

**JOURNAL OF THE  
Q R P  
RESEARCH SOCIETY**

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Q R P  
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“Q. R. P.”

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.....PUBLISHED THE LAST WEEK OF EACH MONTH.....

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..... EDITORIAL .....

All being well I hope that this issue will reach most of you by first post Friday 27th. This being so am going to say, once again "SEE YOU AT THE EXHIBITION ON SATURDAY NOVEMBER 28th AT 1530 HRS just inside the entrance door of the hall (NOT the street door into the tea rooms)". I shall be at the exhibition from about 1300 hrs, so I hope I shall see some of you before 1530.

This issue, I am afraid, is going to be taken up so much with reports on the Kaleveld Cup Contest, and with gen regarding the election of next year's Council, that many of our regular features will have to be held over. But both these items are of prime importance and I am sure no one will grudge the space given to them.

The election of a strong and united Council is more essential than ever at this time as we are on the brink of a year which I hope will see great developments in our Society. We have never been a body to tolerate stagnation, but, if all the plans I have drawn up for the future coming year bear fruit our Council will be exceptionally busy.

Make sure you fill in your Ballot and post it back to me.

### THE I F AMPLIFIER.

The first thing to consider here is the choice of frequency. There are two major determining factors -- selectivity and image rejection. There is also the consideration of gain. The lower the IF the better the selectivity and gain, and the higher the IF the better is the image rejection. Thus it appears that a compromise will be necessary.

It is usual to choose an IF in the region of 300 to 500 Kc/s, but image rejection on the higher frequency bands will be poor. This can be minimised by correct choice of oscillator frequency. However, to obtain better image rejection a high IF can be used. It should be noted that IFs in the range 500 Kc/s to 1.6 Mc/s are impracticable because of the possibility of IF breakthrough. At frequencies above 1.6 Mc/s the selectivity will be poor unless a large number of tuned circuits are used and the gain will be well down.

All the above remarks assume an IF strip which is well aligned and in which there are no traces of regeneration. One solution to the problem would be to use a double superhet and this possibility will be considered later. Thus it would appear that for general purpose applications an IF in the region 450 to 430 Kc/s should be used and suitable steps taken elsewhere to improve the image rejection.

The IF transformer itself is the next step. Two factors determine it's performance -- the  $Q$  of the windings and the coefficient of coupling ( $K$ ). Of these two,  $Q$  is affected by the external circuit and so this effect will be considered first.

The higher the  $Q$  is the better are the gain and selectivity. However, the external circuitry damps the tuned circuit and thereby reduces the effective  $Q$ .

Now we have the equation:-

$$Q_1 = \frac{Q_0 R}{Q_0 W_0 L + R}$$

where  $Q_1$  is loaded  $Q$ ,  $Q_0$  is unloaded  $Q$ ,  $W_0$  is  $2\pi f_0$  ( $f_0$  is resonant frequency),  $L$  is inductance of coil, and  $R$  is resistance shunted across winding.

Now the primary of an IFT is shunted by the plate resistance of the valve feeding it. The secondary is shunted by either the input impedance of an IF amplifier or else by a diode detector. In the latter case the shunting resistor may be taken as approximately half the DC diode load. Assuming an unloaded  $Q$  of 100, with  $f_0 \approx 500$  Kc/s,  $L = 1$  mH and  $R = 1$  megohm (which is a reasonable value of  $R_a$ ) we have

$$Q_1 = \frac{100 \times 10^6}{100 \times 10^{-3} \times 5 \times 10^5 \times 2\pi + 10^6} = 76$$

Assume a double diode detector with a load of .5 megohm, then  $R$  is .25 and all other factors remain as above.

$$Q_1 = \frac{100 \times .25 \times 10^6}{100 \times 10^{-3} \times 5 \times 10^5 \times 2\pi + .25 \times 10^6} = 45$$

Thus it will be seen that the effective value of  $Q$  is seriously reduced by the loading effects of the external circuitry.

In future, throughout these articles, where  $Q$  is mentioned it will be assumed to mean the loaded  $Q$  unless otherwise specified.

To determine the bandwidth at, say, 6 db down, we may use the equation below if the transformer is critically coupled:-

$$2\Delta f = \frac{X f_0}{Q_t}$$

where  $2\Delta f$  is the total bandwidth at 6 db down,  $f_0$  is the resonant frequency,  $X$  is 1.86 for one transformer OR 1.41 for two transformers OR 1.25 for three transformers,  $Q_t$  is the total  $Q$  of the transformer

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and is given by

$$Q_t = \sqrt{Q_p \times Q_s}$$

where  $Q_p$  is the primary loaded  $Q$

and  $Q_s$  is the secondary loaded  $Q$ .

Assuming  $Q_p = 75$  and  $Q_s = 100$ , we have  $Q_t = \sqrt{75 \times 100} = 87$ .

Therefore, if  $f_0 = 500$  Kc/s for one IFT we have

$$2 \Delta f = 10.7 \text{ Kc/s}$$

Or, for two IFTs

$$2 \Delta f = 8.1 \text{ Kc/s}$$

Or, for three IFTs

$$2 \Delta f = 7.2 \text{ Kc/s}$$

Thus it will be seen that the width of the peak of the response curve is not greatly affected by the inclusion of two or three transformers. However, if we take the figure from 80 db down we have:-

$$X = 14.1 \text{ for two IFTs} \quad \text{and}$$

$$X = 6.66 \text{ for three IFTs}$$

which gives us a figure of 82 Kc/s and 38 Kc/s respectively, thus showing a considerable improvement in skirt selectivity.

The factor  $K$  also affects the gain and selectivity. It is usual to make  $K = 1/Q_t$ , i.e.,  $Q_t K = 1$  (where  $Q_t$  is as before total  $Q$ ).

This value of  $K$  giving  $Q_t K = 1$  is known as critical coupling and it was assumed in working out the above band widths. However, a better value of  $K$  from our point of view will be that giving  $Q_t K = 5$ . Under these circumstances the gain will drop by less than 2 db while the bandwidth for a single transformer will be approx .6 x that determined above for critical coupling; i.e. approx 3 Kc/s. For two IFTs (one stage of IF amplification) the gain will be down by 4 db on that for critical coupling and the bandwidth will be less than 4 Kc/s at 6 db down.

Most commercial IFTs have been designed with the object of obtaining critical coupling and thus overall band width figures worked out above will apply to them. (Next month - "Home Made IFTs").

..... SOCIETY NEWS AND ACTIVITY. .....

David Mainhood (G3HZW), Ramsgate, as mentioned last month, is using a new T2FD similar to the G3CED sample except that the resistor is 85 ohms and the balanced feeders 72 ohms. The latest Tx at HZW is a Franklin 6J5/6J5 VFO, 6SK PA with an input of 0.8/1.0 watt. David, being stationed at Chelmsford, only gets weekends at home, but he makes good use of them on the air. He has a battery Tx/Rx under construction which is to use it's own VFO and output, plus a 100 Kc/s Xtal as a wavemeter.

H.J.Hinks, Christchurch, points out two errors in our description of his 80/160 Superhet (Issue 47). On page 10, left hand sketch, "AC" should read Ae, and on page 11, left hand sketch, Fil lead "LHT" should be "+LT". (Your editor deeply regrets these errors which can only be excused by extreme pressure of work causing too much hurry in getting out the mag -- sorry, GMS!)

Allan Herridge (G3IDG), Balham, SW 12, endorses the suggestion of G2ZC regarding the use of large name or call signs on lapels for identification during the RSGB Exhibition etc. He points out, however, that every QRP RS member should wear the "Green Diamond" as they can be the means of making many friendships. At a recent IEE meeting IDG met both 3GBP and 2DHV as a result of his QRP badge. Poor Allan has had zero activity during October owing to a pending call by the GPO to clear a mysterious patch of BCI.

Ted Stonestreet, Willesden Green, also has an error of ours to point out -- in his 2 metre log in Oct "QRP" we transcribed the call "G8KR" as "G8ITR". Ted has spent so much time on two lately that he has not been able to keep his C-Z scores moving. On the other hand his enthusiasm for two has infected several other members and we hope soon to see several logs joining his regular reports. Ted reports that two was "not so hot" during Oct and that he did try the LF bands "but even these have not brought much to shout about".

John Tipping, Brighton, says that he much prefers short. complete articles on constructional items "proved in action" to the "long drawn suggestions" such as the HQ Rx series (You are in a minority there, OM. It has already been reported that the "HQ Rx" series has brought in a heavier correspondence than any subject we have ever published. It must not be forgotten that we are a Research society and such research cannot be carried on without discussion of preliminary stages. In any case every issue of the mag carries "short complete" articles, so you have no really serious grouse, John -- Ed.)

D.J. Williams, Blaenavon, Mon, has rebuilt his O-V-1 with gratifying results, having gained an imposing list of calls heard while using "a couple of lengths of wire and a steel cloths line" for an antenna. (We are thinking of launching an Association for the Prevention of Cruelty to Receivers, run on the lines of the RSPCA, to deal with these ruthless antennae cases, OM!)

C.A. Wharton (G3JHX, ex-DL2UH), Leeds, has just received the new G call and is transferred to our Full Membership category. He is running 1 watt with a 1S4 Xtal Osc for 7 Mc/s and has a 5 watt 6V6 job in mind for CW on 20. Being in the RAF, 3JHX is not likely to be heard any too regularly for a while yet.

Vic Cudall (G3FAU), Stratford, E 15, has just completed a new rig for 40 and 80, at present running 15 watts but with strict QRP to follow. It is hoped that other members using those bands will look out for FAU.

Norman Bason, Peel, I.c.M., has, to quote his own words, "spent most of this month applying artificial respiration" to the new 2 metre Rx which, so far, has refused to show any signs of life (We must most sincerely congratulate you on your obvious fund of patience, Norman. It will be rewarded in the end without any doubt at all, and you will realize then that the time has been well spent as you will know the habits of the Rx inside out).

Peter Huntsman, Hexham-on-Tyne, is building a Xtal calibrator

which he feels is essential apparatus for any station, either licenced or SWL. His listening time has been severely restricted of late, and he has spent most of his time on Top Band. A perusal of back numbers of "QRP" has persuaded Peter to consider a SW crystal set and he is wondering what results he can hope for being situated 4 miles from a 100 KW BBC transmitter. (Your other comments noted, OM, and answer to follow when all weighed up -- Ed)

Harry Wells, Waltham Cross, sends us the good news that he has passed his Mouse and is now waiting his call. Harry certainly deserves this and we shall be anxious to hear reports of the new station.

Jack Cowles, (VK6EJ) ex-G2AJU Bencubbin, Western Australia, has got settled in to some purpose. He is 190 miles north-east of Perth & is on a 5000 acre wheat-sheep farm (Back garden 20 acres, nearest neighbour "the other end of the farm four miles away"). There are 2000 sheep and no mains, but already they have laid a field telephone between the two houses and Jack took out with him a B2 and his own "old faithful" battery rig built around the TU units which worked all G counties on 3 watts years ago. So some of us may be lucky to hear the OM himself again before long. (And let me hasten to assure those who may feel like saying "jolly old romancer" or words to that effect, that, having spent a few years in Canada myself -- and having had ONE field to plough that measured a mile and a half wide by three miles long -- I can fully appreciate that Jack is stating no more than bare facts - Ed). Best of luck, Jack. Let's hear from you regularly, OM. And that goes for the XYL and Paddy, too!

Bryan Read (G3JDT), Liverpool 20, deserves our humblest apologies as he sent us notification of his new call last month and we failed to get the fact into the mag. At the time of his letter he had been on for 17 days and had had 84 QSOs with 53 stations in 17 counties on Top Band with 5 watts. Once only he went QRC (to 10 watts) and, as he says, "was his face red" when the only contact turned out to be a QRP RS member (G3HCW)!

KALEVELD CUP RESULTS

PLACINGS OF THE FIRST FIVE ENTRIES :--

1:-	GC2CNC	with	963,200	points.
2:-	VQ2W	"	280,950	"
3:-	G3JEV	"	186,500	"
4:-	G2BOF	"	55,940	"
5:-	PAQXE	"	27,040	"

EDITORIAL COMMENT:-- May I be forgiven for butting in just a minute before we tear these scores apart and analyse them in detail? I just want to record that I have gained more pleasure from this edition of the Kaleveld than from any previous one by reason of the enthusiasm shown by all the contestants, the varied prefixes shown above, the fact that we are getting entries from as far afield as Northern Rhodesia, and the fact that we have a club on the entry list.

There is no need for me to introduce the winner -- if anyone is known to every member of our Society Monty certainly is -- nor is there any need for me to harp on the popularity of his most decisive win. That will be unanimous without a shadow of doubt. I would, however, like to say this -- Monty has the advantage of what one might, perhaps, term a rather "fancy" call sign. No doubt it helped him to a certain degree, but what did give him the undisputed lead is his gift of patience, thorough preparation and remarkable skill as an operator (perhaps that last more than anything else). Monty's Kaleveld log is a picture, not only in respect of the amazing list of QSOs which it contains, but also for the care, legibility and wealth of detail which it contains within its neatly bound stiff covers. AND, EVEN MORE NOTEWORTHY, A DAY OR TWO AFTER HIS LOG ARRIVED AT H-Q THERE CAME, BY AIR-MAIL, CONFIRMATION OF FIVE OF HIS fb QSOs -- QSL varies from VK4FJ, W5BNO, CN8BJ, K2AFZ, and

W3LEB, Monty asked us to consider his scores from among the five QSOs only, but our adjudicators, myself and our two SWL members of the Contests Committee (Peter Huntsman and Harry Wells) very firmly overruled this point and took his log as a whole in the same way that the other entries were judged. THANK YOU FOR A VERY FINE SHOW, MONTY -- we shall have real pleasure in having your call engraved on the cup for a second time (Monty won the cup in 1951).

The runner-up, who coyly hides his identity under the VQ prefix, is none other than our old friend Peter Colledge (ex-G3EDW), and it is really grand encouragement to have contest entries from so far overseas. We cannot help hoping that it forecasts entries from Bob Eldridge in Vancouver and from Jack Cowles in Australia next year.

Third place goes to the first club to enter any QRP contest -- The Dartmouth and District Amateur Radio Society -- a heartening sign that we are, at last, being joined in our gospel of QRP by greater concentration than the isolated individual.

Fourth came the one and only individual G call to send in an entry. Other Gs, we know, had the contest in mind during their week on the air, but perhaps they were unlucky in their Dx? Anyway we are grateful to BOF for his lone effort. Thank you, Jack Harris.

Lastly -- Evert Kaleveld himself. Perhaps we should not have done this, but Evert sent in a log at just the right time and, though he did not say it was specifically for the contest, we could not resist giving him a chance to get his name engraved on his own cup.

To sum up, we have just read in the Bull that only eight entries were received for the RSGB's Low Power Field Day (out of a membership of many thousands) so we feel that we have done extremely well in our much smaller way -- but, of course, not well enough! We want more returns for this contest next year. We shall never be satisfied until we get ALL our active transmitters sending in reports for our most important contest. And to Monty we would say -- if you can win it three years running, OM, we'll see that it becomes yours outright!

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THE WINNING CONTEST REPORTS: --

GC2CNC, Ernest ("Monty") Banks used a Clapp VFO - 6J5 - Bfr 6J5 - PA 6V6 on 1.8, 3.5 and 7 Mc/s. On 14 Mc/s the PA only was used with Xtals making it CO only. At all times the input was 2 watts. The Rx was an S640, and the antenna a 260 ft long wire, end fed via a Pi-coupler link coupling to the Tx.

The selected QSOs were: W5BNO (Texas) on Oct 6th at 1958 GMT on 14.056, BNO 459, CNC 559, held for 58 min. VK4SD (Brisbane) on Oct 8th at 1344 GMT on 14.056, SD 439, CNC 339, held for 29 min. VK4FJ (Brisbane) on Oct 11th at 1235 GMT on 14.028, FJ 449, CNC 339, held for 35 min. During the contest Monty worked 46 QSOs giving him 13 countries on 14 Mc/s, 5 on 7 Mc/s, 4 on 3.5 Mc/s and 2 on 1.8 Mc/s, and including 5 continents and 5 States

VQ2W, Peter Gollidge used a 9003 ECO - 9003 BA - 6SH7 FD - 6SH7 FD - 6AG7 FD - 807 PA, running either 5 or 1.5 watts input. The Rx was an RL07 fed from a 14 Mc/s dipole, while the Tx antenna was the 14 Mc/s Ground Plane as described in the July / Aug "QRP".

The selected QSOs were: G6GN (Bristol) on Oct 6th at 1630 GMT, GN 579, 2W 459, held for 15 minutes. SU1BJ (Canal Zone, Egypt) on 7th Oct at 1559 GMT, BJ 579, 2W 579, held for 43 minutes. GM3DYS (Invergordon) on 7th Oct at 1701 GMT DYS 579, 2W 449, held for 17 min.

G3JEV, Dartmouth & DARS, used an EF50 VFO - EF50 Bfr/Db1r - TT11 Power/Db1r. Input to the TT11 was limited to 5 watts by high value cath bias resistor (1200 ohms - 20 mA at 250 v). The Rx was a Hambander. For 14 Mc/s two halfwave dipoles were used, fed in phase, sloping north.

Selected QSOs were: W2AYU on Oct 9th at 2254 GMT, AYU 579, JEV 549. W2BUV on Oct 4th at 1850 GMT, BUV 589, JEV 569. VE3ADM on Oct 4th at 2030 GMT, ADM 589, JEV 559. All these on 14 Mc/s.

G2BOF, F. J. Harris used a 6SJ7 Clapp VFO - 6AC7 untuned BA-807 PA running 6 mA at 325 V (watts) or 4 mA at 250 V (1 watt). Rx was a

Canadian VRL and the antenna a 132 ft Pi-coupled.

PAØXE has not supplied details of his rig, but perhaps he will do so later on as we should like, in due course, to publish articles on each contest Tx in turn.

ADJUDICATOR'S COMMENTS: (1) Pity some reports did not carry QTH and mileage (2) If the three best QSOs were marked off it would help judging a great deal (3) Monty and Peter both sent in excellent logs with these two points well covered, and Monty's was (as in previous years) a picture of neatdetail and thoughtful completeness. (4) A frequency multiplier is obviously a "must" for next year. (5) Monty's report, as a whole, records a truly amazing performance.

THE WINNER'S COMMENTS: The VK4FJ contact was enabled by G3AAM who called Monty and told him he was being heard in VK. 3AAM then asked VK4FJ to transmit and the contact developed into a four-way QSO with SM5ARP. On Oct 8th at 1330 Monty called CQ, VK/ZL at 10 wpm and was insistently answered by F3TX, but Monty's reply in French succeeded in silencing him! A YU station did his best to spoil a QSO with ZC4FB by repeated wobbling of VFO -- Nice Chap! Contacts with 3 QRP RS members were made on Oct 3rd and 4th, one of which gave G2AOL a new county for his "200". Finally Monty says: "Found the going very hard; perhaps it's me - getting too old - hi! Tried ever so hard to raise a third VK without success although one did call me. Best "getaway" was VR2AS and ZL4UX. Was not able to devote much time, but hope the entry at least swells the bag"

LAST WORD: It was swell all right!

.....: NOTES TO HARRASSED OMs, by G3JNB :.....

Most operators of transmitters use the conventional "bulb and loop" method of peaking amplifiers at some time or other. However, Gentlemen, have you noticed how elusive that seemingly innocent instrument can become?

The unmetered stage of the Tx needs retuning...one reaches up to the dial with the left hand whilst the right gropes for the loop indicator..."Where's that -- thing gone? I always leave it on the

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side here! Why can't you leave things alone! No -- I haven't put it in the drawer! Why on earth women can't leave -- Oh! Well, if you hadn't fussed me to tidy up it would never have got in there!"

Why not avoid such domestic strife by titivating the Gubbins so as to produce an attractive instrument that will always be kept on it's own hook, screwed, perhaps, into the leg or underside of the ops table. It's quite easy. The full list of components are obtainable from Cop-All Corner as follows:- (1) strip of wood approx 8" x  $\frac{1}{2}$ " x  $\frac{1}{2}$ " to be found in firewood box; (2) length of insulating or other sticky tape; (3) small quantity French chalk from the Mother-in-law's cycle bag; (4) the bulb out of the wife's torch (5) batten type bulb holder from last year's Xmas decorations; (6)  $8\frac{1}{2}$ " of 14 or 16 swg wire -- if tinned cover with systoflex; (7) two  $\frac{1}{4}$ " wood screws and one eye-screw which can always be found holding up the kitchen curtains.....Now for the back breaking toil! Smooth down the strip of wood, bind with tape at one end to make a handle, dust over with French chalk to unsticky the grip, mount the batten holder with wood screws, bend the wire into a loop and mount on holder terminals, insert bulb, put eye-screw into end of handle and inscribe station call sign on space remaining.

Results....(possibly) a burnt out bulb,  
(probably) amazement on the part of uninitiated  
visitors, (certainly) postponement of that  
divorce...."Pass the

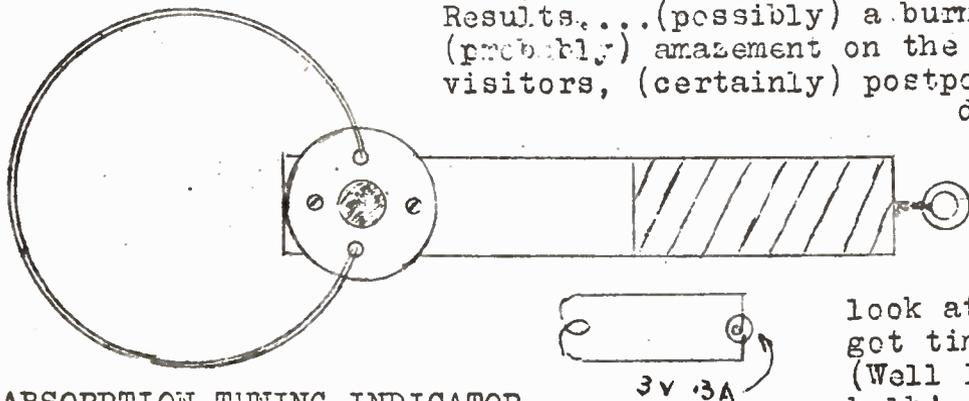
loop, please, dear.

Thank you, dear....

No, I don't know  
why your torch won't  
light, dear - I'll

look at it as soon as I've  
got time, dear."

(Well I did burn out MY  
bulb! -- G3JNB.)



ABSORPTION TUNING INDICATOR.

..... 1954 COUNCIL ELECTIONS .....

There have been relatively few nominations for the 1954 council, a fact which, perhaps, indicates how satisfactorily the existing one has carried out its numerous duties.

A very strong nomination has been sent in for GC2CNC, Ernest Banks, to the Presidential post. Monty has already insisted upon retiring from the chairmanship of the Contests Committee, much to the regret of all of us.

He is, of course, so well known to every member of the Society that there can be no need for me to enlarge upon his ability to carry out Presidential duties with the thoroughness and enthusiasm which he has always shown in all his work for the Society in the past.

A nomination has been received for Vic Brand, G3JNB, to the post of Press Officer. Vic is particularly well placed to carry out the most important work involved here as he is on the staff of Messrs Iliffe & Sons, publishers of many technical journals, including Wireless World, and is therefore well aware of the methods and procedure best calculated to keep our activities before the public.

The retirement of Monty from the chairmanship of the Contests Committee leaves this position open and a nomination has been put forward for Peter Huntsman to fill this vacancy. This still leaves one vacancy on the Contests Committee for which a nomination has been received on behalf of Ted Stonestreet, one of our most enthusiastic Foundation Members. Ted holds the undisputed record for having sent in, if not a report, at least a letter every single month since our initial effort in Sept 1949 -- and now, of course, he is best known as our leading VHF SWL. We shall ask him to take over the VHF Section Secretaryship vacated by Monty Banks, as we still feel quite convinced that, despite the lack of support given to this Section so far, it is a most essential one to be kept alive.

So much, then, for nominations. It only remains to complete and return to me the form on page 15 NOT LATER THAN DECEMBER 7th PLEASE.

.....: THE 1953 QRP C-Z PANEL :.....

	COUNTRIES					C Total	Zones	GRAND TOTAL
	3,5	7	14	21	28			
1: P.Huntsman	20	35	133	32	9	144	35	179
2: N. Bason	15	32	109	19	-	123	33	146
3: E.W.Gardiner	23	16	103	59	5	116	29	145
4: A.E.Stonestreet	20	27	98	-	8	110	30	140
5: B.J.Read	6	24	83	-	-	95	31	126
6: D.Gordon	25	15	68	25	7	82	27	109
7: R.Whitfield	22	7	75	26	6	84	24	108

.....: TOP BAND SWL PANEL :.....

	COUNTRIES	COUNTRIES	TOTAL
W.B.Baker (Berwick-on-Tweed)	8 (7)	60 (39)	68 (46)
P.Huntsman (Hexham-on-Tyne)	11 (11)	51 (51)	62 (62)
N.Bason (Isle of Man)	7 (7)	47 (47)	54 (54)
D.G.Gordon (Bournemouth)	5 (5)	46 (40)	51 (45)
H.G.Wells (Waltham Cross)	7 (-)	39 (-)	46 (-)
E.Gardiner (Diss, Norfolk)	4 (3)	35 (18)	39 (21)

There have been no entries for the "200" Contest this month for some peculiar reason -- perhaps it is just as well as we seem to have no space left what with the Kaleveld and the Council Elections. Let's hope that next month brings in a real climax to the 1953 "200"!