The SHORT WAVE Magazine

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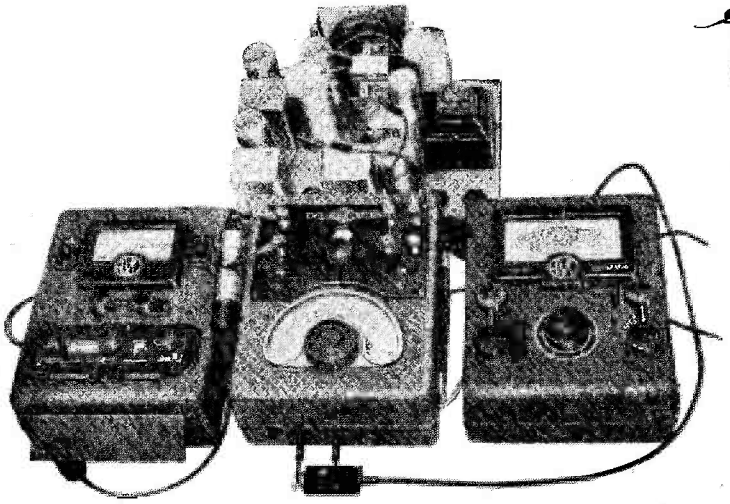
VOL. XI APRIL, 1953 NUMBER 2



The PERFECT TEST TEAM

The illustration depicts a set of modern "AVO" testgear being used to measure the "Q" of the secondary winding of the second I.F. transformer on a chassis of unknown characteristics — just one of many tests which can be performed by this combination of instruments.

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,,	4.	1.5 Mc/s.—5.5 Mc/s.
,,	5.	5.5 Mc/s.—20 Mc/s.
,,	6.	20 Mc/s.—80 Mc/s.

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SHORT WAVE MAGAZINE

VOL. XI APRIL, 1953 No. 116

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FOR THE EXPERIMENTER AND THE RADIO ENGINEER

The SHORT WAVE Magazine

EDITORIAL

Receivers *This essential link in the communications chain is taken for granted at most stations—indeed, it does not seem possible to do very much else about it. There sits the receiver in its cabinet, with its rows of knobs and—though there may at times be furtive doubts as to whether the thing is really giving all it should—the line of least resistance is to assume that it does not need a maintenance check-over "yet."*

In this issue we have placed particular emphasis on the subject of Receivers, and there are two long articles which will undoubtedly open the eyes of a good many people. In the first place, it is shown that the performance of a boxed-up commercial receiver can never be taken for granted, and secondly, on the constructional side there is the first part of an article on the design of an unusually ambitious home-built receiver assembly.

Both these articles are worth careful study, for they explain a great deal about the construction, testing and use of high-grade equipment. Incidentally, they should also show how much planning and design must go into a good commercial receiver, and why its cost is so high.

We have frequently been asked by readers for "More information about Receivers." Well, here is the first offering, with more to come.

Austin Forbes
G6FO.

Top Band Trans-Atlantics, 1953

SURVEY OF RESULTS IN THE THIRD POST-WAR SERIES

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

More than 30 years ago the first DX was worked on wavelengths in the region of our present 160-metre band. Then for many years the DX potentiality of 1.7 mc was lost sight of, until contact with the States was re-opened on One-Sixty by a QSO G6FO/W1DBM in February, 1933. Privately organised tests were continued until 1938, when the first of the SHORT WAVE MAGAZINE *regular Test series was instituted. Coming down to the immediate past, the first post-war Trans-Atlantic Top Band Test took place during January-March, 1951, fully reported in our issue for May, 1951. The results obtained over the next Test series, December, 1951-February, 1952, were considerably short of those achieved on the first post-war occasion. We are now glad to record that the 1953 results show a very great improvement and have been, in some ways, even more interesting than those of the first season. Once again, co-operation has been excellent on both sides, and the Tests have proved their worth as a means of establishing DX operating standards for the 160-metre band. Throughout the history of these Tests, we have been fortunate in having the enthusiastic assistance of Stewart S. Perry, W1BB, as organiser on the other side of the Atlantic. It is fair to say that over the years the success of the Tests has been very largely due to his active co-operation.—Editor.*

AFTER the somewhat disappointing results of the 1952 Transatlantics, we embarked on this third series with a certain amount of misgiving. It had been hoped, a little more than a year ago, that the steady decline in HF conditions would have resulted in a noticeable improvement on One-Sixty for long-distance work. For some reason things did not turn out in this way, and the 1952 tests were very disappointing.

This season's efforts have rewarded everyone's patience and perseverance by giving us many interesting contacts and by turning out to be far more successful in every way than any of their predecessors.

As usual, certain enthusiasts "jumped the gun" and showed that they could work across the Pond without waiting for organised Tests! And this time they did it most handsomely, because the season appears to have opened as early as November 9, 1952. On that morning W1LYV worked G3GGN, G3HYG, G6BQ and GW3FSP, thus declaring the new foundation stone well and truly laid. After that, however, we have no record of further contacts until the first official Test took place on December 28.

The First Test, December 28

Although regarded on the other side as only a preliminary warm-up, this one got off to a good start. We do not propose to mention all the stations making contacts (these are given in Tables I and II), but it seems that at least four U.K. stations had QSO's and four others were heard. From the far side, some thirty W's and VE's were heard, and six of them worked. An outstanding achievement was the way in which W2HCW put his phone signal across, several observers on this side reporting it as S9 on peaks. The best DX from the other side was WØNWX, who started off well and remained prominent throughout the DX season.

KP4DV and KP4KD were being worked by the W's, but were not heard by anyone on this side. W1BB was suffering from a very high noise level and heard very little on this morning, although his own signals were reported by everyone who took part over here—both transmitters and SWL's.

On December 29 and 30 and on January 3 conditions were still favourable, and SWL J. L. Hall reported hearing WØNWX on two of those days.

January 4, 1953

As always, the Sundays in between the organised tests saw plenty of activity, and January 4 was particularly good. Thirteen different W's were worked, by six U.K. stations, and conditions were obviously better than on December 28. G5JU really scooped the pool on this occasion by working W5ENE, right down in Texas—the longest hop within the U.S.A. yet achieved. (In all G5JU worked eleven W/VE stations on January 4, including W9MFV, 9NH and ØNWX as well as the record-breaking W5).

W2EQS raised VP4LZ (1982 kc) for the only South American contact to come into the picture this season. The KP4's were on again, but still did not get across to us.

W5ENE only made the one contact, but also received G3PU and G6GM.

Second Test, January 11, 1953

And so we arrived at the best morning for Trans-Atlantic work that any of us remember. For some reason January 11 turned out to be a real winner, although conditions on the other bands were not, apparently, abnormal in any way. No fewer than 52 W/VE stations "got across," thirty of them being worked by U.K. stations, the remainder being heard. Many of our SWL's achieved notable results on this occasion.

On the other side of the balance sheet, fourteen U.K. stations made contact, and two more were heard on the other side. Unfortunately the W5 was not in evidence this time, the best DX being represented by WØNWX and five ninth-district stations. G6GM made no fewer than thirteen contacts; G5JU worked twelve; and EI9J, appearing on the band for the first time with a special permit, cleaned up *nineteen* of them! With his slight geographical advantage and the undoubted attraction offered by the EI prefix, EI9J was in terrific demand. W2QHH, using only 16 watts to a 6L6, worked him, and also raised G5RI for his first G.

A whole list of W's was heard by DL1IX; EI9J was logged by W5ENE; all SWL's made a very fine morning of it. But the bouquet for this occasion must be handed to W1BB and OH3NY, who managed to make the first W/OH contact ever recorded on this band.

W1BB was really making a *test* of it this time, with three aerial systems (one of them a "Kytoon") and three receivers on the bench. Stew was anxiously waiting for a still morning for some conclusive tests with the balloon, which could not be operated if the wind was fiercer than about 15 m.p.h. On this occasion there wasn't too much wind, but the balloon iced up and grounded itself; it was recovered safely and stored ready for the next Test.

Other stray comments on this excellent morning: W1LMU, using 16 watts like W2QHH, got across to G5RI; W9PNE worked six U.K. stations; W2EQS was hearing EI9J as late as 0845 GMT; and G6ZN with *three watts* worked K2ANR.

January 18, 1953

Another unofficial test took place on the following Sunday, January 18, but conditions were not nearly so good. Out of eighteen W/VE stations whose signals were logged over here, only five were worked, although ten of our stations succeeded in getting across. KV4AA was up on this occasion and was heard over here but not worked. G6ZN got his 3-watter over again, this time to W3EIS.

W6KIP was active, from his spectacular QTH 280 ft. *below* sea-level in Death Valley. 'KIP is a real OT, dating from 1912, and is thrilled to be back on One-Sixty, but although he has heard all W districts no DX has come his way as yet.

W1BB couldn't fly the Kytoon this time owing to a brisk wind, and in any case he found conditions pretty poor.

TABLE I

DATE	W AND VE STATIONS WORKED FROM U.K.	OTHERS HEARD IN U.K.
Dec. 28, 1952	W1LYV, 2EQS, 2HCW (Phone), 2WWP, 3EIS, 9VHR.	VE1EA, 1HJ, 3AAZ, W1AYG, 1BB, 2AMC, 2JPW, 2KNZ, 2QOS, 2UKS, 2WH, 2YS, 3AJS, 3HL, 3RGQ, 4JBF, 4LRN, 4POB, 4VFL, 4VUA, 8NJC, 9NH, ØNWX.
Jan. 4, 1953	VE1EA, W1BB, 1EFN, 1QJM, 2EQS, 3EIS, 5ENE, 8BKH, 9FIM, 9MFV, 9NH, ØNWX, K2ANR.	W1HSC, 1SS, 2BMC, 2HCW, 2JPW, 2TRK, 2WH, 3HL, 8GDQ, 8NJC, 9PNE.
Jan. 10, 1953	W1BEA, 1RQR, 2PSQ, 3RGQ, ØNWX.	W1BEZ, 2RYJ (Phone), 8SYJ, 9FIM.
Jan. 11, 1953	VE1HJ, 1YW, W1BB, 1COV, 1DWO 1EFN, 1LYV, 1QJM, 1RQR, 1SS, 1TCR, 2AMC, 2EQS, 2GVB, 2HCW, 2MX, 2QHH, 2TMC, 2WWP, 3HL, 3RGQ, 4LRN, 8HMF, 9CZT, 9FIM, 9MFV, 9NH, 9PNE, ØNWX, K2ANR.	W1AYG, 1DGV, 1HSC, 1IVR, 1LMU, 1QCA, 2EKI, 2HRW, 2JPW, 2KOA, 2HCW (Phone), 3AVL, 3ENF, 3TBG, 4JBF, 4TUP, 8DNB, 8GDQ, 8HFD, 8NJC, 9FWO, 9NGB.
Jan. 17, 1953	*Nil*	WØNWX.
Jan. 18, 1953	VE1EA, W1BB, 1LYV, 3EIS, ØNWX.	VE1HJ, 2AIE, KV4AA, W1DWO, 1EFN, 1QCA, 1QJM, 2EQS, 2WH, 3FUP, 4DTB, 4LRN, 8BKH.
Jan. 25, 1953	VE1HJ, W1BB.	K2ANR, KV4AA, W2HCW, 3EIS.
Feb. 7, 1953	*Nil*	K2BWR, W2IYP, 2WC.
Feb. 8, 1953	VE1EA, W1BB.	VE1HJ, 1YW, K2BWR, W1LYV, 1OE, 2NC, 2WC, 3EIS, ØNWX, KV4AA.
Feb. 13, 1953	*Nil*	KG4AF.
Feb. 15, 1953	W1BB.	VE1EA, W1LYV, 2EQS, 2MX, 3EIS, 9PNE, KV4AA.
Feb. 22, 1953	VE1EA, 1HJ, 1YW, K2ANR, W1AHX, 1BB, 1LYV, 2WC, 3EIS, 4BRB.	VE3AAZ, W1AW, 1LMU, 1VDB, 4VXH/2, 3HL, 3TBG, 8BKH, KV4AA, 4BB.

Third Test, January 25, 1953

This time we really caught a cold, the number of signals from the other side being the smallest ever. Only six stations were heard, and only two of them (VE1HJ and W1BB) worked. On our side only three stations worked across the Pond, one more being heard. KV4AA was quite prominent and was QSO'd by a few W's and VE's, but nothing of real interest took place throughout the whole three hours. A poor show for once !

W9's and Ø's didn't hear a breath of DX in this Test and said it was the poorest night so far. No W4's or 5's were logged by W1BB, who was on the tail end of a severe gale—and still couldn't fly his Kytoon.

February 1, 1953

This " interim " Sunday morning was also a loser, conditions apparently being very bad on the other side. Many W's and VE's were on, but no one heard or worked any DX except for a solitary contact between VE1EA and KV4AA.

Fourth Test, February 8, 1953

By contrast, this morning was almost good though it fell far short of January 11. Twelve W/VE stations were logged, but only two (W1BB and VE1EA, the old reliables) worked. The trouble was QRN on the American side, reported from all stations right out as far as WØ.

The surprising event of this Test turned out to be the reception of W1BB's signals by ZS3K, who reported this by radio a few days later. KV4AA was active again but made no Transatlantic contacts, although he was heard working W's.

W1BB was flying the Kytoon with some success, but conditions were against the carrying out of any tests that might have meant anything, so results still remain rather uncertain.

The next event of interest was on the morning of the 13th, when SWL J. L. Hall logged KG4AF, on 1819 kc, working W's around 0600 GMT—another new country for the band !

The morning of February 15 was not good, and there seems to have been an exceptionally high QRN level on the other side again. A new G station to get across this time was G3GZK, operating from Penzance.

W6DBI was reported to be QRX on 1902 kc, and W6KIP was still on the look-out, although neither of them had been heard in W1. W1BB, however, has been regularly heard at the latter's QTH in Death Valley.

The Kytoon, after a number of trials, appears to have given no better results than the horizontal wire except in one or two unaccountable instances—possibly depending on the type of aerial used at the receiving end. But in the rather strained atmosphere of these Tests it is not easy to do a careful check between two systems, especially if one is liable to lose the station at the other end without any warning !

Fifth Test, February 22, 1953

This, the morning of the final organised Test, proved to be somewhat better as far as conditions were concerned, but activity had fallen off a little by now ; some of those who had consistently failed to make a contact were discouraged and stayed in bed. (It was also a very cold morning !)

Twenty stations from the other side were heard, ten of them being worked. Some eleven U.K. stations were logged in W/VE and seven of them worked.

Several newcomers made their appearance at this eleventh hour. W4BRB, a very consistent and well-known 80-metre performer, moved upwards and made his first European QSO on One-Sixty by working EI9J. KV4BB also turned up on the band and was heard by most of our SWL's on this side.

High scorers were EI9J, G5JU and 6GM ; and, from the other side, VE1EA and W1BB made the most contacts. After the regular

TABLE II

DATE	U.K. STATIONS WORKING W OR VE STATIONS	OTHERS HEARD AT DX
Dec. 28, 1952	G3PU, 5JU, 6GM, 8KP.	G5RI, 6GO, GI2ARS, 5UR.
Jan. 4, 1953	G3BKF, 3PU, 5JU, 5RI, 6GM, 8JR.	
Jan. 10, 1953	G6GM.	
Jan. 11, 1953	G2FGD, 3ATU, 3BKF, 3FGT, 3PU, 5JU, 5RI, 5TN, 6GM, 6LB, 6ZN, GM3EHI, GW3FSP, EI9J.	G3GKQ, 8JR.
Jan. 18, 1953	G3BKF, 3PU, 5JU, 5MP, 5RI, 6BQ, 6GM, 6LB, 6ZN, EI9J.	G3HVX.
Jan. 25, 1953	G3PU, 6GM, EI9J.	G3GGN.
Feb. 8, 1953	G6GM, EI9J.	G5RI.
Feb. 15, 1953	G3GZK, 5JU, 5RI, 6GM.	G3US.
Feb. 22, 1953	G3GZK, 3GLW, 3PU, 5JU, 6GM, 8KP, EI9J.	G2PL, 3FEW, 5VB, 6CJ.
Mar. 1, 1953	G5JU, 6CJ, 6LB, 6GM.	G8WF.

tests were over, trials were carried out between the W's and ZL1AH, who was keeping skeds on 1903 kc. Only faint traces of the ZL were heard, but his luck was better and he definitely logged W1BB, 9PNE and ØNWX.

ZC4XP was active and worked OH3NY, but no Transatlantic QSO's were made. His big moment was to come a week later . . .

March 1, 1953

The fact that the organised tests were over didn't discourage the keen types, and a goodly gathering collected on the morning of March 1 to see what was going to happen.

Two or three of the " usual " G's got across, and G6CJ added a new call to the active list. But the big news was another Canada-Asia QSO, between ZC4XP and VE1EA. (The first QSO between Canada and Asia was made two years ago by VE1EA and HZ1KE.) ZC4XP's signals were first audible at W1BB as early as 0255 and " peaked " at RST 229 around 0315. At this time the two stations heard each other but ZC4XP does not claim a QSO.

Shortly after this, however, VE1EA joined the party and a definite QSO did take place, with VE1EA's signals 339 and ZC4XP's 569.

Following this there came another ZL party, when ZL1AH heard W1BB, 2EQS, 9NH, 9PNE and ØNWX, but once again QSO's were impossible.

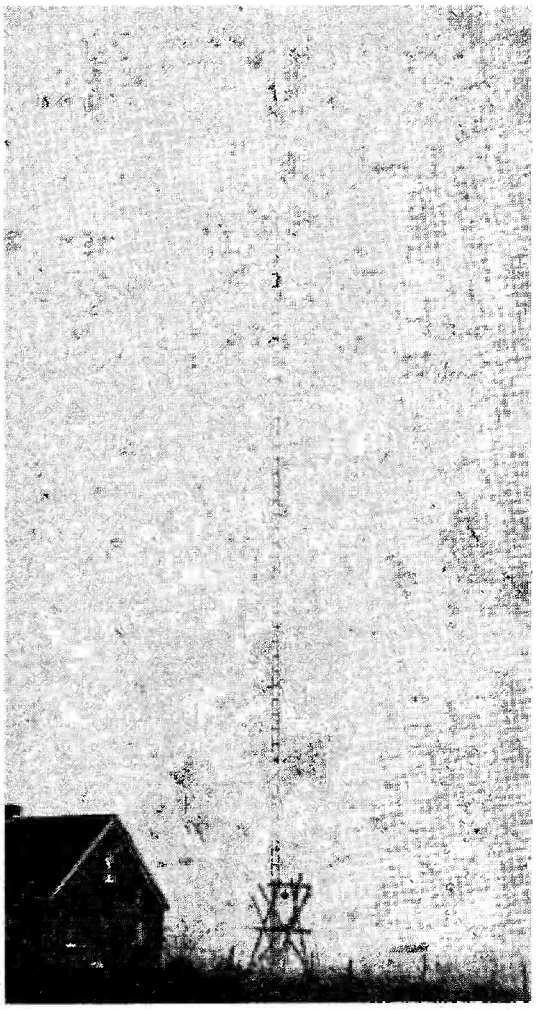
Even this did not by any means close the season, for a last-minute report from SWL J. L. Hall suggests that the morning of March 8 may have been another really good one. On this morning he logged W1LYV, 2HCW, 8GDQ and KV4BB, *all on phone*, and all S7-9. On CW he added a new country with VP9BF, as well as logging many W1, 2, 3, 4, 8 and W9PNE. On the previous morning (March 7) he heard KG4AF working W6KIP.

These mornings in March suggest that we suffered from a temporary falling-off of conditions during February, and that on future occasions it might be wise to keep the organised tests going well into March, as we did in the first series.

General Notes

Several points of interest have cropped up from time to time—so many, in fact, that it is very difficult to pick them all out or to summarise the happenings.

W1BB's Kytoon has already had a lot of publicity, and we were all sorry that he didn't have better weather in which to give it a real test in the vertical position (apparently it never did do much better than a 45-degree angle !) But ZC4XP's excursion into Canada was



This is the 137-foot vertical mast aerial used on One-Sixty by W8GDQ of Wellington, Ohio.

apparently due to a similar effort at his end. The aerial used was 262 feet of 28-gauge bare copper " suspended by a bunch of toy balloons "; and half-way through the contact with VE1EA a short rain squall with a 30-knot wind removed the aerial *and* the five-bob's-worth of balloons. 'XP says he was dumbfounded by that 569 report from VE1EA, and the expense was well worth while !

VE1YW, who figured in so many lists, used only 25 watts to an 807, and thinks he can probably claim the first VE/EI contact, as EI9J, on January 11, told him he was *his* first VE. (It was probably the first post-war contact, but others took place before the war, and, we believe, as far back as the 1920's.)

Several phone QSO's were attempted, and

W1BB and 3EIS both worked G3PU on phone . . . W6's and 7's were participating for the first time ever . . . KG4, VP9 and ZC4 were new countries on the band for these tests . . .

W1LYV, so consistently heard over here, has a quiet location and plenty of space for sky-wires. One of them is a 2,000-footer running East-West, but the main one is a centre-fed two-wave (about 1,100 ft.) running North-East and South-West. The receiver is an NC101, with DB20 Pre-selector and Q5-er.

W8GDQ uses a 137 ft. vertical tower with ground radials (*see* photograph) and gets out well with 45 watts, but has difficulty in hearing the DX. W2HCW was using a 66 ft. vertical, base-loaded ; W5ENE was said to be trying a vertical ground-plane for the band. But the general opinion seems to be that verticals, while greatly increasing signal-strength at ranges of about 1,000 miles, do not help for super-DX—or, at any rate, are inferior to very long horizontal wires.

Notable Firsts

It is pretty certain that the coveted label "First" can be attached to the following contacts :

W1BB/OH3NY	...	**January 11 ;**
VE1EA/ZC4XP	...	**March 1 ;**
VE1YW/EI9J	...	**January 11 ;**
W5ENE/G5JU	...	**January 4 ;**
W2WWP/EI9J	...	**January 11 .**

As all these events have comprised a series of tests rather than a contest, "firsts" do not really assume very great importance, but such claims are published in order that full credit may go to those who (intentionally or not) carry out pioneer work on this band.

The world-wide character of the DX work now possible on One-Sixty is once again demonstrated by the striking fact that all six continents figure in the foregoing summary. It is true that inter-Continental QSO's have not yet spread to this extent, but North America has been heard in Africa and New Zealand and has *worked* Europe, South America, and Asia. It is a pity that North Africa was not represented this year, and, of course, many countries who could put up excellent representatives on this band are not allowed to do so by the terms of their licences.

Our thanks are due, however, to the stations in such parts as KV4, KP4, KG4, VP4, ZC4 (why all "fours"?) who co-operated to the limit which circumstances would permit. Next year we hope to see many more countries on the band.

Conclusion

As always, our hearty thanks go to W1BB, Stewart Perry, on whom fell most of the organising work on the other side of the Atlantic. Thanks to Stew's efforts the publicity was better than ever—hence the increase in the number of W stations taking part. W2ESO co-operated splendidly and arranged many broadcasts in the VOA Programmes ; *QST* and *CQ* spread the news widely ; and many of the keen Top-Band types on the other side went to a lot of trouble to get others on the air.

W1BB considers that the schedule over there, involving operation from midnight until 3 a.m., is rather tougher than our own, which means getting up early. This is probably due to the fact that Stew *has* to get up early on Sunday mornings anyway, even after his three-hour sessions ! Add to that the hours spent in wet darkness retrieving a recalcitrant Kytoon from neighbours' property and you will appreciate that a considerable loss of sleep went towards the organisation of these very successful Tests.

Thanks are also due to the many operators on this side who reported to us consistently, even if their efforts met with no success. The logs duly came in after each week-end, and only a few grew tired and fell by the wayside before the last test. And it is only from the reports of participants that this account could have been written.

In particular we must commend the work of the listeners, who lived up to their reputation by hearing, on the whole, many more W/VE signals than did those who were preoccupied with calling CQ every five minutes. Acknowledgements for most excellent logs go to J. L. Hall (Croydon), G. C. Allen (Thornton Heath), C. L. Bradbrook (Alton), R. H. Jeakings (Luton), R. Iball (Worksop) and the many other listeners who did not contribute regularly but sent in occasional reports.

There seems to be no possible doubt that we shall be organising a similar series of Tests next winter, and for advance details, together with any notes of interest in the way of Top-Band DX, watch "DX Commentary" month by month. Meanwhile, our thanks again to all who helped us—and BCNU next season.

ABERDEEN AMATEUR EFFORT

In the Music Hall of the Silver City by the Sea, the Aberdeen group will be laying on an exhibition stand during the period May 21-23. Their Club station GM3BSQ will be on the air, and it is hoped to display also a wide range of equipment of Amateur Radio application and interest.

Getting the Utmost from the AR88

CALIBRATION, IF AND RF ALIGNMENT, SENSITIVITY CHECKS AND GENERAL TESTING

W. K. MILLER (G6QF)

Large numbers of AR88's, of various vintages and degrees of effectiveness, are in regular use by amateurs and at commercial or experimental stations in this country and abroad. By reason of the complexity, size and weight of the AR88, it is certain that many operators—having wisely decided to leave well alone—are in fact accepting a performance far below that of which their receiver is capable. But if the experienced reader has the necessary test equipment available — and the need for experience and the proper gear must be stressed—then this article will show him how to proceed to get the utmost out of his AR88. Our contributor not only gives all the detailed information required to set about the work, but also quotes figures which will serve as a useful guide in estimating the performance of models which have not recently been given maintenance attention.—Editor.

IN a professional capacity, the writer specialised in peaking this one type of receiver up to a performance level higher than that claimed for it by the manufacturers. Certain modifications were made, one of which was included by RCA in later models. Details of these will be given.

Working with Grade 1 precision equipment enabled exact performance data to be obtained, but as it is most unlikely that this type of equipment will be available outside the laboratory, the figures derived will serve as a guide, if not a goal. To proceed:

The receiver should first be given a general test over all bands.

There are three common faults which crop up in some receivers which have seen long service. These are: (a) Shorted .01 μF by-pass condenser to the anode of the 6K6GT output valve. In this case the whole receiver is, of course, dead. (b) Defunct 6K6GT output valve, due to running the receiver for long periods on 'phones only. This can be cured by fitting a cathode bias resistor of 100 ohms. The cathode of a normal receiver is shorted to ground: cut out this short and insert the resistor. (c) Shorted trimmer condenser in one or more of the first or second RF, Mixer or Oscillator stages. This will result in one or more dead bands, the remainder of the six bands being live. Normally, a very slight movement of the plunger of the faulty condenser will clear the fault temporarily, but the affected condenser should have its plunger removed by pushing downwards out of the chassis. It will usually be seen that a flake of the inside plating of the condenser tube has lodged across the small ceramic washer at the lower end of the plunger. This should be removed and the inside of the condenser thoroughly cleaned out with carbon tetrachloride before re-assembling.

When the receiver has been cleared of such faults and is known to be working, however inefficiently, on all bands, the first job to be done is the calibration.

Calibration (Stage 2)

Normal calibration consists merely of feeding a 1,000 kc, 100 kc, 10 kc crystal controlled signal through loose coupling to the aerial terminal and, starting always on the HF band (No. 6), adjusting the oscillator trimmer condensers and inductance cores until every 1,000 kc, 100 kc and 10 kc mark on the dial is "spot on." Every one, that is, except 22 mc on Band 5 and 31 mc on Band 6. Owing to some minute characteristic of the tuning of the oscillator section, it is a physical impossibility to get both these frequencies to "spot" exactly. If 22 mc is on, 31 mc is off, and *vice versa*—and no amount of fiddle will change it. The best arrangement is to fix 22 mc on Band 5 and let 31 mc on Band 6 go where it likes. The discrepancy is only very small and is outside the 28 mc amateur band anyway.

Should the calibration of the receiver be very much off—so much so that no amount of trimmer and inductance adjustment will bring it right—it will be necessary to adjust the vanes of the tuning condenser oscillator section. This is the first section of the tuning condenser bank nearest the front panel.

If the condenser cover is removed it will be seen that the oscillator section is divided into two parts, one having a greater number of vanes than the other. The smaller of the two is in circuit when using Bands 4, 5 and 6, and the larger when using 1, 2 and 3. Let there now be given a word of warning: "Leave well alone" should be the watchword for all

except those who have had considerable experience with oscillator calibration on this receiver. That small section of the beautifully made tuning condenser is indeed a place "where angels fear to tread." Unless the condenser has been damaged it is unlikely that physical adjustment of the vanes will be necessary, but, if it is, the procedure is as follows:

(1) *Zero BFO.* Adjust knob on BFO tuning condenser so that the pointer is exactly vertical when vanes are half-meshed. With BFO switched off and 1000 kc signal feeding into aerial, adjust main tuning condenser to zero beat; leave tuning set at this point and switch on BFO. If the heterodyne is not zero beat adjust BFO coil core L22 until signal is zero beat. Repeat until zero beat remains constant with BFO on or off, always keeping BFO tuning condenser in its mid-vertical position.

(2) *To Calibrate Receiver.* Set BFO switch on. BFO tuning condenser mid-vertical.

Tune 1000 kc signal on Band 6 at 30 mc and check all megacycle points down to 23 mc. To adjust HF end of band, tune condenser C32. To adjust LF end of band, adjust core L56. The adjustment of each one of these trimmers naturally affects the other, and the HF and LF end adjustments must be repeated several times until all megacycle points are spot on. It is at this stage that it is possible to determine whether or not any physical adjustment is necessary to the condenser vanes. Supposing 30 mc is spot on, 29 mc is 100 kc low, 28 mc is 200 kc low and 27 mc is spot on, as are all other points down to 23 mc, then this condition indicates that the tuning condenser capacity between 23 and 27 mc is correct, but from 27 to 28 mc there is too little capacity, hence the signal tunes earlier on the scale than it should for 28 and 29 mc. To increase this capacity, proceed as follows: Lightly mark in pencil the edge of the smaller group of rotor vanes where they enter the fixed vanes when the tuning condenser is set at 27 mc and again at 30 mc. *Between these points* it will be necessary to close up *very* slightly the outside rotor vane of the small group *without disturbing the setting of the remainder of that vane.* Only the slightest touch is necessary to effect a considerable alteration in the effective capacity, and extreme care must be taken if the whole calibration efficiency is not to be ruined. The only tool used by the writer, after much experiment, was the smooth end of a nail file, applied with a stroking motion. After every single touch with the tool the calibration should be checked and the trimmers C32 and L56 readjusted. This procedure is repeated until all megacycle points on Band 6 except 31 mc are spot on, *i.e.*, until the 1000 kc signal tunes at zero beat when the dial indication is set at any mc point from 23 mc to 30 mc.

In a perfectly calibrated receiver 31 mc will read approximately 30 to 50 kc high when all megacycle points from 23 to 30 mc inclusive are correct. In this condition 22 mc on Band 5 will also be spot on when that band has been calibrated.

When Band 6 has been adjusted as outlined above, the adjustments for Bands 5 and 4 follow in that order, using trimmers C27 and L55, and C25 and L54 respectively.

Note: No adjustment whatever is necessary to the condenser vanes on these bands, as they are covered entirely by the setting of the condenser for Band 6.

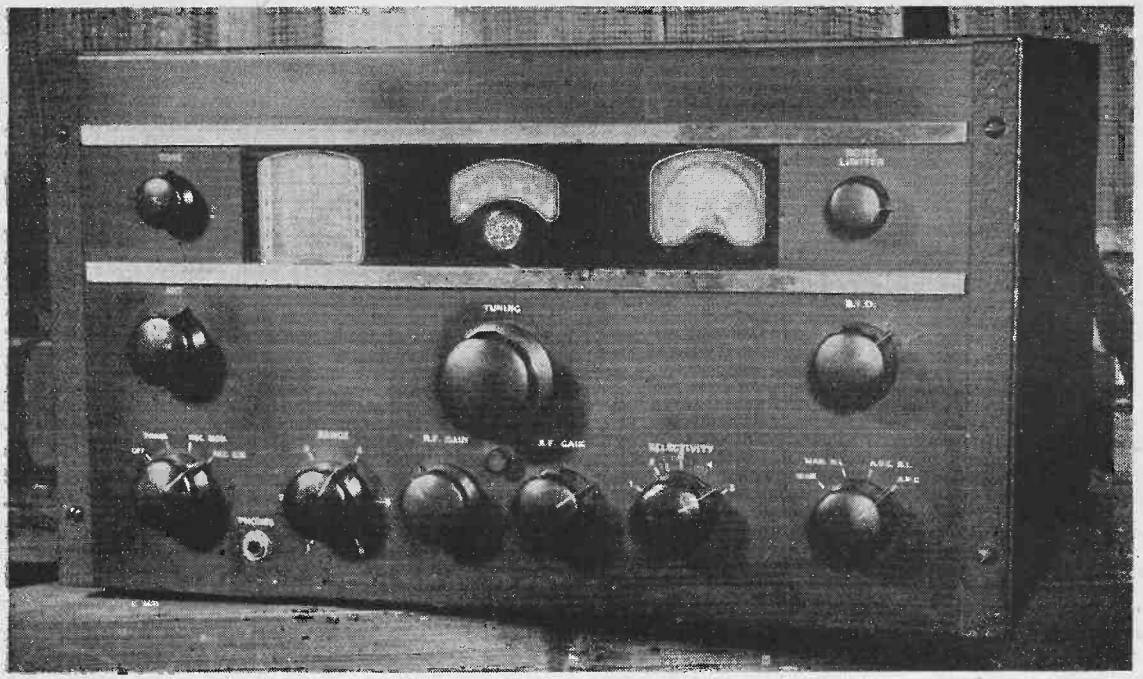
Band 3 should now be calibrated in exactly the same manner as Band 6, but using trimmers C22 and L53. Adjustments of the condenser vanes may be necessary to bring this band up to perfection, but this time the adjustment is made on the larger group of vanes of the oscillator section of the tuning condenser. A further difficulty is encountered in this operation as, unless very great care is taken not to upset the setting of the smaller group of vanes which are attached to the large group, when adjusting the large group the calibration of Band 6 will be altered and the whole of the work done up to this stage will have to be repeated in detail.

When Band 3 calibration is completed, Bands 2 and 1 may be calibrated using trimmers C19 and L52, and C16 and L51 respectively. No adjustment whatever is necessary to the condenser vanes on these bands as they are covered entirely by the setting of the condenser for Band 3.

The work of calibration is tedious and exacting, but if perfection is the aim there are no short cuts, and the job should not be undertaken at all unless time and patience can be given to it.

IF Alignment (Stage 3)

The one and only way to align the AR88 IF system properly is with an oscilloscope and wobbulator. It is impossible to align the 13 tuned circuits, including crystal load, by any other method, as will be appreciated. Receivers aligned by the output meter method, when checked on an oscilloscope, have shown some remarkable instances of misalignment not easy to detect in any other way.



General appearance of the famous AR88, in use at a great many stations at home and overseas. The tuning dial is centre top, with the band indication panel on the left and the S-meter to the right.

IF Set-up. The IF crystal frequency is 455 kc. The IF signal from the wobbulator set at 455 kc is fed through a .01 μF condenser to pin 5 of the 6SA7 mixer valve. The 6J5 oscillator valve is *not* removed during IF alignment. Oscilloscope input is taken from chassis and point C on IF transformer T9. Time base voltage is fed from oscilloscope to wobbulator.

Control Settings

On-off switch	Rec. Mod.
Band Switch, Band 1 ...	LF end.
RF gain	Max.
Audio gain	Max.
Selectivity	Position 3.
AVC	Position 4.
Crystal Phasing Control	C75 Half-mesh.

Alignment. With oscilloscope scanning at approximately 20 per second, tune wobbulator slowly through crystal frequency until peak appears on screen. Set wobbulator so that the centre line of this peak coincides with cursor line of 'scope.

Preliminary Check. Switch selectivity switch to positions 1, 2, 3, 4 and 5, and note the shape and position of curves in relation to the cursor line of 'scope for each setting in turn. The curves should appear as in the sketch if the IF's are correctly aligned.

In switch positions 1 and 2 the crystal is out of circuit; it is brought in on positions 3, 4 and 5. If the IF's are off-tune, begin alignment at T9, working from there back through the various stages to T1. When making trimmer adjustments it should be remembered that any improvement or otherwise of the trace will relate only to the particular setting of the selectivity switch. It is obvious therefore that when adjustments are made with selectivity switch on, say, pos. 2, the alteration may adversely affect the trace when checked on pos. 1 or 3, and so on. The aim therefore is to adjust each of the trimmers to maintain the curve centrally on the 'scope while, at the same time, increasing the height of the peak of the curve above the base-line. One method is to trim off-centre on one trimmer and then to pull back to centre with a second trimmer, at the same time increasing the amplitude without displacing the central positioning of the curves on the remaining selectivity positions. This sounds, and is, a complicated process, but yields results in due course. Considerable range of tuning is provided by the IF iron cores, but it is not advisable to tune so that the curves are widely offset from the 'scope cursor line, as it is sometimes a long job to pull them back into position. It is an advantage to use two trimming tools

and, working with the receiver turned on its left side, to tune the top and bottom trimmers at the same time. With care and attention to the curve centreing and amplitude, it is quite a straightforward job, but one which does take some time. Unless the receiver has been badly mis-used, no trouble should arise from the IF components, as the writer has yet to find the first fault in this respect. Do not be misled into thinking the IF transformer is a "dud." It is almost always your tuning which is at fault !

Testing IF Sensitivity. Remove oscilloscope and wobbulator leads from receiver. Connect matched output meter to output terminals at back of receiver. Set signal generator at 455 kc and feed through .01 μF condenser to pin 5 of mixer as before, and—with selectivity switch in pos. 3—rock the signal generator tuning to give maximum output on meter, then switch selectivity switch to pos. 2 for future readings. Set modulation on signal generator at 30% and feed in sufficient signal to bring output meter reading up to one watt. Read off the input on the scale of signal generator. This may be anything from 600 to 1000 microvolts on the first test. A note should be made of this figure.

Now take out the first and second RF valves (6SG7's) and removing each of the 6SG7 IF valves in turn, substitute one or other in turn of the RF valves. This should show on the output meter if the valves are all of a standard efficiency. If a substitution results in an increase in output, leaving the valve which caused the improvement in circuit. Should spare valves be available they should be tested in turn, to obtain the best team in the IF stages. If better valves have been found for the IF's the input required from the signal generator will, of course, be smaller, to give one watt output. The IF's should now be trimmed up with the substituted valves in use, using the oscilloscope as before, and the input required for one watt output again measured. This should be lower than the previous figure, but may still be around 600 to 700 microvolts. To improve this figure still further remove the 6SA7 *metal* mixer valve and substitute a 6SA7 *glass* type. If one or two of the glass ones are available, try them in turn, not forgetting to re-align with each change.

The result in almost every case is that the required IF input for one watt of output will drop *from about 600 microvolts to between 80 and 100*—which is a considerable gain.

The IF efficiency measurement is always made with selectivity switch in pos. 2, but constant checks of signal frequency are required, to be made by switching to pos. 3 and rocking generator frequency.

Once this figure is obtained with the curves central on all positions of selectivity switch, the IF's can be sealed by painting the trimmer spindles with a spot of shellac to prevent accidental rotation.

If any difficulty is found in adjusting a particular IF transformer, the signal generator should be fed through the grid of the preceding IF valve and the stage roughly aligned: the signal generator is then returned to pin 5 of the 6SA7 for final alignment.

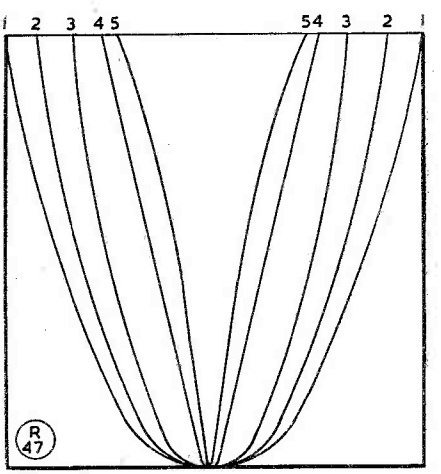
Crystal Phasing adjustment. Connect a high resistance sensitive DC voltmeter to point C on last IF transformer. Feed signal generator tuned to 7 kc off IF resonance to pin 5 of 6SA7 mixer, and adjust C75 for minimum response.

Adjustment Crystal Load Circuit

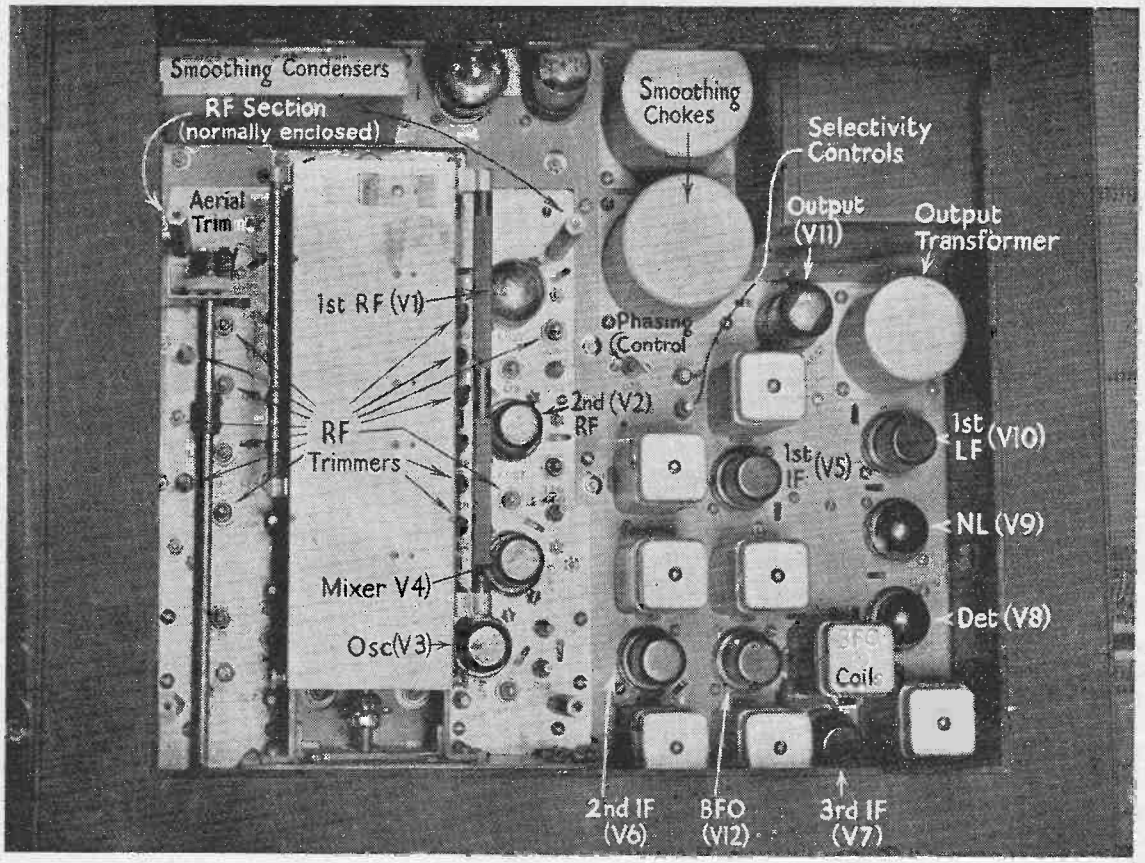
(1) With set-up as for IF alignment and selectivity switch on pos. 3, rock signal generator through IF frequency and adjust L34 for symmetrical round-topped curve. (2) With selectivity switch in pos. 4 adjust C81 for symmetrical curve. (3) With selectivity switch in pos. 5 adjust C80 for symmetrical curve, rocking signal generator as for 1 and 2.

Wave Trap Adjustment. With range switch on Band 1, feed a modulated signal of 455 kc into aerial and ground and adjust L57 on back of chassis for minimum output on meter or speaker.

This adjustment should be made before final RF alignment.



Selectivity curves of the AR88, of the shape to be expected if the IF circuits are correctly aligned. Numbering refers to the positions of the selectivity switch.



The AR88 with the lid open, showing chassis layout and placement of main parts. The accompanying article suggests how the receiver can be checked and adjusted for maximum performance on the amateur bands. This should not be undertaken without proper test equipment and experience in its use.

RF Alignment (Stage 4)

Connect matched output meter to output terminals of receiver, then connect signal generator with 30% modulation *via* a 200-ohm resistor to aerial and ground. (Shorting link from other aerial terminal to ground is left in position.) The manufacturers recommend that the meter be connected across the voice coil of the speaker, but the figures quoted later in this article refer to readings on a Marconi matched output meter without speaker load.

Control Settings

Tone Control ...	Fully clockwise
Antenna Trimmer	Adjusted for max. output at HF end of each band in turn.
On-off Switch ...	Rec. Mod.
Range Switch ...	To band being aligned.
RF Gain	Max.
Audio Gain ...	Max.
AVC	Position 4.
Selectivity Switch	Position 2.

Begin alignment on Band 6 by feeding 30.5 mc from signal generator. Tune receiver for maximum output and adjust aerial tuning on front panel for maximum output. Adjust 1st and 2nd RF trimmers C45 and C68 carefully for maximum output. Then set signal generator to 22.5 mc and retune receiver for maximum output, but do not alter the previous setting of aerial tuning on front panel. (This is tuned for maximum at the HF end only of each band in turn, and is left so tuned when the remaining adjustments are made at the LF end of each band.) Adjust aerial inductance trimmer L12 (on back of chassis) and 1st and 2nd RF trimmers L21 and L31 for maximum output.

Repeat these adjustments at the HF and LF ends several times to obtain peak output.

The writer obtained 5 watts output for one microvolt input consistently at both ends of this band on a properly aligned receiver.

Switch off modulator from signal generator and read off the noise-level on meter. The

reading should be below one watt, but if it is higher remove the 1st RF valve and substitute a 6AC7, or 717A, or 6SH7 for the 6SG7 and re-align. This should reduce the noise considerably without affecting the output with modulation on generator signal.

Band 5. Tune 22.4 mc generator signal on receiver, adjust aerial tuning and C43 and C66, all for maximum output. Tune 16.4 mc generator signal on receiver and adjust L10 (on back of chassis) and L20 and L30, all for maximum output. Repeat several times. Output should be between 4 and 5 watts for one microvolt input.

Band 4. Tune 16.4 mc generator signal on receiver and adjust aerial tuning and C41 and C64, all for maximum output. Tune 12.2 mc generator signal on receiver and adjust L8 (on back of chassis) and L19 and 29 for full output. Repeat several times. Output should be 3.5 to 4.5 watts for one microvolt input.

Band 3. Tune 11.5 mc generator signal on receiver, adjust aerial tuning and C39 and C62, all for full output. Tune 4.6 mc generator signal on receiver and adjust L6 (on back of chassis) and L18 and L28 for maximum output. Repeat several times. Output should be 3.0 to 3.5 watts for 1 microvolt input.

Band 2. Tune 4.4 mc generator signal on receiver, adjust aerial tuning and C38 and C60, all for maximum output Tune 1.7 mc generator signal on receiver, adjust L4 (on back of chassis) and L16 and L26, all for full output. Repeat several times. Output should be 2.5 to 3.5 watts for one microvolt input.

Band 1. Tune 1500 kc generator signal on receiver, adjust aerial tuning and C37 and C59, all for full output. Tune 550 kc generator signal on receiver and adjust L2 (on back of chassis) and L14 and L24 for maximum output. Repeat several times. Output should be 1 to 1.5 watts for input of one microvolt.

When the receiver has been tuned up to peak performance with the modifications mentioned, it may be found that IF oscillation appears, as indicated by unwanted whistles at odd places on one band, or perhaps several. To eliminate this with certainty, the writer spent many hours before finding that the trouble was caused by the close proximity to each other of the anode, screen and cathode leads of the last 6SG7 IF valve. These leads each go to .05 μF fixed condensers on the chassis front, and should be cut out and replaced by screened leads, as short as possible, with the screening braid well grounded.

Since the discovery of this cure, the manufacturers have included sceened leads at this point as a standard modification. This will therefore only apply to earlier models. Yours can be identified by the main tuning dial, which is of translucent material with figures in black. Later models (which include the modification mentioned) are provided with dials of the same material, but with alternate bands marked all black with translucent figures.

Readers wishing to fit an S-meter (5 mA f.s.d. right hand zero) will find the adjusting potentiometer in the centre back of chassis, provided with screwdriver slot.

The "D" in the AR88D indicates that provision is made in the receiver design for diversity reception. R.C.A. manufacture a standard rack to accommodate two AR88D's, and a diversity switching unit which automatically selects the most useful signal from separate aerials, and feeds this signal to one or other of the receivers. The output is therefore kept as near as possible at a constant level, irrespective of fading in one or other of the signal paths.

So, if you want to keep track of that fading DX, this is the set-up you require, and the writer does not know of a better. Before ordering, however, make sure you have an import licence, a dollar bank balance, and an aerial farm !

It is realised, of course, that much information can be obtained from the manufacturers' handbook, but the writer has tried to set out his own results and conclusions, arrived at after months of concentrated study and experiment, together with modifications which the reader may care to try out.

MORE ABOUT THE T2FD AERIAL

The article by G2NS in our issue for January, 1953, describing an unusually effective multi-band aerial for confined spaces developed by W3HH, has aroused a good deal of interest. Many versions of the design are now being operated by G stations, and following are some further notes on the T2FD offered by G2NS after correspondence with the States : The best angle of tilt is 30° and the optimum value of the terminating resistance is fairly critical for best results, being 390 ohms for a 300-ohm feed line, and 650 ohms for a 600-ohm line. These resistors should be non-inductive and capable of dissipating the power involved. Wire-wound resistors will do, but if they are used the system as a whole tends to become non-aperiodic and calls for changes in the method of coupling when going from band to band. High-wattage wire-wound resistors are still readily available, but carbon types are preferable if they can be obtained. It has been found in practice that a three-band version of the T2FD can be loaded up and operated efficiently on five bands.

Design for a Communications Receiver

UNIT CONSTRUCTED RACK MOUNTING CRYSTAL GATED SUPERHETERODYNE

PART I

W. H. SEGROTT (G8SI)

It has frequently been said that "Amateur receiver construction is a lost art" and that "It is not possible for an amateur to build a receiver to compare with the commercial product." While both these statements may be true as regards the generality of amateurs, there are still many who can, and do, build their own receivers, incorporating in their designs ideas and refinements not possible to include in the factory-built product. The approach suggested by G8SI in this interesting article will not be everybody's meat, but it will undoubtedly be useful thinking for would-be constructors and those interested in specialised receiver design. Having adopted the unit principle, and giving all necessary details at each stage, it would be possible to adapt his design to individual needs and aspirations.—Editor.

THE material for this article has resulted from the design and construction of a receiver primarily intended for reception of CW signals. Apart from a brief description of the mechanical design, it is proposed to restrict discussion mainly to the technical considerations of the circuits involved. This method of approach is considered preferable since the design, although of some complexity, is flexible and adaptable to individual requirements. Furthermore, the intended purpose of this article is the stimulation of interest in receiver design generally, with particular emphasis on amateur requirements, rather than detailed information for the duplication of a specific Chinese-copy model.

Design Problems

The lack of elaborate test equipment is often regarded, from the amateur point of view, as being an insurmountable problem when it comes to the construction of other than elementary receivers. Theoretically, test equipment is of course essential. From a *practical* viewpoint, however, whilst still highly desirable, satisfactory performance can be obtained with a minimum of such equipment. It should not be inferred from this that "optimum" performance will necessarily be achieved, since only by measurement of all the appropriate receiver characteristics can this be proved. This factor also applies to a large proportion of the "commercial" receivers in amateur use, particularly those purchased on the surplus market, performance relative to the manufacturer's original specification often being unknown. The amateur constructor is therefore at no great disadvantage in the final assessment of performance which, of necessity, must be judged in both instances by "on the air" comparisons.

Certain of the more important characteristics of a receiver can on the other hand be checked, to a fair degree of accuracy, with simple and easily built test equipment and will be referred to later in this article.

A factor of some complexity in the design and construction of a standard type communication receiver, is the tracking and alignment of the RF section. This results from the requirement of a wide frequency coverage, say 1 to 30 mc, with a minimum number of ranges. Since this involves a frequency coverage of two- or three-to-one for each range, precise calculation of component values for the RF tuning unit becomes necessary and the use of close tolerance components essential. Even assuming the availability of such components, satisfactory alignment still requires at least a variable frequency oscillator of reasonable stability and calibration accuracy.

By restricting the frequency range to the amateur bands only and deviating from the standard practice of ganged tuning of multiple RF circuits, all the above difficulties can be obviated. This leads to a considerable simplification in the design of the RF section, and often improved performance, since optimum LC ratios can be selected for each frequency range.

Increased activity in recent years and the general use of higher power transmitters has considerably increased congestion within the amateur bands. Although further improve-

ment in the standard of transmissions may be possible, *e.g.*, better frequency stability, elimination of unnecessary sidebands, and so on, the maximum utility of available amateur frequencies ultimately depends upon improved reception techniques. In this connection, the effective reduction of receiver bandwidth is an important factor. The minimum usable bandwidth is, amongst other things, determined by the speed at which the desired intelligence is being transmitted. Fortunately in amateur communication, at least under difficult reception conditions, transmission speeds representing a few words per minute are acceptable and hence bandwidths of a few cycles will suffice. Considerable scope therefore exists for development along these lines.

Design Requirements

Having the above factors in mind it was decided to build an experimental receiver, using only such test equipment as would be available to the average amateur.

Before considering the design, a specification was compiled, illustrating the requirements of the author's own particular station, as follows:

(i) Frequency range to be 7, 14 and 21 mc amateur bands only, with adequate bandspread.

(ii) 28 to 30 mc coverage to be provided by a separate converter, which also functions as a "tunable IF" in conjunction with pre-tuned converters on 144/430 mc.

(iii) Provision to be made for remote control on 7, 14 and 21 mc, controls being limited to tuning, bandwith and send-receive switching (CW operation only).

(iv) Selectivity and signal-to-noise ratio to be comparable or better than that of a typical high grade commercial receiver.

Constructional Details

From the above specification the broad principles of design were evolved. This led to the conclusion that a system of unit construction, with standard rack mounting, would be the most convenient arrangement. Although this method of construction has the disadvantage of large physical size, the advantages are numerous and the system is well suited to experimental work.

The complete receiver, in its final form comprises nine units as indicated below. Units 7 and 9 will not be discussed in this article. Similarly, only brief reference will be made to Unit 8.

Units 2, 3 and 4 utilise standard 16 inch by

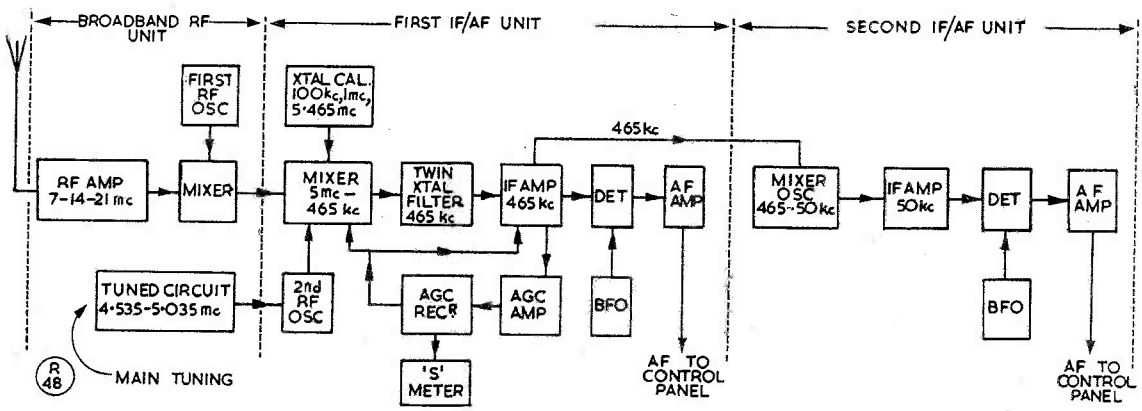


Fig. 1. Block diagram showing general receiver layout and inter-connection.

Table I

RANGE	SIGNAL FREQUENCY LIMITS (mc.)	APPROXIMATE % FREQUENCY VARIATION	1st RF OSCILLATOR FREQUENCY (mc.)	1st IF FREQUENCY LIMITS (mc.)
1	7.0 7.5	7.1%	2.0	5.0 5.5
2	14.0 14.5	3.5%	9.0	5.0 5.5
3	21.0 21.5	2.4%	16.0	5.0 5.5

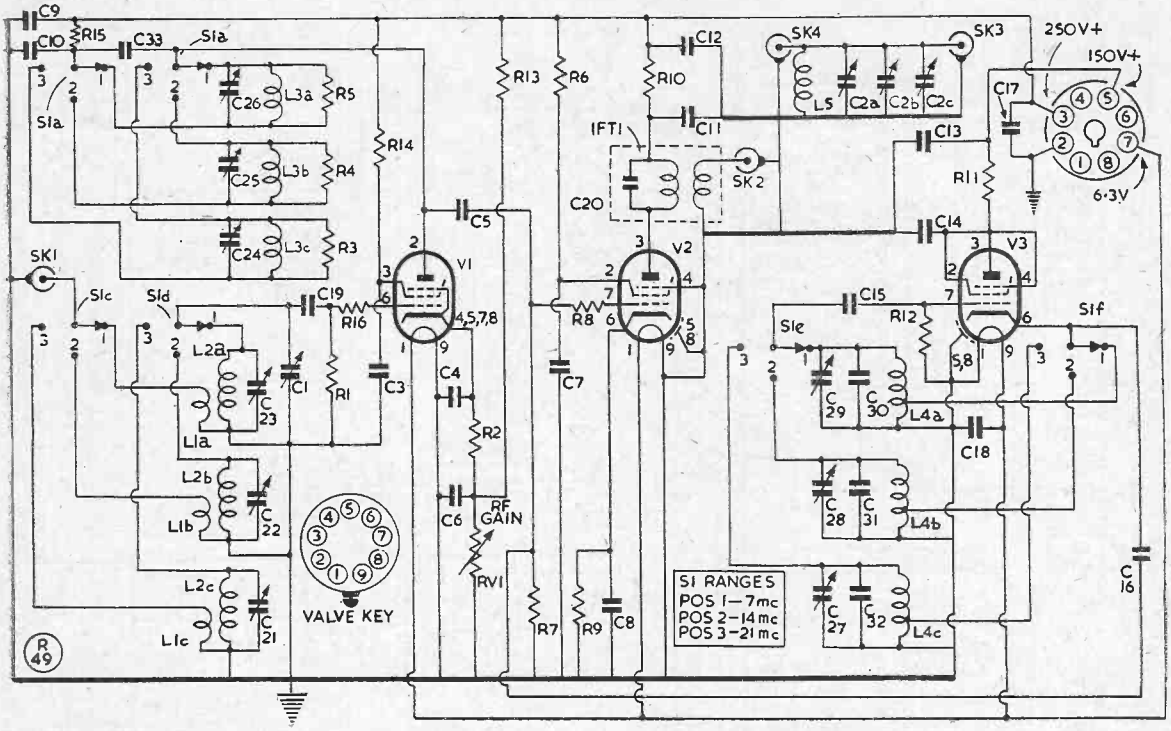


Fig. 2. The RF unit for the receiver designed and constructed by G8SI.

10 inch chassis, the remainder, however, are non-standard and designed to suit the particular layout of the unit concerned.

1. **Main Tuning and RF Unit.**
2. **1st IF/AF Unit — 5 mc-465 kc.**
3. **2nd IF/AF Unit — 50 kc.**
4. **Power Supply and P/P AF Unit.**
5. **CRT Monitor and S-Meter Unit.**
6. **Control Panel — Switching, etc.**
7. **AF Filter Unit.**
8. **28-30 mc Converter.**
9. **144/420 mc Converters.**

An operating desk is fitted to the rack, Units 1, 6 and 8 being located in convenient positions relative to the desk. Details of the layout can be seen from the accompanying photographs.

General Design Details

Reference to Fig. 1 will enable the general functional details of the main receiver circuits to be followed, a more detailed account of the separate units being given later.

The "broadband" RF Unit is followed by the 1st IF/AF Unit. This comprises a 5 mc mixer/oscillator and 3 stages of IF amplification at 465 kc (9 tuned circuits). The 465 kc section also includes an optional twin-crystal filter. The tuned circuit of the 2nd RF oscillator associated with the 5 mc mixer stage is located on the RF Unit panel and forms the main tuning control of the receiver. The 465

Table of Values

Fig. 2. Circuit of the RF Unit.

C16	=	10μμF.
C32	=	25μμF (Silver mica) ± 1%.
C33	=	30μμF (Silver mica) ± 1%.
C20, C31	=	50μμF (Silver mica) ± 1%.
C30	=	100μμF. (Silver mica) ± 1%.
C5, C19	=	100μμF.
C15	=	200μμF.
C14	=	500μμF.
C4	=	.001μF.
C3, C7, C9, C11,		
C12	=	.002μF.
C18	=	.005μF.
C6, C8	=	.01μF.
C10, C17	=	.03μF.
C13	=	.05μF.
C21, C22, C23, C24, C25, C26, C27, C28,		
C29	=	3-30μμF. concentric trimmer.
C1	=	75μμF. variable.
C2c	=	75μμF. variable (preset).
C2a	=	125μμF. variable.
C2b	=	200μμF. variable.
R8, R16	=	33 ohms.
R2	=	47 ohms.
R9	=	1,000 ohms.
R3, R4, R5	=	6,800 ohms.
R10, R15	=	8,200 ohms.
R11	=	10,000 ohms.
R6, R12, R13, R14	=	47,000 ohms.
R1	=	470,000 ohms.
R7	=	1 megohm.
RV1	=	10,000 ohm potentiometer.
S1A-F	=	6-pole, 3-way wafer switch (ceramic insulation).
1FT1	=	R.F. Transformer, primary, 14.5μH, secondary, *see text*.
V1	=	Mullard EF54.
V2, V3	=	Mullard EF50.
L2A-3A	=	Mmc. RF. Coils, 8μH.
L2B-3B	=	14mc. RF. Coils, 2μH.
L2C-3C	=	21mc. RF. Coils, 1μH.
L4A	=	2mc. RF. Oscillator Coil, 50μH.
L4B	=	9mc. RF. Oscillator Coil, 4μH.
L4C	=	16mc. RF. Oscillator Coil, 2μH.

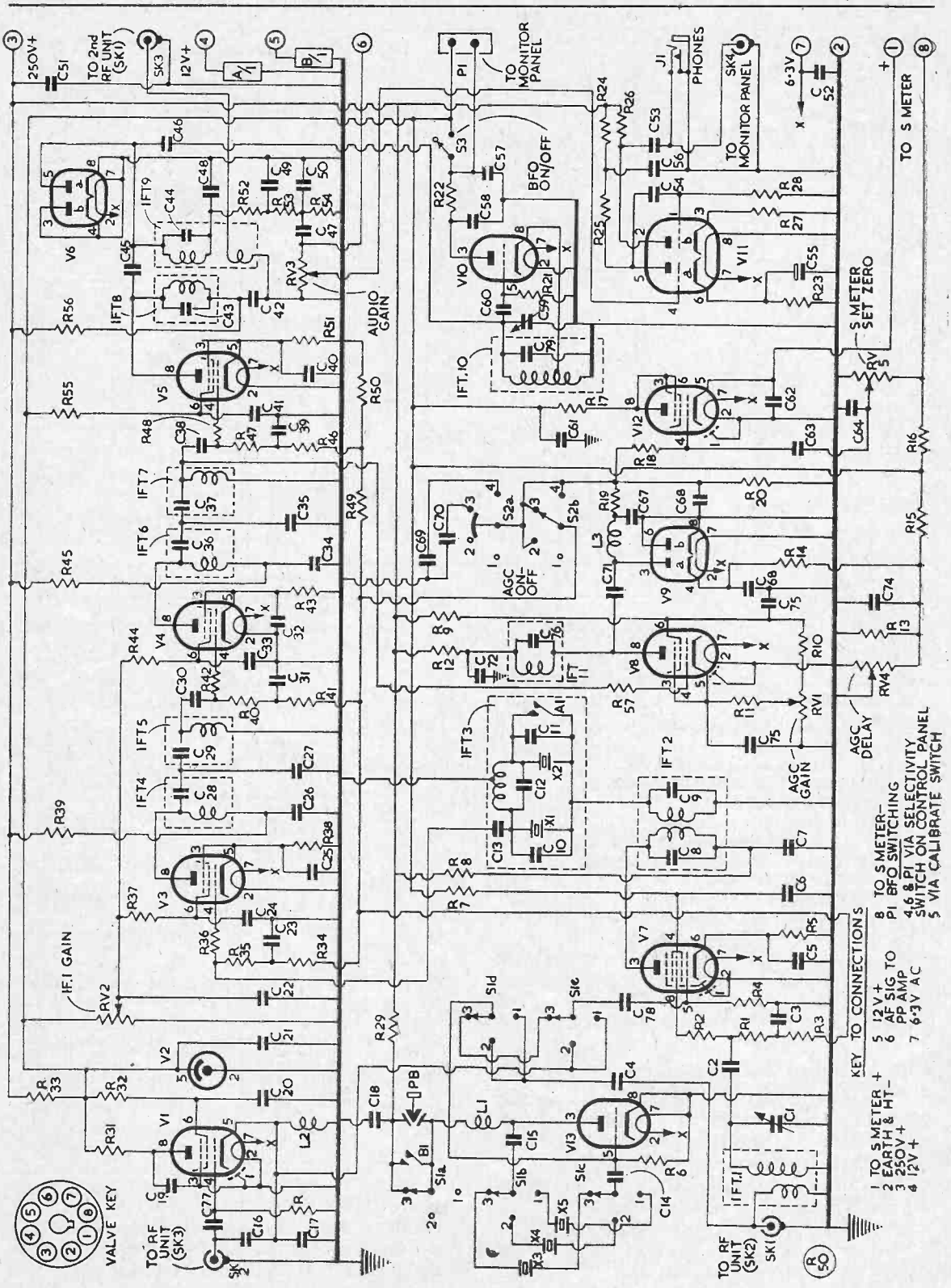

250V+
TO 2nd RF UNIT (SK1)
12V+
TO MONITOR PANEL
PHONES
6·3V
TO S METER
S METER SET ZERO
AUDIO GAIN
BFO ON/OFF
AGC ON-OFF
IF.I GAIN
AGC DELAY
AGC GAIN
VALVE KEY
TO RF UNIT (SK3)
TO RF UNIT (SK2)
KEY TO CONNECTIONS
1 TO S METER +
2 EARTH & HT−
3 250V+
4 12V+
5 12V+
6 AF SIG TO PP AMP
7 6·3V AC
8 TO S METER− PI BFO SWITCHING
4,6 & PI VIA SELECTIVITY SWITCH ON CONTROL PANEL
5 VIA CALIBRATE SWITCH

Table of Values

Fig. 3. Circuit of First IF/AF Unit.

C46	= 2$\mu\mu$F.	R8, R37	= 4,700 ohms.
C11	= 5$\mu\mu$F.	R10, R31	= 10,000 ohms.
C4	= 7$\mu\mu$F.	R17	= 15,000 ohms.
C45	= 10$\mu\mu$F.	R29	= 20,000 ohms.
C38	= 35$\mu\mu$F.	R9, R24	= 22,000 ohms.
C30, C78,		R21	= 30,000 ohms.
C79	= 50$\mu\mu$F.	R4, R6,	
C76	= 60$\mu\mu$F. ± 1%.	R7, R15,	
C2, C48,		R30, R32,	
C49, C50,		R52	= 47,000 ohms.
C71, C77	= 100$\mu\mu$F.	R16	= 86,000 ohms.
C13	= 300$\mu\mu$F.	R3, R18,	
C8, C9,		R25, R26	
C12, C28,		R28, R34,	
C29, C36,		R41, R53,	
C37, C43,		R54	= 100,000 ohms.
C44	= 350$\mu\mu$F. ± 1%.	R1, R35,	
C14, C15,		R40, R46,	
C60	= 500$\mu\mu$F.	R47, R50	= 470,000 ohms.
C16, C17	= 500$\mu\mu$F. (Silver mica) ± 1%.	R20	= 680,000 ohms.
		R49	= 2 megohms.
C18	= .001μF.	L1, L2,	
C3, C5	= .002μF.	L3	= 2.5mH. RF. choke
C23, C31,		RV1, RV5	= 10,000 ohm potentiometer.
C42, C68	= .003μF.	RV4	= 15,000 ohm potentiometer.
C19, C20,		RV2	= 100,000 ohm potentiometer.
C25, C32,		RV3	= 1 megohm potentiometer.
C40, C52,		S1A-E	= 5-pole, 3-way, wafer switch.
C61, C62,		S2A-B	= 2-pole, 4-way, wafer switch.
C63, C64,		S3	= S.P.S.T. toggle switch.
C65, C72	= .01μF.	X1	= Crystal 465.05kc.
C21	= .02μF.	X2	= Crystal 464.95kc.
C34	= .03μF.	X3	= Crystal 5.465mc.
C27, C35,		X4	= Crystal 1mc.
C66, C67	= .05μF.	X5	= Crystal 100kc.
C6, C7,		IFT1	= IF. Transformer, primary, *see text*. Secondary, 14.5μH.
C22, C24,			
C33, C39,			
C41, C47,			
C51, C53,			
C54, C57,			
C58, C74	= 0.1μF.		
C26	= 0.2μF.		
C73, C75	= 0.25μF.		
C70	= 2.0μF.		
C69	= 6.0μF.	IFT2	= IF. Transformer, primary, 340μH., secondary, 340μH.
C56	= 8.0μF. Electrolytic (350v. wkg.).		
C55	= 25.0μF. Electrolytic (50v. wkg.).		
C10	= 3-30$\mu\mu$F. concentric trimmer.	IFT3, 4, 5, 6, 7, 8	= IF. Transformer, 340μH.
C59	= 30$\mu\mu$F. variable.	IFT9	= IF. Transformer, primary, 340μH., secondary, *see text*.
C1	= 75$\mu\mu$F. variable.		
R36, R42,			
R48, R57	= 33 ohms.		
R2	= 120 ohms.	IFT10, 11	= IF. Transformer, 2mH.
R5, R11	= 400 ohms.		
R22, R38,		V1, V8,	
R43	= 1,000 ohms.	V12	= 6AC7.
R33, R51	= 1,200 ohms.	V3, V4,	
R12, R13,		V5	= 6SK7.
R14, R19,		V6, V9	= 6H6.
R27, R39	= 2,000 ohms.	V7	= 6SA7.
R23	= 2,200 ohms.	V10, V13	= 6J5.
R44, R56	= 3,000 ohms.	V11	= 6SN7.
R45, R55	= 4,000 ohms.	V2	= VR150/30.

kc amplifier stages are followed by a diode detector and two stages of AF amplification. Additional circuits include a BFO, S-meter valve, AGC amplifier and AGC rectifier.

Additional selectivity is obtained by switching into circuit the 2nd IF/AF Unit. This unit consists of a combined mixer-oscillator followed by two stages of amplification at 50 kc (12 tuned circuits). The detector is succeeded by

Fig. 3. The first IF/AF unit, 5 mc/465 kc. Connection coding is: 1, S-meter positive; 2, Earth and HT negative; 3, 250v. HT positive; 4, 12v. positive, through selectivity switch on control panel; 5, 12v. positive, through "Calibrate" switch; 6, AF input to push-pull amplifier, through control panel; 7; 6.3v. AC; 8, S-meter negative; P1, BFO switching, through control panel.

AF amplifier stages identical with those in the 1st IF/AF Unit. No AGC circuits are provided, gain adjustments being made manually by means of separate IF and AF gain controls.

Provision is made for the optional inclusion of an AF Filter (1) in the AF output of the 1st or 2nd IF/AF Unit, whichever is in circuit.

Each unit will now be considered separately with a view to providing more detailed design information.

RF Unit—Fig. 2

An important characteristic of a receiver is its Noise Factor (NF). (2) (3) In order to understand the meaning of this term, consideration must be given to the theoretical limit that exists with regard to receiver performance, from the point of view of signal-to-noise ratio. Assume initially a perfect receiver, *i.e.*, one having no inherent noise, connected to an aerial. In the absence of signals or external noise, either site or atmospheric noise, the receiver output, for a given bandwidth, will be due entirely to thermal noise generated by the resistive component of the aerial impedance. This noise power is *irreducible* and independent of the ohmic value of the aerial impedance. The presence of a signal equal in magnitude to this noise will obviously represent unity signal-to-noise ratio.

Consider now a practical receiver having the same overall gain and bandwidth. The noise output will be higher due to the additional noise developed by the receiver and hence will require a larger signal input to provide unity signal-to-noise ratio. Assuming the receiver input/output characteristic to be linear, this additional signal input will be equal to the receiver noise. The NF of the receiver can therefore be defined as (3)

$$NF = \frac{\text{Thermal Noise due to Aerial Impedance + Receiver Noise.}}{\text{Thermal Noise due to Aerial Impedance}}$$

In practice, particularly if the efficiency of the aerial system is high, thermal noise due to the aerial impedance will normally be masked by site and atmospheric noise. Therefore, with a receiver of reasonable design, *e.g.*, when mixer and IF noise can be regarded as insignificant, external noise is the controlling factor rather than noise originating in the RF stage.

Under these conditions of operation simple NF measurements (4) will indicate, within the required limits, whether performance is satisfactory and improvements of a few dB in NF, even if attainable, are not likely to give any significant improvement in performance.

Two requirements exist therefore in relation to the design of the RF stage—See Fig. 2:

(i) RF gain must be adequate to ensure that the amplified input noise is large compared with the inherent noise of the mixer stage, both voltages being referred to the mixer grid.

(ii) The effective noise resistance of the RF valve selected should be as low as possible. Contribution by the valve to total input noise will then be at a minimum.

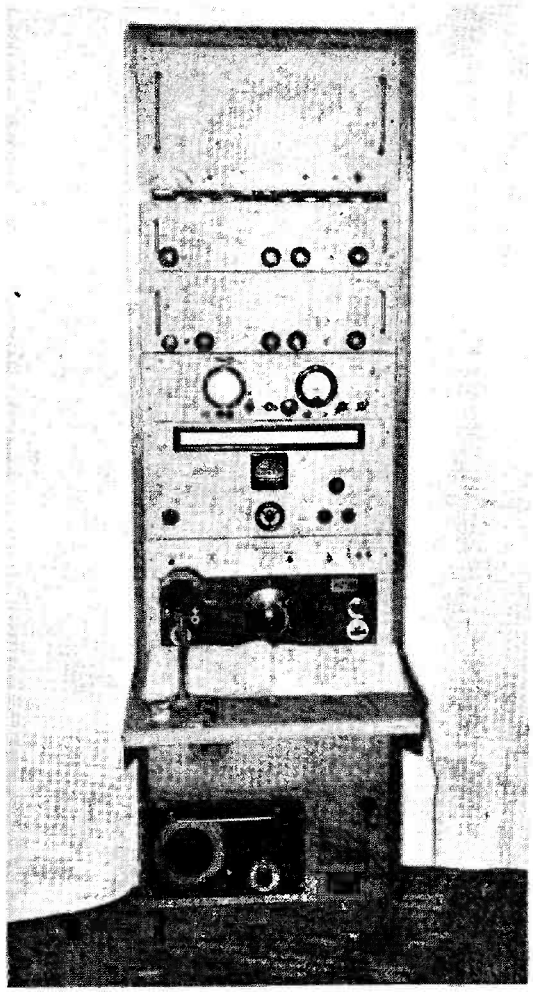
A single RF stage using a low noise, high slope RF pentode (V1-EF54) ensures that these requirements are met up to the highest frequency involved (21 mc). The use of only one RF stage simplifies the circuitry but necessitates the use of a reasonably high IF. This is essential since satisfactory "image" protection cannot be achieved at normal IF (465 kc), with only two RF tuned circuits. Actual choice of frequency is somewhat complicated by the numerous spurious signals that may result from the various oscillator harmonics and their combination frequencies. In this connection careful attention to layout screening and filtering is of particular importance. A nominal frequency of 5 mc was chosen as being the most suitable.

The secondary of the input transformers (L1, L2) are tuned by condenser C1, adjustable from the front panel, the latter serving as an "aerial trimmer." A simple parallel tuned circuit, resistance loaded to broaden frequency response, provides the anode load for V1. No AGC is applied to this stage, which normally operates at maximum gain. An RF gain control (RV1) is provided, however, for use in the presence of strong signals, mainly as a precaution against cross-modulation. The anode of V1 is capacity coupled (C5) to the grid of the pentode mixer (V2-EF50) the first RF oscillator voltage being injected *via* the control grid. A transformer (IFT1) in the anode circuit of V2 couples the IF signal, at low impedance, to the IF output socket (SK2). No AGC is applied to this stage.

The 1st RF oscillator (V3-EF50) is of the cathode coupled type, injection voltage to the mixer being that developed between cathode and ground. Since this oscillator is fixed tuned,

Table II

1st IF FREQUENCY LIMITS (mc.)	2nd RF OSCILLATOR FREQUENCY LIMITS (mc.)	2nd IF (Kc.)
5.0	4.535	465
5.5	5.035	465



The G8SI Communications Receiver assembly in its completed form. This is a fine example of a home-built receiver specifically designed for optimum results on the amateur HF bands.

the IF output at SK2 comprises all signals within the passband of the unit. Maximum signal frequency coverage on any range does not exceed 10% of the nominal frequency; a satisfactory gain frequency characteristic can therefore be achieved without resort to special broadband techniques. The relationship between signal, oscillator and IF frequencies is shown in Table 1.

Supply voltages to the unit are brought in *via* octal plugs and sockets to facilitate easy removal of the unit from the equipment rack. HT line voltage to the 1st RF oscillator (V3) is stabilised at 150 volts by means of a VR 150/30 (located on the P/P AF Amplifier and Power Supply Unit chassis, V5, Fig. 5).

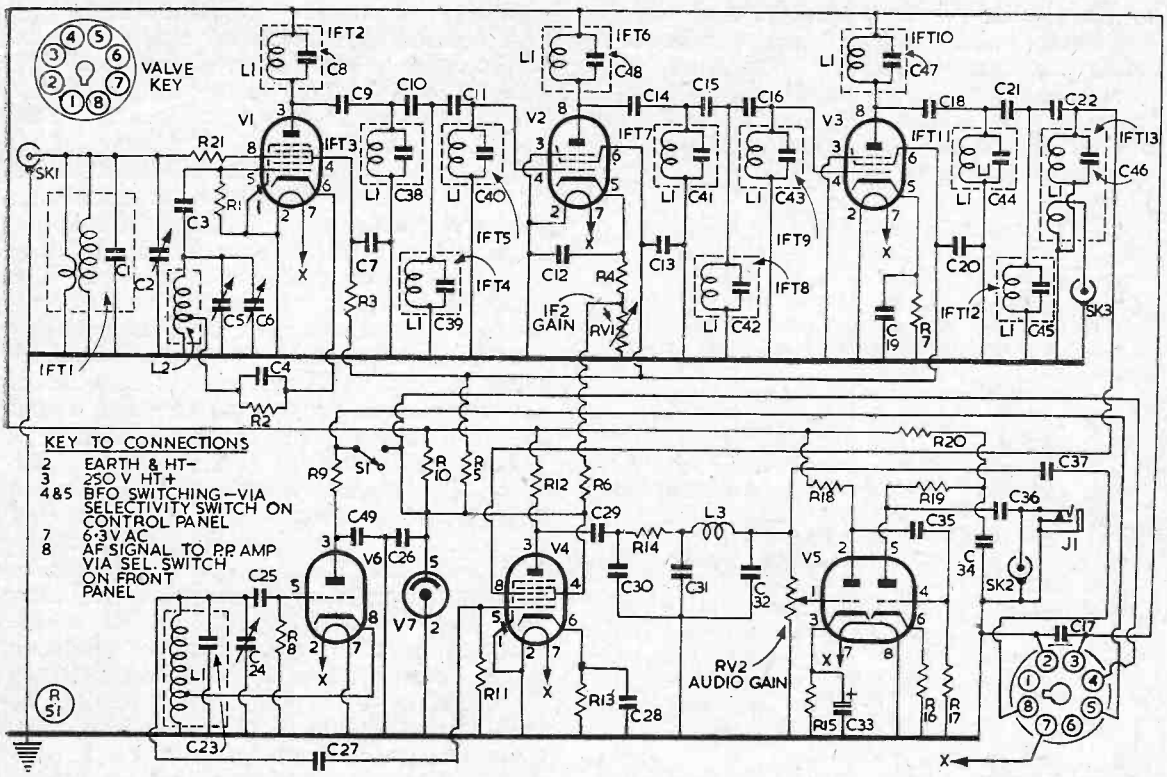


Fig. 4. The second IF/AF unit, functioning at 50 kc, in the G8SI receiver. Key to connections: 2, Earth and negative HT; 3, 250v. HT positive; 4-5, BFO switching, through selectivity control on panel; 7, 6.3v. LT point; 8, Audio signal to output amplifier, through control panel.

1st IF/AF Unit (5 mc-465 kc)—Fig. 3

(a) 5 mc-465 kc Mixer. The nominal 5 mc input (SK1) is applied to the mixer (V7) *via* transformer IFT1, the secondary being tunable (from the front panel) by means of C1. The 465 kc component of the conversion is selected by the tuned anode circuit (IFT2), the secondary of which forms the input circuit to the balanced twin-crystal filter. Automatic gain control of this stage is effected by the application of the negative voltage developed across the AGC load resistor (R20) to the signal grid of V7, *via* the decoupling network R3, C3. The screen voltage for V7, suitably decoupled, is derived from the 150 volt stabilised HT line (V2-VR150/30).

(b) 2nd (5 mc) RF Oscillator. The separate oscillator (V1) associated with the 5 mc mixer stage is of considerable importance and requires special consideration.

The oscillator tuned circuit (L5, C2a-b-c) and its associated tuning mechanism is located on the RF Unit (Fig. 2), coupling to the 1st IF/AF Unit being *via* coaxial cable (SK3 on RF Unit to SK2 on 1st IF/AF Unit). Condenser C2a and its tuning mechanism functions

Table of Values

Fig. 4. Circuit of Second IF/AF Unit.

C9, C10, C11, C14, C15, C16, C18, C21, C22 = 7$\mu\mu$F.
C1 = 30$\mu\mu$F. (silver mica).
C27 = 240$\mu\mu$F.
C3, C30 = 500$\mu\mu$F.
C23 = 520$\mu\mu$F.
C8, C38, C39, C40, C41, C42, C43, C44, C45, C46,
C47, C48 = 600$\mu\mu$F. (Silver mica) ± 1%.
C25 = .001μF.
C31 = .002μF.
C29, C32, C49 = .01μF.
C4, C7, C13, C26, C35 = 0.1μF.
C12, C19, C28, C36, C37 = 0.25μF.
C17, C34 = 1.0μF.
C20 = 2μF.
C33 = 10μF. Electrolytic (50v. wkg.).
C6 = 3-30$\mu\mu$F. concentric trimmer.
C2, C5, C24 = 75$\mu\mu$F. variable.
R21 = 10 ohms.
R2 = 220 ohms.
R13 = 330 ohms.
R4, R7 = 500 ohms.
R9, R10 = 1,500 ohms.
R3, R16 = 2,000 ohms.
R15 = 2,200 ohms.
R5 = 3,000 ohms.
R1, R11, R20 = 20,000 ohms.
R6, R8 = 33,000 ohms.
R12, R14 = 47,000 ohms.
R17, R18, R19 = 100,000 ohms.
S1 = S.P.S.T. toggle switch.
RV1 = 10,000 ohm potentiometer.
RV2 = 0.5 megohm potentiometer.
IFT1 = IF. Transformer, primary, *see text*, secondary, 2mH.
IFT2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 = IF. Transformer, 15mH.
IFT13 = IF. Transformer, primary, 15mH., secondary, *see text*.
L1 = RF. Oscillator coil, 15mH.
L2 = BFO. coil, 2mH.
L3 = RF. choke, 150-mH.
V1, V4 = 6SA7.
V2, V3 = 6AB7.
V6 = 6J5.
V5 = 6SN7.
V7 = VR150/30.

as the receiver "main tuning control," the horizontal indicator scale being calibrated relative to signal frequency. Reference has already been made to the main advantage conferred by this system, *i.e.*, simplification of receiver alignment. The following additional advantages should also be noted:

(i) Since the same tuned circuit is used on all frequency ranges, the tuning rate in terms of kc per unit length of indicator scale also remains constant. This simplifies initial calibration, since one frequency scale (in this particular case calibrated 0-500 kc) will suffice for all ranges, the appropriate mc factor being prefixed mentally. Furthermore, this initial tracking and calibration may be carried out independently of the remainder of the receiver, the only equipment required being a frequency meter and/or calibrated receiver. The relationship between oscillator frequency range and the 1st and 2nd IF is shown in Table II.

(ii) Resulting from the absence of oscillator switching and the relatively low frequency involved, a considerable improvement in calibration accuracy is achieved insofar as the 2nd RF oscillator is concerned.

Limitations imposed (in this desgin) by the 1st RF oscillator could be avoided by the use of crystal control. In practice, however, the provision of C2b as a "zero re-set" control for the 2nd RF oscillator appears adequate and enables slight inaccuracies or subsequent drift of the 1st RF oscillator to be tuned out when changing frequency range. This adjustment and checking of calibration is facilitated by reference to harmonics of a 1mc-100kc crystal oscillator (V13) injected *via* C4 into the primary of IFT1. This circuit is brought into operation by push-button switch (PB).

The Colpitts oscillator was chosen for a particular reason. Since the tuned circuit (L5, C2a-b-c) associated with the oscillator valve (V1) is separated from the latter by a length of coaxial cable, the distributed capacity of this cable is in shunt with L5 and so affects its resonant frequency. Resulting from this and the circuitry associated with the remote tuning of the receiver (see below), the total circuit capacity is rather high (approximately 600 $\mu\mu$F at the lowest frequency), and hence requires an oscillator that functions satisfactorily with a high C/L ratio.

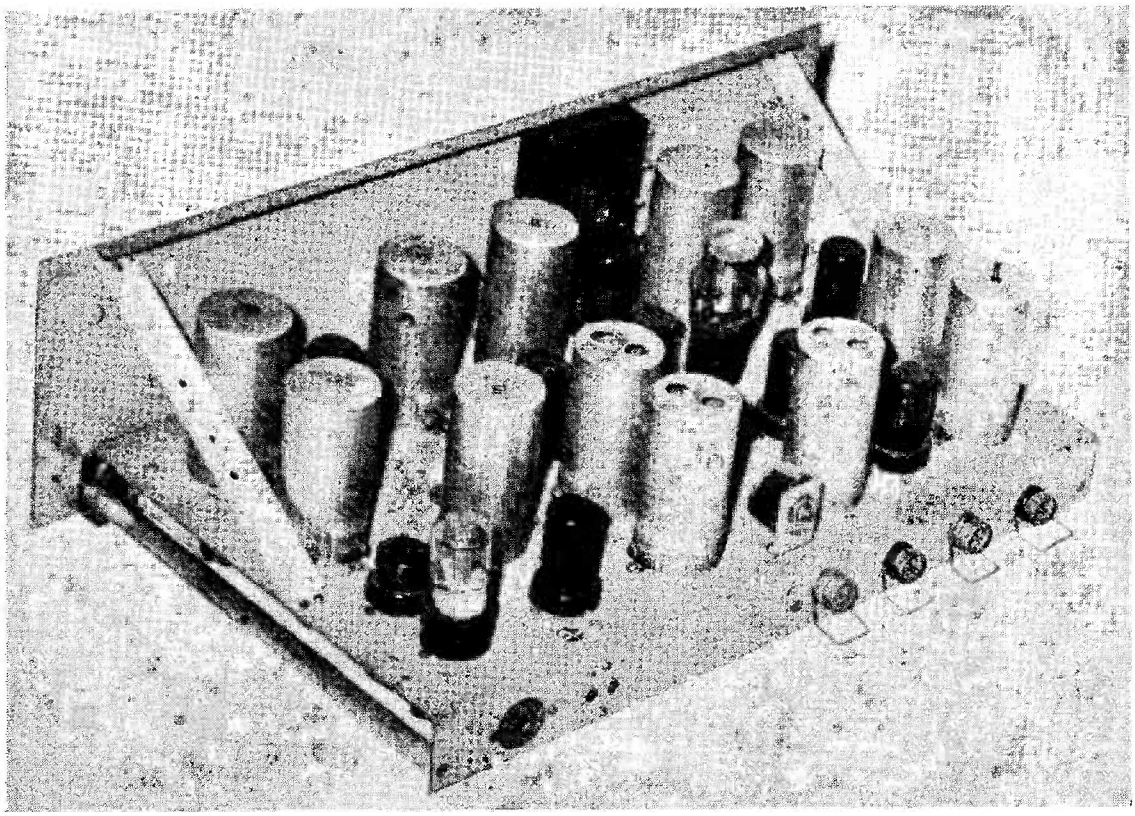
The requirement for remote control of receiver tuning is met by the duplication of the tuned circuit (L5, C2a-b-c) at the "remote" operating position and the interchanging of coaxial cables for these circuits at SK2 (Fig. 3). Compensation for the added capacity of the longer cable is effected by the adjustment of C2b at the "remote" position, C2b at the "local" position being set initially near maximum capacity.

The Clapp oscillator was also considered since it is admirably suited for use in conjunction with coaxial cable. The main reason for not using this circuit is based on the necessity for containing the complete tuned circuit in a small screened box. The Clapp oscillator requires a high "Q" coil for optimum performance which, in the author's experience, demands a coil of relatively large physical dimensions. The coil used in the Colpitts circuit is wound on a half inch diameter ceramic former.

The "main tuning" condenser C2a is of the straight-line frequency type, so providing a linear frequency scale. The effective length of this scale is 15 inches, thus the 100 kc calibration points are 3 inches apart. The tuning mechanism comprises a gear train (reduction ratio 50-to-1) to which has been added the necessary drum drive and cord for operation of the indicator along the horizontal scale. A logging scale, 0-100° (an integral part of the gear train) facilitates interpolation between calibration points on the main scale and represents 100 cycles per degree on all ranges. Relative to the signal frequency limits, the required oscillator coverage is 4.535 to 5.035 mc with a small overlap at each end of the scale for calibration adjustment and tracking purposes.

(c) 465kc Twin-Crystal Filter. The 465kc signal from the mixer (V7) is applied, *via* the secondary of IFT2, to a balanced twin-crystal filter. A brief description of the filter follows but for detailed information the available literature should be consulted.(5)

From Fig. 3 it will be seen that the two halves of IFT3, in conjunction with the crystals (X1, X2), form a bridge circuit. The response of this type filter is such that, for frequencies within the limits of the selected crystal frequencies, little or no attenuation occurs. For frequencies outside this range, however, attenuation increases rapidly with changing frequency and so largely determines the selectivity of the receiver (excluding the 2nd IF/AF Unit). This type of filter has a distinct advantage over one which utilises only a single crystal, in that its response curve is symmetrical about the centre frequency. Additionally, the sides of the response curve are much steeper (relative to the "un-phased" side of a single-crystal type) and by suitable design and adjust-



View of the first IF/AF unit in the G8SI receiver. See underside construction in the accompanying photograph.

ment two "rejection notches"—the anti-resonant frequencies of the crystals — occur equally spaced about the centre frequency. The overall practical effect of switching in the filter is that undesired off-frequency signals on *either side* of the desired signal are subject to appreciable attenuation whilst the amplitude of the desired signal remains relatively unaffected. This is in contrast to the single-crystal type filter which, in its simplest form, only provides high attenuation to off-frequency signals on *one side* of the desired signal.

The required crystal frequencies depend upon the intended application of the filter. Since the emphasis here is on reception of CW signals, the selected frequencies are 464.95 and 465.05 kc. Theoretically, with crystals and holders having identical characteristics and a circuit of perfect symmetry, phasing is unnecessary, one side of the filter being balanced with respect to the other. In practice this symmetry is not achieved and phasing becomes necessary. Furthermore, the positions of the anti-resonant frequencies, previously referred to, are dependent upon the existence of a larger capacity across the higher frequency crystal. The most effective circuit is a small fixed condenser (C11) across the LF crystal and a somewhat larger (maximum) variable capacity (C10) across the other.

A midget relay (A/1), having low capacity contacts and ceramic insulation, is energised in the "Broad" selectivity position so short circuiting one of the crystals (X2).

(d) 465kc Amplifier Stages. The crystal filter is followed by three stages of IF amplification using variable-mu valves (V3, V4, V5). Automatic gain control of all stages is provided, in addition to manual control (IF1 Gain) of the first two. This latter control (RV2), adjustable from the front panel, varies the HT line voltage to the screens of V3 and V4. Coupling between each stage consists of two separate tuned circuits (IFT4, IFT5), with bottom-end capacity coupling (C27). This method of coupling offers several advantages:

(i) Due to the low value of the common coupling impedance C27, the signal

voltages involved are small. This reduces the possibility of instability that may occur as a result of stray coupling, when using high impedance coupling.

(ii) Variable bandwidths, if desired, may be arranged by a simple switching system for changing the values of the coupling condensers C27, C35.

(e) Detector and AF Amplifier Stages. The tuned anode circuit of V5 (IFT8) is loosely coupled, *via* C45, to the input circuit (IFT9) of the detector (V6a). This latter circuit also has a low impedance winding which, *via* the coaxial socket SK3, feeds the 465 kc signal to the 2nd IF/AF Unit. A separate BFO valve (V10) is provided, the output being applied to the anode of the detector *via* a small condenser (C46). The AF component of the detector output is applied, *via* the AF gain control (RV3), to the AF Amplifier (V11a-b). This stage is of conventional design, both halves of the 6SN7 being in cascade. The output of V11b feeds high impedance headphones at J1 or, as will be explained later, *via* the "Selectivity" switch on the "Control Panel" to a second jack similarly located. The cathode bias resistor of V11b has not been decoupled since the available gain is adequate for the purpose.

(f) AGC Amplifier and Rectifier. Because provision has been made for the remote control of receiver tuning, it follows that a similar control of receiver gain is essential. This could be accomplished by providing a manual control at the remote operating position, but entails the use of additional control lines. Alternatively, automatic gain control (AGC), for both CW and Phone, offers a more satisfactory solution. In order to be effective this implies the use of amplified AGC with a suitable delay voltage characteristic, *i.e.*, the AGC system must remain inoperative until the signal input to the receiver exceeds a predetermined level. Also, since this control is required for both CW and Phone, it is essential that in the former case the BFO injection voltage should not operate the AGC system. This is important since, if permitted, control becomes ineffective except on strong signals. Conversely, due to the control exercised by the BFO, and the consequent reduction in gain, response to weak signals will be adversely affected.

Two systems of AGC are possible. In the first method the IF signal is rectified, the DC component then being subject to DC amplification. This amplified voltage, being proportional to signal level and negative with respect to earth, is then applied as bias to the grids of the valves to be controlled.

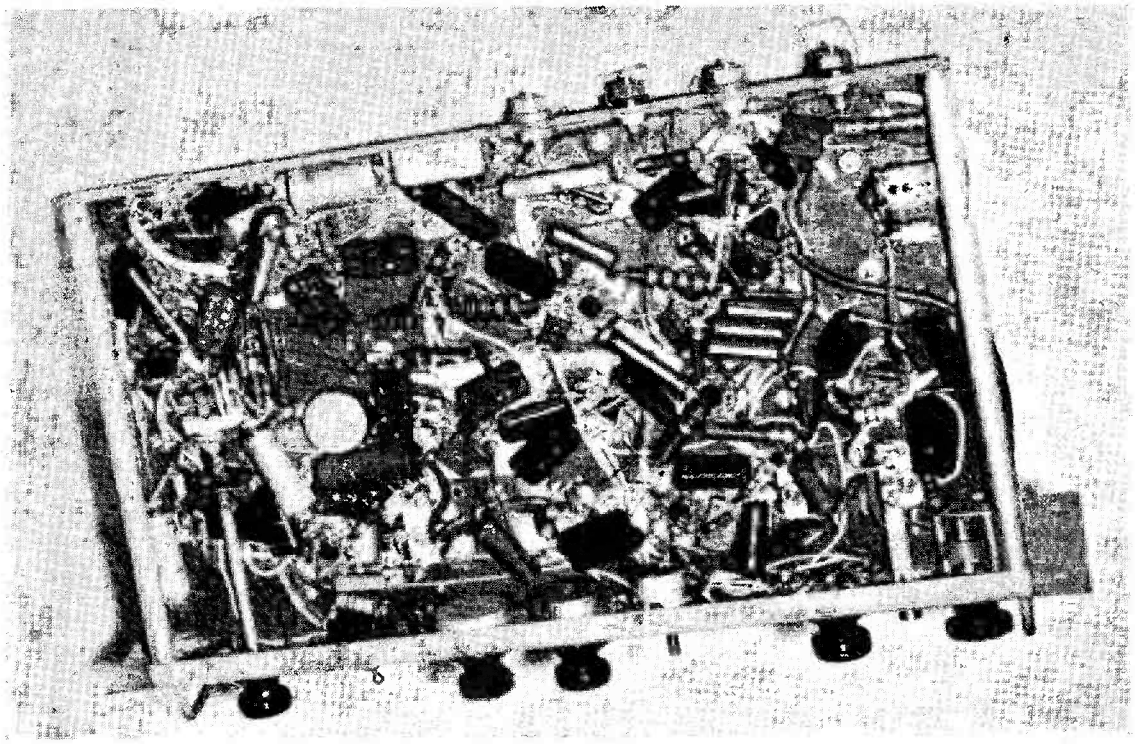
In the second system, the IF signal is subject to further amplification before application to the AGC rectifier. This latter method has been adopted since stable IF amplification is easier to achieve than a comparable gain at DC. Additionally, isolation of the BFO voltage from the AGC system is easier to provide for than in the former system.

The IF signal developed across IFT7 is applied to the grid of V8, the AGC amplifier. This stage utilises a high slope RF pentode, the gain of which is controlled by adjustment of RV1 (AGC Gain). The amplified voltage developed across IFT11 is applied to the AGC rectifier (V9a), the cathode of which is held at a voltage positive to earth. Hence, this latter voltage constitutes the AGC delay and prevents V9a from conducting until the signal input to the receiver exceeds a certain level. This level is determined by the setting of RV4 (AGC Delay) which forms part of a resistance network across the HT supply.

The anode circuit of the AGC rectifier (V9a) comprises a filter network (R19, L3, C66-67), the purpose of which is to present a higher series and lower shunt impedance to the 465 kc signal than would otherwise appear across the AGC load resistor (R20). During the conduction period of V9a, when the level of the IF signal at the anode exceeds the cathode delay voltage, a negative voltage is developed across R20 and constitutes the amplified AGC voltage. This voltage is applied, *via* suitable decoupling and AGC switching circuits, to the grids of the controlled valves (V3, 4, 5, 7).

(g) AGC Switching and Time Constants. AGC switching is effected by means of a four-position switch (S2a-b). In the first position (AGC Off), the common AGC line to the controlled valves is disconnected, by S2b, from the AGC load resistor (R20). In this position IF gain is controlled manually by adjustment of RV2 (IF1 Gain). In positions 2, 3 and 4 (AGC On) the common AGC line is reconnected to R20 (by S2b). Also in these positions, the capacity shunted across the AGC load resistor is progressively increased (by S2a), so increasing the AGC time constant.

The purpose of this variable time constant is to cater for the rapid variations in signal level (fading) that may occur in practice. The requirements for CW and Phone, however, are different. In the case of the latter, a short time constant which permits rapid readjustment of receiver gain may, under certain conditions of fading, be advantageous. For reception of CW, the minimum time constant practicable is



Under-chassis construction of the first IF/AF unit—see Fig. 3. for the circuit of this section.

a function of transmission speed. This limit is set by the fact that too short a time constant causes the receiver gain to vary in synchronism with keying (at slow speeds, say 5 w.p.m.). As a result, particularly on strong signals, the noise output of the receiver rises to maximum between each signalling element. A variable time constant is therefore essential if the diverse conditions of CW, Phone and the varying rates of fading are to be met efficiently.

(h) Signal Meter Stage. V12 (6AC7, triode connected) provides for the operation of an S-meter (0-1 mA FSD). Under no-signal conditions the anode current of V12 is set to 1 mA, as indicated on the S-meter, by adjustment of the cathode bias control RV5 (S-meter—Set Zero). The control grid of V12 is connected to the AGC line *via* R18 and hence goes negative in the presence of a signal of sufficient amplitude. This produces a proportionate decrease in anode current and is indicated on the S-meter. Since zero signal corresponds to maximum S-meter current, a special meter with a reversed pointer zero is to be preferred.

Unless a signal source having an accurate output attenuator is available, S-meter calibration can only be on an arbitrary basis. Inclusion of this circuit is considered worthwhile, however, since it performs the following useful functions:

(i) Facilitates alignment of the receiver (excluding the 2nd IF/AF Unit).
(ii) Provides an indication of the input signal level at which the AGC becomes operative, *i.e.* checks the AGC delay characteristic.
(iii) Indicates the presence of any BFO leakage into the AGC system (S-meter indication should, particularly on weak signals, remain the same with the BFO "On" or "Off").
(iv) Although arbitrary, signal level reports given during contacts are more consistent.

Regarding (iv) above, the requirement for remote control led to the adoption of amplified AGC. As a result the need for manual gain control at the "remote" position has been obviated, the AF signal remaining constant for a wide range of input signal levels. From this it will be obvious that, for remote operation, some form of S-meter is essential since the AF signal no longer bears any relationship to the input signal insofar as variations in amplitude of the latter are concerned.

(i) Crystal Calibrator Stage. Provision has been made for the injection of 100 kc and/or 1 mc harmonics, *via* the three-position switch S1a-e, into the 5 mc mixer stage (V7). This enables the band edge frequencies and/or small errors between calibration points on the main frequency scale to be corrected, by adjustment of C2b, Fig. 2. This improves the interpolation accuracy of the logging scale. In the third position of this switch a 5.465 mc crystal (X3) is brought into circuit, the oscillator then replacing the variable 2nd RF oscillator (V1) when the 28-30 mc tunable converter is in use.

For calibration purposes the oscillator is brought into operation by the push-button switch (PB) or, from the "remote" position, by the energising of relay B/1.

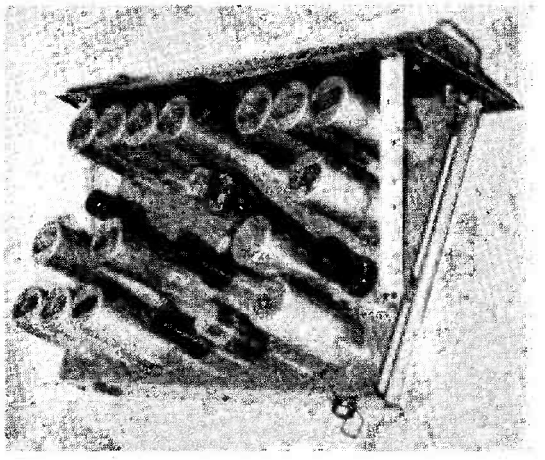
2nd IF/AF Unit (50 kc)—Fig. 4

This unit comprises a combined mixer/oscillator (V1-6SA7) followed by two amplifier stages at 50 kc using high slope RF pentodes (V2, V3-6AB7), a detector (V4-6SA7) and AF amplifier (V5a, V5b-6SN7). Additionally, there is a separate BFO (V6-6J5) and also a voltage stabiliser (V7-VR150/30) for the amplifier screens and the oscillator HT line voltages.

Since the 1st IF/AF Unit has adequate gain the only purpose of the 2nd IF/AF Unit is to provide additional selectivity for the reception of CW signals under conditions of extreme adjacent channel interference. This selectivity is achieved by cascading a number of high "Q" tuned circuits (12 in all). In addition to decreasing susceptibility to adjacent channel interference, the reduced bandwidth provides a significant improvement in signal-to-noise ratio under weak-signal conditions.

The 465 kc signal from the 1st IF/AF Unit is applied to IFT1 *via* SK1. The secondary of this transformer is tuned by C2, adjustable from the front panel of the unit. The tuned circuit (L2, C5, C6) associated with the oscillator section of the mixer (V1) is similarly adjustable from the front panel by means of C5.

The 50 kc output from the mixer is subsequently applied to a series of high "Q" tuned circuits, with V2 and V3 interposed to make good the attenuation of the signal that results from the weak coupling betwen the individual tuned circuits. The 50 kc signal is applied to the detector (V4) along with the injection voltage from the BFO (V6), the latter being variable in frequency by adjustment of C24 from the front panel. An RF filter follows, the purpose of which is to prevent the 50 kc signal from reaching the input of the AF amplifier (V5a-b). This signal is of considerable amplitude at the anode of V4 and if allowed to reach V5a would cause appreciable grid current to flow, with consequent overloading and distortion of the desired AF component of the signal. The AF amplifier is identical in design to that in the 1st IF/AF Unit. Separate IF and AF gain controls are fitted although, after initial equalisation of overall gain to that of the 1st IF/AF Unit alone, no further adjustments are required.



General appearance of the second IF/AF unit, of which the circuit is given in Fig. 4.

(To be continued)

INVITATION FROM GERMANY

The D.A.R.C. (German Amateur Radio Society) has arranged for its annual Convention to be held at Iserlohn, a small, very pleasant old town about 20 miles from Dortmund. Convention dates are August 6-9, and a large camping site has been planned which will be available both before and after the official period. The D.A.R.C. would welcome British amateurs to this meeting, and those interested in making the trip should write to : DL1WA, Uhlenhorster Weg 37/3, Hamburg 21, Germany.

XTAL XCHANGE

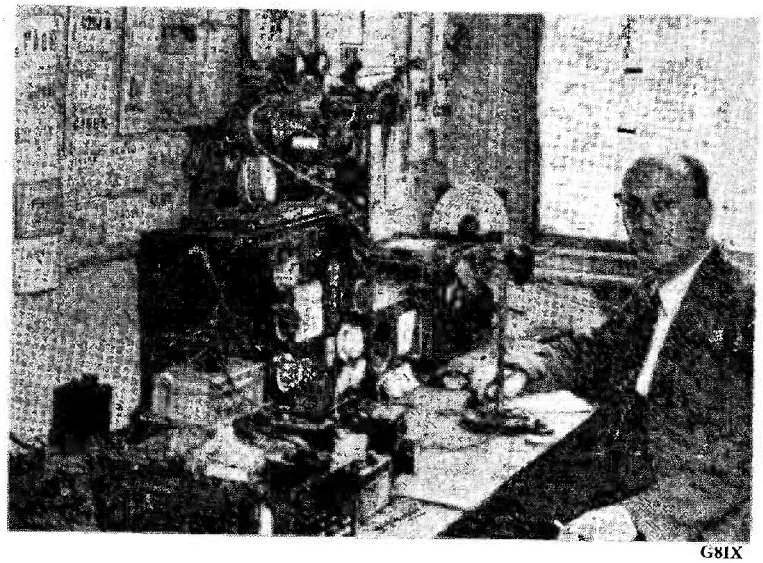
Those wishing to exchange crystals are invited to make free use of this space. Notices should be set out in the form shown below, on a separate slip headed "Xtal Xchange—Free Insertion," and all negotiations conducted direct.

G3CDR, 16 Manor Road, Preston, E. Yorks.
Has 8050, 8073.3 and 8075 kc crystals, FT-243 fitting, no certificates. Wants frequencies in Top Band.

G3FOO, 8 Withert Avenue, Bebington, Wirral, Cheshire.
Has 1770, 6020, 7075, 7300, and 8155.71 kc crystals. Wants frequencies 1715, 7005, 7020, 7030 and 8035 kc, any mounting.

DX COMMENTARY

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



G8IX

CALLS HEARD, WORKED AND QSL'd

ONCE again a deep depression is reported over all the DX bands. In the words of the met. people, we have "occasional fine periods," but on the whole the DX weather is extremely dull and cloudy, with little prospect of an early improvement.

Let us console ourselves by the thought that this is perhaps the last of the 11-yearly troughs that will worry us. Now that the VHF boys in the States have taken the first steps towards Lunar-echo DX, it seems possible that in eleven years' time we could be dispensing with sunspots altogether—or could we?

Is it too optimistic to imagine that, within the next eleven years, we shall have a space-station orbiting the world, or stationary in space, chiefly for the purpose of providing an efficient reflector for world-wide TV? If we have, there is nothing to prevent us DX types from jumping on the band-wagon and using its surface for our own purposes; in fact, nothing could stop us—except the Heaviside layer!

If we are spared long enough to write the "DX Commentary" for April, 1964, we will undoubtedly make further reference to this subject!

Back to Earth

Once again the saving feature of the whole business has been our good friend the Top Band. You will find most of the Trans-Atlantic news dealt with elsewhere in this issue, so it is not proposed to dwell on that subject, except to record that this was a pretty good season. If a few more people had been able to put up large aerial systems, or to fly kites or balloons, there would have been many more contacts. But admittedly it is a bit hard to raise enthusiasm for kite-flying at 5 o'clock on a cold winter morning (For next season we are preparing a dissertation on How to Make Beds Uncomfortable.)

The fact remains that without the enthusiasm aroused by our various Top-Band activities it would have been very difficult to find enough news to make this Commentary of any great interest during the past three or four months. So we will start at the top once again.

Top-Band Activities

ZC4XP (Nicosia), who made history in the tests by clocking up the first contact on the band between ZC4 and VE, continues the story in a later letter. He could not get on very early in the season, but on January 25 he received several G's, and on February 8 worked GM3GUS and heard W2WC. From February 9 onwards many G's were worked, the first being G6KP. G6BQ was heard until long after sunrise at strengths from RST 599 to 459. OH7OH, HA5BX and OH3NY were worked, the latter being a six-band contact. Other six-banders came with GW3FSP and G8KP.

On February 22, ZC4XP heard W1BB, W3NCA and EI9J, the latter continuing until 2½ hours after sunrise. Then, on March 1, after several more QSO's with G's, came the contact with VE1EA at 0400 GMT. At this time, 'XP was flying balloons which were holding up a 262-ft. wire of No. 28 gauge—until the wind blew!

On March 6, VE1EA was worked again. But the best night of all was March 8, when the bag included several G's, GD, GM, OH and finally W1BB at 0355. Again the aerial was a vertical 262-footer suspended by a balloon, and the input was 100 watts.

ZC4XP wants to defend his

operating methods by stating that when there is a crowd waiting he *will not* have long-winded contacts; rubber-stampers will give ten times as many stations their desired QSO with Cyprus. Likewise, he will not answer stations that have already worked him as long as others are there who have not yet had their first contact.

In conclusion, note that ZC4XP will continue to be on the band every Wednesday and Saturday from midnight till 0100 and from 0300 till 0500. He will also try to make an all-night session of it on the Saturday night and Sunday morning.

Thanks also to ZC4RS, who was hoping to get organised for One-Sixty but had to pack up and come home just as things were getting lively. He will be back in Cyprus in 1954; meanwhile he will be on the air as a G, mostly on 21 mc, on which band he worked 54 countries before leaving ZC4.

And so to less spectacular Top-Band news. Still more WABC's have been issued, and several stations now boast 70 confirmed. We are beginning to think that 70 should have been the qualification for the Certificate! GI6YW (Belfast) is a lucky man with 71 worked and 71 confirmed; GM3OM (Larbert) is even luckier with 73 worked and 73 confirmed. He tells us that he has been hearing TF5TF on the band during the last two week-ends, but no QSO yet.

GW3ITD, normally at H.M.S. *Collingwood* (Fareham), will be home in Carmarthenshire for three weeks, starting April 16. He will work as many Top-Banders as possible during that time.

GM3IGW (Clackmannan) will probably have been operating from Kinross before this is published; all contacts will be QSL'd with special "WABC Expedition" cards! But he tells us that GM3HYX lives in Kinross and hopes to work the band shortly. 'IGW has raised ZC4XP. DL2PT and several new OH's and OK's.

G3AKU (Hunts.) laments the total absence of Suffolk since the departure of G2AJU from Ipswich. 'AKU now scores 59 and cards are becoming mighty important. (GM3OM recently worked G8MU in Suffolk.)

GM3EFS (Dumbarton) points out that the full total is 97 counties, not 98 as we erroneously slipped into an aside last month. Up to date he has worked 74 of them—the highest score yet recorded.

G3GUM (Formby) hopes to take a portable 1.7 mc station to the summit of Snowdon this summer. Not a rare county, but an interesting expedition, and QSL's will be suitably postmarked "Summit of Snowdon." 'GUM has been up there reviewing the aerial situation, and it looks good. G2JI and G6DP, both mountaineers, will probably be in on this project—and if we know this trio it's a safe bet that they will *not* travel up there the easy way, even with a portable!

G3HDQ (Cheshire) says there are a lot of English counties missing or scarce, and mentions the "dead belt" comprising Leicester, Huntingdon, Cambridge and Suffolk. Westmorland, Shropshire and Dorset are also hard to come by. But 'HDQ has put his score up to 55 worked. (We know of G3BQQ in Shropshire and G3HMR in Westmorland.)

G3IEF (Aylesbury) sends his first report, and has a grievance about certain types who ask for a QSL direct, as they are nearing the 60 mark . . . . and that's the last you hear of them. We repeat, though, that many of these little moans are due to not acting on Bureau rules. For all that, however, 'IEF says that in future he will only QSL first if *he* wants the other fellow's card; otherwise he will QSL everything that comes in, but not until then.

The Finnish WABC

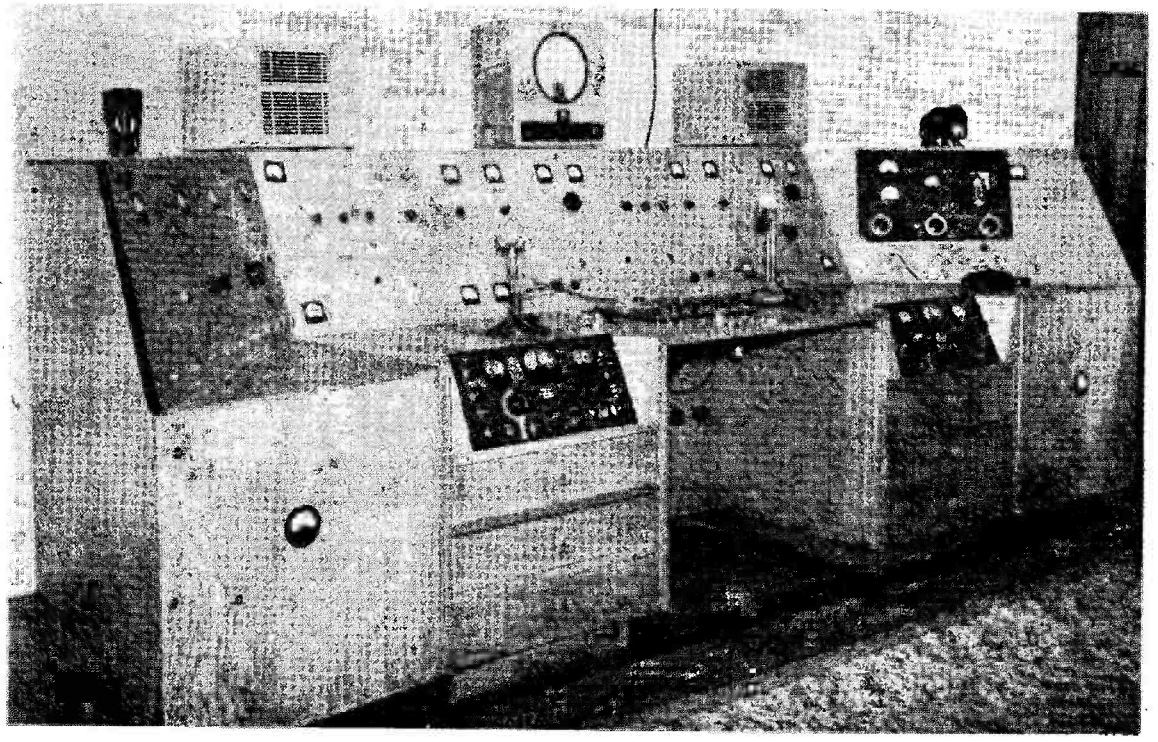
OH3NY (Lyly) has now reached the marvellous total of 70 worked and 66 confirmed (including *all* English counties). Matti has certainly done terrific work on 160 metres, and we are very sorry to hear from him that the OH's lose it for good on May 1st. So you have just one month left to make that OH contact. Matti says "I will stay there until the end." He has worked EI, DL2, OK, OH, UA, HB, MF2, W1 and ZC4 (a magnificent record, this), and is very keen on finding an African for his fourth continent before saying good-bye to One-Sixty for good.

G3ICX (Sutton Coldfield) braved the 'flu germs and got up a 265-ft. wire for the Trans-Atlantics; he was disappointed not to get across after all. But the new aerial is paying dividends, judging by signal reports since it went up.

TOP-BAND COUNTIES LADDER

(Starting Jan. 1, 1952)

Station	Confirmed	Worked
GM3OM	73	73
GM3IGW	71	72
GI6YW	71	71
GM3EFS	70	74
G8KP	70	72
G3ELZ	70	71
GI3HFT	70	71
G6ZN	68	72
GM3JDR	67	69
OH3NY	66	70
G2NJ	65	67
G3ESY	64	65
G6VC	63	69
G3IAF	63	68
G3GZJ	61	63
G3FNK	60	69
G4XC	60	64
G5LH	60	61
G3AFL	60	60
G5JU	54	60
G2YS	46	61
G3AKU	45	59
G3HTI	43	55
G3HDQ	40	55
G3IEF	31	47
G3BDS	30	50
G3DO	25	39
GW3CKB	20	46
G3HWH	20	41
G5FA	20	24
G3DVQ	19	26
G3NA	18	31
G3FZS	14	25



The very fine layout at ZS1W, Somerset West, South Africa. The whole station is home-built, including the oak console, 14 ft. long by 5 ft. broad. Seven separate self-contained CW/Phone transmitters are provided, one for each band from 80 metres to 70 centimetres, running a maximum input of 100 watts. The receiver for all bands (except VHF) is an SX 28, used with converters for 144 and 430 mc. The aerial system likewise consists of a separate array for each band, ranging from a half-wave wire for Eighty to an 18-element beam on 430 mc. The middle section of the desk carries a Bush tape recorder, and centred above is the beam direction indicator. The station record at ZS1W is 175C worked, with contacts of over 30 miles on 430 mc. His whole station is a striking example of planned construction, resulting in a good-looking layout which provides all possible operating convenience and facilities.

G3NA (Hereford) reports hearing UA3FT on the band, about 2020 GMT on March 2 — RST 569. If things were different we could make some nice DX skeds out that way! GW3CKB (St. Athan) keeps Glamorgan on the map and has heard ZC4XP but hasn't yet raised him, the best so far being DL2PT and OH2YV.

The Rutland Expedition

G5PP/P certainly stirred things up from this rare spot on February 21/22, when he worked 146 stations in seven countries and over 40 counties. They had to operate 150 feet below the selected hill-top owing to the state of the ground, and three cars were bogged down as it was. Kites were flown, but high winds caused plenty of troubles. Up to 8.30 a.m. on the Sunday, G5PP/P was running 5 watts of CW, but after this nearly ten watts of phone was used.

'PP expects to radiate /P from Radnor on April 4, Montgomery on April 5 and Merioneth on April 6, and hopes stations will spread out a bit more. On the Rutland jaunt they were "yards deep on the frequency" and kept calling during QSO's. Next portable plan is for Cumberland and Westmorland during the last week of July and first week of August.

Our old friend DL1IX sends another report and a Calls Heard list comprising loads of G's, 8 W's, 3 VE's, KV4AA, ZC4XP and all the other countries known to have been active. He is also keen on cross-band 80/160 QSO's and asks for G co-operation in this. GD3UB, OK1HI and KV4AA have now been heard on five bands by '1IX.

G3FNK (Derby) claims his WABC and confirms that the QSL's are much harder than the contacts. He adds that it isn't the "rare" ones who are the offenders, and thinks they have been excellent, considering that every contact they make must include an urgent request for a card. One of 'FNK's interests is control circuitry, and the whole rig operates without throwing any switches; it goes either by manipulating the bug, the straight key, or the push-to-talk switch on the mike, returning to "receive," after an adjustable delay, at the end of a transmission.

G3FZS (Bristol) hopes One-Sixty is not becoming *too* DX-conscious, as he always regarded it as the one band where you could take your time and not bother about records and awards. The DX season is just about closing, in any case, and the band will probably become a little more "relaxed" from now on.

That seems to wind up our Top Band report, and if any carping critics should argue that all this is not DX, we retort that

DX is a relative term. Furthermore, that the activity on this band outstrips all the others at present, and seems to be of considerable interest to quite a large number of our regular 'chasers—as well as a great many others who simply join in the fun for their own amusement.

Eighty-Metre Doings

On *this* band, now, nothing can be described as DX unless it is either a rarity or something from, at least, a different continent. The inter-G work on Eighty is in a category by itself, but never comes under the heading of DX, as similar work on the Top Band might well do.

Lots of ZL contacts continue to be made in the early mornings; VK5KO has again been heard and worked in the evenings; and even a few ZS signals have pushed their way through the late evening QRM. W's and VE's were there during the *ARRL* tests, and the only missing continents seem to be Asia and South America. (Now someone will tell us that they worked them both last month!)

GM3IGW was pleased to raise OY3PF on phone, with help from GM3HXC and GM2CAS. The OY is genuine. G3HDQ made one excursion to the band around midnight, and raised SP3PD, CN8EG and CT2BO in half-an-hour or so—all new countries for the band.

G6QX (Hornchurch) added CT3AB and ZL1HM to his list, and G5FA (London, N.11) heard OQ5RA and CT3AB, both of whom he would have liked—but they got away. And J. L. Hall (Croydon) passes along the interesting news that he has been hearing ZK2AA, of all people, on this band; the ZK has also been reported heard by at least one G and by a DL1.

G8KP worked ZB1BJ for a new one, also KV4AA.

Forty-Metre DX

G2BJY (West Bromwich) has been concentrating on Forty for a while. He believes in changing bands at regular intervals and sticking solely to each band in turn for at least three months. He has found conditions very erratic, but VK and ZL have been workable around 0800, ZS at 1930, and the odd PY, LU and VE around 0730. The W's, of course, are usually at their best from 2300 onwards, but sometimes have been absent altogether. The band has usually been dead at 0300. Best DX for 'BJY was SU1RS, 4X4DH, MF2AG, YI2AM, ZS3HX, ZB2B and the crop of W, VK, ZL, PY, LU and ZS. Heard, but not worked, were ZD4AB, ZS9D and CO7NR.

G4QK (Croydon) raised ZB2B, ZB2I and SU1RS, and his "heard" list includes CR4, EA9, SV, TA, VP8 and 9, ZD4, ZE and ZS3. G5FA managed two new ones with OD5AD and VS6CG; others worked were MP4HBK, YI2AM, VK6DJ (2225), ZL3GQ (1900, with 25 watts) and many lesser lights. 'FA says the DX comes back to an ordinary CQ, right through all the European QRM, so he advises everyone to dig deep!

Nice ones reported heard were DU7SV (1650), ZK2AA, ZS7D and ZS2MI on phone, which all adds up to the fact that there is often some super-DX there at times when impatient people take one whirl round the band and either QSY or QRT. But is *is* a mess . . . .

Twenty-Metre Topics

We have never received so little news about Twenty since we started this Commentary nearly seven years ago! For a long time it was the mainstay of all the DX news; it was never actually *short* of news. Nowadays one or two people raise the odd bit of DX on the band and mention it in one sentence at the end of a letter.

As a matter of fact, Twenty *is* showing signs of improvement at the time of writing, but over the period covered by most of this month's letters it certainly was grim.

Chief item of interest comes from G6XY (Kenilworth), who worked NEP1NMC at 1600 on March 9. This station is in Nepal, and the operator was W6NMC, who said he would be there for "another five days." The contact started on phone on 14155 kc and then went on CW as conditions deteriorated. VS1EG was also in on the QSO and did some relaying of remarks lost in QRM. This one looks like being the first contact ever made between G and Nepal—but we are always open to receive prior claims. Meanwhile, we hand it to G6XY! (He would like to know how to QSL this one).

G3GUM worked OA4ED, CX7AC, FI8AB, FP8AP, VP9AU and YV5AB. He also raised VE3BWY, who is, of course, ex-G6WY and our predecessor in writing this Commentary. Ham Whyte sends his 73 to all the types and is still trying to work new ones.

'GUM says his heart was gladdened by a card from VS5ELA (as were many others), but he is despondent about ZC2MAC. There seems no need to worry here, because we recently passed a message from

FIVE BAND DX TABLE

POST WAR

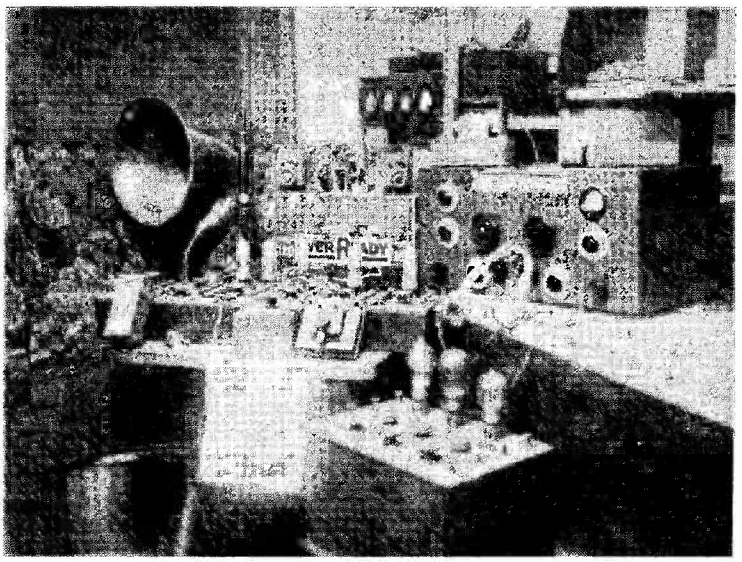
Station	Points	3.5 mc	7 mc	14 mc	21 mc	28 mc	Countries
DL7AA	568	74	131	210	53	100	217
G6QB	555	52	100	215	53	135	231
G5BZ	489	56	101	216	51	65	220
G2VD	468	46	84	175	55	108	184
G2BJY	436	48	76	141	55	116	179
G2WW	412	23	70	187	25	107	194
G3DO	409	24	45	192	41	107	—
G3FXB	403	54	102	168	40	39	174
G5FA	392	33	114	150	22	73	165

Station	Points	3.5 mc	7 mc	14 mc	12 mc	28 mc	Countries
G6QX	365	50	85	142	31	57	162
G4ZU	333	11	9	175	18	120	189
G3ABG	303	35	79	142	17	30	149
G2YS	297	42	50	125	40	40	142
G2BW	294	24	57	144	26	43	151
G3GUM	281	31	38	148	63	1	159
G8VG	268	34	76	123	9	26	140
G2DHV	173	20	21	107	10	15	111

him concerning his QSL cards, which had failed to turn up. We heard subsequently that the affair was settled, and we know that once he gets them he will fill them in and despatch them.

G3EHT (Wadebridge) worked TG9RB, HR1BG, KZ5's, KV4's VP6's and the like, all on phone. G3TR (Southampton) worked OQØDZ (Ruanda), HR1RL and CR4AD, also all on phone. He is moving shortly to the top of the hill, at the bottom of which he now resides (if you follow us) and is hoping for a much better location.

G4QK raised FQ8AP, IT1AGA, SU's, 5A's and TA3AA. Among the Gotaways were FB8BE, PJ2CA, ST2HK, VP9GX and some other nice ones. 'QK says his aerial seems to have only one lobe, and that runs through SU, W7 and G5BZ! G8KP raised YV5AB at 1405 GMT, and ZL1HY the long way round. The others were CR6, CR7, FQ, OQ, ZE and the like.



Some of the equipment at G6TG, Scarborough in 1923. In front of the HT battery is the 5-valve receiver using Ediswan AR valves. The more modern-looking Rx is an Eddystone ECR (still in operation) and standing on it is an original specimen of the famous Brown microphone amplifier, which was not a valve-operated device at all. In the foreground is an audio amplifier using LS5 type valves, and "Ford spark coils embedded in paraffin wax." At that time, DX was mainly the reception of American medium-wave broadcasters.

The 21 mc Band

Our newest band has been letting us down during the winter, but that shouldn't discourage those who remember how Ten used to behave, even in the moderately good years. It should come back this spring and summer, even if things are still a bit half-hearted. But it won't be many years before we are looking back nostalgically to the days when there was *no QRM on the band*!

An interesting letter from VU2CQ (Bombay) tells us that the VU's were allowed on the band from January 17. So on that day he came on the air and worked E, G, ZS, VK, DL, SM, CR7, VS7, VQ3, VQ4, ZC4, OZ, LA, ON, TA—in that order! He uses both phone and CW and runs 100 watts to a dipole. Crystal frequencies for CW are 21030 and 21060; for phone, 21180. Best time for G's is 0900-1200 GMT.

G5CP (Sale) worked ZD9AA on phone for his very first ZD9 QSO on any band. He also raised a WØ, who phoned through to his friend WØUYC—the latter having entertained 'CP in person while he was in the States last year.

G5BZ (Croydon) wishes more people would get on the band and *call CQ*. The inactivity, he says, is worse than the conditions. During the *ARRL* DX Contest the whole band was full of South Americans working W's—and you never hear all those stations normally. He suggests a couple of 21 mc Activity Sundays, but although we could organise them very well for G's, it is the DX that we want the activity from. However, we will see what can be done.

G2BW (Walton-on-Thames) added VP7, VQ2 and 3, OD, SU, ZB1, PY and VU to his list—all in one week-end. G2BJY is leaving the band alone during his Forty-Metre spell, but admits that this is really due to the bad conditions.

G3GUM is quite sure that 21 mc has been wide open for long spells when there has been no activity to confirm it. At 1040 one morning he heard ZL4BO at 479—called him and got 579 back. The ZL said 'GUM was the first European he had heard for six weeks! Apart from that contact and some with VQ3BM and some ZS's, there is nothing else to report.

G6QX about sums it up when he says "It is a disappointing band since the initial surge, when the boys got going as soon as the flag dropped. There is a danger in lack of occupancy . . . . I wonder if the gang realise this aspect."

G3TR started up on phone on February 21, and since then has worked VQ2, ZS, ZB1, OQ, ZD9, 4X, PY, SV and FQ. This with 100 watts and a rotary ZL Special.

From ZB1AH (Malta, G.C.) we have it that they too are now fully licensed for Fourteen—but he remarks that there is very little to be heard, and says "Surely the Old Timers haven't forgotten how to make a doubler triple for a change in their transmitters?" We can only underline what G6QX says above.

General Patter

For once there is not a single mention of Ten Metres in the entire post-bag, so we pass on to those letters that deal with a certain amount of this-and-that, and no band in particular.

G2NS (Bournemouth) amends last month's letter about the T2FD aerial; he says that G3IQX now finds that he gets out on *five* bands with it—80 to 10! G3IOQ (Haslemere) got a bit cross with his home-built receiver, and in a moment of annoyance heaved it across the bench towards him. After that the science of dynamics took control, and he found himself on the floor surrounded by bits of the rig! So now, a rebuild . . . .

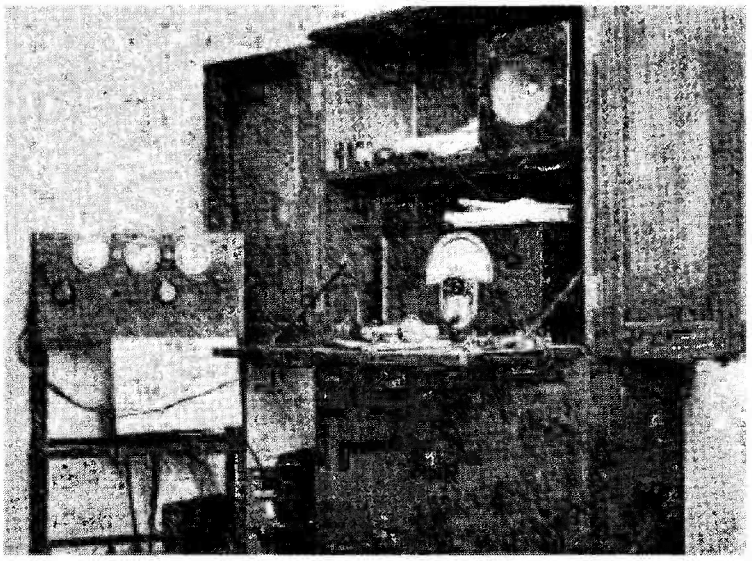
VS2BS (Penang) is looking for QSO's with London on 14 mc phone, 1200 GMT. And HI6TC (Cuidad Trujillo) wants contacts in the Plymouth area, 2300-0100 GMT, on 3925, 7080 or 14260 kc phone.

G2WW (Penzance) has started Certificate-chasing in earnest, and has amassed a WAE III (Telephony); four Annual ones for the WEA, and the fifth on the way; DXCC (after all these years); and is gunning for WAI, WAIP, AAA, OZ-CCA, the Espana Award and sundry others! And he puts all the blame on a chance remark of ours about the number of Certificates available. An FBA has already been forwarded to him from our department, and a couple more cards will bring in the WFE. (A rude aside from someone in the shack suggests that all we want now is a "WTKS"—Worked The Kitchen Sink—to complete the terrific array of pasteboards and sheepskins already available to the real enthusiast).

G3EAC (Northumberland) disserts at some length on the subject of QSL's. He says that "the boys who dropped the Iron Curtain" can claim the best percentage of returns (80 per cent.), and also finds that CW produces better returns than phone. 'EAC has averaged ten contacts a week for the last 4½ years and makes no claims to fame. But he says that his occasional DX thrill can be likened to the "rabbit" golfer who, on occasions, hits one right on the nose and clean down the fairway, thus achieving the ultimate in DX. His day thereafter becomes a thing of beauty—whereas the scratch man must do this every time or perish in the depths of despair. How true! We've always thought that rabbits of all kinds are very fortunate; carefree right up to the last, when something goes "snap" right behind them! But that fate, at least, does not befall the radio variety.

For the Multi-Band Contact enthusiast, G8KP can claim eight on 6 bands, 32 on 5 bands and 56 on 4 bands—figures refer to countries, not to the same individual stations. We really shall have to think up a Six-Band Award before it gets too easy.

That's the lot for this month, and the next deadline is **first post on April 15.** For the following month it will be first post on *May 13.* Please make a note, and address everything to "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. 73 and BCNU on the beach.



G8UA, Burnley, has designed his station to be as simple as possible. The transmitter runs 75 watts to a CC 6L6-T20, operating only on 14 mc CW; the receiver is a pre-war Tobe. This equipment has produced 42 of the 48 States, more than 120 different W6 stations, and 92 countries worked. G8UA takes his DX as it comes, disliking formula QSO's and competitive DX. He doesn't stay up late for it either, but he does take a turn round the band in the early mornings!

21 MC MARATHON

(Starting July 1, 1952)

STATION	COUNTRIES
W4COK	64
G3GUM	63
G6GN	61
G2VD	55
G2BJY	55
DL7AA	53
G6QB	53
G5BZ	51
G8KP	50
G5CP	42
G3DO	41
G3FXB	40
G2YS	38
G8OJ	32
ZE3JO	30
G6QX	28
G2BW	26
G2WW	25
G5FA	22
G3ABG	17
G3TR (Phone)	10
G2DHV	10
G8VG	9

Amateur Radio in Soviet Russia

PART II

The first part of this interesting article appeared in our March issue, outlining the Russian amateur licensing system and the geographical significance of their callsign allocations. Here, the authors show how SWL numbers are issued by "oblasts" (corresponding roughly to our counties) and give enough information for translations to be made of the inscriptions on Russian QSL cards. The Soviet amateur contest and achievement certificate system is also discussed.—Editor.

LAST month the distribution of the Russian republics and of the oblasts of the R.S.F.S.R. (UA) among the various DX Zones was outlined. No difficulty should arise in determining the Zone of a particular station except in the case of Archangel oblast. The greater part of this oblast, including the town of Archangel itself, is in Zone 16, but a small strip of the mainland including the town of Anderma (UA1PA and UA1KEB have been active from Anderma) and the island of Novaya Zemlya (no known stations as yet) are in Zone 17, while Franz Josef Land (where UA1KEC and UA1KED have been operating) is in Zone 40. With the single exception of Archangel, no oblast is in more than one Zone. It may not have escaped the notice of some of the DX fraternity that Tannu-Tuva, a part of UAØ, is in Zone 23. It would be tantalising if any activity occurred in Tannu-Tuva—except for our SWL's !

Those of us who put strong signals into the U.S.S.R. used to be deluged with what were regarded as SWL cards. In actual fact many of the cards which found their way into numerous wastepaper baskets were sent by Russians who did not have their own private transmitters but were allowed to operate club stations, and had had genuine QSO's with the recipients. Naturally enough they wanted QSL's for themselves—cards sent to the club station were small consolation. Having been mistaken for SWL's, many must have been disappointed.

Just as Russian call-signs give a clue to the QTH, so these "SWL" numbers indicate the oblast. For example, the number UA4—15407 shows the operator to be in Stalingrad oblast ; 154 identifies the oblast, the final two figures being a serial number. This system was developed later than the call-sign system explained last month, and has been extended to the other republics such as the Ukraine (UB5). Full details are not likely to be of sufficient interest to be given here, but it should perhaps be mentioned that the immediate post-war numbers, which were prefixed by four letters instead of two, do not fall into such an organised pattern.

Russian Characters

To be able to read QSL cards printed in Russian characters a knowledge of the Russian alphabet is essential. The task is made more difficult because the accepted English equivalent of a Russian character is not always consistent with the apparent equivalent when that character is sent in Morse ! Two examples may make this clear : The character B is pronounced V but is sent in Morse as W ; similarly the character щ is pronounced *shch* but is sent in Morse as Q. Table 2 gives the Russian alphabet in three forms—capitals, small type and handwriting script—together with the "pronunciation equivalent" and the "Morse

TABLE 2. THE RUSSIAN ALPHABET

Russian Character Capitals	Type	Script	Pronunciation Equivalent	Morse and Call-sign Equivalent
А	а	*а*	a	A
Б	б	*б*	b	B
В	в	*в*	v	W
Г	г	*г*	g	G
Д	д	*д*	d	D
Е	е	*е*	e	E
Ж	ж	*ж*	zh	V
З	з	*з*	z	Z
И	и	*и*	i	I
Й	й	*й*	i or y	J
К	к	*к*	k	K
Л	л	*л*	l	L
М	м	*м*	m	M
Н	н	*н*	n	N
О	о	*о*	o	O
П	п	*п*	p	P
Р	р	*р*	r	R
С	с	*с*	s	S
Т	т	*т*	t	T
У	у	*у*	u	U
Ф	ф	*ф*	f	F
Х	х	*х*	kh	H
Ц	ц	*ц*	ts	C
Ч	ч	*ч*	ch	Ō (— — — ·)
Ш	ш	*ш*	sh	CH (— — — —)
Щ	щ	*щ*	shch	Q
Э	э	*э*	é	Ē (· · — · ·)
Ю	ю	*ю*	yu	Ū (· · — —)
Я	я	*я*	ya	Ā (· — · —)
Ь	ь	*ь*	*not pronounced*	X
Ы	ы	*ы*	y	Y

The type of recent Russian QSL card which will be familiar to many readers. A translation of the inscription is : " In commemoration of the 3rd All-Union Competition for Short Wave Operators of the USSR honouring the 54th anniversary of the invention of radio by the great Russian scholar A. S. Popov." Since about 1948, it has been Soviet policy to lay claim (for internal consumption) to every imaginable invention, without the slightest regard for facts.

and call-sign equivalent." For example, the Table shows that a call-sign given on the QSL card as " уазцх " is UA3CH and would be sent in Morse as such. Again, Ворошиловград is pronounced Voroshilovgrad but is sent in Morse as Worochilowgrad.

During the last few years all QSL cards emanating from Russia have been of a standard design bearing, in most cases, a view of some famous building, or perhaps a monument, or occasionally an illustration of a Russian war medal. One of those seen more recently carried a coloured photograph of the Dynamo Stadium in Moscow—home of the well-known Russian football team. These cards are printed in bulk and issued to amateurs and SWL's as required by the DOSAAF organisation. Space is left on each card for the operator's own call-sign to be inserted and a choice can be made from a few dozen different illustrations. Some of the older QSL's were printed in English (and have thus acquired a rarity value), but those now being issued are usually inscribed in Russian, as follows :—

(*Romanised version*)

Vashi signaly slyshal — **19** **v** — **MCK s RST**—
Your signals heard (date) at (time) MCK with RST. . .

na — metrov.
on — metres (or m.)

Peredatchik ——— **Vatt** ———
Transmitter ——— Watts ———
Priemnik ———
Receiver ———
73 Operator ———

Proshu Vas prislat kartochku : CCCP, Moskva, P.Ya. 88.
Please send your card to : USSR, Moscow, P.O. Box 88.

Readers may already have noticed that many of the terms used in Amateur Radio are spelt exactly the same in Russian as in English, typical examples being : *Radio*, *Antenna*, *Operator* and so on, while in other cases the Russian version is similar though not identical *e.g.* Kondensator, Lampa (valve), Batarey (battery), etc.

Contest Organisation

Contests are held at frequent intervals throughout the whole year. Some of them are organised on a nation-wide basis while others are sponsored by the amateurs of a particular region, such as the Ukraine, Georgia or Sverdlovsk. These contests are generally for CW operators and the major event of the year is the DX Contest held on the Sunday nearest to May 7, which date is celebrated as " Radio Day " in the Soviet Union. The main telephony event takes place each year on the second Sunday in January, when Russian phones can be heard on all bands from 1.7—28 mc (usually operating in the CW portion of the bands !). In addition to contests, there are a number of targets which Russian amateurs try to reach, corresponding to our WAC, WABC, FBA and DXCC awards. Chief among these is the " Worked 100 Oblasts " award—not too difficult when one realises that there are over 150 of them ! Another award is known as the " PZMT "—or " Worked All Countries of Peace "—and is issued by the Czechoslovakian Radio Society, now known as the CRA ; the certificate is available from OK1CX (QTH as in 1951 *Call Book*) on production of QSL's from 21 Iron Curtain countries —the various districts, UA1, UA2, UA3 and so on of the USSR, each counting separately. There must surely be quite a number of G's who would qualify for this award !

Radio Literature

The only Russian publication available to radio amateurs is entitled *Radio* and separate editions are produced monthly in Moscow and Kiev. It is similar in size to *Short Wave Magazine*, but at the official rate of exchange costs approximately 5s. 6d. per copy ! It claims a circulation of about 90,000, a fair proportion of which is " exported " to Eastern European and other countries. *Radio* carries technical articles comparable with those appearing in British radio periodicals, with a fairly high proportion of matter intended for newcomers to Amateur Radio. There is no equivalent to our own operating news-feature articles like " DX Commentary " and " VHF Bands," but the space thus made available is often used for effusions with titles like : " The ARRL and IARU Unmasked !," " BBC Spies Caught Red-handed!," " Belgrade Radio in the Service of the Anglo-American Warmongers!" to name a few selected at random from recent issues ! No doubt these serve to boost the morale of the DX-starved Russian operators.

No article on Amateur Radio in Soviet Russia would be complete without mention of the well-known Alexandr Stepanovich Popov—" Inventor of Radio "—whose benign features adorn many a Russian QSL and to whose memory solemn homage is paid by all dutiful UA's on Radio Day—the anniversary of his " discovery." However, the esteem in which he is held is, to a certain extent, justified as there is no doubt that he was among the pioneers of radio.

(*To be continued*).

MORE TVI TROUBLE !

The Post Office announces, with an understandable air of satisfaction, that by the end of January last there were more than 2,000,000 TV receiving licences in force, with January sales at 110,000 odd showing the largest increase recorded in any one month. However, even this figure is barely 20% of the sound licences issued, which include no less than 179,544 permits for sets fitted in cars. TV is certainly creeping up, and wherever it appears, there are new problems for amateur transmitters who have long since forgotten about BCI.

NOTE FROM YU1AD

Mirko of YU1AD is now in hospital for an operation on his left foot, which will have to be in plaster for three months or so. After he gets home, he hopes to be very active—but will be unable to QLF ! His DX friends the world over will wish him a speedy recovery, and a happy time on the air during the period of his convalescence. He asks us to say that his " improved El-Bug "—mentioned in the description of his station in our issue for February last—is made to the pattern of that described by W6DPU in *QST* for February two years ago.

HALF-YEAR SUBSCRIPTIONS

Readers should note that we are able to accept direct subscriptions on a half-yearly basis, at the rate of 12s. post free for six issues of *Short Wave Magazine*. There are solid advantages in becoming a direct subscriber. Your copy of the *Magazine* is delivered by post on the day of publication, and it arrives flat in a large envelope. You are also entitled to free both-way use of an established QSL Bureau, handling amateur-station cards on a world-wide basis. (For a year of twelve issues, the rate is 24s., as announced in our March issue). Place your subscription order with The Circulation Manager, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

CORRECTION NOTES

In the circuit diagram Fig. 2 on p. 19 of our March issue (" Bandspreading the VFO "), ZE3JL now wishes to amend C9 to read C8, and C8 to read C7 in the table of values, with R1 taken to a 90v. regulated supply. In the table of values on p. 41 of G2DD's article on his 70-centimetre converter, L1 should read as being of 26g. wire tapped at the 4th turn from the grid end, and L7 as being of 30 turns.

VHF BANDS

A. J. DEVON

Both Bands Open Wide, March 1-6—

Twelve Countries Workable on Two Metres—

New 70-Centimetre Record: GW2ADZ/ON4UV, March 3, 360 Miles—

GC3EBK Takes British Ground Record—

High Activity on Both Bands—

Many New EDX/GDX Contacts Made—

Large Movements in the Tables—

IS there any news *this* month! Well—is there any need to tell you that we have just enjoyed what will probably prove to have been the best VHF opening yet experienced in these latitudes?

The whole thing started with stable weather, over almost all the country and well into Northern Europe, from about February 27. For the next week or so, the glass remained high and steady, there was little or no wind, days were bright and "mild for the time of year," fog formed thickly in inland areas, and the nights were cold, with freezing wind-screens and early morning frost.

Up aloft, the effect of this was to produce what must be almost a record temperature inversion, resulting in a huge, stabilised duct which eventually covered all Northern Europe from the longitude of Berlin to the southern part of Scotland—a condition which held for the best part of a week, from March 1-6. There were local movements, in that at times the path became easier East-West (and moving north or south) or better North-West/South-East (with movement north-east or south-west), thereby temporarily favouring one area of activity when stations just outside the belt were not hearing the DX.

The general result was that large new VHF areas were exposed for the first time, and on both Two Metres and 70 Centimetres it was possible to work with comparative ease over relatively long distances with unusually high signal levels.

Note, however, that the area of exceptional conditions did not extend much beyond the latitude of Southern Scotland—due probably to the high ground of the Pennine Ridge and the Cheviot Hills "breaking the duct"—so that the GM's were more or less excluded from the real DX (but they had a nice display of Aurora Borealis on March 7, as if to make up!). Nor did the belt of superlative conditions really take in EI or GI, and the Irish stations were not getting through to the Continentals. It is not the first time that the same sort of thing has happened.

Fortunately, the VHF clans in the favoured areas were on and in full cry as soon as the bands began to open, with the highly gratifying result that new records were made, new distances worked, and new experiences gained by a very large number of VHF operators—many of them quite new to the band.

Workable Europeans available on Two Metres included stations in DL, F, LA, OK, ON, OZ, PA and SM—and the calls heard/worked lists elsewhere in this space show that the fullest advantage was taken of the opportunity. There is no record of an actual QSO with OK1AA, though he was heard by several G's, including G3MY/P up near Sheffield late on the evening of March 1, for a very nice piece of EDX.

The GDX there for the working included EI, GC, GI and GW, though the Irish were not nearly as easy for the G's as were the Continentals. One of the heroes of the hour was GC3EBK (Guernsey, C.I.), who was making his initial appearance on Two and only put his first call out *on March 1st* (can you beat it!); he found the DX coming in thick and fast, and himself in great demand as a new country and a new county—he scores for both, incidentally. After less than a week on the band, GC3EBK was probably also a little surprised to find himself emerging as the new holder of the G ground record, by virtue of his fine 647-mile QSO with OZ2FR. (*Subject to final check when we have pin-pointed OZ2FR.*—ED.)

Other notable QSO's on Two were G5YV-DL7FS, in U.S. Berlin, and ON4BZ-SM7BE for a "First." G8MW (Nottingham) was another to work DL7FS, on March 2. But in truth nearly every G on the band worked one or more Europeans (in many cases it was a first taste of VHF EDX) and the Continental contacts—which under more normal EDX conditions would be noteworthy—were on this occasion so numerous that to list them all would become a tedious recital.

It was, for instance, an extraordinary experience to sit listening in the South Midlands to ON4BZ, a steady speaker signal as loud as a local, working G phones one after the other during the three evenings March 2-4. He did not need to call CQ—it was simply "QRZ? any G station" after every contact, and back somebody came every time, from all over the country! His best in terms of distance were probably G3EHY and GW2ADZ, worked in succession at S9 + both ways.

Taking it all round, everybody able to operate for this particular Two-Metre Session got something worth having, in terms of counties or countries and the thrill of working new DX.

But it was not only on Two Metres that things were happening—read on!

The 70-Centimetre Break

The 430 mc chaps were enjoying exactly the same conditions as the 144 mc operators—indeed, in some ways, things were better for them. Signal strengths were quite as high, if not higher; their

band was far less crowded; and in every case they were breaking new ground—in itself an exhilirating experience.

This was made possible largely by ON4UV (Hayt-lez-Manage, Nr. Charleroi), who was there to give everyone who could work 70 cm a QSO, or to take a cross-band 70-centimetre test from those without a 430 mc receiver. The culmination of his efforts was a fine both-way 70 cm contact with GW2ADZ (Llanymynech, Mont.) at 2350 on March 3, S9 phone both ways, the distance being 360 miles—a new European and, in all probability, a new world record for the band. (We are not at the moment of writing quite sure on the latter point, due to certain recent happenings on the 430 mc band in the States).

At any rate, full credit must go to GW2ADZ and ON4UV for being there with the gear and able to jump in on the conditions. For an opportunity like they had, it is readiness that counts, and both of them were right on the spot when their chance came. Well done!

ON4UV also had noteworthy 70 cm QSO's with G2WJ (Great Canfield, Essex), G2XV (Cambridge), G3BKQ (Blaby, Leics.), G3HAZ (Birmingham) and G4AP (Swindon). To all these five G's likewise, congratulations on the efficient way they handled their contacts—first by cross-banding, then clinching the matter with a straight two-way QSO on 430 mc.

Thus is VHF history made, and the boundaries pushed out further.

The gear at ON4UV (who has now worked four countries on 70 cm, but not yet his own ON!) runs, in the transmitter, a QQE06-40 at 15w. as a straight PA, into a 32-element beam; his receiver is a two RF 6J6-EC80 into a crystal mixer, with CC oscillator. Other stations worked on 430 mc from ON4UV during the period February 28 to March 6 were PAØWAR and PE1PL, the latter having been heard by G2WJ on March 3.

Another outstanding 70 cm result was a cross-band G2WJ/DL3FM on March 2, with the DL on 436 mc—undoubtedly the first time DL signals on 70 cm have been heard in this country; reception was good enough for DL3FM to be re-transmitted on Two by G2WJ.

Apart from the ON4UV contacts, the G's operating on 430 mc were able to QSO freely amongst themselves. G4AP (Swindon) worked G2MV (Coulsdon, Surrey) and G2WJ, his transmitter being an 832 tripling, with a beam consisting of three stacked dipoles having a wire-mesh reflector, 70-ohm coax fed; the G4AP receiver is a CO-multiplier 6J6-6J6 with output on 409 mc, into a crystal mixer, giving a tunable IF across 25 mc, with a 6AK5 IF amplifier and 6C4 cathode follower to couple into the main receiver.

During the three weeks or so February 15-March 9, G3BKQ, of Blaby, Leics., now one of the best equipped and most successful stations on the 430 mc band, had no less than 31 contacts with 16 different stations, the G's concerned being at distances up to 100 miles; this makes him 10C worked on 430 mc. His transmitter is an 8012 tripler run at 30w., and the receiver a CC job with 446A lighthouse RF stages in concentric line, into a crystal mixer, with a cascode head amplifier into an AR88 tuning 23-29 mc, to cover 432-438 mc in the band. The G3BKQ beam for 70 cm is a 16-element stack 45-ft. high, fed with 300-ohm line, on a site 200-ft. a.s.l.

The 430 mc outfit at G3HAZ (Northfield, Birmingham) consists, for receiver, of two RF stages GL-446B into a CV102 crystal mixer, with a 955-955 oscillator-multiplier giving injection at 410 mc, the mixer being coupled directly into an S.640 tuning 22-28 mc. A lot of this receiver is built round the ASB8, a lovely piece of "UHF surplus" once available at a give-away price. His transmitter is essentially the 2-metre 829B PA driving a CV127 as a power tripler, taking 50w. input on phone and 60 watts on CW. The G3HAZ beam is a 4-over-4 Yagi at a mean height of 27 feet.

G3IRA (Swindon) is working locals on 70 cm with simple CC equipment, using a 4-element array with a wire-netting reflector.

G3FZL (Dulwich, S.E.22) had an extraordinary experience when testing 430 mc on March 2—G3BKQ, who was very strong in London, could not hear him, but G5GX (Hull, 170 miles) was getting G3FZL at RST-579! Stations worked by G3FZL at interesting distances include G2XV (Cambridge), G5BY (215 miles), G6CW (Nottingham) and GW2ADZ. The 70 cm receiver at G3FZL consists of RF CV88 into CV102 mixer, with CC first oscillator giving 400 mc injection, the IF being tunable 32-38 mc, followed by an IF/AF strip. The transmitter is a 3B401J run as a power doubler at 36w. input and about 30% efficiency, and the beam a 12-element stack.

G2WJ (Great Canfield, Essex) is an old hand at this 430 mc

The smile of Guy of ON4BZ, Brussels, who has given so many VHF G's their first taste of Continental DX on Two Metres. He can be relied upon to be there whenever conditions serve—and he always QSL's.

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, G5DS, G6LI, GW5MQ, ON4BZ (DL, EI, F, G, GC, GW, ON, OZ, PA, SM).
9	EI2W, G5BD, G6XM, G8IC.
8	G2AHP, G2XC, G3BK, G3EHY, G3GHI, G3GHO, G3VM, G5BY, G5MA, G5ML, G5UD, G8SB.

business—he also transmits TV, regularly at 1800 every Saturday on 436 mc! But on the evening of March 3, the subject was ON4UV, whose phone was R5, S9 + 30 and the loudest signal yet heard at G2WJ on the 430 mc band. The transmitter here is a 218 mc exciter into a CV53 coaxial line doubler, into a similar CV53 circuit as straight PA running 7w. input at about 40% efficiency; for phone working, both the doubler and the PA are modulated. The G2WJ receiver is a CC job with a crystal mixer in a coax line circuit, followed by a cascode head amplifier using 6AK5-6J4; injection is at 408 mc, and an AR88 tunes across 28 mc to cover the 70-centimetre band. This equipment is operated with a 16-element stacked array. With G2WJ, the good conditions persisted until March 6, when he worked ON4UV for another S9-both-ways phone QSO.

To summarise this fine batch of active 70 cm reports, we might add that fully equipped 430 mc stations are now known to be operating in 14 counties, as follows: Cambridge, Essex, Flintshire, Leicester, London, Middlesex, Montgomery, Nottingham, Oxford, Surrey, Sussex, Warwick, Wiltshire and Worcester. There may well be others that should be in this list — but, if so, it is because we have not yet had definite information about their representative 70 cm stations.

Elsewhere in this piece, among several other tables of various kinds, will also be found a First List of Active 70-Centimetre Stations. All operators not mentioned, and those for whom the details in the List are not complete, are asked to let us have the needed data in time for the next issue.

Some General Observations

Naturally, for this month's VHF report, your A.J.D. has been favoured with what for this time of year is an exceedingly heavy mail—in fact, the movements claimed for the Countries and Counties Tables total no less than 60. This is well up to the best of what we can expect during the height of the VHF season, and is in itself an indication of how con-

TWO-METRE ACTIVITY REPORT

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

G2CNT, Cambridge Airport.
WORKED: G2ANT, 2AVR, 2FTS, 2MV, 3DIV, 3DJX, 3FEX, 3GBO, 3GIT, 3GJZ, 3GSE, 3HXO, 3IIT, 4MW, 5IG, 6PG.
HEARD: G2AOK, 2HCG, 2YB, 3FAN, 3IAI, 5ML, 5YV, 6CW, 6RH, 6YP.

G2FJR, Sutton Bridge, Lincs.
WORKED: DL3FM, 3VJ/P, G2BUJ, 2BVW, 2DKH, 2DRA, 2FCL, 2FNW, 2FQP, 2HOP, 2HQ/P, 2UN, 2UQ, 3ABA, 3AUS, 3AVO, 3BK, 3CCH, 3EEL, 3EHY, 3FIH, 3FUL, 3HTY, 3HVO, 3HWJ, 3GMW, 3IIT, 3IOE, 3IOO, 3ITI, 5HB, 5ML, 5UF, 5UM, 5YV, 6CW, 6LL, 6NF, 6TA, 6XX, 8DM, 8IL, 8SC, 8SY, GW2ADZ, ON4BZ, 4HC, 4HN, 4WW, OZ2FR, PAØFP, ØHAK, ØNL, PEIPL.
HEARD: G2MV, 3FZL, 3GJZ, 4OT, PAØAB, ØALO, ØFC. (*February* 15 *to March* 8).

GC3EBK, Guernsey, Channel Isles.
WORKED: G2AHP, 2AIW, 2AOK/A, 2BVW, 2DDD, 2DSW, 2FTS, 2HCG, 2HDZ, 2HIF, 2MV, 2UN, 2XV, 2YB, 2ZU 3ABA, 3ABH, 3AGA, 3APY, 3ARL, 3AUS, 3AVM, 3BEX, 3BHS, 3BLP, 3BVU, 3CCH, 3CGE, 3CXD, 3DIV, 3DKZ, 3EHY, 3ESY, 3FAN, 3FIH, 3FTI, 3FMO, 3GBO, 3GDR, 3GHO, 3GOP, 3GSE, 3HAZ, 3HBW, 3HXJ, 3ION, 3JM, 3MA, 3WW, 3YH, 4CI, 4GR, 4MW, 4SA, 5BM, 5DS, 5HB, 5HN, 5LK, 5MA, 5ML, 5MR, 5NF, 5RW, 5UF, 5YV, 6CI, 6CW, 6XX, 6YU, 8DM, 8DV/A, 8IL, 8KL, 8MW, 8OO, ON4BZ, OZ2FR.
HEARD: G2AVR, 2HDZ, 2NM, 3FAX, 8SY. (*All during March* 1 *to* 7).

G3MY/P, Nr. Sheffield.
WORKED: DL1CK, 3FM, 3VJ/P, 7FS, 9LU, G2AHP, 2AJ, 2AOK/A, 2DTO, 2FCL, 2FFG, 2HQ, 2MV, 2NM, 2YB, 3ABA, 3AUS, 3BHS, 3BVU, 3FAN, 3GOP, 3IOO, 3IRA, 3MA, 3NL, 3WW, 4DC, 4SA, 5AM, 5BM, 5LK, 5RW, 5UM, 5YV, 6PG, 6PJ, 6XX, GW3FYR, ON4BZ, 4HC, 4HN, PAØFB, ØFP, ØIKS, ØOP, SM6ANR, 6QP.
HEARD: F8JR, OKIAA, OZ2FR, SM7BE. (*January* 25 *to March* 8).

G4SA, Drayton, Berks.
WORKED: F3JN, G2BMZ, 2BVW, 2CYN, 2FJR, 2HCG, 2HIF, 2HOP, 2UJ, 2YB, 3AVO, 3BHS, 3BK, 3BVU, 3CCH, 3CNY, 3DA, 3DKZ, 3EOH, 3FAN, 3FEX, 3FQS, 3FUM, 3GJZ, 3GHI, 3GOP, 3GUU, 3HAK, 3HCU, 3HVO, 3HZF, 3IAI, 3IOO, 3IRA, 3MY/P, 3NL, 4AP, 5HB, 5MA, 5ML, 5NF, 5RZ, 5SK, 5TP, 6YP, 8IL, 8PX, 8SC, GC3EBK, ON4BZ, 4HC, 4PJ, PAØFP.
HEARD: DL3FM, F8HL, 8JR, OZ2FR, PAØLDG, SM7BE.

G2BRR, South Woodford, Essex.
WORKED: F8DB, 8JR, G2ANT, 2DDD, 2DGW, 2DUV, 2FTS, 2HCG, 2UJ, 2YB, 3ANB, 3CNF, 3DVQ, 3EYV, 3FAN, 3GBO, 3GSE, 3HSC, 3IEI, 3ISA, 3JMA, 3WW, 4HQ, 5DT, 5MR, 6PG, 6QN, 6SG, 6TA, 6YP, 8HY, 8LN, ON4UV.
HEARD: DL3FM, F8GH, 2AHP, 2ATK, 2BTY, 2CYN, 2DSW, 2FZU, 3ABA, 3AEA, 3AUS, 3BKQ, 3BLP, 3BVU, 3BZG, 3CQC, 3CFK, 3CGQ, 3DA, 3DJX, 3DLU, 3EHY, 3ENI, 3EOH, 3FEX, 3FHS, 3GDR, 3GHI, 3GHO, 3HBW, 3HWJ, 3IAI, 3IEX, 3ION, 3SM, 4MW, 4OT, 4SA, 5BC, 5DF, 5DS, 5LK, 5MA, 5NF, 5UF, 5UM, 5YV, 6CW, 6LR, 6NU, 8DV/A, 8IL, 8KL, 8WW, ON4BZ, 4CH, 4WW, PAØFC, ØJOB, ØNL, SM5MQ, 7BE. (*All February* 1 *to March* 11).

G3HCU, Chiddingfold, Surrey.
WORKED: F3JN, 3XY, 8BY, 8GH, G2ANT, 2BTY, 2CYN, 3DSP, 2FCL, 2FFG, 2FZU, 2NM, 2UN, 3AKZ, 3APY, 3BKQ, 3CXD, 3DO, 3FEX, 3GHO, 3GJZ, 3GVL, 3HAK, 3NL, 3WW, 3ZI, 4AP, 4SA, 5BC, 5BM, 5FF, 5RO, 5YV, 6CW, 8DM, 8SY, ON4HN, 4PJ, 4XB, OZ5HV, PAØFB, ØFC, ØLDG, PEIPL, SM7BE. (*All month to March* 11).

ON4XB, Louvain, Nr. Brussels.
WORKED: DL3FM, 3VJ/P, 9MK, F3JN, 3CA, 8DB, 8GH, 8NH, 9LD, 9MX, G2BCB, 2DSW, 2FTS, 3AGA, 3APY, 3CGQ, 3HAZ, 3HCU, 3HOP, 3IOO, 3WW, 5NF, 5YV, 6CW, 6RH, 8SY, ON4BZ, 4CP, 4HC, 4HN, 4IW, 4LN, 4PJ, 4UD, 4UV, 4ZR, 4FJ, PAØBAL, ØBL, ØFB, ØFP, ØHAK, ØNEL, ØNL, ØROB, ØWI, PEIPL.
HEARD: DL6DV, 6GS, F8KF, 8NW, 8UK, 9DI, G2FCL, 3ABO, 3BKQ, 3DIV, 3DKZ, 3FRH, 3GHI, 3GSE, 3IAI, 4MW, 5ML, 6PJ, OZ2FR, 5HV, PAØBN, ØFC, SM6QP, 7BE. (*All March* 1 *to* 6 *only*).

G3IWJ, Liverpool, 8.
WORKED: G2CYN, 2FCV, 3BKQ, 3BLP, 3BPJ, 3CCH, 3DA, 3EPW, 3FMI, 3GMX, 3HII, 5BM, 5DS, 5YV, 6TA, 8TR, GW3GWA.
HEARD: EI2B, G2AJ, 2AOK/A, 2BNZ, 2CBR, 2HDZ, 2HGR, 3EHY, 3FAN, 3GDR, 3GHI, 3GOP, 3HPY, 3IOO, 5MA, 5ML, 5QI, 6CI, 6YP, 8DV/A, 8OU, GI3BIL, GW3ENY, 3FYR, 5MQ. (*March* 1 *to* 10).

G3DLU, Weston-Super-Mare, Somerset.
WORKED: G3AUS, 3FAN, 3FUM, 3GHI, 3GOP, 3HSD, 3HVO, 3IEI, 3YH, 4DC, 5DS, 5ML.
HEARD: G2HIF, 3CGE, 3DJX, 3FIH, 3FMO, 3GHO, 4GR, 5BM, 8IL, 8OU. (*February* 13 *to* 26).

G2HDZ, Pinner, Middlesex. NGR. 51/126886.
WORKED: F3JN, G2ANT, 2BTY, 2BUJ, 2CYN, 2DDD, 2DKH/P, 2FO, 2FTS, 2HOP, 2UN, 3BKQ, 3CNY, 3DA, 3ENI, 3FAN, 3GHO, 3HAZ, 3HTY, 3MI, 3WW, 4DC, 4GT, 4HQ, 5BC, 5DS, 5LJ, 5ML, 6LR, 6XM, 8DV/A, 8KL, 8OU, GC3EBK, GW2ADZ, 3FYR, 8SU, ON4BZ. (*February* 9 *to March* 10).

G3YH, Bristol.
WORKED: G2AJ, 2YB, G3ABA, 3APY, 3BVU, 3DJX, 3DLU, 3EHY, 3FIH, 3FRY, 3GBO, 3GHO, 3GOP, 3HSD, 3IER, 3IOO, 3IRA, 3WW, 4MW, 5BM, 5JU, 5ML, 6CW, 8IL, 8MW, GC3EBK.
HEARD: G2AOK/A, 2BMZ, 2BUJ, 2FFG, 2FJR, 2FTS, 2FZU, 2HCG, 2WJ, 2XV, 3BLP, 3BK, 3BKQ, 3CFK, 3CGE, 3DKZ, 3FAN, 3FMO, 3GJZ, 3HBW, 3HXO, 3IAI, 3IEI, 3IFV, 3ION, 3MA, 3MY/P, 4AP, 4CI, 4GR, 4SA, 5MR, 5RW, 5RZ, 6CI, 6FO, 6YU, 8DM, 8DV/A, 8OU, 8PX, 8SY, ON4BZ, PAØNL. (*February* 11 *to March* 11).

G3DO, Sutton Coldfield, Warwicks.
WORKED: G2BUJ, 2COP, 2DSW, 2DTO, 2FFG, 2FTS, 2FXK, 3AVO, 3BKQ, 3BLP, 3CGQ, 3DKZ, 3DNP, 3EHY, 3ELT, 3EUP, 3FSD, 3FXR, 3GBO, 3GJZ, 3GSE, 3HAZ, 3HCU, 3IAI, 3IOO, 3MA, 3WW, 5HN, 5LJ, 5LK, 5ML, 6CI, 6TA, 8DV/A, 8IL, GW2ADZ, ON4BZ. (*February* 1 *to March* 5).

G3GHO, Roade, Northants.
WORKED: G2AIW, 2ASF/A, 2ATK, 2COP, 2DKH/P, 2FCL, 2FFG, 2HCG, 2HDZ, 2HOP, 2HQ/P, 2NM, 2UQ, 2YB, 3ANB, 3ASC, 3AUS, 3BHS, 3BKQ, 3BNC, 3BVU, 3CNY, 3CXD, 3DMK, 3EOH, 3FAN, 3FMO, 3FMI, 3GBO, 3GHU, 3GVL, 3GWB, 3HCU, 3HSD, 3HVO, 3HWF, 3HWJ, 3HZF, 3HZK, 3IAI, 3IEI, 3IIT, 3NL, 3YH, 3ZI, 5AM, 5ML, 5NV, 6CW, 6NF, 6PJ, 6TA, 8SC, 8VZ, GC3EBK, GI3BIL, GW3FYR, 2ADZ, ON4BZ, 4HC, PAØNL.

HEARD: DL3FM, 3VJ/P, F8GH, G2AHP, 2ANT, 2AVR, 2BMZ, 2DRA, 2FD, 2FTS, 2HIF, 2MV, 2PU, 2UN, 2WJ, 2XV, 3ABA, 3BK, 3BLP, 3CGQ, 3DJX, 3EHY, 3FIH, 3FUL, 3FUM, 3GHI, 3GZM, 3HAZ, 3HBW, 3HSC, 3IOO, 3IUK, 3MI, 3MY/P, 3WW, 4DC, 4MW, 4SA, 4UA, 5BC, 5NF, 5MR, 5RW, 5RZ, 6FO, 6PG, 6RH, 6XX, 6YU, 8DV/A, 8IL, 8MW, 8OU, GI3FJX, ON4HN, 4UV, OZ2FR, PAØDLK, ØFB, ØFC, ØFP, ØHAK, ØLDG, ØNL, SM7BE. (*February* 17 *to March* 8).

G3HBW, Wembley, Middx.
WORKED: F3CJ, G2AOK/A, 2BMZ, 2BVW, 3GVL, 5RW, GC3EBK, ON4HN, PAØFB, ØNL.
HEARD: DL3FM, F8AA, 8GH, 8JR, 8NW, G2CYN, 2DDD, 2DSW, 2FCL, 2FNW, 2FTS, 2FZU, 2HCG, 2HOP, 2XV, 3ABA, 3ANB, 3APY, 3AUS, 3BEX, 3BHS, 3BK, 3BKQ, 3BVU, 3CCH, 3CFK, 3DIV, 3DKZ, 3EDD, 3EHY, 3FAN, 3FEX, 3FIH, 3GGL, 3GOP, 3HAZ, 3HVO, 3IOO, 3IRA, 3ITI, 3IUK, 3MY/P, 3NL, 3WW, 4AP, 4GR, 5RO, 5UF, 5YV, 6CI, 6CW, 8DM, 8IL, 8KL, GW2ADZ, ON4BZ, 4HC, 4LN, 4UV, PAØFC, ØRK. (*March* 1 *to March* 6, *all over* 50 *miles*).

G5RZ, Leighton Buzzard, Beds.
WORKED: G2DDD, 2DTO, 2FFG, 2MV, 2NM, 2YB, 3CGQ, 3DJX, 3GBO, 3GHO, 3HVO, 3HXO, 4DC, 4SA, 5DS, 5NF, 6FO, 6PG, 6TA, 6XH, ON4BZ.
HEARD: G2BVW, 2DSW, 2FTS, 2HCD, 2HCG, 2XV, 3ABA, 3BHS, 3BK, 3BKQ, 3BLP, 3BUJ, 3BVU, 3EHY, 3EVY, 3FAN, 3FQS, 3GHI, 3GSE, 3HAZ, 3HWJ, 3IIT, 3IMI, 3ISA, 3MI, 3NL, 3WW, 4AP, 4AU, 5ML, 5MR, 5RW, 6CW, 6NF, 6RH, 8DM, 8DV/A, 8KF, 8OU, 8SY. (*February* 15 *to March* 4).

G3IRA, Swindon, Wilts.
WORKED: G2HCG, 2YB, 3BLP, 3BVU, 3DKZ, 3EDD, 3FIH, 3GWB, 3HWF, 3IEI, 3MY/P, 3WW, 3YH, 4AP, 4SA, 5MR, 6CI, 8DM, 8IL, 8PX.
HEARD: ON4BZ, 4UV, PAØFP, SM7BE. (*March* 1 *to* 5)

G3FIH, Radstock, Somerset.
WORKED: F8JR, G2BMZ, 2FJR, 2FNW, 2MR, 3AUS, 3BK, 3BVU, 3CQC, 3DJX, 3EHY, 3FKO, 3FMO, 3FZL, 3GHO, 3HWF, 3IER, 3ION, 3IRA, 3YH, 5BC, 8DV/A, GC3EBK, GW8SU, ON4BZ.
HEARD: G2DSW, 2FTS, 2MV, 3AGA, 3BHS, 3BLP, 3DLU, 3FAN, 3GBO, 3GHI, 3GJZ, 3GOP, 3HSD, 3WW, 4AP, 4DC, 4SA, 4MW, 5HB, 5RW, 8DM, 8MW, 8OO, 8OU, 8SY. (*February* 12 *to March* 12).

G3GSE, Kingsbury, Middx.
WORKED: DL3FM, 3VJ/P, F8GH, 8JR, G2AOK/A, 2BVW, 2CNT, 2DSP, 2FTS, 2FZU, 2NL, 2WA, 3APY, 3BHS, 3BKQ, 3CGQ, 3DIV, 3DO, 3GEG, 3IOO, 4OT, 5TP, GC3EBK, GW2ADZ, ON4BZ, 4HC, 4HN, 4UV, PAØFP, ØJOB, ØNAI.
HEARD: G2BTY, 2DDD, 3AUS, 3DA, 3DJZ, 3EBH, 3GJZ, 3HAZ, 3HIF, 5HB, 5RW, OZ2FR, PEIPL, SM7BE. (*All March* 1 *to* 11).

70-CENTIMETRE BAND ONLY

G3BKQ, Blaby, Leics.
WORKED: G2FKZ (95), 2FNW (17), 2WJ (80), 3ABA (17), 3FZL (95), 3GZM (70), 3HAZ (40), 3HTY (50), 5DT (100), 6CW (24), 6NF (100), 6YU (17), GW2ADZ (85), 5MQ (95), ON4UV (250+). (*All between February* 15 *-March* 9. *Approximate distances in brackets. Represents* 10 *Counties and* 3 *Countries*).

G3GSE, Kingsbury, Middx.
HEARD: G2DD, 2FKZ, 2MV, 3FP, 5DT. (*February* 20 *to March* 11).

ditions have been, with activity in corresponding volume.

All movements reported up to March 14 have been entered in the Tables herewith—we do hope that the claims of everybody have been met. If anyone is misplaced, put it down to A.J.D. having had to apply himself to the task on a sunny Sunday afternoon, when the larks sang in the field across the lane.

During the great break on Two reported above, it was observable that a number of stations moved out of their Zone areas, partly perhaps to make themselves more prominent at the LF end and partly to avoid QRM'ing those Europeans who were operating well up in the band. It is under the sort of conditions we experienced during this opening that the Zone Plan tends to be less effective. It *is* essential to avoid interfering with the European DX, and it is true that the EDX nearly always searches QLM. This obviously makes things difficult, if not exasperating, for those who are zoned above about 145 mc, and is a fact that must be recognised.

In our view, however, there is nothing much that can be done about it. Something like 80% of all VHF operators adhere to the Zone Plan for normal working, but it must be expected that, under unusual conditions, the rules may be broken. More than a few of the two-metre men found that their receiver selectivity (due to broad band RF stages and over-coupled circuits) was far below that necessary to cope with the QRM conditions at the height of the party, and this may have been inspired (as it excuses) some frequency shifting.

But the fact still remains that, in the general interest, *all* operators should endeavour to keep within their Zone areas at all times. The over-all effect is always to minimise interference for the majority, even if one or two stations do get heavily jammed. This is, in any case, usually avoidable by a shift of a few kc within the Zone, and if at all possible it is a good thing to have one or two additional crystals available for any necessary movement *within the Zone*.

The few European DX stations still unaware of the British VHF Zone Plan will soon get to know that there are workable G's through the whole band. Any tendency to crowd to the LF end will certainly lead to chaos, with much more QRM for everybody, less chance of working the DX, and a lot of unnecessary ill-feeling. Remember, there are a great many keen VHF operators who scrupulously observe the Zone Plan with only one crystal, and it is most unfair and unreasonable to spoil the band for them when we get one of these big openings.

For the information of all interested—and especially those who are just coming on—the Zone Plan is given in detail once again in the panel herewith.

Bouncing Off The Moon

Those who may have seen the March issues of our American contemporaries, *CQ* and *QST*, will know that they high-light the interesting results reported by W3GKP, W3LZD and W4AO in getting reflections from the moon in the two-metre band. On January 27 last, some very positive blips were recorded from the one-second CW pulses radiated by W4AO's 1-kw transmitter.

Fortunately, the operators responsible for this test—which is the reward of some three years of hard and unremitting toil—themselves agree that the result, as a result, is not new and does not in itself mean a great deal. This is not in any way to play down their effort, which is certainly a step forward in the amateur field. But they would certainly agree that at this stage it amounts to no more than QRP radar — and radar echoes were first obtained from the moon as long ago as 1946, and at intervals since. The subject has several times been discussed in the American *Proc. I.R.E.* during the last few years. It has been shown that (*a*) Comparatively high power is necessary, to overcome normal attenuation effects over a half-million mile circuit and the fact that the surface of the moon is a poor reflector, and (*b*) There would be a high degree of scatter due to the broken nature of the moon's surface. In other words, the thing is not at all easy.

Nevertheless, there are obvious possibilities along the lines of the W4AO/W3GKP experiment, and as they themselves have said, "Phase B will be to transmit intelligence to another station. Phase C will be to work somebody, two-way . . . . After three years, we are just getting started."

Two-Metre Station Reports

G5YV (Leeds) was, of course,

well in on the EDX—he had a total of 50 European QSO's, with 6 countries, as well as EI6A and GC3EBK. Over the period March 2-4, *lunch-time* sessions produced EI6A, F3XY, ON4HC, ON4XB, PAØFB and PE1PL. Best DX was DL7FS, and many G's were also worked previously not even heard at G5YV.

G3IOE up in Newcastle was evidently never properly under the refracting umbrella, though he did hear OZ2FR at good strength, and made several new GDX QSO's; the best night was March 5, when G3FAN was S7 on phone and G3WW a strong signal, but unworkable. Yet G5NF (Farnham) was raised from G3IOE at about the same time.

G3IOO (Oswestry) rolled in 13 different Europeans in five countries, and heard DL7FS, F9DI and GC3EBK. From Liverpool, G3IWJ reports himself as having made a start. G3MY/P has been putting in a lot of time at the portable site; he goes /P every Sunday morning from 1100 to 1400 and can be found on 144.40 mc. He may give either Yorkshire or Derbyshire, depending upon which of two possible /P sites is used. G2HQ/P joins in on this, and both have by now been heard over a wide area of the South. On March 1 and 2, G3MY was out both evenings, knocking off Europeans on a band "just like Forty on a Sunday morning"—the XYL was hard put to it to keep up the log, and the results of their efforts can be seen in the Activity Report. As an aside, it might be mentioned that G3MY/XYL assembled the beam by moonlight, and the car battery got so low that he had to run the engine every time they radiated, which was pretty often! Good show.

G2FCL (Shipley, Yorks.) using only a 3-element *indoor* beam, knocked off 14 Europeans in four countries (including five DL's) during March 1-5, and also scored heavily with the GDX. A lot of new construction is in hand here, including a 150w. transmitter, CC converter and 12-element stack with low-impedance feed having a matching unit up in the eye of the array. *That's* the way to do it.

Some Midland Reports

Freddy of G5ML (Coventry), with his inner marker SWL Bastin, was right in amongst the EDX and GDX for the whole period, producing a large addition to the G5ML totals. Seven Europeans were worked, and OZ2FR and SM7BE heard—they could not be called on phone because of a temporary modulation mis-fire. In four days, no less than 41 new G stations were worked, including GC3EBK, with the 5th as the best evening, when G's along the South Coast were being raised at the rate of one every three minutes. And if you hear G5ML/P early in May, he will be in Worcestershire.

Still Flying the Jolly Roger 6 ft. b.s.l., G2FJR (Sutton Bridge) found things best for the Continent on March 2, and for GDX in Southern England on March 3 and 4; ON4BZ was heard, PE1PL worked at mid-day on the 2nd—but SM7BE could not be found at all, even when he was being given S9 by other stations. GDX to the North for G2FJR included G2DKH and G3IOE, Durham and Northumberland respectively, with several new stations and counties in other directions.

G3BT (Derby) was listening to much of the goings-on with a new converter and he hopes to be radiating soon; from the same neighbourhood, G3GVL reports himself in—he started on September 7, then was off for nearly three months, but got on again in time to work four Europeans and increase his score to 17C.

G3ABA (Coventry) managed GC3EBK, GI3BIL and SM7BE for new countries during March 1-5, and also progressed with counties. G3DO, of Sutton Coldfield, one of the well-known DX men from the HF communication bands also to be active on VHF, puts in claims for both Tables. Brian of G6CI says that the ethereal iron curtain which formerly hung between Kenilworth and all EDX stations has at last been penetrated, and also mentions GC3EBK and GI3BIL as interesting QSO's for him. G6YU (Coventry) only had short spells on the air during the period of good conditions, but nevertheless scored with DL3FM and GC3EBK, with some new counties as well.

G3GHO of Roade, Northants. (or "Daddy Mac," as we must call him now) says about the opening what so many others must have been thinking: "It was really terrific while it lasted, but very hectic—imagine a contest with conditions like that!" G3GHO kept hard at it the whole time and was well rewarded; his calls h/w offering in the Activity Report is an excellent and a very complete list of all that was available on Two in the South Midlands area. It will interest G3IOE to know that G3GHO is spending a lot of time trying to trace his signal.

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER, 1, 1952
Starting Figure, 14

Worked	Station
43	G3WW
40	G5YV
39	G3GHO
38	G2HDZ, G5DS
37	G2AHP
36	G4SA
35	G3IOO
32	G3HWJ, G5ML, G8IL
29	G2FJR, G6TA
28	G2HOP, G3FAN, G3HBW
25	G3HXO, G6YU
24	G3HCU, G5BM
23	G3DO
22	GC3EBK
21	G4RO,
18	G3YH, G5MR, G8DA
17	G2FCL, G3GJZ, G3GVL, G6CI
14	G2BRR, G3IRA

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.

West and South

G3YH (Bristol), on schedule with G5ML at 1830, now works G3GHO (Roade) at 1930 daily except Wednesday and Saturday, and G3GBO (Denham) every morning at 0715 except at week-ends, when presumably they both want to lie in! But G3YH is on nearly every day at 0645-0745. The good spell brought him new counties, and GC3EBK. G3DLU (Weston-s-Mare) missed out altogether over March 1-6, and must be gnashing his teeth—he started a rebuild on February 26! Bad luck. Not far away in Radstock, G3FIH was active over the hot period, and on March 2 worked four countries in 2½ hours, with ON4BZ and F8JR as best DX.

G5BM (Cheltenham) makes a welcome return to these pages, and brings his scores up-to-date. G4AP (Swindon), already mentioned in the 70-centimetre section of these notes, was also hitting hard on Two, with five Continentals worked and OZ2FR as best DX. G3IRA, of the same town, was ready for "the peak of conditions," and worked 8 new counties to bring him into the Annual Table.

From the Channel Islands, GC2CNC now writes that he is giving up radio altogether for an indefinite period, but that Jersey "may be represented on Two by GC2FMV." So that's that. But how well GC3EBK is batting for Guernsey as the only really active Channel Islands station—and what a lucky break it was for him, and us! For those who may want GC3EBK, his frequency is 145.35 mc, and he is on every evening 1900-1930, and for the Thursday sessions. The Tx is an SCR-522 with 12w., the receiver a G2IQ converter into an SX-23, and the aerial a 3-element Yagi fixed to fire into the North-East. GC3EBK wants to thank G3WW and G5YV for letting him know where to look for OZ2FR, and also that the latter was receiving him. In that short spell while the going was so good, GC3EBK worked a total of 79 different DX stations—what an experience!

G8IL (Salisbury) ran up a total of 22 new stations during the "super spell," including six Continentals, but could not find DL, OZ or SM. GC3EBK is logged as a new local—he is S9 + at 110 miles. In the other direction, G8IL maintains a regular schedule with G3ANB (Brightlingsea). G2HIF (Wantage) had his share in the activity, and two new countries in the bag.

G3FEX (Bramber, Nr. Steyning) is back again in regular operation on 144.89 mc, and would be pleased to have some of the QSL's owed him from 18 months ago! From Vernon at G5MR we were particularly glad to hear that the conditions gave him a break, too, as he is very badly sited for working North; anyway, the good spell yielded four new counties as well as European contacts.

Eastwards

G3GJZ (Newmarket) gained 10 new counties and two countries and enters the Tables; G2CNT reports active from near Cambridge Airport—or "Marshall's Air Force," as it used to be called in our *ab initio* days.

G3WW (Wimblington) naturally put in every moment he could, and in spite of some power pack trouble, got in amongst the Continentals in great style, emerging with two new countries (GC and SM) and a fine list of DX worked on 144.83 mc, where he is regularly to be found irrespective of conditions.

The Belgian Stations

On this occasion, we have had reports direct from ON4BZ

TWO-METRE PROGRESS

British Records

		Miles
Sept. 1, 1948	G2BMZ-G6LK	140
Sept. 5, 1948	G2AJ-G5MQ	164
Sept. 14, 1948	G5BY-G5MQ	220
Sept. 14, 1948	G3APY-G5BY	227
Sept. 17, 1948	G5BY-G6OS	287
Nov. 12, 1948	G5BY-PAØZQ	380
Jan. 1, 1949	G2BMZ-PAØEO	384
May 13, 1950	GW2ADZ-PAØHA	417
June 28, 1950	G5BY-DL3FM	470
Sept. 13, 1950	G2BMZ-DL4XS/3KE	520
June 1, 1951	G5YV-SM7BE	602
Oct. 9, 1951	G5YV-F9MG	620
March 2, 1953	GC3EBK-OZ2FR	647

TWO METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14
From Fixed QTH Only

Worked	Station
60	G3BW
59	G3BLP (620)
57	G2OI (349)
56	G3EHY (365), G8SB
55	G5YV, GW5MQ
54	G6NB
53	G2AJ (519)
52	G3WW
51	G2HIF (200), G4CI
50	G2HDZ (361), G3ABA
49	G4SA, G5DS (439)
47	G2NH, G5MA, G5WP
46	G4HT (476), G5BM, G5BY
45	EI2W (132) G2XC, G3FAN (315), G6XM (356)
44	G3HAZ (194)
43	G3BK, G3COJ, G5DF
42	G3GHO (214), G5BD
41	G2FQP, G3BA, G3DMU
40	G3CGQ, G4RO (256), G5JU, G5ML (182), G8KL, G8OU
39	G2IQ, G3VM, G8IL (325)
38	G2FJR, G3APY, G3HBW, G6CI
37	G2AHP (350), G2FNW, G3GSE (383), G3HBW
36	G3CXD, G6CB (312), G8IP
35	G2FZU (118), G3FZL, G3HCU (202), G6TA
34	G2FCL (146)
32	G2FVD, G3HWJ, G8IC, G8QY
31	G3HXQ, G5RP
30	G2HOP, G3BKQ, G5NF
29	G3AGS, G3AKU, G3BJQ
28	G3FIJ (143), GM3BDA, G8VR
27	G3BNC, G3DAH, G3FIH, G6GR
26	G3CFR (125), G3GBO (289), G4MR (189), G5MR (144)
25	G5SK
24	G3DO, G3FD, G3FXG
23	G3CWW (260), G4LX, G5PY, G6PJ
22	G3AEP, G3ASG (150) G3BPM, G3FRY, G3GOP (122), G3HII, GM3EGW
21	G6XY
20	G3EYV
19	G3DLU, G3FEX (118), G3SM, G5LQ (176)
18	GM3DIQ
16	G2AOL, G3FRE, G3YH, GC2CNC
15	G2DVD, G3IWA
14	G2DHV, G3GYY, G3ISA

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.

(Brussels), ON4XB (Louvain) and ON4UV, already covered in the 70-centimetre section. Guy ON4BZ amassed *une totale formidable* of no less than 118 different DX stations worked in the five days, and enters our Countries Table for the first time—nice work, OM!

ON4XB says he has long been a follower of this piece, but writes in for the first time to send his Activity Report. He heard both SM6QP and SM7BE, but was not lucky with either, working only OZ2FR in that direction; his best GDX was G3AGA (Falmouth), who always seems to do well when conditions are right. The transmitter at ON4XB runs a QQE-06/40 in the PA at 70w. input, into a 4-element beam at an effective height of 240-ft. a.s.l. His receiver is on the lines of the ON4BZ converter described in this issue, and he also has separate QRP miniaturised equipment for Two, using three ECC81's in the Tx, intended for fixed or /P work from AC mains or a 6-12 volt DC supply. ON4XB says that over there they are very interested in our Thursday VHF Session, and also run a similar party of their own on Wednesdays and Fridays from 2000 GMT onwards.

SEVENTY-CENTIMETRE STATIONS
First List

CALL	LOCATION	FREQ. (mc)	EQUIPMENT
G2BVW	Leicester	?	Tripler, 5-ele Yagi, (? Rx)
G2CNT	Cambridge Airport	435·2	Tripler, CC Rx, 12-ele stack
G2FKZ	London	435·95	*no details*
G2FNW	Melton Mowbray	?	Tripler, 5-ele Yagi (? Rx)
G2WJ	Great Canfield, Essex	436·00	Straight PA, CC Rx, 16-ele stack
G2XV	Cambridge	435·24	*no details*
G3ABA	Coventry	?	Tripler, 16-ele stack (? Rx)
G3FFC	Leicester	?	Tripler, 16-ele stack (? Rx)
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)
G3IRA	Swindon, Wilts.	?	Tripler, SEO Rx, 4-ele Yagi
G4AP	Swindon, Wilts.	435·60	Tripler, CC Rx, 3 st'kd D'ples
G5DT	Purley, Surrey	?	*no details*
G6CW	Nottingham	?	*no details*
G6NF	Shirley, Surrey	?	*no details*
G6YP	London, S.E.5.	435·75	*no details*
G6YU	Coventry	?	Tripler, CC Rx, 16-ele stack
G8QY	Birmingham	?	Tripler, 24-ele stack (? Rx)
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 first 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.

London and Home Counties

Many stations report. G3HBW (Wembley) found that practically all signals up to about 300 miles distant were in the S9 region, and on March 3 ON4BZ was as loud as some locals at 5 miles—but SM7BE could not be heard.

Johnnie G3BLP (Selsdon) thinks that any theory that "Two metres goes dead in the winter" has been finally disproved; as he has found things, the band has been almost continuously open since the beginning of January, except for about 10 days. Already standing high in the Tables, G3BLP nevertheless managed to find another county (GC3EBK) and a new country (SM7BE), with a stations-worked total now of well over 600. G3GSE (Kingsbury, Middlesex) worked stations in his "shadow area" never previously heard, and 12 Continentals as well.

G6TA (London, S.W.12) goes up nicely in the Tables—and so does G2HDZ (Pinner), though he feels his own experiences during the opening to have been "somewhat disappointing"; he was unable to hear some of the DX being worked by his neighbours. G3HCU (Chiddingfold) writes to adjust his scores, and Bob of G5MA (Ashtead) was very glad to raise the two Durham stations.

G2FO and G2DKH/P. for the first time for that county. G3SM (North Harrow) reports himself as "still active" and heard a lot of the European DX, with GC3EBK worked. G2BRR (South Woodford) puts in a useful calls heard/worked list and hopes very shortly to be applying for VHFCC. G3JMA (Harlow, Essex), not far away, must surely be the newest-licensed station on the two-metre air.

G3HWJ (Surbiton) was a happy chap during the opening, rolling in DL, ON and PA for new countries, and adding largely to the Counties scores. He and G5DS worked hard on SM7BE, but neither had any luck. G3HWJ is rather shaken to find that even on direct QSL'ing his return is only 50%. G4SA (Drayton, Berks.) said he had a "really wonderful" time during the opening, and his calls h/w list is interesting. G5DS (Surbiton) goes up five in Annual Counties, and notes G2CYN for Cheshire and G3NL for Worcester.

TWO-METRE FIRSTS

G/DL	G3DIV/A-DL4XS/3KE	5/6/50
G/EI	G8SB-EI8G	23/4/51
G/F	G6DH-F8OL	10/11/48
G/GC	G8IL-GC2CNC	24/5/51
G/GD	G3GMX-GD3DA/P	29/7/51
G/GM	G3BW-GM3OL	13/2/49
G/GW	G5MQ-GW5UO	22/10/48
G/ON	G6DH-ON4FG	25/9/48
G/OZ	G3WW-OZ2FR	1/6/51
G/PA	G6DH-PAØPN	14/9/48
G/SM	G5YV-SM7BE	1/6/51
GC/EI	GC2CNC-EI2W	8/10/51
GC/ON	GC3EBK-ON4BZ	4/3/53
GC/OZ	GC3EBK-OZ2FR	2/3/53
GD/EI	GD3DA/P-EI2W	30/7/51
GD/GM	GD3DA/P-GM3DAP	29/7/51
GD/GW	GD3DA/P-GW5MQ	28/7/51
GI/EI	GI3GQB-EI2W	13/6/51
GI/GM	GI2FHN-GM3OL	1/7/49
GI/GW	GI2FHN-GW3ELM	8/7/49
GM/EI	GM3BDA-EI2W	12/6/51
GW/EI	GW2ADZ-EI8G	19/4/51
DL/OZ	DL6SW-OZ2FR	4/3/51
DL/SM	DL2DV-SM7BE	10/3/51
EI/ON	EI2W-ON4BZ	21/9/51
ON/OZ	ON4BZ-OZ2FR	3/6/51
ON/SM	ON4BZ-SM7BE	2/3/53

For Your Notebook

From Malta, it is reported that both ZB1AJ and ZB1BZ are now on Two, really active, and determined to work out of the Island during this season. Well, they have good stations to test with in Southern France and in Algeria, and are in the weather belt that produces quite frequently the sort of propagation conditions we have recently experienced in this country. At the moment of writing, we have no information as to frequencies, equipment or times of operation, but that is being asked for—in the meantime, if you hear ZB1 with your beam headed South, it will almost certainly be either 'AJ or 'BZ.

VHFCC Elections

New members of the VHF Century Club this month are: G5ML, Coventry, No. 141; and G3FSD, London, S.W.18, No. 142. The latter remarks that he has been working for nearly three years for his VHFCC, his first two-metre QSO having been with G2AHP on June 19, 1950.

Freddy Miles, G5ML, is, of course, one of the world's best-known OT's, with a long record of DX achievement in the pre-war years. (Our own earliest QSL card from him is dated 1926). It was not until after the war, and only comparatively recently, that station G5ML was put on the air on VHF, with the enthusiastic co-operation of SWL Bastin as a working partner—and we suspect that Ray does all the hard work, like putting up beams and building converters! Be that as it may, they are a most successful partnership.

VHF Wedding

It cannot often be that an active member of the VHF fraternity is married by a member of the VHF Century Club. But that is what happened in Glasgow on March 21, when GM3DIQ was the groom and GM3BDA the officiating minister. Our felicitations to all concerned, and good luck to GM3DIQ.

THE TWO-METRE ZONE PLAN

(This is reproduced here for the benefit of newcomers to the band).

***Zone A & B:* 144.0 to 144.2 mc.**	All Scotland.
***Zone C:* 144.2 to 144.4 mc.**	All England from Lancs. Yorks. northward.
***Zone D:* 145.8 to 146 mc.**	All Ireland.
***Zone E:* 144.4 to 144.65 mc.**	Cheshire, Derby, Notts., Lincs., Rutland, Leics., Warwick and Staffs.
***Zone F:* 145.65 to 145.8 mc.**	Flint, Denbigh, Shrops., Worcs., Hereford, Monmouth and West.
***Zone G:* 144.65 to 144.85 mc.**	Northants, Bucks., Herts., Beds., Hants., Cambs., Norfolk, Suffolk.
***Zone H:* 145.25 to 145.5 mc.**	Dorset, Wilts., Glos., Oxon., Berks., and Hants
***Zone I:* 145.5 to 145.65 mc.**	Cornwall, Devon, Somerset.
***Zone J:* 144.85 to 145.25 mc.**	London, Essex, Middlesex, Surrey, Kent, Sussex.

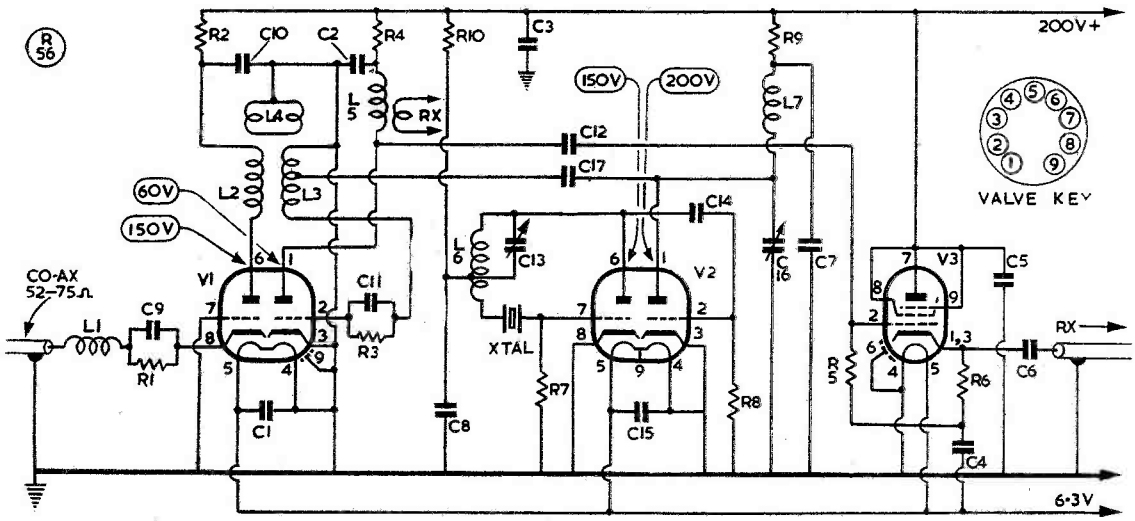
And Finally—

That brings us to the end of the longest winter-season VHF report ever published in *Short Wave Magazine*, which has taken your devoted but exhausted A.J.D. more than an hour or three to get sorted out and into print — all those Tables and calls lists! But that is how we like it, and a sure indication that this feature still sets the pace, gets the news, and produces the ideas for the VHF fraternity in this country, as it always has done.

Our next appearance is on May 8, for which the closing date will be **Friday, April 17, certain**—this month the calendar plays with us, and not against us, as it has done for the last two issues. Thank you again for your interest and co-operation, and a happy Easter.

THE PHYSICAL SOCIETY'S EXHIBITION

The 37th annual exhibition of the Physical Society will be held at the Imperial College of Science, South Kensington, during the period April 13-17, and is always of considerable interest in the fields of research and advanced electronics. The dates coincide with the R.E.C.M.F. show at Grosvenor House, London, W.1.



The ON4BZ VHF Converter

INTERESTING TWO-METRE DESIGN

A GOOD DEAL has been heard on the Continent of a particularly hot two-metre converter designed by ON4BZ, round a 6BQ7 in the RF-mixer stages. We are therefore glad to be able to give the circuit of this converter here, together with the necessary values.

It will be seen that one half of a 6BQ7 is used as a grounded-grid triode RF stage, with the second half of the same valve as mixer. A 12AT7 functions as oscillator-multiplier, with an additional stage (to the right of the line C7) as a cathode follower for proper matching into the main receiver. This stage performs no other function, and output could in fact be taken by link coupling to L5, as indicated.

The crystal in the first half of the 12AT7 is chosen to give (in this particular design) an injection frequency of 130 mc, so that the main receiver tunes 14-16 mc for coverage at signal frequency.

According to ON4BZ himself, this converter should give a noise factor of 3.3 dB only—or perhaps even a little less by using a 6J4 in the cathode follower position. He also says that if the 6BQ7 is not easy to come by, a 12AT7 can be substituted with only a slightly degraded performance in terms of noise factor. Fortunately, 12AT7's (by Brimar & Tungsram) are now readily available in this country and are proving excellent for all VHF converter and small-power driver stage applications.

When operated with a 200-volt HT supply, the voltage at the junction of C2, L5, R4 should be about 40v. with the oscillator "dead," *i.e.*, crystal pulled out, or no HT on the oscillator-multiplier section. When the oscillator is functioning, the voltage at this point should increase to an optimum of 60v., and the injection should be adjusted to get this. C17 must be a very small capacity, and is most easily arranged by the method of paralleling insulated wires. In the RF-mixer section, L2 and L3 can be spaced $\frac{3}{4}$ in., optimum coupling being obtained by adjustment of link L4.

We have no precise details of the form of construction adopted by ON4BZ, but this will in any case suggest itself to all who are experienced in the layout and building of VHF converters—obviously, the whole thing will go on a small box-chassis about 6 ins. x 4 ins., with screens between the oscillator-multiplier, RF-mixer and cathode follower sections. All other details are given in the Table of Values.

A. J. D.

Table of Values

Circuit of the ON4BZ VHF Converter

C1-C8	= .0015 μF, ceramic.	R1	= 200 ohms.
C9, C10	= 800 μμF.	R2	= 5,000 ohms, 2-w.
C11, C12	= 50 μμF.	R3	= 10 megohms.
C13	= Xtal trimmer, 50 μμF.	R4	= 150,000 ohms, ½-w
		R5	= 15,000 ohms.
C14	= 20 μμF.	R6	= 500 ohms.
C15	= .0015 μF, ceramic.	R7	= 5,000 ohms, ½-w.
C16	= Trimmer, 2-7 μμF.	R8	= 200,000 ohms.
C17	= About 4μμF. (*see* text)	R9	= 1,000 ohms.
		R10	= 5,000 ohms, 2-w.

Resistors rated ½-w. unless otherwise stated

V1 = 6BQ7 (12AT7). V2 = 12AT7. V3 = EF80 (6J4).

COIL TABLE

L1=7 turns 16g. SWG, ¼-in. diam., by ½-in. long, air spaced.
L2=7 turns 16g. SWG, ¼-in. diam., by 1-in. long, air spaced.
L3=5½ turns, as L2.
L4=2-turn link winding at earthy ends L3, L4.
L5=35 turns, slug tuned, to resonate at 14-16 mc IF.
L6=16 turns, slug tuned, tapped 3½ turns from earthy end, to tune crystal frequency.
L7=2½ turns 16g. SWG, ½-in. diam. by 1-in. long, air spaced.

Actual coil values depend upon valves used, layout and IF range selected.

Random Jottings by the Old Timer

ONE of my friends is a keen motorist who takes part in as many Trials and Rallies throughout the year as he can find time for—and that is usually quite a lot. He remarked to me the other day that we amateurs were a lucky crowd — we could pursue our hobby without continually wearing things out! For him, the equivalent of a week-end contest probably means at least half a set of tyres and a partial engine overhaul; for us, a slightly heavier electricity bill and perhaps a few condensers and resistors. On the other side of the picture, of course, one must remember that he has had an exhilarating week-end in the open air while we have been cooped up in a rather nerve-racking atmosphere of fug and tobacco smoke. Certainly, though, the contrast in expense is very striking, and this doesn't imply that Amateur Radio is a hobby for the poor and motor-rallying for the rich. I know several keen amateurs who are much better off than many of the fellows who run up large repair bills and huge insurance premiums on their cars for the sake of week-end hill-climbs and mud-wallows.

THE VOICE

How often, I wonder, has anyone been just right in building up a mental picture of a man simply from what they know of him over the air? Most of us find ourselves getting to know three or four operators particularly well, especially if we work a lot of semi-local phone on Eighty or the Top Band; but do we ever form the right idea of what they look like? I must admit to some rude shocks in my time. The chap with a deep booming voice, boisterous laugh and general air of hail-fellow-well-met has turned out, before now, to be a little man whom one would take at a glance to be timid, henpecked and generally uphappy. On the contrary, the little voice that is often full of apology and frequently interrupted by a most irritating nervous cough has proved to emanate from a hefty six-footer who looks as though his week-ends should be spent at Twickenham rather than on the Eighty-metre band. If amateur TV were to become general it would put a stop to all this and remove a source of wonder and amusement for some of us.

AS OTHERS SEE US

One would have thought that by now the popularity of the tape recorder would have served as a solemn warning to some of the phone operators. Having heard ourselves played back, many of us have had nasty shocks by observing, for the first time, some of our own queer little mannerisms and our frightful habit of repeating the same old phrases time after time. But over the years no change seems to have taken place on our bands, and still, to the general public, the amateurs are that queer body of people who gabble meaningless phrases over and over again. It is a great pity that the uninformed observer must always gather the impression that we are a crowd of nitwits, but that is usually what he does—largely through not understanding the traditional jargon and the way we use it.

OPERATING COMFORT

How few station layouts one sees have been planned with any thought of the operator's own comfort! A flat bench, receiver to the left, transmitter to the right, power packs anywhere, switches all over the place, and an aerial tuning unit miles out of reach . . . but you all know the sort of thing I mean. A station just "grows" like an untidy garden, and before one can stop to size things up, a major rebuild is necessary if things are all to be in the most convenient position. Seeing that most of us now spend our time as operators, rather than as experimenters, it is surprising that we don't take our personal comfort, while doing so, more seriously. Remote control of all units, by relays, is not a difficult goal to achieve, and it is probably the biggest contributing factor to operating convenience.

LIGHTS OUT!

In the Good Old Days, when certain G's were allowed to use 500 watts or even a kilowatt, there were many comic examples of what large and untamed quantities of RF could do. One operator in Newcastle could strike a neon-tube off his stair-rods; another in London used to demonstrate that the bathroom light came on when he tuned up his final tank circuit. In yet another case, the street lights went down every time the key was pressed. Nowadays the most spectacular demonstration we can offer seems to be the dimming or brightening of lights in some particular part of the house when we switch on or key. So I was quite pleased to hear from a chap whose wife complains that her bedside reading lamp goes *out* when he switches on the rig—but I can offer no explanation.

COLLECTORS' FRENZY

At last I have met a *genuine* QSL-collector. He collects cards, not for the purpose of claiming certificates, or even of amassing as many countries as he can, but just for their designs. Nothing pleases him more than to receive a new specimen donated free by the local chamber of commerce, advertising Barcombe's Balmy Breezes or suchlike. And the collection is kept, not on the wall, but in a delightful old-fashioned post-card album of the kind that used to embrace countless mauve-hued portraits of Zena Dare, Gaby Deslys or Mistinguett! So every QSO for this fellow is a glorious gamble; what kind of a card for his collection will arrive from *this* one?

NEW QTH's

This space is available for the publication of the addresses of all holders of new U.K. callsigns, 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.

DL2BA, D. Wilde, No. 1 P. & E. Unit, Wahnerheide, B.A.O.R. 19.

EI2I, W. Scully, St. Theresa, Avenue Road, Dundalk.

G3ASU, A. N. Myles, Borough Marsh, Twyford, Berks.

G3GSN, T. N. Reekie, 35 Mill Bank, Stafford, Staffs.

G3GWM, E. S. Watterson, 83 Rodney Street, Birkenhead, Cheshire.

G3GXV, R. W. Livermore, 256 Grove Green Road, Leytonstone, London, E.11.

G3HGB, J. Mills, 19 Walnut Avenue, Weaverham, Northwich, Cheshire.

G3HIM, I. D. Piggott, 95 Letchmore Road, Stevenage, Herts. *(Tel.: Stevenage 522).*

G3IDW, R. Reynolds, 136 Beech Avenue, Swindon, Wilts.

G3IGG, J. P. G. Jones, 278 Lickey Road, Rednal, Birmingham.

G3IGT, W. Borley, 1 Lansdowne Gardens, South Lambeth, London, S.W.8.

GW3IHL, J. H. Parry, 1 Church Road, Southsea, nr. Wrexham, Denbighshire.

G3IHX, N. J. Bond, 159 Warwick Road, Coventry, Warks.

G3IJX, E. B. Irving, The Snack Bar, The Square, Milnthorpe, Westmorland.

G3ILL, A. G. Mabbutt, 206 Sebert Road, Forest Gate, London, E.7.

G3INR, P. B. Buchan, 123 Hinton Road, Hereford.

G3IPH, L. Smith, 77 Dunkirk Street, Droylsden, nr. Manchester, Lancs.

G3IRL, S. L. Sawyer, 166 Stradbroke Grove, Ilford, Essex *(Tel.: WAN. 3365).*

G3ISC, W/O. F. W. H. Colborne, R.A.F. Station, West Raynham, Fakenham, Norfolk.

G3ISP, P. Cairns, 44 Cambridge Avenue, Hebburn, Durham.

GW3ITQ, S. H. Weaver, 2 Princess Street, Gelli, Pentre, Rhondda, Glam.

G3ITW, S. F. Berridge, 20 Ethel Street, Northampton.

G3IUB, University of Birmingham Radio Society, Guild of Undergraduates' Union, University Road, Edgbaston, Birmingham, 15.

G3IUF, J. J. C. Goulder, 35 West Road, Bourne, Lincs. *(Tel.: Bourne 207).*

G3IUG, A. E. Harvey, 39 Curlieu Road, Oakdale, Poole, Dorset.

GM3IUI, D. Colligan, 45 Milnbank Road, Dundee, Angus.

G3IUM, F. J. Warman, 213 Sutton Road, Walsall, Staffs.

G3JMA, J. M. Appleyard, 13 Roseley Cottages, Eastwick, nr. Harlow, Essex.

G3JWB, W. Bush, 256 Dersingham Avenue, Manor Park, London, E.12.

CHANGE OF ADDRESS

EI6C, J. J. Moriarty, The National Bank House, Kells, Co. Meath.

G2AVR, A. V. Spray, Atoona Cottage, Netherfield, nr. Battle, Sussex.

G2BID, J. Warwick, 171 Hollin Lane, Hebers, Middleton, nr. Manchester, Lancs.

G2BOC, D. H. H. Clarke, 10 St. Botolphs Crescent, Lincoln.

G2BON, T. Burton, 75 Herondale Road, Sheldon, Birmingham, 26.

G2BSR, T. S. Tatton, 320 Trowell Road, Wollaton, Nottingham.

GI2DVH, J. Stewart, 36 Millbrook Road, Lisburn, Co. Antrim.

G2MA, D. D. Marshall, 57 Godstone Road, Rotherham, Yorkshire.

GM3AKM, L. R. Richardson, 64 Easter Drylaw Place, Edinburgh, 4.

G3ANS, N. Mason, 12 Basegreen Drive, Gleadless, Sheffield, 12.

G3AYT, A. Smith, 27 Redgate, Cheetham Fold, Hyde, Cheshire.

GM3BNX, J. J. Shaw, 60 High Street, Coldstream, Berwickshire.

GM3BZJ, B. Woodward, 3a Air Ministry Houses, Wick Aerodrome, Wick, Caithness.

GM3DDE, L. F. Benzies, 83 Hillview Road, Corstorphine, Edinburgh, 12.

G3DJE, G. E. Lumley, 84 Greencroft Road, Heston, Hounslow, Middlesex.

G3DQ, W. R. Metcalfe, Carr Farm, Flamborough, East Yorkshire.

GW3DVG, R. I. Jenkins, 12 Upper Market Street, Haverfordwest, Pembrokeshire.

G3EZX, S. Wood, 70 Derwent Road, Lower Walton, Warrington, Lancs.

G3FKY, J. Parker, 36 North Avenue, Leek, Staffs.

GM3GCH, A. Johnston, Morven, Garden Street, Macduff, Banffshire.

G3GFB, N. K. Sealey, 78 Evesham Road, Astwood Bank, nr. Redditch, Worcs.

G3GVV, R. J. Hughes, 182 Reservoir Road, Tuffley, Gloucester.

G3ICO, G. W. Davis, The Square, Milborne St. Andrews, Blandford, Dorset.

G3ICZ, W. J. Clowes, 70 George Street, Hanley, Stoke-on-Trent, Staffs.

G3IQF, R. A. Fowler, 56 Dedmere Road, Marlow, Bucks.

G3SD, F. Thompson, 29 Sandringham Avenue, Benton, Newcastle-on-Tyne. *(Tel.: Newcastle-on-Tyne 62490).*

G4IX, G. M. Barber, 8 Lagoon Road, Lilliput, Parkstone, Dorset.

G5SI, A. Wood, 9 Alkrington Hall Road North, Middleton, Lancs.

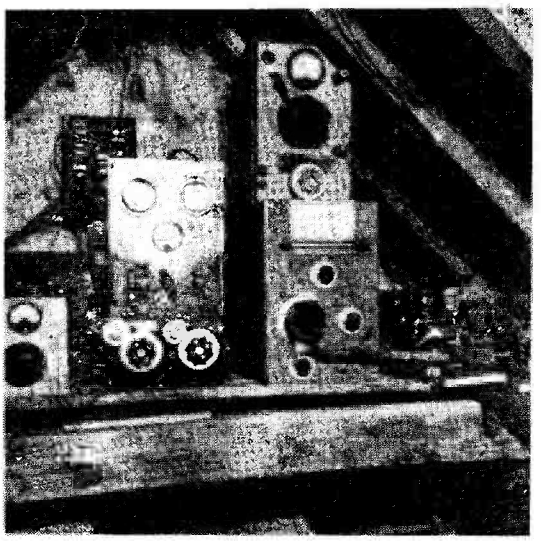
The Other Man's Station

G4LC

THIS time it is G4LC—owned and operated by W. E. Philpott, Russell House, Rye, Sussex, whose station, in his own words, "consists mainly of junk collected since 1920 and picked up cheaply on the surplus market." But this does him less than the credit which is his due. With the exception of the R.1155 and the Type 145 Oscillator, both considerably modified, the whole outfit at G4LC is home-constructed, and the point of particular interest is that it is remote-controlled "from downstairs" (*see* the article by G4LC in *Short Wave Magazine* for February, 1951).

Our photographs show the general arrangement, with the operating position in a neat desk assembly in the sitting room, and all the remainder of the gubbins (transmitter, modulator, and power supplies) two floors up out of the way in the roof space, near the aerial termination. The operating desk shuts up tidily when not in use, and then the only evidence of G4LC is the transmitter control circuitry neatly cabled away from the desk. This is Amateur Radio as it should be in many a home!

The present operator of G4LC was first licensed as G2XT and came on the air as long ago as 1926. At that time, the main interest was experimental and



constructional work, and reception on commercial frequencies using recording equipment. Nowadays at G4LC, DX is not sought after for its own sake, stations being QSO'd as they come, with construction as a secondary interest as opportunity offers.

In the roof-space, the transmitter consists of a Type 145 Osc-6L6-807, remotely band-switched for Twenty, Forty and Eighty, built mainly round and in a T.1154 chassis, with two pre-set frequencies in each band (making use of the T.1154 click-stop mechanism). The modulator is a pair of 6L6's in push-pull, and the aerial a 132-ft. end-on, taken in to the transmitter through a coupling unit for matching up on each band. The remote control business involves motor drive for the VFO tuning and a family of relays to perform the switching functions—it all works as described and illustrated, and has done for years.

When we read the description of a station such as that of G4LC, our own immediate urge is to scrap our lot and rebuild for real remote-controlled working, with all the standard items (switchable and unchangeable) put away in that vast unused space under the roof.

The Month With the Clubs

Last month's request for details of regular Club transmissions has, so far, brought only a very small response. It seems that the great majority of active Clubs have no permanently installed transmitter, and that not many of those who do have one run to any fixed schedule of operating.

For the benefit of other Club stations who want contacts, however, here is the list as received up-to-date:

BRENTWOOD:	Fridays, 2000-2230 ...	1.7 mc CW.
GRAFTON (G3AFT):	Monday and Friday evening	1.7 mc, also 3.5, 7 and 14 mc
HARROW (G3EFX):	First and third Fridays 2030-2130	3.5 mc
NOTTINGHAM (G3EKW):	Sundays, 1030-1230 ...	All Bands
YEOVIL (G3CMH):	Wednesdays, 1930-2230... Sundays, 1000-1300...	1.7 mc

This month we acknowledge the following Club publications, in addition to the normal reports: "Monthly News" (SURREY), "News-Sheet" (PURLEY), "CQ CARS" (COVENTRY), and "News Letter" (CLIFTON).

The latest date for next month's reports is **April 15,** *and, for the month after May 13. They should be addressed to "Club Secretary," SHORT WAVE MAGAZINE, 55 Victoria Street, London, S.W.1.*

And here are this month's reports, from 21 Clubs:

Barnsley & District Amateur Radio Club

Recent meetings have covered a variety of subjects, including Tape Recorders (G3CML, February 13), Learning Morse (G3ABS, February 27), Explanation of Class-A, Class-B and Class-C (G6LZ ,March 13) and a talk on Mass Production Receiver Design (M.R.G. Co., March 27). The fortnightly meetings continue at King George Hotel, Peel Street.

Chester & District Amateur Radio Society

New officers were elected at the AGM. Since then there have been talks on VHF (by MD2B, February 10), Workshop Practice, NFD Plans, and "As Others Hear Us," by G2YS, the latter including some tape recordings of members' transmissions! A Committee has been formed to deal with the Club Tx. Coming events: April 14—Transmitting in North Africa; April 21—Radio Interference; April 28—"Test your Gear."

Coventry Amateur Radio Society

The big event has been the 21st Anniversary Dinner, held on February 27, at which several cups and trophies were presented. Since then the programme has included a talk by G3FAB on The Application of Wavemeters; a lecture by G6YU; a further instalment of the Mathematics lectures by Mr. T. R. Theakston. A "Readers' Digest" evening will be held on April 13, and there will be a talk on a Multi-Purpose Power Supply by Ray Bastin on April 27.

East Surrey Radio Club

Officers for the year were elected at the AGM, and the Treasurer's and Secretary's reports adopted. On February 26 Mr. Dennis Lloyd talked on a home-built electronic timer, and the lecture on March 26 was given by Mr. Bird, of the GPO (G4ZU) on TVI and BCI. G2MV will lecture on Beam Aerials on April 22. The Club is open on Mondays at 8 p.m. for Morse practice, and on Thursdays for practical work, lectures or demonstrations being held monthly.

Solihull Amateur Radio Society

The first meeting of this society since its re-forming was held on February 18. Future meetings will be at the Old Manor House, Solihull High Street, on the first and third Mondays, and new members will be welcomed. The Club call, G3GEI, will soon be heard on 160-metre CW.

South Manchester Radio Club

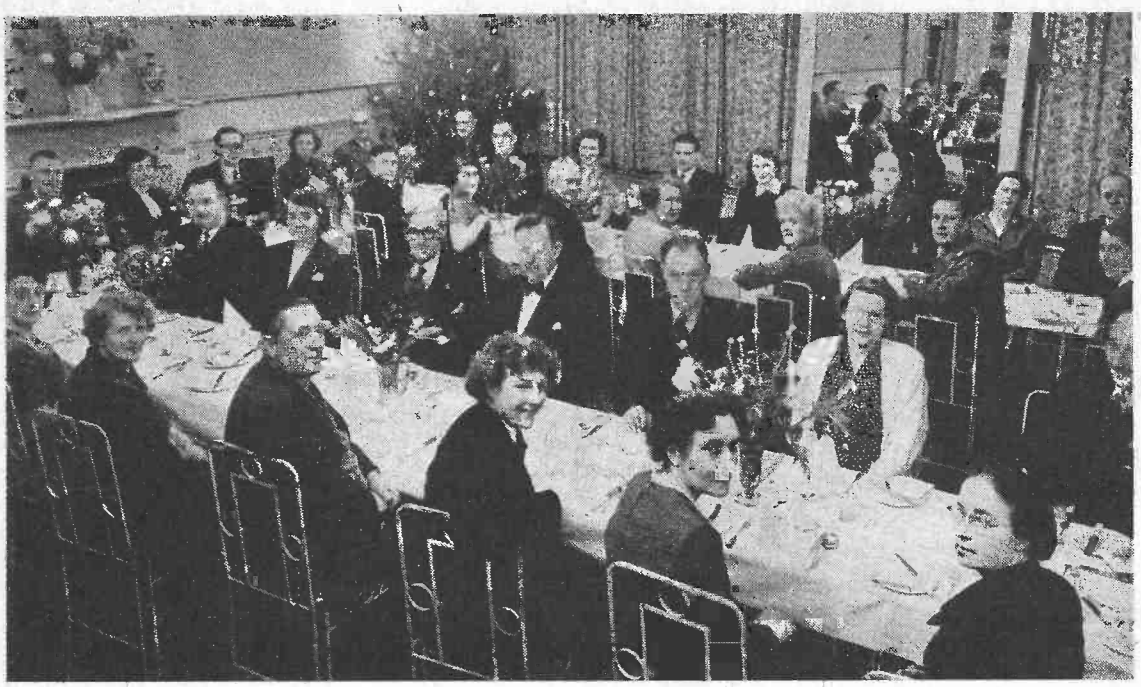
There has been a change of Hon. Secretary (*see* panel for name and address) and news of the future programme will be published shortly. Meanwhile, meetings are held every Friday night at the Club Headquarters. They are occupied alternately by lectures and transmitting nights, the next lectures being on April 10 (Film Strip), April 24 "Junk Box Transmitters"), and May 8 (Operating Experiences).

Torbay Amateur Radio Society

At a recent meeting the Club was visited by G5QA and G3EFY; the latter demonstrated an automatic control unit, owned by G3GWH, to control his 144 mc and 430 mc transmitter and receiver, using the dialling system. He also gave a talk on the working of the four main types of relays used in Amateur Radio. Arrangements are in hand for NFD and for the proposed Devon Hamfest. Meetings are on the third Saturday, at YMCA, Torquay, 7.30 p.m.

Warrington & District Radio Society

At a recent meeting members were given a talk and demonstration on The Teleprinter, by G3EXG. The intricate mechanism



The gathering at the annual dinner of the Reading Radio Society on January 9 last, when 37 members and guests were present.

of this most modern of communication instruments was clearly explained. G2HW then lectured on TVI and detailed methods of preventing it, from both transmitting and receiving viewpoints.

Waterloo
Amateur Radio Society

At a recent meeting, G3IOA was appointed Chairman-Secretary. Meetings are held on Thursday evenings at the rear of St. Alban's Church, Barrow Hill, off Waterloo Road, Cheetham. The present programme includes a drive to build test equipment, a communications receiver and a transmitter. New members will be welcomed.

West Lancashire
Radio Society

There has been a change of premises once more, and from now on the meetings will be at the room over Gordon's Sweet Shop, St. John's Road, Waterloo, Liverpool 22. They are held at 8 p.m. on Tuesdays. Recent events have included a talk on BCI and TVI (Post Office Radio Dept.) and a trip to the Port Radar Station at Gladstone Dock. A visit to Holme Moss TV station is also in the offing. Plans for building a Club Tx are being prepared.

Baldock & District
Radio Club

The AGM is on April 2, the season's activity having been concluded by the Club Dinner. Arrangements are being made to put on a radio display in the town for the Coronation. Meetings are on the first Thursday of the month—new members welcomed.

Cambridge & District
Amateur Radio Club

The April meeting will be held on the 10th at the Jolly Waterman. The subject for the evening is "Television Interference," and the speaker will be G8PB.

Brentwood & District
Amateur Radio Society

Last month a lecture on Receiver Servicing was given by G3LA, and by the time this note appears a Film Show will have been held, with films from EMI and Metro-Vick. The Club meets every Friday at the Parochial Hall, Pilgrims Hatch, where new members and visitors are always welcome.

Cheltenham
Amateur Radio Society

This society has recently been re-organised, and a small but keen body of members are determined to make the club call, G3GPW, well-known. Meetings are held on Fridays, 7.30, in the Clubroom at St. Mark's Community Centre. Business and practical meetings will alternate.

Grafton Radio Society

Recent events have been a talk on the PS7 Pre-selector (Radio-Craft) and another by G5RV on his TVI-proofed transmitter. Coming events are talks by G3CU on SSB, and Mr. H. Hill on Amplifiers and NFB. Meetings continue on Mondays and Fridays at Grafton School, Eburne Road, Holloway, and visitors are always welcome.

Radio Society of Harrow

Forthcoming events: April 10, Some Aspects of Valve Design;

April 17 and May 1, Practical; April 24, Junk Sale; May 8, G3IMI on Frequency Measurement.

Nottingham & District Short Wave Club

An Extraordinary Monthly Meeting was held on February 8, at which an election was held. (The QTH of the new Hon. Sec. appears in the panel.) The Club was opened at its new address last October, after a suspension due to lack of accommodation; attendance has been rather small, but it is hoped that reorganisation will encourage increased support.

Slade Radio Society

The past month's events have included a Film Show, a lecture on Radio Fundamentals and a special meeting on Direction Finding. On April 17 there will be a lecture and demonstration on an Electric Guitar. Visitors will be very welcome at this meeting—at the Church House, Erdington, at 7.45 p.m.

Surrey Radio Contact Club

A Junk Sale was held on March 10, and the AGM is fixed for April 10. All members are urged to attend. Normal meetings are held on the second Tuesday of each month.

Yeovil Amateur Radio Club

This Club has been rebuilding the transmitter, G3CMH, for some time past, but before this they were active on all bands and made some 750 contacts during 1951-52. A Top-Band transmitter has been given to the Club, apart from the "main rig," which is nearly finished (*see* panel for operating times).

Brighton & District Radio Club

March lectures included "Radio Autobiography," a Film Lecture on Valves, and "Practical TV—Part II." On April 14 there is a Multitone lecture on Sub-Miniature Equipment, and on April 28 the subject is "Designing a Simple Transmitter" by Mr. F. R. Canning, G6YJ.

NAMES AND ADDRESSES OF SECRETARIES REPORTING IN THIS ISSUE

BALDOCK: A. Fussell, G3HBH, 6 Clare Crescent, Baldock.
BARNSLEY: P. Carbutt, G2AFV, 33 Woodstock Road, Barnsley.
BRENTWOOD: J. S. Thornton, G3FQQ, 18 Western Road, Billericay.
BRIGHTON: R. T. Parsons, 14 Carlyle Avenue, Brighton, 7.
CAMBRIDGE: T. A. T. Davies, G2ALL, Meadow Side, Comberton, Cambridge.
CHELTENHAM: E. A. J. Miles, G3GCR, Hamble, 8 Elmfield Road, Cheltenham.
CHESTER: N. Richardson, 1 Victory Villas, Upton Lane, Chester.
COVENTRY: K. Lines, G3FOH, 142 Shorncliffe Road, Coventry.
EAST SURREY: L. Knight, G5LK, Radiohme, Madeira Walk, Reigate.
GRAFTON: A. W. H. Wennell, G2CJN, 145 Uxendon Hill, Wembley Park, Middx.
HARROW: S. C. J. Phillips, 131 Belmont Road, Harrow Weald, Middx.
NOTTINGHAM: K. Hourd, 132 Bannerman Road, Bulwell, Nottingham.
SLADE: C. N. Smart, 110 Woolmore Road, Birmingham, 23.
SOLIHULL: W. T. Bastin, G2BFT, 386 Lugtrout Lane, Catherine de Barnes, Solihull.
SOUTH MANCHESTER: M. Barnsley, G3HZM, 17 Cross Street, Bradford, Manchester, 11.
SURREY (Croydon): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
TORBAY: W. H. Baker, G3JD, 46 Dover Road, Torquay.
WARRINGTON: G. S. Leigh, G2FCV, 49 School Road, Orford, Warrington.
WATERLOO (Manchester): A. B. Langfield, G3IOA, 43 Thornham Crescent, Moston, Manchester, 10.
WEST LANCS: B. J. Whitty, G3HWX, 46 Argo, Road, Waterloo, Liverpool, 22.
YEOVIL: D. L. McLean, 9 Cedar Grove, Yeovil.

ANOTHER QSO COINCIDENCE

In the year 1935, two men met in the course of business—one was a licensed amateur, G2RP of Derby, and the other as it happened a keen SWL, who kept G2RP's QSL card as a souvenir of their meeting. In February last, 18 years later, G3HWO of Deal the new-timer worked G2RP over the air—you never know what can happen in Amateur Radio.

THE 1953 R.E.C.M.F. EXHIBITION

During the three days April 14-16, the annual exhibition of the Radio & Electronic Component Manufacturers' Federation (R.E.C.M.F.) will be held at Grosvenor House, Park Lane, London, W.1. This is an "invitation-only" show, and is becoming of increasing importance and interest in the electronics world, with a large attendance of buyers and foreign visitors.

IMPROVED FREQUENCY-CHANGER ON THE B9A (NOVAL) BASE

A new frequency-changer, which should prove of great interest to designers of communications and industrial electronics equipment, has recently been introduced by Mullard, Ltd. It is the ECH81 Triode Heptode on the B9A (Noval) Services' preferred base.

The high conversion conductance and low noise of this valve makes it of value for a large number of applications in the communications field. It is particularly suitable for use as a frequency changer in AM, or AM/FM receivers where its HF performance is considerably better than earlier Mullard valves. The small size of the ECH81 also recommends it to designers of modern compact equipment, where space is limited.

SMALL ADVERTISEMENTS

For years, the Small Advertisement columns of *Short Wave Magazine* have constituted a market for the buying and selling of individual items of equipment—indeed, many readers have said that "Small Ads" is one of the first features they look through when they get their copy. Every month, large numbers of Wants or Disposals are advertised and, as the *Magazine* circulates wherever the English language is read, there is a good response, and always a rush for the attractive items. If you have some gear you no longer need, or require a particular item of equipment, why not try a small advertisement in *Short Wave Magazine?* The rates are low and, if you are in any doubt as to how much it would cost to insert, a draft of your notice, addressed to Small Advertisement Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1, will bring a quote by return.

SALFORD AT R.E.C.M.F. EXHIBITION

One of the biggest advances in powder core technique will be highlighted at the 1953 R.E.C.M.F. Exhibition by the Salford Electrical Instrument Co., Ltd., in the form of a new Gecalloy micro-powder magnet for television tube focussing.

Another aspect of powder core applications will be the display of all the transformer and other cores needed for a television receiver. In addition, the latest range of Gecalloy toroidal cores with plastic coatings and the new miniature types will be on show.

For the first time a precision frequency measuring equipment used for quartz crystal calibration will be exhibited, with a new version of the quartz crystal activity test set.

Other exhibits at the show will include a wide range of quartz crystals, selenium and copper oxide rectifiers, synthetic sapphire gramophone needles and both portable and panel mounting instruments.

MEDIUM-POWER VISION AND SOUND TRANSMITTERS

The BBC announces that it has placed orders with Marconi's Wireless Telegraph Co., Ltd., for the supply of three pairs of medium-power vision and sound transmitters for stock.

The vision transmitters will have an output power of 5 kW. and the sound transmitters 2 kW. They are generally similar in design and construction to those already in use for stand-by purposes at the post-war television stations.

WODEN TRANSFORMERS

The Woden Transformer Co., Ltd., manufacture an extensive range of transformers for applications over the whole field of radio and electronics, which includes electro-medical, television, broadcasting and industrial requirements. Selections of these are to be shown at the forthcoming R.E.C.M.F. Exhibition and the British Industries Fair, and will include the C-core, hermetically-sealed, potted, compound filled and shrouded types.

CARDS IN THE BOX

We are holding cards at our QSL Bureau for the operators listed below, for whom we have no forwarding address. Please send a large s.a.e., with name and callsign, to: BCM/QSL, London, W.C.1, which is a full and sufficient address for our Bureau, from any part of the world. If appearance of the callsign/address in our "New QTH" feature, and subsequently in both editions of the *Radio Amateur Call Book*, is also required, this should be mentioned at the same time.

G2ABP, 2AOT, 2AXV, 2DAV, 2DCZ, 2FZY, 3AEO, 3CDB, 3DOB, 3DQO, 3HGN, 3HPE, 3HPJ, 3IFW, 3IGF, 3IIS, 3IJN, 3IKV, 3ILD, 3IRU, 3ISQ, 3ITH, 3ITZ, 3IUP, 3IZZ, 4BQ, 4QP, 6BQ, 6JR, 6MG, 6OY, GM2BBW, 3GV, 3HZX, 3IKD, GW2HPS, 3AP, 3AYV, 3CDX.

SMALL ADVERTISEMENTS

9d. per word, minimum charge 12/-. No series discount ; all charges payable with order. Insertions of radio interest only accepted. Add 25% for Bold Face (Heavy Type). No responsibility accepted for errors. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, S.W.1.

TRADE

QSL's and LOGS by MINERVA. The best there are.—Samples from Minerva Press, 46 Queen's Road, Brentwood, Essex.

WANTED: RCA 4331 Transmitters. — P.C.A. Radio, Cambridge Grove, Hammersmith, W.6. *(Telephone : Riverside 3279).*

QSL CARDS AND LOG BOOKS. APPROVED G.P.O. SAMPLES FREE. — ATKINSONS BROS., PRINTERS, ELLAND, YORKS.

QSL CARDS, neat attractive ; reasonable prices.—Samples, Lovedee, BRS.15643, Mill Street, Barwell, Leicester.

VALVES WANTED : TYPES 805, 807, 813, 832. 100TH, 250TH, 723A/B, 2K33, 2J36, ETC. HIGHEST PRICES PAID INSTANTLY.—DETAILS TO : MESSRS. PYPE-HAYES RADIO, 606 KINGSBURY ROAD, BIRMINGHAM, 24. *(Phone ERDINGTON 4942).*

45/- EACH paid for valves Type 813 ; 25/- each 832 ; 20/- each 931A, etc. Also wanted urgently: BC610 Transmitters, etc. Highest prices paid.—Details to Box 1202, *Short Wave Magazine*, 55 Victoria Street, London, S.W.1.

METAL WORK: All types cabinets, chassis, racks, etc., to your own specifications.—Philpott's Metal Works, Ltd. (G4BI), Chapman Street, Loughborough, Leics.

1155 RECEIVERS VERNIER TUNING, £7 : TU-6 TUNING UNITS, C/W OUTER CASE, 19/6 ; IE-36 TEST SET, ARMY TR38, 35/- : RF25, 10/- ; VALVES, 1625, 801, 830B, 5/-. C.O.D.. PLUS POSTAGE.—R.S.S.. LTD., 189B SHAWHEATH, STOCKPORT.

WANTED: BC610 Hallicrafters, ET4336 transmitters. SX28's, AR88's, receivers and spare parts for above. Best prices.—P.C.A. Radio, The Arches, Cambridge Grove, W.6.

WANTED: R.C.A. Speech Amplifiers, Type MI-11220 J or K, and aerial tuning units BC.939A coils and tuning units for BC610 transmitters.—Offers, stating quantity and price, to P.C.A. Radio, The Arches, Cambridge Grove, W.6.

12AT7, 12AU7, 12AX7, 6J6, 9/-; EF91, 6X4, 7/6; 6AL5, 6/6 ; EF92, EAC91, 6C4, 6/-.—Skillman, Franchise Street, Weymouth.

SITUATIONS VACANT

£50 A YEAR TAX FREE BOUNTY is paid to electronic artificers joining special section of the Army Emergency Reserve. Men with City and Guilds Final Certificate in Telecommunications and Radio and up-to-date experience in current electronic engineering practice will be needed to maintain electronic instruments controlling fire of anti-aircraft guns which protect vital centres of Great Britain should war break out. By joining the AER a man will not only be playing a vital part in the defence of this country, but will also know his exact role in the event of war. Minimum rank, Staff Sergeant; minimum of 15 days' training per year with Regular Army rates of pay in addition to bounty.—Further details from DDME, Anti-Aircraft Command, Glenthorn, Stanmore, Middlesex, or the War Office (AG.10/EA9), London, S.W.1.

CROWN AGENTS FOR THE COLONIES

RADIO OFFICER required by the East Africa High Commission for the Directorate of Civil Aviation for one tour of 30-48 months in the first instance. Commencing salary according to age and experience in scale £687, rising to £929 a year (including temporary allowance). Gratuity between £74 and £96 for each year of service on satisfactory completion of final service unless officer is placed on pensionable establishment. Outfit allowance £30. Free passages. Liberal leave on full salary. Candidates should possess the First Class Certificate of Proficiency in Radio Telegraphy issued by the Ministry of Civil Aviation, or alternatively an Operator's Licence of equivalent standard, provided they have had at least 5 years' operating experience and can operate at 25 words a minute.—Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience, and mentioning this paper, to the Crown Agents for the Colonies, 4 Millbank, London, S.W.1, quoting on letter M.32494.G. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration.

LOST: A number of applications to join the AWRS. Where is yours? Don't leave it to the other fellow. A good operator with a sense of National Duty just like you is the chap we want. Accept fifteen days a year paid training to follow your own hobby, plus other voluntary activities of interest. Join now, or write to OC ARMY WIRELESS RESERVE SQUADRON (G3ADZ), 230 Devonshire Avenue, Southsea, Hants.

SITUATIONS WANTED

GERMAN STUDENT of electro-technics wants job in the high frequency branch for the vacation from August-October, in order to improve his knowledge about Britain. Who can give a hint?—DL3QK, Auf der Bunte 11, Kassel-Ki, Germany.

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Box Numbers 1/6 extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, S.W.1.

RCA TE149 Crystal Check Frequency Meter, all HF bands, transit case, and spares kit; beautiful job, £12. — Box 1224, *Short Wave Magazine*, 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS. READERS—*continued*

WANTED: Marconi Magnetic Detector; D.E. and Multiple Tuners; 101, 106, 107 and 112 Receivers; Fleming Valves; Coherers; and other early wireless gear. valves and literatures.—FRANKLIN WINGARD. Rock Island. Illinois. U.S.A.

FOR SALE: HRO Coils, all ranged, 30/-; HRO Senior 4 G/C coils, power pack (needs slight attention), £17/10/-; RCA Oscilloscope, perfect. 110-volt primary. £17/10/-. WANTED: AR88. QRO Transmitter ET4336 or ET4332, also ART13. Any U.S.A. Test equipment; 813's. Will collect.—Box 1230, *Short Wave Magazine*, 55 Victoria Street, London, S.W.1.

SWL requires communications receiver; must be good internal condition; reasonable price.—Parsons. 88 Lister Street. Nuneaton, Warks.

WANTED: Radiovision Commander Receiver. unmodified; £30 offered.—17 Tudor Avenue. Bebington, Cheshire.

OFFICIAL Manuals R107, B2, B29, B28. 33 & 36: set, 10/- each. Philips Transformers, 110-250v. input, 250-0-250v. 60 mA, with two LT, 10/-. Philips 2756 10-watt Amplifier, complete, 200v. input, £2. Garrard Auto-changer, 230v., £8. 500v. Power Pack with two LT, chassis-mounted. £2/10/-. Ex-W.D. Transformer, 230v. input, 6.3v. 2A, 7.5v. 3A, 4v. 4A. 5v. 4A terminal strips need replacing, £1. Carriage extra.—17 Tudor Avenue, Bebington. Cheshire.

FOR SALE: R.1155A and power pack, £5. Also wanted: Hallicrafter S-20R manual.—Apply: B. Goldstein, 169 Oxford Gardens, London. W.10.

FOR SALE: Radiovision "Commander" communication receiver, in new condition, complete with speaker, phones and instruction manual, £40.—Box No. 1231, *Short Wave Magazine*, 55 Victoria Street, London. S.W.1.

TX FOR SALE; 2 racks, 12 panels, black crackle and chrome, built to commercial standards: separate trays for each band 80-40-20-10; Phone and CW; crystal or VFO; full power; comprises 18 controls, 9 meters, 30 valves. Noted for quality. Cost £160 to build; sacrifice £90. Considered one of the finest stations in the Midlands.—Apply Box 1226, *Short Wave Magazine*, 55 Victoria Street, London, S.W.1.

SALE: Type 37 Oscillator 20 to 80 mc, £5: Meissner Signal Shifter, £3; B2 Tx, £3; Wilcox Gay VFO, £2/10/-; BC348R, unmodified, no case, but perfect, £8/10/-.—G3HWC. No. 36 Malt Street. Preston, Lancs.

TX SCR522, complete with valves, £5/5/-; pair new 813's, £5; Multimatch mod. transformer. 60 watts audio, £2; heavy 6ft. rack containing partly completed push-pull 813 PA, also exciter chassis and power supply chassis, 2000v. 800 mA, and all valves and parts to complete, £24; BC455 with p/pack, £4. WANTED: 829B's, HK24G's, etc. — Send S/A envelope for list of valves, meters and components, etc., G5YV, 8 Ashfield Avenue. Morley, Leeds.

SMALL ADVERTISEMENTS. READERS—*continued*

BARGAIN: R1224 5-valve superhet, 1-9 mc, working condition. Officially sold at £8; £4/10/-. —Davies, 19 Coronation Road, Blackwood, Mon.

WANTED: Pre-War copies *Short Wave Magazine* from No. 1. Your price plus postage.—G3VU, 20 The Drive, Roundhay, Leeds 8.

MCR1, all coils, power pack, earphones, perfect, £8/10/-.—Box No. 1225, *Short Wave Magazine*, 55 Victoria Street, London, S.W.1.

AR88D, fine receiver in excellent condition, S-meter and manual, £60. RA34G variac controlled power unit, foolproof and perfect; 150v. to 1200v. in 10v. steps, AC and DC LT; £25. Taylor Oscilloscope, 30A (as new), £15. CRT 517c and base, new, 25/-. TU5B, 25/-.—Sanders, 34 High Street, Tring.

WANTED: Mobile 2-metre Tx/Rx outfit for 12-volt operation; suitable car, caravan.—Particulars and price, please, Box No. 1227, *Short Wave Magazine*, 55 Victoria Street, London, S.W.1.

BULLETINS WANTED: July 1925 to June 1926, August 1926, February 1928, October 1934, February 1941. Also *CQ*, 1945 and 1946. *QST*, April 1945, and pre-1928. *BSWL Review*, September 1948 to February 1949, and pre-May 1945. Any copies of *Radio*; 182 odd *Practical Wireless*; most *Popular Wireless*. And what have you in Amateur magazines? (NOT *Short Wave Magazine, News, Listener, Radio Constructor*).—G3IDG, 95 Ramsden Road, London, S.W.12.

FOR SALE: AC mains "Q-Max" VHF Converter, 18-205 mc. Cost over £24 new in September 1952. Perfect condition. Black crackle cabinet, 9in. x 6in. x 6in.; £16 o.n.o.—J. B. Cook, The Gables, Melrose Road, West Mersea, Essex.

SALE: R1155, built-in power-pack and output, £10; T1154, 12v. motor-generator, £3; B2, complete power-pack, £12. WANTED: Army Type 12, any condition.—GM3BFJ, Station Garage, Biggar, Lanarkshire.

EDDYSTONE 680 Super Communications Receiver, in mint condition, used only a fortnight, with matching speaker; a bargain at 69 gns. May be inspected at Brown's Radio, George IV Bridge, Edinburgh.—(Robertson, Royal Bank, Ardrossan).

WANTED: Type "A" Mark III Suitcase Tx/Rx with 6-volt vibrator pack complete, or B2; good price offered. Must be mint condition; urgently wanted.—Cooke, Larbreck, Gt. Eccleston, Preston, Lancs.

HRO SENIOR Bandspread Coils 10, 20, 40, GC.80, 160 and Broadcast; S-meter, power-pack, manual; perfect; £35. Seen London.—Box 1229, *Short Wave Magazine*, 55 Victoria Street, London, S.W.1.

ASB4 500 mc Rx, ARN-1 450 mc altimeter Tx/Rx; both brand-new. AVO oscillator, TV generator, Oscilloscope, 7in. plus magnifier TV kit, Wenvoe. "Viewmaster" parts cheap. — Page, G3HKV, Beaminster, Dorset.

SMALL ADVERTISEMENTS, READERS—*continued*

TRIPLE Diversity Receiver R-201 ; every possible refinement.—Terry, The Huon, Bournemouth.

WANTED: R107 Receiver. State price and condition.—P. Hartley, Mead Cottage, Carr Wood, Hale Barns, Altrincham, Cheshire.

COLLINS TCS 10 Rx, P/Pack and speaker, mint condition, £9 ; also 1155, new panel, convertor for 160/15/10 metres, S-meter, circuit, etc., £8.—Newham, 13 Warkworth Avenue, Wallsend, Northumberland.

BC221, stabilised power-pack rarely used, £25 ; 5in. panoramic radio spectroscope, only used a few hours, £55.—Pearson, Ivanhoe, Barnfield, Kirkham, Lancs.

SALE: BC348-L, internal power supply, perfect working order, £18 ; BC454-B, £2 ; BC-453, modified to MW, £3 ; Wilcox-Gay VFO, perfect order, £5.—Wilson, 47 Victoria Road, Sydenham, Belfast, N. Ireland.

WANTED: BC-348 Cabinet.—Price to: G3HQT, 74 Dalyell Road, Stockwell, London, S.W.9.

AR88D, technically perfect, polished wood case, £50 ; Rola speaker, polished cabinet, £3 ; MCR1, £5 ; Everett Edgcumbe all-purpose tester, AC, DC, capacity, insulation (but resistance inaccurate), £5 ; Television fringe pre-amplifier (AP), £4 ; Heater transformer for pair 813's, 30/- ; 25-watt modulation transformer CT2:1, 30/-. Deliver Hants., Bucks. areas, or buyer collects.—Turner, 34 St. Edwards Road, Southsea, Hants.

SELLING UP: Double Superhet 150 kc-44 mc, £10 ; Sig. Gen., 90 kc-30 mc, £5 ; Type 145 VFO and power-pack, £5 ; various xtals, 10/-. S.A.E. for list of bargains.—G3TS, Viola, Cambridge Road, Laindon, Essex.

FOR SALE: Two new boxed 100TH Valves. WANTED: BC455 with valves, unmodified.—G2FVD, 108a Tudor Drive, Morden Park, Surrey.

AR88D wanted, in good condition. Will collect any area.—G2DLJ, 147 Pear Tree Road, Derby.

BC221-T Frequency Meter with stabilised power-pack, calibration chart and service manual ; 230 volts AC, £20 ; RF 25 unit, 17/6.—Box 1232, *Short Wave Magazine*, 55 Victoria Street, London, S.W.1.

FOR EXCHANGE: Bendix 639A 2-metre Receiver with power-pack, in good condition. WANTED: CNY1 Transmitter for phone working on 1.8 and 3.5 mc. Must be in good condition.—Box 1233, *Short Wave Magazine*, 55 Victoria Street, London, S.W.1.

SALE: R.1155 power-pack, output stage, regen. IF, £7.—Read, 4 Wendover Drive, New Malden, Surrey. (*Malden 4459*).

EDDYSTONE S640 with matching speaker, purchased new August, 1952, £25/10/-. German communication receiver with new spares, exchange for modern 7 × 50 binoculars. Buyer collects.—Fawkes, St. Chloe Green, Amberley, Stroud, Glos.

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