

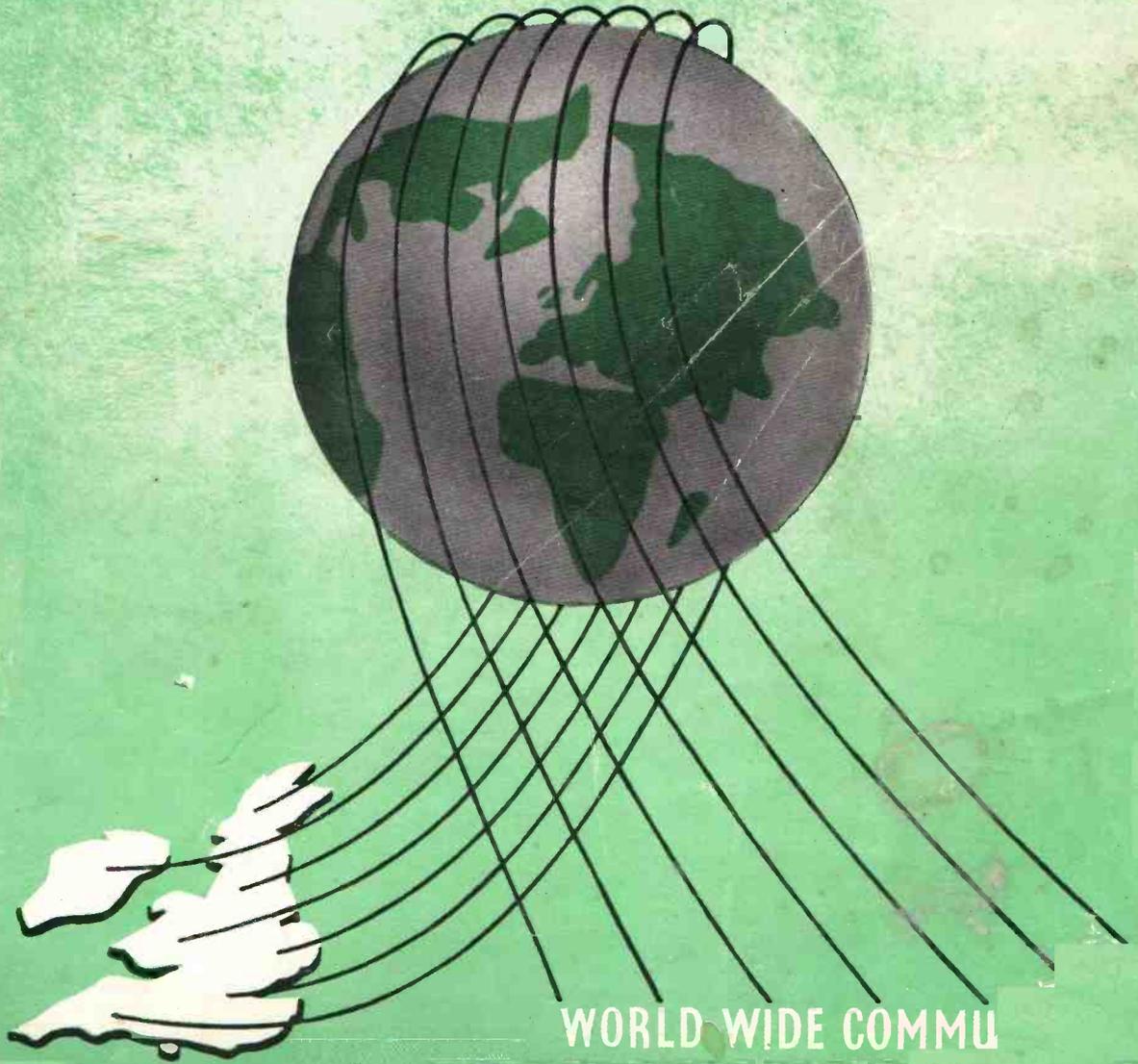
The
SHORT WAVE
Magazine

21-

VOL. XI

JUNE, 1953

NUMBER 4



WORLD WIDE COMMU

H. WHITAKER G3SJ

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VALVES. 6Sg7, 6SS7, 6SK7, 6K7, 6AB7, 7/6. VMS4 7 pin 4/-, 6D6 8/-, 12SH7 5/-, VP4B 10/-, EF80 17/6, Z77, UF42, UAF42 17/6, 6AC7 8/-, 7Q7 6/-, 6SA7, 6L7, 8/-, ECH3 15/-, X150 10/-, UCH42 16/-, X24 7/6, 1R5, 1T4, 354, 3V4 8/6, 6J5 5/-, 6C8 7/6, 12C8 5/-, L63, H63 7/6, TDD13c 8/-, D63 8/-, 9004 4/-, 6H6 3/-, 6N7 8/-, 6F7 7/6, 6B8 6/6, 12J5 3/-, 12SL7, 12SR7, 12AH7 5/6, 6AL7 9/-, 6Q7gt 10/-, 7193 2/-, 866 20/-, 836 17/6, VU29 30/-, 1W4-350 8/-, 6X5, 5Z4, 25Z4, 35Z4, 80, 5Y3, 5U4 10/-, VU111 2/6, 24/- doz. RK72 3/-, CV235, CV187 8/-, YR105 10/-, 813 90/-, T200 60/-, 6AK5, 8/6, 832, 30/-.

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A wide range of resistance measurements can be made using internal batteries, separate zero adjustment being provided for each range.

It is of importance to note that this model incorporates the "AVO" automatic cutout for protection against inadvertent overloads.

Size : 8½ in. x 7¼ in. x 4½ in.
Weight : 6½ lbs. (including leads)



The following accessories are available to widen still further the ranges of the instrument:- A Resistance Range Extension Unit to extend the limits of measurement from 0.025 ohm to 200 MΩ, a 10kV D.C. multiplier and a number of A.C. current transformers.

| D.C. Voltage | D.C. Current | A.C. Voltage | A.C. Current | RESISTANCE |
|--------------|--------------|--------------|--------------|--------------------------|
| 2.5V. | 50µA. | 2.5V. | 100mA. | First indication 0.5Ω |
| 10V. | 250µA. | 10V. | 1A. | Maximum indication 20MΩ. |
| 25V. | 1mA. | 25V. | 2.5A. | 0-2,000Ω |
| 100V. | 10mA. | 100V. | 10A. | 0-200,000Ω |
| 250V. | 100mA. | 250V. | — | 0-20MΩ |
| 1,000V. | 1A. | 1,000V. | — | 0-200MΩ |
| 2,500V. | 10A. | 2,500V. | — | |

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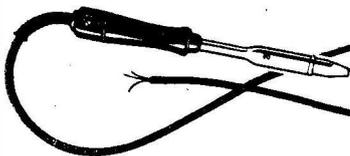


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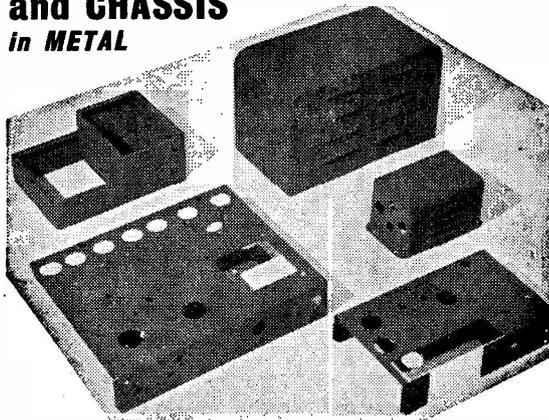
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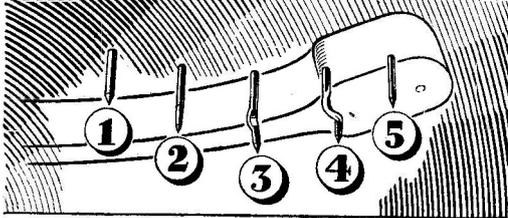
AERIAL MASTS. Consist of two sections of stout all-weather resisting paxolin tubing, each 7ft. long x 1 1/2 in. wall and respective dia.'s of 1 1/2 and 2in. The sections plug into each other by means of metal ferrules. Guy ropes, etc., not provided. Suggested uses: Field days (total weight only 5lbs.) or fixing to chimney stack for permanent use. PRICE 18/6, carriage 2/6.

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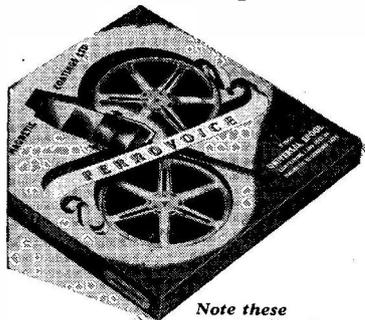
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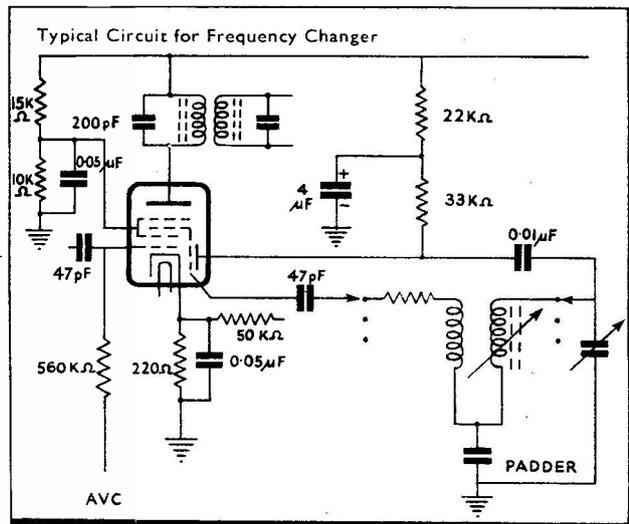
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The
SHORT-WAVE
Magazine

C O R O N A T I O N

The great event in which Britain, the Commonwealth and a large part of the free world has recently joined marks the opening of the New Elizabethan Era, with all that it could mean for the peace, prosperity and happiness of the English-speaking peoples.

Nobody who saw our young Queen on her Coronation Day can fail to have been deeply moved by the poise, dignity and charm with which she accepted the homage of the people as she assumed her great inheritance. For her, it means much self-sacrifice and a rigorous daily routine of duty in the service of the Commonwealth, to a degree which many of her subjects do not appreciate and very few would tolerate.

But we may be sure that once again the Crown is in safe hands and that Her Majesty Queen Elizabeth II, sustained by the affection of her peoples and the devotion of her counsellors, will add to the lustre brought to it by her distinguished predecessors.

HER MAJESTY
QUEEN ELIZABETH II

*May Her Reign Be Long, Happy and
Prosperous*

Miniature Wide-Band Couplers

DESIGN & CONSTRUCTION

B. J. P. HOWLETT (G3JAM)

We have previously published data on the home-construction of wide band couplers—see SHORT WAVE MAGAZINE, July 1951. But this is the first description of miniaturised components for the intermediate stages of transmitter assemblies, suitable for low power working over all bands 1.7 to 28 mc. Our contributor gives full details, as well as a set of curves showing the resonance characteristics to be expected.—Editor.

ABOUT a year ago, before the writer was licensed as a transmitting amateur, he chanced to examine a bandpass-coupled Table Top rig. This particular job suffered from the fault (very common, apparently) of providing insufficient drive for phone working, besides being quite bulky.

However, it was an advance over the old-rack-and-panel layouts, which are virtually rooted to the floor, and it was fairly simple to change bands. The question of size revolved

round the fact that only a 6L6G doubler would produce a reliable 4 mA of drive with the couplers then available, and these themselves were considered too bulky, and wasteful, requiring heavy external damping to make the response reasonably level.

As the main object was compactness, it was decided to design a new driver using 6AQ5's (miniature 6V6's) and home-built miniature couplers on 5/16 in. Aladdin coil forms. The results exceeded expectations and are shown in Fig. 3.

Although the purpose of this article is to describe the couplers, not the transmitter, some notes on the latter are necessary. A six-bank switch is employed for band-changing, and the length of the wiring used is shown in the table, together with the winding data. Subsidiary small trimmers are included across each doubler grid circuit to equalize the stray capacities for the two main conditions: (1) When driving the PA, and (2) When driving the following doubler. Each doubler stage uses a 680-ohm cathode resistor for protective bias and a 33,000-ohm grid leak. No extra damping is needed, unless extremely low harmonic generation is essential.

The couplers are designed to resonate with the stray capacities in the circuit, as not only is the highest dynamic resistance achieved together with a lowish Q to avoid excessive double humping, but excellent power matching

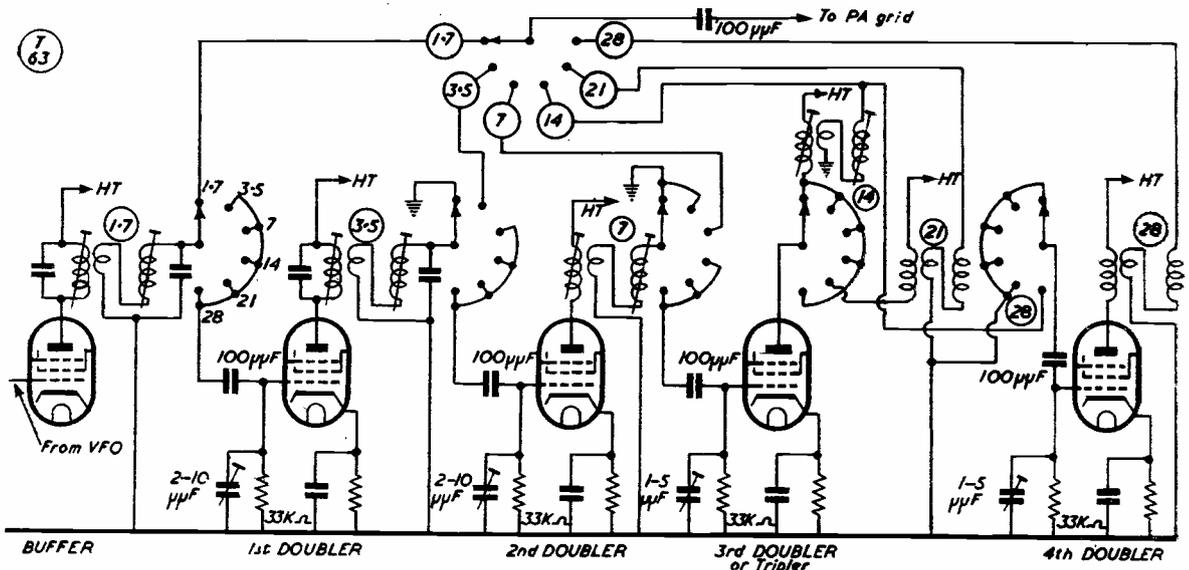
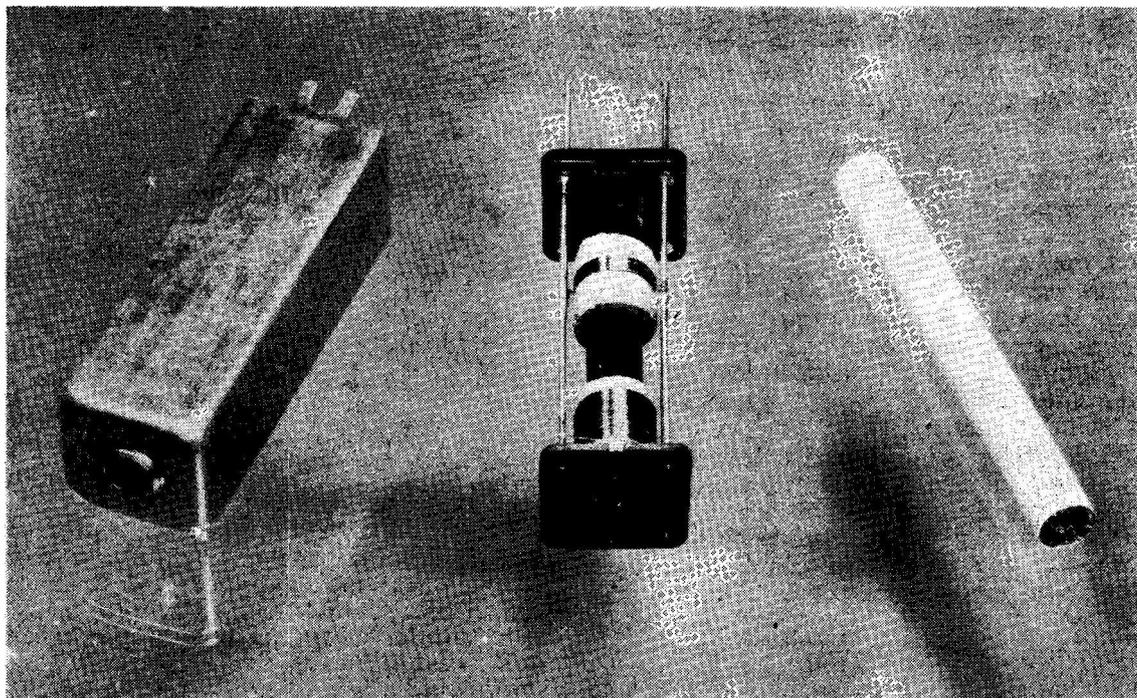


Fig. 1. Suggested circuitry, with optimum values, for the use of the wide-band couplers described in the article. Stray capacities can be equalized by the small condensers across the grid resistors.



Sample of a miniature wide-band coupler designed and constructed by G3JAM, with a size comparison. The excellent flat-band characteristic of these couplers is shown in the curves at Fig. 3.

occurs. However, some capacity is added on 3.5 mc and Top Band to provide a more rapid decay either side of the band. (In case someone thinks to query the fact that the drive appears to be down on Top Band and 21 mc, the 160-metre buffer in the writer's case is only a 6AM6 working on 150 volts and 21 mc is, of course, trebling from 7 mc.)

Construction

The formers used have a polished surface, a snag which is overcome by binding the former just where the winding is required with a specially prepared layer of 1/2 in. wide Scotch Boy self-adhesive crepe paper tape. A 1 1/4 in. length of the tape has added to it a 3/8 in. piece by pressing the adhesive sides together for an overlap of 3/16 in. This will leave exposed 3/16 in. of adhesive facing the opposite way from the rest. The 3/16 end will adhere to the former without difficulty and the remainder can be wrapped round to constitute a secure adhesive base on which to begin the winding.

Referring to Fig. 2 will show that the anode end goes on first and windings are close-wound, turns touching. The rotation of both windings is as indicated. Where two and three layers

are needed (see table) these should be wound back over the previous layer with an inter-

Coupler Winding Data

| BAND MC | PRI. TURNS | LINK TURNS | SEC TURNS | SWG | C | GRID LEAD (inches) |
|---------|------------|------------|-----------|-------|-----------|--------------------|
| 28-30 | 14 | 1 1/2 | 12 | 28DSC | — | 3 1/2 |
| 21-21.5 | 18 | 1 | 18 | 28DSC | — | 4 |
| 14-14.8 | 24 | 2 | 24 | 32 en | — | 4 |
| 7-7.5 | 25 | 4 | 25 | 32 en | — | 6 |
| | | | 21 | | | |
| 3.5-3.8 | 33 | 9 | 30 | 32 en | 5 μμF | 7 |
| | 32 | | 29 | | | |
| | | | 31 | | | |
| 1.7-2.0 | 65 | 16 | 60 | 40 en | 10-15 μμF | 9 |
| | 60 | | 55 | | | |
| | 55 | | 50 | | | |

Parts List

(FOR ONE COUPLER).

| Item | Manufacturer | Part No. | List Price s. d. |
|------------------|---------------|----------|------------------|
| Former | Aladdin | PP5937/4 | 11 |
| Eyeletted Top | Aladdin | PP5973/4 | 2 1/2 |
| Dust Cores | Aladdin | PP5839 | 3 1/2 |
| Insulating Piece | Aladdin | PP16040 | 1 1/2 |
| Can | J. Dale & Co. | DT/VI | 1 0 |
| | | | 2 6 1/2 |

Also Required: Quantity of 40 and 32 SWG enamelled, 28 SWG DSC, 20 or 18 SWG tinned copper wire. Small quantity "Scotch Boy" tape.

leaving of tape prepared as described.

When the primary is finished, it is covered and the link put on, in the centre of the tape on all bands except 28 mc, where it is located edge on at the HT end.

As the coverage on 28 mc is materially "assisted" by stray capacity coupling, it is recommended that this link be adjusted after the transmitter is built. All the others, however, can be taken as read.

The secondary winding continues without break from the link, the joining wire coming straight along the former unsupported, as drawn in Fig. 2. Double silk covered wire was chosen for the two HF coils because it sticks to the tape better.

When the windings are complete and the ends bared and tinned, the top spacer is pushed on, lining up the expansion slit with the notch in the former. Four pieces of 20 or 18 SWG tinned copper or brass wire connected to the appropriate windings completes the operation. (Don't forget to put the square insulating piece in the top of the can before inserting the coupler or the power pack might take off!) A satisfactory lubricant for the slugs is vaseline.

Adjustment

When tuning, the top slug is adjusted for the LF end of the band (normally) and the bottom slug for the HF. However, as these are bandpass circuits, critical adjustment is not required and with reasonable care anyone can, without test gear beyond a calibrated VFO, obtain the very satisfactory results shown by the curves.

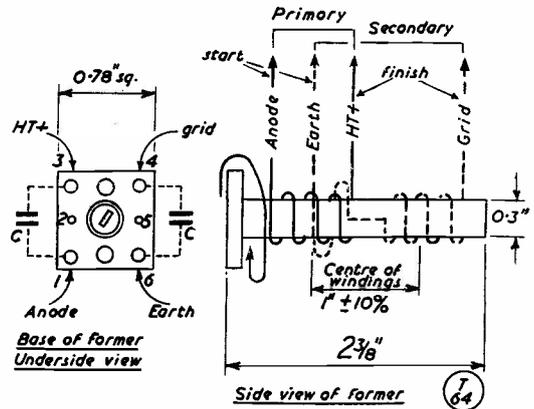


Fig. 2. This sketch shows the constructional details for the miniature wide-band couplers. Winding data are given in the Table on page 203.

Provided the couplers and the valves are mounted side by side and the switch (six-pole, six pos'n) takes up a length not more than nine inches from the first to the last wafer and is mounted over them (looking at the underside) no marked differences from the writer's transmitter should occur. The Top Band buffer will be close to switch wafer No. 1 and the 28 mc final doubler near switch wafer No. 6. Also, to keep the 28 mc wiring at a minimum, the PA socket will need to be close to this last switch wafer.

If, however, it should happen that one of the couplers tunes slightly LF even with the iron-dust slug right out, this can be replaced by an 0-BA brass one which will save altering the coupler. The real remedy would be to try and reduce wiring length a little.

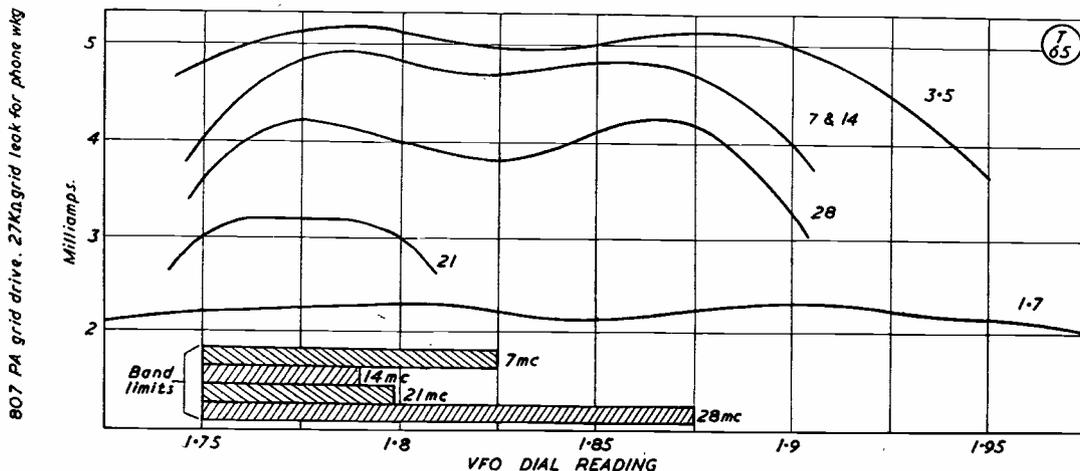


Fig. 3. These curves show frequency coverage against drive into an 807 PA for a set of wide-band couplers as designed by G3JAM and described in his article.

Performance

For the record, each 6AQ5 was drawing 20 mA from a 220 v. rail on the anode and 2.7 mA from 135 v. on the screen when Fig. 3 was drawn, and the screen voltage is made variable in practice to provide a means of controlling the drive. If 300 volts is used on the anodes, as is permitted with 6V6GT or 6BW6 valves, 30% more drive can be obtained.

Types 6AG5 and 6AM6 can also be used with reduced bias, and give about half the output obtained from a 6AQ5, but take only half the current. It can safely be assumed

that EF50, 6SH7 and similar "television pentodes" will give a similar result.

Even the tiny 6AK5 with 150 volts anode and screen will provide a useful 2 mA of drive.

Conclusion

Two sets of the couplers have been in constant use for eight or nine months now with no complaints and no breakdowns, and the performance of the other four sets tested shows remarkably little variation.

Construction time averaged two hours per set not including meals !

Multi-Purpose Crystal Oscillator

TEN CIRCUITS IN ONE
CO UNIT

W. N. STEVENS (G3AKA)

The crystal oscillator is still the basic method of generating a stable fixed frequency and continues to be the only acceptable way of obtaining RF drive on the VHF bands. This article shows how a simple crystal oscillator unit can be built up to provide a variety of CO circuits, either for experimental work or as a source of RF drive. By the use of plug-in adaptors no less than ten different types of CO can be produced. Our contributor discusses a number of practical points covering crystal oscillators in general, and his article will be of particular interest to those who are beginning to find their way about our bands.

—Editor.

THIS little unit should appeal to many of the fraternity. In brief, it comprises a basic crystal oscillator built around a 6AG7 pentode so that by the selection of suitable plug-in units (themselves of the utmost simplicity) the operator has the choice of at least ten different circuit arrangements !

It is useful, therefore, to the newly-licensed amateur who may wish to try out the various standard crystal oscillator arrangements but who does not feel inclined to set up a collection of CO's, or alternatively to build and rebuild until the most suitable unit has been evolved.

The not-so-new operator will also find the unit of interest. In designing a new rig such questions as "Will the fourth harmonic from the triode drive the amplifier," or "How much RF drive can I expect from a Pierce," and so forth, can be answered in a few minutes simply by plugging in an adaptor unit and tuning up.

The uses to which this composite oscillator can be put are varied and fairly obvious. As a permanent part of the station equipment it will find a place with the other pieces of auxiliary gear on the test bench. With a suitable crystal, the unit also functions as a band-edge marker.

Circuit

The circuit is given in Fig. 1. All parts shown are wired in permanently except for the tank coils and condensers which should be of the plug-in type. The vital junction points are brought to an eight-pin socket, making certain to keep the connecting wiring as short and direct as possible.

Alongside the circuit diagram are the coil and plug connections for the adaptor plug-in units. As will be seen, ten alternative arrangements are provided for — but the ingenious experimenter may well discover other circuit arrangements which can be accommodated by the system. In any case the securing of even ten arrangements will be enough for most people, and will provide sufficient variety for most purposes.

It is not proposed to discuss the theory and tuning of crystal oscillators; those who are legally entitled to use such apparatus have (mainly) passed the technical examination and should know all about it. In any case, it has been thoroughly covered so many times before . . .

However, it might be useful to run through

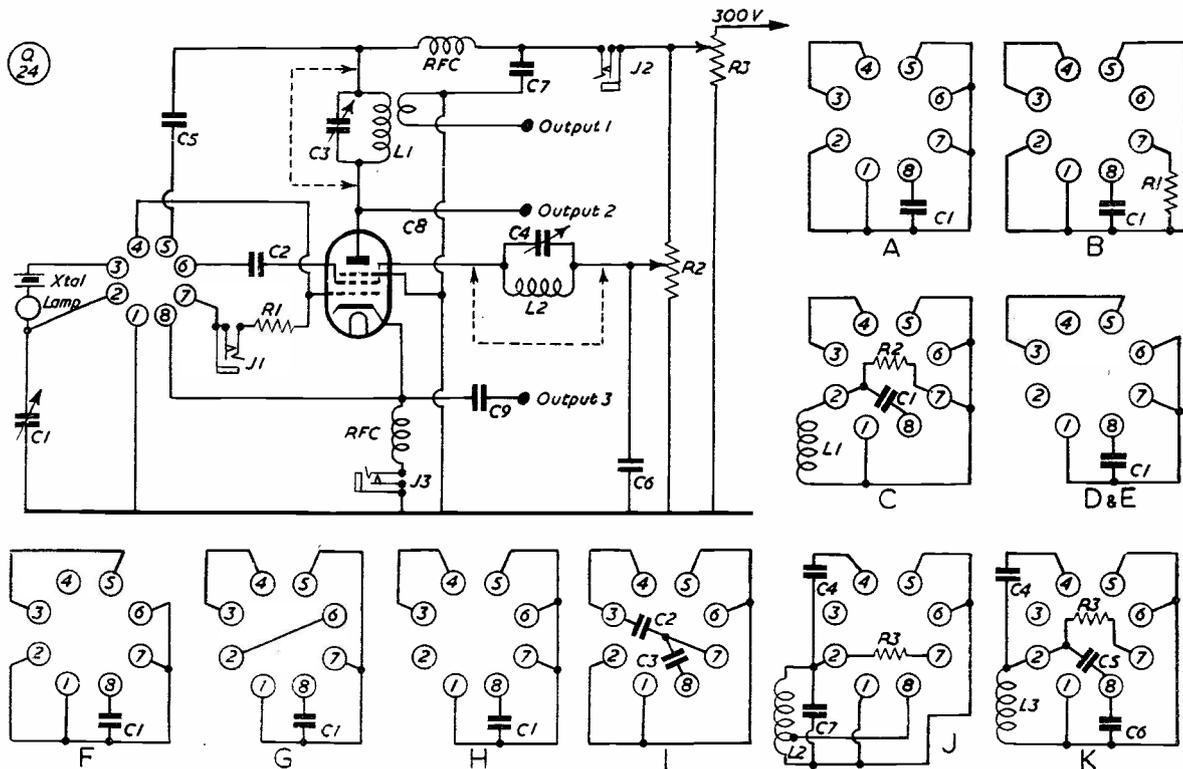


Fig. 1. Basic oscillator circuit and plug-in unit connections for selecting various oscillator arrangements. The plug reference letters identify the complete circuits they form, as shown in Fig. 2.

the suggested circuit and comment on any particular points arising therefrom.

Arrangement (A) is the familiar Tuned Anode Crystal Grid oscillator. Plug (A) is used here and the actual circuit diagram of the oscillator is seen at Fig 2 (A)—the reference letters of the plugs and the Fig. 2 circuits correspond with each other to aid identification. There is nothing here that calls for special mention except that the tank circuit L2/C4 is shorted out in this arrangement as it is for all circuits except the Bliley Oscillator-Multiplier.

This multiplier circuit (Fig 2 B) is extremely useful and although it is a comparative newcomer to the family of crystal oscillators does not seem to have been given much publicity. Perhaps one reason is that it is unsuitable for high power working — in any case quite often a mistake as the oscillator should be considered more as a frequency determining device than a power producer. Be that as it may, this Bliley circuit will score over the more usual Tritet in that the fourth harmonic output is much greater. Additionally, the cathode

Table of Values

Fig. 1. The Basic Crystal Oscillator Unit.

| | |
|--|--|
| C1 = 250 $\mu\mu\text{F}$ variable. | R3 = 40,000 ohms, 20 watt wirewound variable power type. |
| C2 = 0.001 μF . | |
| C3 = 160 $\mu\mu\text{F}$ variable. | |
| C4 = 50 $\mu\mu\text{F}$ variable. | |
| C5, C6, C7, C8, C9 = 0.001 μF . | J1, J2, J3 = Closed circuit jacks |
| R1 = 47,000 ohms. | L1, L2 = To suit waveband required. |
| R2 = 25,000 ohms, 20 watt wirewound variable power type. | V1 = 6AC7, 6AG7, etc. |
| Additional components required in certain plug-in units :- | |
| C1 = 0.001 μF . | R2 = 47,000 ohms. |
| C2 = 10 $\mu\mu\text{F}$. | R3 = 1 megohm. |
| C3 = 220 $\mu\mu\text{F}$. | L1 = Cathode coil for Tritet. |
| C4 = 100 $\mu\mu\text{F}$. | L2 = Tapped ECO coil. |
| C5 = 300 $\mu\mu\text{F}$. | L3 = Grid coil for Colpitts VFO. |
| C6, C7 = 500 $\mu\mu\text{F}$. | |
| R1 = 220,000 ohms. | |

is at earth potential—another useful point.

In operation, the screen grid acts as the anode of a triode oscillator and the tuned circuit (a normal low-C arrangement on the crystal fundamental frequency) keeps the screen grid voltage down. The anode tank is tuned to the fourth harmonic, sufficient output being obtained at this frequency to drive a

tetrode PA of the 807 class to full output. Moreover, it will do this with the HT restricted to about 200 volts—a figure which it is inadvisable to exceed. One further point: It is a good thing to provide external screening between the screen-grid and anode circuits.

It will be noted that the plug-in unit for use with the multiplier circuit brings in a series resistor; this is to increase the grid leak to a value of 270,000 ohms—the normal optimum value for fourth harmonic output.

Arrangement C is our old friend the Tritet, probably the most popular of all known oscillator-multipliers. As with the previously described multiplier, it is advisable to keep the HT on the low side; 200 volts on the anode and 150 volts maximum on the screen are safe figures. Higher potentials can be used, but if anything in the region of 300-350 volts is applied the circuit *must first* be tuned and set-up on low voltage; otherwise, the strain on the crystal is likely to be disastrous because the action of the Tritet is that of a triode oscillator and a triode circuit always imposes a greater RF load on the crystal.

The cathode circuit is tuned to a frequency well above that of the crystal and must never be used on the fundamental. This is, of course, old stuff—but if the repetition saves only one crystal from destruction it will have been worth while! The setting of the cathode condenser will have a large bearing on stability and should accordingly be adjusted with care. As a practical example, the cathode tank should resonate around 5 mc when using a crystal in the 3.5 mc band. Adjustment of the cathode tank can be carried out on reduced voltage—indeed, it is advisable. This is definitely one circuit at least where an indication of crystal current (a low consumption bulb of around 100 mA in series with the crystal) is a worth-while inclusion. Again at the risk of repetition let it be said that the series bulb offers no protection *in itself* as the crystal will be fractured before the bulb fuses. It will, however, serve as an indication whether or not the crystal current is rising to dangerous levels.

The anode circuit of the Tritet is tuned to the required harmonic. Properly adjusted, three watts of RF can be obtained on the second harmonic and almost as much on the third—which makes the Tritet a useful source of drive power for the 21 mc band.

A Pierce oscillator is possible in arrangement (D). Incidentally, it is strange that this is fundamentally a type of Colpitts oscillator and that the Tuned Anode Crystal Grid

arrangement owes its origin to Pierce and is sometimes acknowledged as such! In the oscillator generally known as the Pierce, the anode is untuned and as it is a free-running oscillator which will function, without initial adjustment, from any crystal it is popular for use in test sets.

When used as a transmitting RF oscillator, the Pierce can be dangerous and has indeed a certain reputation for being Unfair to Crystals. This is because the full RF voltage is developed across the crystal; to reduce the consequent risks the HT should be kept low—say, 150 volts.

In the Pierce, the feed-back is obtained by the potential divider action of the anode-cathode and cathode-grid capacities, which can be manually controlled by the variable C1. Set up the oscillator on reduced voltage and keep C1 as low as possible consistent with sufficient feed-back—a good average value is 100 $\mu\mu$ F, or even less. The inclusion of a series fixed condenser in the plug-in unit would avoid excess capacity and consequent feed-back damaging the crystal due to excessive current.

Frequency Halving

Another variation is the Pierce frequency *halving* oscillator—little used but nevertheless with interesting possibilities. This is shown in Fig. 1 and 2 (E). Since we usually aim at frequency multiplication the uses of this circuit may not be at first apparent. It can be used, of course, for simple halving in frequency from one band to another where crystals are to hand on the higher frequencies, thus saving the cost of “rocks” for the LF band. It will be more useful, however, where the operator has a number of crystals which are of limited use on their fundamentals, *i.e.*, those falling in the broadcast station bedlam of the 7 mc band (or those from 7150 kc upwards, since we are scheduled to lose the rest of the band), or oddments such as those between 3800-4000 kc which will halve into Top Band.

As can be seen, it is identical with the normal Pierce except for the addition of the tuned anode circuit—switching from one system to the other is therefore quite simple. To set up the Halving Oscillator, first operate the circuit as a conventional Pierce (with the tuned circuit shorted out) and tune in the fundamental on the receiver. Then insert the tank circuit—the crystal will then cease oscillating until the overtone has been tuned. Take care in adjustment as the circuit is prone to self-oscillation.

Keeping to the Pierce group, we come to example (F). This is the same as the halving circuit except that the grid condenser is disconnected and a tuned circuit is included in series with the crystal. The advantage of this system is that some control over the output frequency is obtained. With the tank condenser at minimum capacity, the circuit will oscillate normally but as the capacity is increased the frequency begins to alter within a range of something like 5 kc. Increasing the capacity beyond the 5-kc limit will cause a sudden jump to a new frequency about 10-15 kc lower than the fundamental; further increasing will produce several more frequencies. Note that beyond the initial 5 kc variation the quality of the note is liable to be poorer and may not be usable for drive purposes. However, the circuit has possibilities for the experimenter.

Still more circuits can be obtained from the composite unit. There is the example (G) which shows an oscillator of the screen-grid feedback variety, the regeneration in which is controlled by the condenser C1. As with the Tritet, but more so, the setting of C1 is likely to be critical and requires careful adjustment to obtain optimum output consistent with safe crystal current and stability in keying.

Another method of obtaining some measure of crystal frequency control is shown in example (H). This is a normal tuned anode crystal grid circuit as at example (A), but the variable condenser is retained in series with the crystal. Finally, example (I) is that of a grid-plate Colpitts oscillator, the excitation of which can be adjusted if necessary by altering the ratio of the two grid condensers.

Provision is made in the unit for using the valve as a VFO. In (J) the circuit becomes a conventional ECO type oscillator. Example (I) could, if required, easily be adapted for VFO operation with a series or parallel tuned Colpitts (parallel circuit is shown at K). When using the unit as a VFO the anode side should be tuned to a harmonic (usually the second) of the fundamental. Alternatively, to give better isolation, the tank circuit could be shorted out. Again output could be taken from the cathode—in which case the anode is by-passed so as to operate at ground potential.

Summing Up

A few notes on crystal oscillators in general will probably be of interest to newcomers. In first testing an oscillator all variable condensers

should be set at minimum capacity, and it is a good point to run only half HT voltage—this has been the saving of many crystals due to incorrect operation, or over excitation.

The screen grid voltage is critical. It should be adjusted in practice for the lowest permissible voltage consistent with RF output requirements. Before plugging in the crystal it is wise to test for parasitic oscillations of the TPTG variety. This is easily checked by plugging in a milliammeter (in series with the grid-leak). The grid meter should read zero (or show only a small reading) and the anode current a stable high value. On swinging all variable condensers through their complete ranges there should be *no variation whatever* in grid or anode current meter readings with the crystal out.

If the oscillator is shown to be free from TPTG tendencies, normal tuning procedure can follow — on tuning the tank condenser (in straight oscillator) or cathode condenser (Tritet, etc.) the anode current will fall and a positive grid current will flow on reaching resonance. The Pierce circuits, of course, oscillate on switching-on—or they should!

When making initial adjustments, keep the grid meter under careful observation, and if the grid current begins to run high, the screen grid voltage should be reduced. The actual RF voltage developed across the crystal can be calculated from $\frac{I \times R}{1000}$, where I = grid current in mA and R = grid leak resistance (ohms).

In testing, the oscillator should be loaded into a following doubler, buffer, amplifier or dummy load. Loading should be light as possible since over-coupling can result in sour and chirpy notes.

In the multiplying or halving oscillators an absorption wavemeter or grid dip oscillator is, of course, essential. The receiver can on occasion be used for harmonic testing, but trouble may be experienced due to spurious high-order

Key to Fig. 2

- (A) Tuned Anode Crystal Grid Oscillator.
- (B) Biley Oscillator-Multiplier (for fourth harmonic output).
- (C) Tritet Oscillator (for second, third and fourth harmonic output).
- (D) Untuned Pierce Oscillator.
- (E) Pierce Frequency Halving Oscillator.
- (F) Tuned Pierce Oscillator (for control of crystal frequency).
- (G) Screen-grid Feedback Oscillator.
- (H) Tuned Anode Crystal Grid Oscillator (with variable crystal frequency).
- (I) Plate-Grid Oscillator.
- (J) Electron Coupled Oscillator (VFO).
- (K) Parallel Tuned Colpitts VFO.

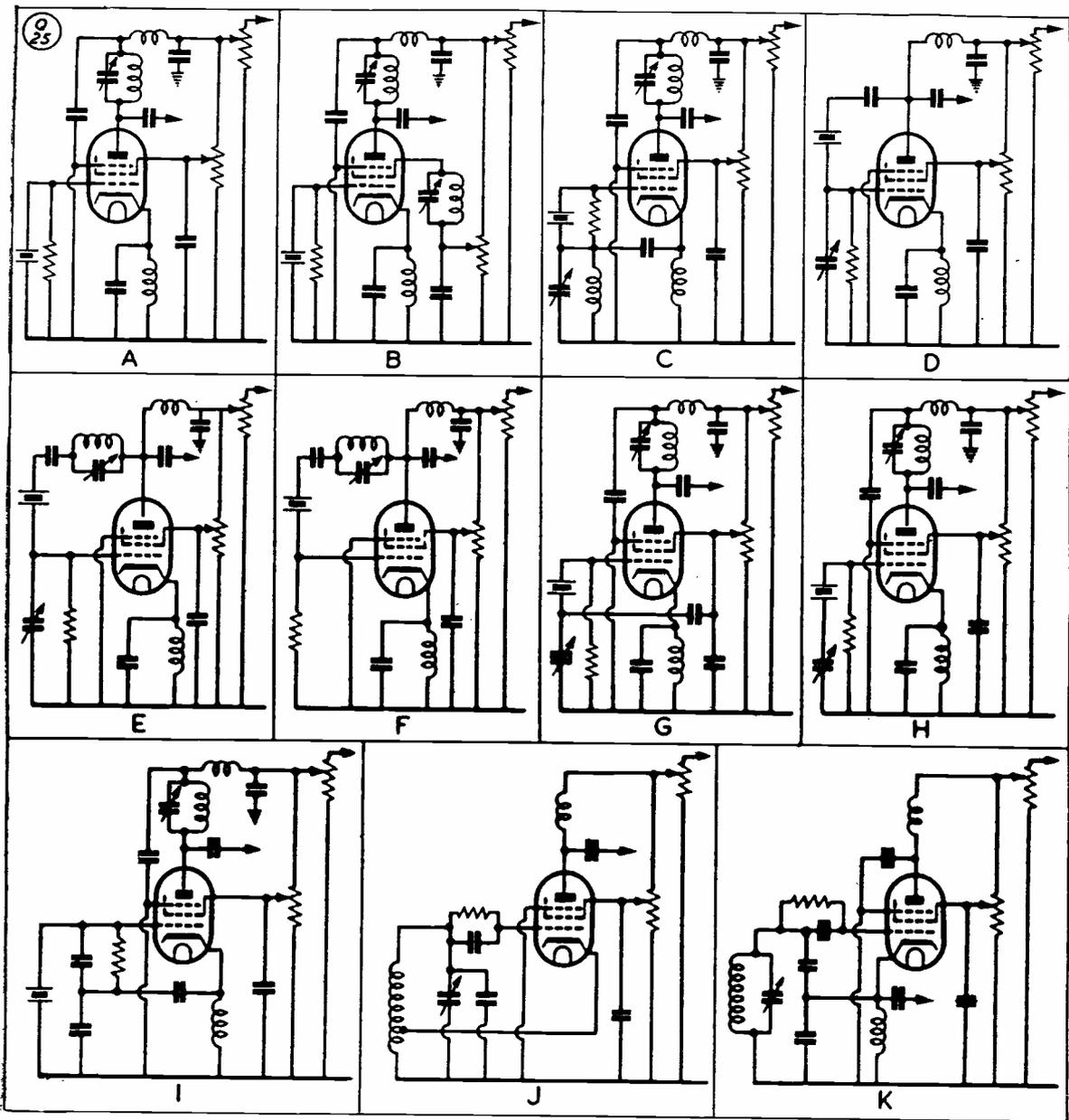


Fig. 2. Circuits derived by plugging in the adaptors wired as shown in Fig. 1.

harmonics from the oscillator beating with those from the receiver local oscillator. When an oscillator is tuned to a harmonic a marked increase in strength will be noticed in the receiver. A spurious beat will not alter in strength.

Rubber Crystals

A word or two on variation of crystal

frequency. Apart from the methods shown in this article, a small trimmer (of around 50 $\mu\mu\text{F}$) can be shunted across the crystal; this will give a slight control over the crystal frequency, having the effect of lowering the resonance. The best method is the variable air-gap system, but so far as the writer is aware no holders embodying this useful feature have

been marketed in this country since the war. A pre-war holder with variable air-gap gave a frequency variation of something like 10 kc on a 7 mc crystal. There are other methods of shifting the resonant frequency of a crystal (permanently), but these stratagems are strictly for those with green fingers.

Getting back to the composite oscillator unit, the newcomer can build up the unit piece-by-piece as the mood or necessity arises.

Or a selection of the types shown can be picked out as the most likely to be needed. Again other crystal circuits could be incorporated—those shown do not exhaust the possibilities!

From any standpoint, the multi-oscillator is a handy piece of gear to have about. Like the resistance and capacity substitution boxes and similar simple units, it soon becomes an indispensable item. Maybe readers will have ideas for developing the theme or adapting it.

Coax Feed for the T2FD

MATCHING A LOW-IMPEDANCE LINE

N. P. SPOONER (G2NS)

Here is some more practical information on a very interesting and effective multi-band aerial system, which is easy to try out at most locations. A T2FD erected and fed as described here is probably the answer to many an aerial problem, where space is a factor and operation is required on several bands.—Editor.

THE preliminary results experienced by the writer on 14 mc with this 5-band terminated tilted folded dipole using 300-ohm feeders have already been fully described in *Short Wave Magazine* (January, 1953) and more recently in April, 1953, readers were given the latest information collected by the originator of this unpretentious system, W3HH/4. His experiments, as he states, have hitherto been confined to feeders of the "open lines and twin-lead variety" with impedances between 300 and 600 ohms. Therefore, it occurred to the writer that a co-axial feeder might not only prove just as easy to match but also be more acceptable in fringe areas where TVI often demands a combination of several different suppression methods.

The original T2FD already described was accordingly operated upon and the 300-ohm Telcon K25 flat ribbon-type twin feeder was replaced by a suitable length of co-ax. Where this joined the aerial it was securely taped to the porcelain "T" strainer already anchoring the dipole wires and the junction was then weather-proofed with the usual liberal coating of Bostik. The original 300-ohm "surplus"

50-watt wire-wound resistor was replaced by a 90-ohm wire-wound Bulgin PR206 60-watt type, over which was slipped a movable clip for tapping purposes. As W3HH has already pointed out, a non-inductive resistor is always preferable because it allows the system to be aperiodic and permits one coupling to serve all bands. As, however, such a resistor should have a wattage equal to 35% of the input to the PA it will be difficult to obtain for full-power transmitters, and even then its value will not be variable.

Test Set-Up

A wire-wound resistor was therefore again inserted and the high end of the aerial, now modified as shown in Fig. 1, was accordingly raised to a position in which the resistor could be handled from a tall pair of steps. To give an indication of comparative radiation on successive bands a crystal diode and meter check unit, wired to a plug-in coil and variable condenser, was placed some ten feet below the high end of the aerial.

The problem of how to save the writer the tedium of having to make more than thirty journeys up and down thirty-two stairs was solved by running an inter-com. line from the radio room at the top of the house out to G3IQX, collaborating in the garden; he had been prevailed upon to perform the duties of assistant operator and ask for the transmitter to be switched on while he took a field-strength reading—and then off while he moved the clip further along the resistor. Whether with assistance or performed single-handed this "drill" will be found necessary in order so to arrange things that the optimum resistor value coincides with the highest reading obtainable on the meter.

Starting at the zero end a reading of 8 μ A was obtained when the clip reached 5 ohms, and further progressive steps gave readings of 12 μ A at 15 ohms and 15 μ A at 85 ohms, while

a maximum reading of 20 μA appeared when a return was made to 82 ohms. A move to either side of this point at once gave lower readings, so 82 ohms was obviously the optimum value to match the feeder impedance, and here the clip was securely fixed.

After the resistor had been taped to the porcelain spreader already anchoring the two ends of the folded dipole the whole was weather-proofed with a thick application of Bostik. Readers will have noticed that the system was loading up and radiating even when badly mis-matched (with only 5 ohms in circuit) and this confirms W3HH's statement that results can still be obtained even with a resistor value that differs from the optimum. In fact, shortly before the tests now being described were carried out the writer found that with the folded dipole ends floating and no resistor connected at all the system radiated on the three bands that happened to be open at the time; he obtained three RST reports each of 579 from Buckinghamshire on 3.5 mc, Hamburg on 7 mc and Belgrade on 14 mc!

Multi-Band Operation

After the resistor had been fixed in its appointed place the next procedure was to ascertain whether the system was loading properly on each of the five bands upon which it should normally work. For this purpose the drive to the grid of the PA was kept at a steady 3 mA while the anode voltage to the pair of 807's in parallel with a Pi-filter tank was steadied at 600 v. Each time the band was changed the co-ax feeder was exactly matched again by means of the Coarse and Fine loading controls shown in Fig. 2—which is mentioned as a matter of interest although coming under the heading perhaps of "refinements." The loading procedure with the Coarse and Fine controls both set at 1 (total maximum capacity in circuit) consisted of adjusting the PA tank condenser for minimum dip and switching the Coarse control in steps from 1 upwards (decreasing the total capacity in circuit) with a retuning of the PA each time for minimum dip, which occurred at higher readings of the PA anode current meter each time as the system was brought towards resonance. The Fine control was then tuned in exactly the same way with the PA tank re-set for minimum dip each time until the correct loading was obtained.

If the loading became too great the Coarse control was simply reduced and a readjustment made with the Fine control and the PA tank tuning. With 3 mA drive in each case

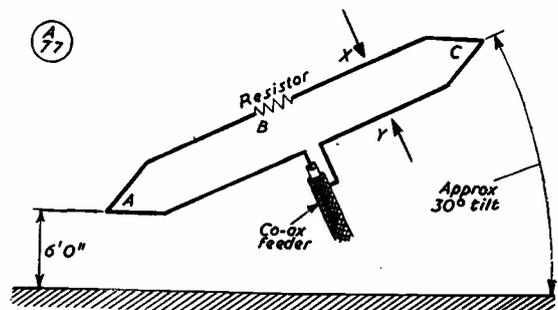


Fig. 1. The five-band T2FD aerial system, as modified by G2NS for coax feed. The dimensions and values are: AB = BC = 23 ft. 3 in. for all bands 3.5 to 28 mc; Spacing XY = 17 ins. for all bands; Tilt, 30° with low end 6 ft. above ground; Resistor, as discussed in text.

and 600 anode volts the maximum loadings gave input readings of 126 watts on 3.5 mc, 135 w. on 7 mc, 144 w. on 14 mc, 148 w. on 21 mc, and 150 w. on 28 mc. In other words, the system was drawing the power all right, and on all bands.

If with the feeder-matching method described it can be accepted as true that a considerable percentage of input was definitely appearing as useful radiated output, then the figures obtained confirm G3IQX's theory that while each "T2FD" is cut for its *lowest* desired operating frequency according to formula it will always radiate best at its *highest* frequencies. As an alternative check that the system was operating as indicated G3IQX reported 599-plus signals on every band in turn from 3.5 to 28 mc. One further point of interest is perhaps worth mentioning.

Checking on the Receiver

During recent correspondence with W3HH the writer suggested to him that as the "T2FD" is always as good for reception as it is for transmission why should not a receiver be used to establish the correct value for the terminating resistor? He thought the idea worth trying, and publicising if the result agreed with field-strength checks. Unfortunately, no S-meter was available at the time these particular tests were carried out, so that any increase in incoming signal strength had perforce to be judged by ear. The receiver was left tuned to a strong steady automatic tape transmitter found sending 5-figure groups towards the HF end of the 3.5 mc band. With the gains turned down until the signal was just steadily audible an increase in strength actually did appear to occur at the moment that G3IQX (as already explained) found the 82-ohm mark on the resistor; at the same

Table of Values

Fig. 2. Low-Impedance Coupling Network for the T2FD.

| | |
|---|--|
| C1 = .002 μ F mica, 2,500v. wkng. for full power. | C6, C7 = .0003 μ F mica, 350 v. wkng., coarse loading. |
| C2, C2A = 150 μ F PA tank tuning, split sta- tor, 1,500v. wkng. C2A in circuit for 3.5 and 7 mc only. | C8 = 5 μ F, 350v. wkng., for harmonic check coupling. |
| C3 = 300 μ F, 500v. wkng., fine load- ing control, dial marked 1 for max. capacity and 10 for minimum. | L1 = Coil for 21/18 mc bands. |
| C4, C5 = .0003 μ F mica, 350v. wkng., coarse loading. | L2 = PA tank coil, band- switched or plug- in. |

time, he came through on the inter-com. to say that he had also reached the highest possible reading on the field strength meter. (It should be explained here that while off-scale readings were easy to obtain the meter had to be protected from damage during the tests described and a fixed position of some ten feet below the aerial was adopted when it was found that this dropped readings to about half-scale.) With the receiver test, unless wishful thinking stepped in and the writer's ear was deluded upon the point, such a method as this could certainly be used with advantage by owners of receivers fitted with S-meters, or listeners who require a "T2FD" for reception only. It performs the latter duty very well with 300-ohm feed line as this approaches the required aerial input impedance of the average receiver, which is usually about

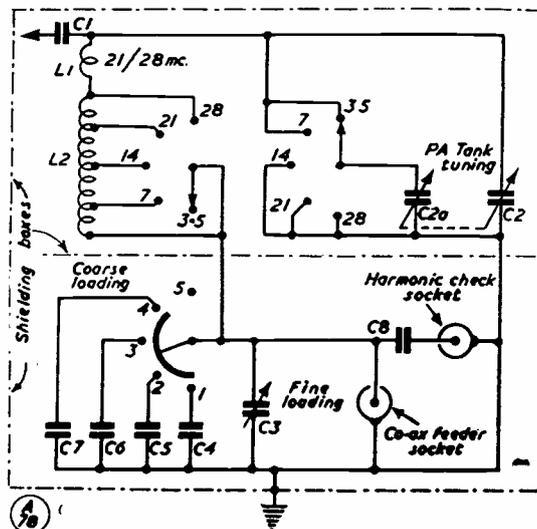


Fig. 2. Band-switched Pi-filter and feeder matching network used by G2NS during tests with the T2FD. His PA is a pair of 807's.

400 ohms. Only a small variable resistor would be required in such a case—better still a bank of non-inductive carbon ones might be found to total up to the required value.

We've all heard the old saying that "If you can't hear 'em, you can't work 'em." As a tail-piece, it might therefore be mentioned that Rush Drake, W4ESK, who won the CQ DX Contest in 1951, used a "T2FD" for reception, and a temporary one put up in a hurry at that!

"RADIO QUARTERLY"—DUE ABOUT JUNE 15

This is a 96-page production in the old *Magazine* format (pocket-size), and is to be published four times a year, in September, December, March and June.

This first issue includes, among many other items of interest to the general reader, an entirely new HF/VHF converter design for extending the range of any "all-wave" BC receiver from Ten right up into the amateur Two-Metre band. Thus, the utility and coverage of such a receiver is greatly increased, and for the SWL in particular this converter will be of special interest. Other constructional articles include a combined Heterodyne Frequency Meter/Beat Oscillator for frequency checking and CW reception over the short wave range of the ordinary broadcast receiver.

Feature articles discuss amateur band reception for the SWL, and SW broadcast listening for the general-coverage enthusiast. There is a complete list of SW broadcast stations receivable in this country; an up-to-date list of the QSL Bureaux of the world; a new list of about 100 amateur stations in all parts of the world who are inviting SWL reports ("Pse QSL"); a long article on fault-

finding in home-built TV receivers — and many other useful features, some new and some for reference, but all of lasting value and interest to the radio enthusiast.

The price of RADIO QUARTERLY is 4s. per copy, or 16s. post free for a year of four issues. Order on: The Circulation Manager, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

CARDS IN THE BOX

If the operators listed below, for whom we have no postal address, would send a large s.a.e. to BCM/QSL, London, W.C.1, with name and call-sign, cards held for them in our Bureau will be forwarded. If publication of the call-sign/address in "New QTH's," and subsequently in the *Radio Amateur Call Book*, is also required, that should be mentioned at the same time.

G2HUI, 3ICK, 3IIB, 3IJS, 3IKI, 3ILH,
3ILN, 3ILU, 3IPT, 3IPZ, 3IRX, 3ISV.
3IUE, 3IXC, 3IXY, 3IYM, 3JJH, 8ZK.
GM3IUH.

Handie-Talkie for Two Metres

SELF-CONTAINED
PORTABLE PHONE
TRANSMITTER/RECEIVER

T. W. BLOXAM, B.Sc. (GM6LS)

This is an ingenious approach to the problem of designing a close-range transceiver which is truly portable — in fact, as the photographs show, it can be slung over the shoulder and operated with one hand while walking about. Having regard to the need, under these conditions, of absolute stability on the transmitting side, crystal control is used for the transmitter. But as the receiver section would be working to strong, CC transmissions over line-of-sight distances (and there are difficulties about the design of a miniaturised two-metre crystal-converter type of receiver in strictly portable form) it was decided to go for a super-regenerative circuit for the receiver. This enormously simplifies the Rx side and in view of the use to which the handie-talkie would be put under practical conditions, is an acceptable solution of the receiver problem. Over line-of-sight ranges, even with quite low transmitting power, the super-regenerative hiss will be almost completely suppressed, resulting in loud, clear signals with the simplest possible type of receiver.—Editor.

THE writer has been attracted to the problem of constructing portable high frequency equipment for some years. In the transmitter-receiver to be described it is obvious that the Galvin Motorola SCR-536 "handie-talkie" has been the basis, at least externally, of the design.

However, the SCR-536 itself, which operates by means of selected plug-in coils and crystals over chosen bands in the 3.5 to 6 mc region, presents constructional difficulties, particularly in regard to the elaborate switching, which are not easily duplicated by the amateur—especially in the two metre band !

There is no difficulty in obtaining miniature components. The major problems are suitable valves for this frequency, and the physical size of the batteries. Commercially built portable equipments frequently have the batteries "tailored" to suit, whereas from the amateur point of view the reverse applies.

The valve problem is not so acute as regards the transmitter, but presents a difficulty when one contemplates a two-metre superhet. A careful search of available battery valve types revealed none that were really suitable for use in such a receiver.

It is essential that the battery drain whilst receiving should be kept at an absolute minimum, since the receiving periods will normally be of longer duration than those transmitting. Apart from the expense of having to renew the batteries at frequent intervals, a superhet receiver had to be ruled out, although a workable circuit was designed using a triode mixer and a local oscillator source from the transmitter crystal oscillator, followed by a tunable IF and the usual chain.

Considered from a functional aspect, namely, the ability to operate portable to fixed-stations, the latter providing comparatively high signal



The author with the Handie-Talkie in operation. It is entirely self-contained and very useful ranges have been achieved on the two-metre band, for which the unit is designed. As mentioned in the text, marked directional effects can be obtained by altering the plane of the aerial.

strengths, there seemed little need for a complex, space and battery-consuming receiver.

The size of the available batteries decides almost exclusively the size of the case, the dimensions of which can be "juggled" with in various ways until a compromise between length and width is arrived at. Small deaf-aid batteries, whilst satisfactory for the receiver, would be quite inadequate for the transmitter requirements.

Having reviewed the major problems rather briefly, the final outcome of much deliberation and experiment will now be described.

The Transmitter

It was decided at the outset that the final RF stage should be a "straight" driven amplifier on 144 mc, since previous experience had shown that the performance of a frequency-multiplier in the final stage was wasteful in battery power, and delivered negligible RF to the aerial. Real saving in space and battery drain were realized by the use of a 12 mc crystal, the first stage operating on the third harmonic to produce 36 mc. The output from this stage is fed into the second half of the double triode, acting as a doubler to 72 mc. This in turn drives the last doubler to 144 mc.

The grid current to the final amplifier was at first measurable only in terms of microamperes. However, by means of regeneration supplied by C8 it was possible to deliver 0.6 mA of grid current through 4700 ohms to the final stage with an overall reduction in HT consumption amounting to 5 mA over the condition without regeneration! The value of C8 is not critical since the input and output frequencies differ—fixed condensers were used to save space. The capacity of C8 is carefully increased to a point where the valve is still held by the crystal, but any further increase of capacity would cause self-oscillation, evidenced by a large increase in grid current in the final stage.

The neutralization of the final amplifier proved to be easier than was anticipated, the neutralizing condenser C12 being a normal 3-30 $\mu\mu\text{F}$ compression-type ceramic trimmer with about two-thirds of the movable plate cut away to reduce the minimum capacity.

Care must be exercised not to return the grid circuits to ground, except in the case of V1, since the filaments are in series and the result would be the production of a fixed bias, more or less "killing" the RF drive voltage. To make this clear the filament circuit has been shown entire in the circuit diagram.

The modulator requires no comment except

to say that the valve used was chosen as requiring no bias at the voltage used, although bias is easily obtained if required by returning the grid to a suitable point on the filament line. Furthermore, the plate impedance of the modulator under these conditions of voltage and current approximately matches the plate impedance of the RF amplifier. This simplifies matters, rendering the use of Heising choke modulation possible.

The choke is a small 80:1 ratio speaker-type transformer, the whole of the primary being used. If necessary the low-impedance secondary could be coupled through an extra contact on the send-receive switch to provide side-tone during transmission.

In the transmit position with aerial connected and feedback set at optimum the total HT drain is 17 mA, divided thus: CO-Tripler 3 mA; Doubler 4 mA; Doubler 1 mA; Final 5 mA; Modulator 4 mA. The input to the final is therefore 0.45 watt.

It is extremely unlikely that a grid current of 0.6 mA developed in the final amplifier grid circuit could be obtained at anything like such a low HT consumption using an 8 mc crystal.

The Receiver

A type 3B7/1291 valve is used in this stage since the characteristics are somewhat better than those of the 3A5 for receiving purposes, approaching more closely those of the 955 and 9002 VHF triodes.

It will be noted that R1 is returned to the "cold" end of L2 and not to ground. This ensures that oscillation will start easily, and at the same time produces a high quenching frequency with a long time-constant, together with a higher audio output. The values of C1, R1 and C2 are optimum for 144 mc operation.

The inductance of the RF choke is critical if "blank spots" are to be avoided over the tuning range. L4 is a small 1:3 plate-to-grid transformer coupled to the grid of the other half of the 3B7. The output transformer L5 is a small microphone transformer which provides a fairly close match to the 50-ohm impedance headphone.

The value of R3 is adjusted by experiment to a point where oscillation just commences, this being the most sensitive condition of the super-regenerative receiver. The tuning condenser shaft is extended out through the case by means of a coupler and a short insulated rod to which a plain knob is fitted.

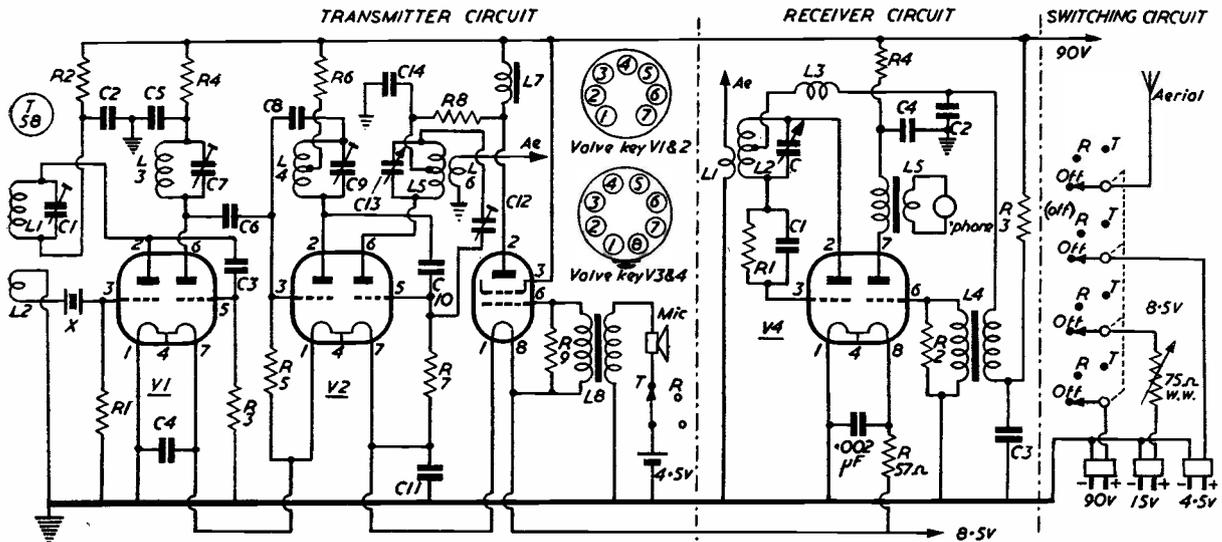


Fig. 1. Circuit complete of the short-range Handie-Talkie designed and constructed by GM6LS. The transmitter section is crystal controlled to ensure stability, but the receiver is a simple super-regenerator, since it is intended to work only with stabilised signals of high field strength. For this particular application (see photograph) it is an acceptable combination.

Table of Values

Circuit of the Two-Metre Transceiver.

Transmitter Section

- C1, C7 = 20 $\mu\mu\text{F}$ air trimmer.
- C9 = 10 $\mu\mu\text{F}$ air trimmer.
- C13 = 10 $\mu\mu\text{F}$ air trimmer with spindle.
- C2 = 880 $\mu\mu\text{F}$ ceramic.
- C3, C6, C10 = 100 $\mu\mu\text{F}$ ceramic.
- C4, C5, C11 = 300 $\mu\mu\text{F}$ mica.
- C8 = 10 $\mu\mu\text{F}$ ceramic.
- C12 = 3-30 $\mu\mu\text{F}$ compression trimmer with $\frac{2}{3}$ of movable plate cut away.
- C14 = 1,000 $\mu\mu\text{F}$ ceramic.
- R1, R5 = 22,000 ohms.
- R2, R4 = 2,200 ohms.
- R3 = 50,000 ohms.
- R6 = 79,000 ohms.
- R7 = 4,700 ohms.
- R8 = 1,000 ohms.
- R9 = 150,000 ohms.

All resistances $\frac{1}{2}$ or $\frac{1}{4}$ watt.

- L1 = 6 turns 24g. enam. $\frac{1}{8}$ " dia. close-wound.
- L2 = 3 turns 24g. enam. $\frac{1}{8}$ " dia. close-wound $\frac{1}{16}$ " from "cold" end of L1.
- L3 = 5 $\frac{1}{2}$ turns 18g. copper $\frac{3}{16}$ " dia. $\frac{1}{2}$ " long.
- L4 = 3 turns 18g. copper $\frac{3}{16}$ " dia. $\frac{1}{2}$ " long, centre-tapped.
- L5 = 4 turns 16g. copper $\frac{3}{16}$ " dia. $\frac{3}{8}$ " long, centre-tapped.
- L6 = 2 turns "hook-up" wire interwound with L5, at centre.
- L7 = Modulation choke. Primary winding of 80:1 speaker transformer.

- L8 = 1:100 Transformer. Microphone to grid.
- L1 and L2 wound on $\frac{3}{8}$ " polystyrene tube. Other tuning coils are self-supporting in wiring.
- V1, V2 = 3A5.
- V3 = 3D6/1299.
- X = 12 mc crystal (Brookes).

Receiver Section

- C = 10 $\mu\mu\text{F}$ trimmer with spindle.
- C1 = 50 $\mu\mu\text{F}$ ceramic.
- C2 = 0.002 μF mica.
- C3, C4 = 0.1 μF paper.
- R1 = 10 megohms.
- R2 = 220,000 ohms.
- R3 = 10,000 ohms.
- R4 = 30,000 ohms.
- L1 = 2 turns 18g. copper $\frac{3}{16}$ " dia. Turns spaced to clear, and fixed about $\frac{1}{4}$ " from "cold" end of L2.
- L2 = 3 $\frac{1}{2}$ turns 18g. copper $\frac{3}{16}$ " dia. $\frac{1}{2}$ " long, tapped at one turn from "cold" end.
- L3 = RF choke. 22 turns 24 enam. close wound on $\frac{1}{2}$ watt ceramic resistance.
- L4 = 1:3 Intervalve transformer.
- L5 = Output transformer. Plate to low-impedance headphone. (Microphone transformer).
- V4 = 3B7/1291.
- Sw. = 4-pole 3-way ceramic switch.

All $\frac{1}{2}$ or $\frac{1}{4}$ watt.

Batteries and Switching

The HT is supplied by a standard 90 volt "portable type" battery measuring approximately $3\frac{7}{8}$ ins. x $2\frac{3}{4}$ ins. x 2 ins. The HT drain whilst receiving is $1\frac{1}{2}$ mA.

The LT drain of 0.1 amp. is rather high in terms of the usual broadcast portable receiver, although some of the latter use 0.1 amp. filament current for the output pentode, commonly a 1C5 or 1Q5.

A good reserve of LT voltage is desirable,

and means of maintaining the required filament voltage with ageing of the batteries. Two 7.5 volt batteries approximately $3\frac{1}{8}$ ins. x $2\frac{5}{8}$ ins. x $1\frac{1}{2}$ ins. in size are series'd to provide 15 volts of LT. A small 75 ohm wire-wound variable resistance is wired in series with the filaments and is adjusted to give a load potential of 8.5 volts to the three valves of the transmitter, each of which takes 2.8 volts 0.1 amp. To correct the LT voltage for the receiver a 57-ohm resistance is put in series with

the 3B7 filament to drop the 8.5 volts of LT to 2.8 volts.

By means of suitably located holes in the case of the Handie-Talkie a test prod can be inserted and the LT voltage on load read off and adjusted by means of the 75-ohm variable resistance.

Current for the carbon microphone is supplied by an ordinary 4.5 volt "flat" type torch battery which is switched off whilst receiving. A ceramic 4-pole 3-way rotary switch performs all the switching operations.

Construction

The outside measurements of the case are 4 ins. x 4 ins. x 16 ins., and it is made in two parts, one consisting of two sides and the 4 in. x 4 in. ends, with a narrow surrounding lip into which are rivetted copper bushings tapped 4 BA. (6 BA would be large enough, but were not available.) The remaining section of the case provides the other two sides, being simply a bent plate which secures to its counterpart by means of 4 BA c/s screws passing into the tapped bushes. Other means such as lengths of drilled and tapped angle to provide the lip can be used, of course. The material for the case is 20 SWG tin-plate. It was made by a tinsmith, and finished at home with black crackle paint.

A small aluminium chassis 10 ins. x 3 ins. x 1½ ins. deep carries the transmitter and receiver. In order to make adjustments readily it is necessary to mount the chassis on one or other part of the two-unit box. Hence the chassis unit is mounted on the "two sides" (or lid) portion, only the batteries occupying the other section of the case.

The headphone and microphone were cut from a standard GPO type surplus handset, the angle of cut being adjusted to obtain the desired angle of tilt for the microphone and earpiece relative to the mouth and ear. Holes were drilled and tapped into the moulding (which is almost solid section) to allow fixing.

A short length of leather strap affords means of supporting the case while operating. Other details of construction can be seen in the photographs.

The aerial is a ¼ in. dia. copper tube tapped 2 BA at one end, providing for attachment to a screwed rod which projects 1 in. through a hole in the top of the case, but which is supported by a polystyrene bracket fixed to the lid part of the case.

The aerial length is based on the usual relationship for a ¼-wave rod end-fed. The approximate length of 19.5 ins. was arrived at.

Short lengths of coaxial cable connect between aerial and switch, and switch to transmitter and receiver. The outer braid is grounded at the base of the aerial and also at the coupling-coil ends of the cables, to the chassis.

Adjustment and Operation

One principal adjustment has already been discussed. A microammeter placed in each successive grid circuit provides the best check on each preceding stage, and does not upset the tuning when removed from the circuit.

When the maximum grid current is being delivered to the final amplifier neutralization can be checked in the normal manner by adjusting C12 until swinging the final tank condenser produces no dip in grid current. This latter operation is of course carried out with the HT removed from the final stage. In checking the operation of the transmitter the final grid resistor R7 is brought to a convenient point where a meter can easily be put into the circuit and all trimmers are then adjusted for maximum grid current. The plate tuning of the final amplifier can be carried out by observing the dip in plate current, or more easily by simply adjusting C13 for maximum reading on a receiver S-meter.

Tests

An initial test to the fixed station GM6LS produced R5 S9 signals from the Handie-Talkie at 1 mile, the receiving equipment at the fixed station comprising 6J6 converter into HRO with 24 mc IF and beam aerial.

Standing in the garden at GM6LS a late-evening QSO was obtained with GM3EGW at Dunfermline 12 miles away, who to our surprise reported the Handie-Talkie signal peaking S7 QSB to S3, R5 most of the time. GM6LS is 500 ft. a.s.l., and the path is nearly line-of-sight, but with rather bad screening by houses and trees near to 6LS.

Thus encouraged, a further test was made one afternoon with the Handie-Talkie at the summit of The Knock, a hill 1,015 ft. a.s.l. near Bathgate in West Lothian, 14 miles west of GM6LS and a line-of-sight path except for the local screening at the fixed station. The signal received at GM6LS was S8/9 causing overload of the HRO input, whilst the Handie-Talkie receiver gave perfectly R5 signals estimated as S7 from the 90-watt transmitter at GM6LS. The signals were steady and could be read clearly whilst walking about on the hilltop. Contact was maintained for nearly an hour to and fro. Part of the test was tape-

recorded at GM6LS. There was no QSB whatever on this occasion.

It is now thought that, conditions permitting, contact could be established up to the limit of the line-of-sight path with the fixed station. Of course, Scotland is rather favoured in this respect. The summit of Ben Lomond is some 56 miles distant and line-of-sight from GM6LS and it is thought possible that contact could be made over this path if and when sufficient "steam" could be raised to take operator and Handie-Talkie to the top of the mountain!

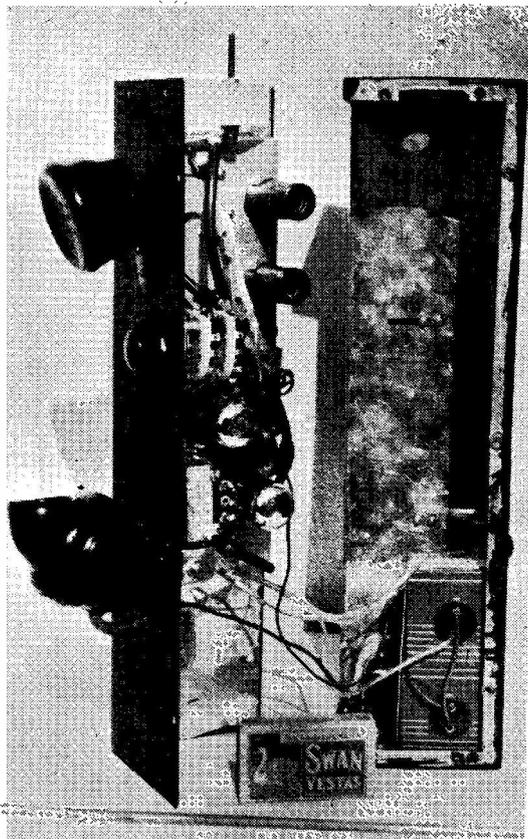
The transmitter is perfectly stable, even when operated whilst walking, and vigorous shaking produces no undesirable results at the receiving end. Likewise the received signal is steady (in the absence of QSB), the tuning does not need to be touched, and one can walk about whilst receiving.

The effects of polarization are interesting. The aerial at the fixed station being horizontal, it was found on the 14-mile test that the received signal was two S-points higher on the HRO meter when the Handie-Talkie was held so that its aerial was also horizontal and broadside-on. Next best position for the Handie-Talkie aerial was found to be when it sloped at an angle of about 45° with the base end nearest the other station—a position which results naturally when one stands facing towards it.

Signal-noise ratio was also best on the Handie-Talkie receiver with the aerial horizontal, and broadside-on, no super-regen. noise being audible on the 6LS carrier. The broadside is not sharp except close to the end-on position where the signal suddenly disappears and the super-regen. noise comes in very steeply, and it was observed that by this means a very sharp DF could be obtained on the fixed transmitter. Except for this the signals were R5 both ways with the aerial in any position, including vertical, with only slight super-regen. noise. It would appear that the signal wavefront undergoes some "twisting" at these ranges, as the difference of signal strength between horizontal and vertical is not great. Nevertheless a vertical aerial at the fixed station would be best for regular working—or a horizontal one on the Handie-Talkie. For distance working a $\frac{3}{4}$ -wave aerial might be worth while, say in two sections, to make up the 58½ ins., but it has not been tried yet.

Battery Drain

It is obvious that an HT drain of 17 mA whilst transmitting is high compared to the normal 8 mA or so imposed on a similar



General interior arrangement of the GM6LS Handie-Talkie. The spindle to the right of the microphone is the receiver tuning.

battery by a broadcast receiver. Hence the Handie-Talkie is not intended for long rag-chews!

On "receive" the HT drain of 1½ mA allows for longer periods of operation. After operating for half-an-hour or so, transmitting and receiving, the HT drops 6 or 8 volts, but regains normal voltage quickly when "resting."

In conclusion, it may be remarked that this design is regarded as being far from the ultimate, but in terms of size and power-consumption it presents a reasonable solution to the problem of the portable VHF phone transmitter-receiver.

R/T DISTRESS WAVE

Concurrently with the various changes taking place in the Top Band area, the *Mayday* channel is now 2182 kc. This is the small craft international calling and distress wave, for telephony operation, and is in effect the SOS channel for vessels in this category.

DX COMMENTARY

L. H. THOMAS, M.B.E (G6QB)

ANOTHER very mixed bag of reports. We had roughly ten days of really nice DX conditions, at the end of April and the beginning of May, but then things reverted to the normal extremely low level for just about the same period of time. After that (which brings us roughly to the time of writing) they showed distinct signs of improving again.

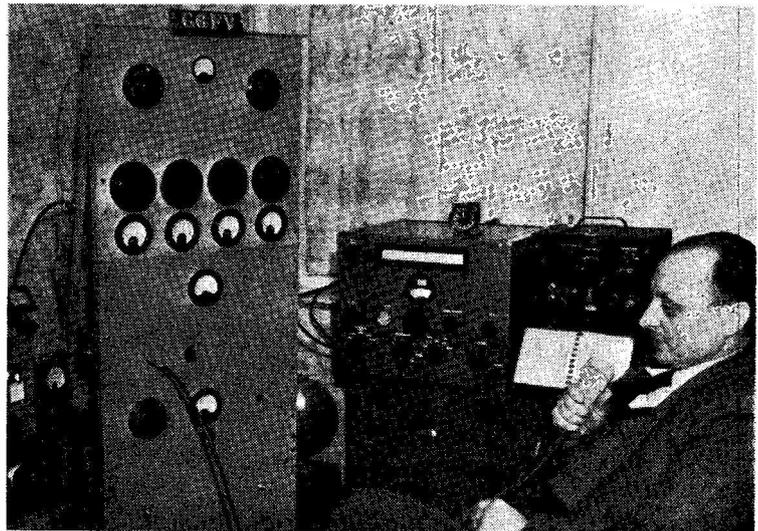
There isn't the least doubt that those who continue to work the good DX are only doing so because they have improved their receivers, transmitters and aerial systems as the deteriorating conditions have spurred them on.

When we think of the DX that could be worked in 1947 with an inefficient 100 watts and a full-wave aerial festooned over the roof-top, and compare it with what that same outfit would do today, we realise more and more that our long spells of bad conditions have acted as a very useful goal! What we are wondering is what some of those DX signals will be like when conditions do really turn good again.

Upheaval

Everyone knows the Top-Band news by now, as briefly reported on p.186 of the May issue. We are allowed to use 1800-2000 kc, very much on sufferance, and the onus is on us (pardon!) to keep clear of the coastal stations and shipping wavelengths.

The implications are far-reaching, particularly after dark, when the 10-watt amateur achieves ranges that the commercial fraternity really don't associate with an honest 10 watts. But we know well what 10 watts can do,



G6FV

CALLS HEARD, WORKED AND QSL'd

and it seems that we ought now to be thinking of two forms of activity on 160 metres: Firstly, the use of real QRP (1 watt or less) after dark; and secondly, an increased interest in the band during daylight hours, when we are less likely to cause interference at long or even medium ranges.

Top-Band Efforts

Despite the somewhat disturbed state of the band as a result of the new regulations, the activity does not seem to have fallen off very greatly. Several WABC-holders have increased their scores still further, and others are coming up rapidly to the 60 mark. This WABC business certainly stirred up some CW activity on the band, and many of the "local-phone only" types seem to have been badly shaken and somewhat amazed.

A new claimant for the Certificate is G3IBL (Derby), who was the loser in a neck-and-neck competition with G3HIS, and who

also used a crystal. These two stations were chasing WABC with frequencies less than 2 kc apart, and at a physical distance of about 12 miles, but they are still friends! IBL collected OH2MA, 3NY, 3RL, 5PN and 7OH, as well as OK1ZW.

G3BJU (Aylsham) has been taking a keen interest in the band for some time, and puts in a score of 65/68. He remarks that, despite the periodical grumbles of some old-timers, there is a growing band of very keen and efficient youngsters coming along.

G3BRL (London, W.5) reports for the first time, and laments the lack of activity in certain English counties. He uses 6 watts into an invisible aerial (block of flats!) and has had much fun since he started using the band last September. G3ITY (Chester) is slacking off until the shipping frequencies are stabilised; but he worked GM3HGA (Shetlands) and EI7S for his first EI. The latter QSO was at 1715 on May 2.

GI3HFT (Belfast) now shares the top scoring figure of 79 worked, but still wants GM3HSB (Perthshire) and a GW in Cardigan. The light evenings have decreased his activity, but he doesn't seem to have missed much. G2NJ (Peterborough) reminds us that his WABC (awarded on January 19) was achieved with crystal control—he was probably the first to do so.

GM3IGW (Alloa) is rebuilding and waiting to see how One-Sixty settles down. He heard CT1LA on the band some time back, and wonders whether he was genuine. IGW also reports that W2GGL was heard on the last Sunday in April.

G3HDQ (Woodford) was pleased to make a personal QSO with GM3IGW up at Alloa, but it was too early to get on the air and make G contacts. G13CVH (Armagh) finds activity dropping off, and asks us to say that he QSL's *via* the Bureau unless an s.a.e. is sent. For 148 cards sent out, he has received 14 in return, apart from those reaching him direct.

G5JU (Birmingham) heard W2GGL on April 19, and got a "QRZ?" from him, too. G5LH (Horbury) was given a fine welcome in GI-land on his recent visit, and reports that some members of GI6YM are hoping to organise a WABC expedition to Co. Tyrone and Co. Fermanagh before long.

GM6FB (Paisley) asks us to

mention that his outgoing cards seem to have gone astray in many cases, although every QSO has been confirmed. If anyone has not had his card, he will send another on request. 'FB is rock-bound on 1820 kc and says that not many people listen up there—so look out for him on that frequency, between 2030 and 2230.

GM3JDR (Caithness) needs to work *Caithness* for a new one, but has no immediate hopes! This county, with GW3FYR, would give him that magic score of 79, which seems to be about the maximum possible at the moment.

G8JC (Worcester) remarks that the very chaps who complain about not receiving QSL's are themselves defaulters, and quotes quite a few of them. But he says the standard of operating is very high, with an atmosphere of general friendliness. GM3EHI (Lanark) claims his Certificate and thanks everyone for the enjoyment it has given him. He, too, says the behaviour has been excellent and the queues most orderly.

G6VC (Northfleet) has now worked 78 of them, but he's a bit disappointed at not having yet worked ZC4 on the band (so are we!) G3IQO (Liverpool) thanks all GM stations for their speedy QSL's (he is rushing up to the post with 58 confirmed) and adds that he has worked MF2, OH, OK, HB and DL, with an aerial never longer than 87 ft.

G2HKU (Sheerness) is back on the band after his somewhat

TOP BAND SURVEY

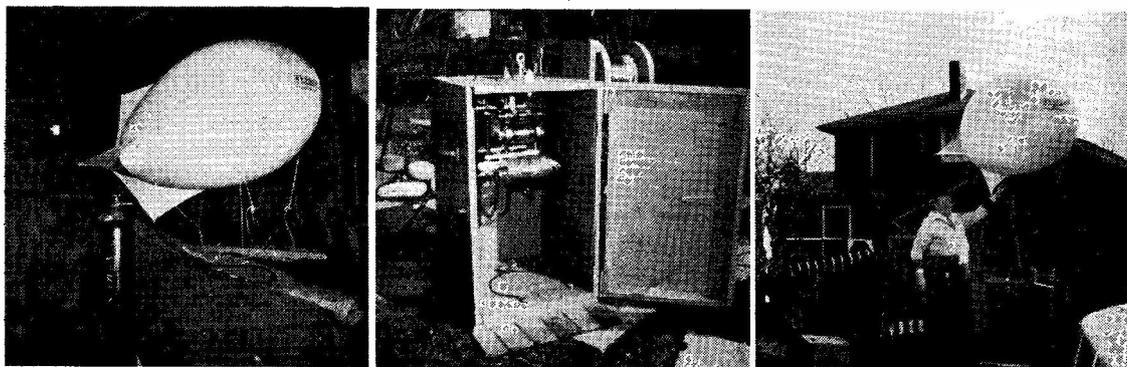
Daylight DX Test, Saturday-Sunday, June 20/21, 1500-1700 BST only, each day. Call "CQ MDT" and look for stations over 100 miles distant—and please Report Your Results.

drastic rebuild, following the floods. But even the gear that was above water-level is now packing up on him. Notwithstanding these trials, he has worked OH2MA, G15UR and GM3JDR. He tells us that OH2MA hopes to visit England at the end of June, and gives the following GI news, *via* G15UR:—G13GQA, 3HFT, 6WG, 6YW in Co. Antrim; G13CVH, Co. Armagh; G13HAJ and 3IOS, Co. Down; Tyrone, Fermanagh and Derry still blank.

G3ABG (Cannock), with an aerial only 8 ft. high, worked OH2MA, 2YV, 3NY, 7OH and 8NV/2. G3GUM (Formby) reports that his Snowdon expedition, projected for Whitsun, has had to be postponed until September . . . but he is toying with the idea of a station up there for the Trans-Atlantics! (We will launch the appeal for electrically-heated clothing later on).

Daylight DX Tests

Last month we commented on G2Y's suggestion that some



These interesting photographs show the essential details of the miniature balloon ("Kytoon") used by W1BB, Winthrop, Mass., to support his vertical 160-metre aerial for tests on the Top Band. At left is the Kytoon parked in the garage, with the bottle of helium for charging it. At centre is the aerial coupling and tuning unit, housed in a water-tight box outdoors, with the control winch. At right, Stew Perry about to let the Kytoon sail aloft with 260 ft. of light wire attached. The one snag is of course to find windless conditions at the time the thing is wanted; with anything more than a light breeze, the tendency is for the aerial to be pulled away at some angle well out of the vertical.

TOP-BAND COUNTIES LADDER

(Starting Jan. 1, 1952)

| Station | Confirmed | Worked |
|---------|-----------|--------|
| GM3OM | 79 | 79 |
| GI6YW | 78 | 79 |
| GM3IGW | 78 | 78 |
| GI3HFT | 76 | 79 |
| GM3EFS | 75 | 80 |
| G6VC | 75 | 78 |
| GM3JDR | 74 | 77 |
| G8KP | 73 | 77 |
| G3ELZ | 73 | 76 |
| G2NJ | 73 | 74 |
| G4XC | 69 | 72 |
| G5LH | 69 | 72 |
| G6ZN | 68 | 72 |
| G3HDQ | 67 | 69 |
| G3ESY | 67 | 68 |
| G3HIS | 66 | 69 |
| G3IAF | 65 | 73 |
| G5JU | 65 | 71 |
| G3BJU | 65 | 68 |
| GM3EHI | 63 | 68 |
| G3AKU | 61 | 63 |
| G3GZJ | 61 | 63 |
| G3FNK | 60 | 69 |
| G3HTI | 60 | 64 |
| G3IBL | 60 | 60 |
| G3IQO | 58 | 62 |
| G2BJN | 52 | 55 |
| G3HIW | 50 | 66 |
| G3IEF | 50 | 60 |
| G2YS | 46 | 61 |
| G3BRL | 45 | 60 |
| GI3CVH | 44 | 62 |
| G2AOL | 42 | 66 |
| G8JC | 37 | 50 |
| GW3CKB | 35 | 55 |
| G3ABG | 30 | 54 |
| G3DO | 28 | 39 |
| G3DVQ | 24 | 30 |
| G3ITY | 23 | 45 |
| G3HWH | 20 | 41 |
| G3FZS | 20 | 33 |
| G5FA | 20 | 28 |
| G3NA | 18 | 31 |

daylight tests over "semi-DX" distances should be tried. Now, as our band is in such a parlous state after dark, we feel that something should be done. Even in the summer there is surely a call for such activity, so we suggest the following trials:

Dates, Saturday, JUNE 20, and Sunday, JUNE 21; *Times*, 1500-1700 BST. *Objects*: To work as many stations over 100 miles distant as the band conditions allow. In other words, let us have as much activity as possible from all over the country at those times, to give things a chance. To identify yourself as an interested party, call "CQ MDT" (for Magazine Daylight Test). This is only a trial run, but the results will be useful in deciding whether we can manage a properly-organised contest during the autumn, having regard to the urgent importance of avoiding QRM. Useful preparation for this event would be (a) A careful survey of the 1800-2000 kc area during the week-end June 13-14 to find clear frequencies for daylight operation, and (b) A wall map of the U.K. with a circle of 100 miles radius with your station as centre. Please send in your reports immediately after the week-end concerned, and *don't* wait for the next deadline.

Eighty Metres

The 80-metre DX crowd seem to be in a bad way these days, and the band is more tightly jammed with strange-sounding transmissions than ever before. Even persistent gramophone grinding is beginning to make an appearance. This is something we had to fight down on the 180-metre band 25 years ago! The trouble is that on Eighty it causes much more annoyance, and on a Sunday morning is quite inexcusable. Real DX is almost non-existent, although we are pretty sure that some concentrated listening would unearth VK5KO at some time of day or night!

G3ITY contributes an interesting one, having had a contact with OD5AK. This has been confirmed, too, but unfortunately the OD has put "14 mc" on the card in error.

Others have reported contacts

with CT2BO, OY2Z and 3IGO, an occasional OX and the like, but there's nothing there to make a real DX-chaser's heart beat faster.

Forty Metres

Forty seems to be in the doldrums, too. A few stray reports indicate that some people still stand by the band, but they are mighty few. G3HEV (Downham) has worked 12 countries on phone since January; G3HDQ worked P11LC, the Dutch weather ship *Cumulus*; G6QX (Hornchurch) raised OD5XX; G3IEF hooked his first PY, one early morning.

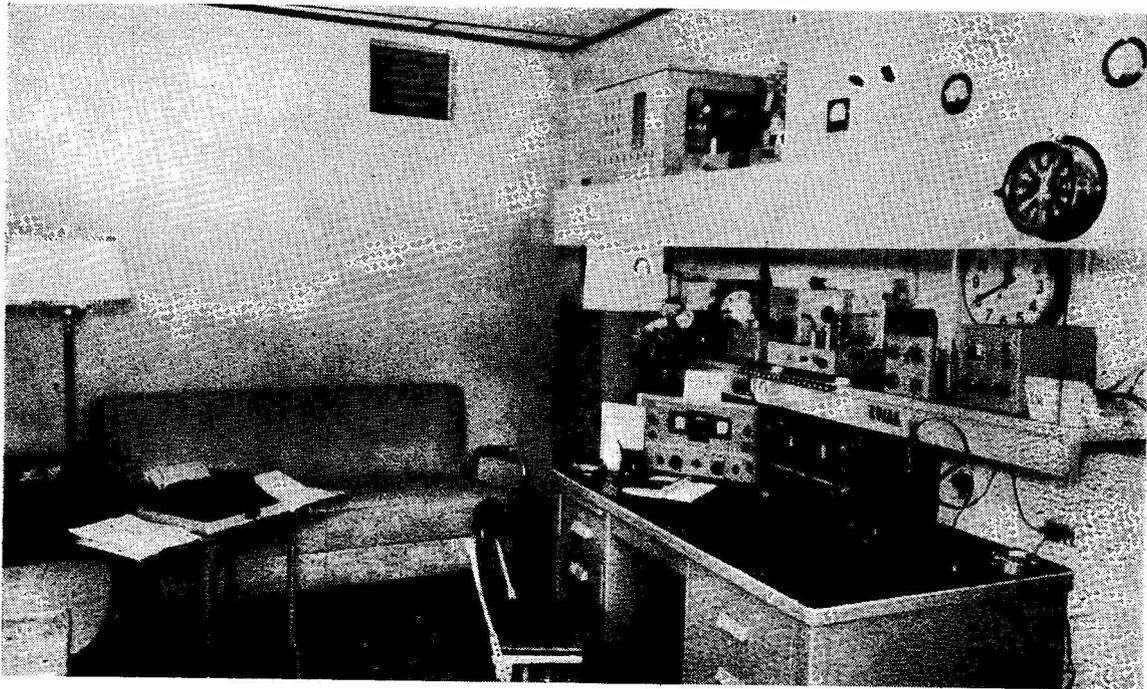
Otherwise no one even mentions this strip of territory at all, and judging by what we have heard during the occasional tour round the receiver, we are not surprised.

General Notes and News

G3GUM says that everybody up his way seems to be very enthusiastic about the "T2FD" aerial—but all are waiting for someone else to try it out first. So he suggests that some real first-hand gen. from users of the thing would be most welcome. Of course, the way to get this is to try it—but T2FD owners, please note, and let us know by next month what they are up to.

G3ABG tells us that G2ATM/G3FYN sailed for VS2-land during May, for a three-year tour of duty. He has taken a B2 with him and has applied for VS1/VS2 licences. He will be looking for G's on Twenty CW and will QSL all contacts.

As we predicted last month, contacts with VU7AF (Nepal) in 1948-9 have been claimed by quite a few stations. G3COJ (Maidenhead) supplies particulars of his, on 10-metre phone; two of them were with VU7AF, but even before that, he worked a station with no call-sign, but announcing himself as "Khatmandu, Nepal." This mystery has never been solved, and he doesn't think it was VU7AF before his licence arrived. G3COJ goes on to refer to the sunspot cycle, and rather dashes the hopes we aired last month. He says that the last minima were in 1932-33 and 1943



Impressive layout at the well-known DX station KV4AA, Virgin Islands. To the left on the top shelf is the 750-watt PA, using 4-125A's. Other items visible in the photograph are the beam direction indicator, VFO (centre, middle shelf), and the electronic key, to the right of the VFO. Aerials at KV4AA include a 136-ft. Zepp for 1.7, 3.5 and 7 mc and three-element beams for 14, 21 and 28 mc.

-44, so that the present minimum might not arrive until 1954-55. But, as he says, the cycle is not always 11 years long; it has been as short as 8 or 9 years, and one (before the discovery of radio) lasted as long as 14 years.

Certainly the cycle is never symmetrical, but if the last minimum was really in 1943-44, how is it that 10-metre conditions early in 1946 were so terrific? Our impression is that the maximum was reached in 1947—if not actually in 1946. The only hope can be that this present cycle was not so lop-sided that we reached the maximum in three years and shall have to endure eight years of falling down the other side. One thing is certain: When conditions do peak up again, a great many people will have a lot of fun in re-finding all the DX data discussed in this column over the years. (In the meantime, shall we start moon-beaming, hopefully, on Forty Metres?)

G6PD (Knebworth) is another who claims a contact with VU7AF—his was on Christmas Day, 1948, and he has the card.

GM2DBX, remarking that the heading to this Commentary mentions "Calls Heard, Worked and QSL'd," says that there is really very little QSL news most months. So he supplies some. Cards have arrived from M1B, ZK2AA and VP4TH—all for Twenty phone. Jimmy has also received his Certificate from CQ as leading GM in the 1951 DX Contest, all bands. (Also first place on Ten and Twenty).

Flashback

As an aftermath of the season's Top-Band Trans-Atlantic Tests comes a very full and interesting report from W0NWX (Newton, Iowa). Bob Denniston will also be remembered by many for his fine Top-Band work from W4NNN in previous years. For this season's epic he put up an 1100-ft. wire while the "nice antenna weather" was on, but a week before the tests it iced up until it was half-an-inch thick, and naturally came down.

So, in "below-Zero Wx" Bob re-erected an 800-footer, from his 75-ft. pole to a 50-ft. tree; this

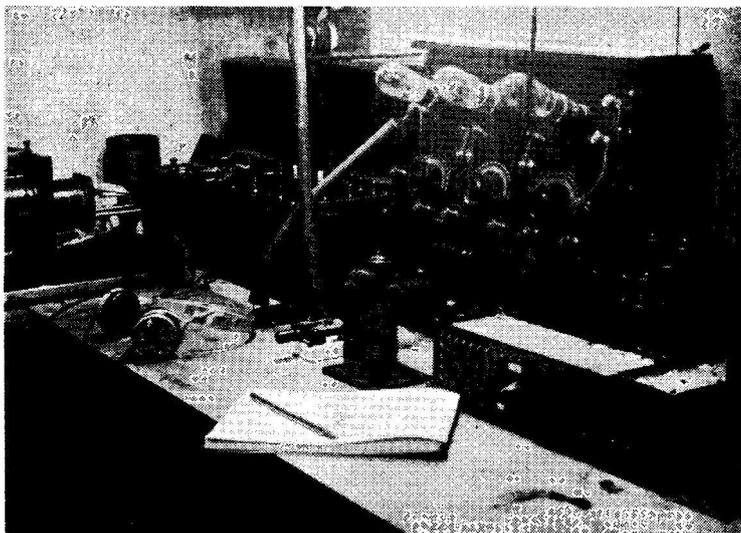
wire, running NNW, was used with another one, 545 ft. long, running WSW. Other aerials available were the other half of the 545-ft. Vee-beam (WNW) and another 1100-ft. wire running SE! So much for the copper farm.

Stations worked on One-Sixty last season included KV4AA, ZL1BY, XE2OK, KH6QY/KC6, KH6IJ and KG4AF. Then, in November, 1952, skeds were started with ZL1AH, who heard W0NWX on almost every occasion, but could not be found, although he did work W9CVQ.

On December 28, G5JU was heard and G3PU worked for the first Europe/W0 contact; and ZL1AH, ZL1NX and G5RI were

TEN-METRE PARTY

All G's able to operate on Ten, Phone or CW, are invited to come on that band for Sunday, June 28, to work who or what they can, local or otherwise. Reports will be greatly appreciated for the August issue.



This was some of the gear in use at G2BBZ, Finchley, London, in the early 1920's. In those days sliding tuners, tapped coils and heavy wooden cabinets were very much in vogue—and a lot of fun we had with them, too. A description of the modern G2BBZ appeared recently in our "Other Man's Station" feature.

worked the same night. Thereafter the contacts were thick and fast, but the pick of the bunch from December to March seem to have been KP4DV, EI9J, VP4LZ, KV4AA and 4BB, KG4AF, VP9BF, XE2OK, VP9BDA and KP4KD. Interspersed with these were plenty of G's, but on several occasions Bob could hear W1BB and the East Coast stations working G's straight off the reel—but nothing doing out in Iowa.

Doing a bit of theorising, Bob says he thinks the tests of 1951-52 were poor only on account of abnormal and freakish solar activity (mostly, as usual, at weekends!) He agrees with everyone else that the 1952-53 series were much more interesting, and he certainly managed to extract his own fair share of DX from them. Incidentally, all this fine work was done with P/P 805's running at 200 watts, and an SX28A receiver, modified in accordance with the recent article in *Short Wave Magazine*.

Another interesting account of activity comes from W2EQS (Westwood, N.J.), who was one of the "regulars" throughout the tests. Leaving out all his G contacts, his efforts brought him QSO's with KP4DV and 4KD, VP4LZ, KV4AA and 4BB,

KG4AF, VP9BF and 9BDA, and, lastly, KP4TF, as late as March 21. He heard ZL1NX and XE2OK, and was heard by ZL1AH, 1NX, DL1IX and XE2OK. 'EQS suggests that G stations ought to spread out more, and says that there was less commercial QRM in the 1825-1875 kc region than in the congested 1775-1800 kc area. It looks as though we shall be using 1825-1875 next year, anyway!

Whatever views you may hold about these Trans-Atlantic Tests,

TOP BAND SURVEY

Daylight DX Test, Saturday-Sunday, June 20/21, 1500-1700 BST only, each day. Call "CQ MDT" and look for stations over 100 miles distant—and please Report Your Results.

it cannot be denied that our joint efforts with W1BB stirred up world-wide interest and some worth-while activity, proving once again the DX value of the 160-metre band. Now if only we were allowed to use 100 watts, say, between 0500 and 0700 only, there might be a chance of a Top-Band WAC.

Notes from Overseas

ZS2AT (East London) reports that a hailstorm neatly split all his feeder spacers, thereby converting his 136-ft. Zepp into a 207-ft. long-wire, end-fed, with much improved results on 21 mc! (Did that hailstorm twist the feeders together, too, or did it just drop the dead one on the ground?)

G3AIR (RCAF, Goose Bay, Labrador) sends some useful gen. on the activity in that region. On 14' mc you should find VO6B, 6P, 6N, 6R and 6U; and on 3.75 mc phone, if you are lucky, you will hear VO6AB, 6B, 6H, 6N, 6P, 6S, 6T, 6U and 6X. The latter run two nets on 3780 kc—one at 2045 and the other at 2245 GMT

**FIVE BAND DX TABLE
POST WAR**

| Station | Points | 3.5 mc | 7 mc | 14 mc | 21 mc | 28 mc | Countries | Station | Points | 3.5 mc | 7 mc | 14 mc | 12 mc | 28 mc | Countries |
|---------|--------|--------|------|-------|-------|-------|-----------|---------|--------|--------|------|-------|-------|-------|-----------|
| DL7AA | 589 | 74 | 131 | 210 | 74 | 100 | 217 | G6QX | 374 | 50 | 91 | 143 | 34 | 57 | 166 |
| G6QB | 567 | 52 | 103 | 215 | 62 | 135 | 231 | G4ZU | 333 | 11 | 9 | 175 | 18 | 120 | 189 |
| G5BZ | 500 | 56 | 101 | 217 | 61 | 65 | 221 | G3GUM | 312 | 31 | 38 | 168 | 74 | 1 | 177 |
| G2VD | 468 | 46 | 84 | 175 | 55 | 108 | 184 | G2BW | 308 | 24 | 57 | 144 | 40 | 43 | 153 |
| G2WW | 439 | 23 | 70 | 188 | 51 | 107 | 195 | G2YS | 307 | 42 | 52 | 125 | 48 | 40 | 145 |
| G2BJY | 437 | 48 | 77 | 141 | 55 | 116 | 179 | G3ABG | 307 | 35 | 81 | 143 | 18 | 30 | 151 |
| G3DO | 418 | 24 | 45 | 192 | 50 | 107 | 219 | G8VG | 268 | 34 | 76 | 123 | 9 | 26 | 140 |
| G3FXB | 403 | 54 | 102 | 168 | 40 | 39 | 174 | G3FPQ | 254 | 47 | 40 | 120 | 35 | 12 | 127 |
| G5FA | 398 | 33 | 116 | 150 | 26 | 73 | 165 | G2DHV | 173 | 20 | 21 | 107 | 10 | 15 | 111 |
| | | | | | | | | VS7XG | 116 | 1 | 17 | 93 | 2 | 3 | 93 |

—mainly for traffic. Amateur Radio is the sole means of communication in some of the remote spots out there, and they may be heard arranging everything from movements of sacks of potatoes to the air-lifting of patients to a hospital 400 miles away

W2GT (Rochelle Park, N.J.) says he is hopping mad about the EA9DC affair, several W's having sent one dollar for their QSL without any result. He was also mortified to miss VS9AW while he was in Oman and to find that VS9AS is in Aden. (However, we understand from VS9AS that trips to Oman are planned.)

Twenty Metres

For a few days this band showed flashes of real brilliance. KH6's were heard in the mornings on

several occasions, and KB6AQ and VR2CG broke through on one or two occasions. Afternoons were sometimes good for Asia, and late evenings for North and South America. The average over the whole month, however, was pretty poor.

GM3JDR transferred his attentions from the Top Band, and with 25 watts he raised MI3, 4X, ZC4, OQ, OD, FF, KV4, TF, W6 and other "medium DX." G3CMH (the Yeovil Club) raised KV4, OD, SU, 3V and VO on phone. Gotaways were HI6EC, HP3FL, OA4B, PJ2's, VP5, VS7 and SVØWG, who, despite his call, is on Rhodes.

G5JU raised KH6ARL, and remarks that KH6 will shortly disappear as a country when Hawaii becomes one of the United States. (Will it stay as

KH6 or will it become the 11th District?)

Activity at G8FC (Locking) brought in CO2BM (0005), EL9A (1720), HH2FL (1035), JA6AD (1130), KC6PX (1640), KR6IG (1110), VS1, 2 and 9, VU2JK (1450) and Y12AM (0800).

G3HDQ worked his first ZL's at 0900 one morning and raised KV4AA for a new one. G4QK (Croydon) raised OY3IGO and heard YS10 and CP2BA. G5BZ (Croydon) worked a few KH6's, but missed KB6AQ and ZK2AA. Others worked were VP8AJ, LU3ZO, OA4ED, CR5AA, JA3AF, ZS3KG and "the usuals."

G3TR (Southampton), on phone, operating for the first time from his new hill-top QTH, collected DU, VS6, OA, HR, VP2, 3 and 7, TG9, HH and SVØ (Rhodes). A nice bag for parallel 807's and



All those who heard or worked W0NWX, Newton, Iowa, during our Trans-Atlantic Tests on 160 metres earlier in the year will be particularly interested in this photograph. The gear includes a Lysco VFO driving a pair of 805's to 200 watts, and the receiver is an SX28A, modified as described in "Short Wave Magazine" for October, 1952. Outside, W0NWX has a 75 ft. mast supporting one end of an aerial 1,100 ft. long running across a valley.

21 MC MARATHON

(Starting July 1, 1952)

| STATION | COUNTRIES |
|---------|-----------|
| G3GUM | 74 |
| DL7AA | 74 |
| G6GN | 62 |
| G6QB | 62 |
| G5BZ | 61 |
| G2VD | 55 |
| G2BJY | 55 |
| G2WW | 51 |
| G3DO | 50 |
| G8KP | 50 |
| G2YS | 48 |
| G5CP | 46 |
| VK2AWU | 45 |
| G3FXB | 40 |
| G2BW | 40 |
| ZE3JO | 36 |
| G6QX | 34 |
| G8OJ | 32 |
| G3CMH | 31 |
| G5FA | 26 |
| G3WP | 24 |
| G3TR | 18 |
| G3ABG | 18 |
| G2DHV | 10 |
| G8VG | 9 |

phone—perhaps the “ZL Specials” helped!

Slightly increased activity at G6QB, testing out a new rig, brought in JA5AB (1145), VS7MC (1635), AP2R (0905), VU2FH (1600), KH6IJ and 6VG (0900), KL7APT (0900), VR2CG (0930), AP2N (1555), VS1FC (1730), VS7GV (0845) and W6LW (1740).

The 21-mc Band

Our newest band raised a few good patches—in fact, some really freakish DX was heard on occasions. On April 29, with a few ZS phones coming through, a

terrific signal suddenly arrived from W8BHW on phone. He was using a 12-element beam only a few feet off the ground, but it certainly put a signal over here. Apart from this sort of thing, we have had several periods of short-skip which have brought new European countries into circulation.

G3TR now has 18 countries on phone; G3DO (Sutton Coldfield) added OQ0DZ on phone, with VQ3, EA, OZ and SP on CW. G6QX pulled in SM, I and HE9LAA, the last being a new one for any band.

G2WW (Penzance) tells us that since VQ4RF came on the band, in six weeks' operation he raised 73 countries—although he was off the air for a while on account of the rival activities of typhoid fever! (He is now better, we are glad to note). 'WW himself worked ZD1SW, EA5DC, I1BLF/Trieste, 3V8AX and ON4MI.

New ones for G3GUM were MP4BBD, ZD2JDH and I1BLF/Trieste. Best Gotaway was CP5EK. G5BZ raised SP, VS9, IS, CT, 9S and GW on short skip; DX was CE6, KV4 and ZB1; Gotaways, CP, HK, CR4, EA9, ZD1 and ZP. (So there's really plenty to choose from if you hit the band at the right time.)

G2BW (Walton) added MP4, OQ5 and KV4, and was amazed on May 3 to find the band full of loud South Americans at 2200. G3CMH found it open on occasions until 2300, and raised LU3DAH, KZ5IL on CW, with a much larger phone bag including CE, CN2, HC, KG4, OD, VQ4 and 5, ZP and 5A. Gotaways were CR4AP, CX1GG, HP3FL, HK4FV, W7PKF (2145), ZD1SW and ZD9AA.

G3ABG had one session on the band, which brought in KV4AA, KZ5DE, LU8QA, KP4KD, PY's and W's. G6QB added six new ones with OD5BA, ZD9AA, SM, SU. SP and MP4BBD.

Ten Metres

Not one single correspondent

TEN-METRE PARTY

All G's able to operate on Ten, Phone or CW, are invited to come on that band for Sunday, June 28, to work who or what they can, local or otherwise. Reports will be greatly appreciated for the August issue.

mentions the ten-metre band this month, and conditions certainly have been just about at rock-bottom for DX. We are reminded, however, that we promised to lay on another “Activity Sunday” for Ten. The last was on December 7, and was pretty well received; we suggest a repetition of this on Sunday, June 28. No rules or conditions—just come on the Ten-Metre band at any time that day, and use it! If there's no DX, we might as well use some of those 2000 kc for local work

Some 1.7 mc DX QSL's

G. C. Allen (Thornton Heath) has been receiving some nice QSL's for his good work on the Top Band, and some quite interesting news with them. W9FIM mentions having worked XE1A last year; W8BKH, using 75 watts, worked all W districts on March 9, plus VE1, VP9, KG4 and KV4. And finally, G.C.A. remarks a useful opening on April 12, when he logged W1AW, 2ZUW, 2GGL, 4BZE, 4HQN and 9CZT.

N. C. Smith (Petts Wood) has received a card confirming his logging of W0APF on 1.7 mc phone; W8GDQ and KV4BB were heard at the same time (March 8).

And with that we reach the end of this month's news. Next month's deadline is first post, June 10, and the following one first post July 15.

Address everything, as usual, to “DX Commentary,” *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. Until next month. 73. Good Hunting, and BCNU.

Amateur Radio in Soviet Russia

PART III

This is the concluding article of a series, the first two parts of which appeared in our March and April issues. The authors discuss the Russian official attitude to Amateur Radio, and show how the policy of the satellite countries as regards amateurs conforms to the Moscow pattern. They also suggest that the change in Soviet leadership may result in Russian amateurs again being permitted to work beyond the Iron Curtain—as they could until two years ago.—Editor.

DURING the early post-war period a very familiar callsign on the 7 and 14 mc bands was that of RAEM — normally a Russian maritime identification, but which was in fact used ashore as well as afloat by Ernst Krenkel. The privilege of using this call was bestowed upon Krenkel by the Ministry of Communications of the USSR in recognition of his outstanding services as radio-operator of the icebreaker *Chelyuskin* which, as many readers will remember, rescued a party of Russian explorers who had become marooned on an ice-floe in the Arctic. Krenkel was made a "Hero of the Soviet Union" and was also appointed president of the Central Radio Club of the USSR. However, his glory appears to have been short-lived for he has not been heard on the air for some years and vacated his presidential office in 1949.

Many other well-known operators have also followed Krenkel into oblivion, but as quickly as they disappear new calls are being issued. As previously explained, newly licensed operators are permitted to work initially only on the 1.7 and 3.5 mc bands, and it is here that the most recently issued calls can be heard. During the last few weeks we have noticed quite a spate of new ones on these bands, including UA1DF in Tosno, Leningrad (op. Kapralov), UA3GA in Moscow (op. Shokin), UA3XW in Kaluga — operated by Nikolai Denisov, widely known as chief operator of club station UA3KWA; UA4FG and 4FH in Penza, UA4PD in Kazan (op. Stakhov), UA4HM in Kuibyshev (op. Machurin), UQ2AS of Riga (op. Freyman) and UR2AP in Tallinn. With their 10-watt limit these stations are rather elusive on Top Band, but a search during one of the frequent Russian

contests will usually produce some of them between 1750-1800 kc, their normal operating area.

Some of the YL's

In a country which claims to have been the pioneer of the "Equal pay for equal work" theory and forerunners of female emancipation, it is not surprising that the Russian amateur fraternity includes a high percentage of YL operators compared with most of the member-countries of the IARU. At the present time YL operators form about 20% of the total number and this proportion is steadily increasing! Perhaps the best known of Russia's young ladies is Zoya Kirilko, who for several years swung the key at UA1KBB—she is now UA1BJ and is still heard frequently. The March, 1952 issue of *Radio* was entirely devoted to YL operators, the front cover of this issue depicting Tanya Volkova (UA3-3831) and Nina Golubeva (UA3-3812) operating station UA3KQB at the Radio Club, Bagaev Street, Ivanovo.

Official Attitude

It may often have been wondered why the Soviet Union, which remains a closed shop in so many other respects, allows Amateur Radio operation at all. This is undoubtedly due to the fact that in Russia a high proportion of technical development in the field of radio can be attributed to the experiments of the radio amateurs of the Soviet Union, as in other countries. There is also the desirability, from a military point of view, of encouraging and maintaining a reserve of skilled operators, interested in radio for its own sake, whose training costs next to nothing. In the latter connection it has been noted that great importance is attached to efficient traffic handling combined with high sending speeds. Morse speed trials seem to have become a fetish with the Russians, in much the same way as sweepstakes and CD parties elsewhere! They claim to have broken the international record as far back as 1936, when one Zavolev transmitted plain text at a speed of 382 letters per minute (equivalent to 76.4 w.p.m. by our standards). This record remained unbroken until 1948 when Fedor Roslyakov of Kaliningrad (UA2-12205) performed at 85 w.p.m. We have not experienced the pleasure of hearing Roslyakov during one of his speed exhibitions (so far as we know!) but he is frequently heard with a steady 30-35 w.p.m. at the key of UA2KAW and undoubtedly possesses a good clean fist.

The DOSAAF organisation have recently introduced a new yardstick for operators with the object of inducing their members to become "Masters of Radio-amateur Craft." In order to achieve this desirable status Russian operators have to work the 16 Union Republics (the RSFSR counting as a single entity for this purpose) in 3 hours and 100 oblasts in 15 days, and to prove a sending and receiving speed of not less than 24 w.p.m. with 98% accuracy. This "norm," as it is termed, was introduced in the autumn of last year, since when quite a number of well-known UA's have qualified. Among the first to do so were UA3AW—Yurii Prozorovsky, and UA3CR — Leonid Labutin, both of Moscow, who jointly merit the title of Russia's top-flight operators.

VHF Activity

In addition to the usual LF and HF amateur bands the UA's are permitted to use the band 85-87 mc. But possibly owing to the vast distances which separate the more important towns very little appears to have been achieved on VHF and activity is, by all accounts, at rather a low level. The foremost VHF authority in the USSR is Georgi Kostandi, UA1AA, of Leningrad, who frequently writes constructional articles for *Radio* magazine and who for the past few years has been winning cash premiums at the annual Radio Day exhibition in Leningrad for his home-built VHF gear. In spite of their apparent apathy towards VHF work in general the Russians have made excellent progress in the fields of Radio-astronomy, Radar and TV. The latter has gained immensely in popularity now that radio gear has become more easily obtainable and although amateur television transmission is as yet unknown a large number of enthusiasts have built their own TV receivers. The main TV stations are in Leningrad, Moscow and Kiev, and TV centres are also planned for Khabarovsk, Sverdlovsk and other cities. A description of the Kiev station was recently given in the Russian press, from which we note that it employs the usual Russian 625-line system; the vision channel requires a bandwidth of 50 c/s to 5.5 mc (amplitude modulation) and the sound channel from 50 to 10,000 c/s (frequency modulation). The service area of the Kiev station is comparatively restricted—20 to 25 miles—but the fringe area extends to 60 or 75 miles. The Moscow and Leningrad TV stations cover rather wider areas — the former's transmission being regularly received in Ryazan, which lies about 120 miles to the south-east, while Leningrad TV, both vision

and sound, has been received in Holland, Belgium, Germany and is believed to have been picked up also in this country.

Satellite Policy

Since their alignment with the Soviet Union most of the satellite countries have reorganised their amateurs on very much the same lines as the UA's. In Poland, for instance, the same system of SWL numbers is used and a fair percentage of Polish stations now active are collectively operated and have the familiar three-letter suffixes to their calls. The number of active amateur stations in Poland is very small compared with pre-war days, although the opposite impression may have been created by the fact that call-signs have been changed on two or three occasions during the last few years.

One of the few countries in which there has been a decided increase in the numbers of radio amateurs since their entry into the Iron Curtain orbit is Bulgaria, which now boasts upwards of six club stations each with a dozen or so licensed operators. Owing to the dearth of suitable equipment most of these operators have been obliged to pool their resources and operate on a collective basis, although each of them has his own call-sign and will presumably be heard from his own station if and when gear becomes available. The LZ's have a semi-military sponsoring authority, known as DOSO, from whose Central Radio Club in Sofia emanates the call LZ1KAB (formerly LZ1AA). The chief operator at this station is Dimitr Petrov, LZ1DP, and he is assisted by Pencho Toskov, LZ1PT; Alexandr Torosyan, LZ1NW; Mihail Mihailov, LZ1MN; Spas Delistoyanov, LZ1DW; Todor Dikov, LZ2AC and others. Club Stations LZ1KSA and LZ2KAC are also very active with several more under construction or being rebuilt.

Roumania seems to have roughly the same number of amateur stations as in pre-war days, with one or two old timers such as Ernst Gross (YO3AA, ex-YR5IG) still in circulation. Call-sign numbers are issued on a territorial basis, as follows:

| | |
|------------------------------------|---------------------------|
| YO2—Banat | YO3—Bucharest |
| YO4—Dobrudva and South Moldavia | YO5—North Transylvania |
| YO6—South Transylvania | YO7—Muntenia |
| | YO8—North Moldavia |

The position in Hungary and Czechoslovakia has also followed the usual pattern,

with the introduction of Club stations and the disappearance off the air of many operators well-known in Western countries before the Communist era. So far as Albania is concerned the position remains practically unchanged, and no licensed stations are in operation. The same applies to the Russian-occupied Zone of Germany, although it appears that several DL8's, with commendable initiative, are making their presence known to the outside world.

We would like to conclude this series with a brief mention of the possibility of Russian amateurs again being permitted to communicate with stations outside the Soviet Bloc.

Although no official word has come through in this connection it seems very probable that in the current Russian mood the Soviet authorities may grant a wider degree of freedom to their radio amateurs than has existed during the last two years.

Already a number of G/UA QSO's have been established since the change in leadership, but so far these contacts have been possible only with a very tactful and infrequent use of respective call-signs! However, the seed has been sown and who knows but that the more enterprising among us will be able to collect that overdue UJ8 or UL7 QSL in person during the summer holidays!

Station G3JFP on the Air

STORY OF A GREAT
ACHIEVEMENT

“HONORARY SECRETARY”

No words of ours are needed to give point to this account of an undertaking which reflects the greatest credit on all concerned, and not least upon the beneficiary himself.—Editor.

THIS is an account of one man's sheer determination to overcome considerable difficulties in order to join the amateur fraternity—and on the other hand is also an example of the very fine *esprit de corps* obtaining in Amateur Radio itself.

The story commences back in September, 1952, when the writer was consulted by the local branch of the G.P.O. regarding an application they had received from a blind ex-Serviceman who wished to become a licensed amateur. The G.P.O. authorities were able to tell from his letter that he was not aware of the standard required of amateurs before a licence can be granted. But rather than just turn the application down they very sympathetically dealt with it by passing on the applicant's name and asking if our Club would care to investigate the matter and see if we could do anything towards making it possible for him to achieve his ambition.

Without loss of time the writer called on the ex-Serviceman concerned, now G3JFP, at his home some five miles out of town. After

a long chat with him on that evening it was obvious he was a keen and genuine case, with the ability to learn all that was necessary to get his “ticket.” It was clear, too, that here we had a case that simply must receive all the help and consideration that we could give.

Not only was G3JFP *sightless*, but he had also suffered the *loss of his hands*.

Club Co-operation

Thinking the matter over, the writer realised more and more that the Club was going to be asked to take on a job such as they had never tackled before in bringing G3JFP up to the necessary standard.

Confidence in the Club was not mis-placed. On the following meeting night all the regular members were told the story up to that time. To a man they agreed to help and we at once made tentative plans to go into action. From that point it became a kind of combined operations scheme to get G3JFP on the air. That evening's conference produced many offers of help and to commence the course three volunteers were selected to begin tuition. One ex-RAF type to give technical instruction, an ex-Army Signaller to give Morse practice with help from an R.N. Signals type (who, incidentally, is regarded as the “grand old man” of our membership, having done over 25 years' service in R.N. Signals).

This trio commenced visiting G3JFP every week, making a total of three visits per week and giving in all some 8 to 10 hours' practice and instruction each week.

It was indeed a start from scratch as G3JFP had no knowledge of Morse or Amateur Radio technique and the only listening he had done was on the household receiver on the 40

and 20 metre bands. Coupled to this was the fact that he could not write anything and neither could he be instructed by drawings, so everything had to be given aurally.

Technical Side

The technical instruction was handled by typing out beforehand a lesson covering one particular subject and then giving our student a piece-by-piece run through it, answering questions and explaining as we went, finally leaving the type-script for his XYL to read over to him again during the following week. Any queries could then be dealt with before commencing the next week's lesson. The two Morse instructors employed the conventional buzzer after teaching the alphabet, and speed was gradually increased through the weeks and months until it became helpful to use a stop watch to get an accurate estimation of G3JFP's speed.

By Christmas, 1952, very considerable progress had been made both in technical work and Morse learning, and it was clear to the instructors that another few months would see more active steps being taken towards the great day when G3JFP would make his first transmission. Here it must be said that in spite of the cramming, and we did cram G3JFP, he never let up in his keenness the whole time and was indeed always ready for more.

Providing Gear

By February it was time to call for more help from the members as it had been decided that it would be a nice gesture for the Club to build a transmitter for G3JFP and make him a gift of it. Accordingly a meeting of the interested members was held and a decision threshed out as to what type of rig would meet the special requirements of G3JFP. It was decided that he should commence operation on the 80-metre band and would, of course, have to be crystal controlled. This meant selective crystals as a Pierce oscillator had been chosen and crystal switching was to be used.

An appeal to the membership for components to build the rig brought an astounding number of gifts and a large percentage of the club membership rallied around with offers of equipment or personal help, in a most gratifying way.

Another direct participant was now brought in, a local licensed operator who offered to build the transmitter. The power pack construction was taken on by the writer himself. The final decision about the transmitter

was that it would be a 6J5 Pierce oscillator followed by a 6SK7 buffer amplifier, tuned, and then an 807 final, aiming at an input of 25 watts. The buffer stage was to be pre-tuned and controls were to be kept to a minimum, as any tuning requiring sight or touch would have to be undertaken by G3JFP's wife.

On these lines our fourth active helper went ahead and all the while the pressure was being kept up on G3JFP with the instruction and practice.

By April it was generally reckoned that G3JFP was in a position to cope with his G.P.O. test, as he was answering all types of questions similar to those set for the R.A.E. and his Morse had reached a speed of some 13 to 14 w.p.m.—in spite of the fact that keying was carried out *by the stub of his wrist*. Accordingly, the application was sent in and G3JFP sat back and waited for action.

Receiver Problem

Whilst this was in progress a determined search was started by us to obtain a receiver suitable for our friend to use and numerous letters sent out brought offers of help. However, nothing quite simple enough for a blind and handless operator to use was forthcoming so a direct approach was made to Messrs. Stratton & Co., Ltd., manufacturers of Eddystone equipment. The full story of the case was given them and they were asked if they could assist in any way. Here again we were given help far in excess of what we had hoped for; the result of our letter to Stratton's brought to G3JFP an Eddystone 640 in mint condition almost as a gift. G3JFP afterwards confessed to me that he was overwhelmed with the help and generosity he had experienced from all concerned.

Further cramming was now necessary, the use of the receiver had to be mastered in time for the installation of the transmitter, so the writer himself took on the job of devoting further attention to this. Within a very short time G3JFP was handling that 640 like a veteran, and it says something for the layout of the receiver that not one of the several controls beat G3JFP; handicapped as he is, he manages to manipulate every one of the eleven controls on the front panel.

By this time G3JFP had taken his G.P.O. test and he had passed in a blaze of excitement. Here tribute should be paid to the G.P.O. Rather than create for someone the job of taking G3JFP to them, they sent their examiner to G3JFP—a nice gesture indeed.

On the Air!

And now on to the last chapter of the story. Having got that ticket, a fine receiver, aerial erected by our members last Good Friday (better the day, better the deed) there only remained the installation of the Tx. Two of the interested parties, who had been in the quartette of active instructors (and both of whom were as anxious as G3JFP himself) went over to his QTH in the evening and commenced installing the transmitter. When the whole rig was ready for testing it was put on the air, and to the delight of all concerned it performed in every way as was hoped, giving exactly 25 watts input and loading nicely. There only remained the job of instructing G3JFP's XYL in the setting up and the meanings of the meter readings and so on—here again we found as apt a pupil as G3JFP himself.

The first call made went, by prior arrangement, to one of the helpers who had devoted more time than any in teaching G3JFP over the past months, namely, G3EDG. This con-

tact had to be a cross-band effort, but was 100% both ways. The only slip-up was due to the fact that G3JFP was so excited about the whole business he just could not swing a key that night, and only managed to say "hello" to G3EDG. However, those nerves will soon wear off and doubtless G3JFP will be key-pounding as well as the next man before long.

Well, there is the story up to the moment, a story of which our Club can feel justly proud, since it upholds the finest traditions of Amateur Radio. And now may we appeal to transmitting readers—please look for G3JFP at the CW end of the 80-metre band and give him a call, he will be happy and grateful to work you.

Lastly, as the honorary secretary of the Club concerned, the writer would like to put on record his personal thanks to all members who in the past months have assisted in some way or other in making possible "CQ CQ CQ de G3JFP."

Rotating the Beam

DESCRIBING AN AUTOMATIC REMOTE CONTROL SYSTEM

G. A. ALLCOCK (G3ION)

Getting the VHF array up on its mast is one thing, but devising some means of rotating the beam head is quite another, and many ingenious solutions have been put forward. Here is yet one more, based upon rotation not of the mast, but of the beam itself through 360° by remote electrical control, with the added facility of automatic operation. Set the pointer knob, and the beam takes up the desired heading. The article shows how in developing his system the author proceeded step by step till he arrived at the final solution.—Editor.

THE writer is blessed by having (what in these days must be something of a rarity) a tolerant landlord, so no objections were raised when permission was requested to erect a mast in the back garden to support a Two-Metre Yagi array. It was thought that the major obstacles had then been overcome, and so the mast was hurriedly installed with a beam perched on it, and turned by the simple method

of pulling a rope attached to the two ends of the boom. This system, however, left much to be desired. From the station end it was impossible to see the direction in which the beam was aiming, and, after pulling the beam off the mast twice due to hefty tugging on the rotating mechanism, it was thought that some electro-mechanical method should be tried. Furthermore, with the cord system, unless an arrangement of pulleys is used the beam can be rotated through a limited angle only (approximately 180°).

G3ION was very jubilant indeed when he returned one evening from the local club meeting loaded down with a fine 24-volt propeller pitch motor. But when this monstrous machine was tested the results were disappointing, to say the least. The motor took roughly 7 amps. running and 9.5 amps. to start it at its correct voltage. The weight of the thing would have necessitated mounting it at the bottom of the mast and revolving the mast itself. The size and cost of the power supply to furnish the necessary voltage to operate this motor was the deciding factor, and for a time the idea was shelved.

Suitable Motors

Some months later the writer managed to acquire a very small motor (about 4 ins. x 6 ins. only) geared by two worm reduction drives to

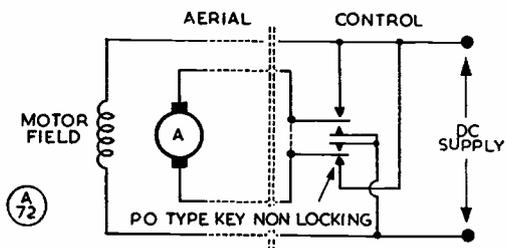


Fig. 1. Control switching, as first used at G3ION.

a final speed of one revolution every fifteen seconds. A number of motors from the well-advertised IFF units have since been seen which are slightly larger than the one actually used at G3ION; nevertheless, they are admirable for the job. The torque that this motor is required to furnish is very small indeed, since it is only necessary to turn an all-aluminium array against wind resistance and its own inertia.

The motor was found to be shunt wound and luckily the field connections were easily removed from the brushes and brought out separately in order that the motor could be reversed. The total current taken by the motor on 24 volts DC was found to be 250 mA only. Assuming this motor had enough torque to do the work the saving in power over the propeller pitch motor represented 28 times!

A simple system was then worked out, which involved mounting the motor on top of the mast and running it off the DC supply available in the station; a Post Office type key of the non-locking variety was to be used to switch the *armature* connections, the field being connected directly to the supply, as shown in Fig. 1.

Unfortunately, with the arrangement as it stood, there was still no indication of beam direction, so a further refinement was thought up—that of mounting a potentiometer on the motor shaft and using this potentiometer in a bridge circuit, as shown in Fig. 2.

The operation of the system is quite simple. The potentiometer at the station end is calibrated in compass points and when the beam is required to aim in a particular direction, the potentiometer is turned to this marking. This upsets the balance of the bridge and the meter reads. The motor is then energised by means of the key and turned until the potentiometer on its shaft is at the same reading as the control potentiometer. At this point the bridge is balanced, the meter reads zero and the "motor operate" key is released. Assuming the beam was correctly aligned in the first place, it will now be aiming in the required direction.

Control Circuitry

A word here about the potentiometers. Carbon types will *not* do since they are usually non-linear and in any case will not be matched up well enough with one another for any particular movement. If a sacrifice of approximately 85° of rotation is permissible, then a standard wire-wound potentiometer of about 10,000 ohms in value may be used with good results.

In the writer's case, however, it was decided that 85° could not be sacrificed and a potentiometer was constructed with 25 steps and each step wired with a 470-ohm $\frac{1}{4}$ -watt resistor. This involves 50 resistors and represents the major proportion of the cost of the final set up,

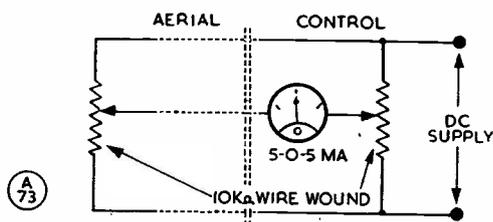


Fig. 2. Wiring for the beam direction indicator.

but it was thought worth while in order that the completed arrangement should be of maximum effectiveness, with full rotation and complete control.

The construction of the two potentiometers (which must be identical) is shown in Fig. 3. The potentiometer disc is made of paxolin and drilled as shown to take 25 6BA cheesehead bolts. A square hole is made at the centre to take the locating brass block which is drilled the shaft diameter, slipped over and soldered to the shaft. It will be seen that the potentiometer card revolves with the motor, the wiper remaining stationary. The 25 470-ohm resistors are then soldered to the screws on the underside of the card.

When set up this system proved very effective and providing the individual resistances on the two pots were within tolerance it was possible to judge the zero on the meter fairly accurately and thus to obtain a true indication of beam heading. The individual steps thus covered angles of $14\frac{1}{2}^\circ$ approximately, the beam width of the aerial being wider than this.

Considering the system now finalised, the writer then built up the motor on a steel plate, with a small bearing for the beam to rotate on mounted on another plate above this. (The

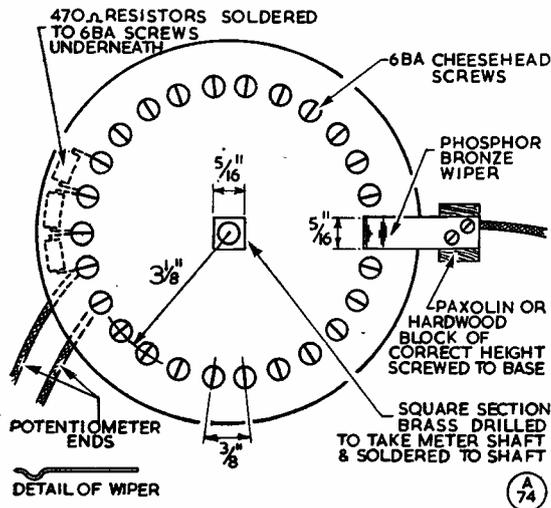


Fig. 3. Construction of the control potentiometers. It was found necessary to make these up, manufactured types not being suitable for reasons explained in the text.

beam shaft itself was turned up by a friend whose skill and patience when involved in the sordid business of constructing something mechanical is a job to behold. It is, in fact, a simple job, and does not take much time for a knowledgeable person to produce.) Full details of the construction are not given here since it is obvious that the system actually adopted will have to be designed around the motor available.

Automatic Operation

During a discussion on this set-up with a more learned colleague, it was suggested that full use was not being made of the system in that, if a polarised relay were inserted in the circuit in place of the meter, relays could be energised which caused the motor to turn to the left or to the right.

Difficulty was experienced in finding a relay for this purpose, because in the de-energised condition the travelling contact must sit in the middle of the two fixed contacts and make with neither. A search through deeply buried junk boxes produced a German army polarised relay which operated on a very small current.

It is doubtful if any reader's junk box would produce such a useful item. But it is possible to construct a relay of this type by hinging a piece of soft iron, obtained from an old relay, on a phosphor bronze strip, and using two solenoids from discarded relays. These relays must be connected so as to oppose each other. The construction of a suitable relay is shown in Fig. 4.

Having constructed the polarised relay it is an extremely simple matter to convert the system to fully automatic operation. The circuit for this is shown in Fig. 5.

Briefly the operation is as follows: The control pointer is set to the desired position. This produces a positive or negative out-of-balance voltage to the polarised relay which then operates to one side. This operation energises the "motor left" or "motor right" relay and the motor turns until the out-of-balance voltage at the polarised relay is cancelled out. The relay then de-energises and the motor stops. It is impossible to rotate the beam more than 360° since, if this happens, the voltage applied to the polarised relay reverses, and thus the direction of rotation of the motor reverses. The feeder, then, cannot get wrapped around the mast. This in itself is an extremely useful safeguard.

Snags

If the motor "hunts," *i.e.*, oscillates about one position, possibly the polarised relay is too sensitive, but more probably the tolerance on the resistors on the beam head and control potentiometers are astray. Check that the two values of resistance on identical studs are

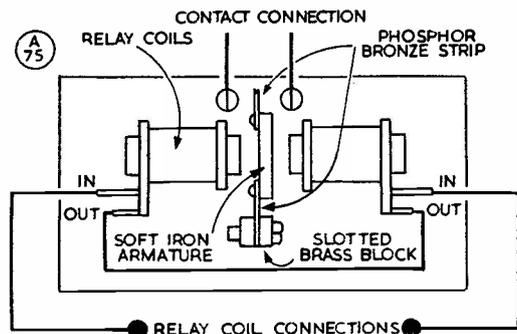


Fig. 4. Construction of a suitable polarised relay to obtain "right" and "left" rotation—see text for details.

more or less equal. Two cases of this were found in the writer's set up, one "470-ohm" resistor being 300 ohms and the other 550 ohms!

If the circuit is not sensitive enough the voltage applied to the potentiometers must be increased. This will involve disconnecting the motor field from the potentiometer supply and running one extra lead up the mast. The system in use necessitates five wires of fairly small gauge running up the mast.

Due to the fact that the motor used at G3ION employs worm gears some form of protection became necessary in order that the

initial torque from the motor should not be transferred directly to the beam itself. This protection consisted of a fairly stiff flexible drive made from a brass plate 2 ins. diameter into which were tapped two 6BA screws. The brass plate was drilled at the centre to take the base of a bush removed from a discarded carbon potentiometer. The bush was pegged to the beam shaft, and the plate pegged to the motor shaft. Connecting the two was a spring fashioned from .048 in. diameter piano wire, in the form of a figure "8"; the top "0" of the "8" was pegged to the bush and the bottom "0" engaged with the 6BA studs in the brass plate.

Although making the system fully automatic in action appears somewhat laborious the ease of operation which results has more than justified the time, trouble, and thought given to the construction.

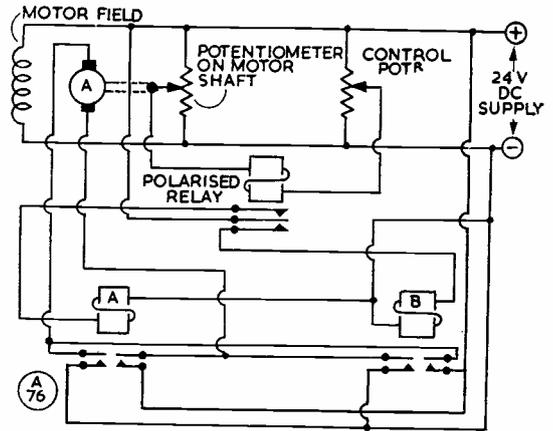


Fig. 5. Circuit arrangement for full automatic operation. In this system, the beam head cannot be turned more than 360°, since the motor is automatically reversed. The desired heading is simply set up on the direction-calibrated potentiometer, and the beam takes up its position accordingly.

"LESS THAN THE CROWN JEWELS"

It has been reported that, as the Coronation drew near, American magazines and newspapers were devoting more and more space to it and the Royal Family. The inside back cover of the April issue of our American contemporary *QST* carried a fine colour advertisement by the National Co. for their HRO-60, with a representation of the Crown of St. Edward as a centre-piece, and the receiver (much smaller) in the bottom right-hand corner. A caption in small print says simply "\$483.50, slightly less than the Crown Jewels!". Advertising by the National Co. of America has always shown taste and distinction, and this one may be regarded in that sense.

LOW-POWER TELEVISION STATION AT BRIGHTON

The new Truleigh Hill (Brighton) station will remain in operation until the proposed permanent station in the Isle of Wight is built; the latter is one of the five permanent medium-power stations planned by the BBC, the construction of which is still deferred by the Government because of the national economic situation.

The site of the temporary station at Brighton is 3½ miles north of Kingston-upon-Sea, and it is intended to improve reception in the populated districts of Brighton, Hove, Worthing and Shoreham-upon-Sea, where reception from Alexandra Palace is unreliable.

The station will operate on the same frequencies as those later to be used by the permanent station at Rowridge in the Isle of Wight, so that receivers and aerials arranged for reception of the temporary station will be suitable (possibly with some change in direction) for receiving transmissions from Rowridge. Viewers in particularly favourable situations in the neighbourhood who already obtain satisfactory reception from Alexandra Palace need not, of course, make any change when the Brighton transmitter comes into service.

The test transmissions take place each weekday from 10 a.m. to 1 p.m., and from 4.15 p.m. (approximately) to 5 p.m. The morning transmissions are composed of demonstration film and still patterns, and the afternoon transmissions of still patterns only. These test transmissions which are for engineering purposes and also to assist the Trade in the installation and adjustment of receivers and aerials, are subject to interruption, variation in power and alteration in time without notice.

Because of the temporary nature of this station and the very short time that was available for its construction, there will be no permanent link with the main television network.

The programmes radiated from Truleigh Hill will be obtained by direct pick-up from Alexandra Palace and there may, therefore, be some interference and fading, particularly when there are sudden changes in weather conditions.

As previously announced, the technical details of the transmissions from Truleigh Hill are as follows:—

| | | |
|--------------|-----------------------------------|-------------|
| Frequency | Vision 56.75 mc Sound 53.25 mc | } Channel 3 |
| Polarisation | Vertical | |
| Transmission | Asymmetric sideband system. | |

The frequencies of the vision and sound carriers will be slightly offset from those of the high-power transmitter using the same channel (Kirk o'Shotts) so as to reduce the effects of interference from it in the fringe areas.

SHLIGHT SHLP

From ZS1SW of Somerset West, South Africa, a note that his call appeared incorrectly in the caption to that fine photograph on p.99 of the April issue. It is not often we get a callsign wrong—but apologies, and repeat, ZS1SW.

WELL, have you tried a moon-bounce yet? However difficult, unlikely, far-fetched or chancey the story in our last may seem, the fact remains that VHF working by moon-reflection is a practical possibility and worth the serious attention of all VHF operators who want to contribute to the problem of DX working on our 144 and 430 mc bands.

As to the mathematics of the business, any sailor or air navigator will be able to tell you that moon positions can easily be worked out for a given QTH by knowing how to use the *Nautical Almanac* and the *Nautical Tables*. To make this as easy as possible for everybody, we shall shortly be publishing an article on the subject—this will enable anyone to find the azimuth and altitude of the moon without difficulty.

Coming earthwards again, and on to the subject of VHF conditions as affected by the weather, we begin in this issue what is hoped will be an interesting and instructive series of "VHF Weather Reports." The idea is to establish the relationship between the results and conditions as discussed in this piece with the VHF weather as it developed during the period covered by the current "VHF Bands." Thus, by turning to "VHF Weather Report" in this issue, you will find a meteorological summary giving the weather conditions observed for the month to May 13, the date-areas over which EDX working should have been possible, and other interesting information as to the trends and possibilities during this period. Obviously, this will not only be very useful as a back-check on conditions—in due course it should also yield valuable statistical data on the general effect of weather on VHF propagation.

Since the compiler of the weather data will be scanning these notes to correlate with his own observations—he does not know until "VHF Bands" appears what results have actually been obtained during the period covered by his summary—it follows that all correspondents can help considerably by noting carefully when GDX or EDX

VHF BANDS

A. J. DEVON

More Good DX Openings—

Discussing Activity and
Conditions—

Comments on The Zone Plan—

Station Reports and Table
Movements—

conditions were, or appeared to be, good and quoting dates and times in their reports to your A.J.D.

What we are trying to do is to tell you when conditions should have been good; what we want you to tell us is exactly how you found them, and on what dates.

Anyway, there it is—let us see, over the next few months, how things work out. In the meantime, note that according to the "VHF Weather Report" in this issue, there were occasions in the month to May 13 when good EDX working should have been possible, though we agree that they were mainly at most awkward times!

Records Going Up

The GW2ADZ/ON4UV 70-centimetre contact, on March 3 last over 360 miles, has not been challenged from the States, so is being accepted by all concerned as the new world record for the band. And a very fine effort, too.

More than 100 miles have been added to the European two-metre

ground record by G5UF's magnificent 750-mile QSO with SM6ANR on March 22, during the later good spell reported last month and mentioned in the weather summary on p.170 of the May issue. Congratulations to both these operators on their important contribution to progress.

A record of a rather different kind is that now held by G3BW (Whitehaven, Cumb.), who will be found at the head of All-Time Counties again this month, with 61C; the 61st was EI6A, Wicklow. It is interesting to note that G3BW still wants—after all these years—Cornwall and Suffolk to complete his all-English-counties worked list. And, needless to say, GC3EBK and a few others in the new GDX category would also be welcome additions.

Conditions and Activity

It can be said that GDX was fairly consistent for most of the month. By this we mean that the 200-250-mile stations were workable if things were as they should be at both ends. For instance, G6NB (Brill, Bucks.) finds that G2FO (Stockton-on-Tees) and G3BW "are now like locals," with GC3EBK, GM3EGW and GW3ENY often heard; in fact, Bill totalled no less than 46C worked for the month to May 13! His gear, his location and his experience have, of course, much to do with such results, but conditions also need to be pretty favourable to make such scoring possible.

Again, from the Activity Report herewith, we find that in less than one month G3WW (Wimblington, Cambs.) worked a total of 142 different stations, many of them at good GDX distances, and including a few near-Europeans.

Much of the activity can be put down to the first (RSGB) contest of the season, May 2-3, when the turn-out was good and the scoring fast. Most correspondents report that after that week-end activity dropped off considerably; nevertheless, there was nearly always someone on, and new stations to be worked.

Movements claimed for the Tables total about 40, which is

rather less than for the last two months, though the volume of reports is about the same.

Overseas Items

ON4XB (Louvain) sends in an interesting calls h/w list, and discusses the ON4BZ converter at some length; it seems that what has come to be known as the "ON4BZ" was actually a development of ON4XB's original work with the 6BQ7 as a GGT—and he himself says he was inspired by the G6VX design in *Short Wave Magazine* for February 1951, and by later articles in *QST*. At any rate, we now have even fuller details, with photographs and constructional notes, on the ON4XB version, which will appear in due course.

Down in Malta, G.C. ZB1BZ—who has built himself eight receivers in three years—has now produced a brand-new one, consisting of a 3-stage GGT amplifier for the front end of a 6AK5-6AK5 arrangement, which local tests show to be far superior to any of its predecessors. ZB1KQ is putting in an 829B as PA, and ZB1AJ, ZB1BJ and ZB1L are also on; all the ZB's are looking for a G/ZBI QSO on Two, and ZB1BZ remarks that judging by Service experience on frequencies around 200 mc, the most likely periods would appear to be during August and in October. It should be noted, by the way, that ZB1BZ himself regularly keeps the Thursday evening schedule, 2000-2230 clock time, listening hopefully for G's—so long CQ's with the beam headed south would be well worth while.

To PAØLDG (Rotterdam) goes the distinction of being the second PAØ member of our VHF Century Club, with Certificate No. 146—PAØZQ was the first with No. 68. Since July 1949, PAØLDG has worked nearly 70 Dutch stations on Two, which is a measure of the PAØ activity on VHF. His list for VHFCC included 20 G's, 11 ON's and the rest DL's and F's.

Portable Notes

The /P season has opened in earnest, and, indeed, may now be said to be in full blast. G5MA has been out three times in the month—to Storrington, Sussex, on April

TWO-METRE ACTIVITY REPORT

(Lists of stations heard and worked are particularly requested for this section, set out in the form shown below.)

G2DHV, London, S.E.13, NGR 51/384776.
WORKED: G2AIW, 2BRR, 2DTC, 2DUV, 2FKZ, 3BEX/P, 3BLP, 3FD, 3FZL, 3GBO, 3HBW, 3IIR, 3ISA, 4AU, 4RO, 4SA, 5DS, 5LK, 5NF, 5UM, 6WU, 6YP, 8DV/A.
HEARD: G2BFT, 2DCI, 2HCJ/P, 2HDZ, 2HQ/P, 2MV, 2NH, 2RD, 3AEP, 3AGR, 3BI, 3CFE, 3CGQ, 3EYV, 3GHI, 3GSE, 3HWJ, 3IEX, 3IOO, 3IWA, 4GT, 4JJP, 4KD, 5ML, 5YV, 6NB, 6PG, 6RH, 8VR, GW2ADZ, 5MA/P. (During April and May).

G6NB, Brill, Bucks.
WORKED: DLILB, 3FO, 3VJ/P, 6FX, 9SY, 9NB, G2BCY, 2BMZ, 2DKH, 2FCL, 2FO, 3A0O, 3ASE, 3AUS, 3BJD, 3BW, 3CSC, 3FAN, 3FKO, 3FFY, 3FMO, 3GMX, 3GNJ, 3HSD, 3HVO, 5MA/P, 5YV, 6MI, 6PJ, 8TR, GC3EBK, GM3EGW, GW2ADZ, 3BNQ, 3ENY, 3FYR, 5MA/P, 8SU, 8UH, ON4BZ, 4HN, PAØFC, ØFD, ØNL, ØWI, ØWO, ØVLM, PEIPL. (DX stations April 13 to May 10).

G3HSD, Bristol, 3.
WORKED: G2HCJ/P, 3DLU, 3FAN, 3FMO, 3FRY, 3GNJ, 3HWF, 3IER, 3IFV, 3YH, 4GR, 4SA, 5BM, 5ML, 6NB, 8DA, 8DM, 8MW, GW3BNQ, 5MA/P, 8SU, 8UH.
HEARD: G2XV, 2FJR, 2FKX, 2FZU, 2HIF, 3BLP, 3EYH, 3EPW, 3FIH, 3ION, 3WW, 4AP, 5YV, 8QY/P, GW3AKW. (March 24 to May 6).

G2CZS, Chelmsford, Essex.
WORKED: G2BCB, 2UQ, 2WJ, 2XV, 3AAN, 3ANB, 3BEX/P, 3CFK, 3FL, 3WW, 4AC, 4OT, 5ML, 5YV, 6AG, 6PG, 8AO/MA, 8MW, ON4HN.
HEARD: F8NW, G2AVR, 2FJR, 3CGQ, 3DJX, 3EEL, 3GBO, 3GJZ, 3GMJ, 4AU, 4PV, 5BD, 6LI, 6RH, 6WU, 8VR. (April 1 to May 12).

G4SA, Drayton, Bucks.
WORKED: G2AIW, 2BFT, 2BMZ, 2DSW, 2FCL, 2FJR, 2FNW, 2FZU, 2HCG, 2HCJ/P, 2HDZ, 2HGR, 2HIF, 2HOP, 2WA, 2XV, 3A0O, 3BEX/P, 3BI, 3BKQ, 3BLP, 3BNC, 3BW, 3CCP, 3DO, 3DVK, 3EJO, 3ELT, 3FAN, 3FMO, 3FPW, 3FUM, 3FZL, 3GCS, 3GHO, 3GKD, 3GNJ, 3HAK, 3HSD, 3HWF, 3IEX, 3IEX, 3IOO, 3WW, 4JJ, 5BM, 5DF, 5MA/P, 5ML, 5NF, 5YK, 5YV, 6NB, 6WF, 8DA, 8DM, 8MW, 8QY/P, GW2ADZ, 5MA/P, 8UH, ON4HN, PAØFC, ØFP, ØJOB, ØWO.

G3DO, Sutton Coldfield, Warks.
WORKED: G2ACV, 2AIW, 2AVQ, 2BFT, 2CVD, 2DCI,

2FKZ, 2FWW(?), 2FKX, 2HCJ/P, 2HDZ, 2HIF, 2JZ, 2MV, 2NV, 2WA, 2XV, 2YB, 3A0O, 3BEX/P, 3BLP, 3CHY, 3CWV, 3EDD, 3EYH, 3EPW, 3EYV, 3FAN, 3FD, 3FUL, 3FUM, 3FXR, 3GHI, 3GHO, 3HWF, 3MY/P, 3NL, 3WW, 4JJ/P, 4RO, 4SA, 5DF, 5DS, 5FH, 5IO, 5ML, 6NB, 6PC, 6XY, 8MW.
HEARD: G2FJR, 2HOP, 2HQ/P, 3DIV, 3GJZ, 5NF, 5RW, 6AG, 6RH, GW2ADZ. (April 14 to May 3).

GM3EGW, Dunfermline, Fife.
WORKED: G2FO, 3BW, 3IOE, 4LX, 5BD, 5QU, 5YV, 6LI, 6NB, 6XX, 8AO/MM, 8GL, G12FHN, 3BIL, 3FJX, 3GQB, 3HNM, 5AJ, GM3DIQ, 3ENJ, 3FGJ, 3FYB, 3HYX, 3IBV, 4HX, 4QV, 5YV, 6KH, 6LS, 6SR, 6WL, PEIPL.
HEARD: DLILB, EI2W, G2BCY, 2DRA, 2FCL, 3A0O, 3BJD, 3CC, 3DIJ, 3DMK, 3GHO, 3WW, 4JJ/P.

G3ISA, Beckenham, Kent.
WORKED: G2AHM, 2BMI, 2BRR, 2DL, 2DHF, 2DUV, 2FKZ, 2HCJ/P, 2HDZ, 2RD, 2XV, 3AGR, 3ANT/A, 3BEX/P, 3BLP, 3BYU, 3CCQ, 3CNF, 3FD, 3FUM, 3FZL, 3GBO, 3HVQ, 3HW, 3IEX, 3IIR, 3IWA, 3WW, 4EF, 4GT, 4JJ/P, 5DS, 5LQ, 5ML, 5YV, 6NB, 6PG, 6RH, 6SG, 6TA, 6UH, 6XH, 6YP, 8AO/MA, 8CK, 8DV/A, 8QY/P, GW2ADZ, 5MA/P. (April 12 to May 14).

GW3BNQ, Cardiff, Glam.
WORKED: G3DLU, 3GNJ, 3HSD, 3YH, 6NB, GW2ACW, 5MA/P, 8SU, 8UH.
HEARD: G2BMZ, 2FZU, 3AUS, 3BKQ, 3EYH, 3FIH, 3FWW, 3HVO, 3HWF, 4GR, 4SA, 5BM, 5ML, 5RW, 8MW, GW3FYR. (April 17 to May 13).

G5MA/P, Walbury Hill, Nr. Inkpen Beacon, Berks.
WORKED: G2ATT, 2DDD, 2HIF, 3BI, 3FUM, 3GKD, 3GOP, 3GVF, 3HWF, 3HXJ, 3IEX, 3ITF, 4CI, 4SA, 5HB, 5NF, 6NB, 6XH, 8DM, 8IL, 8OU. (April 25).

GW8UH, Cardiff, Glam., NGR 31/319178.
WORKED: G2HCJ/P, 2HDZ, 2HIF, 3WW, 3YH, 3FWW, 3GNJ, 3HSD, 3IFV, 3HWF, 3HWJ, 3ION, 4SA, 5DF, 5DS, 6NB, 8DV/8, 8IL, GW3BNQ, 3FYR, 5MA/P.
HEARD: G2BMZ, 2DDD, 2DSW, 2DTC, 3BI, 3ANB, 3AUS, 3BLP, 3DLX, 3EYH, 3FAN, 3FIH, 3FMO, 3GOP, 3GHO, 3HBW, 3HVO, 4GR, 5BM, 5HB, 5ML, 5UF, 6AG, 6RH, 8DA, 8DM, GC3EBK, GW8SU.

G3BW, Whitehaven, Cumberland.
WORKED: EI2W, 6A, G2CYN, 2FCV, 2FOS, 2HGR, 2HIF, 2XV, 3A0O, 3BJD,

3BLP, 3FMI, 3GMX, 3GUU, 3IOO, 4SA, 5BM, 5YV, 6LI, 6NB, 6XX, G13BL, 3HNM, GM3EGW, 3FJG, 6KH, 6WL, GW3ENY.
HEARD: G3WW, GW3GWA. (April 9 to 12 May).

ON4XB, Louvain, Nr. Brussels.
WORKED: DJ1DC, DL3QA, 9MK, 9SY, F3CI, 8DB, 9LD, G2FCL, 2HCG, 3ANB, 3ARL, 3BK, 3FAN, 3GHI, 3GOP, 3HWJ, 4MW, 4SA, 5ML, 5NF, ON4AK, 4AT, 4BZ, 4CI, 4CK, 4CP, 4CT, 4DE, 4FE, 4FI, 4HC, 4HN, 4IL, 4KM, 4LN, 4MG, 4PA, 4PH, 4PJ, 4UC, 4UD, 4UV, 4WW, 4ZR, PEIPL.
HEARD: DL1DB, 1DK, 1MI, 3VI, 6EP, F3LQ, 8GH, 8NW, 8OL, 8UK, 9MX, 9TK, G2FKZ, 2MV, 2QU, 2UN, 3DIV, 3HAZ, 3HU, 5YV, 6RH, 8LN, GW2ADZ, PAØFC, ØWO, ØZIZ. (All March 15 to May 15).

GW5MA/P, Near Blaenavon, Mon.

WORKED: G2AOK/A, 2AOL, 2BFT, 2CD, 2DSW, 2FJR, 2FKZ, 2FNW, 2FRY, 2FTS, 2HCJ/P, 2HDZ, 2HIF, 2MR, 2MV, 2NH, 2OI, 2RD, 2UI, 2UN, 2XV, 2YB, 3ABH, 3AEP, 3AGR, 3APY, 3BEX/P, 3BI, 3BLP, 3BNC, 3CCH, 3CGE, 3DKZ, 3EYV, 3FAN, 3FD, 3FSL, 3FUM, 3FZL, 3GBO, 3GEN, 3GHI, 3GHO, 3GSE, 3HSD, 3HVO, 3HWA, 3IER, 3ION, 3IRA, 3ISJ, 3ITF, 3MA, 3NL, 3WS, 3WW, 3YH, 4AU, 4CI, 4GR, 4JJ/P, 4RO, 4SA, 5DF, 5DS, 5HB, 5JO, 5JU, 5LK, 5LQ, 5ML, 5NF, 5YV, 6NB, 6PG, 6RH, 6TA, 8DA, 8DM, 8DV/A, 8IL, 8OU, 8QY/P, 8VR, GW3BNQ, 8UH. (All during May 2-3).

G3YH, Bristol.
WORKED: G2FJR, 2HIF, 2XV, 3ABH, 3FSL, 3GBO, 3GNJ, 3HSD, 4CR, 5ML, 6NB, 8DA, GW3BNQ, 5MA/P, 8UH.

HEARD: G2WA, 3BI, 3DJX, 3DLU, 3EYH, 3FIH, 3FRY, 3HVO, 3HWF, 3WW, 4SA, 5HB, 5IO, 8QY/P. (April 17 to May 13).

G5ML, Coventry, Warks.
WORKED: G2ACV, 2AOK/A, 2ATK, 2BFT, 2BMZ, 2CZS, 2DCI, 2DSW, 2DUV, 2FCL, 2FJR, 2FKZ, 2FTS, 2HCJ/P, 2HDZ, 2HIF, 2HOP, 2HQ/P, 3ABH, 3A0O, 3APP, 3BEX/P, 3BKQ, 3BLP, 3BNC, 3CHY, 3CNY, 3DIV, 3DKZ, 3DO, 3DVK, 3EDD, 3EYH, 3EJO, 3EPW, 3FAN, 3FD, 3FMO, 3FZL, 3GBO, 3GHI, 3GNJ, 3GOP/P, 3GZM, 3HSD, 3HTY, 3HVO, 3HWJ, 3IER, 3IRA, 3ISA, 3MA, 3MY/P, 3WW, 3YH, 4AU, 4JJ/P, 4RO, 4SA, 5DF, 5DS, 5HB, 5JU, 5UM, 5YV, 6CI, 6LI, 6NB, 6TA, 6XX, 6XY, 8DA, 8DM, 8DV/A, 8IL, 8MW, 8QY/P, 8VN, 8VR, GW2ADZ, 5MA/P.

HEARD: G2FNW, 2HCG, 20I, 2YB, 3BI, 3CC, 3CWV, 3FUM, 3GJZ, 3NL, 4GR, 6RH, GW8UH. (May 2 and 3 only).

G3DLU, Weston-Super-Mare, Somerset.

WORKED: G3FRY, 3FWW, 3GNJ, 3IER, 3IFV, 5BM, 6NB, 8DA, GW3BNQ.
HEARD: G3AUS, 8DM, 8MW, GW8UH. (April 14 to 28).

G3WW, Wimlington, Cambs.

WORKED: F8NW, G2AIW, 2AVR, 2BFT, 2BMZ, 2CZS,

2DCI, 2DDD, 2DSW, 2DUV, 2FCL, 2FJR, 2FNW, 2FO, 2FTS, 2FWW, 2FZU, 2HCG, 2HCP, 2HDZ, 2HGR, 2HIF, 2HOP, 2HQ/P, 2IQ, 2KE, 2MQ, 2OI, 2RD, 2UJ, 2UQ, 2WA, 2WJ, 2XV, 3AEP, 3AGR, 3AGS, 3AKU, 3AMM, 3ANB, 3AOO, 3ASC, 3AZU, 3BEX/P, 3BI, 3BK/P, 3BKQ, 3BLP, 3BNC, 3BPD, 3CC, 3CCH, 3CFC, 3CGO, 3CSC, 3DJX, 3DKZ, 3DO, 3DVK, 3EDD, 3EOH, 3EPW, 3FAN, 3FMO, 3FOU, 3FRE, 3FUL, 3FUM, 3FZL, 3GBO, 3GCK, 3GCX, 3GDR, 3GHI, 3GHO, 3GJZ, 3GNJ, 3GOP/P, 3GRD, 3GSE, 3GZM, 3HTY, 3HVO, 3HWF,

3IEX, 3IIR, 3IIT, 3IOO, 3ISA, 3IWA, 3JKW, 3MY/P, 3NL, 3WS, 4AU, 4GR, 4GT, 4IJ/P, 4RO, 4SA, 5BD, 5BM, 5DF, 5DS, 5GX, 5JO, 5LK, 5ML, 5MR, 5NF, 5UM, 5YK, 5YV, 6AG, 6CI, 6NB, 6PC, 6RH, 6TA, 6XY, 6XX, 6YP, 8AO/MM, 8DV/A, 8GL, 8IC, 8MW, 8OU, 8SY, 8TR, 8VR, GW2ADZ, 3GWA, 5MA/P, 8UH, ON4AK, 4HC, 4IW, 4YB, PA0FC, 0VLM, PE1PL.

HEARD: G2AOK, 2FKZ, 2MV, 2YB, 3EEL, 3EYH, 5NV, 5TP, 5MA/P, 6LI, 8QY/P. (All April 12 to May 6—142S worked).

latter is trying out an "ON4BZ" and wants to know if European countries worked can also be reckoned into the counties scores—NO! G2FJR is doing nicely with counties worked as it is, and shouldn't need such adventitious aids! G3GVL (Derby) has now achieved 52S worked in 25C, and G8DA (Gloucester) goes up four in Annual Counties; he has been chasing G2WJ, G3FUM and G5BD for three more.

G4SA (Drayton, Berks.) had a session with the Europeans on the evening of May 3, ON's and PA's being worked for over an hour; this was all with the 12-ele stack, which is proving in every way superior to the old 4/4. Another to put up a 12-element stack is G5BM (Cheltenham), but in rather a different way from that probably visualised by most people: He has six pairs of elements arranged in two stacks of three, with 0.15-wave spacing between each reflector and its driven element, and constructed on the plumber's delight principle using ½-in. welded ali tubing; the only wood used is the 2-in. pole. The result is a light but strong assembly, weighing only 14 lbs. and having very low wind-resistance. This new beam is working out very well, and scores have advanced appreciably.

G5YV (Leeds) got himself 7 new counties for the Annual Table, and remains a strong, consistent and reliable signal over large areas of the country; he is frequently to be heard during TV hours, and once again asks for more activity during those periods.

G5MR (Hythe, Kent) is making steady progress and continues to be able to work north in spite of the screening. G3FKO (Bath) is now on 145.5 mc, and has a new receiver consisting of EC91 p/p RF, 12AT7 p/p mixer, ½-12AT7 osc, IF 7 mc, into a home-built superhet with regeneration applied to its 2nd IF stage on 1.4 mc, to improve gain and selectivity; this stage can also be made to oscillate for CW reception. G3FKO remarks that this arrangement is better than anything tried previously.

Tune Above 145

GW8UH (Cardiff) thinks that the Zone Plan would be an

18-19; to Walbury Hill, Berkshire, on April 25; and to Blaenavon Mountain, Mon., over May 2-3. The latter was the most successful effort, when Bob was able to work no less than 87 different stations, many of whom wanted Monmouthshire for the Tables.

A trip into the Snowdonia district of Caernarvonshire is planned by G2XV for the period June 27-July 4, when he will be signing GW2XV/P on 144.58 mc. This should be a particularly interesting undertaking, as even under poor conditions past Snowdon expeditions have produced strong signals over the whole country—many will remember the results obtained by GW6AA in pre-war days on five metres; and with pretty rosey gear, too, judged by present-day standards.

The GD3DA/P climb on Snaefell could not, after all, take place in May, and is now scheduled for the second week in June, presumably about June 11-15, though G3DA does not mention actual dates in his letter; arrangements will be as before, and his 70-centimetre transmitter frequency will be within the band 432.5-433.0 mc.

And on June 21, G5ML/P will be at Redhill, giving Worcestershire, with QRP portable gear.

The Station Reports

G3BW (Whitehaven, Cumb.) is fully operational again, on 145.25 mc CW, with a 4/4 at 51 ft. He was unfortunate enough to miss the March openings, but has been doing very well since, nevertheless. Converter tests between a G2IQ and CC Cascode suggest that the latter is superior only by

reason of the fact that T9 notes sound T9. With G3BW, the most consistent GDY signal on the band is G6NB.

G3IOO (Oswestry) is now cracking on 432.54 mc, with an 832 tripler, a 16-element stack, and cavity tuned crystal mixer; the IF is 8 mc, and the oscillator section half-6J6 on 142 mc, with the 3rd harmonic taken out of the second half, all much on the lines of the very successful GW2ADZ 70-centimetre converter. Results have been encouraging, with G3BKQ (Leicester) and G3GZM (Tenbury) worked, and in the other direction G3DA has heard G3IOO; tests G2OI/G3IOO/G3DA are being conducted almost nightly on the 430 mc band.

During the busy May 2-3 contest week-end, G5ML (Coventry) heard about 100 different stations on Two, working 83 of them. Some of Freddy's more notable GDY contacts during the month included G2BMZ (Torquay), G2FTS (Hailsham), G3BEX/P (Brighton), G3DIV (Eastbourne) and G3FAN (Ryde, I.o.W.); with this lot, new stations worked total 31. The Miles-Bastin team has also made a start on 70 cm, with G2BFT, G3BKQ and G3HAZ heard, on a G2DD converter to the design as featured in our March issue; the beam is a 16-ele stack and the transmitter is to be a QQVO6/40 tripling.

Across at Weston-s-Mare, G3DLU has finished a new PA to run at 80w., and after his experience with 832's has decided to stick to triodes in future. G3YH (Bristol) goes up a peg in the Tables and is on regular schedule with G2FJR (Sutton Bridge); the

TWO METRES

COUNTIES WORKED SINCE
SEPTEMBER, 1, 1952

Starting Figure, 14

| Worked | Station |
|--------|--------------------------|
| 48 | G5YV |
| 45 | G3BLP* |
| 44 | G3GHO, G3WW* |
| 40 | G2XV |
| 39 | G2HDZ, G4SA, G5ML |
| 38 | G5DS, G3IOO |
| 37 | G2AHP |
| 35 | G2FJR |
| 34 | G3FAN |
| 32 | G3HWJ, G8IL |
| 30 | G5BM |
| 29 | G6TA |
| 28 | G2HOP, G3HBW |
| 27 | G6YU |
| 26 | GC3EBK |
| 25 | G3GVL, G3HXO, G8DA |
| 24 | G3HCU, G5MR |
| 23 | G2FCL, G3DO |
| 22 | G6CI |
| 21 | G3FIJ, G3GJZ, G4RO, G8VR |
| 20 | G3ISA |
| 18 | G3EOH, G3IRA |
| 17 | G3YH |
| 14 | G2BRR, G3DMK |

Note: This Annual Counties Worked Table opened on September 1st, 1952, and will run until August 31st, 1953. All operators who work 14 or more Counties during this period are eligible for entry in the Table. The first list sent should give stations worked for the counties claimed; thereafter, additions claimed need show only stations worked in each county as they accrue. A certificate is given for all VHF operators who work 40C or more in the year, for which QSL cards must be shown. Cards are not, however, required for entry into the Table.

* Cards held for Annual 40 Counties Worked Certificate.

excellent scheme if everybody worked to it, and they all remembered that there is a lot of Zoned activity HF of the London area's Zone J. He says that very few people seem to tune above 145.2 mc, and quotes the experience of GW3BNQ (also Cardiff) and himself during the recent contest,

when they both heard and called many more stations than they worked, while GW5MA/P, only 20 miles away but in the middle of the band, had four times as many QSO's. This does not quite prove Alan's point, but he is undoubtedly right when he says that the generality of operators always search QLM. This is unfortunate, and can only lead to crowding at the LF end—there are already signs of this, and the result, inevitably, will be the breakdown of the Zone Plan and absolute chaos when the band opens for EDX or GDX. The solution is in the hands of everyone—Keep to the Zone Plan, and for cripes' sake Tune QHM or QMH at least twice for every search QLM. That is *all* that is necessary to keep things tidy, comfortable and fair for everybody.

At GW8UH, the transmitter runs 60w. to an 829B — to be increased to 100 watts very shortly—and the receiver is a G2IQ into an Eddystone ECR, with a 3/3 at 40 ft, rotated by a prop-pitch motor. So far, about 80 different stations have been worked, with the North the most difficult direction due to the heavy screening, only broken through when conditions are exceptionally good.

G3AEP (Whittlesey) is on again after two years' absence, with a G2IQ-AR77, an 8-ele stack, and 18w. into an 832. G3FIJ (Colchester) can be found at 145.06 mc nearly every evening from 1900, and has added 20 new stations to his total; equipment is now ready for 70 centimetres, and a schedule G3ANB/G3FIJ/PE1PL is running on that band.

GW3BNQ (Cardiff) reinforces GW8UH's comments and adds that too many CQ's are not on CW, or when they are the area covered by the beam is not searched; he suggests also that CW CQ's should have the QTH appended, to assist in assessing beam headings and conditions. All this is very true, and if observed by everyone would be a great help to all VHF operators. In all these matters, the "big men" could set a very useful example, which would soon be followed by everybody and so become accepted procedure.

G8VR (London, S.E.2 is now

on 430 mc, but says he has spent too much time listening to "sharsh" — he thinks the Rx is too noisy, anyway! G3GHO (Roade, Northants.) found that conditions peaked during the period April 19-23, with the evening of May 3 also very good; he worked DL3FO and ON4HN during the latter session, with high signal levels and no fading. G3GHO is now testing a 6-ele stack against the Yagi flat-top, and preliminary tests indicate a useful gain with the stack; during the month 70S were heard and 62 worked.

Unusual Two-Metre Receiver

G3WS (Chelmsford) has put away all his HF-bands gear and is now fully active on 144 mc only; during the May 3-4 opening DL1LB, DL9SY, F8NW, PAØRK and PAØWI were raised, with some nice GDX as well. It was a heartening experience after a complete rebuild—so often, one finds afterwards that the band was open *during* the rebuild! Receiver at G3WS is interesting—a complete superhet designed exclusively for Two Metres, running EC91, neut RF, EC91 as GGT, EC91 mixer, EC53 local oscillator to give 21 mc IF, three Z77 IF stages, DH77 2nd det., Z77 CC 2nd osc., and EL91 audio; input to the first RF stage is by a concentric line circuit. The figures on this receiver are a gain of 100 dB against a reference level of 0.1 volt and the noise-factor is 4.5 dB, measured under laboratory conditions. It took him 4 months to design and build it.

G3GJZ (Newmarket) raised PAØFC for his first Dutch contact, and is putting up a 4/4 to try and improve matters at his rather poor location. Results at G6NB (Brill, Bucks.) have already been touched upon, but here it might be added that though Bill is banging a terrific signal round the country on Two, London has now become his least favourable direction in comparison with the old QTH, signals being down by 10-15 dB.

After 2½ years on the VHF bands, G3EOH (Enfield, Middx.) writes in for the first time. On Two, the transmitter runs 6F12-6F12-EL91-5763-832 PA with 30w.

SEVENTY-CENTIMETRE STATIONS

Third List

| CALL | LOCATION | FREQ. (mc) | EQUIPMENT |
|--------|----------------------------------|---------------|---|
| DL3FM | Mulheim-Ruhr | 434.2 | Tripler, 32-ele stack, SEO Rx |
| G2BVW | Leicester | ? | Tripler, 5-ele Yagi, (? Rx) |
| G2CNT | Cambridge Airport | 435.2 | Tripler, CC Rx, 12-ele stack |
| G2FKZ | London | 435.95 | <i>no details</i> |
| G2FNW | Melton Mowbray | ? | Tripler, 5 ele-Yagi (? Rx) |
| G2WJ | Great Canfield, Essex | 436.00 | Straight PA, CC Rx, 16-ele stack |
| G2XV | Cambridge | 435.10 | Tripler, CC Rx, 12-ele stack |
| G3ABA | Coventry | ? | Tripler, 16-ele stack (? Rx) |
| G3DA | Liverpool | 432.6 | Tripler, 6-ele Yagi, CC Rx |
| G3EOH | Enfield, Middx. | 436.03 | Tripler, G2DD C'vrtr., 12-ele stack |
| G3EUP | Swindon, Wilts. | 433.9 | Tripler, 3 stk'd dipoles, CC Rx |
| G3FFC | Leicester | ? | Tripler, 16-ele stack (? Rx) |
| G3FIJ | Colchester | 435.18 | Tripler, SEO Rx, 5-ele Yagi |
| G3FZL | Dulwich, S.E.22 | 435.24 | Doubler, CC Rx, 12-ele stack |
| G3GZM | Tenbury Wells, Worcs. | ? | Tripler, 16-ele stack, (? Rx) |
| G3HAZ | Northfield, Birmingham | 435.00 | Tripler, SEO Rx, 4/4 Yagi |
| G3HTY | Kidderminster, Worcs. | ? | Tripler (? beam array and Rx) |
| G3ILI | London, S.E.22. | 434.97 | Tripler, 6-turn Helix, R.1294 mod. |
| G3IRA | Swindon, Wilts. | 436.05 | Tripler, SEO Rx, 8 d'ples stk'd |
| G4AP | Swindon, Wilts. | 436.50 | Tripler, CC Rx, 3 stk'd D'ples |
| G5DT | Purley, Surrey | ? | <i>no details</i> |
| G5YV | Leeds | 432.72 | Tripler, 8-ele stack, G2DD C'vrtr. |
| G6CW | Nottingham | ? | <i>no details</i> |
| G6NF | Shirley, Surrey | 435.47 | Straight PA, 5-ele Yagi, SEO Rx, ASB8 cavities |
| G6RH | Bexley, Kent | 434.7 | Tripler, 16-ele stack, ASB8 C'vrtr. |
| G6YP | London, S.E.5. | 435.75 | <i>no details</i> |
| G6YU | Coventry | 434.10 | Tripler, CC Rx, 16-ele stack |
| G8QY | Birmingham | ? | Tripler, 24-ele stack (? Rx) |
| G8SK | Enfield, Middx. | 433.15 | Tripler, G2DD C'vrtr., 8 1/2-waves s'tkd |
| G8VR | London, S.E.22 | 435.0 | Tripler, SEO Rx, 12-ele stack |
| GW2ADZ | Llanymynech, Mont. | ? | Doubler, 32-ele stack (? Rx) |
| GW5MQ | Mold, Flints. | ? | Tripler, 3-ele Yagi (? Rx) |
| ON4UV | Fayt-lez-Mange, Nr. Charleroi | 434.7 | Straight PA, CC Rx, 32-ele beam |

This list is incomplete as regards many stations known to be equipped for the 70-centimetre band. All 430 mc operators are asked to forward details for inclusion in this Table, under the headings given.

on 144.60 mc from a 6 mc crystal; receiver is G2IQ-HRO using 9 mc IF, and the beam a 12-ele stack at 39 feet. This equipment has enabled G3EOH to make his first claim for the Counties Tables. On the other band, he built himself a G2DD converter as described in March—it worked almost from the word Go—and has heard G2FKZ, G2RD, G2WJ, G5DT, G6NF, G6YP and G8SK. The 430 mc PA is to be an 8012; in the meantime, an 832 is tripling.

Another correspondent from Chelmsford this time is G2CZS, who has been on 144.912 mc for about two months, with an interesting 3-stage transmitter using EL91 CO-tripler into ECC91 quadrupler-doubler into TT15 PA at 12w.; receiver is a 6J6 RF stage into a modified ZB3 converter, with 10 mc IF and an NC80X as output section. The aerial at G2CZS is unusual—two “ZL Special” beam sections stacked 1/2-wave vertically, with which he has worked G5YV on phone. G2CZS is there most evenings about 1900 clock time, and would like to hear from more London and West Country stations.

G3BNC (Southsea) is rather badly situated with what he calls “a worm’s eye view” of the band, with Portsdown Hill blanking off the northerly paths, except under the best of conditions. In other directions, G3BNC is on level terms with G3FAN. More than 2,000 QSO’s have been obtained on the two-metre band, with some 250 different stations worked, and G3BW, GD/P, GI, GM and EI heard. This has been done with a 25-watt transmitter evolved from an SCR-522 and using an 829 in the PA, modulated with about 200 watts (!) of audio from a pair of TZ40’s—with speech clipping!—the receiver consisting of a G6VX CC converter with head IF amplifier into an HRO tuning 8-10 mc. The beam is 4/4 delta-matched at 35 feet.

From Scotland

GM3EGW (Dunfermline) is on regularly, conditions have been good, and G5BD has been added to G2FO for regular schedule working. During TV hours, the GM’s are plagued by harmonics

from TV receivers, which smear the two-metre band from about 144.8 mc upwards, with gurglings as low as 144.3 mc. G6NB was worked for a new county and GM3EGW may also be the holder of the GM/PA "First" by reason of his QSO with PE1PL on May 3, of which we heard only as this was going to press. And the distance looks good, too!

GM3DIQ (Stevenston, Ayr) receives G5YV at S9+ on phone, but is unable to raise him, in spite of numerous and frequent calls. 3DIQ is on every evening from 2030 till about 2300 clock time, listening and calling south, but the only G's he hears are G3BJD (Whitehaven, Cumb.) and G5YV. The "VHF Weather Report" suggests that much of this is due to the blanking-off effect of the Pennines and the Cheviots, which can only be spanned when the reflecting layer reaches heights greater than 3,000 feet or so—usually at about 3.0 a.m.!

Results and activities at G3WW (Wimblington, Cambs.) were mentioned earlier, and there can be no doubt that he remains one of our keenest and most successful VHF operators. He remarks that he is still short of 11 workable counties for the Annual Table, and Northumberland, Pembroke and Radnor for the All-Time. G3WW also has something to say about people who always announce, after a CQ, that they are "Tuning from the low-frequency end," thus helping to defeat the objects of the Zone Plan by working, one after another, the stations they happen to encounter while "tuning from the low-frequency end." If these chaps would tune from the *other* end on at least two CQ's out of three they would not only find some eager and interesting GDX to work, but would also contribute to their own comfort by preserving the Zone Plan as a working proposition.

This sort of thing is so obviously right and true that we are almost moved to suggest that everybody (including you) should move forthwith into the first 50 kc of the 144000-146000 kc band in order to prove, by the chaos and shambles that would ensue, what a Good Thing is the Zone

Plan! And your A.J.D. would then be the first to take no notice of the bleats and moans of those who—buffeted by the QRM, robbed of the DX and blasted off the air by QRO locals—sent in petitions praying for some sort of band planning to make things tolerable. For that is how it would be!

Populating Seventy Centimetres

G3HSD (Bristol, 3) has been on Two since 1950, and uses a 3-RF stage converter with 6AK5 as a triode mixer, 9003 osc. and 9002 cathode follower into an R.1155 at 12 mc IF; the beam is a 4-ele Yagi at 60 ft. The transmitter consists of the output side of an SCR-522 modified to incorporate a coiled-line series tuned tank circuit, with 35w. to the 832 driving an 829B PA to 120 watts on 145.44 mc. The coiled-line series tuned tank is so successful—giving about 40% increase in RF output compared with the conventional parallel tuned arrangement—that it is being fitted in the QRO RF amplifier stage in order to get the utmost urge from the 829B. G3HSD is on most evenings, 1800-2000 clock time and after TV, and has so far worked 67S in 16C in spite of a noisy location, with sixteen TV aerials within 100 yards.

G3HSD urges that we encourage the use of squish gear (SEO transmitters and super-regenerative receivers) on the 430 mc band, in the interest of occupancy. This is a matter which is hardly arguable if the sole object of populating the 430 mc band is to develop it as a cross-town talking channel within the immediate bricks-and-mortar area. But if the object is to make 70 Centimetres into a useful and interesting communication band comparable with Two Metres at its present stage of development, then it becomes positively anti-social to use SEO gear because three or four active stations so equipped can blot out the band in any given area over which line-of-sight ranges are possible. SEO transmitters using the simpler circuits are subject to at least a 10% frequency shift at 400 mc, and in many cases much more, so that unless stabilised (which means then that CC might

TWO METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14
From Fixed QTH Only

| Worked | Station |
|--------|--|
| 61 | G3BW |
| 60 | G3BLP (629) |
| 58 | G3EHY |
| 57 | G2OI (349) |
| 56 | G5YV (439), G6NB, G8SB |
| 55 | GW5MQ |
| 54 | G2HIF (200) |
| 53 | G4CI, G2AJ (519) |
| 52 | G2NH, G3WW |
| 51 | G2HDZ (368), G4SA |
| 50 | G3ABA |
| 49 | G5DS (439) |
| 48 | G5BM, G5MA |
| 47 | EI2W (140), G3FAN, G5WP |
| 46 | G4HT (476), G5BY, G6YU (205) |
| 45 | G2XC, G3GHO, G6XM (356) |
| 44 | G3BK, G5ML (250), G3HAZ (194) |
| 43 | G3COJ, G5DF |
| 42 | G5BD |
| 41 | G2FQP, G3BA, G3DMU |
| 40 | G3CGQ, G4RO (256), G5JU, G8KL, G8OU |
| 39 | G2FJR, G2IQ, G3VM, G6CI (157), G8IL (325) |
| 38 | G3APY, G3HBW, G8DA |
| 37 | G2AHP (350), G2FNW, G2FZU (180), G3GSE (383), G3HBW |
| 36 | G3CXD, G6CB (312), G8IP |
| 35 | G3FZL, G3HCU (202), G6TA |
| 34 | G2FCL (182) |
| 33 | G3BNC |
| 32 | G2FVD, G3HWJ, G8IC, G8VR, G8QY |
| 31 | G3GBO (364), G3HXO, G5RP |
| 30 | G2HOP, G3BKQ, G5NF |
| 29 | G3AGS, G3AKU, G3BJQ, G5MR (153) |
| 28 | G3FIJ (163), G3BDA |
| 27 | G3DAH, G3FIH, G6GR, GW8UH |
| 26 | G3AEP, G3CFR (125), G4MR (189) |
| 25 | G5SK |
| 24 | G3DO, G3FD, G3FXG, GM3EGW |
| 23 | G3CWW (260), G4LX, G5PY, G6PJ |
| 22 | G3ASG (150), G3BPM, G3FRY, G3GOP (122), G3HII, G3ISA |
| 21 | G3SM (180), G6XY |
| 20 | G3EYV |
| 19 | G2AOL, G3DLU, G3FEX (118), G3GCX, G3WS, G3YH, G5LQ (176) |
| 18 | GM3DIQ |
| 16 | G3FRE, G3HSD, GC2CNC |
| 15 | G2DVD, G3IWA |
| 14 | G2DHV, G3GYY |

Note: Figures in brackets after call are number of different stations worked on Two Metres. Starting figure for this classification, 100 stations worked. QSL cards are not required to verify for entry into this Table. On working 14C or more, a list showing stations and counties should be sent, and thereafter added to as more counties are worked.

TWO METRES**COUNTRIES WORKED**

Starting Figure, 8

- 13 G3BLP (DL, EI, F, G, GC, GD, GI, GM, GW, ON, OZ, PA, SM), G5YV (DL, EI, F, G, GC, GD, GI, GM, GW, ON, OZ, PA, SM).
- 12 G2HIF, G3WW.
- 11 G2AJ, G3ABA, G6NB.
- 10 G2FQP, G2HDZ, G3BK, G3EHY, G5DS, G6LI, GW5MQ, ON4BZ (DL, EI, F, G, GC, GW, ON, OZ, PA, SM).
- 9 EI2W, G4SA, G5BD, G5MA, G6RH, G6XM, G8IC.
- 8 G2AHP, G2XC, G3BNC, G3FAN, G3GHI, G3GHO, G3VM, G5BM, G5BY, G5ML, G5UD, G8SB.

just as well be used) they would shudder and wobble and splurge across about 40 mc of the 70-centimetre band, making any sort of reception with a decent receiver quite impossible. This is why a super-regenerative receiver *must* be used with an SEO transmitter—its acceptance is, if anything, wider than the transmitter frequency shift! On the other hand, there is much scope for experiment using the super-regenerative technique (with adequate precautions against re-radiation) in VHF receivers designed for working with stabilised transmitters. At the present stage, such receivers will only respond to strong signals, and then the gain is quite extraordinary.

We had all this out 15 years ago, when exactly the same arguments were advanced in favour of populating the five-metre band, which was then regarded as difficult, tricky and altogether outside the scope of the average amateur. At that time, VHF work was all squish - and - line - of - sight, with mountaineering the only recognised way of getting a signal outside the local area.

It was your A.J.D. in *Short Wave Magazine* who first stuck out against these conceptions, contending in 1938 that the only right way to develop the 56 mc band was by using stabilised equipment to look for GDX contacts from the home location. It has long since been on record that his contentions were fully justified and his arguments abundantly proved. It could reasonably be claimed that had not *Short Wave Magazine* taken this stand just about that

time, and supported it by such results as the G5BY-G6FO schedule, amateur VHF development in this country would be years behind its present stage. Look at the Italians (*Never mind the history; get on with the report!* —Ed.)

Actually, most of the rest of this month's story is covered by the Activity Report (calls heard and worked) and the movements in the Tables. The expansion in the 70-Centimetre Station List will also be noted—and, of course, we shall be glad to have further information for this List from equipped and active practitioners on the 430 mc band.

EI/GI Stations

It is only from the EI and GI areas of VHF activity that we are without any reports at all this month. Accordingly, all EI's and GI's who may chance upon these lines are particularly requested to let us have their station reports, individually and direct, by the date and to the address always given at the foot of this column each month. We are glad to credit every report reaching us, and feel that it is high time we had more up-to-date information about what is doing in Ireland.

Some of the Crax

Comments out of context from this month's mail: "I might also admit that I may be behind with some QSL's; I will send direct on request, and I for one would not mind being mentioned on any black-list; my time is far too precious for elaborate QSL records and I am never sure whether I've sent one or not" (G3BW). . . . "Looking back on the log for last year, activity has increased greatly; please ask the GM's to turn their beams south and call from 1900" (G4SA). . . . "It seems quite unethical to radiate a signal far in excess of the efficiency of one's receiving equipment when conditions are average or worse" (GW3BNQ). . . . "Conditions so far this year have been generally much better than last, both for EDX and GDX, with a lot of new stations coming up" (G5YV). . . . "I am in the police force, and after pounding the beat for eight hours,

TWO - METRE QUICK CONTESTS**Dates**

July 25-26; August 22-23; September 26 - 27; October 24-25.

Times

Saturdays 2200 - 2359 only. Sundays 1000 - 2300 only, BST.

Scoring

0-50 miles, One point.
50-100 miles, 5 points.
100-150 miles, 10 points.
150-200 miles, 15 points.
200-250 miles, 20 points.
250 miles Plus: 20+20 pts. for each 50m. additional distance or part, e.g., 375-mile QSO scores 80 pts.

Multipliers: Multiply total pts. by Counties worked, including own as one, e.g., 585 pts. from 16C gives 9360 pts. as final score.

Portables

Score as above but deduct 25%, and will be listed separately. Portables give full points to fixed stations.

Logs

Need show QSO's only, with Time, Call, RST, and QTH.

To be in within 10 days of each Contest week - end, addressed to A.J.D.

Prizes

None — but Certificates of Merit may be awarded at Editor's discretion.

(Note: Each week - end counts as one complete Contest period.)

it is very nice to sit down in the shack and rest my poor old feet" (G3BNC). . . . "With G5YV at S9+, well, I ask you, is there anything wrong with the receiver?" (GM3DIQ).

Surface Wave Transmission Line

On p.150 of the May issue of *Short Wave Magazine* appeared a

short note on the SWTL, it being suggested that it had no practical application on frequencies below about 1,000 mc. In the April issue of the *Journal Brit. I.R.E.* there is an interesting article on some experimental work on the SWTL, and one of the conclusions is that the SWTL technique applied to lower frequencies (than 1,000 mc) would seem to have advantages. It is shown that under certain conditions a 17g. wire set up as an SWTL would have an attenuation of but .022 dB per yard at 400 mc, and would be almost unaffected by moisture; this is about one-tenth the attenuation of a typical RF cable at this frequency.

Aurora Borealis

It is reported that during the late evening of Saturday, May 16, and early into Sunday morning, 17th, there was a display of the Northern Lights visible from the Caithness district of Scotland. We have not yet had any authenticated cases of two-metre reflection by Aurora Borealis, and VHF operators—especially in GM—are asked to make careful observations on the band whenever the Lights are evident. The significance of this was explained on p.44 of "VHF Bands" in the March issue.

Dead-Line

And so we wind up another month's business, with plenty to interest everyone, even if there were no fireworks. The VHF season is well into its stride now, with all sorts of exciting possibilities in the offing. So that we can report it all, keep abreast of events and build up an accurate picture for you, please let us have your report, and on time!

For the July issue, send all your VHF news, views, ideas, claims, suggestions or complaints to: A J. Devon, "VHF Bands," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1, to arrive by **Friday, June 12, certain**. With you again on July 3.

VHF WEATHER REPORT

PERIOD APRIL 16 TO MAY 13

A. H. HOOPER (G3EGB)

For the next few months, we have commissioned the regular appearance of a VHF weather appreciation which will coincide in date-area with the "VHF Bands" report in the same issue. Thus, it will be an up-to-the-minute summary, enabling results and experiences on 144 and 430 mc to be checked against the weather conditions actually occurring over the period concerned. Since these weather phenomena build up the propagation conditions most frequently encountered in VHF work, we hope that this new series will be interesting and of practical value to all VHF operators.—

EDITOR.

THIS first monthly summary deals only with the period April 16 - May 13 — corresponding to the "VHF Bands" report in this issue—and, as far as possible, results are given in tabular form.

Interpretation

Table I is largely a summary of the charts in the *Daily Weather Report* of the Meteorological Office, London. The first line indicates the type of pressure system, anticyclone (A) or depression (D), over Southern England during the evenings of the dates shown; a col (C) is an area of slack pressure gradient between the main types of pressure distribution.

The first period of anticyclonic conditions, from April 18-22, was associated with an extension eastwards over the Scottish Highlands to Scandinavia from an anticyclone over the Atlantic; its southern limit just included our area. For the short spell April 24-25 we experienced a small anticyclone

centred over the British Isles. The last (A) period May 1-11 was due to a belt of high pressure extending north-eastwards from the Azores over England to Scandinavia. It swung into a north-south orientation during May 6, temporarily cutting off the Scandinavian path. The ridge of high pressure began to weaken on the 11th, due to the gradual encroachment of a more unstable airmass from the south-west.

VHF propagation can be enhanced when cooling of the lowest layers of the atmosphere sets in by means of night-time radiation during quiet fine spells. As previously described, the onset of dew or fog marks the beginning of a process which may lift the refracting layer beyond aerial height. In the second line of Table I, figures are shown for each evening when such radiation occurred over South Bedfordshire. They give, as far as can be ascertained, the approximate time when the lowest layer of air had cooled to near-saturation. Where this was delayed until after midnight the figure is still placed under the date of the previous evening. Only reasonably marked occurrences are shown, no entry being made for *nil* cases and the proportion of poorly defined cases which inevitably occur.

The remaining lines of Table I show the occasions when anticyclonic or ridge conditions extended over paths in certain directions from Southern England. Their presence should indicate in a general sense the directions of influence of any discontinuities which develop aloft. Such discontinuities are not an inevitable feature of these pressure systems, and reference to a vertical analysis, is necessary.

For long-range working and all but quasi-optical sea paths we look to reflection from the discontinuities aloft. Fig. 1 shows the presence of MRI discontinuities over East Anglia as deduced from the results of radio soundings reported in *The Daily Aerological Record* of the Meteorological Office. For the first favourable period in April, associated with the east-west belt of high pressure over the

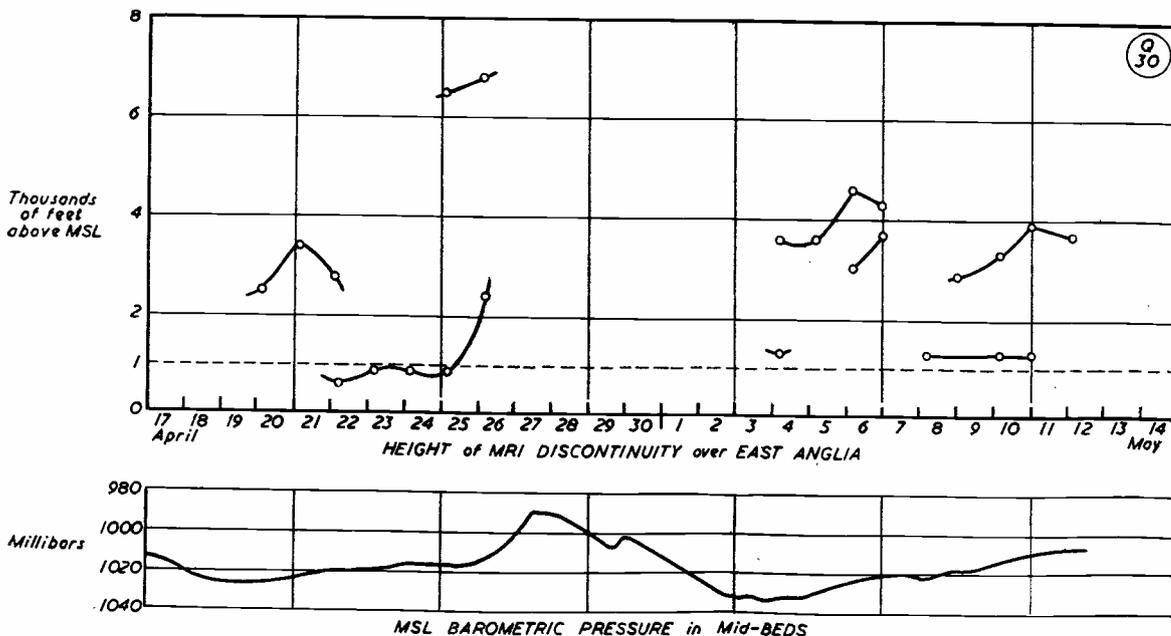


Fig. 1. The reflecting layers which formed over East Anglia during the period April 17 to May 13, showing also the order of barometric pressure fluctuation in the South Midlands. This graph should be studied in conjunction with Table 1, which gives further information.

TABLE 1

| Date | APRIL | | | | | | | | | | | | | | MAY | | | | | | | | | | | | | |
|--|-------|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Pressure System over Southern England | D | D | A | A | A | A | A | C | A | A | D | D | D | D | A | A | A | A | A | A | C | A | A | A | A | C | D | D |
| Radiation over Bedfordshire, GMT | — | — | 24 | 04 | 03 | 03 | 03 | 24 | 05 | 05 | — | — | — | — | — | — | 23 | 03 | 23 | 01 | 21 | 03 | 05 | — | 02 | 04 | — | — |
| NE | — | — | OZ | LA | LA | LA | LA | SM | — | — | — | — | — | — | — | LA | LA | LA | LA | LA | — | — | LA | LA | LA | — | LA | — |
| | | | SM | SM | SM | SM | SM | | | | | | | | | SM | SM | SM | SM | SM | | | SM | SM | SM | | | |
| Ridge and "A" conditions from Southern England | E | — | DL | SP | SP | SP | SP | — | PA | DL | — | — | — | — | — | — | PA | DL | SP | — | — | UA | PA | — | PA | — | — | |
| SE | — | — | — | OE | OE | OE | — | — | F | DL | — | — | — | — | — | — | — | F | OE | DL | F | OE | DL | — | OE | — | — | |
| S | — | — | — | — | — | — | — | — | 45 | 45 | — | — | — | — | — | — | — | 47 | 47 | 45 | 47 | 45 | 45 | 45 | 49 | — | — | |

- Notes—(1) Country prefixes indicate the approximate extent of conditions.
- (2) For the Southern Path which is wholly over France it has been necessary to quote latitudes in two degree steps. The latitude of Paris is approximately 49°, and of Marseilles 43°N.
- (3) D = Depression. A = Anticyclone. C = Col, slack pressure gradient.

Table showing the broad features of VHF weather conditions during the period April 17 to May 13. The association of radiation with pressure systems is very apparent. Actual results could well have followed a similar pattern. Some deductions from this Table are that it might have been possible to work LA, SM and PA during the late evening of May 2, and as far as UA in the early hours of May 7. It will be noted that during the period covered by the Table almost all the EDX openings lasted till well after midnight.

Highlands, it is interesting to note that over Lancashire a similar low-level discontinuity developed, while over Central Scotland the discontinuity sank to a minimum level of 2,000 feet on April 23, lifting again during the following day. In other words, about April 23 conditions were right for easy working over the whole of G and GM and in the direction of SM, though the curve of Fig 1 shows only the MRI discontinuity over East Anglia.

At the foot of Fig. 1 is shown the mean sea level (MSL) barometric pressure at a place in Bedfordshire for the whole period covered by this survey. This has been included as being of interest to those who like to "follow the glass" in estimating VHF conditions—note that the high points on this curve are *minimum* pressure points.

Extending the Survey

A full analysis of weather conditions in relation to anomalous propagation is a large undertaking. It would need to show the radiation effect for a sufficient number of places to establish the limits of enhanced propagation, surveying in several different directions. A family of graphs of the type of Fig. 1 would be necessary for places out to at least the mid-point of each path considered. It is hoped to extend future work on these lines.

For those who would like to know the results of a statistical investigation relating radio propagation with several weather features, a reference, readily available, is appended.* It may help to show how vast this subject is.

SPRING CALL BOOK

The 21-page G section of the Spring 1953 issue of the *Radio Amateur Call Book* contains in its 61 columns the call-sign/addresses of 7,500 licensed amateurs in the British Isles, and includes all QTH's and changes of address published in our "New QTH" feature up to and including the February 1953 issue of *Short Wave Magazine*. This edition of the *Call Book* runs to over 460 pages, and is more than ever an essential buy for all those interested in DX, in QSL'ing and the geography of the Amateur Radio

A Ducting Effect

In the May issue of *Short Wave Magazine* appeared an appreciation of the meteorological conditions in early March. A fact there omitted was that the low-level discontinuity aloft developed into a duct in the early hours of both March 3 and March 4. For stations below the discontinuity level of about 1,000 feet it merely intensified the splendid reflection effects that were occurring, and so was not discussed.

However, it has since been learned that G3MY/P was operating portable 1,400 feet up on the Pennines during this period. Being above the discontinuity, he might have experienced conditions inferior to those at stations at much lower levels. But on March 3 and 4 his site was actually within that rarely occurring phenomenon at two metres—a *real duct*!

The writer wishes to acknowledge the ready assistance of G3JU in completing the data for this article, due to his unavoidable absence at the end of this first period, and is indebted to the Director, Meteorological Office, London, for permission to quote from the official publications mentioned.

REFERENCE

*"Radio Wave Propagation at 89 Mc/sec in Relation to Synoptic Conditions," by C. W. Spencer, B.Sc. *The Meteorological Magazine*, July 1952, p.206.

world. It can be obtained for 25s. post free from the Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

QSL BUREAU FOR KUWAIT

It should be noted that the Box 54 address for MP4 QSL's is now closed down, the new one being: W. N. Burgess, MP4KAL, c/o Kuwait Oil Co., Ltd., Ahmadi, Kuwait, Persian Gulf. The only stations now on are: MP4KAB, MP4KAC, MP4KAI and MP4KAL. (*Overseas journals please copy.*)

NEW VHF FREQUENCY MODULATED TRANSMITTER

The General Electric Co., Ltd. has recently supplied to the British Broadcasting Corporation two FM transmitters of the latest type. These transmitters, which were used by the B.B.C. in the launch *Everest* in connection with the televising of this year's Boat Race, have been designed for the high quality transmission of sound over relatively short distances. Giving an RF power output of 12-15 watts, they operate in the band 88 to 108 mc. The modulation frequency response is exceptionally good, being flat within ± 1 dB from 100 c/s to 10 kc and within 3 dB from 50 c/s to 15 kc.

A thermostatically controlled oven houses the crystal for the oscillator stage, which is followed by five multiplier stages giving a frequency multiplication of 72 times. These are followed by a PA stage which employs a

TT15 Osram valve. All the other stages use Osram type Z77, which is a miniature screened pentode.

Modulation is effected by the use of an audio amplifier stage succeeded by a cathode follower which feeds the phase modulator. All these valves are also Z77's.

The associated receiver is a superhet with two RF stages, mixer, four IF stages and a discriminator followed by two separate audio amplifiers, each of two stages.

The equipment works on the normal mains supply of 200-250 volts at 50 c/s, the consumption of the transmitter being 170 watts and the receiver 90 watts.

This equipment, which proved highly satisfactory in operation for the Boat Race, is suitable for many applications where a high quality radio telephone link is needed.

NEW QTH's

This space is available for the publication of the addresses of all holders of new U.K. call signs, as issued, or changes of address of transmitters already licensed. All addresses published here are reprinted in the quarterly issue of the "RADIO AMATEUR CALL BOOK" in preparation. QTH's are inserted as they are received, up to the limit of the space allowance each month. Please write clearly and address on a separate slip to QTH Section.

E16I, J. Owens, 23 Dargan Street Bray.

GM3HZX, A. Massie, 66 Rosslyn Street, Kirkcaldy, Fife.

G3IGF, E. F. Brooke, 6 Exeter Gardens, Ilford, Essex.

GW3ILZ, T. E. I. Bromham, 51 Bath Road, Morriston, Swansea.

G3IPN, F. Cooknell, Montgomery House, Alexandra Park, Manchester, 16.

GM3IQH, G. Johnstone, 280 Duke Street, Glasgow, E.1.

G3IRB, R. G. H. Baker, 64 Cranmer Avenue, West Ealing, London, W.13.

G3IRM, P. Lumb, 19 Aspin Avenue, Knaresborough, Yorkshire.

G3ISL, G. B. Davis, 24 Bedwell Road, Tottenham, London, N.17.

G3ISQ, R. C. White, 40 Parkwood Road, Wimborne, Dorset.

G3ITH, R. D. Franklin, 30 Churchill Road, Bordesley Green, Birmingham, 9.

G3IUL, G. H. Taylor, 4 Edward Road, East Bedfont, Middlesex.

G3IUP, F. G. Stow, 88 Merlin Grove, Beckenham, Kent.

G3IUR, R. F. Nelson, 5 Stanhope Avenue, Glen Hills, Blaby, Leics.

G3IVU, D. B. Coleman, 26 Aln Avenue, Gosforth, Newcastle-on-Tyne, 3.

G3IWE, A. M. H. Wyse, 7 Smith Crescent, Orford, Warrington, Lancs.

G3IWI, R. Grosant, 58 Moss Grove, Liverpool, 8.

G3IWQ, P. Carter, 51 Sundew Avenue, Shepherd's Bush, London, W.12.

G3IXE, R. J. West, 28 Avenue Road, London, N.W.8 (Tel.: Primrose 6347).

G3IXN, M. M. Lovejoy, 14 Iris Road, Bassett, Southampton, Hants.

G3IYG, B. E. Cook, 19 Recreation Road, Andover, Hants.

G3IYK, J. E. Parkes, 34 South Road, Stourbridge, Worcs.

G3IYW, M. L. Owen, 14 Sydenham Road, Cotham, Bristol, 6.

G3IZA, D. S. Allison, 71 Hubert Grove, Stockwell, London, S.W. 9.

G3IZJ, M. J. Faulkner, Grange Hostel, Hawley Lane, Farnborough, Hants.

G3IZM, J. S. Harper-Bill, 34 Chandos Road, Bristol, 6 (Tel.: Bristol 45750).

G3IZU, D. Aveling, 87 Southfields Drive, Stanground (Hunts.), nr. Peterborough, Northants.

G3IZY, R. A. Parsonson, Long Gardens, Brook Lane, Galleywood End, Chelmsford, Essex.

G3JIM, A. J. Rourke, 130 Ravenhill Avenue, Belfast.

G3JRK, J. R. Knight, 10 Lynton Drive, Burnage, Manchester, 19.

CHANGE OF ADDRESS

G2CMH, R. T. Henley, 57 Sandown Road, Brighton, 7, Sussex.

GW2FUD, A. W. Owen, Gwenarth, St. David's Road, Caernarvon.

G2MC, H. B. Dent, 56 Ainsworth Avenue, Ovingdean, Sussex.

G2VD, L. F. Viney, 60 Langley Road, Watford, Herts.

G3ABK, F. Burns, 24 Coniston Avenue, Little Hulton, Walkden, Manchester, Lancs.

G3ATF, C. B. S. Seaman, c/o Command Secretary, Far East Land Forces, c/o G.P.O., Singapore, Malaya.

GW3BNQ, N. L. Carpenter (ex-G3BNQ), 117 Allensbank Road, Heath, Cardiff.

G3CXQ, E. B. Britton, Wynyard, Leys Road, Oxshott, Surrey.

G3DRQ, W. F. Freestone, 9 Third Crescent, Gloucester Avenue, Slough, Bucks.

G3FIT, N. E. Ashman, 19 Seabrook Road, Weston-super-Mare, Somerset.

GM3FSV, C. O. Thomsen, B.Sc., Papdale House, East Road, Kirkwall, Orkney.

G3FVG, W. A. Martin, 38 Holmdene Avenue, Herne Hill, London, S.E.24.

G3GSS, S. M. Sugden, 185 Henley Avenue, North Cheam, Sutton, Surrey.

G3HBZ, N. E. A. Rush, 17 Lebanon Avenue, Hanworth, Feltham, Middlesex.

G3HDL, S. E. Kelly, 80 Eaton Gardens, West Derby, Liverpool, 12.

GD3HQR, A. W. Anderson, 25 Greeba Drive, Onchan.

G3IMI, A. E. Harrowell, 26 Weald Lane, Harrow Weald, Harrow, Middlesex.

G3ITB, T. H. Bartlett, The Bungalow, Beeston Road, Sheringham, Norfolk.

G3JU, S. G. Abbott (ex-LI3JU/VU7JU/VS9AA), 35 Spinney Crescent, Dunstable, Beds.

G3OV, A. H. Parker, 59 Juniper House, Juniper Estate, Pomeroy Street, New Cross, London, S.E.14.

G4CK, R. J. Stellig, 17 Lodge Road, Bedhampton, Havant, Hants.

G1SHV, W. H. Martin, Swallow Lodge, Greenisland, Co. Antrim.

GM6FB, Lt.-Cdr. E. W. Burgis (ex-G6FB/G16FB) 7 Riccartbar Avenue, Paisley, Renfrewshire.

G8JR, N. P. Haskins, 48 Byng Drive, Potters Bar, Middlesex.

G8UP, J. G. B. Bransom, 30 Sholesbroke View, Leeds, 7, Yorkshire.

CORRECTION

G2HHV, J. Spivey, Healey Cottage, Healey, Batley, Yorkshire.

GW3ERW, J. Lines, 6 Heol-y-Castell, Caerau-Ely, Cardiff.

ONCE more we have suffered one of those upheavals that keep the good amateur on his toes. This time it is only of slight consequence (we are referring to the truncation of our Top Band), but it should serve to remind us that our hold on all the HF bands is only precarious, and that the arrival of an emergency which causes a need for re-shuffling will usually imply that we are the shuffled, and certainly not the shufflers! There may be no connection between the facts that we have lost 1715-1800 kc and that the occupancy of this section by Top Band users was always ridiculously small; there probably is not, for it has always been a shared band, and the needs of the other sharers have not been static for some time.* We have hopes that when all their requirements are sorted out, we shall at least know where we may tread and where we may not! Meanwhile, it behoves everyone to choose his frequencies with considerable care and not to make any cracks about "commercial on my frequency."

OLD TIMERS' QUIZ

Here are the answers to the little posse of posers set last month. (1) F. B. Arnyne was a purely mythical name which, however, appeared as the signature on the early WAC Certificates. (2) Leon Deloy, 8AB, was the first amateur in Europe to make a two-way contact with the USA. His station was at Nice, and he used 25-cycle raw AC as his HT during those first contacts! (3) PCII was a Dutch amateur; but PCGG was the call used for the famous "Dutch Concerts" on long waves. The others, 2ZY, 5IT and 6BM, were all broadcast stations—Manchester, Birmingham and Bournemouth respectively. (4) FO was South Africa; SB, Brazil; OA, Australia; and OZ, New Zealand. (5) An ATI was an aerial tuning inductance; QSS originally meant "fading"; and CRAC was "chemically rectified AC," usually implying banks of tantalum rectifiers all over the floor or even under the bed. We will think up



another of these Quizzes, we hope, in time for the next issue.

SHARP PRACTICE

Just as we were thinking that the voluntary segregation of CW and Phone on our bands has been working pretty well, the situation appeared to deteriorate sharply. The first example was on a recent Sunday morning, when we found the 80-metre phones spreading right down to 3550 kc. It has been an accepted policy for phone transmitters to make full use of the 3600-3635 kc portion of the band, and no one would really object if a certain amount of pushing and thrusting sent the lowest ones down to 3590 or thereabouts, but to spread right down to 3550 is purely selfish and unethical. Such a state of affairs leaves the CW users of this band (of whom there are legion) just 50 kc to themselves, with 200 kc all clear for phone. Yes, we know that 80-metre phone is a pretty popular pursuit, and that after dark the phone stations suffer badly from CW interference, but it is not amateur CW. We don't like taking up the cudgels on behalf of one particular section of our community, but we feel bound to state that the CW men behave much better in this respect than their brothers of the microphone.

A VERSATILE LANGUAGE

One of our constant joys is the use of the English language, as

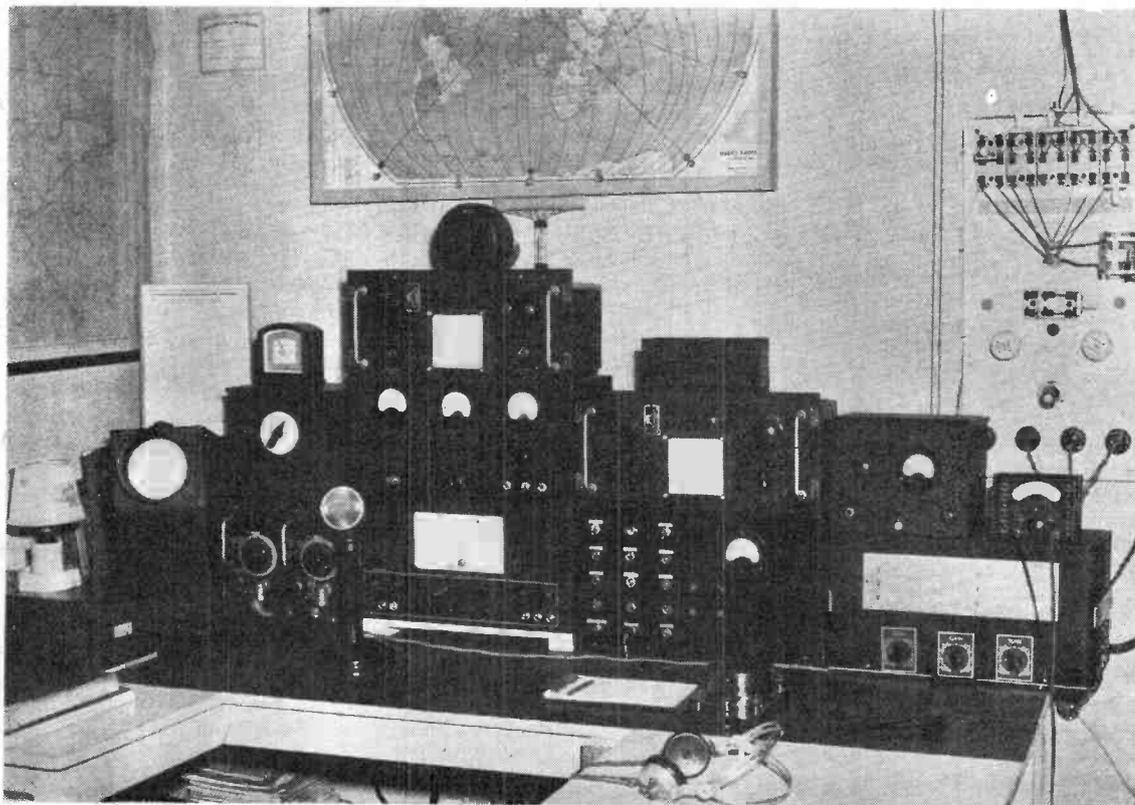
demonstrated by our colleagues from all parts overseas. We are not making fun of them (far from it, because our admiration for their command of English is boundless), but we do derive quite a kick from some of the phrases that they invent from time to time. When one hears a Swedish amateur working a Belgian in English, one realises that English (of sorts!) is certainly the adopted language of Amateur Radio. From all parts of the world the man behind the microphone can make himself understood in it, though here in this country not one amateur in fifty could carry on a QSO in French, and not one in five hundred in any other language. So, if we can't repress a smile when we hear someone saying "I do not quite got you very well," we can at least reflect that we shouldn't be so hot ourselves in Portuguese, Roumanian or even Polish! We have been making a collection of some of the brighter gems recently heard, and we really feel that many of them are worthy of introduction into a new phrase-book of colloquial English. So—we will see you again . . .

SUNSPOTS AND THE LIKE

Just so as to whet the appetites of the newcomers, we ask them to imagine a 10-metre band on which, instead of hearing a nice steady *swis-s-s-sh*, as at present, one could be sure of hearing DX at almost any time of day. Switch on, almost any week-day morning, and there were Japan, Guam, China, Philippines, Okinawa and Iwojima all crashing in with S9 phone. Turn to the CW band almost any morning and hear VK, ZL and most of the above. Drop in the USA phone band any afternoon after about 1400 GMT, and search it diligently, not for a signal, but for a quiet space between two adjacent phones! Yes, that's what *Ten* was like six years ago, and will be again. So, when you hear those W7 phones, all 40 dB over S9 like they were in the autumn of 1947, just remember this little note of encouragement. *M e a n w h i l e*—what a band!

The Other Man's Station

G5TV



FOR G5TV—W. H. Lloyd, 13 Monro Gardens, Harrow Weald, Middlesex—experimental radio activity began as long ago as 1914, when the receiver consisted of a rolling-pin wound with a vast quantity of DCC wire, and a simple detector. This was followed by service in Royal Signals (both wars), and the bug having bitten deep during the 1914-18 period, G5TV was fully licensed in 1924.

The photograph shows the particularly neat layout of the operating position "as is." Main receiver is a much altered S.640, with RF-27 Units modified as pre-selectors and giving as much as 20-24 dB gain at the front end. The transmitter (not shown) is in a 6-ft. rack, containing power packs, driver stages, RF power amplifier and aerial tuning panel; the PA consists of two 807's in push-pull, running 50-60 watts input on phone and 80w. on CW. The speech amplifier and modulator are kept on the operating table, and the ancillary equipment provided includes a 4-in. oscilloscope, crystal checked frequency meter, 100/1000 kc oscillator, CW and phone monitors and, of course, the VFO. In the box to the right of the 640 are the relays and switches for finger-tip control of the whole station.

At G5TV, main interest is in the 28 mc band, with occasional sorties on 7, 14 or 21 mc. The aerial arrangements include dipoles for all bands 7-21 mc, but for Ten, a 3-element close-spaced beam is used,

33-ft. high. This is of particular interest from the design point of view, because it is mechanically controlled throughout. A car steering-wheel at the operating position gives the rotation through a train of cycle-sprockets with cable drive; at the base of the steering column are sixteen contacts which are wired to pilot lights round the circumference of the great circle wall map. Thus, rotation of the wheel not only swings the beam, but also indicates its heading visually on the map. This ingenious device has worked perfectly for more than four years, and has not given a moment's trouble since it was first installed.

As at many other stations, more time is spent in experimenting and construction than actually on the air—though on the desk can be seen a light-up panel which says "G5TV On The Air." There is never any hurry to design or complete a new job, nor any desire to give up good sleep in chasing the exotic stuff. His pet aversion is a contest. In the course of the years, much interesting DX has been encountered, and, like many Old Timers, G5TV holds a number of QSL cards in the rarity-value category.

Finally, the reaction of Mrs. G5TV to Amateur Radio probably sums up the feelings of many another tolerant XYL—"When he's playing radio, I do at least know where he is, which is not so when he's playing golf."

The Month With the Clubs

Royal Air Force Amateur Radio Society

The AGM was held at the Headquarters Station, G8FC, on March 28, and new officers elected for the coming year. During the past year stations in 115 countries had been contacted, and many contests participated in; a full programme was contemplated for the next few months, with a possible Hamfest at Locking. Meanwhile, G8FC is on the air to the following schedule: 1300-1430, 3525 kc, CW; 1430-1530, 7015 kc, CW; 1530-1645, 14025 kc, CW. Sundays, 1130-1230, 3715 kc, Phone. All times are BST.

Brighton & District Radio Club

During May the members took part in a Quiz (May 5), heard a talk and demonstration on the Grundig recorder (May 12), had an informal evening (May 19) and a talk on AVO Meters (May 26). A full programme continues, including participation in NFD.

Clifton Amateur Radio Society

Future meetings are as follows: June 5, Junk Sale; June 12, Debate; June 19, Quiz; June 21, D/F Field Day; and June 26, Talk and Demonstration on Recording. Rendezvous for the D/F Field Day is the Larches Café, Green Street Green, Farnborough, Kent, at 1030. A meal will be provided at the end of the day's sport.

Baldock & District Radio Club

At the recent AGM all the officers were returned again for

With winter conditions well behind us, many Clubs are thinking in terms of portable expeditions, Field Days, D/F Contests and all the other outdoor activities that help to make the summer season more interesting.

Only those Clubs with resources above the average are able to tackle VHF work in the field, but we feel that in this branch of outdoor radio lies the perfect combination of experimental work and operating skill. VHF Field Days are one obvious form of activity, but the VHF D/F Contest is an even greater test of ability. We shall be particularly interested to hear from all those Clubs who do manage to include VHF work in their summer programmes, with a view to encouraging some of the others who are still in the stage of wondering "what to lay on next."

Of particular interest is the fact that this month we have a report on the activities of an overseas Club—Canberra. It should be noted by secretaries concerned that we are always glad to have such reports.

Newsletters and Broadsheets are acknowledged this month from the following Clubs: QRP Research Society, SOUTHEND & District Radio Society, PURLEY & District Radio Club, CLIFTON Amateur Radio Society, SURREY Radio Contact Club.

Next month's deadline for Club News is first post on June 10; for the August issue it will be first post on July 15. Address: Club Secretary, SHORT WAVE MAGAZINE, 55 Victoria Street, London, S.W.1.

And herewith this month's reports, from 31 Clubs.

the coming year. A show is being put on in the Town Hall, at which the Club will exhibit a working TV Transmitter, a DX Transmitter, a Top-Band Transmitter, an electronic organ, tape recording, and a QSL section. There will also be exhibits by the GPO and Services electronic research labs. Meetings are on the first Thursday of each month.

Barnsley & District Amateur Radio Club

This Veteran Club is celebrating its 40th Anniversary this year, having been in active existence since August 21, 1913. Its first call-sign (AXR) was granted in April, 1914, and the President now in office, G2BH, was a founder-member, then holding the call YXK. To celebrate this interesting and important anniversary, all transmitting members of the Club will be operating between September 12 and 20 with a view to making as many world-wide contacts as possible, each to be confirmed by a special commemorative QSL card.

Coventry Amateur Radio Society

The MARS/CARS Inter-Club Transmitting Contest was held on April 19, and results are now being studied. Recent events have

been a further talk on Maths., a "Readers' Digest" evening, and a demonstration of a multi-purpose power supply. Future meetings—June 8, Talk on 70 cms; June 21, VHF Field Day; June 22, Visit to the Solihull Club.

York Amateur Radio Society

On May 20 a Film Show was given by a representative of the Mullard organisation, showing the manufacture of valves and cathode ray tubes. (This note was received too late for publication in the May issue).

Rochdale Radio & Television Society

Meetings are held at 1 Law Street, Sudden, Rochdale, every Thursday evening at 7.45 p.m., and the Club will shortly be heard on the air with the call G3IYD. Recent meetings have mostly been devoted to informal talks.

Torbay Amateur Radio Society

The AGM was well attended, and a successful year was reviewed. All the 1952 Officers were re-elected. The President appealed for the introduction of some "new blood" into the ranks, and regretted the lack of interest in technical matters



The Amateur Radio stand at the Morecambe Rotary Club Hobbies Exhibition on April 8, when G3BAP/4 was in action on the 80-metre band. This was the first time anything of the sort had been attempted in the district, and the venture was a great success.

among the young men of today. The meeting concluded with a Junk Raffle, yielding a useful sum towards Society funds.

Southend & District Radio Society

Exhibits of Home-Built gear for the Pocock and Hudson cups were recently judged, and Messrs. Wallace and Whitworth were deemed the winners. The cups were presented at the Hamfest on May 16. Forthcoming events are as follows: June 12, lecture on Frequency Measurement; June 26, Demonstration of apparatus by Cup winners; July 10, talk by Mr. R. J. Varcoe, A.M.I.E.E.

Bradford Grammar School Amateur Radio Club

The Hon. Sec. of this Club would be very glad to know of any amateurs in Bradford and district who would be willing for a party of about 10 boys, or two parties of 5 each, to visit their stations. (See panel for Secretary's QTH.)

Cambridge & District Amateur Radio Club

Next meeting is on June 19, 8 p.m. at the Jolly Waterman,

Cambridge. No particular programme has been fixed, but it seems probable that a retrospective discussion on NFD will take place.

Canberra Radio Club

This Club, which should soon be heard on all bands with the call-sign VK2ACA, was formed in late 1951 and is now in a flourishing state. Clubrooms are open at all times, together with the transmitter, library and workshop. The membership is cosmopolitan, and includes enthusiasts from Great Britain and several European countries. Lecturers at the Club have included the Professor of Nuclear Physics from the Australian National University, engineers from broadcasting stations, and other notabilities.

Cannock Chase Amateur Radio Society

Recent reorganisation has brought membership to 34, with 16 licensed amateurs. G3ABG supervised a preparatory course for RAE, and seven members took the exam on May 1. Meetings are held on the first Thursday at the Castle Inn, Bridgtown, and

visitors from neighbouring societies will be extremely welcome.

Radio Society of Harrow

On June 5, K. W. Cranfield will talk on Selsyns and their uses; June 12 and 26, Transmitter and Practical evenings; June 19, a Junk Sale. Membership still increases, and visitors to the Harrow area will be welcome at the clubroom any Friday evening.

Bristol & District Amateur Radio Society

Meetings are held every Friday evening at the St. Mary Redcliffe Church Hall, Guinea Street, Redcliffe; the first Friday of the month is a general meeting, and the others are devoted to talks and discussions. On May 30 a party of members visit the TV transmitter at Wenvoe, and the informal Annual Outing is arranged for June 28 in the shape of a trip to Weymouth.

QRP Research Society

This Club is very anxious to hear from Secretaries of Clubs where there is some interest in low-power work, with a view to organising National inter-Club QRP contests. Please send details

to the Hon. Sec. They would also be glad to hear from QRP enthusiasts in the USA who are willing to partake in a regular exchange of QRP topics. The power limit to qualify for Club membership is 5 watts—but this does not preclude the use of higher power for other purposes.

Ravensbourne Amateur Radio Club

Meetings are on Wednesday evenings, 8 p.m., at Durham Hill School, Downham. The club transmitter G3HEV is active on four bands, phone and CW, and the equipment is comprehensive. Morse practice is also organised. New members will be welcome.

Ribblesdale Amateur Radio Society

The first public appearance of Amateur Radio in Clitheroe was at the Rotary Club Hobbies Exhibition in April, when G2FOL operated mostly on 80 metres and made some 120 contacts. The success of this exhibition is reflected in a steady increase in membership. Meetings every Friday evening at the Club Rooms, Back York Street, Clitheroe, Lancs.

Slade Radio Society

Forthcoming events: June 12, Evening D/F Test, with assistance for beginners, starting at Club HQ, 7.45 p.m. June 13/14, Midnight D/F Test. June 26, Technical Discussion Evening at the HQ, Church House, Erdington, Birmingham.

South Manchester Radio Club

Future lectures are as follows: June 19, Mr. C. R. Plant, G5CP; July 3, Mr. A. Potter, G3ESK, on Control Systems. The RAE Course will commence in June and will be held every Monday night at the HQ, Ladybarn House, Mauldeth Road, Fallowfield, Manchester 14, beginning at 7.45 p.m. The annual D/F Contest will take place during July.

Surrey Radio Contact Club

A short extraordinary general meeting was called for May 12 to consider an alteration in the rules. After this there was a series of talks on Simple Apparatus for the Amateur. The Club also arranged a display at a local Exhibition at the Selsdon County Secondary School on May 30.

Warrington & District Radio Society

Meetings continue at the King's Head Hotel, Winwick Street, on the first and third Tuesdays. Recent lectures have been by G8TR on Synchronous Motors, G3FGI on the CRO, and G5CP on his visit to the USA. Forthcoming: June 9, Basic Radar Principles; June 16, Business and Ragchew. Preparations for NFD are in hand, and anyone interested is invited to join in.

British Two-Call Club

Membership is open to any British subject who has held a call-sign in any two countries. New members include G3EDW/VQ2W/D2DW, G3EBA/DL2BA, G3IDR/DL2SR, G2ICH/DL2SU, MP4BBH/MP4BAC/VP4RG. Col. Sir E. Y. Nepean, G5YN/VS1YN/AC4YN/etc., is a member who has recently joined the Six-Call section. A Quarterly Newsletter, "QTC," is issued to members. (Note panel for Hon. Sec.'s QTH.)

Chester & District Amateur Radio Society

The new Club Tx is almost ready for Top Band work on both CW and Phone. Friends and new members will be welcomed to all Club meetings—every Tuesday at



Spenn Valley Radio & Television Society made up a party of 32 for their visit to Catterick Camp, Yorks., on May 3 last, when they were shown all round this important Royal Signals training establishment.

7.30 p.m. when a good crowd from Chester and the surrounding parts will always be found.

Dartmouth & District Amateur Radio Society

Regular meetings continue, and have been well supported throughout the winter season. Portable plans have been made for the summer, and some of the necessary gear constructed for this purpose. G4RJ/P will be operating every Sunday from 0930 BST on 7 mc CW, QRP. All interested persons in the Torbay or Dartmouth areas are asked to get in touch with the Hon. Sec. (See panel for address.)

Grafton Radio Society

This year, Grafton are holding their own special Field Day on June 20/21, on Hampstead Heath. It is hoped to run two stations on four, or possibly five bands. A recent lecturer to the Club was G2NH (in the absence of G3CU) on the subject of Single Side-Band Transmission.

Gravesend Amateur Radio Society

At the recent Special General Meeting a new Chairman was elected, the previous holder of the office asking to be released. Three members sat for RAE on May 1. The Medway and Grays Clubs have been invited to a lecture to be given by Mr. L. Varney (G5RV) on TVI Suppression.

Salisbury & District Short Wave Club

This Club was represented at the Wiltshire Rover Moot on May 3, and operated two stations (G3FKF/P and G3IVP/P) from

NAMES AND ADDRESSES OF SECRETARIES REPORTING IN THIS ISSUE

BALDOCK : A. Fussell, G3HBH, 6 Clare Crescent, Baldock.
BARNESLEY : P. Carbutt, G2AFV, 33 Woodcliffe Road, Barnsley.
BRADFORD (Grammar School) : D. M. Pratt, 27 Woodlands Grove, Cottingley, Bingley.
BRIGHTON : R. T. Parsons, 14 Carlyle Avenue, Brighton 7.
BRISTOL : N. G. Foord, 71 Brynland Avenue, Bristol 7.
BRITISH TWO-CALL CLUB : G. V. Haylock, G2DHF, 63 Lewisham Hill, London, S.E.13.
CAMBRIDGE : T. A. T. Davies, G2ALL, Meadow Side, Comberton, Cambridge.
CANBERRA : R. Clark, P.O. Box 59, Kingston, A.C.T., Australia.
CANNOCK CHASE : C. J. Morris, G3ABG, 58 Union Street, Bridgtown, Cannock, Staffs.
CHESTER : N. Richardson, 1 Victory Villas, Upton Lane, Chester.
CLIFTON : W. Wooller, G3GYZ, 7 Neptune House, Neptune Street, London, S.E.16.
COVENTRY : K. Lines, G3FOH, 142 Shorncliffe Road, Coventry.
DARTMOUTH : B. Farleigh, G4RJ, Montpelier, Lower Contour Road, Kingswear.
GRAFTON : A. W. H. Wennell, G2CJN, 145 Uxendon Hill, Wembley Park, Middx.
GRAVESEND : R. Appleton, 23 Laurel Avenue, Gravesend.
HARROW : S. C. J. Phillips, 131 Belmont Road, Harrow Weald.
QRP RESEARCH SOCIETY : J. Whitehead, 92 Rydens Avenue, Walton-on-Thames.
RAF AMATEUR RADIO SOCIETY : R. F. Weston, G6PZ, RAF Locking, Somerset.
RAVENSBOURNE : J. H. F. Wilshaw, 4 Station Road, Bromley, Kent.
RIBBLESDALE : E. Pearson, 1 Cowper Avenue, Clitheroe, Lancs.
ROCHDALE : J. Riley, 1 Law Street, Sudden, Rochdale.
SALISBURY : V. G. Page, G3IVP, 32 Feversham Road, Salisbury.
SLADE : C. N. Smart, 110 Woolmore Road, Birmingham 23.
SOUTHEND : G. Chapman, B.E.M., 20 Leigh Hill, Leigh on Sea, Essex.
SOUTH MANCHESTER : M. Barnsley, G3HZM, 17 Cross Street, Bradford, Manchester 11.
SPEN VALLEY : N. Pride, 100 Raikes Lane, Birstall, nr. Leeds.
STOCKPORT : G. Phillips, G3FYE, 7 Germans Buildings, Buxton Road, Stockport.
SURREY (Croydon) : S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
TORBAY : L. D. Webber, G3GDW, 43 Lime Tree Walk, Newton Abbot.
WARRINGTON : G. S. Leigh, G2FCV, 49 School Road, Orford, Warrington.
YORK : G. Nottingham, G3DTA, 51 Carr Lane, Acomb, York.

the School Playing Fields, Salisbury. The former was on Two Metres and the latter on Eighty, and considerable interest was shown. G3IVP lectured on the History and Meaning of Ham Radio. The Club station is active every Tuesday evening on six bands—new members are always welcome.

Spenn Valley Radio & Television Society

Some 32 members paid the annual visit to Catterick Camp, where, after inspecting all manner of Royal Signals equipment and aids to training, they were enter-

tained by the Sergeants' Mess. Forthcoming events: June 10, Visit to Met. Station at Huddersfield; June 17, Open Meeting.

Stockport Radio Society

Attendances of over 40 have been maintained at recent meetings. Two portables will be operated on NFD, and future lectures are "Field Day Working" (June 9), "NFD Inquest" (June 23) and "BCI and TVI" (July 7). A contest is being arranged between this Club and the South Manchester Radio Club. Meetings are at Blossoms Hotel, Buxton Road, Stockport.

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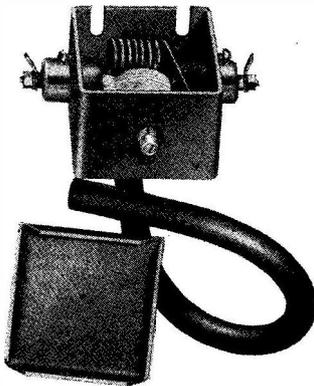
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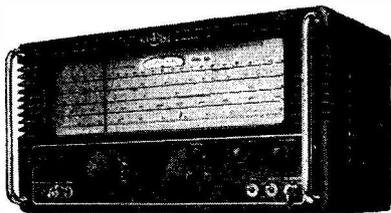
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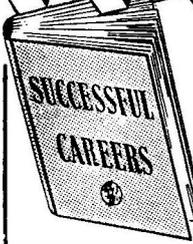
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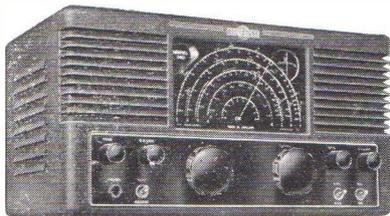
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