MERCURY

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AMATEUR RADIO SOCIETY

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CONTENTS

Editorial 1

Activity Periods 1

Receiver Selectivity (by G3EJF) 3

How Good is your Mobile Installation (by G3BID) 7

The Royal Signals 1966 DXpedition to Kuria Muria (VS9H) Nov. 66 (by VS9ARV) 8

Mission Accomplished (VS9ARV) 11

The Valve Voltmeter (by G5YN) 13

Reciprocity (by G3BID) 17

Confessions of an Amateur Radio Addict (by G3NWQ) 18

On the Awards Front (by GI3DZG) 19

Amendment No1 to RSARS Award 19

Reminders 19

Discount Deals 19

The Origin of '73' (by G3NWQ) 20

Calibrating the SWR Meter (by G3EJF) 21

Members and Club Activities 22

From the Mailbag 22

From the Treasurer, is your number here? 23

Amendments to Membership List 24

Rules for the Royal Signals Amateur Award 25

For your Diary 26

Available from Headquarters ..... Back cover

EDITORIAL

CALLING CQ DOG X-RAY

No apologies are considered necessary for printing verbatim, the log of the unsuccessful DXPEDITION to the KURIA MURIA Islands group by RAY VASPER (VS9ARV).

Unsuccessful in that it did not achieve the direct object of the exercise, i.e. to establish communication from VS9AH land with the world-wide fraternity of Amateur Radio enthusiasts. Nevertheless, insofar as the RSARS is concerned it achieved much more; it really put the Society firmly on the map.

It is a wonderful example of inter-service working, in fact of truly integrated communications, since all three Services and civilian elements were involved at times.

Members will no doubt have heard that Ray has since clocked 'Mission Accomplished' by a further trip (8-22 Jan 67) confirming the fact by over 2000 QSO with 109 countries.

The Society would also like to place on record its thanks to our American friends of ARRL who, having followed VS9ARV Bulletins, sent over as a present a new HW32A in time for the second attempt.

Well done all.

Congratulations too, to the latest Award winners, especially to Bill WINDLE (340) who is the first member to get the Society Class I plaque. At the rate that Bill's wartime unit chums are joining RSARS he should soon be able to get a further award by merely "calling the roll!"

You should by now have all made your number with G4RS, established in the sunny south with the School of Signals at BLANDFORD. Thanks are due to our friends at G3VXX who have helped considerably with the settling-in problems.

G3CIO after 1 Apr. 67 reverts to its former title of Catterick Amateur Radio Club, as a Member Station (AFF).

We sincerely hope that our many friends will continue to drop in on us or to give us a buzz. G3CIO will be particularly interested in hearing from you over the weekend (Annual Old Comrades) 24 and 25 June at Catterick when the Stn will be in continuous operation. Make a note.

73 es gud hunting

G3RUS

-o-o-o-o-o-o-o-o-o-o-o-o-

ACTIVITY PERIODS

On the LAST SUNDAY OF EACH MONTH from 1000-1200 and 1400-1600 UK time, approx. frequencies:-

3530, 14050 and 21050 Kc/s on CW
3700, 14120 and 21150 Kc/s on Phone (SSB or AM)

UK members are particularly asked to attempt to contact overseas members on 14 and 21 Mc/s during these periods.

Ring these dates on your calendar:-

Apr. 30	May 28	Jun. 24/25	Jul. 30

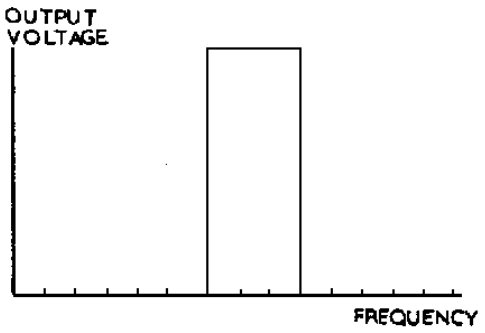


FIG 1. THE IDEAL RESPONSE CURVE

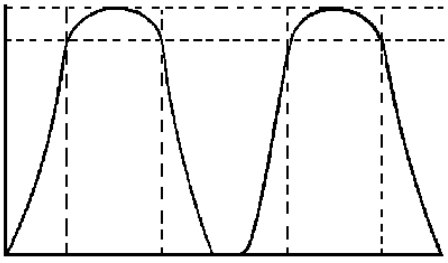


FIG 2. PRACTICAL RESPONSE CURVE

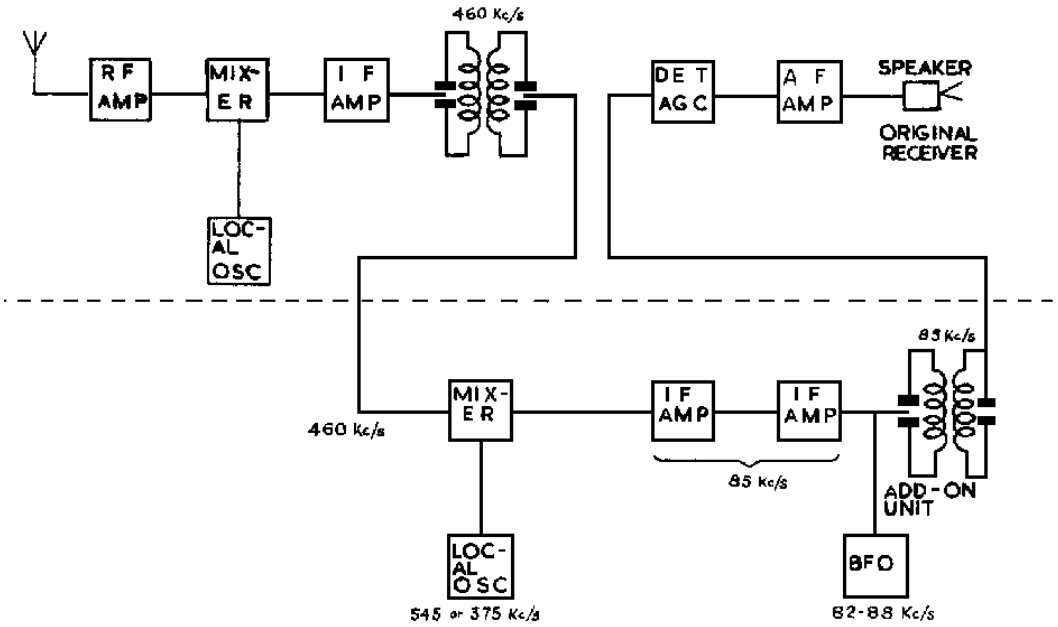


FIG 3. THE Q 5 ER PRINCIPLE

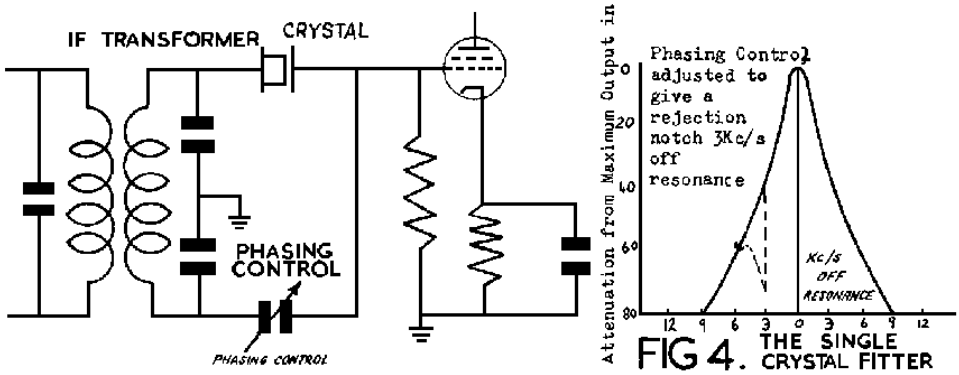


FIG 4. THE SINGLE CRYSTAL FITTER

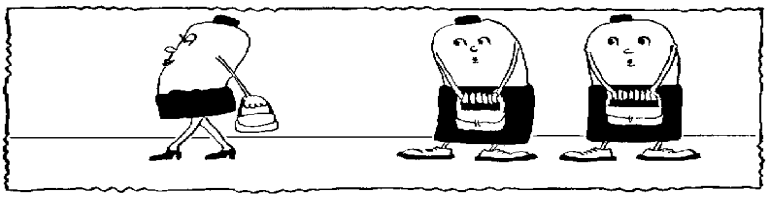
RECEIVER SELECTIVITY

BY G3EJF (4)

The ability of a receiver to separate stations on closely adjacent frequencies is determined by its selectivity. So says the RSGB Handbook and as anyone who listens on our bands knows there is always someone on a very closely adjacent frequency to the one we want to use. As a result the amateur probably needs a higher degree of selectivity than any other user of radio receivers. This article sets out to show what is required and what one is likely to get with various types of receivers.

Assuming that the frequencies in the human voice are those of 3000 c/s and below an AM transmission will have a bandwidth of 6 Kc/s and an SSB transmission a bandwidth of 3 Kc/s. However it is not necessary to receive both sidebands of an AM signal so a receiver bandwidth of 3Kc/s is suitable for both types of signal. In the case of AM it will be necessary to detune the receiver slightly for natural sounding speech. CW requires a much narrower bandwidth, between 100 c/s and 300 c/s being typical of many receivers.

Now the perfect receiver would pass all the frequencies within its given bandwidth with an equal degree of amplification and would not pass any signal outside the bandwidth no matter how strong the signal was. In other words its frequency response curve, the graph of output voltage against frequency, would be a rectangle as at Fig 1. However the human ear is a poor judge of sound intensity and provided the weakest part of the output was not less than half the strength of the loudest part we wouldn't notice the difference. Since the top of the response curve is usually rounded we talk of the bandwidth at 6 dB (one S-point) down, 6 dB corresponding to a voltage drop of one half. It will be seen that this definition of a receiver bandwidth, and it is the one quoted in most receiver specifications, gives no information as to how much other signals outside the passband will be attenuated. Both the curves in Fig 2 have the same bandwidth at 6 dB down but that on the right will give much better rejection of signals on adjacent frequencies, this is because the output falls much more sharply outside the passband. Since you may be trying to hear that S3 station a few Kc/s away from an S9 local what you are interested in is the bandwidth 30, 40 or even 50 dB down. Thus it may be said that the shape of the skirt is all important. The



longer and straighter it is the less the likelihood of interference.

We are still talking about receivers:

The selectivity of a receiver is determined by the design of the IF stages although audio filters have their place in CW reception. Within the IF stages the IF transformers control the selectivity,

the main factors being the Q of the tuned circuits and the degree of coupling between them. For best selectivity the Q should be high and the coupling below optimum. The higher the Intermediate Frequency used in the receiver the wider will be the bandwidth. One well known manufacturer gives the following figures for a stage of IF amplification using two of his transformers,

Intermediate Frequency	Bandwidth at 6 dB down	Bandwidth at 20 dB down
85 Kc/s	2 Kc/s	3 Kc/s
460 Kc/s	4 Kc/s	8 Kc/s
1620 Kc/s	7 Kc/s	13 Kc/s

Obviously we could only use an Intermediate Frequency as low as 85 Kc/s in a double superhet due to second channel Interference. However it would be possible to take the signal from the existing receiver at its IF, say 460 Kc/s, and feed it into a small fixed frequency superhet with an 85 Kc/s IF before passing it into the detector at the latter frequency. This was the principle of the Q5er which was very popular in the early 1950's. The block diagram is shown in Fig 3.

All but the cheapest receivers have a crystal filter in their IF stages but many people are surprised to find that the improvement in selectivity when the crystal is brought into use is not as great as they would wish. In many receivers the crystal filter is of the type illustrated in Fig 4. It is relatively simple to add a filter of this type to an existing receiver. Assuming that one has obtained a crystal whose frequency is near to the IF it is only necessary to modify the IF transformer by removing the capacitor across its secondary and replacing by two capacitors each of double the value of that removed. There is no great advantage in trying to squeeze them into the IF can. The capacitor C1 is the phasing capacitor and has a great effect on the response curve, making it either symmetrical or with a notch about 40dB deep on one side. Unfortunately the phasing capacitor is rarely a front panel control although the HRO and Eddystone S640 have this facility, and very useful it is. The response curves in Fig 4 show that the bandwidth is narrow at the top but the skirt on the side opposite to the notch falls quite gently. This means that whilst interference on one side of the wanted signal can be effectively removed by adjustment of the phasing control a strong signal on the opposite side would still be troublesome. This type of filter therefore would not be a great deal of help when there are strong signals either side of the one you want to hear. Since the bandwidth at 6 dB down is narrower than that required for phone signals this filter is going to give a distorted speech quality.

The next step is to combine the response of two crystals so as to give the full bandwidth required at 6 dB down whilst retaining reasonably steep skirts. This is the half lattice filter shown at Fig 5, if the crystals have frequencies about 1·7 to 2 Kc/s apart the response will be reasonably flat over the 3 Kc/s that we require for telephony reception. For CW the crystals should be about 200 c/s apart. For example if the receiver IF is 465 Kc/s crystals whose frequencies are 464·8 and 466·6 Kc/s would be suitable for telephony. A single half lattice filter of the type shown is an improvement on the single crystal filter both from the point of a flat top to the curve and improved skirt shape. However it is quite likely that there will be frequencies either side of the passband where the attenuation is reduced and this may show up as very strong signals appearing at more than one spot on the tuning dial. Supposing the main passband is centred on 465 Kc/s but there is a hump on the skirt at 470 Kc/s some 30 dB down. A very strong signal would appear at two spots on the tuning dial 5 Kc/s apart, once very strong at the correct frequency and once some 5 S points weaker. With some of the very strong commercial signals on the bands this is a nuisance.

FIG 5 HALF LATTICE CRYSTAL FILTER

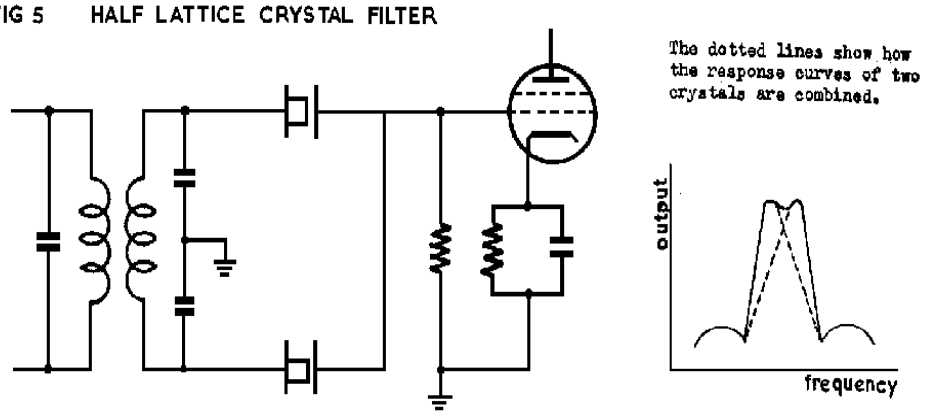
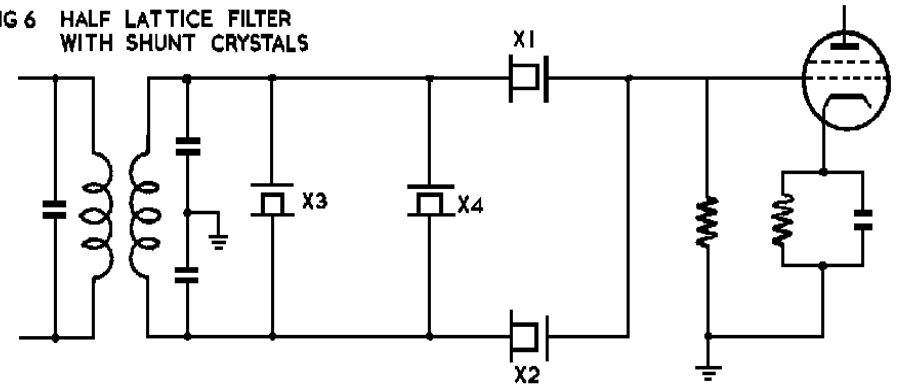


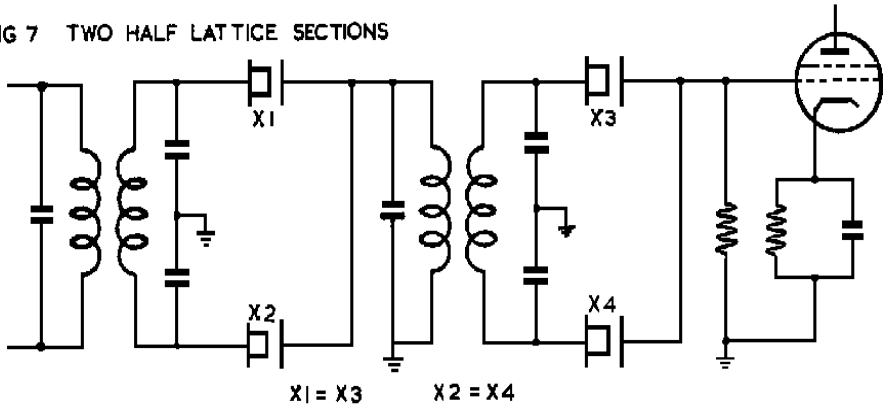
FIG 6 HALF LATTICE FILTER WITH SHUNT CRYSTALS



TYPICAL CRYSTAL FREQUENCIES FOR TELEPHONY FILTERS

Nominal IF	X 1	X 2	X 3	X 4
465 Kc/s	464·8 Kc/s	466·6 Kc/s	464·3 Kc/s	467·1 Kc/s
1620 Kc/s	1619·4 Kc/s	1621·2 Kc/s	1618·9 Kc/s	1621·7 Kc/s

FIG 7 TWO HALF LATTICE SECTIONS



of capacitance is so small that it is best done by soldering a short length of stiff wire to one of the tags on the crystal holder, sliding an insulated sleeve onto it and bending it close to the other tag. Capacitance across the higher frequency crystal will increase the steeples of the skirts but increase the height of the side humps. Capacitance in parallel with the lower frequency crystal broadens the response and deepens the trough in the middle of the passband.

A far more effective way of making the sides steeper is to connect additional crystals across the filter as shown in Fig 6. The additional crystals should have frequencies about 500c/s less then the lower frequency and 500 c/s more than the higher frequency crystal in the original half lattice filter. This type of filter will have nice steep sides down to about 30dB (five S-points). Typical crystal frequencies for IF's of 465 Kc/s and 1620 Kc/s are given in Fig 6.

Whilst the filter in Fig 6 probably represents the best that can be done in a single filter we do not need to stop at this. It is usual to place a crystal filter in between the mixer and First IF Amplifier stage, however assuming that the receiver has more than one IF amplifier stage further filters of any type can be placed between the first and second IF, second and third IF etc. Alternatively more than one half lattice filter can be used at the same point in the circuit. Fig 7 shows two half lattice filters connected together. An example of the use of more than one filter in a receiver is the circuit of the G2DAF receiver which has the filter of Fig 7. between the mixer and first IF and a further half lattice filter (Fig 5) between the first and second IF stages.

At the start of this article we stressed that to the amateur it was not so much the bandwidth 6dB down that was important but that 50 or more dB down. Bearing this in mind the following figures derived from the specifications of three typical receivers show what can be expected from different types of filters.

Receiver No.	I.F.	Type of filter used	Skirt width
1	465 Kc/s	Single crystal	2 Kc/s at 6dB 12 Kc/s at 45dB
2	460 Kc/s	Three half lattice	2·5 Kc/s at 6dB 3·7 Kc/s at 60dB
3	100 Kc/s	Single half lattice	1·2 Kc/s at 6dB 8 Kc/s at 66dB

It will be seen that from the point of view of removing QRM Receiver No. 2 is by far the best.

When building crystal filters into receivers it must always be remembered that any stray coupling between the filter input and output will degrade the performance.

No mention has been made in this article of the other aids to selectivity such as Q-multipliers, T-notch filters and Audio Filters. There is no doubt that the addition of any of these devices to a receiver will improve the selectivity, particularly for CW reception, but the results will not approach those obtained by the careful use of crystal filters.

HOW GOOD IS YOUR MOBILE INSTALLATION? by G3BID (381)
(ACK to "MOBILE NEWS")

Apart from the actual transmitter and receiver or transceiver which one installs in the car, there are a number of other factors which will go to determine the efficiency or otherwise of the whole mobile installation. First, of course, there is a choice of a suitable antenna. There are many commercial antennas on the market and one can build one's own. It is, however, not the purpose of this article to discuss antennas. The installation itself is of great important and here the ability to measure fractions of an ohm is vital.

First and most obvious there should be a very good connection between the output from the rig itself right through to the antenna itself. This should definitely show less than [illegible]-ohm resistance. Remember that most mobile antennas are low impedance and that the feed point is, therefore, a current maximum. Any resistance here will cause considerable losses. However, the feed to the antenna itself is usually good and of low resistance, though parts of it, being out in the weather, suffer corrosion. You probably use coaxial feeder. Where does the outer conductor or braiding go? What is the resistance?

The outer conductor of coax cable should be connected to the mass of metal which the car represents. The end of the coax nearest the antenna should make good contact with the car near to the antenna base. From here you should have a good low resistance connection to all parts of the car. This is most important.

But have you got a means of measuring fractions of an ohm? I hadn't for some time and had to be satisfied with a relatively low reading on an ordinary multimeter. Then I got hold of a special meter on which one can easily read 0·1 ohm or less. This is a "Megger " , made by Evershed and Vignoles. It has two scales. One reads 100 ohms to infinity, with the top reading 200,000 ohms well spaced below the infinity mark. The other reads from 1,000 ohms to nil and the 0·1 division is well clear of the nil mark.

I then began prodding around one installation. I was delighted to find the outer of the coax to the door was under 0·2 ohms. The rear bumper to the outer of the coax on the antenna base was also under 0·2 ohms. The door to the windscreen, the bonnet (hood) to the chassis of the transceiver less than 0·2 ohms. So all was well.

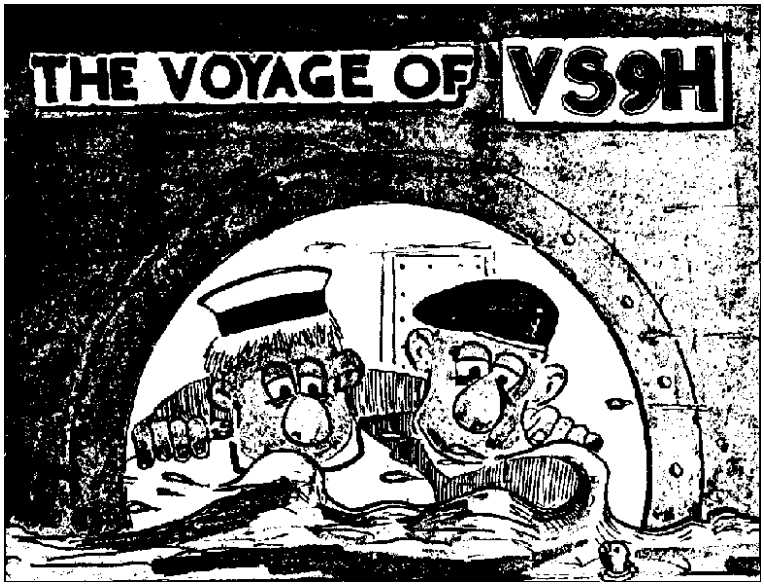
Then I prodded the other installation. The lead to the antenna was excellent, less than 0·2 ohms. But the outer of the coax to the car body near the antenna base was several ohms. Gradually checking around the installation I was able to locate the worst connection. The coax plug which plugged into the antenna base was well and truly corroded. The inner was adequately protected by the outer and was still making a low resistance contact, but the outer had several ohms. As this is a low impedance point, quite an amount of power must have been dissipated in the ohmic resistance of this joint.

Once I have replaced this connection, I shall continue checking. There may well be other bad joints. It is surprising how several high resistance joints will add up in a mobile installation. Only if there is really low resistance to all parts of the car can one get the best out of the mobile rig. From the receiving point of view also, these high resistance joints, especially bonnets, will cause increased ignition noise, as the bonnet is not really at earth (ground) potential, and doors, boot lids, etc., will cause crackles in motion.

So check your installation from time to time and a really sensitive ohmmeter capable of reading fractions of an ohm is almost essential.

THE ROYAL SIGNALS
1966 DXPEDITION TO KURIA MURIA (VS9H) NOV. 66
(OR HOW NOT TO GET TO VS9U FROM ADEN)

by VS9ARV (418



Sept/Oct. saw the final details of proposed trip to KURIA MURIA being sorted out, and by NOV 1st we were ready to go.

The party consisted of:-

Capt.	BROUGHTON	REME	- OC PARTY
Sgt	VASPER		- RADIO HAM
L.Cpl	CORRIE		- NCO IC REAR LINK
Sig	ACKRILL		- RADIO OP
Pte	PURDOM	RAMC	- WITCH DOCTOR
Pte	MAKJEWOWSKI	(APPROX)	COOK (ACC)
L.Cpl	SMITH	REME	-(SOMETHING TO DO WITH GENERATOR MAINT)
ABDULLAH ADEN			-(LOCAL NATIONAL, WHOSE JOB WOULD HAVE BEEN INTERPRETER).

Aims of the EXERCISE (NAMED : SHORT PATH):-

1. Establish and maintain a rear link with 210 Sig Sqn in ADEN using C11/R210 STN.
2. Complete extensive trials on the A13 manpack equipment using different types of antennae, and testing the kit back to ADEN.
3. Set up an amateur radio station with as much gear as possible and have as many QSOs in the time available on the Island.

Duration of the exercise was to have been 25 days, that is, from the 6th - 30th NOV inc

Diary of events: (Suitable background music - "THE CRUEL SEA")

Log of VS9ARV/MM aboard HMS YARNTON (this is a RN Minesweeper in the 500 ton class)

Mon. 7th NOV.

0800 c. Party arrived at HMS Sheba and commenced loading of all stores on HMS YARNTON.

1130 c. Loading completed - personnel in party were detailed off to do watch work with the ships company. Bunks sorted out - personal kit stowed. Ship made ready to leave port.

1300 c. HMS YARNTON left port, set course for KURIA MURIA ISLANDS, Approx. located at 17º 32' N, 56º 05' E·

2000 c. For those not on watch a film show. Sailing conditions good, ship making 20 knots on 2 engines. No noticeable swell.

TUE 8th NOV.

0800 c. Increase in swell, wind speed noticeably higher, still making good progress.

1200 c. Party enjoying chance to steer ship, sometimes take the whole watch period as steersman.

2130 c. Ships radar U/S but visibility good. Ships electrical system working OK.

2300 c. Swell now quite troublesome, boat is battling well, but because of small size of ship, rolls heavily from side to side.

WED 9th NOV.

0800 c. First idea that all is not well. Ship will not be able to lower its small boat to pick up a member of the party at SALALAH, this is because of seas being too rough.

LCpl SMART of VS90C is left carrying the TA32 beam at SALALAH.

1300 c. Warned by skipper that conditions ahead might get worse, all hands set to, lashing of equipt, our kit was on the open deck.

1800 c. Lashing completed - ship leaves SALALAH for KURIA MURIA 120 miles away. Sailing conditions rough. High rough seas, - heavy swell - wind force 5 to 6.

2330 c. Alarming pitching and tossing. Much gear breaking loose and rolling around decks. Now on edge of cyclone area.

2350 c. Petrol (300 Gals) and oil for Generators jettisoned overboard.

THU 10th NOV.

0600 c. YARNTON now completely closed down. Bridge and engine room unmanned. All hands warned to stay below decks. Everyone from skipper down, violently sea sick.

1000 c. A 2 ton piece of minesweeping equipment has broken loose, it is rolling around the deck, smashing into the ships open electrical system, deck holed in many places.

1300 c. Lower decks of ship completely flooded. Electrical control room is completely water logged - main switchboard has burnt out, ship now without RADIO (WT) STEERING, COMPASS, RADAR, DECCA NAVIGATOR, and DEPTH SOUNDING GEAR, or any power at all.

1400 c. Now passing through eye of cyclone, WINDS CYCLONIC, FORCE 12 GUSTING to 13, WAVES 55 ft high, ship is left to mercy of the waves.

1500 c. All hands to beds - issue of life-jackets.

1530 c. All hands stood to emergency stations, visibility nil. Very dark overhead, no meals because sickness prevails.

2200 c. No activity aboard ship. Very quiet below decks, everybody hanging on.

FRI. 11th NOV.

0800 c. Passing through far side of cyclone. Conditions as before.

1200 c. Slight let up, less rolling, wind down to GALE FORCE 9. Still unsafe to go on open decks.

1500 c. Considerable improvement, restricted movement possible only in corridors. Doors and portholes opened.

CONFESSIONS OF AN AMATEUR RADIO ADDICT

1800 c. Comparative calm, waves down to 20 ft, winds down to force 5 to 6, very heavy swell and many waves breaking over the decks.
2300 c. Boat now listing slightly to Starboard. Conditions much better. Biscuits and corned beef handed out. Most people keeping food down OK.

SAT 12th NOV.
0600 c. A good nights sleep by most blokes. Open deck movement now possible. A close examination of equipment an the open decks reveals much damage to ships superstructure, planks from hull missing, guard rails torn away when 2 ton gear went overboard. Military kit scattered over deck, but on a complete check, very little found missing. 3 Generators very badly damaged, packing crates broken open. All hands to work places, serious attempt to get things ship shape and damage repaired.
1200 c. Starboard list corrected. Ships AC 230 volt supply restored, but as most of the demand is for 12 volts, no electrical apparatus working.
1300 c. Passed a British ship, asked him our position by heliograph - his answer "YOU MUST BE JOKING".
1530 c. WT Room flooded - extensive damage to Radio Room equipment, no Radio contact with other ships or land possible.
1600 c. Asked by Skipper if I could give radio assistance by Amateur Radio means, as ship required food, fuel and water urgently. Also a doctor was required to tend injured Seaman.
1800 c. Put the Ham TX/RX on the air, antenna was a piece of P11, 25 ft long, attached to the top of the yardarm. TX loaded well - first QSO was with MP4TBO in the TRUClAL OMAN, he had full COMCEN facilities available, and was able to accept my emergency traffic.
2000 c. VS9ABL in ADEN checked in on 14140 and handled traffic direct to ADEN, FLAG OFFICER MIDDLE EAST, and the NAVAL SIGCEN at STEAMER POINT.
2359 c. Maintained ship to shore link for many hours. All traffic left me as Priority, but was upgraded to Emergency on land. Greatest difficulty was trying to keep the freq. clear of breakers and well wishers. Many reports given between traffic handling.

SUN 13th NOV.
0600 c. Radio contact maintained with ADEN, VS9ABL, for F.O.M.E. staff BAHRAIN, MP4BCC, for PHONE PATCH FACILITY MAURITIUS, VQ9BG, for SHIPS REAR LINK to MAIN NAVY CONTROL CENTRE, SHARJAH, MP4TBO, for COMCEN FACILITY TO ANY SPOT ON 'THE MAP WE NEEDED.
1200 c. HAVE BEEN GIVEN APPROX. POSN BY PASSING VESSEL, WE ARE 100 MILES SOUTH WEST OF KURIA MURIA ISLANDS.
1330 c. OPEN DECK CHURCH SERVICE, NEEDLESS TO SAY THE WHOLE CREW ATTENDED.
1500 c. A 100% check on our equipment serviceability shows C11/R210 Stn and A13 stations working OK. ONAN 3·5 KVA (QTY 3 OFF) are badly damaged. One is got going, but unreliable. (The 3 have since been BERd).
2000 c. Contacted HMS MOHAWK, they were on NATO exercises in the Persian Gulf. Arranged a RV for the 15th Nov so that they could resupply us.
2359 c. Lots of breakers from all over the world. The USA crowd want to pay for the damage to the ship and equipment. Told them that HER MAJESTY might not like the idea too much. HI.

MON. 14th NOV.
1200 c. Ham Link with shore continued, ships WT still not working.
1400 c. Ran series of tests with ships WT to MOHAWK, with Ham Radio as the engineering link. MOHAWK very nervous about operating in amateur bands. Somebody must have got at em previously. HI.

1800 c. Ships WT now in contact with MOHAWK and will remain so for duration of voyage. Ham link may now close down. Final "thank you" to land stns VS9ARV/MM, then, QRT.

TUE. 15th NOV.
1800 c. RV with MOHAWK as planned. MOHAWK's radio officer came aboard, examined ham rig closely and indicated that MOHAWK could not possibly do without one. Extremely impressed. One up for Ham Radio.

WED 16th - THU. 17th - FRI. 18th NOV.
Steady progress to Bahrain. Ships speed 8 knots on one engine. Sea like glass.
0800 c. Arrived at BAHRAIN, commenced off-loading of Army stores.
1200 c. Decided that it would be impractical to continue dxpedition, arrangements made to return ADEN the following day.

SAT 19 DEC
1600 c. Back in ADEN. Situation normal.

-o-o-o-o-o-o-o-o-o-

MISSION ACCOMPLISHED
by VS9ARV (418)

After the abortive attempt in Nov. 66 to reach KURIA MURIA the DXpedition was remounted and established through the period 8-22 Jan 67.

CONTACTS	2003 TOTAL
COUNTRIES	109
CONTINENTS	ALL
CONDITIONS	Very poor and limited to 14 hrs daily due S8 noise level.

The most consistent Band for good DX was 80 metres and very few SSB or CW Sigs were heard before 1000 GMT.

Rigs used were the new HW32A (sent over as a gift from the States) and a KW 2000.

Antennae used were 10/15/20 metres inverted V at about 50 feet and 40/80 metre dipoles up at 40 feet.

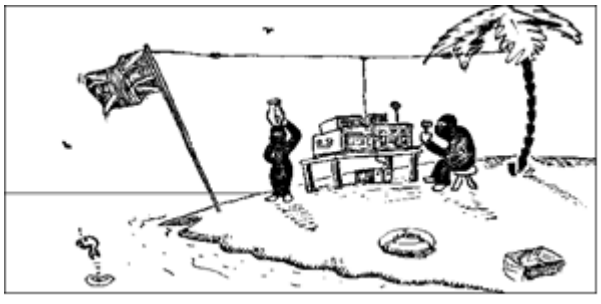
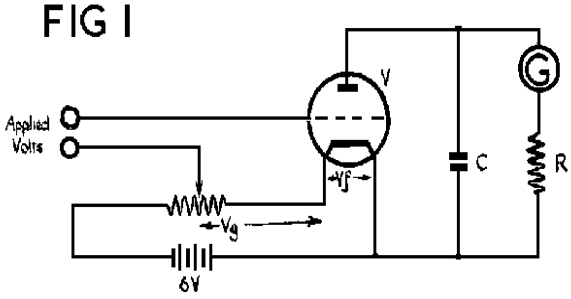


FIG 1



Va = Vf = 3.6 volts
Vg = - 1.6 volts
R = 30 K
C = 1 μF
V is a bright emitter triode with a 4 volt filament.

FIG 2

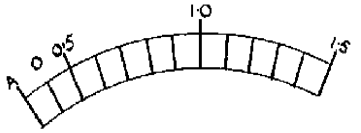


FIG 3

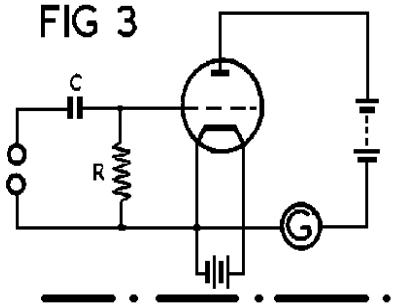


FIG 4

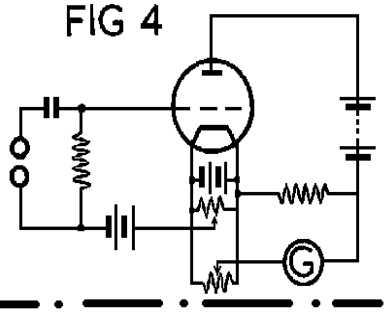
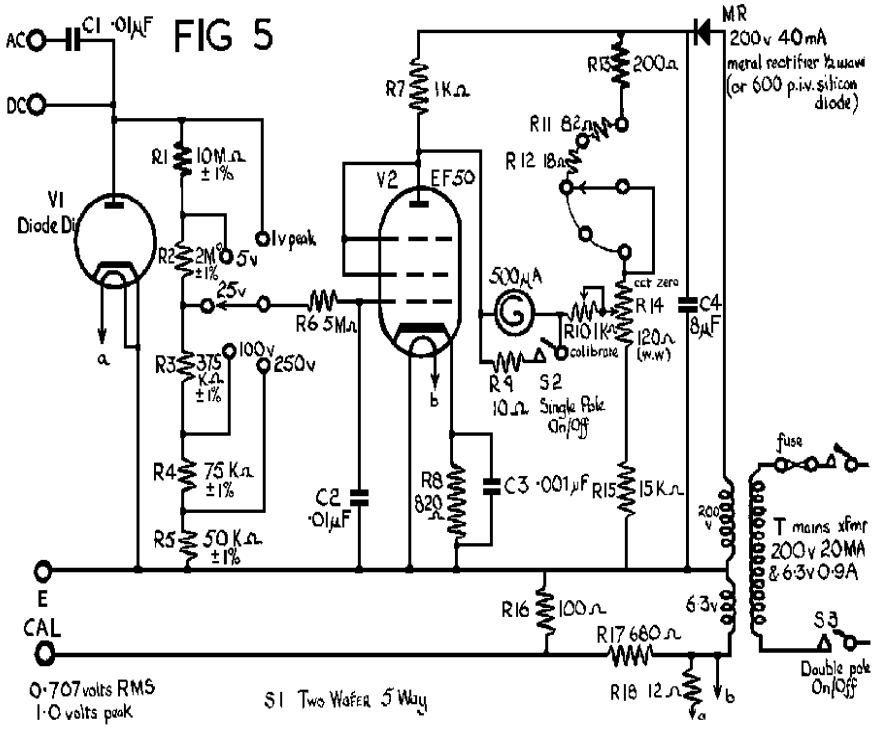


FIG 5



THE VALVE VOLTMETER

by G5YN (40)

The development of the valve voltmeter grew out of the necessity to measure voltages at high frequencies and direct voltages in high impedance circuits without disturbing conditions and obtaining false readings. At power and audio frequencies in low impedance circuits moving iron and rectifier instruments are satisfactory. For use in RF circuits their self capacitance and inductance are too high and their resistance too low. They will load, damp and detune the circuit and false readings will be obtained. The DC resistance even of modern moving coil instruments with full scale deflections of 20 μA is too low to obtain correct readings in very high resistance circuits.

The essential components of a valve voltmeter are a rectifier which produces a direct current or a change in a direct current the magnitude of which is controlled by the alternating voltage and a galvanometer, suitably calibrated, to measure the change in direct current.

The first commercial valve voltmeter, devised by Professor E.B. Moullin, was built round a bright emitter triode and a Cambridge unipivot Galvanometer. It operated on the anode bend rectifier principle and the circuit is given in figure 1. The anode voltage is the voltage of the positive end of the filament with respect to the negative end. The grid voltage is that of the slider on the resistance in the filament circuit with respect to the negative end of the filament. R is included in the anode circuit to make the scale, which would otherwise be square law, more linear. C by-passes to earth the RF component of the rectified current .

Figure 2 shows the scale. Point A is the true zero or position of rest of the pointer when no current is flowing through the galvanometer. The meter was set up by short-circuiting the input terminals and adjusting the slider of the resistance in the filament circuit until the value of the small standing anode current was such that the pointer rested over the "0" mark. So long as no grid current flowed the input impedance was high. Grid current started to flow for inputs of 1·4 DC or peak AC and at full scale deflection the input resistance is of the order of 0·5 megohms. This is low by modern standards but the input capacitance and self inductance of the grid lead was low enough for the calibration of the instrument to be independent of frequency up to 30 Mc/s.

Other models were developed working on the grid rectification principle with circuits for balancing out the standing anode current. These had the advantage that the grid capacitor enabled AC and RF measurements to be made in the presence of DC potentials. The circuit of such a simple grid rectifier pattern of valve voltmeter is shown in figure 3. R was high being of the order of 7 megohms. Whereas in an anode bend rectifier the anode current increases with the application of a signal, in the case of a grid rectifier the anode current decreases. This decrease in anode current is less than the standing anode current. In order to read this change more accurately it was customary to balance out the standing anode current so that only the change in anode current affected the meter. It was thus possible to use a very sensitive meter and measure small changes in anode current accurately. Such an arrangement is shown in figure 4.

Current practice is to separate the rectifying part of the circuit from the indicating part. Rectification is carried out by a separate diode. The rectified voltage is then applied to the grid of a valve which forms one arm of a bridge circuit. At figure 5 is the circuit of a simple valve voltmeter which will measure AC and DC potentials from 1 to 250 volts in five ranges.

FIG 6 Circuit for DC Measurement

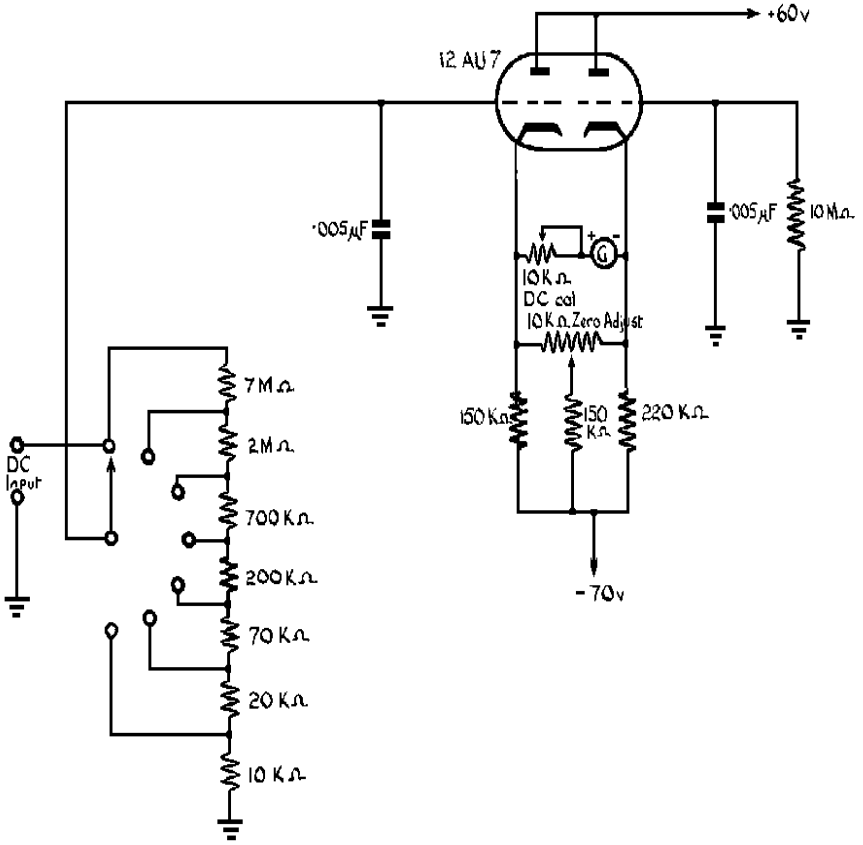
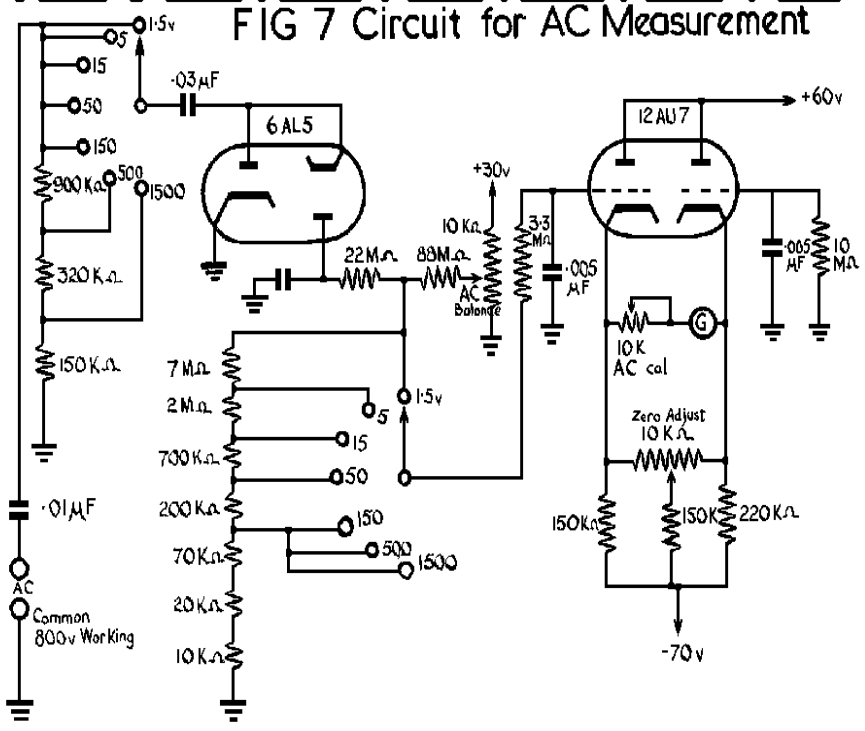


FIG 7 Circuit for AC Measurement



Component values are given so that this can be reproduced if desired. It was, in fact, described in Electronic Engineering for January 1950. It is built round a 500 microamp surplus meter. The scale reads DC and peak AC volts.

The resistor R9 and switch S2 is to shunt the meter when V2 is cold on first switching on. This keeps the meter within full scale deflection until the cathode of V2 heats up and the bridge balances.

The purpose of R11 and R12 is to maintain the zero setting on low ranges. The diode passes some current even with no applied voltage. This current passing through the chain of resistors R1 to R5 causes a voltage to be developed. Different proportions of this are applied to the bridge depending on the setting of the range switch. The values given for R11 and R12 are starting values. They must be adjusted individually until there is no change of zero setting on the first three ranges. R18 reduces the diode heater current and limits the zero voltage current .

With the values of components given the galvo is calibrated for DC and peak values of AC. This is the reason for providing a value of calibration voltage equal to 1 volt peak.

At figures 6 to 10 are the circuit arrangements in different modes of use of a valve voltmeter of well known make that can be obtained in kit form. The measuring circuit is a bridge-connected double triode with a galvanometer connected between the cathodes. The circuit for measuring DC is shown in figure 6. The voltage to be measured is applied to the grid of one triode through a potential divider. This unbalances the bridge and causes a current proportional to the applied voltage to flow through the galvo. The connections to the galvo can be reversed with a switch so that voltages either positive or negative with respect to earth can be measured. The DC prod contains a 1 megohm resistor so that DC can be measured in the presence of RF without shunting the latter with the input capacitance of the voltmeter.

To measure AC a double diode full wave-rectifier V1 is brought into circuit ahead of the measuring circuit. Potential dividers associated with the range switch arrange that at no time is more than 150 volts RMS AC applied to V1. Voltages greater than this would damage the 6AL5. This circuit is shown at figure 7.

Figure 8 shows the circuit of the probe used in conjunction with the main voltmeter to measure voltages at RF. The rectified output from the probe is plugged into the DC input socket on the voltmeter. The small silicon diode used in the probe must not be used on voltages in excess of 50 volts RMS or it will break down. The object of using a special probe at RF is to upset the working conditions of the circuit in which it measures as little as possible. The input capacitance of the probe in question has been kept down to 8pf. The construction of the probe also ensures that the series inductance of its input connection shall be as low as possible. This is to ensure that the calibration shall be independent of frequency. In this case accurate readings can be taken up to 1,000 Mc/s and useful indications up to 4,000 Mc/s.

The circuit for resistance measurement is given at figure 9. The resistance to be measured is connected in series with a 1·5 volt cell and a resistance of appropriate value chosen by the range switch. The voltage dropped across the unknown resistance is measured and the galvanometer carries a scale calibrated in ohms. It will be noted that a valve voltmeter can measure resistance over a much wider range than can an ordinary multimeter. Readings can be taken between 0·1 ohm and 1,000 Megohms. Figure 10 shows the power supply incorporated in the instrument

FIG 8 RF Probe

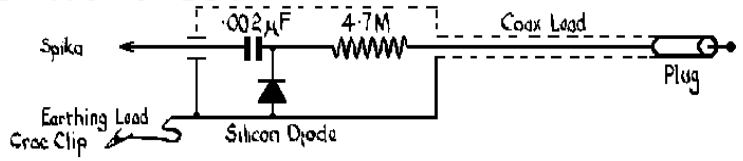


FIG 9 Circuit for Resistance

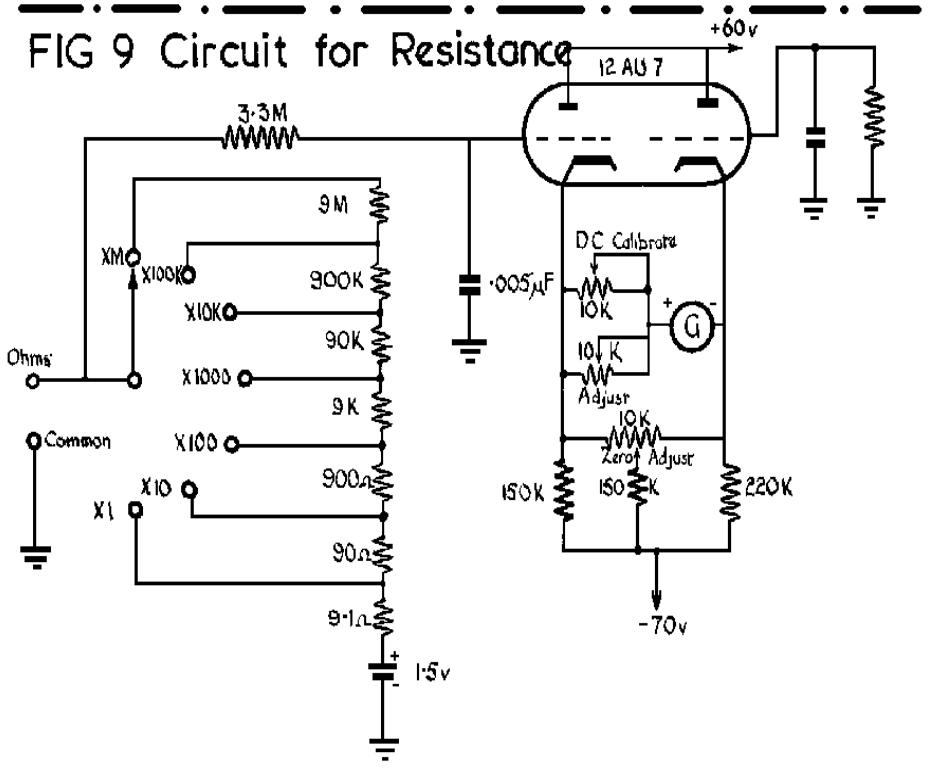
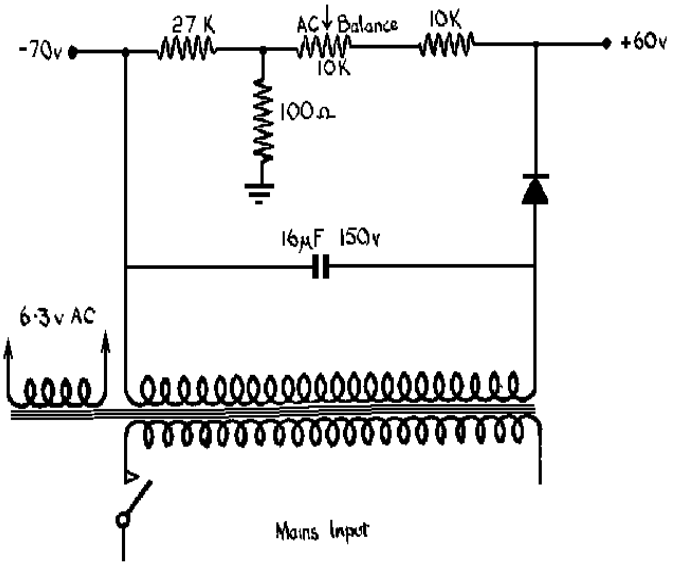


FIG 10 Power Supply



To recapitulate, the advantages of a valve voltmeter compared with a moving coil/rectifier type multimeter are:-

a. Very high input resistance. This enables accurate readings to be taken even when the internal resistance of the circuit in which measurements are being taken is high.
b. Resistance readings can be taken over a very wide range using a single 1·5 volt cell.
c. Using a probe, RF measurements can be taken with a minimum of disturbance to working conditions of the circuit. Calibration is not affected by frequency up to UHF.
d. The expensive galvanometer will not be damaged by overload as it is protected by the circuitry ahead of it.

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RECIPROCITY by G3BID (381)

If you have a valid British Amateur (sound) Licence 'A' you can now operate your Rig in several foreign countries (as well as Commonwealth countries)

These countries include:-

AUSTRIA	GERMANY	MOROCCO
U.S.A.	BELGIUM	HOLLAND
PORTUGAL	FINLAND	LUXEMBOURG
SENEGAL		

In all except FINLAND you can operate FIXED or MOBILE. In FINLAND only FIXED licences are granted to foreign radio amateurs, but it is hoped that, before the summer, mobile licences will also be issued to foreign radio amateurs.

The details of the method of application and the cost vary widely from country to country.

It is hoped to issue the details in a booklet shortly.

Meanwhile details of any country/countries may be obtained from,

HON SEC Amateur Radio Mobile Society,
N.A.S. FITCH G3FPK,
79, Murchison Road,
Leyton,
LONDON, E.10.

------000000------000000-----

Confused by the new calls which have come into use during the past two years? Here's a summary:-

G6XXX/T	-	Amateur television
G8XXX	-	Sound licence 'B'. Operation limited to voice and only above 427 Mc/s.
G5XXX	-	Foreign amateurs residing in UK.

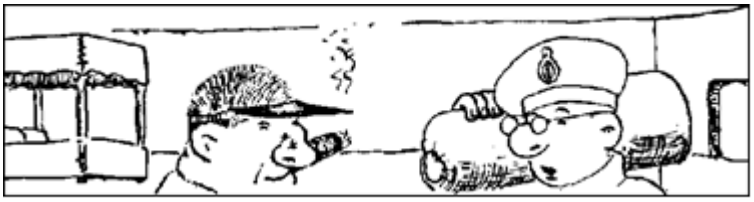
------000000------000000-------

by G3NWQ (282)

Part 1 - 'Secrets of the Bridal Suite'

It all began for me one night in the bridal suite of a hotel in Luxembourg. (No, sir, you have not picked up the wrong magazine. Read on). It had once been quite a select hotel, but now German artillery fire was altering the classical lines of the building and all the guests wore steel helmets. It was December 1944. Fresh from the flesh-pots of Brussels, and in company with another OWL BIII and an IM, I had been despatched to Luxembourg to open a hand-speed morse link from the 12th U.S. Corps to General Montgomery's headquarters in Holland. The Ardennes battle had just opened.

At 2300 one evening I reported for duty to the bridal suite now, I hasten to add, the Corps HQ receiver room. There I met my American opposite number, a tall, grizzled, cigar-smoking sergeant who was introduced to me as Pappy. He was seated in front of a BC342 receiver, flicking at a Meccano-type contraption which was connected to his remote keying lines. He was wearing a green eyeshield and reminded me of all the railway telegraph operators in all the Western films I'd ever seen. I sat down in front of my R107, fumbling for the controls through Pappy's cigar smoke



I came to know Pappy very well. He had indeed been a telegraph operator, although not on the railway, and had worked at it for almost 20 years before being conscripted. He was a great talker, especially during the early hours of the morning, when traffic was light. It was during one of these early-morning chats that he first spoke of his interest in amateur radio, a subject I'd never even heard of.

During the next few weeks I underwent a crash course in amateur radio fundamentals, learned that the Meccano-like object was a bug key and became so proficient in using it that Pappy gave it to me as a farewell present.

About this time I became aware of other, less technical, youthful pursuits and ten years were to elapse before I really became interested in amateur radio.

All this came back to me one evening in 1957 when, having finally become licensed as DL2PA, I was rag-chewing with a DL4 on 80. I learned that the DL4 had known Pappy very well during his Army service, but had since lost track of him.

I don't know where Pappy is now, but wherever he is he'll be wearing a green eyeshield, smoking a cigar and stroking a bug key paddle.

I'm still using the old bug key which Pappy so kindly presented to me and if the U.S. Signal Corps is still trying to account for a key, J36, Serial number (Phila-42) 192, I'd be glad to let them have a signature for it.

ON THE AWARDS FRONT BY GI2DZG, (5)

Well, it's been done! Bill Windle, G8VG, is the first member to gain the Society's Class I Award. Congratulations, Bill, and I hope your effort will be an inspiration to others who may think that the Award is too difficult to obtain. Bill had worked 62 members up to 23.1.67 so his claim was much less and proof that member activity is on the increase.

Since the last issue of 'Mercury', Class II Awards have been issued as follows:-

6. G3EJF
7. GM3NXA
8. G3DMK

An analysis of the claims to date shows that 3·5 mcs is the most popular band, followed by 1·8 mcs, 21 mcs, 14 mcs, 7 mcs and 28 mcs. CW seems to be the main mode and overseas members have been contacted, something which I'm sure they appreciate. Sorry to reiterate the Editor's remarks in the January issue, but over the air contacts show that many members are awaiting QSL's for QSO's made with other members, so how about getting those cards off, right now! Tnx, chaps!

Another thing, if you are going after the Awards, how about dropping me a postcard giving your latest score of stations worked. In this way, I'11 be able to gauge the interest of the members.

STOP PRESS G8VG confirms that he is delighted with his Class I Award and adds that he has worked 66 members to date with 52 confirmed. Ambition is worked and confirmed 100.

AMENDMENT No 1 to RSARS Award

a. WEF 1 APR 67 the HQ Stn will be G4RS.
b. Contacts made with G3CIO on or after 1 Apr. 67 count as contacts with a MEMBER STATION.
c. If a member who has contacted G3CLO prior to 1 Apr. 67 contacts G4RS after that date he may count the G3CIO contact as being with a Member Station.

REMINDERS

1. Make a note of the dates 24 and 25 Jun. G3CIO and G4RS (GB3RCS) will both be on the air:
   0800- 2000 GMT 24 Jun.
   0800- 1700 GMT 25 Jun.

Opportunity knocks. The Class I award is a really worthwhile class I trophy. Ask G8VG.

2. Annual subs at 5/- were due on 1 Jan 67. Have you paid yours??? 220 annual subs are now overdue.

DISCOUNT DEALS

The firms listed below offer discount to members of the Society as under:-

KW 5%	Partridge (Joystick) 15%
PETER SEYMOUR 10% (Swan eqpt)	Green Electronics 10%
TW. Electronics 10%	Daystrom 5%
	Service Trading Coy 15%

THE ORIGIN OF '73'

by G3NWQ (282)

Way back before the American Civil War the Western Union Company of America was operating land-line Morse circuits. In the cause of brevity, operators devised a numeral code, of which the following have survived:-

4 ..... Please start me
30 ..... End of transmission (or 'the end.' 'No more.')
73 ..... Best regards
88 ..... Love and kisses
99 ..... Keep out

The prosign SK or VA, still used by amateurs to indicate end of transmission, also had its origin in the land-line Morse of this period.

The traditional '73' appeared in the National Telegraphic Review and Operator's Guide, published in April 1875, where its meaning was defined as, 'My love to you.' It is reported that in a short time this meaning began to change so that '73' became a friendly greeting between operators on wire circuits.

The Western Union code ran from 1 to 92, but few of the meanings have survived. Until recently German amateurs were using 55 as a form of greeting, although its meaning was never clear.

Other commercial telegraph companies employed a similar sort of brevity code for the texts of telegrams. I remember, many years ago in Egypt, handling telegrams received via commercial companies for Army personnel stationed in the Canal Zone. At the telegraph office one would be presented with a list of phrases from which the telegram could be composed; the operators would then send the appropriate numerals. Although the meanings allotted to particular numerals are long since forgotten, I remember that some of the more frequently used phrases were:-

"Congratulations on your birthday"
"Daughter born. Both well"
"Your letter received"
"I have received no mail for one/two/three months"
"When are you coming home?"

and, of course:-

"Send money"

Quite often, garble in transmission would produce the most alarming telegrams. A bachelor would receive news that his wife 'had been delivered of twins, or that his mother-in-law was arriving by the next train. "Congratulations on the death of your uncle" and 'My husband leaving to-morrow. When are you coming home?" are other howlers which were dutifully passed on by the non-English-speaking commercial operators. Frantic requests for re-runs usually produced the correct version - eventually.

CALIBRATING THE SWR METER

by G3EJF (4)

Several designs of simple Standing Wave Meters have been published but a method of calibrating the meter is often omitted.

The value of SWR is given by: -

$$\frac{Vf + VF}{Vf - VF}$$

Where Vf = forward voltage.

VF= reflected voltage.

With the meter indicating forward voltage and the transmitter on the required frequency, adjust the Sensitivity control until full-scale deflection is obtained.

Then switch to reflected voltage and note the reading.

Reflected Voltage Reading (FSD = 1)	SWR
0·1	1·2
0·2	1·5
0·3	1·9
0·4	2·3
0·5	3
0·6	4
0·7	5·6
0·8	9
0·9	19
10	Infinity

REMINDER

Annual Subs (5/-) were due 1 Jan 67. Have you paid yours?

THE ROYAL SIGNALS AMATEUR RADIO SOCIETY

The RSARS offers membership to all who are serving, or have served, in the Regular Army, TA, AER and CADET FORCES:

Life Membership	£2.	2.	0.
Annual Membership	5.	0.	
Affiliated Club	10.	0.	

The Society runs an active HQ STN (G3CIO) at Catterick (to be re-established in April 67 as G4RS at BL4NDFORD). Membership of the Society now totals some 20 AFFILIATED CLUBS and over 500 individual subscribers.

Whether you be young or old - a licensed operator - a listener or vaguely interested in improving your communications technique you are invited to write for further details and a copy of the Society Journal, 'MERCURY', to:-

Field Secretary, RSARS,
Major L.H. Beaumont (G3RUS),
24th Signal Regiment,
Catterick Camp, Yorkshire.

The response curve of the half lattice filter can be modified in a number of ways, the simplest of which is to add a very small amount of capacitance in parallel with one of the crystals.

MEMBERS and CLUB ACTIVITIES

G3BID (381) on a DXpedition to the GAMBIA and surely original with ZD3F as fixed and ZD3F/M for mobile working.

G3NJM (7) on a short course in Catterick added his dulcet tones to those from the mike of G3CI0.

G3VXX (AFF 38) new club station now going great guns at 30th Sig Regt, BLANDFORD.

G3TAN/DL5XE (268) David Llewellyn now busily establishing a new Club Stn and off to a good start with three G members 3VYT, 3VBE, 3TAN at 22nd Sig Regt, BAOR. Look for 'em on Tues. and Thurs.

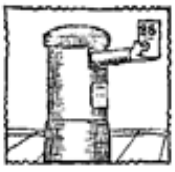
G3NWQ (282) travelled to SHREWSBURY to give a talk to G3SRT and his Club Members. A most successful evening.

G3WAA (AFF/NYA) now QRV with a DX40 at 14 Sig Regt, Gloucester and with G3NWQ as principal operator will no doubt soon be making themselves heard on 80.

G3VZQ (AFF 42) new Club Station at 35 (SM) Sig Regt TA., Birmingham 1.

GM3TLR (AFF 36) Lowland Royal Signals Amateur Radio Club, Glasgow, now on the ground and prepared to give a good account of itself when the 'Beams & Trap dipoles have been made galeproof'.

FROM THE MAILBAG



G3IFF Ray COLEY of the RM wishes to be remembered to his old friends of War Office Signals and in Comcan MALTA.

VS9ARV (418) "Ref. activity weekend 29 Jan. Called CQ RSARS all morning in a vain attempt to get my Class II Award. Hi. Nil return except for a couple of dozen Vlads and Heinz's. Quietly threw the cover off the rig and put a ·38 slug into the PA" (they are there some-where, Ray, ask Bill Windle - Ed)

G2FMT SENDS 73 TO G2VG.

G3LPC reputedly manned by 3NWQ and 3INE in the first leg of the CW ARRL Contest. No reports have been received. (possibly because the Club adjoins the Sgts mess)

RADIAL (Invalid and Bedfast Club) calls for help and we are always happy to oblige whenever possible. CAN YOU?
CHRIS KEDDLE, 79 ELFRIDA CRESCENT, BELLINGHAM, LONDON E.6. NEEDS REPLACEMENT VALVES FOR COSSER 472/UX AS FOLLOWS, EF39; ECH35; EBC39; 142; AND OM1 (HALF WAVE RECT)

JOHN FAWCETT (G3RXR) REQUIRES TWO LP FILTERS OF THE LABGEAR TYPE, QTH IS 50 THE SQUARE, GILLING WEST, RICHMOND, YORKS.
Rally round chaps, there certainly cannot be more deserving cases.

G3VM WANTS Semi Automatic Bug in good second-hand condition. Price Please to WO/Sgts Mess, AAC, HARROGATE.

STOP PRESS

G3NWQ reports 400,000 points in the first leg ARRL CW contest. Together with G3LQC and G3INE hopes to make it a million in the second leg.

Quote of the month (22 Sig Regt) (and one commended for reading by all Commanding Officers)

"Amazing how Tg Ops who live and work in D11s will sit there for ages bringing in a JA1 or VK, where they would normally give up if it was a Div Sigs or outstation. They will certainly be better operators as a result of their Ham Club activities".

(Our sentiments exactly and one which we have been preaching for years, ED)

FROM THE TREASURER
IS YOUR NUMBER HERE?

At the AGM on Oct. 29/1966 it was decided that annual subscriptions at 5/- were payable wef 1 Jan 1967.

Following subs are overdue. Will members please forward ASP to the Treasurer.

At 10/- wef 1 Jan 67

AFF 2	AFF 7	AFF 14	AFF 23	AFF 34
" 3	" 8	" 21	" 26	" 36
" 6	" 12	" 22	" 33	" 40

At 5/- wef 1 Jan 67

11 - 14 - 34 - 37 - 51 - 57 - 58 - 59 - 60 - 62 - 65 - 67 - 69 - 70 - 80 -
90 - 101 - 105 - 111- 119 - 123 (2/6) - 130 - 131 - 137 - 138 - 142 - 147 -
157 - 158 - 163 - 165 - 166 - 169 - 170 - 174 - 179 - 186 - 187 - 189 -
190 - 191 - 193 - 201 - 202 - 204 - 211 - 212 - 220 - 221 - 227 - 230 -
231 (2/6) - 232 - 236 - 237 - 238 - 242 - 243 - 244 (2/6) - 245 - 246 - 247
251 - 252 - 253 - 258 - 259 - 260 - 261 - 262 - 263 (2/6) - 265 - 266 - 269
273 - 274 - 276 - 277 - 280 - 284 - 286 - 287(2/6 - 291 - 292 - 293 - 295
296 - 297 - 298 - 300 - 301(2/6) - 303 - 304 - 305 - 306 - 308 - 309 - 310
311 - 312 - 313 - 316 - 318 - 321 - 322 - 323 - 324 - 327 - 328(2/6) - 333
334 - 337 - 342 - 343 - 345 - 346 - 317 - 348 - 349 - 350 - 351(2/6) - 352
353 - 354 - 355 - 356 - 360 - 361 - 362 - 366 - 368 - 369 - 370 - 371 -
376 (2/6) - 378 - 379 - 382(2/6) - 387 - 388 - 390 - 391 - 392 - 394 (2/6) -
398 - 399 - 400(2/6) - 401(2/6) - 403 - 404 - 406 - 407 - 409 - 411 - 412 -
413 - 415 - 419(2/6) - 420(2/6) - 421 - 423 - 424 - 425 - 426 - 429 - 432 -
433 - 434 - 437 - 438 - 439 - 440 - 441 - 443 - 444 - 445 - 448 - 449 -
450 - 451 - 454 - 456 - 465 - 466 - 468 - 469 (2/6) - 482 - 483 (2/6).

AMENDMENTS TO JAN 67 ISSUE AND NEW MEMBERS

AMATEUR LICENCEES

AMENDMENTS

DL5YK	WO I L. Kinch	405	G2VZ	C. V. Stead	464
G3DHB	Lt.Col D.R. Baynham	377	G3EJF	J. E. Hodgkins	4
G3FGN	Maj A.C. Earle	68	G3IBB	WO II R. Walmsley	37
G3TAN)	S/Sgt D.T.R. Llewellyn	268	G4JT	Maj (TOT) D.A.W.ClarkeTD	11
DL5XE)			GM3VNN	Capt T.L. Craze	210
G3NKO	Sgt R.S. Ford	227	G3NWQ	WO I (FofS) M. Caplan	282

ADDITIONS

G3VZP	L/Cpl K.T. Morrison	233	G3VXX	30 Signal Regt	AFF 38
GM3JIG	K. R. Hodge	471	G8NY	L. H. Luscombe	486
G4PX	G.W. Belsey	489	G2FMT	G.R. King	495
GW3AX	S. Thomas	496	G8PL	L. Kippin	497
G3XT	W. Oliver	498	G4LO	G.W. Fish	499
GM8SQ	G. Proctor	500	GI2BZV	R.R.B. Cowden	501
G2AUA	W. Bigley	502	G6ZT	H. Turner	503
G6DN	G. E. Dakin	504	G5FG	F.B. George	505
VS9ALV	Sgt L.V. Lawbuary	506	G3BG	Mr N.L. Button	507
G6QM	Mr A.J. Mathews	510	G3BY	W. C. Cropper	513
G3PL	A.G. Dunn	514	G2ANG	M.G. Luker	475
G2ZZ	Mr W.H. Peek	509	DL5YH	WO II (FofS) B.W. Thomas	466
G3VZQ	35 (SM) Signal Regt TA	AFF 42	G8ARA	B. King	525
G3HRU	G. Senior	524	G3VNX	A.R. Uwins	526

HON ; MEMBERSHIP

WO I R.C. Evans 494

NON - LICENCED NUMBERS

AMENDMENTS

* 30 Signal Regiment	Delete all details	AFF 38
K.R. Hodge	Oakbum, Seamill, Wiest Kilbride	471
* M.G. Luker	Delete all details	475
Capt R.A. Macheath	13, Signal Regi.ment, B.F.P.O. 40	78
A. D. Pull	Address Unknown	327
I.C. Stevenson	Address Unknown	154
WO II K. Taylor	Address Unknown	311
L/Cpl R.T. Morrison	Delete all details	233

* = denotes - Now Licensed Members.

ADDITIONS

S/Sgt (Y of S) Garvey	1 Sqn, 14th Signal Regiment, Gloucester.	488
D.P.M. Urquhart	7, Badwell Lane, Bushby, Leic's	490
R. Smith	58, Deakin Leas, Tonbridge, Kent.	491
W. Carter	34, West Parade, Peterborough.	492
G.J. Stuck	Sudbury, Suffolk.	493
R.M. Bradley	112, Radford Boulevard, Radford, Nottingham	511
J. F. Cooper	25, Chapel Ave, Liverpool 9.	512
C. Payne	'M' Troop, 252 Signal Sqn, B.F.P.O.1.	515
P. Leybourne	14 Signal Regiment, Gloucester.	516
Sig T. Low	14 Signal Regiment, Gloucester.	518
L/Cpl G. Parkhill	14 Signal Regiment, Gloucester.	519
H.J.B. Wall	54, Little Harlescott Lane, Shrewsbury.	520
Nottingham University Contingent.	TA Centre, Forest Road, Edinburgh.	AFF 40
Unit Amateur Radio Club	252 Signal Squadron, B.F.P.O. 1.	AFF 41

RULES FOR THE ROYAL SIGNALS AMATEUR RADIO AWARD

1. The object of this award is to encourage activity amongst the transmitting and listener members of Royal Signals Amateur Radio Society.

2. The award is available to all individual members of the Society and the affiliated clubs subject to the conditions laid down in these rules.

3. The award will be made in two classes and will consist of a certificate for the Class II award and a Royal Signals plaque for the Class I award .

4. Transmitting members must furnish proof of contact and Short Wave Listener members proof of having heard, member stations as detailed below:-

   For the Class II award:

   25 member stations including the Society's HQ station G3CIO/GB3RCS

   For the Class I award:

   50 member stations including the Society's HQ station G3CIO/GB3RCS.

5. Members may either submit QSL cards or other written confirmation or a list certified by two licensed radio amateurs, an officer of a National radio society or an Officer of Royal Signals. Such a list must take the following form:

   "This is to certify that I have examined QSL cards or other written confirmation from the stations listed below which confirm contacts made by/reports submitted by station .....

   Signed .....
   Appointment/Callsign .....

   Signed .....
   Appointment/Callsign .....

Date	Time	Freq. Band	Callsign of Member station contacted/heard

6. Member stations contacted/heard after 1 Jan 1965 will count towards this award. For the purposes of the Award the same member operating under different callsigns from different countries will count separately under each callsign. Thus G3NJM and 9M4MB although operated by the same member count as two member stations.

However, contacts made by this member under either callsign will count towards his own award.

7. Claims together with the supporting evidence should be sent to:-

   Mr. W. E. Caughey, Awards Manager RSARS,
   Gilnahirk Park, Cherry Valley,
   Belfast 5, Northern Ireland.

8. Details of awards presented will be published in MERCURY.

9. Transmitting members of the Society are asked to scrutinise all listener reports received and to assist by issuing QSL cards to listener members of the Society. Listener members are asked to ensure that their report cards are clearly marked "Member Royal Signals Amateur Radio Society".

10. In conjunction with the award Activity Periods will be detailed from time to time in MERCURY. These will state approximate spot frequencies and will last two or three hours. During these periods G3CIO will be on the air and UK members are particularly asked to use the HF bands in order to help overseas members to qualify for the award.

FOR YOUR DIARY

OLD COMRADES WEEKEND (CATTERICK)
24 and 25 JUN. 67

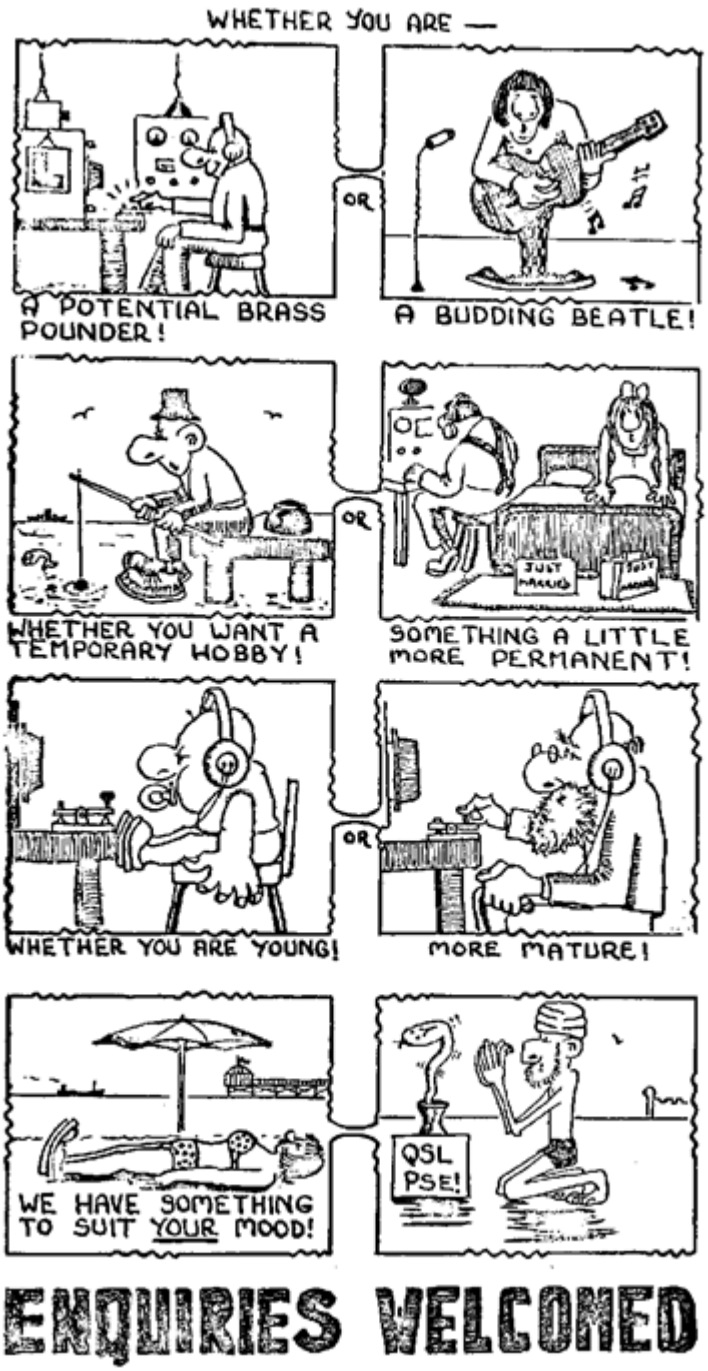
1. During Old Comrades Weekend at Catterick the following activity is planned:-

HQ STATION GB3RCS operating from BLANDFORD (G4RS location).

G3CIO operating from CATTERICK CAMP.

2. Both the stations will be active from:
0800 - 2000 hrs GMT on Sat. 24 Jun.
0800 - 1700 hrs GMT on Sun. 25 Jun.

3. It is hoped that simultaneous operation on a number of bands will be possible from GB3RCS.


WHETHER YOU ARE —
OR
A POTENTIAL BRASS POUNDER!
A BUDDING BEATLE!
OR
WHETHER YOU WANT A TEMPORARY HOBBY!
SOMETHING A LITTLE MORE PERMANENT!
OR
WHETHER YOU ARE YOUNG!
MORE MATURE!
WE HAVE SOMETHING TO SUIT YOUR MOOD!
QSL PSE!
ENQUIRIES WELCOMED

AVAILABLE FROM HQ

Members' Notepaper This is a good quality white paper and costs 8/4d. per 100 sheets post free.

Members' QSL Cards The basic card cost 37/6d. per 500 post free. We can overprint your callsign, Name and address in black, red, blue or green for a further 15/- per 500, making a total price of 52/6d. per 500, less than a penny farthing each.

ORDER FORM
(Block letters please)

Name .....Callsign .....
Address .....
.....

I enclose Cheque/Postal Order for .....Please supply :-

.....sheets of Members Notepaper at 8/4d per 100

.....Basic QSL cards at 37/6 per 500

.....QSL cards overprinted in .....(State colour) at 52/6 per 500

Cheques and Postal Orders to be crossed and made payable to
Royal Signals Amateur Radio Society.