the receiving apparatus in use at the receiving station may be intricate and costly, and it may then be very much more economical to increase the power of the transmitter."

I trust that this information will enable those desiring higher power to frame their applications along sound technical lines. As a general guide applicants should have been licensed for 12 months. The application should be sent to a member's D.R., who forwards it to Council with his comments. Again, as a general rule, increases are granted in 50 watts stages.

Although the news regarding television has already become known, I would mention that the R.S.G.B. is responsible for having obtained the facilities, and the bands proposed by us are those which have been adopted. I considered it advisable, however, to deal with everything now, rather than piecemeal, particularly as the G.P.O. will not be advising everyone of the increased facilities, but have left it to us to explain to you. I think this shows that they have confidence in us.

The new arrangements come into force on September 1, 1934. I wish to make it clear that this does not carry permission to use any band of frequencies unless you already have permission to do so.

In concluding, I wish to express my thanks to the G.P.O. for their unfailing courtesy to me on all occasions, and at the same time I desire to pay a warm compliment to all transmitting amateurs who, by their loyal co-operation and high standard of operating, have made it possible for us to obtain these new and improved facilities.

"SOLILOQUIES FROM THE SHACK."

By Uncle Tom.

(Arriving home at 03.30 with a distinct nautical roll, our slightly curdled old friend proceeds, as usual, to scribble.)

WELL, well, nieces and nephews all! I hope you all enjoyed your Convention. My sincere sympathies to all who weren't there (and, of course, as always, to some of those that *were* there, as well, in a manner of speaking.)

Friday night, to my mind, was the brightest spot of the week-end. If only we could find a place just a *leetle* more suitable for our numbers, with just a *leetle* more fresh air, I should prefer a running buffet to a dinner!

I was grieved and pained to find that so many people thought they knew who I was. Those who fondly imagine that they have pierced my veil of anonymity (not bad, that, for the next day!) must remember that I, Uncle Tom, am *not* a person. I am the sylph-like, ethereal spirit of amateur radio; I am also the professional lead weight that is so necessary to tell people, sometimes, just where they get off.

These two halves of me sometimes indulge in conversation; sometimes they go further and have a proper scrap, in which case it is always the rude old man that wins and the dainty nymph that loses. But, all the same, I was responsible for putting the "YL" in "sylph."

Such a conversation started on Friday evening. The ethereal spirit speaking: "Now then, old 'un, lay off the grouses for a bit. Look at all these bright young things enjoying themselves. Have you the heart to spoil their innocent pleasure by telling them where they get off? No, you wouldn't."

Old Man (speaking): Hoh—*wouldn't* I? *Look* at them! Calling themselves amateur experimental research stations, and what not, and all they want is QSL cards. Now just look at that bloke over there—heard him call test 19 times the other day; I've a jolly good mind to go over and soak him on the beezer right away. . . .

E. S.: Nay, nay, my dear old Unc. Restrain thyself. That same handsome young fellow is loved by *someone*, even if it's only the Frenchman that called him dear, *dear* o.b. the other evening. Besides, I rather like his face. Let him collect his cards; he'll soon grow out of it.

O. M.: Humph—look at that sour-faced old G2—over there; he's been in the game nine years and still goes goofy every time the postman comes. Never done a stroke of experimental work in his life. Listen to him next Sunday asking for reports on his bl——.

E. S.: Now, *now*, NOW. You're a nasty, bad-tempered old codger. Look at the pictures and forget yourself.

O. M.: Good 'evings above, look at all those young nibs playing Boy Scouts. They call that a field-day, huh? Why, I bet G6— over there slept in his socks. Besides, where's the experimental part of that lot? All they're trying to do is grab more points than some of their brother-hams doing the same thing.

E. S.: You know, you'll make me cross in a minute. Don't be so cynical.

And so it went on on the Saturday morning. Someone speaking about the problem of the high-powered station in the B.E.R.U. Tests started Ethereal Spirit and Old Man at it again.

O. M.: 'Ark at the young Squibs. Ask 'em why they enter B.E.R.U. Tests. *I* could tell you—just so as to get more points than someone else in their district, so's they can swank for the rest of the year.

E. S.: No, no; for the love of making Empire Friendships. They don't mind how many points they score so long as they are conscious of having done their best.

O. M.: Best MY FOOT! Bloomin' swank-parade, that's all it is. Why, I know G6—, who beat G5— by about seven points, hasn't stopped crowing yet. Hope he burns himself out next year.

And then again at the Dinner. The O. M. wants to get out of it before he has to pay for any more drinks.

O. M.: Come on. I've heard all these speeches before; I could write down exactly what the next man's going to say, except that he'll put the "er's" in in different places this year.

E. S.: Shush—he's going to make a very interesting speech. He's going to say——

O. M.: Oh, for the love of Mike shurrup, or I'll get the Gugglespitz to you. Don't *you* start making a speech too. Where's that blankety waiter? Hi, waiter! (Oh, beg your pardon—didn't know you were the entertainer.)

And so, with mixed feelings, the two halves have amalgamated once more, leaving your Uncle sour and vinegary on one side, and beaming and benevolent on the other.

And now for the Limerick Department, supplied by our Birmingham Office, but much abridged this month:—

A young Scottish ham in Greenock
Had a bug key, an awful old crock.
He once, says a tale,
Substituted a "Yale,"
And it stuck in his darn Goyder Lock.

A snappy young laddie from Bristol
Used a watch-glass instead of a crystal.
To remove a grease-smear,
He washed it in beer,
And the darn thing went off like a pistol.

An awful machine in *Calais*
Sent out horrible "spitch" every day.
His horrible yells
Swamped all the ZL's
And completely drowned every VK.

A young man in far Venezuela
Had no licence for his "exhalor."
In those countries, I learn
The police are more stern,
So QSL, please, via the Jailer.

Teehnical Articles are Wanted

CONVENTION 1934.

OUR Ninth Convention broke all records for attendance and enthusiasm. For the first time a strong European contingent were present with us and this, coupled with the fact that some 20 or more B.E.R.U. members were also in London, helped to make the event the most international in our history. Chief amongst our visitors from the Continent was Mons. Paul de Neck, ON4UU, President of Reseau Belge, who was accompanied by the well-known DX amateur Mons. Mahieu, ON4AU, Baron Bonaert de la Roche ON4HM, and Mons. C. Anthierens, ON4PA, From Holland we had the two operators of the famous Dutch phone station PA0ASD, also PA0UB, PA0FB, and PA0GG. The B.E.R.U. was represented by Mr. W. E. Lane, VQ4CRH, Mr. Clarkson, ZL1FQ; Mr. Beaumont, VU2FP/G6HB; Mr. Fynn, ZE1JH, and many other well-known amateurs.

Ninth Annual Convention, August 25th, 1934.

The Conversazione.

The Convention proceedings opened on Friday evening, August 24, with a Conversazione at Maison Lyons, Shaftesbury Avenue. It will be remembered that this function formed one of the features of the Eighth Convention, and in view of the enthusiasm shown on that occasion, Headquarters had no qualms in repeating it, if only for the reason that it provided an excellent opportunity for reviving old and making new friendships. On this occasion the technical talks were omitted, but the proceedings were enlivened at about 8 p.m. by a display of films, arranged and titled by our President; these included numerous "shots" taken during N.F.D. by interested amateur cinematographers. Many of the films were of excellent technical quality, particularly that of the Scottish C District and those taken by Mr. Watts during his visit to District 12. At the conclusion of the Field Day display Mr. Stocken, of the Finchley Amateur Cinematograph Society, displayed a series of films taken by the N.V.I.R. of Holland. These were annotated by Dr. Fereday, G6FY.

The feature was regarded as a great success and it is hoped in future years to repeat it on a larger scale. The Conversazione broke up shortly after 10.30 p.m., a total of over 170 members having been present.

Delegates and Business Meetings.

Saturday proved a busy day for all attending Convention. At 9.30 a.m., a Delegates' Meeting was held in the Council Room at the Institution of Electrical Engineers. and at this meeting all Districts, with the exception of No. 4, were represented either by the District Representative in person, or his proxy. In order to save time, a new feature was introduced whereby instead of each Delegate giving his report individually, the reports had all been received by Headquarters beforehand and circulated in "précis" form to the Delegates. By this means more time was made available for general discussion, and as a consequence considerable progress was made. It is not possible in this account to enumerate in detail the many items discussed, but the following will serve to show the variety of the points which were dealt with:—

1. A proposal to arrange for a quiet period during National Field Day.
2. The question of Headquarters' attendance at Conventionettes.
3. The desirability of restricting the number of Society contests.
4. A discussion regarding the character of District notes.

5. A decision to compile DX charts for publication in the BULLETIN.

6. Views regarding the slow Morse practices.

7. A general discussion regarding artificial aerial licences.

8. A recommendation to sponsor local short-wave clubs.

All of the above items and many others were discussed and general agreement reached on any contentious point. The meeting terminated at 10.55 a.m. and was followed immediately by the general business meeting, which in previous years has taken place during the afternoon of Convention.

This meeting was opened by the Secretary giving an extemporary report on the more important matters discussed at the Delegates' Meeting. Other subjects covered Contest Rules, with particular reference to the B.E.R.U. Contest, whilst a scheme was put forward for reducing the number of District Conventionettes by combining adjacent districts. Under the item of "Other Business," that hardy old annual "fone on 7 megacycles" came up again, with the usual result, that no decision was reached!! The meeting terminated at 12.30 p.m. and most of those present adjourned for lunch at Slater's Restaurant, in the Strand, where special catering arrangements had been made.

CONVENTION PHOTOGRAPH.

At 1.50 p.m. the members reassembled outside the Institution of Electrical Engineers for the Convention photograph, and it was then that the vast number attending became really apparent. The group photograph gives some idea of the difficulties experienced by the photographer in taking this picture, and if Convention enthusiasm continues to grow it seems that a sectional photograph will be necessary within a few years. After Convention was all over we made the discovery that at least 40 members missed the photograph by a short head or a few lengths!!

AFTERNOON MEETING.

Following the photograph, each member was individually welcomed by our President, Mr. Arthur Watts, as he entered the Lecture Theatre. The meeting opened with Presidential Greetings when a special welcome was extended to the Belgian, Dutch and overseas visitors. The Secretary then read messages of good wishes which had been received from the following: Messrs. Davidson, VQ4CRL; Mavis, ZE1JE; Cole, SU1EC; Tyrrell, VU2BM; Pettitt, SU1SG; Wedderspoon, VU2JB; Fenner, ZC6FF; the U.S.K.A. (Switzerland), the H.A.R.T.S. (Hong Kong), the R.S.E.A. (East Africa). A message was also received by cable from the President of the East African Society to the effect that he would broadcast a message from the Nairobi Station on Convention Saturday, but owing to the dinner it was not possible for us to receive this transmission.

The President next presented the Society trophies and certificates to the various winners, each recipient being received with acclamation. Mr. Watts then made his important statement with regard to the concessions granted by the G.P.O. This is reproduced in full elsewhere in this issue. The advantages outlined were obviously appreciated by the hearty applause which terminated the statement. Mr. Milne formally moved a vote of thanks to the President and Council for their work in connection with this matter.

Another innovation was then introduced when short papers dealing with technical subjects were given by members. The speakers and subjects were as follows: Mr. J. Davies, G2OA, "Interference on Receiving Aerials and the Reduction of Pick-up Noise"; Mr. H. A. M. Clark, G6OT, "The Bruce Antenna"; Mr. F. Charman, G6CJ, "The Natural Frequencies of Aerial Wires"; Mr. D. N. Corfield, G5CD, "The Valve Voltmeter and its Applications"; Mr. H. G. Collin, G2DQ, "Some

OVERSEAS MEMBERS PRESENT AT THE ANNUAL CONVENTION.
Front:— ON4PA, ON4AU, ON4UU, G6CL, G6UN, VQ4CRH, SU1WEM, HB9RGO, PA0ASD.
Second Row:—ZE1JH, —, ON4HM, VU2BH, —, ZL1FQ, VQ4CRR, VP7NB, AC8LB, —, PA0UB.
Back Row:—VU2FP, PA0GG, PA0ASD (2nd Operator).

Views regarding Contests." Each paper was received with enthusiasm and was discussed as fully as time would permit. The President at the conclusion of the meeting proposed a vote of thanks to the contributors and invited them to forward their papers for publication in the BULLETIN.

THE ANNUAL DINNER.

This took place at the Florence Restaurant, Rupert Street, where some 180 members sat down under the chairmanship of our President. It is of interest to point out that only 50 members had booked their tickets for the dinner up to two days

The Society's Stand at the Radio Exhibition, Olympia, August 16th to 25th, 1934.

before it took place. The difficulties of arranging accommodation under such conditions will be appreciated by any member who has been in the unfortunate position of acting as organiser of a similar affair.

The special guests of the evening included our Vice-President, Capt. P. P. Eckersley, and Mons. Paul de Neck. After the loyal toasts, proposed by the President, a musical programme arranged by Mr. Cecil Hooker commenced. The artists were :— Miss Mary Winter, Mr. Ivor Walters, Clown Argo, Mr. Will Gardner and Mr. Cecil Hooker.

Other toasts followed ; that of " The Society at Home " being proposed in a humorous and characteristic manner by Capt. Eckersley, who entertained the members with details of his recent American trip. This toast was responded to by our Secretary, Mr. J. Clarricoats.

The toast to " The Society Overseas " was proposed by Mr. A. E. Dyson, G6NJ, in the absence of Mr. V. M. Desmond. Mr. Dyson referred to the great progress made in the establishment of overseas groups and on behalf of the home members welcomed all B.E.R.U. members who were present. The toast was responded to by Messrs. Lane, Beaumont, Fynn, Clarkson and Boyce (VP7NB) ; thus, each continent of the Empire was represented in the response.

The toast of " The Visitors " was proposed by Mr. Clark, G6OT, in a very able manner, and was responded to by Mons. Paul de Neck, who referred to the great pleasure it gave him to attend Convention. On behalf of his colleagues he expressed his thanks for the warm welcome which they had received. Mr. W. F. Jacot, PA0ASD, responded on behalf of the Dutch members who were present.

The last toast of the evening was that of "The President," proposed by Mr. H. Bevan Swift, Immediate Past President, who congratulated Mr. Watts on the numerous personal successes attaching to his term of office. The toast was accepted with musical honours amid acclamation. Mr. Watts in his reply thanked Mr. Swift and the membership generally for the assistance which had at all times been

given him. He expressed his great personal pleasure at the attendance of so many B.E.R.U. members.

A surprise item in the shape of a lucky number draw was staged during the evening by our Secretary, which was all the more a surprise because no one with the exception of himself and his fellow-conspirator Miss Gadsden, had the slightest idea that it was to take place; in fact, a definite statement had been made to the effect that no such feature would be introduced this year. It was therefore indeed a surprise when " Clarry," lifting a table-cloth from a side-table, revealed a collection of components and books most generously contributed by numerous firms. Miss Corry, G2YL, and Miss Burns, G2IA, the only lady transmitters present, were invited to assist in making the draw, and some 50 of those present went home richer than they came. Loud laughter greeted the disposal of some of the prizes, especially when one of our more expert members received a book dealing with the elementary principles of Radio Telegraphy, and a confirmed short-wave amateur appropriated a piece of B.C.L. gear. A full list of the donors follows: Mullard Wireless Service Co., The High-Vacuum Valve Co., Messrs. Wingrove & Rogers, Ltd., The Telegraph Condenser Co., Messrs. Dubilier, Ferranti, Ltd., Weston Electrical Instrument Co., Loomes Radio, Quartz Crystal Co., Pertrix, Ltd., Stratton & Co., Ltd., Barnes & Humby, Messrs. Varley, Lectro Linx, Ltd., Belling & Lee, Colvern, Ltd., Iliffe & Sons, Chapman & Hall, Ltd., Sir Isaac Pitman & Sons, Earl Manufacturing Co., British Rola Co., E. R. Martin, Rich & Bundy, Radio Mart.

The proceedings terminated somewhere around 11 p.m. (we regret we cannot be more precise in regard to this detail !) by the customary singing of Auld Lang Syne and God Save the King, and thus

Our supernumerary acting unpaid free lance humorist looks in on Convention.

Technical Articles are Wanted

our Ninth Annual Convention came to an enjoyable and satisfactory conclusion. Those who attended will have the satisfaction of knowing that they helped to break all records as far as British Conventions are concerned.

THE SOCIETY'S STAND AT OLYMPIA.

This report will not be complete without reference to the Society's stand at the R.M.A. Exhibition held at Olympia during the eight days preceding Convention. The stand was located in a prominent position in the gallery, and as a result drew a tremendous number of interested members of the public. Upon the stand were displayed numerous transmitters and receivers, many of which are described in the new edition of " A Guide to Amateur Radio." The 10-watt c.w. and telephony transmitter described by Mr. A. E. Livesey, G6LI, together with a very modern 50-watt transmitter employing link coupling and the tri-tet circuit built by Mr. G. McLean Wilford, G2WD, came in for a good deal of critical examination. We hope to be able to give details of Mr. Wilford's transmitter in an early issue of this journal. The two-valve amateur band receiver built by Mr. Thomas, G6QB, the dual range frequency meter, built by Mr. Gay, G6NF, and the one-valve transmitter, built by Mr. Buckingham, G5QF, were also the subjects of much enquiry from interested visitors. Several 56 mc. receivers and transmitters were also displayed, as was also the portable station used by Capt. G. C. Willmot, ZD2A, during his recent stay in Nigeria. A 250-watts power pack was kindly lent by Mr. W. Nightingale, G5NI, of Birmingham.

The specially printed second edition of " A Guide to Amateur Radio " sold freely at the stand, over 4,000 copies being disposed of during the period of the Exhibition. Many copies of the June issue of the BULLETIN (Birthday Number) were also sold, together with other items of Society interest. Many of our members who visited the stand lent a hand in assisting at the counters, a keen spirit of rivalry existing on many occasions. Our thanks are due to all who rendered assistance in this respect, particularly Messrs. Curnow, Chisholm, Sadler and Martin, who forfeited the enjoyment of the dinner in order to keep the stand going on Convention Saturday evening. The visitors' book bore ample evidence of those who visited the stand, as did one side of the wall which gradually became covered with personal QSL cards left by members. The only drawback was the size of the stand, which although larger in area than usual, became congested every evening by members. This fact, however, constituted one of the finest advertisements the Society has yet obtained. Numerous application forms for membership were submitted and the prospects of large increases in membership are bright. It was everywhere apparent that the general public is taking far more interest in short-wave work than formerly, and questions asked at the stand showed much more intelligence in this direction. An important feature of the stand was to be found in the excellent posters and descriptive labels prepared by Mr. A. W. Hartley, 2BTZ. These undoubtedly contributed in no small way to the success achieved. Our especial thanks are due to our lady assistants, Miss Gadsden and Miss Spence, who were present throughout the Exhibition period, putting in hours of duty with the utmost cheerfulness.

Remote Control Keying.

BY E. L. OWEN (G2OW).

For some time the writer has required a reliable system of keying a 10-watt COPA on 3.5 mc. which embody the following features :—

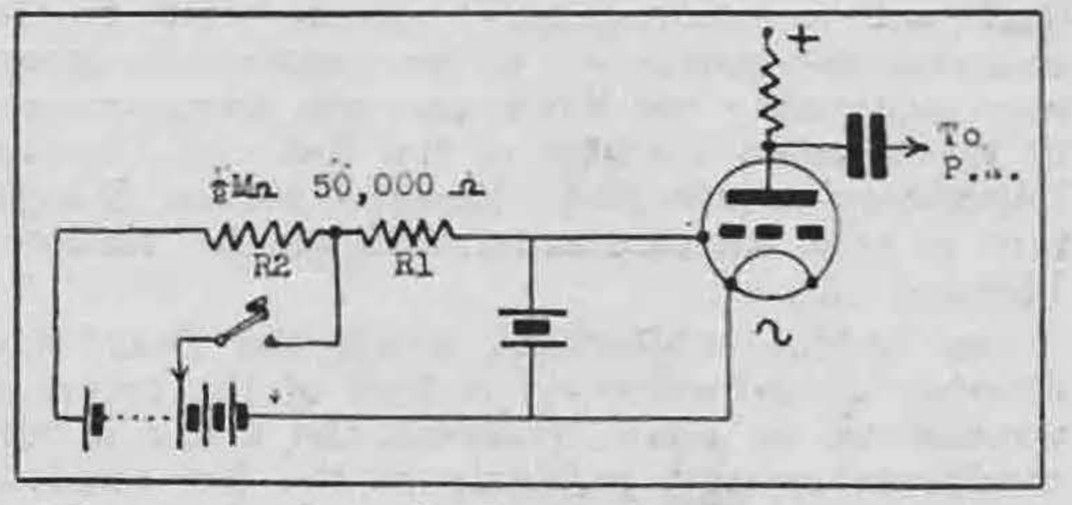
(*a*) Allow " break in " to be worked using a separate aerial for the receiver.

(*b*) Be practically clickless in operation.

(*c*) Avoid the use of relays and their associated batteries.

(*d*) Not pass an appreciable current through the key contacts.

(*e*) Allow any reasonable length of line to be used in the key circuit.



After a good deal of experimenting the circuit shown was developed. With the key up the full bias of about 60 volts is applied to the grid of the C.O. valve, thus backing it off completely. With the key down, the bias is changed to the normal operating value (about 8 volts) and a small current of about one-tenth of a milliamp is taken from the bias battery.

This system of keying has been successfully applied to a transmitter operating with 400 volts at 25 ma.s on the P.A. and 200 volts on the C.O.

Empire Calls Heard.

By BRS822, 63, Tennyson Road, Small Heath, Birmingham, during July and August :—

14 mc. : su1mo (5.5.9), 1pr (4.5.8), 1rm (5.5.8), ve1df (3.4.8), 1dg (4.4.9), 1gi (4.5.8), 2bt (4.4.9), 2dv (4.4.6), 2fl (4.5.6), 2ie (4.4.9), 3am (3.3.9), 3jv (4.5.9), 3ti (3.4.9), vp2rt (4.4.8), 3e (4.5.7), 4tc (3.3.6), 5ab (4.5.8), vu2ja (4.4.7), zc6ff (4.5.8).

W6ENV-W6FKC (A. H. Elsner, Los Angeles, California) :—

14 mc. : g2bg, 2bm, 2bo, 2bs, 2dc, 2di, 2dv, 2gf, 2ma, 2mr, 2oi, 2zj, 2zq, 5bj, 5by, 5fv, 5ma, 5mr, 5ml, 5nf, 5ni, 5nk, 5qa, 5rx, 5wy, 5xt, 5yh, 5yv, 5yx, 6cj, 6dl, 6hp, 6lk, 6lm, 6ml, 6my, 6py, 6qb, 6qx, 6rb, 6us, 6vk, 6xs, su1ec, 1eg, 1sg, 6hl, zd2a, zs1h.

7 mc. : g2jf, ze1jf, 1jj, zs1b, 1cp, 1h, 1z, 2a, 2d, 2f, 2h, 2x, 2z, 4m, 4t, 5e, 5q, 5u, 5x, 6aa, 6af, 6b, 6c, zt1h, 1r, 1z, 2a, 2e, 2f, 2h, 2l, 5f, 5r, 5v, 5w, 5z, 6d, 6n, 6x, zu1e, 1n, 1p, 5g, 5y, 6e, 6m, 6p, vu2lz.

* * *

G6YL (Felton, Northumberland) :—

7 mc. : vk2bp (5.5 mod. c.c.), z11bc (5.7.7), 1hy (3.4.9), 4ai (5.5/4.9), 4fw (4.4.9), xzn2b (4.4/3.9), xzn2e (3.4.6).

14 mc. : ve2fg (5.5/4.mod. c.c.), 2hg (3.4.9), 3jz (3.4.9), 3zb (5.5/4 mod. c.c.), 4bf (5/4.5/4.9), 4mv (4.4.9), vp2cd (3.4.6), 4aa (4/3.5/4.6), 5jb (5.6.6), 5pz (4.4/3.6), 6mo (3.4/3.6), 9w (4.4.4), vs6aq (4/3.5/4.9), 7gj (3.4.9), vu2bl (5.5.8), 2bm (3.5/4.5), 2ja (3.4.8), 2ls (3.4.8), ze1jj (3.4.9).

BOOK REVIEWS.

Research on Radio.

(*Report of the Radio Research Board for the period January* 1, 1932, *to September* 30, 1933, *published by H.M. Stationery Office*, 2*s.* 6*d. net.*)

The Department of Scientific and Industrial Research have issued a report of the Radio Research Board reviewing the work carried out during the year 1932 and most of 1933.

No separate report was issued for 1932 in order that the "introduction and first results of two notable improvements in organisations might be dealt with in more detail." These relate to the complete re-organisation of the Committees generally supervising the work, and the amalgamation of the Wireless Division of the National Physical Laboratory and the Radio Research Station, Slough, into a new Radio Department of the National Physical Laboratory.

One of the subjects to which the Board has devoted special attention is that of the travel of wireless waves which involves the study of the conditions existing not only in the few hundred miles concerned in the reception of broadcast signals, but also of the thousands of miles concerned in long-distance short-wave communications. Both types of travel meet in the "common ground" as it were, of that part of the upper atmosphere, now generally called the "ionosphere," which plays such an important role in the transmission of wireless signals.

The report covers a period of intensive observation of this "ionosphere" and describes the development of new methods of "echo-sounding," by which observers on the ground can explore the electrical condition of the atmosphere at heights of 60 to 150 miles. One reason for the intensive nature of the work was the incidence of the "Second International Polar Year," in which scientists of various countries were engaged in a thirteen-months' study of the conditions in polar regions and a comparison with those in other latitudes. As the end of this special year's work almost coincides with the period covered by the report, the results are at present of a preliminary character since their complete analysis must take some time.

"The general conclusions which appear to be emerging from these experiments are," the Report states, "that ultra-violet light from the sun accounts for the normal ionisation of the two main regions of the ionosphere and for daily and seasonal variations in its intensity. At the same time there appears to be strong evidence that "abnormal" variations in the ionisation of the lower region, which occur mainly at night and during magnetic storms, can probably be best accounted for by the hypothesis that charged particles enter our atmosphere from outside and are carried towards the poles by the action of the magnetic field of the earth.

"A further interesting discovery is the indication of a correlation coefficient as high as 0.75 between thunderstorm activity and the increase in ionisation in the lower layer, suggesting that thunder clouds contribute to the ionisation of the ionosphere, either through intense ionisation currents or lightning flashes."

A matter of considerable interest which is discussed in the report is the manner in which wireless waves are reflected back to the earth by the ionosphere. A knowledge of the complete mechanism of this process is essential in arriving at the whole story of world-wide travel of radio signals. Recent addition to the knowledge of this subject lies in the proof, which has now been obtained, that when a wireless wave reaches the ionosphere it is, in general, divided into two parts by the action of the earth's magnetic field and these two components—two waves, as it were—are returned to earth with a rotational spin, one spinning left-handedly and the other right-handedly. Moreover, the two do not generally take the same time to travel back to earth, one being more heavily delayed than the other. The inference between these waves accounts for much of the fading on long-distance communications especially on short waves.

Collateral work of a more immediately practical nature is proceeding on the long-distance traffic routes of the transatlantic telephone. The whole of this short-wave communication is effected by means of waves returned from the upper atmosphere, and the angle at which they arrive back to earth at the receiving station is of the greatest importance in the design of aerial systems for the most economic communication. New instrumental methods of measuring this angle are described, including methods by which it is possible to analyse the arriving signal into the various rays of which it is composed and to measure the angle at which each of these waves arrives back to earth.

Further problems of a high practical value relate to direction-finding. It has long been known that wireless direction-finding may be subject to considerable errors which were originally found to develop at night, and were, therefore, described as "night effect." Previous work of the Radio Research Board has shown that this effect is due to the condition of the waves returned from the ionosphere after dark when it becomes a more active reflector—the same conditions indeed as those already referred to above. Moreover, recent work shows that with shorter waves, which are coming increasingly into use for direction-finding and other purposes, the effect of these conditions is by no means confined to night time, but persists throughout the day. The improvement of direction-finding consists in developing instruments which are immune from the effects of these conditions, and the most up-to-date practical developments of apparatus of this type are described in the Board's report. Other practical direction-finding improvements consist in methods of utilising the cathode-ray oscillograph, an instrument which the Radio Research Board has always used extensively in the course of its work. A particularly neat form of directional apparatus using this instrument is a small and compact receiver, designed for the prevention of collision at sea in conditions of fog and low visibility generally. This apparatus is designed to work on specially short and widely spaced signals which need not interfere with existing traffic even on the same wavelength, but which would still give the navigator a clear indica-

tion of any nearby vessel likely to form danger of collision.

Devotion to the upper atmosphere does not leave the Board's work entirely " in the air," for attention is also given to the earth itself, and the part it plays in wireless transmission. The nature of the soil round the wireless transmitter is an important factor in determining the efficiency of the station as a source of radiation. The nature of the terrain between transmitter and receiver is also a factor determining the reception, for example, of broadcast signals and the " service area " of a broadcasting station. The work on this subject described in the Report has consisted of laboratory methods of measuring the electrical qualities of samples of soil taken from various places, from which a prediction of their practical properties can be calculated.

Amongst other matters of practical importance, is the work on the development of valve oscillators of high constancy of frequency, for purposes of wireless transmission. In the present crowded state of the ether it is essential that stations should be able to keep very closely to their allotted wavelengths. In the case of stations working permanently on one fixed wavelength this is, with modern technique, a matter of no great difficulty, but with mobile or other stations which have to be able to change to allotted wavelengths of different values there is much greater difficulty in maintaining the exact value of the wavelength to which it is adjusted. This subject has received considerable study, and the report describes the work which is in progress towards the development of oscillators for this purpose.

SENDER-PRAKTIKUM (Practical Transmission), by A. Cl. Hofmann. With 111 illustrations and many diagrams. 128 pages. Published by Deutsch-Literarisches Institut J. Schneider, Berlin-Tempelhof, Germany. Price, paper 3.25 R.M., linen 4.25 R.M.

This book, which is in German, deals with many phases of amateur short-wave transmission essentially from a practical standpoint and contains constructional details of a number of popular transmitters. These include the Hartley, T.P.T.G. and also Crystal Oscillators and Frequency Doublers, in addition to a portable Transmitter and Receiver combined.

These are all dealt with in Chapter 2, which occupies 38 pages. Other chapters concern frequency meters, keying methods and filters, aerials, etc., while Chapter 8 is devoted to short-wave receivers.

There is a table of Valvo and Telefunken valve characteristics at the end of the book. M. W. P.

DER MIKRO-SENDER. (The Micro-Transmitter), by Otto Kappelmayer. With 16 illustrations and a full-size constructional photograph. 23 pages. Published by Deutsch-Literarisches Institut J. Schneider, Berlin-Tempelhof, Germany. Price 1.20 R.M.

This booklet (in German) gives constructional details of a very small portable short-wave transmitter which weighs only 400 grammes when completed. It is an adaptation of a small transmitter used by the Signal Corps of the American Army and originally described in " Proc. of the I.R.E." No. 9, September, 1931. M. W. P.

TELEVISION : THEORY AND PRACTICE. By J. H. Reyner, B.Sc., A.C.G.I., A.M.I.E.E., M.Inst. R.E. 196 pages and 100 illustrations (12 plates). Published by Chapman & Hall, Ltd., London. Price 12s. 6d.

Many more experimenters are now becoming interested in television, and this book should prove very valuable in making them *au fait* with the fundamental principles and difficulties, as well as with the technique of the more successful methods.

Particularly satisfactory is the chapter dealing with the eye, and the author treats this immensely precise instrument in what can, without exaggeration, be called a fascinating way. A real understanding of the requirements of the eye for proper vision and ability to distinguish detail is an obvious necessity to any serious experimenter. One cannot but feel that the ear has been very much neglected in books dealing with the aural side of broadcasting.

Another outstanding feature of this book is the interesting and extremely lucid treatment of the cathode ray tube, and time base circuits. These are not easy to explain in a simple yet comprehensive manner, but the author claims the reader's interest from start to finish, and one wonders at one's previous difficulties.

But it is hardly fair to mention particularly two features of a book which is thoroughly good in every way, and, in fact, one finds that members' attention should be drawn to the chapter on photo-cells—on film television—on the receiver—on velocity modulation—on short-wave television—all of which cannot be done in a short review, but all of which are equally sound.

In conclusion, it should be mentioned that this book was read under conditions which opposed sustained interest—on a hot August afternoon, and outdoors, where flies and wasps disputed every word. The only " fly in the ointment " as far as the book was concerned was that the end-papers were used for advertisements, which, in a moderately high-priced book, is irritating to this reviewer —which may be unreasonable on his part. Or is it ? T. P. A.

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HIC ET UBIQUE.

London Meetings—Slow Morse Practices—International 28 MC. Contest—Reports Wanted—Is This a Miles per Watt Record

London Meetings.

The following is a full list of the dates fixed for meetings at the Institution of Electrical Engineers during the coming session :—

1934.—September 28, October 26, November 23. and December 28 (annual general meeting)

1935.—January 25, February 27, March 29, and April 24.

With the exception of the February and April dates all meetings will take place on Friday evenings.

Tea will be served free of charge from 5.30 p.m., and lectures will commence at 6.15 p.m.

The opening meeting of the season, fixed for September 28, will take the form of a discussion on 56 mc. work, opened by Mr. E. A. Dedman (G2NH), manager of the R.E.S. 56 mc. Group.

Slow Morse Practices.

A schedule will be found below giving details of transmissions for September-October. All test matter will be taken from recent issues of THE T. & R. BULLETIN, and the page number and month of issue will be given at the end of each test. In order that the individual stations can obtain details relating to the number of members taking advantage of these tests, together with effective range, will all those utilising this service kindly report by letter or postcard and enclose stamped addressed envelope if a reply is required ? Stations willing to assist on the 1.7 mc. or 3.5 mc. bands (or both) should write to Mr. T. A. St. Johnston (G6UT), 28, Douglas Road, Chingford, E.4. It should be noted that British summer time ends at 2 a.m. G.M.T. on Sunday, October 7.

SCHEDULE OF SLOW MORSE TRANSMISSIONS.

Date.	1934.	B.S.T.	Frequency kcs.	Station.
Sept.	23. Sun.	00.30	1,820	G2OI
,,	23 ,,	10.00	1,815	G2DQ
,,	23 ,,	11.00	1.7 mc.	G2UV
,,	30 ,,	00.30	1,820	G2OI
,,	30 ,,	10.00	3,630	G2DQ
,,	30 ,,	11.00	1.7 mc.	G2UV
		G.M.T.		
Oct.	7 ,,	00.30	1,820	G2OI
,,	7 ,,	10.00	1,815	G2DQ
,,	7 ,,	11.00	1.7 mc.	G2UV
,,	14 ,,	00.30	1,820	G2OI
,,	14 ,,	10.00	3,630	G2DQ
,,	14 ,,	11.00	1.7 mc.	G2UV

International 28 MC. Contest.

With reference to the above contest, which is due to start on October 1 next, Council have decided to delete Rule 6, which stated that " A minimum signal strength of QSA 3 must be recorded before a contact counts for points."

This decision has been reached as a result of correspondence received from certain members who have had experience of 28 mc. work.

(**OVERSEAS JOURNALS AND COMPETITORS PLEASE NOTE.**)

Reports Wanted.

L. Cooper (G5LC) from Canadian amateurs on his 14,336 kc. signals. Input 50 watts ; operating times 19.00-22.00 G.M.T.

G5AO (Reading) on his 7,140 kc. CW transmissions.

G5XT (Middlesbrough) on his CW and 'phone transmissions. QRH 1,785.5, 3,525, 7,050, 7,160, 14,320 and 57,000 kcs.

B. Pashley (G6PJ) on his 14 mc. signals, input 7 watts.

Convention Photographs.

Members desiring copies of the Convention group photographs, are requested to communicate with the photographer, Mr. Green, 25, Kenton Lane, Kenton, Middlx.

Copies can be obtained at a price of 3s. each, post free. The size is 12 ins. x 7½ ins., on " Cardette."

Is This a Miles per Watt Record?

Dr. J. Lunt (ZT1Q) recently worked U9AF at Tomsk, Siberia, on 14 mc., obtaining a QSA5 R6 report. He calculates the distance between stations as 7,369 miles, which, with an input of 2.9 watts, gives 2,541 miles per watt. Can any member beat this figure ?

CT2AJ.

Mr. H. E. J. Smith (CT2BK) advises us that the broadcast station located at St. Miguel, Azores (CT2AJ), is testing on 3,500 kc., with a power of 50 watts. Reports are urgently required. A horizontal Hertz aerial, with a single line fed through an H.F. filter, was used up to mid-August, since when a vertical radiator consisting of an insulated steel structure 0.56 wavelength long, fed at the base through proper terminating gear, has been employed.

Dynamic microphones are used and all announcements are made in English and Portuguese.

W.B.E. Certificates.

The following W.B.E. Certificates have been awarded :—

Name.	Call Sign.		Date, 1934.
W. B. Stirling	G6RV	...	July 18
E. H. Swain ...	G2HG	...	,, 16
A. A. Barrett ...	G5UF	...	,, 16
T. S. Garrard ...	G6CV	...	,, 23
J. N. Roe ...	G2VV	...	,, 27
P. G. Tandy ...	G2DU	...	,, 27
J. W. M. Brown	VS6AB	...	,, 27
F. E. Groom ...	YI6BZ	...	August 7
S. Conway ...	VS6AQ	...	,, 9
W. G. Pyke ...	G6PK	...	,, 18
Ing. R. Ognibene	—	...	,, 24
W. G. Turnbull	ZL2CA	...	,, 30

In the list of W.B.E. holders published in the May BULLETIN, Mr. Stanton's call appeared as ZL3AC. This should read ZL3AZ.

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STANDARDS OF RADIO FREQUENCY.

Emission of Frequencies of Reference from the National Physical Laboratory, Teddington, Middlesex.

THE National Physical Laboratory undertakes the emission of two types of frequency of reference for standardising purposes. One is in the form of a modulation of 1 kilocycle per second and the other a radio frequency of 1,780 kilocycles per second.

I.—Frequency of 1 Kilocycle per Second (1,000 Cycles per Second).

This standard frequency emission takes place at 10.40 G.M.T. on the second Tuesday of each month as a modulation of a carrier wave of a length of 830 metres (frequency 360 kilocycles per second).

The modulation frequency is derived from an oscillator in continuous operation at the Laboratory, which has a nominal frequency of 1,000 cycles per second. The accuracy with which this frequency is maintained is about two parts in 10 million, but during the emission the exact frequency will be measured and its correct value to one part in 10 million will be announced at the end of the programme.

After the preliminary announcement in morse code the standard modulation frequency will be sent out for one hour continuously. This frequency will then be changed by an amount of about —2.5 parts in a million, and the emission will be continued for a further ten minutes. The object of making this change is to enable those receiving it to decide whether their own frequency of 1,000 cycles per second is above or below that of the Laboratory standard.

At the end of the emission an announcement will be made in morse code giving any corrections that may be necessary.

II.—Frequency of 1,780 Kilocycles per Second.

The second standard frequency emission is primarily intended for amateur experimenters, and in this emission the radio frequency is the standard of reference. It has a value of 1,780 kilocycles per second, *i.e.*, wavelength approximately 169 metres. This programme is emitted on the first Tuesday in March, June, September and December, commencing at 21.00 G.M.T. The programme consists of an announcement in morse, followed by a continuous dash, the whole lasting fifteen minutes. This procedure is repeated for three similar periods, the whole programme lasting one hour. In this case no correction to the frequency will be announced, but it is expected that the frequency emitted will not be in error by more than one part in a million.

The following time tables give the details of the programmes of standard frequency emissions described above :—

Time Tables for Emissions.

I.—Standard Frequency of 1,000 *c.p.s.*

Standard Frequency to be used : 1,000,000 cycles per second.

Carrier Wave Frequency (nominal only) : 360 kilocycles per second (wavelength 830 metres).

Date : Second Tuesday in month.

Time : 10.40 to 12.00 G.M.T.

G.M.T.

10.40	...	Announcement in morse code. "CQ de G5HW (3 times). Standard frequency emission at 1,000 cycles per second."
10.45	...	Emission of modulation frequency uninterrupted.
11.45	...	Modulation frequency changed by minus 2.5 parts in a million.
11.55	...	Announcement in morse code. "CQ de G5HW. The correct frequency was .999x *, .000y (3 times)."
12.00	...	Programme terminates.

II.—Standard Frequency of 1,780,000 *c.p.s.* (1,780 *kilocycles per second*).

Standard Frequency to be used : 1,780 kilocycles per second (wavelength 169 metres).

Date : First Tuesday in March, June, September and December.

Time : 21.00 to 22.00 G.M.T.

G.M.T.

21.00	...	Announcement in morse code. "CQ de G5HW (3 times). Standard frequency emission at 1,780 kilocycles per second."
21.02	...	Continuous dash.
21.15	...	Announcement as at 21.00.
21.17	...	Continuous dash.
21.30	...	Announcement as at 21.00.
21.32	...	Continuous dash.
21.45	...	Announcement as at 21.00.
21.47	...	Continuous dash.
22.00	...	Programme terminates.

*In this announcement of the current value the figures before the decimal point are omitted. Thus, .999x indicates a frequency of .999.999x cycles per second, and .000y indicates a frequency of 1000.000y cycles per second.

RESEARCH AND EXPERIMENTAL SECTION

MANAGER :

H. C. PAGE (G6PA), Plumford Farm, Ospringe, near Faversham, Kent.

GROUP MANAGERS :

No. 1 : 1.7 and 3.5 MC. WORK
J. H. HUM (G5UM), 68, Bridge Road East, Welwyn Garden City, Herts.

No. 2 : 56 MC. WORK
E. A. DEDMAN (G2NH), 63a, Kingston Road, New Malden, Surrey.

No. 3 : ARTIFICIAL AERIALS
J. K. TODD (G2KV), Orchard Place, Wannock, Polegate, Sussex.

No. 4 : ATMOSPHERE AND FADING
J. C. ELMER (G2GD), Aethelmar, Seabrook Road, Hythe, Kent.

No. 5 : TELEVISION
C. W. SANDS (G5JZ), Springfield, Heathfield, Sussex.

No. 6 : CONTEMPORARY LITERATURE
RA. FEREDAY (PAOFY), Reinkenstr, 40, The Hague, Holland

No. 7 : RECEIVER DESIGN
E. N. ADCOCK (G2DV), 206, Atlantic Road, Kingstanding Birmingham.

No. 8 : TRANSMITTER DESIGN
A. E. LIVESEY (G6LI), Stourton Hall, Horncastle, Lincs.

No. 9 : AERIAL DESIGN
F. CHARMAN (G6CJ), The Cottage, Park Way, Hillingdon, Middlesex

No. 10 : VALVE RESEARCH
D. N. CORFIELD (G5CD), 10, Holders Hill Gardens, Hendon, N.W.4,

No. 11 : 28 MC. WORK
W. A. CLARK (G5FV), "Lynton," Hull Road, Keyingham, Hull.

No. 12 : AUXILIARY EQUIPMENT
A. O. MILNE (G2MI), "Southcot," Larkfield, Kent.

THIS month there is very little to report upon from most of the groups, probably due to the call of summer, and preparations for Convention. While on the subject of Convention, may I say how pleased I was to meet so many R.E.S. members in person. It was possible to have a short chat with several of the Group Managers, and, as a result, I hope to publish some interesting news shortly.

Now a word or two about the recently formed Auxiliary Equipment group. G2MI asks me to point out that the group are quite prepared to give advice on technical matters. Should a member have occasion to build, say, an LF choke, and he is not sure how to go about it, the A.E.G. will be only too pleased to give the size of wire, number of turns, etc.

In the absence of G2NH, on holiday, I undertook to write up the 56 mc. groups' notes, but with the exception of Group 2G there does not appear to have been any work done of great interest. Owing to the rush of Convention, I have not had time to edit 2G's report, so must ask them to forgive me. I shall forward their material to G2NH for use next month.

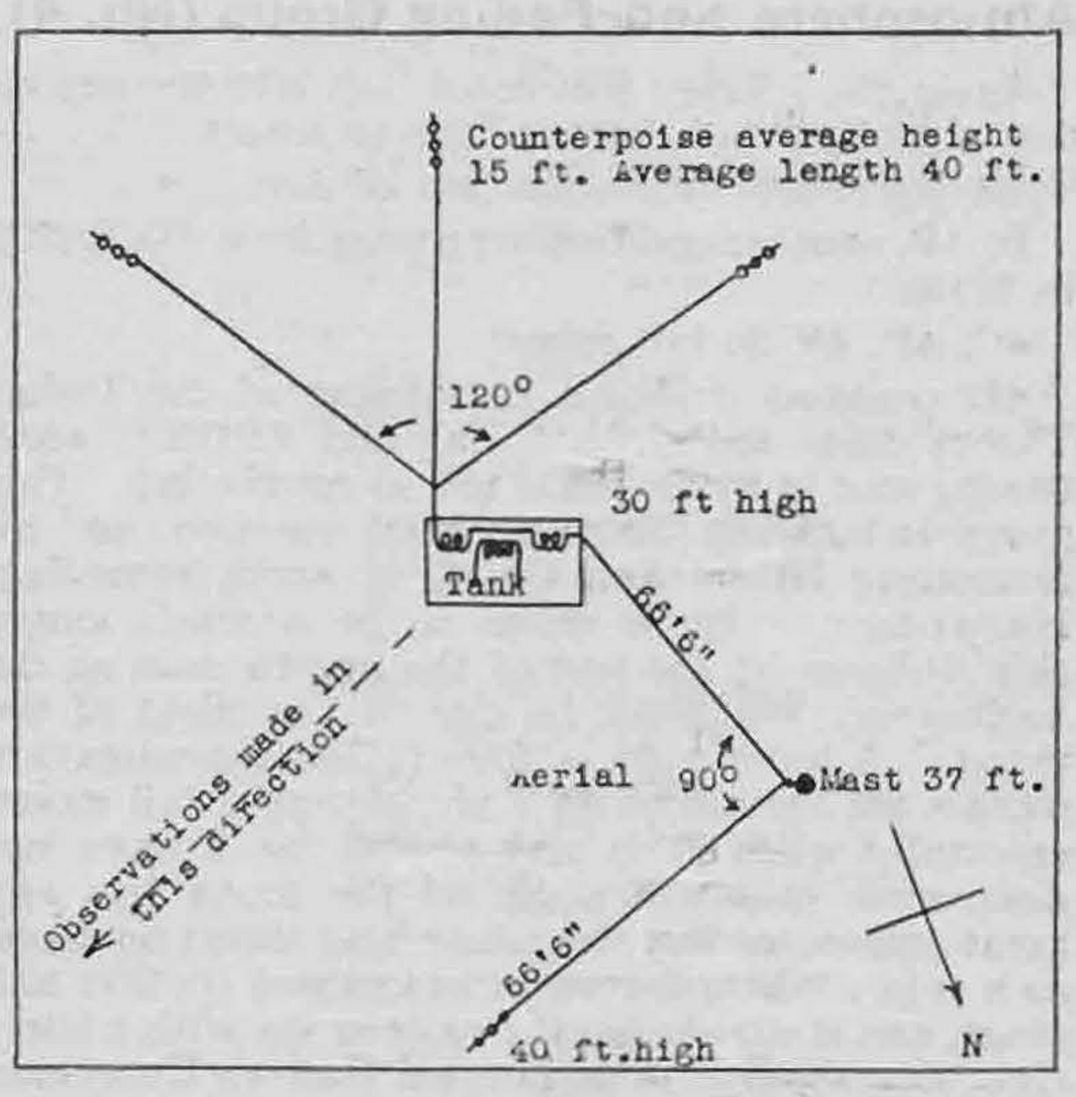
G6PA.

1.75 and 3.5. mc. Group (No. 1).

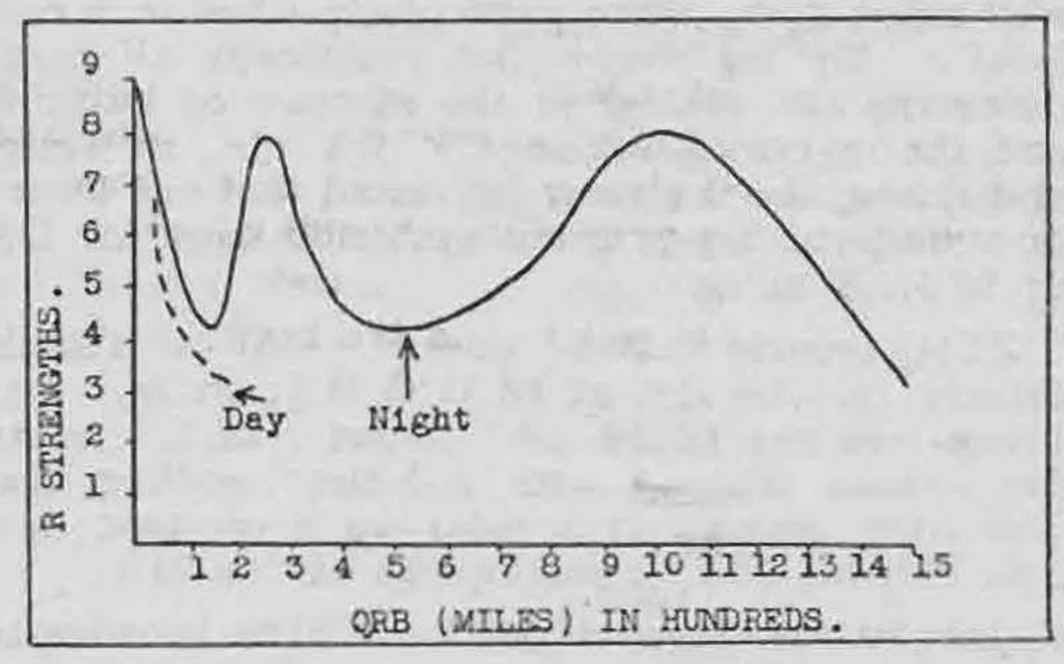
We are able to give this month some details of a novel and interesting aerial system used by G6YJ, who describes it as follows :—

"The accompanying diagram shows the layout of the system. The counterpoise could not be put under the aerial owing to obstructions in the garden. There is no tuning by capacity in the aerial, thus obviating the "dip" effect at the highest point in the current wave (the system is current fed). Tuning is essentially inductive, and only causes a very slight flattening effect on the current wave. The extra trouble of cutting the coils to the exact size is well worth while. This aerial, used with three 40-ft. counterpoise wires and eight turn coupling coils, becomes a half-wave system on 1.75 mc."

The second diagram shows the signal strengths obtained with this system from stations in an easterly direction. He does not consider this his



Aerial system used by G6YJ on the 1.7 mc. band.



Average signal strength obtained by G6YJ up to distances of 1,500 miles in an easterly direction using the aerial system described and an input of 10 watts.

Read and Keep the QSL Rules

best direction, but it had to be chosen as giving the maximum amount of data.

The dips in the graph are most interesting, because they indicate two very definite skip areas on 1.75 *mc.* A reduction of power from 10 to 4 watts smoothes out the dips and gives more consistent reports, though DX naturally falls off.

The 1.75 mc. transmitter is a push-pull Armstrong, and the aerial system is current fed. The observations were made over a long period during 1933 and 1934 on a wavelength of 168 metres.

It will be noticed that the counterpoise is practically out of the field of the aerial, thus avoiding reflection effects, and fictitiously high aerial-ammeter readings, which so often occur when aerial and counterpoise are close together. The right-angled aerial has been used with conspicuous success for distance work on the lower frequencies by W1DBM, G6QQ and G5QY. This new data seems to confirm the value of this type of antenna.

Atmosphere and Fading Group (No. 4).

Again the holiday season has cut into the activities of groups, and there is little to report.

4A continues with collection of data.

In 4B, another good report comes from BERS209 in Malta.

4C, 4E, 4F do not report.

4D contains evidence in support of the Isobar Theory from the G.C., G5OQ and 2BDA; while the log sent in by G6HA is not so convincing. This group is tackling the moon tidal question, and an interesting letter from G5OQ is worth recording. He writes: "There seems to be a much longer skip distance at the end of the month than at the beginning. This may be due to the effect of the moon. I have always found that Scandinavian signals are very loud on 7 mc. during a full moon, especially when it is rising. So far I have not discovered that the angle of the moon has any great influence, but the phase and direction have, as a rule. When the moon has passed its first half stage, and is situated in the eastern sky with a fairly clear sky, the Scandinavian and Eastern Europeans can be relied upon to be strong and workable. During this period I have found that SM, OH, SP, OZ, D4 can be raised with an input of 1 watt or less. Similarly, when such a moon is in the southern sky, CT, EA, CT2 and CT3 can be fairly well relied upon, more particularly when it is cold locally. My log shows that practically all Scandinavians are worked in the summer or autumn, and the reverse direction, CT, EA, etc., in winter and spring. I am almost convinced that our theory of a uniform low-pressure system is best for DX up to 1,000 miles."

ZT1Q reports that he worked U9AF at Tomsk, Siberia, on July 19, at 16.31 G.M.T. on 14.3 mc., being reported QSA5 R6. Input was 2.9 watts. He follows this up with a letter recalling that Daventry announced a tidal wave on that day, and Panama had an earthquake on the 21st.

July 20 was abnormal on 25 and 31 m. broadcasts, inasmuch as there was an almost complete fade-out of the European broadcasts until about 20.30 G.M.T. He made contact again with U9AF on 22nd and 23rd, but the last QSO was not satisfactory.

Television Group (No. 5).

BRS1472 reports receiving very good results from the B.B.C., using a 16-in. disc and driving the neon from a "Phillips'" mains receiver. A universal receiver is being built for television covering from 40 to 2,000 metres.

G5JZ is having trouble with his amplifier, but hopes to have it going by the next television transmission.

Editorial Note.—Members interested in television should study the statement made by Mr. A. E. Watts during Convention, which appears elsewhere in this issue.

CORRESPONDENCE.

AN OLD TIMER'S VIEWS.

The Editor, T. & R. Bulletin.

Dear Sir,—I have just received the special birthday number of The T. & R. Bulletin, and have spent most of the day glossing over its vastly interesting contents.

As one who took part in the pioneer days from 1922 onwards, and previous to my settling in Australia in 1926, operating my low-powered station (then G6XG) in North-West London, this 21st birthday issue brings fleeting memories. I consider that, although amateur radio is to-day just as full of the thrill of personal contact with one's fellows overseas, those who lived through those stirring times of 1924 particularly have something to be justly proud of.

Mr. Marcuse's resumé of his pioneer experiences prompts me to endorse his statements that he considers that signals on the 80-metre band are not comparable to earlier days, and that 32 metres was by far the best band for all-round amateur work. In Australia I have operated my station VK2NO year in and year out, commencing with A2NO in early 1926, but never since the demise of the 32-metre band so far as amateur radio was concerned have I been able to maintain contact with England with anything approaching the same reliability. Whilst we may talk of "conditions" affecting 40 and 20 metres, the fact remains that 32 metres was an open oyster for very strong signals, whereas now we, with all our modern receivers and transmitters, have to fish hard for a good European signal. Quite a few G's will remember the period of New Year in 1927, when on 32 metres the most amazing signal strength held up at most unconventional times between Australia and England and continued for almost a month.

As for 80 metres, well, it is a good local band up to 3,000 miles or so, but where are the 80-metre signals of 1924? Of course, amateur radio is yet very young, and these strong signals of yesteryear may yet return, but in the meantime I am all for the possibility of a thrill during the forthcoming 12 months' 10-metre contest. It would be satisfying to hook up with a G from VK on "ten." Here's hoping, and meanwhile may I live to enjoy the next 21st anniversary issue of the "Bull." All good wishes to all who worked on this one.

Sincerely,

Don B. Knock (VK2NO),
Radio Editor, The Bulletin.

Technical Articles are Wanted

Melbourne Centenary International DX Contest.

JUST before going to press we received 15 copies of the rules and specimen log sheets for this contest. Realising that probably many more than 15 members will wish to enter, we have decided to publish the rules *in extenso*. The transmitting contest rules were published in this journal last May, but at that date we had not seen a copy of the receiving contest rules.

It is hoped that as many home members as possible will support this unique and interesting event.

1.—There shall be two contests:—
(*a*) Transmitting.
(*b*) Receiving.

2.—The Wireless Institute of Australia Centenary Contest Committee's ruling will be binding in case of any dispute.

3.—The nature of the Contest requires the world to work Australia.

4.—The Contest is to be held from 00.01 G.M.T., Saturday, October 6, till Sunday, October 7, 1934, at 23.59 G.M.T., and will be continued over the four week-ends in October at the times stated above on each occasion. The dates of the other week-ends are October 13-14, October 20-21, and October 27-28, 1934.

5.—The contest is open to all licensed transmitting amateurs and receiving stations in any part of the world. Unlicensed ship and expedition stations are not permitted to enter the contest. Financial members of the W.I.A. and its affiliated societies only will be eligible for an award in VK.

6.—Only one licensed operator is permitted to operate any one station under the owner's call sign. Should two or more operators operate any particular station, each will be considered a competitor, and must enter under his own call sign and submit, in his log, the contacts established by him. This debars persons from entering who have not a ham licence.

7.—Each entry must be signed by each competitor as a declaration of the above statement.

8.—Each participant will assign himself a serial number of three figures as detailed in the contest description. When two or more operators work the one station each of them will allot himself a separate number.

9.—All amateur frequency bands may be used.

10.—Only one contact with a specific station on each of the bands during each week-end will be permitted.

11.—Contacts may be repeated on each of the succeeding week-ends with the same stations in accordance with rule 11.

12.—Each contact must be accompanied with an exchange of serial numbers and signal strength reports using the T QSA and R systems.

13.—Scoring: One point will be scored by each contacting station for every 1,000 miles between the capital cities of the States of the competing stations, measured by a Great Circle Line. The points claimed are to be entered on the entry form.

14.—Australian Stations will multiply their total score by the number of countries worked, and the stations outside VK by the number of Australian Districts contacted, there being eight all told, viz., VK2, 3, 4, 5, 6, 7, 8 and 9.

15.—No prior entry need be made for this contest, but each contestant is to submit a log at the conclusion of the test showing: Date, time (in G.M.T.), band, station worked, in and out signal strength reports, in and out serial numbers, distance between stations, and the points claimed for each QSO.

16.—Entries from VK stations must reach the Wireless Institute of Australia (Victorian Division), Kelvin Hall, Collins Place, Melbourne, Victoria, not later than December 1, 1934. Foreign entries will be received up till January 31, 1935.

17.—The awards for all winning competitors will consist of a special attractive Melbourne Centenary Contest Certificate. The station returning the highest total in any country will be entitled to an award, with the addition of similar special awards for the winners of each District of U.S.A. and Canada, and each of the British Isles. There will be no World Winner in this contest.

18.—A special prize will be given to the first, second and third VK stations returning the three highest scores. The contestant in each VK division who returns the highest total for his District will also be awarded a Centenary Certificate. The official organ of the W.I.A., "Amateur Radio," will award a separate trophy for the outstanding station description accompanying a log. This is open to all competitors, foreign or VK.

19.—Foreign stations should call CQ VK "CENT" and the Australian stations CQ DX "CENT."

RECEIVING CONTEST.

1.—The rules for the receiving contest are the same as for the transmitting contest, but it is open to members of any recognised Short Wave Listeners' Society in the world. No transmitting station is allowed to compete in the receiving contest.

2. –Only one operator is permitted to operate only one receiver.

3.—The dates, scoring of points, and logging of stations once on each band per week-end are subject to the same rules for the transmitting contest.

4.—To count for points, the call sign of the station being called, and the strength and tone of the calling station, together with the serial number and signal strength report sent by the calling station, must be entered in the log.

5.—The above items must be filled in before points can be claimed, that is, it is not sufficient to log a station calling CQ or TEST. Verification of reception must be made in accordance with the conditions in rule 3 above.

6.—VK receiving stations cannot include VK transmitting calls in their logs, only foreign. Foreign stations will enter up VK station heard only.

7.—The awards in the receiving contest will be similar for the winners in the transmitting contest. The winning VK receiving station will be awarded a handsome cup providing he is a member of the W.I.A. or Societies affiliated with it.

8.—Receiving logs are to be similar to transmitting logs.

LOG: Melbourne Centenary International DX Contest, 1934.

Name .....
Address .....
Callsign .....
Operating at .....
Station ...../.....

Transmitter ...../.....
Input to P.A.....
Receiver .....
Type of Aerial .....

Date	Time G.M.T.	Band in K.C.	Station Worked	Serial Numbers		Signal Report			Distance Estimated (Miles)	Points Claimed
				Sent	Received	QSA	T	R		
									Total	.....

To be multiplied by

=Grand Total.....

The following is a description of my Station :—.....
I hereby certify that I have operated during this contest in accordance with the rules laid down, have adhered rigidly to the regulations governing amateur radio in my country, and that the score and the points set out above are true and proper.

ROYAL NAVAL WIRELESS AUXILIARY RESERVE.

THE Secretary of the Admiralty announces that it has been decided to increase the membership of the R.N.W.A.R., a Reserve which came into being at the end of 1932, and has at present a total of approximately 400 members.

Its object is to provide a reserve of Wireless Operators trained in Naval procedure for Naval service afloat or ashore, at home or abroad, in time of war.

It has had a particular appeal to ex-R.N. Telegraphists, men holding P.M.G. certificates, and other radio enthusiasts, but men from almost every walk in life have joined. Membership is confined to Great Britain and Northern Ireland.

Members must be the sons of British born parents and be between the ages of 18 and 55. They must have no ties which will prevent them joining the Navy in the event of war.

Applicants need not have any special wireless qualifications, but it is greatly to their advantage if they have a knowledge of Morse and possess a high frequency receiver and are either in possession of, or in a position to construct, a wireless transmitter. The country is divided into districts and units, the latter consisting of groups of about ten members.

Organised training by wireless is now being carried out throughout the country, and oral instruction is given on certain evenings at the Admiralty and at certain centres in the provinces. Many members have reached the standard of operator, having attained a high degree of proficiency in Naval procedure and Morse speed.

In increasing the membership it is desired that fresh enrolments shall come principally from certain towns where there are already some qualified members, in order that oral instruction may be arranged for beginners. These towns are :—

Birmingham, Blackpool, Bristol, Cambridge, Chatham, Chester, Coventry, Harrogate, Ipswich, Leicester London, Manchester, Newport (Mon.), Northampton, Nottingham, Portsmouth, Rugby, Southampton, Southend-on-Sea, Southport, Swansea, Wolverhampton.

There are reserve units in towns other than the above, but these are either full or are being dealt with locally.

It is particularly desired that the numbers in London snall be increased by 30 or 40, as their progress, if able to attend instructional classes at the Admiralty, will be rapid.

The Reserve is under the orders of the Admiralty and administered through the Admiral Commanding Reserves.

Those interested are requested to apply for further particulars by post to :—

The Admiral Commanding Reserves, Queen Anne's Chambers, Tothill Street, London, S.W.1.

More Piracy.

Mr. Cooper (G5LC) reports that the call sign G2LT, which is assigned to the Electric and Musical Industries Radio and Gramophone Society, Hayes, is being pirated.

CORRESPONDENCE.

UNCLE TOM IN HOT WATER.

The Editor, T. & R. Bulletin.

Sir,—In your August issue Uncle Tom laments what he considers to be the bad manners of the average key-thumper. He does not realise that the abbreviated form of QSO, of which he complains, is the product of the archaic medium in which it is conveyed. In other words, that all this " Dah-dah, di-di-dit, dah-dah-dah," is an anachronism !

The Cuneiform inscribed stone, the clay tablets of Ur, the old notched tally-stick, the more recent shorthand script, have all been superseded by the typewritten sheet, the mechanical accounting machine, and the dictaphone.

The post-horse, and the old stage coach, have been replaced by the motor car and the air liner.

Just so, the cumbrous code of Samuel Morse, invented over a hundred years ago, and invaluable in its time, must give way to the short-wave wireless telephone, the wireless broadcast, and the facsimile reproduction, by way of the wireless link, of the original typed message.

Uncle Tom will find that the phone QSO is a much more human contact than the condensed code of the key-thumper, which it will eventually supersede.

I was sending Morse more than forty years ago, on key, lamp and helio. To-day I find QRP phone, with its more personal contacts, much more interesting than any amount of key-clicks.

So cheer up, Uncle Tom, my lad ! Here's another limerick for you !

An old Ham sat thumping a key.
" What a very slow business," said he.
" If I had a good mike,
I could say what I like
To my friends, where'er they may be."

As I know that many, even of my best friends, are violently opposed to my progressive views, I do not give my call-sign, but beg to subscribe myself,

Yours harmonically,
" Modulated Wave."

C.W. *v.* TELEPHONY.

The Editor, T. & R. Bulletin.

Dear Sir,—At the recent Convention, which I had the very great pleasure to attend, a somewhat heated discussion arose with regard to the relative advantages of fone and C.W. signals. I took no part in the argument, for the reason that I had no wish to derail a meeting which was already sidetracked, but I crave your indulgence to put my opinion on record.

I feel that, great as the advantages of telephony are, this type of radiation can never fully take the place of Morse, either from an amateur or commercial standpoint.

Even with a " single signal " receiver, I defy anybody to read telephony if another station of similar type is using the same or almost the same frequency.

It is, however, quite possible to receive telegraphy through bad interference, or static disturbances. There are, naturally, limits, but not so stringent ones as in the case of telephony.

Yours faithfully,
J. J. Maling (G5JL).

RE G-AAZX.

The Editor, T. & R. BULLETIN.

DEAR SIR,—May we thank all amateurs who reported on the transmissions on 7 mc. of our aeroplane GAAZX during its recent tour of Europe. We have received several reports, and would like to apologise for the delay in answering these, but having only returned to London last week we have been unable to acknowledge them until now.

If, however, amateurs heard our transmissions, and have not reported on them, would they kindly do so direct, and we shall be glad to reply.

We trust that in the future we shall be able to carry out further trials, of benefit to all amateurs and to ourselves.

Yours faithfully,
STANDARD TELEPHONES AND CABLES, LTD.
D. B. MIRK,
Radio Manager.

TRADE NOTICES.

We have received from *Messrs. Varley* particulars of some of their new products for the coming season. The first of these is a new line of power transformers, mainly of the semi-shrouded type for three and four valve receiving sets. These are made to operate at various voltages by means of an adjustable plug and sockets. In place of the usual terminals, leads of suitable length are provided, and this fact has enabled a distinct reduction of price to be made. The transformers are made in a number of ratings to meet all usual conditions, including sets embodying Westinghouse Metal Rectifiers.

Another interesting feature is a new range of tuning coils for receivers under the name of Duo-Nicore. A high-frequency iron core is provided which enables the coils to be made extremely small and give it great selectivity upon the medium and long wave broadcast bands. These tuning coils have practical " get-at-able " terminals which will appeal to all set constructors. A similar line of intermediate coupling transformers is also made, wherein the varying coupling between the two coils is adjustable from outside the case through a slot. These coils are also supplied in matched sets for straight or superheterodyne receivers.

Still another new feature is known as the permeability tuner. In this the novel method is adopted of varying the inductance of the coil by sliding an iron core into and around the winding, thus avoiding the use of the customary variable condenser. The iron core is in the form of a compressed powder, thus avoiding the formation of eddy currents. These tuners are also made in multiple form and it is claimed that they give better response over the whole of the band, together with improved quality, than the usual system of tuning. It is also stated that there is better tracking where the two separate bands have to be covered. Again, leads are provided in place of terminals, making the units easy to incorporate in sets.

The average amateur is generally looked up to as an expert on all matters appertaining to radio, and is often asked to advise intending buyers upon the selection of broadcast receiving sets. To such, the extensive range of sets made by Messrs. Pye Radio of Cambridge will appeal to all, by reason of their business-like appearance in design and the excellence of their construction and performance. Quite a number of these sets have passed through our hands during recent years, and in every case they have justified our choice and given their owners satisfaction. We have just received notice of the new models for the coming season, which include battery and mains-driven models. The former includes both straight and superheterodyne designs, either for self-contained or outside aerials. Class B output with automatic volume control is also included. Several mains models listed from 14 guineas to 50 guineas are also shown, the larger being mounted in handsome console cabinets. These are made for A.C. and D.C. supplies. Knowing the care taken in manufacturing and designing these sets, we can confidently recommend them where the best in broadcast reception is concerned.

* * * *

A Valuable Valve Guide.

A copy of the 1934-5 Osram valve guide, published by the General Electric Company, Ltd., has just come to hand.

The rapidly multiplying number of valve types on the market to meet modern circuit developments has set its own problem, which is to compile a reference booklet providing complete technical information and working data for each type, and yet retaining a handy pocket size. This little publication certainly achieves this aim with success.

The 1934 Osram valve guide solves the problem by giving full tabulated data of all the Osram ranges of valves.

In addition to the data charts, the Osram valve guide contains much helpful information, circuit, diagrams, and useful description of the application of modern valves. A copy can be had on application to the General Electric Company, Ltd., Magnet House, Kingsway, W.C.2. Please mention this journal when applying.

CALIBRATION SECTION FEES.

CRYSTALS, 1s. 6d. each; FREQUENCY METERS, 2s. 6d. for five points, plus 6d. for each additional point. These prices do not cover cost of return postage, which must in all cases be remitted as a separate amount.

Crystals and frequency meters should be sent for calibration, at owner's risk, to Mr. A. D. Gay, 49, Thornlaw Road, West Norwood, London, S.E.27.

A Scottish Lament.

Miss A. J. Burns (G2IA) and Mr. W. Stirling (G6RV), who were with us at Convention, both lost their programmes containing autographs of most of those present at the dinner. Will the members who picked them up return them to the owners ?

NOTES and NEWS from the BRITISH ISLES

DISTRICT REPRESENTATIVES.

DISTRICT 1 (North-Western).
(Cumberland, Westmorland, Cheshire, Lancashire.)
Mr. J. Noden (G6TW), Fern Villa, Coppice Road, Willaston, near Nantwich, Cheshire.

DISTRICT 2 (North-Eastern).
Yorkshire (West Riding, and part of North Riding), Durham, and Northumberland (Middlesborough is in this district.)
Mr. L. W. Parry (G6PY), 13, Huddersfield Road, Barnsley, Yorks.

DISTRICT 3 (West Midlands).
(Warwick, Worcester, Staffordshire, Shropshire.)
Mr. V. M. Desmond (G5VM), 199, Russell Road, Moseley, Birmingham.

DISTRICT 4 (East Midlands).
(Derby, Leicester, Northants, Notts.)
Mr. W. W. Storer (G6JQ), 28, Blanklyn Avenue, Leicester.

DISTRICT 5 (Western).
(Hereford, Oxford, Wiltshire, Gloucester.)
Mr. W. B. Weber (G6QW), 2, Balmoral Road, St. Andrews Bristol.

DISTRICT 6 (South-Western).
(Cornwall, Devon, Dorset, Somerset.)
Mr. W. B. Sydenham (G5SY), "Sherrington," Cleveland Road Torquay.

DISTRICT 7 (Southern).
(Berkshire, Hampshire, Surrey.)
Mr. E. A. Dedman (G2NH), 63a, Kingston Rd., New Malden, Surrey.

DISTRICT 8 (Home Counties).
(Beds., Bucks., Cambs., Herts. and Hunts.)
Mr. G. Featherby (G5FB), 30 Lindsey Road, Bishops Stortford Herts.

DISTRICT 9 (East Anglia).
(Norfolk and Suffolk.)
Mr. H. W. Sadler (G2XS), Redways, Wootton Road, Gaywood, King's Lynn, Norfolk.

DISTRICT 10 (South Wales and Monmouth).
Mr. D. Low (G5WU), "Nantissa," Westbourne Road, Penarth, Glamorgan.

DISTRICT 11 (North Wales).
(Anglesey, Carnarvon, Denbighshire, Flintshire, Merioneth, Montgomery, Radnorshire.)
Mr. T. Vaughan Williams (G6IW), "Malincourt," Grosvenor Ave., Rhyl, Flintshire.

DISTRICT 12 (London North).
Mr. S. Buckingham (G5QF), 19, Oakleigh Road, Whetstone, N.20.

DISTRICT 13 (London South).
Mr. H. D. Price (G6HP) 12, Hillcrest Road, Sydenham, S.E.26

DISTRICT 14 (Eas'ern)
(East London and Essex.)
Mr. T. A. St. Johnston (G6UT), 28, Douglas Road, Chingford, E.4.

DISTRICT 15 (London West and Middlesex).
Mr. H. V. Wilkins (G6WN), 81, Studland Road, Hanwell, W.7.

DISTRICT 16 (South-Eastern).
(Kent and Sussex).
Mr. A. O. Milne (G2MI), "Southcot," Larkfield, Kent.

DISTRICT 17 (Mid-East).
(Lincolnshire and Rutland.)
Mr. A. E. Livesey (G6LI), Stourton Hall, Horncastle, Lincs.

DISTRICT 18 (East Yorkshire).
(East Riding and part of North Riding.)
Mr. T. Woodcock (G6OO), 8, George Street, Bridlington.

SCOTLAND.
Mr. J. Wyllie (G5YG), 31, Lubnaig Road, Newlands, Glasgow.

NORTHERN IRELAND.
Mr. W. Graham (GI5GV), 5 Ratcliffe Street, Donegal Pass, Belfast

DISTRICT 1 (North Western).

OWING to holidays and the Convention, reports are smaller than usual.

G2OI officiated for the D.R. at the Convention.

From Manchester comes the report that only nine members attended the last meeting, which was in the form of a general exchange of ideas. Many report working J during the month on 14 mc., while G2DF is doing good work on an inside transmitting aerial.

The last Liverpool meeting was very well supported and most of the evening was spent in discussing points to be raised at Convention on behalf of the Liverpool area. Mr. Davies (G2OA) was elected to give voice to the observations and suggestions of the members.

DISTRICT 2 (North Eastern).

Mr. C. Sharpe, G6KU, reports that holidays have accounted for the quietness of many stations this month, although nearly all have been heard at one time or another.

Station visits will be resumed next month when a good attendance can be looked forward to.

The big event of the year will have passed, namely Convention, and the Bradford area will have sent its full quota to swell the numbers. Many new and old QSO's will have been effected personally and thanks is extended to all who have made such an F.B. time possible. The winter programme of the Bradford Experimental Radio Society is taking shape, and contains a good proportion of Amateur Radio material drawn from the local resources and visitors will be welcomed to the meetings on Wednesday evenings. Full particulars from any local R.S.G.B. member.

From Middlesborough Mr. Garrard reports that G5XT has succeeded in fully neutralising his T61D, whilst he himself has been testing out various modulation systems suitable for 56 mc. work. G5QU is constructing telephony gear. 2BQO and G6DB report active. G2HZ is using a rather unusual type of low loss pen. C.O.P.A. and is testing aerial efficiencies.

DISTRICT 5 (Western).

Activity, notwithstanding the holiday spirit which prevails in the district, has been very good during the past month. The direction-finding 1.7 mc. F.D. which was held on Sunday, August 12,

by members of the Bristol and Gloucester Section was a great success, at least as far as the transmitter was concerned. The latter was operated by a Bristol party and as on the previous occasion was so well hidden and the field so distorted, that none of the searching parties were successful in locating it. Arrangements have been made to continue these D.F. F.D.'s and particulars can be obtained from the C.R.

The C.R. for Bristol G5JU is changing his Q.R.A., and his new address, on and after September 22, will be 4, Frenchay Road, Downend, Bristol, where a welcome awaits any R.S.G.B. or prospective member.

The Wilts letter budget this month was exceptionally good with a most interesting and instructive article by G2BI on the Windom aerial.

Oxfordshire, though having little to report as regards collective work, are individually as active as ever.

Your late D.R., Capt. G. C. Price, sends his most sincere congratulation to all members on their success in winning the N.F.D. Trophy.

County meetings are now being held again throughout the district and it is hoped that as many members as possible will attend and support their C.R.

DISTRICT CALENDAR

September/October, 1934.

SEPT. 19.—District 14 (Essex Section), 8 p.m. at 2BWP, 24, Percy Road, Leigh-on-Sea.

SEPT. 25.—District 14 (East London Section), 8 p.m. at G5AR, 59, Gordon Road, Chingford, E.18.

SEPT. 26.—District 15, G6WN, 8 p.m. at 81, Studland Road, Hanwell, W.7. N.F.D. Films.

SEPT. 28.—London Meeting at I.E.E., 6.15 p.m. Tea from 5.30 p.m. Discussion: "56 mc. Problems," opened by Mr. E. A. Dedman, G2NH.

SEPT. 29.—District 12, 7 p.m. at Gordon Hall, Nether Street, adjoining West Finchley Station.

OCT. 3.—District 1 (Manchester Section), 7.30 p.m. at Brookes Café, 1, Hilton Street.

OCT. 7.—District 7, 2.30 p.m. at Tumble Down Dick Hotel, Farnborough, Hants.

DISTRICT 6 (South-Western).

By the time these notes appear, one more Convention will have come and gone, and no doubt will have been a huge success.

There is very little material on which to report, as the usual summer slack period is on us and evidently many hams are taking it easy. We are pleased to record that G6XD, the C.R. for Devon, is once more at home after a very long absence. He was sent to the North of England some months ago to recuperate after a very serious illness and we all hope that he is once more in full health and strength.

We have not received any reports as to finding any tourmaline near Newquay, but the responsibility of putting that lovely picture of G5VL's trousers amongst the District Notes last month does not lie with the D.R.!

It is hoped that next month the D.R. will have something of interest to report in regard to 56 mc.

DISTRICT 7 (Southern).

News is scarce this month, due to the fact that the D.R. has been on holiday and busy at Convention. It was pleasing to see so many members of No. 7 district at the latter function, and as far as can be gathered everyone had a really enjoyable time.

The letter budget starts again this month, after its annual vacation, and members are reminded that G6GZ requires two copies of each letter in future, in order that two budgets may be put into circulation, so that the whole process of distribution can be speeded up.

The October meeting will be held at G6GZ, Farnborough, Hants, on Sunday, October 7, at 14.30 as usual. Tea has been arranged at the Tumble Down Dick, adjoining G6GZ's QRA. It is hoped that we shall get a bumper attendance, in order that the programme for the winter season can be settled.

DISTRICT 8 (Home Counties).

The D.R. has received the Cambridge letter budget once more, this time it seems to have gone round in about four months so things are looking up! It is full of interesting dope and only needs speeding up to make it equal to the best.

The Herts and Bucks budget is shortly to circulate again after its summer holiday as regularly, it is hoped, as in the past. New contributors will be welcome.

Your D.R. considers the continuance of these budgets to be essential to the successful running of the district, especially so in view of a discussion which took place at Convention. It was decided that in future the D.R.'s will be allowed more scope in compiling these notes. Your two budgets should provide some interesting material.

The question of monthly meetings is receiving close attention, particularly with a view to holding them in Cambridge during the coming winter. G6BS or G5JO will be pleased to hear from anyone in this area who is interested in getting things moving in this direction.

Our ranks are shortly to be swelled by G6XN, who is making his permanent abode in Welwyn. We offer him a hearty welcome and look forward to his co-operation in the activities of District 8.

It must be apparent to all of you that members are enjoying the benefits of the friendly co-operation which exist between the Society's Headquarters and the Post Office. The D.R. wishes to call your attention to the fact, that you should take every opportunity of pointing this out to non-members when tackling them on the question of membership.

DISTRICT 9 (East Anglia).

Another very interesting Convention over once more, but the D.R. regrets that there were not more members from his district present. Those who did not go should be sure to send for a copy of the "Guide."

It is hoped to hold the postponed Norwich meeting towards the end of September.

We are very glad to welcome 2BGO as a member and hope he will soon be on the air. BRS1421 also obtains his AA and becomes 2BSO; incidentally, this station, which the D.R. recently visited, appears to have facilities for some real good work. G2MN has been adding to his QRP DX and VP5AB as a QSO shows that efficiency must be fairly high. Congrat's to BRS1411, who has become G2UT—and from what the D.R. saw there, great things are expected. Congrat's also to BRS1366, who becomes G5JL.

It is understood that G5UF has now finished rebuilding.

G6ZJ is trying out some 56 mc. ideas and it is hoped that this district will be able to do a little useful work on this band shortly.

Five new members are on the way—Norfolk is surely forging ahead.

By the way, where *is* that Letter Budget? Who had it last?

DISTRICT 10 (South Wales and Monmouth).

Reports to hand indicate that quite a number of members are away and, with the hope that all have enjoyed the pleasant summer and a spell of relaxation, we shall look forward to some real activity this winter.

Interesting news comes from Swansea, for not only have 5PH, 2TY, 2UL, 2WO and 2SN continued activity, but all members in this area have spent some time overhauling and reconstructing their gear; further, we hear that another super receiver is in the course of construction by our worthy friend Colonel Isaac. This is an excellent step in the right direction. Members up this way would like an occasional report when those supers take the air!

The Blackwood Radio Society have already held two successful Field Days and Mr. Mudford, the Secretary, indicates the appreciation of members for the co-operation and assistance given by G5BI and G6PF. On each occasion, Mr. Pond, Chairman, not only placed his QRA at the disposal of the party but did everything necessary to complete two very happy summer events. Two receivers were used on each occasion and excellent results were obtained on both 1.75 mc. and 14 mc.

The next outing is to be held during September, in co-operation with the Bristol and Newport members on 56 MC.

The Newport-Cardiff area has had rather a quiet spell owing to the holidays.

DISTRICT 13 (London South).

South London was well represented at the Convention and one trophy came their way, namely, that to BRS250, who won the receiving side of the B.E.R.U. contest.

BRS802 is now on the air with the call G6HM and has made a good start with DX, his best so far being Kharkov QSA3R4 with 4 watts from dry batteries.

G2GZ is also active and still doing good work on both 7 and 14 mc.

G6QB, 5XH, 5IS and 6NF are still working on 56 mc. G5GQ is making sundry alterations to his T.X.

DISTRICT 14 (Eastern).

The last Essex meeting was held at G6KV in July, and 15 attended in spite of heavy rain. Future meetings are announced in the District Calendar elsewhere in this issue. Two old timers, G2PX and G6PD, have again become active and members of this District hope to renew acquaintance. A new member BRS 1497 of Theydon Bois is welcomed, while 2BAI is now G2YW of Woodford Green. The two operators of PA0ASD have just made an extensive tour of the District and are known to have visited at least 12 of our stations. PA0FY-G6FY is back from Holland for a short visit to this country.

DISTRICT 15 (London West, and Middlesex).

In spite of the holidays and other summer attractions most of the active stations seem to be keeping the district on the map.

The date and venue of the September meeting will be found under the district calendar.

DISTRICT 16 (South-Eastern).

In Folkestone 2ASC has now become G2VI after much hard work at Mrs. 6XB's morse classes. Heartiest congratulations to them both; this makes six two letter calls in the Folkestone district. Both G6CH and 2QT have been getting out well. The C.R. and 2GD are "up to their eyes," as usual with lifeboat work; 5FJ is available and co-operates at any time of the day or night when a 20 mile test is required.

G6VA, 2RL and 6QP have been very welcome visitors to Folkestone this holiday season.

The Ashford group are now holding regular meetings; most of them seem to be away on holiday at present but 5QL and 6JV are both testing link couplings.

The Tunbridge Wells group co-operated wtih the Heathfield Society in the recent 56 mc. field day and although they heard 5JZ at 16 miles, they could not get through to him with their tranceivers, so that 5OQ and 2BFJ are constructing a separate P.P. Transmitter.

The usual activity manifests itself in the rest of Kent. The D.R. was particularly pleased to see so many No. 16 members at Convention.

Our congratulations and best wishes go to G5FN the popular and genial Secretary of the Medway Society, and his wife, on the occasion of their marriage.

Gravesend, although now boasting about half a dozen two letter calls, still appears to be unusually quiet.

In Sussex, the 56 mc. tests on July 29 did not have much support, due to the inclemency of the weather. Owing to the great mains failure G2AO was unable to take part.

Still another member of the Heathfield Radio and Television Society has joined R.S.G.B. as BRS1494. He is active with a portable receiver on 56 mc. BRS1472 hopes shortly to build a universal receiver for television, covering from 40 to 2,000 metres. G5OY is trying out aerials. Other stations active are G2MC, 2AO and 2AX. BRS1450 has applied for his full licence.

Northern Ireland.

In the absence of the DR. on holidays I am supplying a few lines with his permission.

Mr. J. Fenwick, BRS 1510, who is to be welcomed this month, is already experimenting with E-C oscillators.

Personally I have to record visits to G20A and G6NJ and my great appreciation of their kindness ; also a very pleasant time at the St. Albans conventionette.

I am sure the D.R. and all members in this district would wish me to offer our hearty congratulations to District 5 on winning the N.F.D. Trophy with such a splendid score. Northern Ireland is working its way up the Merit list and, if progress continues, it should be only a matter of 7 years before we hit the top ; this figure is, of course, only approximate and is subject to alteration without notice !

On behalf of members here I record our grateful thanks to our D.R. for the very hard work he has put in for us in his first year of office. (Gi6YW).

QSL Section.

Manager : J. D. Chisholm (G2CX).

Members of RSGB who are employed in large business houses will probably be able to appreciate more easily the fact that in order to deal effectively with the work of the QSL Section it has been necessary to reduce it to its simplest form as a routine. This being so, it follows that the fewer exceptions to the rules that there are, the more easily is the work done. Every card that requires individual attention means so much delay, and delay when thousands of cards are concerned is serious. Please, therefore, do not write to the Section until you have made certain that a glance at the Rules (July Bulletin) would not settle your query.

Will Indian members please note that as the VU QSL Bureau is now functioning again, all cards for Indian amateurs are being sent direct to Mr. McIntosh, Baghjan T.E., Doom Dooma P.O., Assam. Those members who have envelopes at H.Q. will be credited with a similar amount by Mr. MacIntosh.

QRA Section.

Manager : M. W. Pilpel (G6PP).

NEW QRA's.

G2OP.—Capt. G. C. Price, "The Mount," Pembroke Dock, S. Wales.

G2OR.—C. H. Ollett, 94, Milton Road, Cambridge.

G2PT.—J. Piggott, 11, Jessica Road, London, S.W.18.

G2UT.—C. N. Thayne, "Beni-Mora," 11, Corie Road, Norwich.

G2WO.—W. Walker, Browngates, Hendrefoilan, Swansea, Glamorgan.

G2XJ.—J. Batchelor, 51, Arcadian Gardens, Wood Green, London, N.22.

G5AO.—A. E. Lambourne, 43, Bramshaw Road, Norcot, Reading, Berks.

G5FN.—S. Howell, 124, Trafalgar Road, Gillingham, Kent.

G5QY.—H. Hornsby, "Newlands," Kenton Lane, Newcastle-on-Tyne, 3.

G6HM.—E. R. A. Henman, 2, Ivanhoe Road, Denmark Park, London, S.E.5.

G6LO.—E. H. Leamon, 250, Dalston Lane, London, E.8.

G6MD.—D. Macadie, 50, Kilmorie Drive, Bankhead, Rutherglen, Scotland.

G6QI.—R. Walker, 99, Potters Lane, New Barnet, Herts.

2AIH.—N. G. Hyde, "Fernholme," Knebworth Road, Bexhill-on-Sea, Sussex.

2AOB.—G. W. A. Dummer, 67, Firs Road, Ashton-on-Mersey, Cheshire.

2BAO.—W. Robertson, 41, Lilybank Crescent, Forfar, Scotland.

2BJC.—J. M. Hogg, "Churchill House," St. Johns Road, Dudley, Worcs.

2BSO.—W. A. Dix, 18, Harvey Lane, Norwich, Norfolk.

2BWF.—H. Tinnion, 16, Victoria Road, Whitehaven, Cumberland.

The following are cancelled :—2AGK, 2AWG, 2AWN, 2BFL, 2BGU, 2BLN.

NEW MEMBERS.

HOME CORPORATES.

C. W. Watson (G2ZA, 2ZB), 20, Whitley Road, Keighley, Yorks.
H. Ransom (G5XA), 317, High Road, Wood Green, N.22.
J. W. Ismay (G6JI), 6, Douglas Avenue, Walthamstow, E.17.
E. R. A. Carr (2AXI), 18, Salisbury Road, Walthamstow, E.17.
E. T. Wadsworth (2BVP), Pendennis, Church Road, Urmston, Manchester.
H. J. Edwards (BRS1505), 73, Albion Road, Tunbridge Wells, Kent.
L. B. Thomas (BRS1506), 48, Glennie Road, West Norwood, S.E.27.
T. H. A. Bartlett (BRS1507), 40, Ladysmith Road, Exeter.
R. M. McRobb (BRS1508), 10 Orchard Street, Aberdeen.
R. Almond (BRS1509), Inglenook, Oakworth, near Keighley, Yorks.
J. Fenwick (BRS1510), " Rosita," 37, Park Road, Belfast.
H. W. G. Bysouth (BRS1511), 117, Sherringham Avenue, Bruce Grove, N.17.
E. D. Griess (BRS1512), 37, Parker's Road, Sheffield 10.
R. B. Stratton-Dixon (BRS1513), 17, Iddesleigh Road, Bedford.
P. G. Bradley (BRS1514), 16, Faraday Road, N. Kensington, W.10.
J. Holland (BRS1515), 20, Poplar Road, Cleethorpes, Lincs.
J. V. E. Webley (BRS1516), Cefn-Coed, Bilton Road, Neath, Glam.
R. J. Rider (BRS1517), 97, Gloster Road, Old Woking, Surrey.
C. H. F. Hubbard (BRS1518), 79, Kilmartin Avenue, Norbury, S.W.16.
R. H. Phillips (BRS1519), Lambourn, Shinfield, Berks.
C. Rapsey (BRS1520), 21, Princes Avenue, Greenford, Middx.
G. H. Bromley (BRS1521), 4, Robert Street, Gravesend, Kent.
W. Whitworth (BRS1522), 130, Dudwell Lane, Halifax, Yorks.
A. H. S. Scott (BRS1523), 13, St. Matthew's Avenue, Surbiton, Surrey.
R. V. Burnett (BRS1524), 133, Church Road, Burgess Hill, Sussex.
W. F. Wilbee (BRS1525), Botley, Southampton, Hants.

DOMINION AND FOREIGN.

J. Campbell (EI5B), Martello Terrace, Sutton, Co. Dublin.
Baron Bonaert de la Roche (ON4HM), Harvengt, Belgium.
C. Anthierens (ON4PA), Florastreet 42, La Pinte, Nr. Ghent, Belgium.
G. Moens (SU1RO), Box 254, Cairo, Egypt.
H. N. Bowman (VK5FM), Battams Road, Payneham, S. Australia.
E. A. Boyce (VP7NB), Deputy Director of Public Works, Nassau, Bahamas.
R. E. Nichols (W1CNU), P.O. Box 202, Stamford, Conn, U.S.A.
G. D. Walker (W4CTO), Box 2101, Winston-Salem, N.C., U.S.A.
S. P. Cunningham (Yi7LC) 70 (BT) Squadron, R.A.F., Hinaidi, Baghdad, Iraq.
G. F. W. Penney (ZU5W), P.O. Box 2265, Durban, Natal, S. Africa.
W. J. Fisher (BERS241), Oorgaum Kolar Gold Fields, Mysore State, S. Africa.
A. H. Ridley (BERS242), 79, 4th Street, Umtali, S. Rhodesia.
P. A. Henderson (BERS243), Rob-Roy Tea Estates, Nilgiris, S. India.
R. A. Sfotswood (BERS244), P..O Box 9002, Calcutta, India.
P. L. Lowth (BERS 245), Rhodesia Railways, Beira, Portuguese East Africa.
O. Morrogh-Ryan (BERS246), Dunboyne Castle, Co. Meath, I.F.S.
J. A. Kurtz, 100, E. 18th Street, Brooklyn, New York, U.S.A.

Stray.

VU2RE, due to licensing difficulties, is now inactive, but QSL's confirming QSO's can be sent him via VU2LJ.

Empire B.E.R.U. News.

B.E.R.U. REPRESENTATIVES.

Australia.—H. R. Carter (VK2HC), Yarraman North Station, via Quirindi, N.S.W.

Bahamas, Bermuda and the Eastern Part of the West Indies.—P. H. B. Trasler, (VP4TA) No. 2 Mess, Pointe à Pierre, Trinidad, B.W.I.

Burma.—W. G. F. Wedderspoon (VU2JB), Government High School, Akyab, Burma.

Canada.—C. S. Taylor (VE1BV), Stewiacke, Nova Scotia; R. Prissick (VE2CX), 27, Bellevue Avenue, Westmount, Montreal, P.Q.; S. B. Trainer (VE3GT), 4, Shorncliffe Ave., Toronto, 5, Ont.; A. E. Howard (VE4CJ), 2401, 25th St. West, Calgary, Alberta; and A. L. Cusden, (VE5HJ), 1465, 17th Avenue, New Westminster, British Columbia.

Ceylon and South India.—G. H. Jolliffe (VS7GJ), Frocester, Govinna, Ceylon.

Channel Islands.—Capt. A. M. Houston Fergus (G2ZC), La Cotte, La Moye, St. Brelades, Jersey.

Egypt, Sudan and Transjordania.—Lt. E. S. Cole (SU1EC), Haking House, Abbassia, Cairo, Egypt.

Hong Kong.—C. Emary (VS6AX), R. C. Signals, Hong Kong.

Irish Free State.—Col. M. J. C. Dennis (EI2B), Fortgranite, Baltinglass, Co. Wicklow.

Jamaica, British Honduras, Turks Island and Cayman Island.—C. M. Lyons, (VP5MK), P.O Box 36, 12, Port Royal Street, Kingston.

Kenya, Uganda and Tanganyika.—R. O. Davidson (VQ4CRL), P.O. Box 31, Nairobi.

Malaya.—T. G. Laver (VS3AC), Government Electrical Power Station, Johore Bharu, Johore.

Malta.—H. G. Cunningham (BERS.161), H.M.S. "Royal Sovereign," c/o G.P.O., London.

Newfoundland.—E. S. Holden (VO8H), Box 650, St. John's, Newfoundland.

New Zealand.—C. W. Parton (ZL3CP), 69, Hackthorne Road, Cashmere Hills, Christchurch.

North and South Rhodesia.—J. W. Mavis (ZE1JE), P.O. Box 160, Umtali, South Rhodesia.

North India.—J. G. McIntosh (VU2LJ) Baghjan T. E. Doom Dooma P.O. Assam.

South Africa.—W. H. Heathcote (ZT6X), 3, North Avenue, Bezuidenhout Valley, Johannesburg.

Ceylon and South India.

By VS7GJ.

With no news from South India, or locally, there is little to report.

Conditions on both the 14, and 7 mc. band have been generally bad, no two days alike, QSB being heavy especially on the former band, VK's and South Africans are conspicuous by their absence.

VS7GJ worked W6BYU, and will welcome other reports from Ws and VEs.

Egypt.

By SU1EC via G2QO

I regret the absence of notes during July. Conditions in Cairo have been very poor, static has been strong and fading bad, making it almost impossible to enjoy contacts. However, 7 mc. is showing a little more life and a steady return to good conditions is expected during the autumn.

Activity has almost ceased in Cairo. The SU6HL quintet has now disintegrated; 6HL has moved to his old QRA. 2NP and 3EH have left Cairo. SU1CH has been almost completely QRT. He may be often heard behind the mike on the Egyptian State Broadcasting Station. SU1RO on two months leave in Greece. SU1SK doing military service in Syria. SU1AA has changed his QRA from Ismailia to Cairo and should be active soon.

Another letter has arrived from the Sudan stating that, ST calls not listed are being logged by BRS and also points out that there is one ST amateur, and one only, licensed to transmit.

Irish Free State.

By EI2B.

On the occasion of the motor races held by the L.M.C.C. at Skerries, about 15 miles north of Dublin, on August 4, the I.R.T.S., with the concurrence of the Post Office, arranged for the communication between the headquarters officials at Skerries and the control stations on the course. Three stations were in operation, at Skerries, Lusk and Rush, operated respectively by EI6F (assisted by GI5QX), EI9F, and EI8B. As the distance to be covered was not great, the transmitter at each of these stations consisted of a single valve CO employing a type 47 valve, the crystals being synchronised at 3,551 kc. It was at first intended to use 'phone exclusively for communication, but QRM from the ignition systems of the cars proved too bad for this, and morse was employed instead. Control communication was effectively maintained during the race, and in one case at least proved particularly valuable in bringing an ambulance to the scene of a serious aceident. There was only one "contretemps," due to a race official slamming the door of

the operating room at Skerries on to the temporary leads from the H.T. mains to the transmitter, severing them and blowing the fuses. However, EI6F quickly effected a temporary repair, and the interruption only lasted for two or three minutes. At the writer's station, distant about 60 miles, all three stations were received at R7 to R8, though curiously enough they were not so strong locally.

The following stations have been heard or have reported active :—EI : 2B, 5B, 6B, 8B, 3C, 2D, 4D, 8D, 9D, 5F, 6F, 7F, and 9F. Also BRS1429 and BRS1348. EI5F is keeping a regular sked. with K4CVV.

Northern and Southern Rhodesia.

By ZE1JE.

It is extremely difficult to formulate a monthly report on the "lone hand" system, but unfortunately, more often than not, this method has to be adopted by the writer owing to the absence of reports from active members, which is regretted. It is the essential duty of every member to furnish a brief monthly report in order to assist your representative to keep the flag flying.

The following stations are active : ZE1JE, JF, JJ, JM, JB, JC and JN, the three latter stations are not B.E.R.U. members as yet.

Understand B. M. Orr (ex VQ2XD), now in Salisbury, is having some difficulty in obtaining his licence from the Postmaster-General.

ZE1JF has constructed a temporary transmitter (CO.PA), using link coupling throughout, and with an input of 2½ watts is receiving most excellent reports from stations 1,000 miles distant. The long-awaited components to QRO are not yet to hand.

ZE1JE is still endeavouring to contact "G" on 7 mc., but conditions on this band are again very poor for northern DX, although, SU5NK was contacted on August 15. It is worthy to note than link coupling was used between PA tank coil and aerial coil, during this contact, the link being fully 3 ft. long.

Channel Islands.

By G2ZC.

Reports have been conspicuous by their absence, with the exception of BRS1162, who has reported regularly, though he has had little information to impart. With the approach of winter, it is hoped that more members will get active again.

We had the pleasure of a visit from G6NF in July, who was staying with G2ZC, and while no Ham seems to have been in the islands in August, we had visits from G20C and 2BMR at the beginning of September.

The only item of local news that seems worth recording is that G2ZC has got the duplicate of the Society's Frequency Meter finished and calibrated, and having been checked by G6NF, it appears to be accurate to within 0.01%.

BRS1162 reports that he will be moving his QRA o London District in November, and G5GW paid an all too brief visit home in August but was not on the air.

Calibration Section.

Manager : A. D. Gay (G6NF).

The **3.5** mc. calibration service will recommence at 00.00 G.M.T. on Sunday, September 30. *Once again we ask all members who make use of this service to send a p.c. reporting the reception of these signals.* New frequency-dividing apparatus, which enables us to maintain a 1,000-cycle multivibrator within a few cycles per second, will give even better accuracy than hitherto. The new multivibrator equipment employs six indirectly heated valves to reduce the frequency from 100 kc. to 1,000 cycles, and can be directly compared against the old 5-valve battery equipment described in the Bulletin for January, 1933. When last compared with the NPL Standard Frequency Transmissions, the error was less than ten parts in a million.

Due to the kindness of Col. Dennis (EI2B) in cutting several small quartz bars of almost minute dimensions (27 x 4 x 1.5 mm.), we have been able to select and adjust two to 100.00 kc., which have temperature co-efficients less than 0.5 parts per million, per degree centigrade. This opportunity is taken of recognising his untiring co-operation and thanking him for his help in producing a frequency standard of high accuracy and stability.

The emitted frequencies will be 3,525, 3,625 and 3,725 kc. as before, and we should like amateurs possessing crystals of similar frequency to stand by for the eight minutes of the R.S.G.B. transmission as we had many complaints of interference last year. It is very difficult to calibrate and check apparatus from these transmissions, to an accompaniment of heterodyned telephony and morse.

Will those members who intend sending a frequency meter for calibration please see that their instruments cover the amateur band of frequencies ? During the past year we have received two for calibration made to a certain specification which did not fulfil this condition. It must be remembered that, manufacturing tolerances in components will make coil adjustments necessary and that some time and patience are required to adjust a frequency meter.

The Calibration Section is rendering a unique service by checking and issuing certificates for members' apparatus, a service which is not given by any other society or organisation in the world. Please do your part by making sure the apparatus you send is in proper working order.

STANDARD FREQUENCY TRANSMISSIONS.

SUNDAY,
September 30, 1934

0930 *BST.*	3525 *KC.*
0940 *BST.*	3625 *KC.*
0950 *BST.*	3725 *KC.*

Accuracy within 0.01 per cent.

EDITORIAL.—(*Continued from page* 85).

the first meeting at which the I.A.R.U. have held official status, and although it is unlikely that many points of amateur interest will be raised, it is pleasing to know that Delegates of the Union will be there to offer advice if necessary. Two years hence the next International Conference will take place in Cairo, and on that occasion it is anticipated that we, in company with all other interested Societies, will press for wider bands, in order to meet our increasing needs.

By careful operation and strict adherence to the terms of our licences, this formidable task will be made easier.

Ham Parodies.

No. 4.

(The song of the " rubber-stamp " QSO merchant)

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Always say QRU,
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Let each contact be a wee one.

" PIPS."

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