



THE T & R

BULLETIN



A JOURNAL FOR
RADIO EXPERIMENTERS

Vol. 15 No. 4

OCTOBER, 1939 (Copyright)

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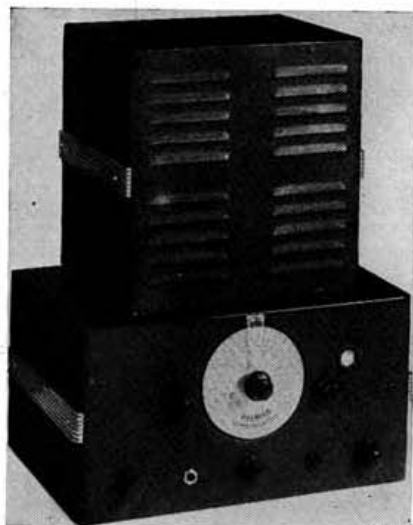
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Llandudno.

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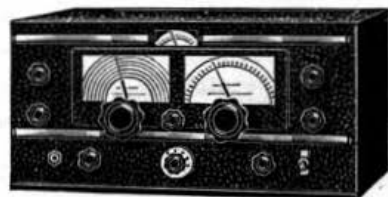
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or general interest. Intending contributors are requested to indicate in advance the scope to be covered by the article under consideration.

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THE T. & R. BULLETIN

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RADIO SOCIETY
OF GREAT BRITAIN

Hon. Editor: ARTHUR O. MILNE



DEVOTED TO THE
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AND ADVANCEMENT
OF AMATEUR RADIO

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SERVING OUR MEMBERS

IN times of War, no less than in days of Peace, the first desire of the Council and Headquarters staff is to serve the membership.

Already many signs are evident that efforts are being made to keep alive the Spirit of Amateur Radio. Reports continue to reach us that local groups and clubs have recommenced their meetings—usually during the daylight hours at weekends. Informal gatherings in shacks are taking place in many parts of the country and before long lectures will again be billed.

Those who have joined H.M. Forces, and are away from home, will do well to remember that our British Isles membership exceeds the 3,000 mark, which means that in almost every town of size there is someone with an affinity of interest.

An important service which Headquarters is anxious to undertake is that of placing Service members in touch with one another and with local activities. Station visiting, in pre-war days was an important feature of our movement; stations as such are now somewhat depleted of gear, but the men behind them are as keen as ever to extend hospitality.

It is essential that when local meetings are arranged, the utmost publicity should be given, in order that any member, living temporarily in the neighbourhood, may have an opportunity of attending. Our columns are open for this and any other purpose designed to keep members in touch with one another.

We cannot stress too strongly that those serving at home and abroad may use our 53 Victoria Street address for the purpose of communicating with their friends. Frequently other addresses may be forgotten or a particular friend may be away from home, but through the medium of the Society it will be possible to maintain contact. For this service to prevail it is essential that everyone should keep Headquarters posted with changes of address.

This month we publish a first list of members serving with H.M. forces. The list has been restricted to Service members but it will be appreciated that a great many other members are playing an equally important part in one branch or another of National or Civil Defence. Our present list is comparatively short due to various factors, but as new information reaches us additional names will be added.

Those at home need no reminding that for the future of the movement serious experimental work should continue, for sooner or later we shall be called upon to justify our demands for the restitution of transmitting facilities. That task will be made lighter if those who represent the Society are in a position to show that during the interregnum development continued.

It is our wish to serve every member to the best of our ability but in return every member must play his or her part by paying subscriptions *promptly* when due.

J.C.

VOLTAGE STABILISED H.T. POWER SUPPLY

By D. N. CORFIELD (G5CD)

THIS article describes a stabilised power supply unit for obtaining two voltages capable of adjustment at any value between 100 and 300 volts, and at loads up to 100 mA. The voltage once set is almost independent of variation in mains input voltage or output load.

The unit, although involving no new principles, is invaluable for providing a stable anode and screen supply for (a) U.H.F. receivers, (b) Electron-coupled oscillators used for calibration, or (c) a master oscillator, where variation of mains or load causes frequency drift. In view of the more general use of U.H.F. superhet receivers and MO-PA transmitters it was felt that the description of such a unit might serve a useful purpose.

Layout and Circuit

The apparatus described may, of course, be used for general purposes and the voltage output can very easily be remotely controlled from any distance by means of a simple volume control type potentiometer. Modifications may be made to obtain a stabilised output at higher voltages or at heavier currents as required, but as most receivers or E.C.O.'s do not require high voltages or heavy currents the design described should cover most cases.

The apparatus was built on an old radio chassis of suitable dimensions. A photograph of the completed unit, with a permanent voltmeter illustrates the article.

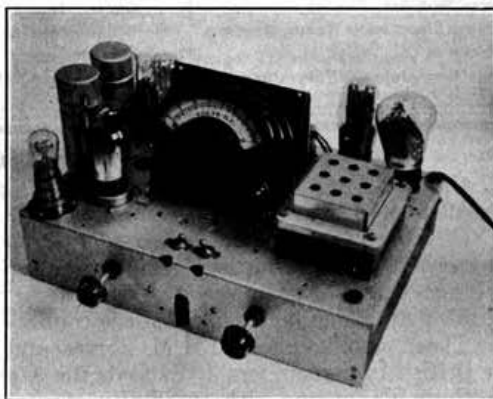
As can be seen from the circuit the output of a mains transformer giving about 350-0-350 volts is rectified by a 5V4G rectifier and smoothed by a 10 henry choke and a $16 + 16 \mu\text{F}$ electrolytic condenser block. The D.C. output which is about 400 volts, is split between the two sections of the stabiliser, both of which are similar in circuit although one uses two controlled valves (V1) in parallel. The regulated D.C. output is obtained from the cathodes of the controlled valves. At maximum output in each case the drop across V1 is about 100 volts. The cathodes of the controller valves (V2) are maintained at a constant potential of about 90 volts by means of *Philips* neon lamps. The resistances R1 are for the purpose of maintaining a striking voltage on the neons even when V2 is biased to cut-off.

The screen voltage and grid voltage for V2 are obtained from a potentiometer circuit connected across the output terminals. It is evident from the circuit that an adjustment of the potentiometer P will vary the grid voltage of V2 with respect to its cathode; this variation is conveyed to the grid of V1 by the drop across the anode resistance of V2. A variation in grid potential of V1 will vary its impedance or voltage drop, hence varying the output voltage.

The potentiometer P is used to adjust the output voltage to the required value. When the output load, for example, increases and the output voltage tends to fall, the top end of P (which is designed to be maintained at about V2 cathode potential at no load), will fall with respect to the cathode, giving an increase in grid bias on V2. At the same

time the screen voltage of V2 will also tend to fall, both effects giving a decrease in anode current. This will produce a decreased bias on V1 with a consequent lower impedance and an increased compensating output voltage. Similarly, the reverse occurs with a decrease in load, and also when the input voltage from the rectifier alters, due to mains variation.

The fixed potential of the cathode of V2 fixes the lowest possible output voltage, since obviously the anode and screen voltage of V2 cannot become lower than that of the cathode. If the lowest voltage required is in the order of 150-200 volts, an *Osglim* Beehive Neon may be used instead of a *Philips*.



Layout of voltage stabiliser using an old receiver chassis. The mains transformer and rectifier are on the right of chassis; the electrolytic block is behind the voltmeter. The second block and the choke are underneath the chassis. The valves in cans are V2. The knobs in front are the two output controls P, and the toggle switches in the centre are S1 and S2. S3 is part of one potentiometer, P and S4 is part of the other. The voltmeter has two ranges 0-150 and 0-375 volts.

The switches S1 and S2 when in their closed positions are used to lower the output to about 100 volts; when open the minimum voltage is around 150 volts. The resistance between the parallel pair of valves V1 is to prevent parasitic oscillation, as are the condensers of $0.1 \mu\text{F}$ and $2 \mu\text{F}$. An additional condenser of about $0.1 \mu\text{F}$ may be required between the screen and grid of V2 for the same purpose, depending on the layout. Oscillation, when present, is indicated by a jerky control of the potentiometer P or lack of any control at certain settings or at certain loads.

The potentiometer P may be at any distance from the unit, but the anti-oscillation condensers should be located close to the valve holder.

The *Philips* lamp is a 100 volts indicating neon and has a resistance in the base which must be

removed. This is easily achieved by standing the neon in methylated spirits for a short time when the base can be removed. After the resistance has been taken out, the neon can be re-based with plaster of Paris mixed up to a thick paste.

Regulation

The table below shows the regulation obtained with various loads and settings of the output

Output set to	Load Current (Milliamps)				
	0	30	50	70	90
Volts	Volts	Volts	Volts	Volts	Volts
300	300	300	295	280	255
250	250	249	248.5	248	247
200	200	200	200	198.5	197
150	150	150	149	148	147
100	100	99	98.5	98	98
	Mains Input Volts at 50 mA, D.C. Load				
	Volts	Volts	Volts	Volts	Volts
	180	200	220	240	260
250	243	245	249	250	251
					252
					input output

voltage, and with variations in mains voltage. The figures were taken using a *Brimar* or *Micromesh* valve, type PA1 as V1 and a 6J7G as V2.

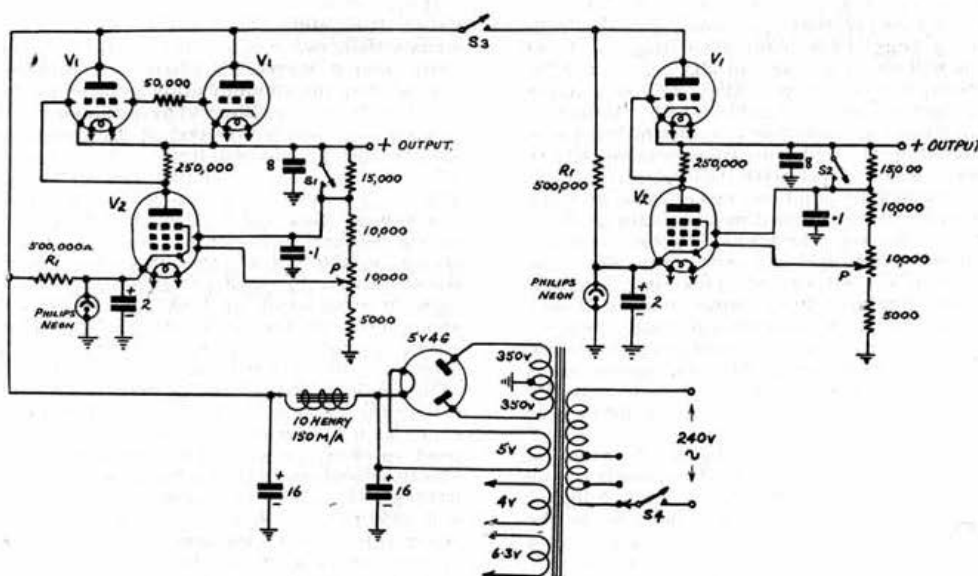
The regulation at 300 volts output is not so good, due to insufficient voltage drop allowed in VI. If voltages above 300 are required, the mains transformer should furnish at least 100 volts more than the output voltage required at full load.

A type PA1 valve or a *Standard 4033A* is the most suitable type for V1, as it has a low voltage drop (impedance) and a high slope, giving good control. Both of these valves are indirectly heated.

For V2 a 6J7G, 6C6 or 77 type valve is suitable, although old screen grid valves, such as a MS4B or AC SG, can be used. Other triodes for use as V1 can be a 2A3, PX4 or Mazda PP3/250, but if these are used a separate centre tapped L.T. winding is required, and it may be necessary to increase the value of V2 from 250,000 ohms to 0.5 or 1.0 megohm. For higher output currents, up to, say, 250 mA., or voltages up to 600, a valve such as the Standard 4300A is recommended; in this case an Osglum neon is preferable to the Philips.

The unit may be fed, quite satisfactorily, from some existing H.T. supply, *e.g.*, from a P.A. or F.D. supply of about 400 volts, the stabiliser both dropping the voltage and stabilising it for an E.C.O. Such a unit may also be used for obtaining a constant grid voltage for various purposes.

Readers who build this unit and experience any difficulty are asked to communicate with the writer.



CIRCUIT FOR DOUBLE OUTPUT VOLTAGE STABILISER.

All resistances are $\frac{1}{2}$ watt type except 15,000 ohms. which should be 1 watt. The 16 μ F. and 8 μ F. blocks are 450 volt surge limiting; 2 μ F. condensers paper or 200 volt electrolytic; 0.1 μ F. condensers 250 volt working. Mains transformer 350-0-350 at 150 mA. with three L.T. windings.

For other components see text. Switch S3 switches off second supply if not required.

Crystal Band Pass Filters

By E. L. GARDINER, B.Sc., (G6GR)

PART III.

Filters for Telephony

Broadly speaking the use of a single crystal gate has been confined to telegraphic reception. It is true that in recent years receivers have been fitted with variable selectivity adjustments whereby the crystal filter can be broadened out to an extent which will render telephony intelligible, but since this is done by lifting the skirts of the response curve, it is liable to bring in additional interference. The fact that many amateurs do in practice use the crystal filter to lift difficult telephony signals out of the interference, in spite of the serious reduction in the higher modulation tones which results, and that speech is rendered on the whole more readable by doing so, is a tribute to the usefulness of crystal filters in general. It does not, however, mean that the single crystal type is suited to this purpose, for which it was admittedly not primarily intended.

By the use of two crystals, however, a band-pass can be obtained which is much simpler to use and more perfect than can be arrived at practically through the use of many I.F. circuits in cascade. If a width of about 3 kilocycles be chosen, and the receiver adjusted so that the incoming carrier falls near to one edge of the band, then single sideband reception will result, giving reproduction of modulation tones up to about 3,000 cycles. This is sufficient for very clear-cut and intelligible speech. Moreover, since the band-pass response is somewhat concave, as shown in Fig. 11, conditions are very favourable to crisp reproduction. The carrier, falling near one peak of the curve, will be amplified rather more than the average modulation. Thus the percentage modulation at the following detector is somewhat reduced, and will not reach 100 per cent. even when the original signal was 100 per cent. modulated. It is well known that single-sideband reception is fairly free from distortion if the modulation depth does not exceed some 70 per cent., but that detection introduces considerable distortion when this percentage is exceeded. The latter condition is automatically avoided by the use of double crystal band-pass as described above.

Similarly, sidebands corresponding to tones of about 1,500 cycles will fall near the middle of the curve, and will be somewhat reduced, whilst higher frequencies up to 3,000 cycles will fall near to the second peak of the curve, and will be increased relatively. Thus the reproduction of higher frequencies in the region most desirable for good intelligibility, is lifted somewhat. The goal of the sound amplification engineer, namely a response curve which is level over the medium frequency range, but which rises at both the upper and lower limits, has thus been reached.

Single sideband reception giving reproduction up to about 3,000 cycles is probably the best theoretical compromise known for the reception of telephony through interference. It will permit three equally

powerful stations to operate within a channel 10 kilocycles wide with a minimum of sideband splash, and no direct interference. Under congested amateur conditions it will enable a signal to be clearly received provided there is no other of similar strength within 3 kilocycles on one side or the other. Whilst this separation may still leave something to be desired, it is doubtful whether any known system can separate telephony signals successfully at still closer spacing except by the sacrifice of so much quality that speech becomes almost unreadable. A bandwidth of 3 kilocycles has been assumed in this argument, but it is of course equally easy to select any narrower band if the user is prepared to tolerate poorer quality of reproduction. The beauty of double crystal working is brought home here, because in the case of tuned circuits it becomes increasingly difficult to obtain a good band-pass as the width is reduced, and still more difficult to maintain the several circuits in line; in the case of crystals the design becomes simpler and the cut-off more sharp as band-width is reduced.

It has been estimated that a sharp 3 kilocycle band-pass will roughly double the number of telephony signals than can comfortably be read during congested periods on the 7 Mc. band, in comparison to a typical modern communication receiver which is not fitted with such a filter. The response of modern receivers is nearly always of the single-peaked variety, being obtained from perhaps four or six I.F. circuits in line. Whilst the width may be effectively a few kilocycles only on weak signals, it will be at least 6 or 7 kilocycles when signals are strong, because the response falls gradually and there are appreciable skirts to the curve which enable very strong interfering signals to break through. Probably an attenuation of 1,000 : 1 can be taken as about the figure necessary completely to reduce the strongest interference usually encountered, although even this value will not cope with a 100 watt station only a mile or two away! A typical I.F. amplifier employing six circuits at 465 kc. will give this ratio at about 6 kilocycles from resonance, or in a very good receiver, possibly 4 kilocycles, implying an effective band-width in the presence of strong interference of from 8 to 12 kilocycles. The crystal filter will attenuate 1,000 times at 1.5 kilocycles from either edge of the pass band. Thus, its maximum effective width is 6 kilocycles for 3 kilocycles crystal separation. If the crystals were chosen at 2.5 kilocycles separation, and the balancing condenser used to steepen the cut-off slope, an effective width of as little as 4 kilocycles could be reached.

An example of the practical advantages of this reduction can best be found in broadcast reception. Consider the separation of Deutschlandsender from Droitwich on the long-wave band. A modern receiver employing six I.F. circuits will separate the German station moderately, but with a considerable residue

of sideband splash. At an intermediate point between the two, a mixture of jumbled programmes will be heard. Comparing now the performance of a receiver containing only one I.F. stage but incorporating a crystal band-pass filter of 4 kilocycles effective width, used in the single sideband condition. The German programme will be found to suffer from perhaps one third as much splash as in the former case, whilst at a point half way between the two transmitters no direct programme interference will be heard from either. There will be a silent spot, containing nothing but an occasional trace of splash as the sidebands of the two stations heterodyne each other. Were we dealing with amateur conditions, there would be room for another transmission at that frequency.

Impedance Matching

To obtain a 3 kilocycle band-pass it is only necessary to modify the telegraphic filter by selecting a pair of crystals differing in frequency by 3 kilocycles instead of a few hundred cycles. Switching from one band-width to another is thus quite easily arranged when desired. If, however, the circuit of Fig. 10 be retained, there will be one serious defect. The central dip between f_1 and f_2 (Fig. 11 or 12) will

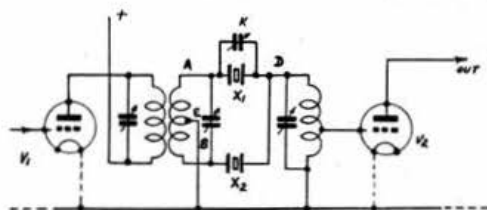


Fig. 14.

By substituting a tuned circuit for the load resistance, the above filter circuit suited to amateur telephony reception is obtained.

be excessive, being perhaps 10 or 20 times down in voltage. Fortunately, several simple expedients will overcome this difficulty, the most convenient from the amateur point of view being based on the effects of impedance matching, which were explained in part I when discussing the single crystal filter so that they could be referred to at this point without further explanation. It was there shown that the effective selectivity of a crystal depends upon the input and output load values, and that if these are made high, the response curve is considerably broadened. By taking this step, the response of each crystal at the mid-point of Fig. 11 can be increased until it approaches half the peak response, when the central region becomes level. In practice a slight central dip has been shown to be useful, partly to

improve the conditions for single sideband reproduction, and partly because the effect of other I.F. and pre-selecting circuits lined up to the mid-frequency will be to lift the centre. If, therefore, the curve were initially flat, it would become convex in shape through the action of these additional circuits, which must be present in any practical receiver. Impedance matching must not therefore be carried too far. It has also been pointed out that if the balancing condenser be adjusted to bring in "zero points" near to the sides of the band-pass, as in Fig. 12, the centre will at the same time be raised. The condenser can in fact be regarded as a means for transferring energy from outside to inside the pass-band. Thus unless the initial response is left somewhat concave, the centre will be raised excessively, if the balancing condenser be used to reject interference.

Practically the only alteration necessary to level the response sufficiently, is the substitution of the load resistance shown in Fig. 10 by a tuned circuit, as depicted in Fig. 14. The following valve may with advantage be tapped at a point about one third the turns up this coil from the earthed end, as shown, in order to prevent it damping the circuit excessively. This tapping is only essential, however, when the filter is followed by a diode or other detector, having a comparatively low impedance. To obtain the best results it is of course necessary that the input and output circuits shall possess high dynamic resistance, since it is upon this factor that the filling-up of the central dip depends. Thus they should be coils of high Q . In practice it is preferable to employ rather high values of inductance tuned by low values of capacity, 2,000 micro-henries being a good figure for an I.F. of about 465 kc.

A sense of proportion will, however, be helpful in selecting the best values of impedance. Naturally the task of levelling the band-pass will be much easier when a width of only 2 or 3 kilocycles is wanted (as in most amateur applications) than in the case of a broadcast receiver in which widths from 4 to 10 kilocycles may be chosen. In the latter case it becomes necessary to choose coils of really excellent Q , say from 200 to 300, and to couple them critically to the respective primary or secondary windings. Both input and output couplings then become loosely coupled transformers, having both primary and secondary tuned to the mid-band frequency. It then becomes possible to attain a pass-band at least 8 kilocycles wide and level to within 2 dB. For amateur telephony reception, however, it will be sufficient to use an output coil having a Q of about 150, directly tapped to the following valve, whilst the input circuit can be a normal centre-tapped I.F. transformer, preferably with critical coupling. In the next two articles the necessary practical details will be given to enable double-crystal filters to be built into any receiver.

(To be continued)

FOR THE SOCIETY TO CARRY ON
SUBSCRIPTIONS MUST BE PAID
PROMPTLY. DO YOUR BIT TO HELP.

POWER SUPPLIES

By J. N. WALKER (G5JU)

Part II.—BATTERY CONVERTOR SYSTEMS

In the following article, discussion is made of the various methods of obtaining a high tension supply when accumulators are available.

MANY readers, whilst not having mains laid on, have nearby charging facilities which enable them to maintain accumulators. In some cases, accumulators are only employed to heat the valve filaments but increasing attention is being turned to their use for the purpose of obtaining high tension supplies, with the aid of auxiliary equipment. It is to this aspect that this article is mainly devoted.

Wet Accumulators

Whilst they do not come under the foregoing category, it is well to mention in passing, the use of wet lead/acid accumulators as a source of H.T. voltage. They are usually manufactured in 10-volt units and a number can be placed in series to obtain any reasonably high voltage. There is normally no difficulty in getting such a battery charged, since the units can be handled in parallel if a voltage sufficiently high to charge them in series is not available.

Probably the best known manufacturers are *Chloride Electric Storage Battery Co.*, who produce batteries of this type in four sizes, to meet practically all requirements. For reception, the *Exide* type WH, having a maximum discharge rate of 25 mA. is suitable. For low power transmission, the type WT is recommended whilst for extra heavy duty, a multi-plate battery, styled WY, is available. All types can be purchased in wooden crates holding up to six units (60 volts), which are convenient for handling. With proper care in charging and use, a long life can be expected from wet H.T. accumulators.

The Milnes Battery

The *Milnes* Unit is a wet battery of the nickel/iron type, the electrolyte being caustic potash, which is a natural preservative of ferrous metals. Each cell produces an E.M.F. of about 1.3 volts and the construction of the unit is such that banks, each consisting of four cells permanently in series, may be connected either in series or parallel. With the switch in the former position a total high tension voltage of 120 is available, whilst, in the latter position, charging may be carried out from a 6-volt accumulator, the current drawn from the latter depending on the degree to which the *Milnes* unit has been discharged. Eventually, as the charge tails off, a state of equilibrium is reached.

The *Milnes* battery is remarkably light in weight and efficient in operation. There is practically no limit to the amount of current which may be drawn from it and a single unit will deliver 100 mA., or even more if occasionally required. It is not harmed by overcharging or even by dead shorting. The actual capacity is not very high, since it is intended that

re-charging should take place frequently, but it is, nevertheless, sufficient for a fairly long period of service without recharging, if the discharge is kept within a moderate limit. In actual fact, the battery is maintained in better condition if it is subjected to moderately heavy and frequent discharges, rather than to a slow discharge over a long period, under which circumstances the battery is liable to slowly lose capacity, although this may be fully restored by a complete discharge and recharge.

In addition to Standard and Minor models, super-capacity and 150-volt batteries are manufactured and all types are suitable for use both in temperate and tropical climates. The writer has had one of the original Standard 120-volt batteries in use for over seven years and it is still in good condition, showing a full voltage on load.

In view of their light weight and compactness, two such batteries form a very serviceable source of H.T. energy for portable transmission work. The address of the manufacturers is *Milnes, Ltd.*, Church Street, Bingley, Yorks.

Advantages of Wet Batteries

Although rarely used when mains are available, wet batteries possess a number of advantages rarely found in other sources. Provided the connections and internal insulation are in good condition, the wet battery gives rise to the minimum of noise when used to operate a receiver. Further, the internal resistance is very low and, as a result, no radio or audio-frequency potentials can develop across it. Feedback troubles are therefore completely absent and receiver decoupling can, in many cases, be dispensed with.

Provided they are not in a run-down condition, the regulation of wet batteries is practically 100 per cent, i.e. the voltage on load is identical with that at no-load. When they are used to operate a transmitter, little or no bother will be experienced from key clicks and associated troubles, whilst the extreme purity of the signal seems to give it an additional penetrative quality.

Although perhaps bordering on luxury, wet batteries can be usefully employed to provide grid bias potentials for a transmitter. As is well known, dry batteries are not altogether satisfactory for this purpose, since the grid current flowing tends to charge the battery, often increasing its voltage to a value much in excess of the nominal value, whilst the gradually increasing resistance further complicates matters. In the case of the wet battery, the grid current serves as a trickle charge which will maintain the battery in good condition for long periods with the minimum of attention.

The *Milnes* battery is particularly suitable for this

class of service, since, no matter how much it is charged, the voltage will remain sensibly constant. The 10-voltappings provided enable the actual bias to be adjusted to a fine degree.

Rotary Convertors

In general, the smaller sizes of rotary convertor have a single armature, with two windings and two commutators, or one commutator and one pair of slip rings. One winding acts as a motor and draws current from a low voltage source (usually D.C.) while the other acts as a dynamo and delivers either direct current at a much higher voltage or else alternating current, at possibly 230 volts.

Until recent years, the drawback of these machines was the very poor efficiency at which they operated—generally of the order of 30 per cent. to 40 per cent. Modern types, however, show a distinct improvement in this direction, although high efficiencies are only realised in high power machines. When choosing a rotary convertor, the output rating should be near to the value which will be required in normal circumstances, since it is under such a condition that the efficiency will be highest and the greatest economy secured.

Rotary convertors are manufactured in a great variety of sizes and types. The smallest is probably the 10-watt *M.L.* convertor, which operates from a six-volt accumulator and delivers a D.C. output of 240 volts, 40 mA. In the larger models, voltages of up to 1,000 are obtainable whilst the input may be arranged for 12, 24 or 32 volts, the latter values being particularly suitable for operation off country house and ship lighting sets. The employment of convertors giving an A.C. output has much to commend it and is finding increasing favour. The A.C. voltage—usually 230—can be stepped up or down by means of suitable transformers in the usual way and operating voltages varied to suit the need of the moment without the use of wasteful series resistances. Further, standard equipment can be used for portable work without extensive alterations being involved.

The regulation of modern machines is excellent—the output voltage is maintained practically constant from a moderate load up to the maximum, the current in the primary winding of the convertor increasing as the load increases.

Where D.C. mains are available, rotary convertors may be employed to transform the current from D.C. to A.C.; thus enabling the user to derive all the advantages of the latter.

The majority of the *M.L.* machines, which are manufactured by *Smith M/L Ltd.*, Coventry, are enclosed in metal cabinets, complete with smoothing and filter devices. A well known make of larger machines is the *E.D.C.*, manufactured by the *Electro-Dynamic Construction Co., Ltd.*, London, the 90 and 200-watt models of this firm being particularly suited to amateur requirements. *Electradix Radios* (218 Upper Thames Street, London, E.C.4), carry a large stock of rotary convertors of all types, particulars of which are to be found in their catalogue 3H.

Vibratory Convertors

With the great strides that have been made during the past year or two in their design and manufacture,

vibratory convertors have found increasing favour as a means of stepping up low voltage direct current to high voltage direct current. The reliability of *Bulgin* vibrator units has been raised to a degree which enables the manufacturers to guarantee the units for a life of at least 1,500 hours when used under proper conditions, whilst, in many cases, the life may extend to as much as 3,000 hours. The efficiency is also quite high, being of the order of 60 per cent. or even greater at full load. It is worthy of notice that practically all modern car radio receivers employ the vibratory convertor as the source of high tension current.

Essentially, a vibrator consists of a synchronous reed, energised by a small internal electro-magnet and bearing two sets of contacts—one set to energise the primary of the associated transformer and the other to rectify the A.C. output from the secondary of the transformer. The unit transforms the current from a low voltage source (types are available for operation off 4, 6, 12, 24 and 32 volts) into alternating current of approximately two-thirds the D.C. voltage, the frequency being between 100 and 110 cycles. The A.C. is applied to the primary of the transformer and is stepped up to a value of 150, 250 or more volts. The high voltage D.C. output is taken from the centre tap of the secondary winding through a conventional smoothing circuit.

The self-rectifying contacts will handle voltages of up to 250. Much greater voltages are obtainable—at a reduced current of course—with a suitably wound transformer and either a valve or a metal rectifier, the latter then being preferable since it avoids the necessity of providing L.T. current for the filament of the rectifying valve.

Precautions to be Observed

A certain amount of care must be exercised in the construction of convertors incorporating a vibratory unit. In the first place, the transformer requires special care in its design, in view of the fact that the current waveform is somewhat different to that found when operating off sine wave alternating current. The size of core, turns per volt, and gauge of wire all call for particular attention and it is recommended that only transformers specially designed for use with vibrators be used. *Bulgin* manufacture a number of types, some of which have tappings which enable them to be employed with varying values of L.T. voltage.

Next, it is very important to include a resistance/condenser filter across the vibrator H.T. contacts to prevent excessive sparking. If operated without buffer condensers it is probable that the unit will be rapidly and irreparably destroyed.

The sparking at the contacts is liable to set up interference at radio frequencies unless suitable precautions are taken. The first of these is thoroughly to screen all the components associated with the unit. All leads should be kept short in order to minimise radiation off them, and the metal case or chassis should be connected to earth with a short, heavy lead.

When very sensitive receiving equipment is employed, especially on the ultra high frequencies, it may be found necessary to place the unit some little distance away, connections being made to it with screened leads. It may also be advisable to screen the aerial lead for a short distance near the set.

In common with ordinary mains eliminators, vibratory H.T. equipment is not suitable for use with receivers employing telephones, without certain modifications, mention of which are made later.

The units manufactured by *Bulgin* are all rated at 15 watts maximum output, which will be found ample for all normal receiving requirements. It is immaterial what value of L.T. voltage is employed, although 4 or 6 volts will be found most convenient in the majority of cases. For those who do not wish to construct their own eliminator, *Bulgin* market one complete with smoothing and filtering, in a screened case and fitted with three output sockets, delivering voltages suitable for a normal T.R.F. receiver. The maximum output is 150 volts at 50 mA. and the unit only weighs 5½ lbs.

The attention of many amateurs it to-day being drawn towards the use of vibrators as a source of high tension energy for operating portable equipment. It is known that a number of transmitting

stations in this year's N.F.D. employed vibrators with eminently satisfactory results. One Scottish station placed the output from two units in series, by which means the full 25 watts allowed were obtained.

In this particular class of service, the vibrator offers several advantages, including compactness, portability and comparatively light weight, whilst the output is sufficient for normal requirements. A power pack incorporating a *Bulgin* vibrator was therefore constructed to test its possibilities in this direction and there will follow in Part III, to be published next month, a description of it, together with comments on its performance, both as regards transmission and reception. It is intended to serve as a model for those who require a fairly high voltage for operating a receiver at home, and for those requiring a convenient source of H.T. for portable work.

(To be continued)

A New Short-wave Transatlantic Receiver*

THE receiver to be described has been built for operation on the transatlantic telephone service. It is designed to receive a transmission which incorporates two independent single sideband speech channels arranged in two frequency bands, one band being above and the other below the frequency of a pilot carrier. The two channels occupy approximately the bandwidth which would normally be occupied by one double sideband transmission.

Advantages of Single Sideband Transmission

- (1) Increase in signal to noise ratio of 9 to 12 dB.
- (2) Improvement in quality.
- (3) Elimination of distortion due to the production of a second harmonic of the modulating frequency caused by interference between signals with a time delay difference.
- (4) Assuming adequate frequency stability the number of telephone channels in a given frequency range is doubled.

Frequency Spectrum

The frequency spectrum of the transmitted signal is shown in Fig. 1. A typical privacy system used is a switched channel device in which one channel (A) occupies the band 250 to 2,750 c/s on one side of the carrier, and the second channel (B) occupies

the band 2,500 to 5,000 c/s on the other side of the carrier. The speech channel (A) is inverted and the channels are interchanged at short time intervals. The channels are spaced by a frequency band approximately equal to the speech bandwidth to reduce crosstalk between the channels.

Pilot Carrier

The main difficulties of this system lie in the development of a sufficiently high degree of stability in the heterodyning oscillator used in the receiver, and in the frequency of the radiated carrier. The frequency stability required is of the order of one part in ten million, and although this requirement may be met by using a special crystal controlled oscillator, a more economical solution consists in arranging that one of the heterodyning oscillators shall be automatically tuned to follow the frequency of the radiated carrier.

This is accomplished by radiating a pilot carrier along with the sidebands, and this carrier is used to control the sense and amount of frequency correction necessary. The pilot carrier may be 16 to 26 dB. below peak sideband level and in the receiver after selection and amplification can be used for demodulating and also for operation of the A.V.C. of the receiver.

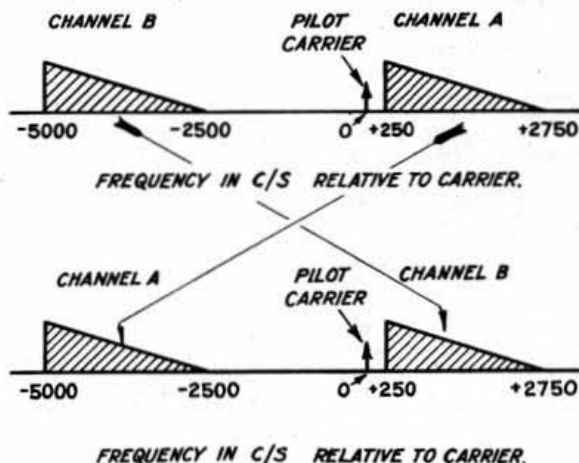


Fig. 1.

Frequency spectra radiated by dual channel single sideband transmitters.

Theoretical Discussion on the Receiver

The receiver (Fig. 2) is a triple detection superhet with two high frequency amplifying stages. The first I.F.

* This précis, prepared by H. R. Heap (G5HF), Receiver Group Manager of E.S., is reproduced by kind permission of the editor of "The Post Office Electrical Engineer's Journal." The original article appeared in the April, 1939, issue of that journal.

band is 590-610 kc.; this relatively high frequency enables an adequate image channel ratio to be obtained with three tuned circuits operating at signal frequency. The first beating oscillator is controlled in frequency by the control valve and the frequency control equipment, so that the carrier at the first I.F. cannot differ from 600 kc. by more than a few cycles per second. The first I.F. filter introduces sufficient selectivity in front of the first I.F. amplifier to avoid cross modulation by strong transmissions on frequency allocations near to the wanted channel. The second I.F. band produced by second frequency

unit. The pilot carrier after passing through the saturated stage, is termed "reconditioned" carrier. The saturated amplifier supplies the reconditioned carrier at substantially constant level to the frequency control equipment and to the channel demodulators. A separate carrier selecting circuit is arranged for the B channel in order that the pilot carrier applied to the channel demodulator shall be of correct frequency. Provision is made at the channel demodulator for the use of a local carrier derived from the 100 kc. crystal controlled oscillator, when necessary. The local carrier has been found to yield

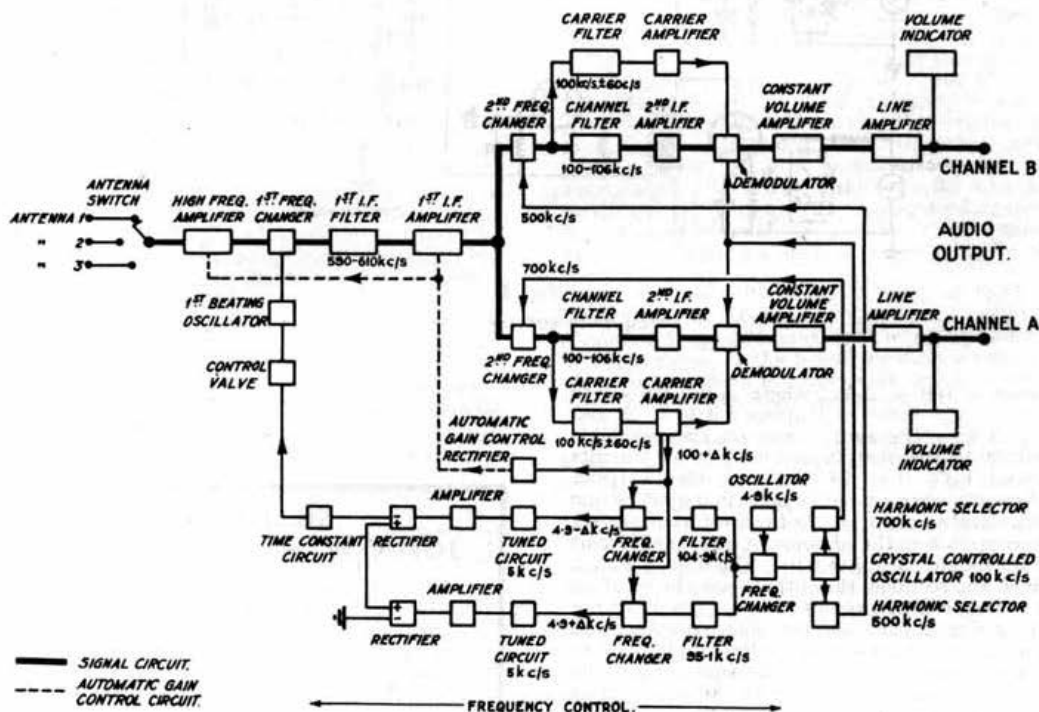


Fig. 2.

Block schematic of dual channel receiver.

changers is 100-106 kc.; this relatively low frequency enables channel filters to be designed with suitable attenuation at frequencies corresponding to the adjoining channels, combined with a suitable degree of flatness of band-pass. Two similar channel filters are used for separating the upper and lower sidebands of the transmission by arranging that the second frequency changers are supplied with 500 kc. feed for one channel and 700 kc. for the other. These feeds are derived from the 5th and 7th harmonics of a crystal controlled oscillator (100 kc.).

The pilot carrier is selected from the transmission by a narrow band-pass filter (100 kc. \pm 60 c/s) and passed through two stages of linear amplification in the carrier amplifier. The output of the linear amplifier of the A channel, branches to supply a saturated stage, the automatic gain control rectifier, and also a valve which operates a relay in the frequency control

slightly better quality when fading is severe and signal strength low. The output of each channel demodulator passes to a constant volume amplifier and the level is finally raised to a suitable value for sending to the line, by a line amplifier.

The power supply to the first beating oscillator and first mixer is stabilised by the connection of two multi-gap neon stabiliser valves in tandem following a separate rectifier unit.

Frequency-control System

The first beating oscillator is subject to variations in frequency due to temperature and heater voltage changes. The function of the frequency control system is to ensure that the carrier at the second I.F. will not differ from the 100 kc. crystal controlled oscillator by more than 10 c/s when the local carrier is to be used at the demodulator. In the control

system a 100 kc. feed from the local oscillator is modulated with 4.9 kc. and the two side frequencies of 95.1 and 104.9 kc. are then selected by two bridge crystal filters. These two frequencies are then arranged to beat with the reconditioned carrier at a

produce a useable circuit. The error frequency (*i.e.*, the difference between the frequencies of the reconditioned and local carriers) is less than 10 c/s nearly the whole time. Carrier fading and static do not upset the operation of the frequency control system.

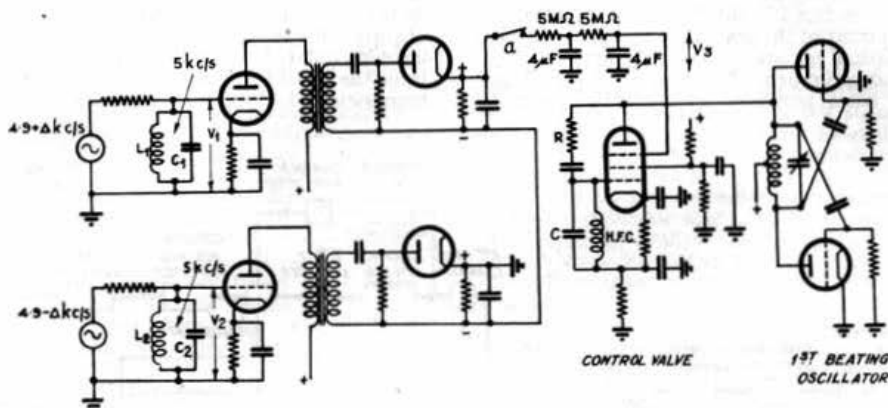


Fig. 3.
Frequency control system.

frequency of $100 + \Delta$ kc., where Δ is a few c/s to yield two audio tones of frequency $4.9 + \Delta$ and $4.9 - \Delta$ kc. The audio tones are then supplied separately to the sharply resonant tuned circuits L_1C_1 and L_2C_2 (Fig. 3) which are identical and therefore subject to similar changes in frequency due to temperature variations. As the error frequency Δ increases from zero the response of one tuned circuit rises and that of the other falls. The tones are then amplified and rectified, the output from the rectifiers being connected in series opposition. The difference voltage is then applied to a two stage resistance and capacity filter for smoothing, before application to the control valve, which is a high frequency pentode whose mutual conductance may be varied according to the bias applied to the suppressor grid. A phase shifting circuit R C (Fig. 3) is arranged so that the anode impedance is substantially that of an inductance $L = RC/m$, where $m =$ the control valve mutual conductance.

Automatic Volume-control

The A.V.C. works off the pilot carrier and operates the two signal frequency stages and the first two I.F. stages. When selective fading is present this method of A.V.C. is not entirely satisfactory, due to the pilot carrier not being representative of the sideband level, and a solution is provided by a constant volume amplifier† designed to maintain the output level constant within ± 2 dB. of 1 mW. for input level variations of from -15 to $+5$ dB. relative to 1 mW.

Performance

The ratio of the response at the image frequency to the response at the frequency of the wanted signal is more than 74 dB. for all frequencies below 20 Mc. The frequency control system is capable of operating under the lowest field strength conditions which will

The channel-to-channel crosstalk ratio due to the receiver alone is better than 50 dB. for the range of signal input levels likely to be encountered in actual operation.

SILENT KEY JOHN W. HAMILTON (G5JH)

It is with deep regret that we have to record the death of John W. Hamilton, late of Hardwicke, near Gloucester, who lost his life whilst serving as a telegraphist on board H.M.S. *Courageous*.

Jack Hamilton was an ardent supporter of the Society and had been a member for many years. He served throughout the last War and was taken prisoner.

A few years ago he met with a serious motor cycling accident and had never completely recovered. His indomitable spirit, however, enabled him to survive, and on the formation of the R.N.W.A.R. he was one of its earliest members.

A short time before the outbreak of War he was again called upon to serve his country, which he did cheerfully.

G5JH leaves a widow to whom we extend our deepest sympathy, and we take this opportunity of publicly placing upon record our grateful thanks for the invaluable help which she gave not only to her husband in all matters connected with the Society but to those members who were closely connected with him.

Jack Hamilton's services and his cheery spirit will be greatly missed by all who knew him.
G5HC.

† P.O.E.E.J., Vol. 31, p. 104.

THE 1939 "GW TROPHY" 56 Mc. CONTEST

By J. N. WALKER (G5JU)

ALL participants agree, almost without exception, that conditions on the Saturday evening of the contest were exceptionally good and it is worthy of note that many long distance contacts were made between 19.00 and 23.00 B.S.T. On the Sunday, conditions fell off badly and were judged by some to be definitely sub-normal.

The weather was none too good, high winds and rain being the experience of the majority, at least until the Sunday afternoon, when an improvement set in.

The Entries

The table which accompanies this article sets out the results obtained by the participating stations in order of placing, together with brief details of the gear and aerial systems employed. It will be evident from a quick glance that the relative merits of fixed and portable operation are about equally divided. True, portable stations take the first two places but they are closely followed by two fixed stations. It is also notable that, with but two exceptions, the order of placing coincides with the maximum distance covered. Between the fourth and fifth places there is a big gap in the number of points secured. It is probable that this gap would have been less noticeable had there been a greater number of entrants.

George Henderson, G8JVP, is the winner of the trophy and he is heartily congratulated on a very fine performance. Operating entirely single-handed, he obtained no less than seventeen contacts, four of them exceeding 140 miles in distance. The contact with G6DH is outstanding.

The apparatus used was not only of a truly portable nature but also of thoroughly modern design. In particular, G8JV was very pleased with the performance of the Mullard TV03/10 double-triode valves employed in the transmitter—their efficiency is indicated by the consistency of the results achieved.

As compared with last year's event, G8JV comments on the noticeable improvement in the quality of signals, whilst no difficulty was experienced in making contacts on CW. Eight stations, several situated at long distances, were heard but not worked. About 23.00 a severe electrical storm arose and the continuous static discharge from the aerial made reception impossible—a rare phenomenon on the ultra-high frequencies and one which the writer experienced at the same time.

Second place was secured by C. J. Rockall, G2ZVP, assisted, as usual, by E. Cosh, 2DDD. The report furnished is exceedingly interesting but space being restricted, justice cannot be done to it here. The log confirms the good conditions prevailing on the Saturday—thirteen of the twenty contacts counting for points were made then and only seven on the Sunday. Considerable fading was present on incoming signals although, peculiarly enough, outgoing signals were reported as being remarkably steady. The three-element beam proved its superiority by enabling contacts to be made with stations which could not be raised on the 84 ft. long wire aerial.

D. Heightman, G6DH, put up an excellent

performance. He was one of those who did not realise the contest was running and, when he came on at his usual hour of 22.00, he found that he had almost "missed the boat!" There is little doubt that if G6DH had started up earlier his score would have been considerably higher. As it was, he succeeded in making seven contacts, four of which were over distances exceeding 100 miles, whilst the remainder exceeded 50 miles. The average distance per contact works out at 100.5 miles. The longest distance contacts of the two leading stations were both made with G6DH.

The average distance of the six contacts made by A. G. Parker, G6QZ, reached the extraordinary figure of 112 miles. The best contact was with G2ZVP—150 miles—whilst only one was less than 100 miles. These results are convincing evidence of what can be accomplished with the aid of modern equipment. G6QZ, in common with the majority of the participants, used CW exclusively. Eight stations were heard on the Saturday evening, compared with only two heard on any one evening previously. Periodic quick fading was evident on nearly all signals on the Saturday.

Restricted hours of operation prevented E. J. Williams, G2XC, from obtaining a better score. He was further unfortunate in that whilst contact was established with G6OH and G6VX, fading prevented an exchange of reports. A newly-added Acorn valve R.F. stage resulted in improved reception, signals from distances greater than 150 miles (G6CW and G6QZ) being logged for the first time. In addition, F8AA was logged at 21.05. G2XC remarks that, using a frequency of 56060 kc., he experienced great difficulty in making contacts but on changing to 56220 kc., matters improved at once. One is led to wonder whether operators are being sufficiently careful to search the extreme L.F. end of the band.

D. E. Palin, G6DPP, put up a consistent performance which would have been better if activity had been higher in the north-western part of the country. He used CW exclusively and noted with interest that this mode of operation was employed by nearly all the stations heard—the others probably could not be heard!

The log of David Mitchell, GW6AAP, is smaller than one would expect and again the reason is put down chiefly to low activity, although, since much time was spent in aerial experiments, no great effort was made to work every station heard. A long-wire aerial was employed on this occasion, as opposed to the beam types normally favoured, and proved fairly satisfactory.

The gear used by G3BYP was truly portable and worked well. Two different types of aerial were used with no apparent difference in results. A location different to the one used during the July 9 event, indicated that signals are attenuated in certain directions by neighbouring high ground, even when the station site is in the clear.

G6FU submitted the only entry received from the London area and only one of the eight stations he worked sent in an entry! Seven additional stations were heard, the call of one being given as GW6AP?—strength 449 at 22.30 B.S.T.

New

OSRAM
Z62

A new high gain screened Pentode of exceptional interest

TYPE
Z62

CHARACTERISTICS

Heater voltage ...	6.3 volts
Heater current ...	0.45 amps.
	approx.
Anode voltage ...	300 max.
Screen voltage ...	150 max.
Mutual conductance at	
Ea 300, Es 150, Eg-2...	7.5 mA/volt
Input resistance at 40	
Mc./sec. ...	4,000 ohms.
	approx.

Price 12/6 each

In the T. & R. BULLETIN for August, advance notice was given of a new Osram valve for reception and amplification purposes.

Amateurs will now welcome technical data on this new Pentode, the Osram Z62, which incorporates many outstanding features.

POINTS OF THE OSRAM Z62

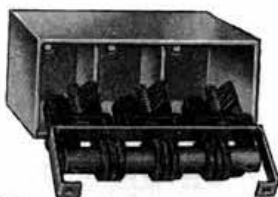
1. The normally long "pinch" is replaced by a shortened design to hold the electrode supports, and results in a great reduction of lead wire length and reduction in lead inductance. This improvement is of real value for short-wave applications.
2. A high mutual conductance of 7.5 mA/volt is achieved at the working point. This means more gain per stage with low impedance anode loading, such as in very short wave circuits or wide band amplifiers.
3. A high ratio of mutual conductance to total cathode current results in an improved signal to noise ratio.
4. Suitable as audio frequency amplifier with high stage gain and low attenuation at the highest audio frequencies.
5. Fitted with "international" octal base—no special socket required.

WRITE FOR TECHNICAL LEAFLET WITH FULL DATA

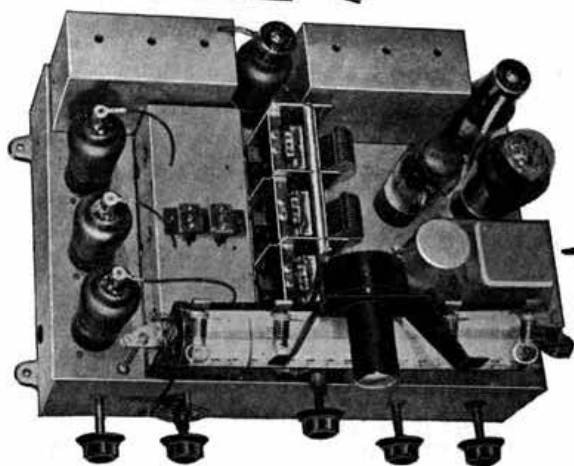
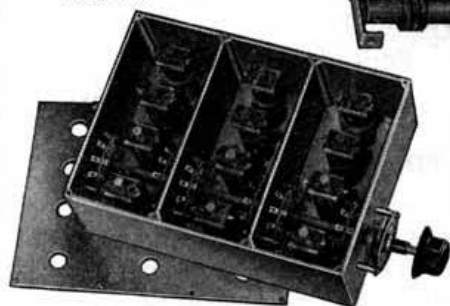
YOUR BLACK-OUT NIGHTS AND ENJOYMENT IF YOU GET ALL-WORLD ALL

CHASSIS AND SPEAKER 21 GNS.

The diecast I.F. unit with integral cast screens, band-pass Litz coils, air trimmer condensers.



The diecast coil unit giving perfect screening, coil rigidity and switch alignment.



No longer will you be restricted to local programmes—if you instal this companionable and thrillingly interesting "EDDYSTONE" Seven-valve All-wave All-world Receiver. Each evening you'll come home to an ever-changing interest—a never-fading appeal—that will rob long evenings of their present dullness and invest them instead with recreational delight.

This "EDDYSTONE" Seven-valve Mains Receiver will give you **HIGHLY INTERESTING WORLD-WIDE RECEPTION**. It has four wavebands, i.e., 13-33 metres, 31-85 metres, 200-555 metres, and 900-2,100 metres, each instantly available (switch selector rotates illuminated cylinder providing separate scale for each frequency). On the short wavebands you will **ALWAYS** find unlimited interest—news from all countries of world events—from countries unaffected by war, interesting official and other communications, American amateurs, special broadcasts, etc. Other features of this outstanding set are special chassis and special coil unit construction, automatic volume control, special intermediate frequency stage, H.F. amplifier, "Magic Eye" for accurate tuning, separate oscillator valve to eliminate frequency drift, tone control output, power pentode valve giving five watts undistorted output, 12" loudspeaker, gramophone pick-up, and external speaker terminals.

In the *wealth* of enjoyment this set *perpetually* gives year in—year out—its cost is negligible—in fact, it offers a saving on what you'd otherwise spend if you hadn't its interest to so pleasantly occupy your time.

IN CHASSIS FORM, 21 GNS. 0/6
WITH SPEAKER

WRITE NOW FOR DESCRIPTION

STRATTON
BROMSGROVE ST

OR TO **WEBB'S RADIO, 14 SOHO ST., LONDON, W.1. 133 NEW ST., B'H**

WILL BE FULL OF INTEREST THIS **EDDYSTONE** E.R.A.7 WAVE RECEIVER

SPECIFICATION.

A 7 VALVE SUPERHETERODYNE circuit for A.C. mains 200/250 volts, 40/100 cycles, 60 watts consumption.

WAVE RANGE. 13-33 metres; 31-85 metres; 200-555 metres and 900-2100 metres with switch selector.

SPECIAL CHASSIS CONSTRUCTION. The chassis is a one-piece aluminium alloy die-casting which gives extreme rigidity to the assembly. Its construction ensures complete freedom from alignment drift.

SPECIAL COIL UNIT CONSTRUCTION. The coil box is also a one-piece aluminium alloy die-casting. Every coil is rigidly held and cannot move. Maximum screening due to die-cast construction. High coil efficiency and reliable switch.

SPECIAL INTERMEDIATE FREQUENCY STAGE. Again enclosed in die-cast box for rigidity and good screening. Band-pass circuit with Litz wound coils and air dielectric trimmers, the latter are positively locked so that the preselected frequency of 465 K/cs. is constantly maintained.

SPECIAL TUNING DIAL. The wavechange switch rotates an illuminated cylinder some 10" long providing a separate scale for each frequency range. Calibrations are in megacycles and metres for the short wavebands and in metres and Station names for the medium and long waves.

SENSITIVITY. The sensitivity is constant and high over the entire waverange. It requires no more than 4 to 6 microvolts to obtain a 50 milliwatt output. Even with this high gain the level of background noise is low.

SENSITIVE AUTOMATIC VOLUME CONTROL specially arranged for efficiency on short waves.

H. F. AMPLIFIER stage which operates on all wavebands. Including this stage there are nine tuned circuits in all.

MAGIC EYE is fitted for accurate tuning.

A SEPARATE OSCILLATOR VALVE eliminates frequency drift.

DOUBLE SMOOTHING. A double smoothing circuit reduces "hum" and extraneous noises to a minimum even on bad supply mains.

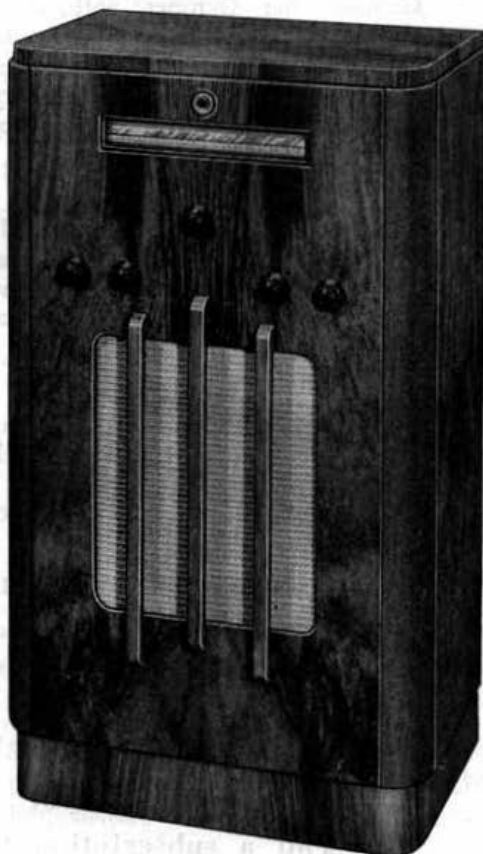
tone CONTROL. A variable control enables tone of reproduction to be adjusted to suit personal tastes.

OUTPUT stage is fitted with a power Pentode valve capable of giving 5 watts of undistorted output.

LOUDSPEAKER. This is a 12" auditorium model moving coil fitted with a special bell diaphragm and has an extremely flat response curve. It is in a class considerably above the average and gives correspondingly good reproduction.

GRAMOPHONE PICK-UP and external speaker terminals are provided.

OAK OR WALNUT CONSOLE
25 GNS.



OR WALNUT CABINET, 25 GNS. 

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The **Wireless World**

To Be Published Monthly

Price 1/-

Commencing October 20th, "The Wireless World" will appear as a Monthly, and with an increased number of pages. Subsequent issues will appear on the 20th of each month. In its new form "The Wireless World" will continue to provide the technical information on all aspects of radio which is desired by engineers, experimenters and others who take a serious interest in the subject.

Additional matter will be included and particular attention will be given to the various phases of wireless development which will be quickened by wartime requirements. To keep well informed it will be more than ever necessary to study "The Wireless World."



After the appearance of this issue, "The Wireless World" in common with other journals will have no copies on bookstalls for casual sale. It will therefore be necessary for you to ask your newsagent to reserve copies for you.

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ILIFFE & SONS LTD., DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1

Experimental Section

Manager: A. M. H. FERGUS, (G2ZC)

WAR! The word may mean many things to many people but to some of our members it signifies Wireless Auxiliary Reserve. Due to Ham Radio and work undertaken of an experimental nature, our Society and Section has been the means of offering a host of operators already skilled and trained in the handling of wireless apparatus to the service of the nation.

To the vast majority of us wireless has been purely a hobby, and while some may argue that in war-time, hobbies should cease, if we examine the case of Ham Radio, there appears to be abundant evidence already just why those who can, should try to carry on the good work, not however in the light of a hobby as such, but of continuing experiments which may be of use to our nation.

In times like the present there are many who will want to be able to "pull down the blind" even as a form of mental rest on more strenuous work, and if they do so by means of wireless, surely if this be directed in solving problems that will be useful to the nation, their work will have been well rewarded.

One of the greatest inventions of the last war was the direct result of "experimenting with a hay-wire contraption"; so can we say we have come to the end of all our problems? Has the perfect receiver been evolved for all frequency bands, do we know as to conditions affecting the bands, so accurately that we can predetermine on what frequency we know which will give us the best results, what has yet to be learnt about 56 Mc. and higher frequencies to give us efficiency near the 100 per cent. mark, and so on?

Experiments along lines like these might be well worth the attention of those members who have the opportunity, for now that brass pounding and rag-chewing has ceased, experiments assume a more national aspect against an individual one, and time devoted to this work may not only help the nation from a scientific point, but will show all nations that we Britons have the will to "carry on" in whatever sphere we can best place our efforts.

Naturally it would not be judicious to publish in THE T. & R. BULLETIN any newly found invention or improvement which might be of value to an enemy, and it is as yet too early to publish our plans for carrying on our E.S., but as the watchword is, and must be "carry on," it is hoped to form even a skeleton section, who will devote what time it can in seeing that Britain can still be supplied if need be with information that may be of use, if not even of vital importance.

The Society and the Experimental Section contains no doubt a majority of younger men, but it must not be overlooked that in the Society are quite a few "veterans," disabled ex-servicemen and the like, whose bodies may not be fit to be put at the service of the State, but that does not mean because of inability of body they cannot put their brains to good use, and it is hoped that those who find themselves "on the shelf" may band together and form and maintain some form of Experimental Section.

Transmitter construction is now shelved, but that does not mean that the last word has been said on

aerials, receivers and propagation problems, so we have a wide field to examine.

Next month we may have something more definite but at the time of writing each group has signified its willingness to try to continue, either individually or under a scheme of the Section becoming one main group.

The nation has expressed itself openly that we are not waging war with the German people, but only with the regime, and we Hams can bear this out, for many a friendship has been made "over the air" which would be resumed tomorrow if Ham Radio had its say in the matter, so in carrying on in our duty to our State, we can still hold the hope that the time will come when the spirit of Ham Radio will spread itself into all aspects of International relations.

Finally, if I may be permitted to strike a personal note, I should like to express my warm appreciation and thanks to Council, the G.M.'s., G.C.'s., and every member of the Section who have done so much to keep E.S. together (not forgetting Headquarters' Staff) and in assisting to foster the "happy family" feeling I set out to encourage when I became E.S.M. To each individual no matter his or her bent of Service, I would like to say "73" and to that add a "darr dit darr."

G2ZC.

Receiver Group

A great effort is being made to continue the activities of the Receiver Group and an urgent appeal is put forward to all members to carry on with their experiments as normally as possible.

No restrictions have been placed on receivers and it is sincerely hoped that many members will turn to this branch of radio, now that transmitting has been suspended. It may be necessary to reorganise the Sub-Groups, but before this is carried out the Group Manager desires to know how many members of other Groups wish to transfer to the Receiver Group and also how many of the present members can still remain active. To save delay and misunderstanding all active members should send a postcard to the G.M. at once, unless they have already notified their Group centre.

To those readers who feel that amateur radio as a hobby must necessarily close down, it should be pointed out that the present state of affairs presents a great opportunity for a return to the technical as distinct from the purely operational side of radio. If amateur radio allows its head to droop, it may never rise again, so keep the flag flying by remaining active and fill in the dark dull evenings with receiver experiments.

G5HF.

From our Post Bag

"May I express my sincere wish for the future success of Council's plans and also my appreciation of their desire to continue not as an organisation only, but to quote the circular "the National Society representing the Radio Amateurs of Great Britain." Yours is, and will be, a hard and perhaps thankless task, thankless not because of any insincerity of the members, but because of their not knowing (not even dreaming) of the countless difficulties you are bound to encounter and will overcome."

2FRX.

Cosmic Notes

By E. J. WILLIAMS, B.Sc. (G2XC)

THE following is a summary of the Cosmic data received since writing the notes for the August issue.

Sunspots

From Tokio the central meridian passage of a large group of spots on August 22 is reported, while personal observations by the writer showed a very large group with C.M.P. September 10 and a large group with C.M.P. September 27. Other smaller groups have also crossed the sun's disc and over 100 individual spots were visible at Tokio from August 6 to 22, the maximum being reached on August 14 when 201 spots in 11 groups were visible.

Large prominences on the sun were reported from Tokio on the following days, July 31, August 1 and 11.

Magnetic Elements

No data has been received from WIXAL (now WSLR) during recent weeks and the following data is taken from Science Service Research Aid Announcements (received by mail). The data is for the period July 18 to August 26. A moderate disturbance of the magnetic elements was recorded from July 20 to 23 and again on July 26. A slightly disturbed period on August 11 was followed by a magnetic storm on the following day beginning at 01.39 G.M.T. Further moderately disturbed conditions prevailed on August 16 and a more severe disturbance began at 21.26 G.M.T. on August 21 continuing through the next two days.

Radio Conditions

The F2 layer vertical incidence critical frequencies at Washington (local noon) for the five Wednesdays beginning July 26 were as follows:—6,300 kc., 8,900 kc., 9,500 kc., 6,900 kc., 5,300 kc. (It should be noted that some of these measurements were taken during periods of magnetic disturbance. See above paragraph.)

A report has been received of extremely poor conditions on short-waves on August 22. This coincided with disturbed magnetic conditions. Short-wave conditions were also poor during the evening of September 17.

The Peto-Scott Preselector

A recent contribution to amateur receivers has been made by Messrs. Peto-Scott, Ltd., with their two-stage Preselector. Use has been made of the new Red "E" series of heptodes EF8 which provide efficient amplification of the signal voltage without raising the noise level of the receiver in the same proportion. The Preselector employs the Peto Scott tuner which embodies no less than twenty coils wired and mounted round a Yaxley type switch.

All frequencies between 0.55 Mc. and 43 Mc. are covered in five stages and the general efficiency of the amplifier is retained right to the high frequency limit.

It can be used with, literally, any receiver from a simple 0-v-1 to a single signal superhet, provided the frequency is common. Some interesting experiments were made by connecting it in front of a

standard "Ham-band two" receiver, for not only was the general signal strength increased by as much as 5 "S" points but selectivity was greatly improved. The results achieved with this arrangement were equal to those obtained with many of the lower priced superhet receivers and for those who do not wish to go to the expense of a Communication receiver, this preselector added on to an existing receiver is an excellent substitute.

The full advantages of the Preselector cannot be judged, however, unless it is used with a communication receiver; here it is invaluable for weak signals where signal strength is so low that the receiver gain is the maximum possible. This always introduces noise and the Preselector boosts the signal in such a way that the receiver I.F. gain can be reduced yet the output voltage of the signal is retained.

This instrument can be recommended to all amateurs as a valuable addition to their receiving gear, no matter how simple or advanced it may be.

G5HF.

The SX24 Receiver

A comprehensive review of the new *Hallicrafter* SX24 receiver has been prepared and this will appear in our next issue. Meanwhile members interested in "a full-blooded communication superhet offered at a reasonable price", to quote our reviewer, should write for full particulars to *Webb's Radio*.

The Wireless World

For the war period our valued contemporary *The Wireless World* will appear monthly in enlarged form at the price of one shilling. The first issue is due to be published on October 20.

"Old timers" will remember that during the last war *The Wireless World*, which at that time was the only British radio journal, continued publication. The new generation of radio amateurs will join us in offering congratulations to the Publishers and the Editor, on their decision to carry on during the present difficult period.

The Short Wave Magazine

We regret to learn that *The Short Wave Magazine* has suspended publication for the time being due to the fact that the technical staff have been called for active service. We understand that publication will probably recommence when the international position becomes more clarified.

Television and Short-wave World

"Electronics, Television and Short-wave World" is the new title adopted for *Television and Short-wave World*.

The World Wide Listener

The World Wide Broadcasting Foundation University Club, Boston, Mass., U.S.A., publish an interesting monthly booklet under the above title. The Foundation transmits programmes over WSLR (formerly WIXAL) on 11.79 Mc. and 6.04 Mc. European test programmes are also radiated on 15.13 Mc. on Tuesdays at 14.00 G.M.T.

WHAT MIGHT HAVE BEEN

WEDNESDAY, SEPTEMBER 20, 1939, scene the Royal Hotel, Woburn Place, London.

"Hullo Bill, how's business." "Fine old man and we expect it will be better still before the week is out. Great idea, the R.S.G.B. running its own radio exhibition."

As the stands took shape we could not help admiring that new range of commercial gear which Webbs had on show, whilst friend Nightingale had surpassed himself with a galaxy of equipment enough to drive us all "commercial." Looking round the centre of the hall we spotted the latest Peto Scott receivers all glittering in the sunshine. Further along we met Teddy Edwards and George Brown, the Stratton stalwarts carefully unpacking a "new sensation." Around the side walls our old friend Ernie Dedman was setting up his special display showing how quartz crystals are made, and almost next door we found Dennis Heightman preparing a super display of Denco parts. Peter Bradley representing Hamrad had his work cut out to fit in even half of those useful components for which his firm are famous. Eddie Read, too, had a superb display of interesting items, including a first class frequency meter of new design.

In spite of the intrusion of American valves, the General Electric Co. were there in force to show us that British valves are made to last. The meter industry represented by Taylor Instruments showed the latest advances in measuring equipment, whilst Percy Voigt, a real old timer, was preparing to prove, as he has done to our knowledge since 1920, that there is more in audio work than meets the ear.

As we looked round the stands during the day before Convention opened, we could not but help thinking that here was an exhibition unique in character, created for and built up by radio amateurs, men who had given of their best in time and money to place Great Britain among the leading "ham" nations.

Thursday, September 21. Bustle and whirl until just before 11 a.m. and then that quiet which precedes every moment of expectancy. Our President accompanied by members of Council and prominent representatives of the trade, assemble on the dais and as eleven o'clock struck Mr. Watts, in a few well chosen words, declared Convention and our first exhibition open.

Representatives of the fighting services, and the Post Office who had been invited to attend the opening were among the first to congratulate the trade upon the remarkable progress made in the manufacture of apparatus designed to meet the requirements of radio experimenters.

Throughout the day crowds of members thronged the stands, and from reports received business was more brisk than anticipated.

As evening came, groups of members fresh from their visits to Dollis Hill, the B.B.C. and elsewhere joined the gathering, renewing old and making new friendships.

Friday, September 22. Brilliantly fine autumn weather brought hundreds of members to the Royal. Moon's Garage opposite was doing a roaring trade

as car after car unloaded its contingent of "call signs." The advantages of holding Convention within one building were patently apparent for informal groups were to be found in every nook and corner of the tea room and bar, whilst the stand attendants were labouring under a pressure unsurpassed at any R.M.A. exhibition. The technical knowledge of those "running" the stands was highly appreciated, as was the galaxy of free technical literature which did not go into a paper bag to be dumped later!

As the witching hour of 6 o'clock approached the coach parties from Tatsfield and Slough unloaded at the door. All was set for a bumper conversazione. To the strains of sweet melodies "put over" by Voigt Reproducers Ltd., the company numbering some 300 members with their wives settled down to their annual ragchew. Following the excellent running buffet, the first rounds of a code contest were staged, after which technical talks were given by G2NH and G6DH. The ensuing debates showed how popular were the subjects dealt with, namely, frequency control and ultra-high frequency development.

Although officially timed to finish at 10.30 p.m. Dame Rumour has it that Convention only really commenced at midnight. How many members actually stayed at the Royal we do not pretend to know, but from all accounts very few of them saw their bed until the wee small hours.

Saturday, September 23. Convention Saturday has always been the high spot of our annual event, but this year all previous records went by the board. The Experimental Section Meeting, the D.R.'s. Meeting, the photograph (who has the full set from 1926?) the presentation of trophies, Presidential greetings, the lecture, informal tea and ragchews were only a prelude to the dinner. Space does not permit more than a brief reference to this, the chief event of Convention, but we know that the dinner was the biggest and best ever. The "swindle," always a popular feature, was even more eagerly awaited than in the past, for the display of gear donated by our friends in the trade had set everyone anticipating, long before the first number was drawn.

AND THEN WE WOKE UP.

From our Post Bag

"I understand the chap who is responsible for collecting the gear from G5... is in a bit of a quandary. He is wondering if it might not be easier to move the house into storage."

"I fully agree with Council's point of view that future approach to the authorities must be made by a fully representative society, and I congratulate the members in the choice of an executive possessing such foresight."

G6KS.

"I think it is absolutely essential that amateurs should continue as an organised body, because we shall, no doubt, find some difficulty in obtaining transmitting facilities when hostilities are over."

G6CX.

THE MONTH "OFF" THE AIR—September, 1939

By ARTHUR O. MILNE* (G2MI)

WELL fellers! "Here's a nice old how de do!" as our friend Syd Walker would say. The deserted shack is like having a corpse in the house and the cards on the wall a mere mockery. We can only hope that the European scrap will soon be over so that we can get back to a civilised way of life again.

With our transmitter silent we must still try to spread the Ham Spirit amongst our fellow-men for it is certain that if this spirit were to pervade mankind in general, there would be no more wars.

Will those old chums who can find the time, please write in to the scribe of this 'ere feature (sorry Syd) and tell us their news, as much that is, as will pass the Ministry of Information! Those who are still at home remember you have, or should have, your receiver, so keep an ear on our bands and tell us what you hear. A word here to any member who has had his receiver confiscated. Write in to the G.P.O. at once and ask for its return.

Amidst the present turmoil, it is heartening to find one country within the Empire whose amateurs are still working, namely South Africa. The ZS boys are doing good work on 28 Mc. in the early evenings. Fortunately, so far the war has not been used as an excuse to flood our bands with commercial signals and there is still plenty of activity both in Europe and other parts of the world. Ten minutes

on 14 Mc. produced signals from OZ, HA, I, LA, SM, CP, KA, W, ZS, PY, LU and EA. The latter appears to be a newly licensed station, EA5A.

The YR's, LA's and OZ's are having the time of their lives working all the DX. In fact only the British and French Empires, the Germans and Belgians appear to be off the air. Belgian Congo is active, so the disappearance of ON signals may be only apparent. OQ5AB was an S9 signal on 28 Mc. 'phone at 17.00 G.M.T. on September 17, working W's who were inaudible here.

The W's have a real moan, especially those with about 75 countries confirmed; as one put it the other evening, "How the heck can we get DX Century with the British Empire off the air?"

A curious effect has been noticed in the mornings when a few fluttery east coast Americans can be heard working the west coast with apparent ease; the band being dead here except for these few very watery W2 or W3 stations. This was very marked on the 17th.

Those who worked CR4MM will be glad to know that the cards are coming in O.K.; also those from MX1A. Talking of cards, the QSL Bureau is now at G2MI and it is really heartbreaking having to destroy cards such as U6ST, MX1A and CR6AF just because you fellows won't collect them. The QSL Bureau is full up with stamped envelopes belonging to people who never seem to receive any cards and with cards for folk who never send any envelopes. Now, all who see this, please send at least one envelope if you expect any cards or think you may not have any envelopes at the Bureau. G3JR has performed a minor miracle by securing a card from U8IB, so there may be hope for others; and that reminds us, don't refer to yourselves as ex-G4 this and ex-G8 that. Keep your peckers up! Your licences have only been suspended, not cancelled. The big book of calls at the G.P.O. hasn't been burnt as some of the more pessimistic of you seem to think.

Well, this month's effort is practically a one man affair, so help us out next month with a few letters. G6WY is in the R.A.F. and telephoned us recently from somewhere near London. G2ZQ is in the Midlands, also R.A.F. and is already trying to organise an R.S.G.B. "get-together" amongst the many Hams at his aerodrome. This is a splendid idea, as is the recommendation always to have a few of your QSL cards in your pocket.

G2IG still finds time to continue construction of his receiver. This is now nearly finished and is a marvel of ingenuity and workmanship. To watch it tune up and down the bands under its own power is almost uncanny. By an arrangement of cams, clutches, sprockets and control spring-sets, etc., etc., it can be set to tune backwards and forwards across any part of the band from a matter of 500 cycles to the full band width.

The 28 Mc. band is now opening up. South Africans have been coming through since the beginning of the month and the first W's were heard on the 23rd. On the evening of September 29, the band was wide open until after 20.00 G.M.T., and U.S.A. 'phones were as strong as at any time

D.X. PERSONALITIES—No. 4.



The cheery countenance of Rene Lebon (F18AC) who has assisted many a Century Club aspirant to his goal with an ever ready QSL.

* 29 Kechill Gardens, Hayes, Bromley, Kent.

last season. What irony having to listen to "CQDX" from the west coast without being able to call back "ur 'fone R9!"

With no key punching to do, quite a lot of time has been spent on the short-wave broadcast bands, especially listening to the American stations WGEA and WNBI, our old friends W2XAD and W3XL. The announcer at WNBI made us smile the other day when, after giving a resumé of Hitler's speech at Danzig, said "and now the boys will play you that old favourite 'You take my breath away'!"

CP4ANE is putting in a nice signal on 14 Mc. around 22.00 G.M.T., but that is only rubbing it in, isn't it? G8IG has had his card from FF3Q, returned marked "unknown."

Our old friend LZ1ID is still active on 14 Mc., whilst XU8ZA is putting over a very good 'phone signal on about 14,060 in the late evenings. His address is Box 685, Shanghai, the same as XU8MI and he answers to the name of "Sandy." The rig is 150 watts to a doublet.

Well, as space, like most other things, is rationed this month, this feature must be cut short. Keep cheerful and remember there are plenty of people keeping our bands open for us. Let's hear from you. The more the merrier. 73 till November.

The 28 Mc. Band

By NELLY CORRY (G2YL)

It has been decided to carry on with these Notes for the present, and an appeal is therefore made to all who still have the time and opportunity to listen on 28 Mc. to send in brief reports by the 28th of each month. Now that the majority of amateur stations in the Eastern Hemisphere are closed down it will obviously be impossible to give a very comprehensive account of conditions, but it is hoped that even a few paragraphs will be of some interest to readers—now and in the future.

Thanks are due to BRS3003 and BRS3179 for their reports covering September 10 to 30, from which it appears that conditions gradually improved as the month went on, and were unusually good during the last week. No signals at all were heard from Europe or Asia, due presumably to reduced activity, though W's were heard working a few Scandinavian and Italian stations.

From Oceania, K6MVX and K6NVA were heard by BRS3179 on September 29, and K4ILB on the 30th. No less than 26 South African stations, and OQ5AB and OQ5AE were logged during the month, and some came through every evening, usually around 15.30 G.M.T. or later. The majority were working U.S.A. on 'phone, and ZS2AH, the most outstanding station, was heard by BRS3003 to say that he had had 387 W contacts in 10 days!

A few South American signals were logged on six days, and included CE3AG, LU4BH, LU7AG, PY1FN, PY2ED and YV5AK. Farther North, K4EZR, 4FKC, 4FOW and TI3AV were heard on and after September 22. W's were inaudible or rare on a good many days, and it was only on September 25, 27, 28 and 29 that all nine districts were heard. BRS3179 brought his number of countries logged on 28 Mc. up to 103 by hearing K7FDE and K7GTP on September 29, the same day that he also heard K6.

The hissing phenomenon was heard by BRS3003 for short periods at 15.46, 15.55 and 16.12 G.M.T. on September 22, and at 16.22 G.M.T. on the 25th.

The 56 Mc. Band

By CONSTANCE HALL (G8LY)

THE writer hopes to be able to produce each month ultra-high frequency news, however scant, in order to keep alive interest in this aspect of experimental work. It is unlikely that much time will be spent listening on 56 Mc. or above, but with 28 Mc. opening up it may be worth while "having a peep" on 56 Mc. in the hope of a DX signal being heard. We shall be glad to publish any reception reports sent in by members.

Extracts from Previous Reports

G6DH recorded in a report last June that even then, although the sunspot maximum had passed, we were still getting short skip summer conditions; this seems to indicate that these conditions do not follow the same course as winter conditions which have dropped off very considerably in the past two years.

G5HF commented recently that he was interested in the influence of rain on 56 Mc. When he worked G6TL (10 miles) signals were S7-8 both ways, but whenever heavy rain was falling the strength dropped to as low as S1-2 at both ends. This effect was independent of the state of dryness of the aerial insulators because the signal strength returned to normal the moment the rain stopped. This in itself he says is not unique, but the puzzling part is that no other stations were affected in the same way.

G5MQ mentioned that he had built a superhet which works very well. This consists of a 954 HF, 6K7 electron coupled frequency changer, two 6K7's in tuned anode I.F. on about 50 kc., or thereabouts, 6F8C twin triode, first half as second detector with reaction, second half used as audio, and a 6C5 beat oscillator. Now here is the point of interest—normally the I.F. coils are damped by resistances in shunt, but if these are removed the I.F.s can be made to ride almost into oscillation; this lifts the magnification very considerably, and at the same time reduces ignition interference a great deal, presumably by lengthening the apparent duration of the cracks so that they merge into an almost steady hiss. This slightly modulates D.C. signals but is preferable to the terrific cracks from ignition.

G8OS reports that the last notes in his August log were to the effect that temperature extremes were present each day when conditions were good.

It might be advisable to remember that really good conditions on 56 Mc. are not anticipated for several years to come, and therefore, although transmitter design, and in many cases that of receivers as well, will be retarded, the lack of active transmitting may be a blessing in disguise to those who have in the past burnt the candle too late and too often!

The writer will be pleased to hear from any member interested in U.H.F. problems. Please forward results of tests, ideas and queries; in fact anything that may be of interest to readers.

Stray

Lieut. J. R. Farr (VU2JG) sends greetings and thanks to the many G's who helped him in the past by standing-by for experiments and in other ways. He hopes to meet them all again on the air in the not too distant future.

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 (See review in this issue.)



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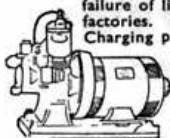
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Swansea members wish to record thanks to Council for the decision to carry on the work of the Society, and in particular for deciding to continue publication of THE BULLETIN.

On August 27, several local members, including 2WO, 3AX, 3UO, 6JW and 8HI, paid a visit by pleasure steamer to Ilfracombe. After lunch the party called upon Mrs. Myler, G3GH, who had also in the shack 8US and 8TK. A very enjoyable time was had by the party.

GW3AX will welcome notes from any member in South Wales for publication in future issues of THE BULLETIN.

* * *

Mr. E. J. Dell, GW2UL, of "Morlais," Dowdeswell Place, Upper Loughor, is anxious to arrange local meetings. Members interested are invited to write signifying their support.

DISTRICT 12 (North London)

Arrangements have been made for meetings to take place during the coming autumn and winter in members' homes. The first of these "fireside chats" has been fixed for Sunday, October 29, at G6CL, 16 Ashridge Gardens, N.13. Nearest station Arncliffe Grove. Buses 34 and 244. Meetings will commence at 3 p.m. Several other members including G5FA, 6OT and 8TY have agreed to hold meetings at their homes during the season. G3SH, 8 Alwyne Road, Canonbury, will be glad to give a lift to any member in his locality who wishes to attend the meeting at G6CL (Telephone: Canonbury 2974.)

It is hoped that members in Welwyn, Watford and North-east London will follow the North London lead and arrange meetings at weekends.

Welcome is extended to Peter Pennell, G2PL, who has joined the District from Cambridge.

G5FA is now located during the week at Hotel de Paris, Bray, Berks, but returns home at alternate weekends.

Keith Adams, G5NM, and Jim Kirk, G6ZO, have joined the services as has Frank Adams, G2YN, late of Welwyn.

G5QF from his Ware Park "home" sends greetings to all old friends and asks us to record his thanks to those who contributed to his recent presentation.

Recent visitors to G6CL have included G2GO, 2PL, 5JU, 6PA, GM6TT, 2 WV and 5FA. Now that R.S.G.B. temporary office is at his home he tells us that visitors will always be welcomed.

Word reaches us that Mr. Pope, G3HT, intends to keep alive the Edgware Society, but no details of meetings have yet been announced. Members in Mill Hill and other North West London areas are asked to support Edgware Meetings.

G5FA.

DISTRICT 15 (London West, Middlesex and Buckinghamshire)

This past month has reduced us to a forced inactivity which we can only hope will not be for long. The D.R. is making arrangements for a meeting with the T.R.'s. to discuss the reopening of District meetings which it is anticipated will be fixed to take place either on Saturday afternoons or Sundays.

As far as is known the Hayes T.R. (G8FA) is serving with the militia, 3MI is with the R.A.F., 4AR and 4FS have probably been called to the colours while 3UQ is expecting to go on taxi-trailer work. G2TJ and 8KZ are both on A.R.P. duties.

The Edgware Radio Society is understood to be carrying on so members in that vicinity are catered for. The High Wycombe group also proposes to keep things going and members expect to run local meetings on Sunday mornings. The D.R. has already asked the T.R.'s. to carry on with local meetings as much as possible pending further arrangements.

G6WN.

DISTRICT 16 (South Eastern)

In the absence of direct news from the D.R., Mr. W. H. Allen, G2UJ (who is serving with the R.A.F.), we are pleased to publish extracts from a report received at H.Q. from the Gravesend T.R., Mr. R. Martin, G2IZ.

The Gravesend Society has decided to reduce its activities, as many members have been called for service. It has been arranged to hold meetings at members' houses, and Morse classes will continue from the homes of the T.R. and the Secretary of the club.

Sympathies are extended to G5SI upon the loss of his father.

DISTRICT 18 (North and East Yorkshire)

Scarborough.—All members are still in the town, with the exception of G2CP and G8KU who are with the Navy. The Scarborough Short-wave Society has been compelled to give up its club-room and to disband, as with the cessation of operating there was insufficient interest to occupy weekly meetings.

All members have had visits from the G.P.O. and major portions of their apparatus have been taken away. At the time of writing receipts are being sent by post for the goods in "free storage."

It was noted that the beginning of hostilities coincided with exceptionally good conditions on the 28 Mc. band around 20.00 G.M.T. However, the sunspot cycle should cause a change in this band long before the resumption of amateur licences.

The District offers best wishes and encouragement to those at Headquarters who are endeavouring to carry on THE BULLETIN and the work of the Society.

G5MV via G6TG.

Appreciations

Sub.-Lt. L. E. H. Scholefield, G5SO, wishes to thank the Northern Ireland Amateurs who extended a warm welcome to him whilst in Belfast.

Laboratory Assistants Wanted

The Signals Experimental Establishment, Woolwich Common, London, S.E.18, are desirous of engaging a number of Laboratory Assistants. Candidates should be between 16 and 18 years of age or 25 years and over. The rate of pay is 30s. to 70s. per week, depending upon age and capabilities.

Members interested should write to the Superintendent at the above address.

On Active Service

We publish below a first list of members who have notified us that they are serving with H.M. Forces.

Additions should be sent direct to the Secretary-Editor, 16 Ashridge Gardens, London, N.13. The following particulars are required:—Rank, name, regiment or branch of the service, pre-war call sign or B.R.S. number.

Rank and Name	Regiment or Branch	Pre-war Call or B.R.S.
Corp. F. C. Adams ...	R.A.F. ...	G2YN
A.C.2 K. Adams ...	" ...	G5NM
Lt. C. W. Andrews, M.C.	R.C. of Signals	G2TP
2nd Lt. H. Atthill ...	" "	G8CV
Lt.-Col. R. W. Bailey ...	" "	G2QB
L./Tel. (A.G.) J. Banner	R.N. ...	G3ZV
Sig. H. M. Campbell ...	R.C. of Signals	G8MK
— T. M. Carter	" "	G4DD
A.C.2 J. R. Christophers	R.A.F. ...	BRS.
		3051
F./O. W. Craig ...	" ...	GM6JJ
A.C.2 H. C. Doherty ...	" ...	G4HP
A.C.2 V. J. Flowers ...	" ...	G8QM
2nd Lt. D. L. Flower ...	R.C. of Signals	G8TO
A.C.2 F. E. Gay ...	R.A.F. ...	2BIH
— J. D. Gillies ...	R.C. of Signals	2FZT
Corp. P. Halligey ...	R.A.F. ...	G8PI
Lead./Tel. M. J. Heavyside, B.Sc.	R.N. ...	G2QM
A.C.2 E. Henman ...	R.A.F. ...	G6HM
2nd Lt. S. Higson ...	R.C. of Signals	GW2PH
W.E.M. F. Hill ...	R.A.F. ...	2FZI
2nd Lt. J. E. Holding ...	R.C. of Signals	G4AS
P./O. J. Hunter ...	R.A.F. ...	G2ZQ
S./Ldr. D. V. Ivins ...	" ...	BRS.
		3509
F./O. C. A. Jamblin ..	" ...	G6BT

Rank and Name	Regiment or Branch	Pre-war Call or B.R.S.
Lt. R. H. N. Johnston...	R.N. ...	G2ZP
Tel. T. C. R. Littlemore	" ...	G8AX
2nd Lt. A. M. R. Mallock	R.C. of Signals	BRS.
		3426
A.C.2 E. J. Napier ...	R.A.F. ...	G8FA
Capt. E. Y. Nepean ...	R.C. of Signals	G5DN
A.C.2 A. C. A. Newman	R.A.F. ...	2FIX
A.C.2 R. F. H. Nicholson	" ...	2DOH
P./O. H. C. Page ...	" ...	G6PA
Lt. T. B. Paisley ...	R.A. ...	BRS.
		3375
A.C.2 W. G. Pyke ...	R.A.F. ...	G6PK
L.A.C. O. Read ...	" ...	G2FP
Gnr. G. M. Reston ...	R.A. ...	G8CH
A.C.1 V. Richardson ...	R.A.F. ...	G4MG
A.C.2 E. R. Rickett ...	" ...	G3PV
L.A.C. C. J. Rockall ...	" ...	G2ZV
Major F. Rodman ...	Worcestershire Regiment	G2FN
A.C.2 J. W. Russell ...	R.A.F. ...	G2ZR
SubLt. L. E. H. Scholefield	R.N. ...	G5SO
Lt. E. Shackleton ...	R.C. of Signals	G6SN
Sig. R. G. Shears ...	" "	G8KW
— H. O. Sills ...	" "	G8OZ
Spr. R. G. Smith ...	R.E. ...	BRS.
		2947
A.C.2 L. F. Steel ...	R.A.F. ...	2BBI
Cpl. R. G. Street ...	" ...	—
2nd Lt. J. W. Swinnerton	" —	G2YS
L./Sgt. L. J. Thomas ...	A.A. Training Batt'n.	Ex-VU2FX
L./Bdr. J. D. H. Turner	R.A. ...	BRS.
		642
A.C.2 E. Wake ...	R.A.F. ...	G5RP
2nd Lt. D. M. Whitehouse	R.E. ...	G2YV
P./O. H. A. M. Whyte ...	R.A.F. ...	G6WY
Sgt. R. C. Wilkinson ...	" ...	G4HW
P./O. G. L. Zech ...	" ...	GM8TT

AROUND THE EMPIRE

Mr. MacKenzie, VK4GK, our representative in Queensland, informs us that VK licences were determined by telegram on the morning of September 2.

No official news concerning W.I.A. has yet been received but we join VK4GK in expressing the hope that for the future of amateur radio in Australia steps will be taken to carry on the work of the Institute.

* * *

No direct communication has come to hand from the N.Z.A.R.T. or S.A.R.R.L. but we gather that New Zealand licences were suspended on or about September 2. Up to the beginning of October, however, South African stations were known to be working.

Canadian amateurs went off the air at about the same time as the other Dominions.

* * *

Mr. J. McIntosh, VS1AA, writing from Malaya on August 31 reports that their licences were suspended first on August 26, but permission to start up again was received the following day. We assume that later, in common with other British Colonies, amateur licences in Malaya were withdrawn.

New Members

HOME CORPORATES

- C. SCOTERN (BRS3700), 3 Albert Street, Radcliffe, Lancs.
 N. E. WHITE (BRS3701), 14 Cranmere Road, Higher Compton, Plymouth.
 J. M. HARDY (BRS3702), Municipal General Hospital, Moorgate, Rotherham.
 J. ALLEN (BRS3703), 38 Grosvenor Street, Radcliffe, Lancs.
 R. W. ROBERTS (BRS3704), 14 Well Street, Ruthin, Wales.
 F. L. LEACH (BRS3705), 38 Wellington Street, Gloucester.
 T. W. B. LAMBERT (BRS3706), "Evergreen," Old Lane, Bramhope, Leeds.
 G. H. WOOLNER (BRS3707), 35 New Road, Wood Green, N.22.
 C. S. BURNHAM (BRS3708), "Vara," Egremont Promenade, Egremont, Wallasey, Cheshire.
 A. A. HORDERN (BRS3709), Drummoyne House, St. Martin, Jersey.
 C. A. BIRTS (A), Glebe House, Fourth Avenue, Worthing.

DOMINION AND FOREIGN

- G. J. EGGART (W4EPT), 311 W. Gadsden Street, Pensacola, Florida, U.S.A.
 J. C. DE GIORGIO (BERS478), 225 Strada Mercanti, Valletta, Malta.
 J. P. CARLYLE-BELL (BRS479), Chief Engineer's Office, Gold Coast Railways, Takoradi, Gold Coast.

G3PV

Eric Ricketts, G3PV, who is serving with the R.A.F. would like to hear from old friends. Letters can be sent via Headquarters.

Band Pass Filter Crystals



(See article in this issue of the BULLETIN by E. L. Gardiner, B.Sc.)

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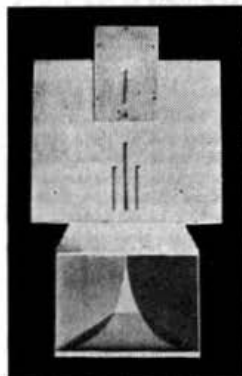
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HEADQUARTERS CALLING

Changes of Address

During the past month, Headquarters has, as anticipated, been inundated with changes of address. When an address is only temporary it will assist us if that information is given. In the case of members in the Services who may frequently change their address whilst in the British Isles, we recommend that their private addresses be retained for correspondence. Arrangements can then be made domestically for THE BULLETIN and other notices to be re-directed. Providing re-direction is made the same day no extra postage is needed on the wrapper or envelope.

Thanks

Our thanks are extended to the editors of *Wireless World*, *Practical Wireless* and *Electronics, Television and Short-wave World* for their several kind references to Council's decision to carry on the work of the Society. For our part we can but express the hope that our members will continue as in the past to support the radio press by placing regular orders for delivery of their favourite periodicals.

T. R. Elections

Council has decided not to hold T.R. elections for the year 1940, but all D.R.'s are asked to make nominations for towns in their area. Where a D.R. is known to be on active service responsible members are invited to offer their services direct to Headquarters.

The Council hopes that as far as possible the 1939 T.R.'s will remain in office.

Last British Calls

We are informed by the G.P.O. that G4QS was the last British call issued before the war. One or two calls, including G4RW and 4RX were, we understand, issued out of sequence.

Our September Issue

We apologise for the late delivery of the September issue but as members will appreciate we could not give instructions to our printers until after Council had made its decision to carry on.

It is hoped that as from the November issue publication will take place on or about the 15th of each month.

Air Ministry Announcement

It may not be generally known that civilians with high technical qualifications may still apply for commissions to serve as Signals Officers in the Royal Air Force. Applications, marked "For the attention of Signals 1(A)", should be sent to the Under-Secretary of State, Air Ministry, London.

Acting Hon. Treasurer

Due to the fact that Viscount Carlow is on active service, Council has appointed Mr. H. A. M. Clark, G6OT, acting Hon. Treasurer for the remainder of the current year.

Back Issues

It is essential during war-time that no more copies of each issue of THE T. & R. BULLETIN be ordered than are absolutely necessary. In past years members have allowed their subscription to lapse for several months and then asked to be brought up to date. This has generally been possible but under present conditions, where paper must be conserved, and storage space is valuable, we cannot load Headquarters with big stocks of back issues on chance.

Members will greatly assist us by renewing their subscription promptly thereby making sure that their copy of THE BULLETIN arrives regularly each month.

QSL BUREAU

MEMBERS are asked to note that the R.S.G.B. QSL bureau is now being managed by MR. A. O. MILNE (G2MI), 29 Kechill Gardens, Hayes, Bromley, Kent.

General Circulars

For reasons of economy and in order to lighten the burden of work at Headquarters, Council has decided to suspend for the time being the issue of a monthly General Circular to D.R.'s and T.R.'s. It is anticipated that the majority of matters dealt with by Council will be recorded as topical information in this journal.

QST Subscriptions

Due to the alteration in sterling exchange, we have been compelled to raise the QST subscription rate from 12s. 6d. to 15s. per annum. Members who have, in the past, subscribed direct to the A.R.R.L. or have purchased copies from booksellers would be well advised to pass their order through the Society in view of the present difficulty of sending money out of the country.

B.R.S. Numbers

Members who have possessed call signs may, on application to Headquarters, be issued with a temporary B.R.S. number.

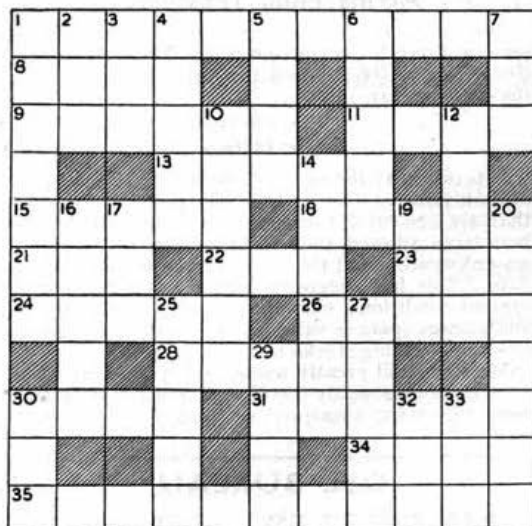
All new members will be given a similar number irrespective of whether or not they held a full or A.A. licence prior to joining the society.

Stourbridge & District Society

The above Society has suspended meetings until further notice, but Mr. C. V. Whitaker G3UK, 12, Terry Street, Dudley, Worcestershire will be pleased to hear from members, and will endeavour to put them in touch with one another.

A "HAM-RADIO" CROSSWORD

Prepared by H. BRABROOK (G5ZD)



CLUES

ACROSS.

1. Aerial array (4, 3, 4).
8. Everyone is not direct at heart (4).
9. Supply power (6).
11. We used to hear a lot of valves being this (4).
13. Loops with anti- before (5).
15. Whether single or double it denotes the termination (5).
18. Xs, perhaps (5).
21. Fair DX, this (3).
22. Character (3).
23. If an "SP" this did it would be fine (3).
24. Don't try to this a march by working off the edge of the band (5).
26. Many such help towards the "Century Club" (5).
28. With 50 off this would sound like 8 (5).
30. You can get withered from false repugnance (4).
31. Harvester of DX? (6).
34. Be delirious with final greeting (4).
35. Kill code pun (anagram—4 and 7).

DOWN.

1. Transmission lines (7).
2. Slack but go round it for a baby too (3).
3. Short tension here—low or high (3).
4. In in the (5).
5. It's annoying to be this a card (4).
6. An animal is at the root of a singer (5).
7. It's nice to find that both ends have (3).
10. Take first steps (6).
12. Lucifer or safety device (especially if curtailed) (5).
14. Allure from a "CE" nite (6).
16. Chemical (5).
17. Give AR for love (3).
19. Residence in Va. (3).
20. All calls should be this (7).
25. Should be avoided for high efficiency (1 and 4).
27. Witty and suggests National Service (5).
29. Therefore (4).
30. I'd add for no blanks (3).
32. Lip up (3).
33. Palindromic woman (3).

N.B.—The figures in parenthesis after the clues denote the number of letters in the word(s) required.

(SOLUTION NEXT MONTH)

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G6DS.—Known the world over for quality. QSL Cards and Log Books. Send for samples. —QRA, 14 Lambley Avenue, Mapperley, Nottingham.

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