The SHORT WAVE Magazine

2/6

VOL. XVII APRIL, 1959 NUMBER 2

For the
Radio Amateur
and Amateur Radio

between this stage and the previous one induced adequate volts even although very loosely coupled, which of course is a very desirable feature. The anode coil L4 for this stage was again similiar to the other anode coils, the same attention being paid to decoupling arrangements as previously mentioned. It was considered necessary that the push-pull oscillator stage should have its own regulated HT supply.

THE MOBILE RALLY CALENDAR

The full list of meetings scheduled is now as follows:

April 26: North Midland Mobile Rally, Trentham Gardens, Stoke-on-Trent.

May 3: Cornish Mobile Rally, Hamfest and Exhibition at Penryn, Cornwall.

May 10: Cheltenham Mobile Rally.

May 24: Northern Mobile Rally, Harewood House (on A61, Leeds-Harrogate), from 12.30 to 6.00 p.m. Talk-in on both LF bands. Organised by Spen Valley Amateur Radio Society. Refreshments and admission charge.

June 21: Harlow & District Radio Society Mobile Rally at Magdalen Laver village hall (Essex). Talk-in on LF bands. Refreshments.

August 16: South Shields Mobile Rally at Bents Park Recreation Ground, South Shields, Co. Durham, in conjunction with the local Annual Flower Show.

August 16: Derby & District Amateur Radio Society Mobile Rally.

August 30: South Manchester & Stockport Radio Societies' joint Mobile Rally.

September 6: London Mobile Rally, Festival Gardens, Battersea Park.

September 13: Woburn Abbey Mobile Rally.

September 20: Hamfest and Mobile Rally, Lincoln.

* * *

For the **North Midland** event on Sunday 26th, make for Stoke-on-Trent, and four miles south on the A34 look for the AA local direction signs for Trentham Gardens, for which there is a small entrance charge. Have a QSL card in your windscreen for correct directions to the car park reserved for the Rally. If you are operating /M, the talk-in stations will be G3GBU for Top Band, G3MAR for 80 and 10 metres, and G3BA for two metres, all suffixed /A. Should the weather be wet there is ample covered accommodation, with full catering facilities (no advance booking necessary). For the family, there are many attractions at Trentham Gardens, including a boating lake, miniature railway, and extensive gardens and hot houses.

* * *

At the first committee meeting of the recently-formed Amateur Radio Mobile Society (*see* p.15, March SHORT WAVE MAGAZINE), R. G. Shears, G8KW, was elected chairman and G. E. Storey, G3HTC (10 Avon Road, Sunbury-on-Thames, Middlesex) accepted appointment as honorary secretary, with V. A. Frisbee, G3KVF, hon. treasurer. General organisation was discussed and rules formulated. All correspondence and applications for membership should be addressed to G3HTC. It is understood that A.R.M.S. is to function as an independent, self-supporting organisation within the general framework of Amateur Radio in the U.K. Indeed, this is the only way it can expect to attract the support of the general body of /M enthusiasts.

* * *

For the **Cheltenham** Mobile Rally, to be held in Montpelier Gardens (in the middle of the town) on May 10, a completely new event is planned which will test the map-reading and navigating ability and operating skill of contestants, as well as the efficiency of their gear under practical conditions. This event will involve what is hoped will be an interesting and enjoyable run through the Cotswold country. An equipment display is also being arranged, and the talk-in stations will be G3GPW/A on 1920 kc and G5BM/P on 145·27 mc. Further details can be obtained from L. W. Lewis, G8ML, 117 Fairview Road, Cheltenham, Glos.

"CW/PHONE TRANSMITTER FOR FIVE BANDS"

From G3AEX (Bromley, Kent) we have a note that a limiting resistor (of 8,000 ohms, rated 5w.) should be placed in series with V10, Fig.4, to prevent over-loading of the VR150/30; he also points out that as the maximum screen voltage rating for the 6146 (the PA valves in Fig.4, p.11, March issue) is 250v. ICAS, with 150-160 volts for phone operation, it would be preferable to keep V10 in circuit on both CW and phone. The author of the article, G3JWZ, of Stoke-on-Trent, says that in fact he uses a 5,000-ohm 10w. resistor in series with L5, on the HT side, to keep the screen voltage down to 150v. in both modes.

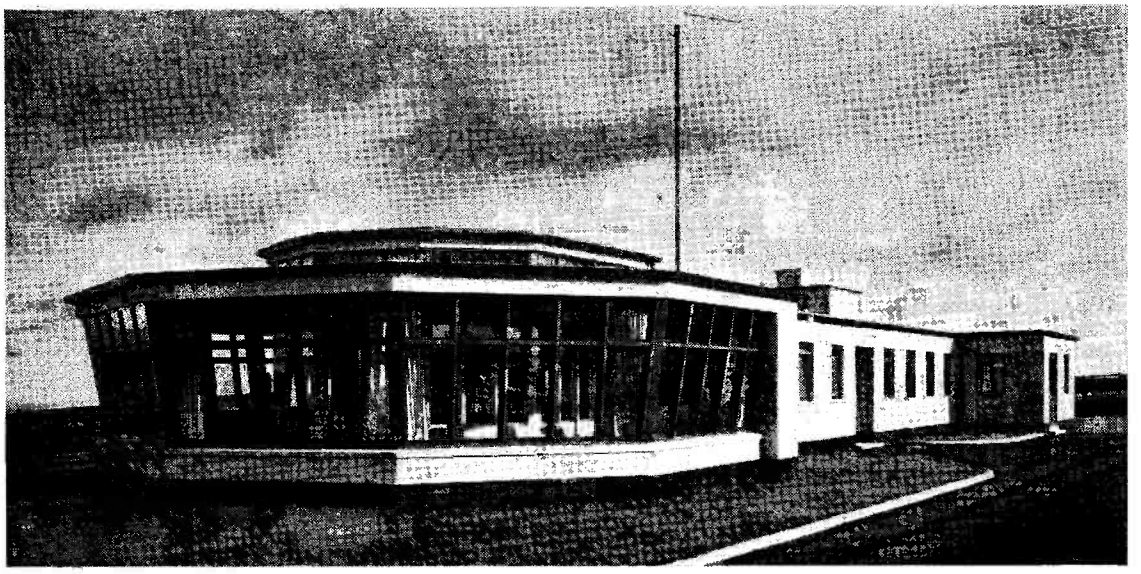
SPECIAL-ACTIVITY AMATEUR STATIONS

In connection with various local events, we have been asked to publicise the following arrangements:

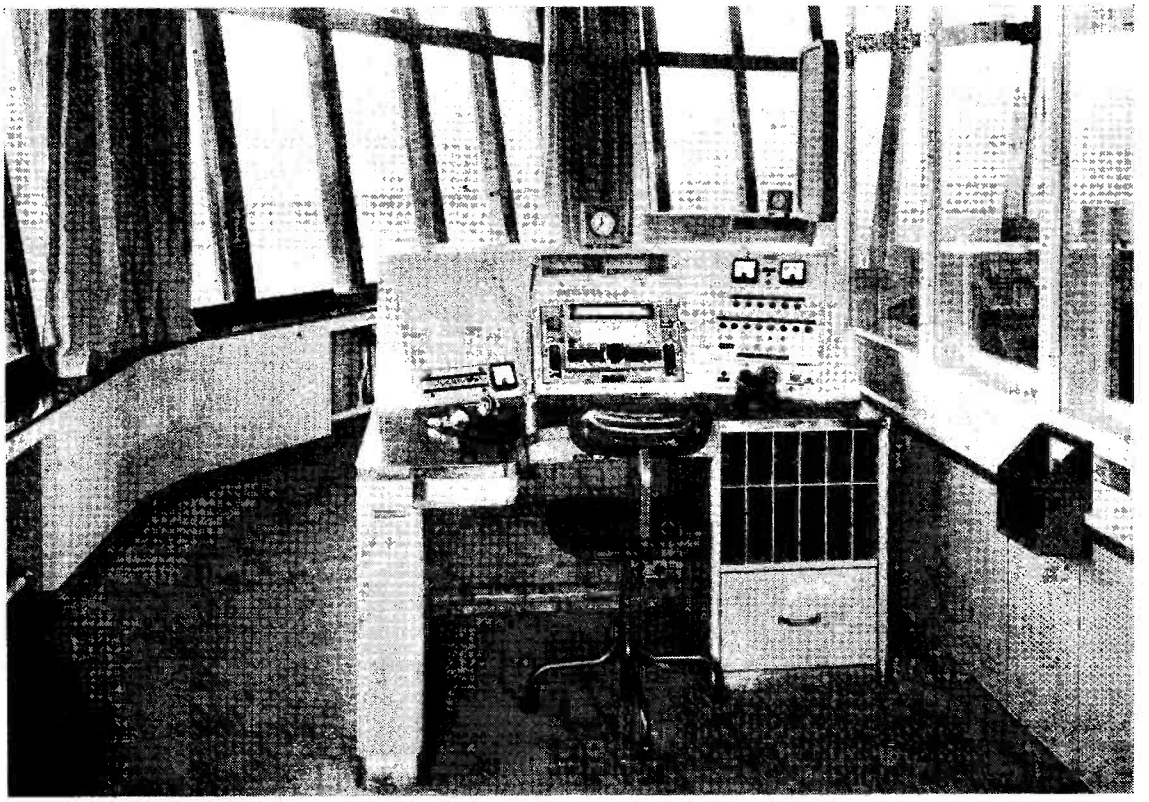
On May 1, an amateur station signing GB3RC will be in operation in the Pier Pavilion, South Pier, Lowestoft, when the Lowestoft & Beccles Amateur Radio Club (hon. sec.: P. Hayward, 60 Egerton Road, Lowestoft) joins with the Lowestoft Rotary Club for a Careers and Hobbies Exhibition.

During the week-end May 9-10, G3HDB/A will be operated on 80-40-20 metres from Newnham, Warks., for the John Lewis Rover Crew of Kenilworth, who will be holding a radio camp. Contacts on both phone and CW will be welcomed, particularly with other Scouts. QSL's can be sent to: J. H. Whitby, G3HDB, 24 Thornby Avenue, Kenilworth, Warwickshire.

For the Lincolnshire Show on June 17-18, G3IHZ/A will be on the air with a Panda Cub, Eddystone S.640 and a Minibeam complete with telescopic mast. Contacts will be greatly appreciated, and can be QSL'd *via* G. F. C. Layzell, G3IHZ/G3AMM, Foxhills School, Foxhills Road, Scunthorpe, Lincs.



Smart modern appearance of the building for the new G.P.O. coast station at Ilfracombe, North Devon. The actual site is Mullacott Cross, about two miles out of Ilfracombe on the Barnstaple road, at the turn off to Woolacombe. Operation is on medium-wave CW, and telephony on the 1.8 mc band. The mast in the background pairs with another similar mast, supporting between them the medium-wave flat four-wire aerial; for 1·8 mc telephony operation, the masts themselves are used as vertical aerials.



The operator's position at Ilfracombe Radio, the new G.P.O. station for working coastal shipping in the Bristol Channel and its approaches. Transmission is on CW/MCW and phone, and, though normally powered from the public supply mains, the station is equipped with a diesel generating set for emergency use. Recently opened for service, it is on a commanding site on the high ground behind Ilfracombe, with a clear getaway across the Channel.

(Photographs by courtesy of H.M. Postmaster-General.

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.

G3MMI, G. Cole, 3 Matlock Road, Norwich, Norfolk. *(Station in London.)*

G3NGA, M. Breeze, 95 Shanklin Drive, Leicester.

G3NHN, G. Snutch, 39 Kingston Avenue, Wigston Fields, Leicester.

GM3NHQ, T. Harrison, 6 Meadow Green, Sauchie, by Alloa, Clackmannanshire.

G3NHT, G. A. Knight, 20 Grove Road, Broadwater, Worthing Sussex. *(Tel.: Worthing 4789.)*

G3NHX, G. L. Quarterman, 37 Bridge Road, Epsom, Surrey.

G3NIB, Amateur Radio Club, British Timken, Ltd., Duston, Northampton, Northants.

G3NID, I. A. McC. Douglas, c/o Officers' Mess, R.A.F. Station, Hullavington, Chippenham, Wilts.

G3NII, R. A. Porter, 23 Spencer Gate, St. Albans, Herts.

G3NIX, R. C. Hewitt, 120 Chatham Avenue, Hayes, Bromley, Kent. *(Tel.: HURstway 3147.)*

CHANGE OF ADDRESS

G2DHV, G. V. Haylock, 167 Engleheart Road, Catford, London, S.E.6.

G2PS, E. A. Parsons, 22 Ferndale, Waterlooville, Portsmouth, Hants.

G3FKI, E. C. Lambert, 19 Holden Avenue, Kingsbury, London, N.W.9.

G3FPQ, D. L. Courtier-Dutton, Blacklands House, Elstead, Surrey.

G3IIR, E. W. Yeomanson, 32 Gaynesford Road, Forest Hill, London, S.E.23.

GW3ITD, M. R. Davies, c/o Rhoslwyn, Llanybyther, Carms., S. Wales.

G3JBU, B. Hayes, 31 Beverley Crescent, The Headlands, Northampton.

G3KHK, D. Connolly *(ex-DL2PL, GI3KHK),* Mundesley-on-Sea, Norwich, Norfolk.

GM3KLW, J. Fraser, 44 Lammerview, Tranent, East Lothian.

G3KUN, J. B. M. Hain, 2 Willowcourt Avenue, Kenton, Harrow, Middlesex.

G3LTF, P. K. Blair, 21 Lodge Road, Writtle, Essex.

G3LXX, H. B. Bellairs, 118 Albert Street, Grimsby, Lincs.

G3MEA, S. Harle, 66 Wigmore Lane, Stopsley, Luton, Beds.

GM3NG, G. Gray, 9 Belstane Road, Carluke, Lanarkshire.

G3RD, E. Stevens, 6 Southfields Avenue, Ashford, Middlesex.

GW3VL, P. R. Jenkins, The Cottage, Upper Porthkerry, Nr. Barry, Glam.

G6CS, P. T. W. Castle, 24 Medway Road, Gossops Green, Crawley, Sussex.

CORRECTION

GM3KPD, A. M. Coutts, 5 Parkgrove Loan, Barnton, Edinburgh, 4.

"TRIP TO ISRAEL"

This item, on p.19 of our March issue, was written from notes by G2BBZ (London, N.W.7). He now asks us to make it clear that it was a holiday trip, that he did not meet 40 amateurs at 4X4CL's, that 4X4CJ arranged the Tel-Aviv meeting and 4X4FF that at Haifa, that the Kol-Zion BC transmitter site is near Ashkelon but not in it, that his guide there was the Deputy-Director of Communications, and that the development area is Eilat and not the Negev, which is barren.

SPRING ISSUE — "RADIO AMATEUR CALL BOOK"

The latest issue of the *Radio Amateur Call Book* —the only directory to the radio amateurs of the whole world—is the Spring, 1959, Edition of the 37th volume. More than a quarter of a million amateur-station addresses are given, arranged alphabetically by country prefix, callsign, name and full postal address. The U.K. section is the most complete and up-to-date now in print, including as it does all new callsigns issued and changes of address notified up to January this year. Two versions of the *Call Book* are always available from us—the Full Edition, which costs 41s. 6d. post free, and the Abridged Edition, at 25s., which omits only the American amateur-station listings. The *Radio Amateur Call Book,* in both versions, also gives a great deal of incidental DX information, such as the Zone area for each country, and its QSL bureau. If you are at all interested in DX or QSL'ing, you cannot be without the *Call Book.* Orders, with remittance, should be sent to our Publications Dept., at the office address.

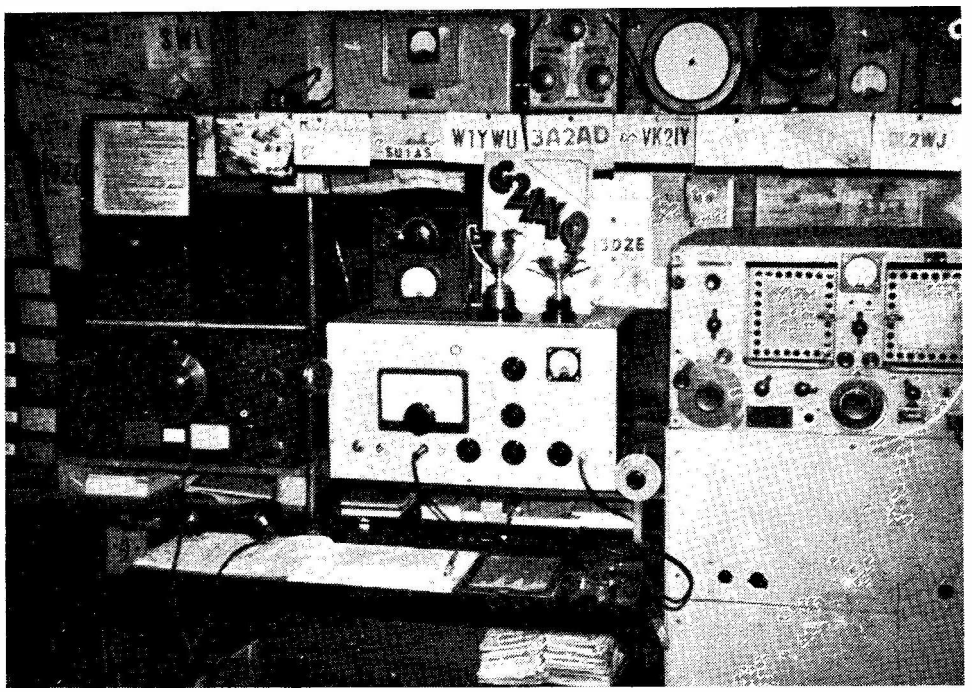
BRITISH MARINE RADAR

On Friday, April 10, a lecture entitled "A Modern British Marine Radar (B.T.H. 601 Escort)" will be given to the Student Section of the Radar and Electronics Association at Norwood Technical College (Room 214), Knight's Hill, London, S.E.27, commencing at 7.00 p.m. Non-members of the Association will be welcome.

SURPRISING FIGURES

At the last count (December 31) the total of radio amateur licences in issue in the U.K. was 8,409. On March 14, the G.P.O. issued the 3,000th licence for the *radio control of models.* There is, of course, no sort of examination for this category of amateur transmitting licence, which only costs £1 and remains in force for five years. But it is a little surprising, to say the least, that there is so much apparent activity on model-control frequencies.

The Other Man's Station G2AYQ



FEATURED this month is the station owned and operated by T. Bowden, G2AYQ, Albany House, St. Agnes, Cornwall. First licensed AA-2AYQ in 1938 at Paignton, S. Devon, he was a keen SWL for many years before that, and was about ready to take the Morse Test for a full call when war broke out. Like many others, he continued his radio activities during the war, joining the Royal Corps of Signals in September, 1939 ; he lost his left arm early in the war, but served on until 1945 as an instructor. May, 1946, saw him back on the air as G2AYQ, from Bristol, working CW only on 40 metres with a QRP battery rig running 2-5 watts (depending on the state of the batteries). Later, a generator was acquired, and power went up to 10 watts, phone and CW, on 160-80-40 metres.

In October of 1949, the station moved to the present QTH, with an AC mains supply. This time the transmitter was a B2, plate-and-screen modulated by a pair of 6L6's in Class-AB1, and an R.107 receiver replaced the ex-R.A.F. R.1082 TRF job ; a later addition was a rather badly battered Sender Type 12, which was modified and rebuilt to take an 807 in the PA, plate-and-screen modulated by a pair of KT66's. By November, 1957, the R.107 had been replaced by an HRO, and a Panda Cub acquired.

The station now is completely press-button and relay-controlled, the relays being operated by a separate 12v. DC pack. Bands worked are 160 to 10 metres inclusive. The aerials in use at the moment are a "G8KW," a 10-metre dipole, and a whip which, with loading coils, can be used on several bands. Other gear includes a Class-D Wavemeter, a field strength/modulation meter, an ATU for 10-15-20 metres, and another for 20-40-80.

As regards statistics, the present total of countries worked is 127, with 96C confirmed, while the contacts made on the various bands run into thousands, with an input never exceeding 60 watts on the HF bands. The cups visible in the photograph were won in transmitting contests organised by the West Cornwall Radio Club, now known as the Cornish Radio and Television Club, of which G2AYQ is a member.

Housed in a wooden shack in the garden, the station is surmounted by a pair of ARRL-type masts, made of 2 in. by 2 in. Oregon pine, 37 feet high, which carry the G8KW main aerial. These masts, constructed and erected in May, 1953, are at 350 ft. a.s.l. and have stood up to some terrific battering by south-westerly gales, on an exposed site without any windbreak. G2AYQ can recommend this type of home-constructed mast, which is cheap and easy to build and will be entirely satisfactory provided it is properly guyed. (The design and construction of this mast is covered in all recent issues of the ARRL *Radio Amateur's Handbook.)*

THE MONTH WITH THE CLUBS

By *"Club Secretary"*

(Deadline for May issue : APRIL 17)

FROM time to time it seems necessary to repeat our hints to Club Secretaries concerning monthly reports. Here, therefore, is the relevant information in its most condensed form.

The "deadline" is usually the second Friday of the month, but occasionally (four times a year) the third. It is always given at the head of this column. Notes reaching us even one day later than the date given will stand a very poor chance of being incorporated in this section.

Please note that we are working nearly a month ahead; so that there is not much point in catching the April 17 deadline with news of meetings occurring on April 20 and 27, for instance. The news you send in for April 17 will appear in print on May 8, and should therefore concern meetings *after* that date, unless it is written in retrospect.

Club news of all kinds is welcomed, but the kind most likely to benefit individual Clubs is advance publicity for future meetings. Therefore, please give the date, time, meeting-place, subject of the meeting, and lecturer's name.

Some Clubs supply us with a list of future meetings going some months forward. These are automatically sorted out, and the appropriate meetings mentioned month by month.

Barnet meet on April 28 for an NFD Discussion, and on May 26 for a talk by G2AHL on Mobile Operation—both meetings at the Red Lion Hotel, High Barnet. **Bradford** have a lecture on Stereophonic Sound on April 7, and a visit to the Esholt Sewage Works on April 21. May 5 is the date for NFD Discussions. Meetings are at 66 Little Horton Lane, Bradford 5, at 7.30 p.m.

The **British Timken** Amateur Radio Club was formed in February; although the product of the engineering works concerned is tapered roller bearings, there is no lack of interest in radio, and membership is 17, including G3JXU and G3JJW. One asset will be a 270-ft. aerial, 90 feet up, between two of the floodlight towers on the sports field! The Club call-sign is G3NIB. On March 8 they visited the BBC at Daventry, and are hoping to arrange more outside visits for the future.

Flintshire announce a Junk Sale on April 6, and a meeting to discuss field days on the 20th. On May 3 they hold their first Two-metre Field Day, and on the 4th they have a talk by G3ERB.

The April meeting at **Halifax** takes the form of a Quiz on Licence Conditions, and for May a Junk Sale is on the books. **Romford** have their Junk Sale on April 7, a Mobile Evening on the 14th, a Lecturette by Ken Adams on the 21st, and a visit to the picture room at Electra House on the 28th.

Shefford are holding their NFD meeting on April 3; on the 10th they have a talk on Fault-finding procedure, on the 17th a Film Show, and on the 24th a "Morse evening." All at 7.45 p.m., Digswell House, and refreshments available.

Cornish met at Falmouth on March 4 and discussed the GPO's TV Detector Van and its method of operation! Members also heard about FSK and Teletype. The Hamfest and Mobile Exhibition will be held on May 3, at the King's Arms, Penryn, and the April meeting is the AGM.

Enfield forward another copy of their *Lea Valley Reflector*, from which we gather that their February and March meetings were very successful, but there are no details of coming events. **Hull** will be meeting on April 7 for a discussion on Simple Tx Equipment, and on the 28th for Further Notes on Test Equipment. Their Clubroom facilities are being improved and some gear has already been assembled. Club Nights are now the second and last Tuesdays, over the Royal Oak Hotel, Ferensway, Hull, to which all are welcome.

Lothians have had two interesting talks—on Air Traffic Control and on SSB. The outcome of the first will be a visit to the local Turnhouse ATC section. On April 16 the subject is TVI—Causes and Cures; and on April 30, Radio Control of Models.

Mitcham re-elected their secretary at the AGM, and he now goes by the call of G3NFA. Meetings every Friday, 8 p.m. at The Cannons, Madeira Road, Mitcham.

Stoke-on-Trent report increased activity and a growing membership. Club members are giving a talk and demonstration to the local Senior Scouts, and a general talk on Amateur Radio will be given to the Newcastle Young Conservative Association by G3DML on April 30. Normal meetings are Tuesdays, 8 p.m., at The Cottage, Oak Hill—prospective new members always welcome.

Bury will meet at the George Hotel, Kay Gardens, on April 14 (8 p.m.) for a talk by G2HW—subject to be announced later. **Medway** meet on alternate Mondays at the Viscount Hardinge, Gillingham, with well attended meetings. At the AGM they elected G2CBA president, G3KNO chairman and G3LCC hon. sec. (*see* panel for address). Next meeting is on April 6, and fortnightly thereafter, with Film Shows, Lectures, Club Contests and so on.

Leeds University Union have their own radio society, with a membership of about 30. They hold fortnightly lecture meetings during the first two terms of the session, and operate G3LUU on Wednesdays and Saturdays. They are hoping to arrange a net of University and College stations for Wednesday afternoons; up to the present, Southampton (G3KMI),

Nottingham (G3KTU/A) and Swansea (GW3KMA) have taken part. Others will be welcomed at 1430 on Wednesdays, on the 7 mc band—no exact frequency given.

North Kent will be hearing a lecture from the Whiteley Electrical Radio Co. on April 23, covering the history and development of Hi-Fi equipment, with demonstrations of both single-channel and stereo. This will be a special "open" meeting, to which *all* are invited. Prior to that, on April 9 they will be having a Film Show.

A new club recently formed is the **Guildford** and District Radio Society, which has started with a small membership but is hoping for a better response from the area—the hon. secretary (*see* panel) would be very glad to hear as soon as possible from prospective members.

Acton, Brentford & Chiswick have had a lecture from G2QY on SSB; on April 21 they will be discussing field day plans. Morse practice continues every Tuesday, 7.30 p.m., in the Clubroom at 66 High Road, Chiswick, W.4.

Clifton had a Junk Sale and a lecture on the Avometer during March; on April 3, G31S will give a lecture-demonstration on Aerials and the Amateur; on the 17th G3HZI and other members will stage a lecture and demonstration on D-F, when members of Mitcham will be entertained. Meetings every Friday at 225 New Cross Road, S.E.14.

Southgate, Finchley & District recently heard a talk by G5DJ on Erection of Poles and Towers, followed by a colour-film on the erection of the TV tower at the Crystal Palace. Next meeting is on April 9 at Arnos School, Wilmer Way, N.14, when it is hoped that there will be a talk on Stable VFO's.

Stockport have had lectures on Power Packs and Video Tape Recording, and on March 21 they took part in a Spring Fair Exhibition, with closed-circuit amateur TV as well as a station on six bands. April 8 is booked for a lecture on UHF by G3AYT, and April 22 for a Junk Sale.

Surrey (Croydon) meet on April 14 for their AGM, 7.30 p.m. at the Blacksmith's Arms, North End, Croydon. The Club is now in its 24th year, and looking forward to their Silver Jubilee, which coincides with Croydon's millenary celebrations!

Torbay had an attendance of 80 or so at their Annual Dinner, one of the best yet. The Construction Cup was won by G3ABU for his mobile transmitter-receiver. G3ABU is also giving RAE instruction at the Clubroom on Tuesday nights. VS9AQ, home from Aden, is now signing G3MIR from Starcross.

Aberdeen are busy decorating until April 3, while the junior members are studying intensively for RAE. On April 10 there will be a lecture on BCI and TVI by GM3FKS; on the 17th a field day discussion; and on the 24th a lecture on Licence Conditions (for the RAE series). Meetings every Friday, 7.30 p.m. at 6 Blenheim Lane, Aberdeen.

Chester held an extraordinary general meeting and re-named themselves the Chester and District Amateur Radio Society. G3ATZ, a former secretary, has now taken over the office once again (*see* panel).

Edgware continue to meet at the Stanmore Community Centre, Merrion Avenue, Stanmore, on Wednesday evenings. They are now active on two metres, and new members, especially those interested in VHF, will be welcome. It is hoped to hold a D-F Contest during April.

Gravesend have six members preparing for RAE—last year seven out of seven passed! Recent talks have covered Transmitter Design and CC Converters, and on April 2 they were due to have a lecture on the Vanguard Transmitter from G8KW. Meetings every Thursday, 7.30 p.m. at The Old Sun, Crete Hall Road, Northfleet.

Nottingham (A.R.C.) will be holding their AGM on April 7; several important matters will be discussed, and it is hoped that the Club will be put on a firmer basis as a result.

Purley will be hearing VK3ACS/G3NFG on The Experiences of an Australian Ham at their meeting on April 10—at the Railwaymen's Hall, Whytecliffe Road, Purley. Future meetings will be on the second Friday, instead of the third.

NAMES AND ADDRESSES OF CLUB SECRETARIES REPORTING IN THIS ISSUE:

ABERDEEN: W. K. Heggie, 80 Leslie Terrace, Aberdeen.
ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, London, W.3.
BARNET: E. W. Brett, G3LUY, 28 Edward House, Edward Grove, New Barnet.
BRADFORD: D. M. Pratt, G3KEP, Glenluce, Lyndale Road, Eldwick, Bingley.
BRITISH TIMKEN: D. G. Chatfield, G3JXU, 55 Bush Hill, Weston Favell, Northampton.
BURY: Mrs. Jean Hodgkins, G3JZP, 24 Beryl Avenue, Tottington, Bury.
CHESTER: H. Morris, G3ATZ, 24 Kingsley Road, Boughton Heath, Chester.
CLIFTON: C. H. Bullivant, G3DIC, 25 St. Fillans Road, London, S.E.6.
CORNISH: J. Brown, G3LPB, Marlborough Farm, Falmouth.
EDGWARE: E. J. Hartshorn, 19 Dryden Road, Harrow Weald, Middx.
ENFIELD: V. Croucher, G3AFY, 15 Nelson Road, London, N.15.
FLINTSHIRE: J. Thornton Lawrence, GW3JGA, 9 East Avenue, Bryn Newydd, Prestatyn.
GRAVESEND: D. Andrews, G3MXJ, 42 The Fairway, Gravesend.
GUILDFORD: S. W. Saddington, G2FXQ, 59 Hamilton Avenue, Pyrford, Woking, Surrey.
HALIFAX: A. Robinson, G3MDW, 7 Upper Brockholes, Ogden, Halifax.
HULL: G. G. Wray, G3MVO, 93 Wolfreton Lane, Willerby, Hull.
LEEDS UNIVERSITY UNION: J. R. Spain, The University Union, University Road, Leeds 2.
LOTHIANS: L. Lumsden, 33 Hillview Drive, Edinburgh 12.
MEDWAY: G. A. Gascoigne, G3LCC, 78 Valley View Road, Rochester.
MITCHAM: D. Johnston, G3NFA, 23 Woodland Way, Mitcham.
NOTTINGHAM: E. C. Weatherall, 16 Avebury Close, Clifton, Nottingham.
NORTH KENT: D. W. Wooderson, G3HKX, 39 Woolwich Road, Bexleyheath.
PURLEY: E. R. Honeywood, G3GKF, 105 Whytecliffe Road, Purley.
ROMFORD: L. S. Owen, G3MDP, 53 Applegarth Drive, Newbury Park, Ilford.
SHEFFORD: G. R. Cobb, G3IXG, 7 Hitchin Road, Shefford.
SOUTHGATE, FINCHLEY & DISTRICT: A. G. Edwards, G3MBL, 244 Ballards Lane, North Finchley, London, N.12.
SPEN VALLEY: N. Pride, 100 Raikes Lane, Birstall, Leeds.
STOCKPORT: G. Phillips, G3FYE, 7 Germans Buildings, Buxton Road, Stockport.
STOKE-ON-TRENT: W. Luscott, 36 Rothsay Avenue, Sneyd Green, Hanley, Stoke-on-Trent.
SURREY (CROYDON): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
TORBAY: G. Western, G3LFL, 118 Salisbury Avenue, Barton, Torquay.
WELLINGBOROUGH: P. E. B. Butler, 88 Wellingborough Road, Rushden.

SMALL ADVERTISEMENTS

("SITUATIONS" AND "TRADE")

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

G3CGD QSL's. Fixed and mobile samples on request. Printing enquiries welcome. — 30 St. Luke's Road, Cheltenham.

70 mc BI-SQUARE BEAMS, 10 dB gain. A few in stock, £4 each to clear. — Labgear, Ltd., Willow Place, Cambridge.

WANTED FOR CASH: Good clean Communication Receivers and SSB Equipment.—Short Wave (Hull) Radio, 30/32 Princes Avenue, Hull, *(Telephone No. 18953.)*

QSL CARDS AND LOG BOOKS, G.P.O. APPROVED. CHEAPEST, BEST. PROMPT DELIVERY. SAMPLES. — ATKINSON BROS., PRINTERS, LOOE, CORNWALL.

WANTED: BC610 Hallicrafters, E.T.-4336 Transmitters, BC-312 Receivers, BC-221 Frequency Meters and spare parts for all above. Best cash prices.—P.C.A. Radio, Beavor Lane, Hammersmith, W.6.

QSL's and Logs by Minerva. The best there are.—Samples from Minerva Press, 2 New Road, Brentwood, Essex.

WILL CUSTOMER who ordered Aerial Coupling Condenser for Geloso G212-TR Transmitter, please write to K. W. Electronics, Ltd., 136 Birchwood Road, Wilmington, Dartford, Kent—or, if convenient, ring *Swanley Junction 2137.*

JOIN my Tape Recorder Morse Code and Radio Club. Stamp for details.—Mitchell, 150 Station Avenue, West Ewell, Surrey.

NEW SURPLUS NITROGOL paper capacitors, 4 μF, 600v., 3/6; 4 μF, 450v., 2/6; 2 μF, 5000v., 11/6, post free. TRANSMITTERS T1131 and ET4336, £10 each, delivery extra. — G.W.M. Radio, 40/42 Portland Road, Worthing, Sussex.

TAPE DECK, Truvox Mk. IV. with Counter and Type "C" Amplifier, as new, perfect, £25. HRO Senior, overhauled, 4 coils (two bandspread), AC, PSU, £23.—G8KW, 136 Birchwood Road, Wilmington, Dartford, Kent.

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 1/6 extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, S.W.1.

EDDYSTONE 888, just vetted by Manufacturers, excellent condition, £70 (o.n.o.); purchased 888A. ZC1, Mk. II, as new, with accessories, offers? American "Master Mobile" 160-metre antenna loading coil, offers?—G3DO, 31 Ladywood Road, Sutton Coldfield, Warwickshire.

SMALL ADVERTISEMENTS, READERS—*continued*

SALE 3E29's, £2. 24G's £1 ; pair each. £5 Lot.—Machin, 62 Valley Way, Stevenage, Herts.

EDDYSTONE 740, complete with Eddystone S-meter and speaker ; also phones (all good condition), £30 ; half carriage.—Day, 48 Woodstock Road, Begbroke, Oxford.

FOR SALE: Rx BC1147A, 1.5 to 30 mc, handbook, auto xformer, £22 10s. (o.n.o.). — Arnold, 23 Hardingstone Lane, Northampton.

CR100, S-meter, noise limiter, manual, good condition, £16.—A. King, Angel Hotel, St. Mary Street, Cardigan.

TYPE 36 T/R with all accessories best offer over £12 ; Philips 12w. amplifier, with microphone and speaker, £15 ; two 9in. television tubes, £2 each; B2 T/R power unit, requires attention, offers? WANTED: Geloso VFO and Tape Recorder.—Box No. 2107, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

RTTY? Brand new Western Electric polar relays, 12/6 each ; Teletypewriter TG-7B, TG-30 Telegraph Repeater, listed $830, £5 ; McElroy tape puller, £6 10s. F.S.M. 1-95A, Signal Generator 1-130A, both 100-156 mc. Ten-metre mobile equipment, plus carriage.—Wright, 4a Nepal Avenue, Atherton, Manchester.

RECEIVER S640 plus S-meter, good condition, re-valved, aligned recently, handbook, £20. Delivery 10 miles Croydon ; s.a.e., please.—Johnson, 82 Kent House Road, Beckenham, Kent.

FOR SALE: Minimitter Converter, as new, 1.5 mc output, with converted Command receiver and p/p output stage, £14. Heavy-duty power pack to suit, with VR-150. £4. R107 with new speaker, perfect, £7. Two 19 Sets given to buyer. Buyer collects or pays carriage. — Wilson, 3 Newfield Crescent, Dore, Sheffield. *(Phone 75168.)*

HOLIDAYS IN GD T.B. and B, 87/6. Amateurs welcomed ; children catered for. — Write to GD3JIU, 146 Ballabrooie Drive, Douglas, Isle of Man.

WANTED: S-meter for Eddystone S.750. Also *Short Wave Listener*, 1948-53, and R.S.G.B. *Bulletins*, 1953 to date. — Partics.: Advertiser, 27 Belmont Road, Beckenham, Kent.

SX28, with manual and step-down transformer, all in good condition, £35 ; buyer examines and collects, Norwich. — Box No. 2108, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

813 and ceramic bases at 35/-, including packing and postage U.K. — Box No. 2109, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: CR-100, hardly used, £12 o.n.o. Buyer collects. — 39, Camborne Avenue, Harold Hill, Romford, Essex. *(Tel.: ING. 41297.)*

SMALL ADVERTISEMENTS, READERS—*continued*

VALVE TESTER REQUIRED, Exchange/Sale Oscillator Unit 145, 2 to 7·5 mc, MO or CO, 807 ; 4/CV45, 4003A with power unit 392 ; 2/CV54. —Box No. 2110, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

AMATEUR SELLING UP, please send s.a.e. for list of radio equipment for sale.—Wright, 42 Malvern Crescent, Spring View, Nr. Wigan, Lancs.

FOR SALE: Latest Panda Cub, condition as new, £45 (o.n.o.). Callers preferred. — G3LIZ, 20 Talton Road, Wavertree, Liverpool, 15.

EDDYSTONE 358x (B34), 1.2-31 mc, in excellent working order, complete with p/pack, good DX'er, £10, carriage extra.—Carey, Kennels, Hewell, Redditch, Worcs.

SALE: 120-watt modulator (zero bias 807's) Labgear wide-band coupler, Radiocraft pre-selector, R.C.A. AR77 receiver with loudspeaker and phones, high-voltage power packs, transformers, chokes, etc., all at low prices.—Ellis, 47 Victoria Road, Saltash, Cornwall.

WANTED: Q-Max GDO, faulty one considered.— Particulars and price to: C. H. Jarvis, 4 Braddyll Terrace, Ulverston, Lancashire.

GOING QRT, equipment, valves, meters, transformers, etc., very cheap ; s.a.e. lists.—Tubbs, 9 Prince's Street, Rugby, Warks.

SX28, £12. 115A, 420 mc Rx unit, £2 10s. 0d. 144 mc GGT amplifier, £1. Prefer buyer inspect above. 0-1 amp. RF meters, 3/-. — G3FCT, 25 Kingsnorth Road, Faversham, Kent.

TYPE 36 transmitter (see article p.626, *Short Wave Magazine*, February '59), best offer.—F. Humphries, 448 Warwick Road, Solihull, Warwickshire.

WANTED Woden Transformers: UM3, DT2, 1500-volt and swinging choke ; also cheap 6-band Tx.—Particulars to Box No. 2111, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Reconditioned R.109 Receiver, AC mains p/pack, bandspread, new cabinet, spare valves, manual, £4 15s. 0d., carriage extra.—Jones, 90 Abbey Road, Sandbach, Cheshire.

FOR SALE: W/S 21, £8 (o.n.o.), and W/S 18, £2 (o.n.o.). Both good working order and condition. Buyer arranges carriage or will deliver N.W. London. —Offers to Eddy Hawkins, 31 Esmond Road, Kilburn, London, N.W.6.

ACCOMMODATION REQUIRED in the Hayes-Hounslow, Middx., district. Away most weekends.—G3KLH, c/o 27 Sussex Avenue, Isleworth, Middx.

WANTED: Communications Receiver for rebuilding ; need not work as long as reasonably complete ; CR-100, HRO, 358 or similar.—Richard Marris, 52 Mill Street, Kidlington, Oxford.

SMALL ADVERTISEMENTS, READERS—*continued*

GM3BQA Dual Quad, 10/15, as new, £10. Phone Tx for 10/15, used mobile, £10.—Poulter, 80 Endsor Street, Manchester, 16.

HAMMARLUND Super-Pro Receiver, Type BC-794B, frequency coverage from 1300 kc to 40 mc, in excellent condition; plus bandswitched Tx, 813 final PA, pair 811's Modulator, pair 866's p/pack, VFO covering 80m., 40m., 20m., 15m. and 10m., complete with built-in ATU; totally enclosed in black rack with grey enamelled facia panels and meters. Spare 813 and 811 valves. The lot, a bargain at £75.—G3LDF, Roslyn, 88 Ormskirk Road, Upholland, Nr. Wigan, Lancs.

WANTED: Tx working, complete, compact, mains, phone/CW, any bands; prefer DL-land seller; full details, price, soonest. — Write DL2BC, Sgt. Akehurst, HQ 12 Bde., B.F.P.O.36, Germany. *(Tel.: Osnabrücke Military 525.)*

WANTED (mint condition or brand-new, unused) latest current model U.S.A. Communications Receiver, also Tx and Mobile Tx/Rx; fullest details and price, etc. Please, only first-class gear, factory-new and guaranteed. Wanted for personal use.—Box No. 2095, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EDDYSTONE S-meter, mounting blocks, Ekco BC set, £7 lot.—R. Grain, 15 Waverley Gardens, Grays, Essex.

ACCOMMODATION REQUIRED in Edinburgh district, from July 18 - August 1, by two SWL's (licensed if pass R.A.E.!) with gear.—G. Lockhart, School House, Echt, Aberdeen.

UNUSED Twin Track Aspenden tape deck, assembled, complete with extra re-wind motor, cabinet; suitable 1,200 ft.; spools; £12. — *Tel.: Wentworth (Surrey) 3032.*

WANTED: AR88 Receiver and prop pitch motor. —A. Isusi, 44 Fortismere Avenue, London, N.10.

Z-MATCH American Tx Condensers, brand new, 400 $\mu\mu$F (C1), 12/6; 500 $\mu\mu$F Johnson, 25/-; pair, 35/-. Ex-equipment ·001 μF, 3 kV. wkng., £1; new, £2.—Box No. 2112, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: *Short Wave Magazine,* October 1953 to October 1955, 25/-; R.S.G.B. *Bulletin,* April 1954 to May 1956, 30/-.—*Phone Beckenham 5135.*

NO. 19 WIRELESS SET Manuals (not photostats), 12s. each, p.p.—G. Eaton, 54 Yoxall Road, Shirley, Warwickshire.

WANTED: 70 Cm Converter, Tx or PA xtals 8000-8005·5 kc.—G3JGJ, Box No. 2113, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

750 AS NEW, £45; Eddystone S-meter, perfect, £3 3s.; 19 Set, new and untouched, £3; Mosley Ground Plane, £5 10s.; "Wolf Cub," new, £4 10s.; Grundig TK12, £50. WANTED: Good American Receiver and *QST's.*—Andrews, 8 Forest Grove, York.

SMALL ADVERTISEMENTS, READERS—*continued*

SALE: K.W. Vanguard Tx, 10-160 m., plus K.W. LP Filter, crated ready for shipment. This Tx is perfect and was supplied quite recently, ready wired and tested, by K.W. Electronics, Ltd. Price £55. Geloso Rx.207, perfect in all aspects; overhauled by K.W. Electronics, now covered 10-160 metres; price £58. New Grundig 830/3D Recorder; offers? —G3KGC, 12 Sussex Ring, North Finchley, N.12. *(North 2083, Hillside 9654.)*

GOING TO VE7: AR88D, fitted proper S-meter, £50. Panoramic Adaptor, £20. K.W. Vanguard, £42 10s. Grundig Condenser Mike, £2 10s. Lionel J36 Bug, £5—or quick sale, the lot £105. May be seen and inspected any time.—G3GQK, 21 Vancouver Road, Forest Hill, S.E. 23. *(Tel.: FOR. 4449.)*

FOR SALE: Three Canadian 58 Sets, as new, unused, best offer secures. One Advance Sig. Gen. Model E2, £18 (o.n.o.). One Minimitter Converter, £8 (o.n.o.). One Vibroplex Bug Key, £4 (o.n.o.). For quick sale, will dispose as one lot for £45.—Box No. 2114, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

CR300 RECEIVER, 15 kc to 25 mc, built-in mains PU, handbook, good going order, £14. —Sherlock, 8, Tudor Road, Canvey Island, Essex.

FOR SALE: Panda Cub in excellent condition, accept £40 (or nearest offer); carriage paid.—GM3MDX, Shandwick, Bentinck Crescent, Troon, Ayrshire.

AR88 with handbook, phones and spare valves. Good working order; £35 (o.n.o.).—R. B. Casson, 16 Wensleydale Road, Catterick Camp, Yorks.

MINIMITTER MR37 Receiver for sale; excellent condition, only 9 months old, just overhauled by makers, very good performer, £45; carriage paid. —Box No. 2115, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

NEW VALVE BARGAINS: 3E29 (829B), 30/-; 2J3I, 20/-; 6C21, 7BP7, 10/-; 3DP1, 83, 6AG7, 417A, 5/-; 5U4G, 6L6G, VR150/30, VR105/30, 4/-; 6SN7, 6SL7, 6SJ7, 6AC7, 3/-; 6B4G, 2/6; 8020, 1616, IN21, 2/-; 2X2, 6H6M, 1/-; METRO-VICK PORTABLE OSCILLOSCOPE, £26 (LIST £86); BRAND-NEW PANORAMIC ADAPTOR FOR S-27, S-36, £45. WANTED: 813's, VARIAC, SUPER-PRO POWER UNIT, TG-34 CODE KEYER, INDICATOR ID-60/APA-10, S-36, HI-FI GEAR, EXCHANGES?—FLETCHER, 62 MOORBRIDGE LANE, STAPLEFORD, NOTTS. *(SANDIACRE 3446.)*

SELLING OUT: R1155, needs attention, pp/op unit, £4. P/pack, 500v., 200 mA, £3. Xtal calibrator, 10, 100, 1000 kc, £4. Wavemeter G56, 15 kc-24 mc, calibration book, £5. TA12G, with manual, £6. Transformer, chokes and smoothing condensers for TA12, £4. 813's, boxed, £4.—A. D. Bailey, 19 Kent Street, Salford 6, Lancs.

DON'T MISS THIS: RCA Communication Receiver with Speaker and Handbook, £17. 14in. speaker, EMI, £4 10s.—Box No. 2116, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: AR88D, fitted with genuine RCA S-meter, complete with manual and trimming tools; buyer collects.—A. J. Reynolds, 149 Waller Road, New Cross, London, S.E.14. *(Phone: New Cross 1443, after 7 p.m.).*

Printed by The Courier Printing Co. Ltd., Tunbridge Wells, for the Proprietors and Publishers, The Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. The *Short Wave Magazine* is obtainable abroad through the following : Continental Publishers & Distributors, Ltd., William Dawson & Son. Ltd. ; AUSTRALIA AND NEW ZEALAND—Gordon & Gotch, Ltd. ; AMERICA—International News Company, 131 Varick Street, NEW YORK. Registered for transmission to Canada by Magazine Post. *April 1959.*

Available from stock

	Post Free
ANTENNA HANDBOOK (*Published by A.R.R.L.* (8th Edition)	19s. 0d.
A COURSE IN RADIO FUNDAMENTALS (*New Edition*)	10s. 6d.
BASIC AUDIO COURSE	22s. 6d.
BASIC RADIO COURSE	19s. 0d.
BEAM ANTENNA HANDBOOK	22s. 0d.
BETTER SHORTWAVE RECEPTION	24s. 0d.
COMMAND SETS (*Published by CQ.*) Information on conversion of many Command Transmitters and Receivers	12s. 6d.
CQ. ANTHOLOGY	16s. 9d.
ELECTRONICS MADE EASY	6s. 6d.
HAMS INTERPRETER (*Published by OH2SQ*)	7s. 0d.
HIGH FIDELITY by G. A. BRIGGS (*Published by Wharfedale Wireless*)	12s. 6d.
HIGH FIDELITY (*Gernsback*)	12s. 6d.
HIGH FIDELITY CIRCUIT DESIGN (302 pp.) (*Gernsback*)	48s. 0d.
HINTS AND KINKS, Vol. 5	11s. 0d.
HOW TO BECOME A RADIO AMATEUR★	5s. 0d.
LEARNING THE RADIO TELEGRAPH CODE	4s. 6d.
MAINTAINING HI-FI EQUIPMENT	24s. 0d.
MOBILE HANDBOOK (*Published by CQ*) (*Second Edition*)	24s. 0d.
MOBILE MANUAL (*Published by A.R.R.L.*)	23s. 0d.
NOVICE HANDBOOK	23s. 6d.
OPERATING AN AMATEUR RADIO STATION (*Published by A.R.R.L.*)★	2s. 8d.
POWER TOOLS (*Published by Popular Mechanics*)	5s. 6d.
RADIO AMATEUR DX GUIDE★	12s. 6d.
RADIO AND ELECTRONICS HANDBOOK (*H. W. Sams*)	40s. 0d.
RADIO AND TV HINTS	8s. 6d.
RADIO DESIGNERS HANDBOOK (*4th Edition*) 1,498 p.p. (*F. Langford Smith*)	90s. 0d.
THE RADIO MANUAL (Sterling) (*Published by Van Nostrand*)	71s. 6d.
RAPID TV REPAIR	24s. 0d.
RADIO VALVE DATA (*Iliffe*)	5s. 9d.
SERVICING COLOUR TV	24s. 0d.
SERVICING RECORD CHANGERS	24s. 0d.
SCATTER PROPAGATION THEORY AND PRACTICE (*H. W. Sams*)	25s. 0d.
SIDEBAND HANDBOOK (*Published by CQ, latest issue*)	25s. 6d.
SINGLE SIDEBAND FOR THE RADIO AMATEUR (*A.R.R.L.*)	14s. 6d.
SURPLUS CONVERSION MANUAL Volume 1	21s. 0d.
Volume 2	21s. 0d.
TECHNICAL DICTIONARY (*H. W. Sams*)	16s. 6d.
TELEVISION INTERFERENCE — ITS CAUSES AND CURES	15s. 6d.
THE OSCILLOSCOPE	18s. 6d.
THE RADIO AMATEUR OPERATOR'S HANDBOOK (*Data Publications*)	3s. 6d.
THE RECORDING AND REPRODUCTION OF SOUND (*H. W. Sams*)	64s. 0d.
TRANSISTORS— THEORY AND PRACTICE (*New Edition*) (*Published by Gernsback*)	23s. 0d.
TRANSISTOR THEORY AND PRACTICE (*Published by World Radio Handbook*)	9s. 6d.
TRANSISTOR TECHNIQUES (*Gernsback*)	12s. 6d.
TV IT'S A CINCH	24s. 0d.
UHF ANTENNAS, CONVERTERS AND TUNERS	12s. 0d.
UNDERSTANDING HI-FI CIRCUITS	24s. 0d.
VHF HANDBOOK	24s. 0d.
LOG BOOKS—Spiral Bound (*Published by A.R.R.L.*)	6s. 6d.

(★ *Not strictly applicable under U.K. conditions*).

Latest Issues

A new and greater edition of the

RADIO HANDBOOK (15th Edition)

Pub. by Editors & Engineers 60s. post free

RADIO AMATEUR CALL BOOK

SPRING ISSUE.

Abridged Edition excludes only American stations. Otherwise complete with latest call sign-address listings for all countries, and including much DX data. In its 37th year of publication.

Complete Edition 41s. 6d. post free.
***Abridged Edition* 25s.**

THE RADIO AMATEUR'S HANDBOOK

Latest 1959 Edition.

Published by A.R.R.L. 34s. post free.
Bound in whole Buckram, 44s. post free.

WORLD RADIO HANDBOOK

1959 Edition, 180 pages. **15s. 3d.** post free.

HOW TO LISTEN TO THE WORLD

1959 Edition, 70 pages, for the Beginner.
7s. post free.

DX ZONE MAP

Paper Edition, Latest Revision. **9s. 3d. post free.**

MAGAZINES BY SUBSCRIPTION

	One Year
AUDIO	40s. 0d.
CQ, RADIO AMATEUR'S JOURNAL	44s. 0d.
ELECTRONICS (*Trade only*)	160s. 0d.
POPULAR MECHANICS	32s. 0d.
POPULAR SCIENCE	48s. 0d.
QST, *ARRL*	43s. 0d.
HIGH FIDELITY	56s. 0d.
RADIO AND TELEVISION NEWS	36s. 0d.
RADIO ELECTRONICS	36s. 0d.
SERVICE	24s. 0d.
TELEVISION	48s. 0d.

Post free, ordinary mail only.

Subscription Service for all American Radio and Technical Periodicals.

SHORT WAVE MAGAZINE

Publications Department

55 VICTORIA STREET, LONDON, S.W.1

Telephone ABBEY 5341

INDEX TO ADVERTISERS

SHORT WAVE MAGAZINE

Vol. XVII APRIL, 1959 No. 188

CONTENTS

Managing Editor: AUSTIN FORSYTH, O.B.E. (G6FO)

Advertisement Manager: P. H. FALKNER

Published the Friday following the first Wednesday each month at 55 Victoria Street, London, S.W.1. *Telephone: Abbey 5341/2*

Annual Subscription: Home and Overseas 33s. ($5·00 U.S.) post paid.

AUTHORS' MSS

Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of quarto or foolscap sheets, with diagrams shown separately. Photographs should be clearly identified on the back. Payment is made for all material used, and it is a condition of acceptance that full copyright passes to the Short Wave Magazine, Ltd., on publication.

The SHORT WAVE Magazine

EDITORIAL

Explanation

The comment in this space in our February issue — "Rejoinder," dealing with alleged interference by U.K. amateurs with coastal services in the 160-metre band — has drawn an interesting reply from the Post Office.

It now transpires that the interference complained of was with Danish ships in the 1950-2000 kc sector of the band, where they have two allocations. There is no question of any QRM with coast stations (as we surmised) which operate always to the limit of their range, depending upon propagation conditions.

In these circumstances, therefore, after-dark interference with Danish ships is obviously possible by U.K. (and other European) amateur stations operating HF of the Loran channel — and it is in this area of the band that U.K. amateurs must take special care. According to the G.P.O. "experience has shown that reception of Danish ships, operating in accordance with their planned assignments [above 1950 kc] can suffer severe interference from U.K. amateurs during the hours of darkness . . . in fact all the reports which have been received relate to interference which occurred during darkness."

In fairness to the Post Office and the Danish authorities, we are glad to be able to quote these facts — merely remarking that it is only since our February comment appeared that it has been made clear what the actual grounds were for the original complaint.

Austin Forsyth G6FO.

Modifying The TCS Transmitter

IDEAS FOR THE TCS6-52245A

J. N. ROE, M.I.R.E., F.R.S.A. (G2VV)

A good deal of information on the TCS Transmitter-Receiver assembly has already been given—see SHORT WAVE MAGAZINE, *October, 1958—dealing with its general construction and operation as an amateur-band station complete. This article discusses possible modifications to the Transmitter section, to improve output and performance on the three bands 160-80-40 metres on which TCS operation is possible. To follow the modification procedure suggested by our contributor, reference should be made to the circuit data given in the October, 1958, issue.—Editor.*

IN the October, 1958, issue of *Short Wave Magazine,* G3LOX contributed a comprehensive article entitled "The TCS Transmitter-Receiver Assembly." The information and circuits, as given in that article, in their original and unmodified form, serve as a basis for the transmitter modifications outlined in the following pages.

To obviate the possibility of confusion, all component numbering quoted (excepting for additional parts required—these bear the suffix *M*) is identical with the original numbering as given by G3LOX.

The somewhat extensive modifications undertaken by the writer, although not strictly necessary (the transmitter can be used in its original condition for amateur band operation) were considered worthwhile in view of the excellent basic design and construction of the 52245A transmitter.

The reader may wish to modify only certain sections. The work under review occupied many hours over a period of three months and involved considerable "surgery," much tricky dismantling, and refitting. This is a modification job that just cannot be hurried. However, anyone who is prepared to devote the time and effort required should be well rewarded by the final result.

Summary of Modifications

Before describing these in detail, some points concerning the general nature of the work carried out may be of assistance to those contemplating similar modifications.

The writer's interest centred round using the transmitter as an entirely separate unit, *i.e.*, removed from the complete TCS assembly, operating only from AC mains. The internal wiring has been simplified considerably by the complete removal of the original 16-point power connector, which at G2VV is replaced by a 4-point Jones type plug for power input from the separate power supply. The internal relays were not required, for reasons stated later. These, together with their associated wiring, were, therefore, also removed. The original microphone/key jack was extracted, its hole being used in the course of the subsequent modifications. The plate meter included in the transmitter reads only the current taken by the PA valves. In the modifications an additional meter has been included to read the VFO/Buffer/Doubler HT current. Keying is applied now only in the exciter stages.

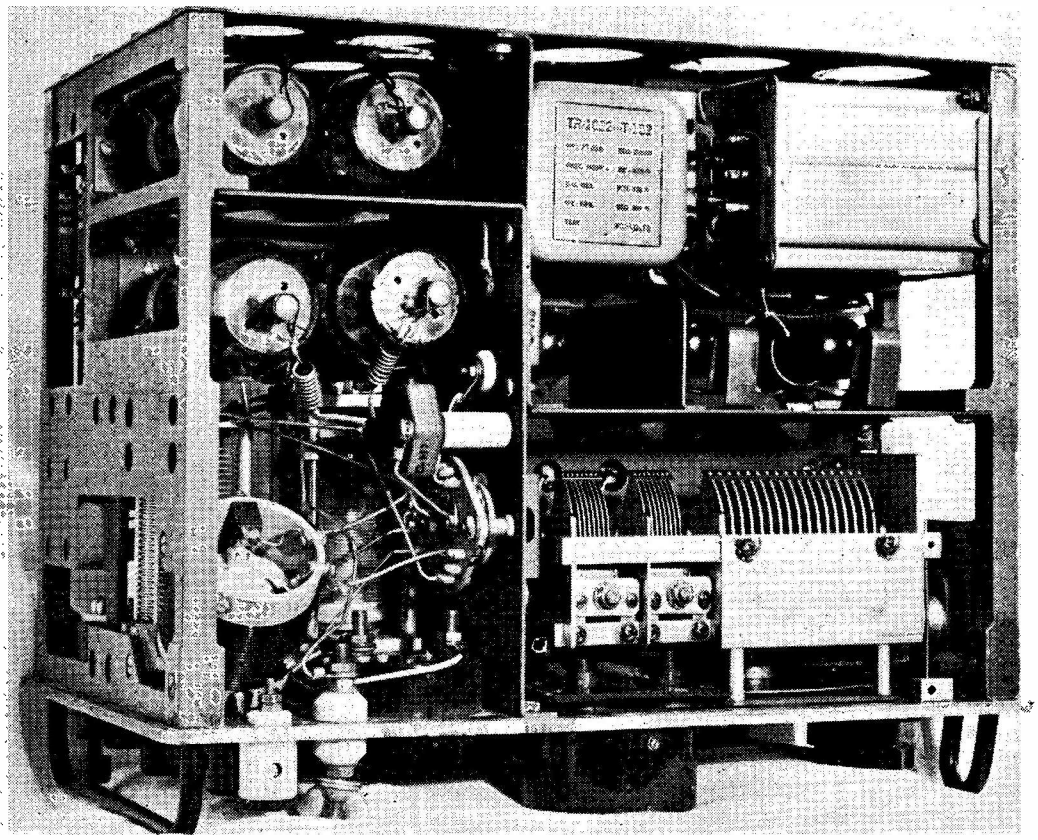
The major modification involves the removal of all wiring associated with the crystal oscillator stage V102-S104. The 4-section crystal holder mounted on the top deck is also disconnected and extracted. V102 is rewired as a driver for the modulators which—with a small separate, self-powered speech pre-amplifier—makes the transmitter capable of delivering high-quality speech from a crystal microphone.

Removal of Power Connector and Relays

When taking the 16-point power connector from the front panel, all wiring excepting the leads from pin No. 13 (live side of 12-volt heater supply) and pin No. 14 (+ 225-volt line) can be discarded. This necessitates undoing the cable form and stripping out unwanted leads.

At G2VV a separate keying and change-over relay unit is always available for use with any transmitter. The relays included in the 52245A were accordingly not required and these (K101, K102, K103) were removed. The three leads on the modulator power relay K101 were retained and marked for later wiring to the modified switch S104.

The transmitter aerial terminal is now connected directly to one side of the aerial condenser C121, common to S103 "parallel—off" positions. All other relay wiring is stripped out. When getting the wiring away from the components mentioned each lead should be continuity meter checked—in con-



Top deck view, after modification. At left is the PA compartment with V104, V105 (parallel 1625's) together with PA and ae ial tuning circuits. Modulators V106, V107, also 1625's, occupy the rear section, to the right of which is the modulator plate transformer with the additional Woden DT1 driver transformer to its right. The metal valves are 12A6's with, left to right, V103 buffer/doubler, V102 modulator/driver (the original CO stage modified), and V101, the VFO. The method of mounting the additional plate current meter can be seen at lower centre. The transmitter is turned panel face dowu.

junction with the original circuit—and followed through to its other connection points to determine which junction leads must remain connected for correct operation after modification. During these major surgical operations and reshaping of the leads in the cable-form, the underside of the chassis takes on rather a horrifying appearance.

Careful checking and cross checking is really essential during these operations. Some reconnections and additional leads are necessary here and there, as will be apparent when following the circuit diagram.

The interlock switch S106, fitted at the rear of the transmitter chassis, is removed together with its leads. Disconnect wiring from the power switch S107, leaving the switch in position. Remove the microphone/key jack, J101, retaining (and marking) only the centre-point lead for re-connection later in the proceedings.

Put in a 4-point Jones-type plug to occupy the position of the original 16-point power plug. Reference to the underchassis photograph will show that it is recessed behind the front panel on two supporting brackets. This allows the power input socket to rest flush with the panel when the transmitter is operating. (The square cut-out already in the front panel is quite large enough to permit this.) The shape of the brackets and method of fixing in the existing panel holes can be seen in the photograph. On the plug, two pins carry the 12-volt AC heater supply (one being common to HT— and earth). The two remaining contacts are + 225 volts and + 400 volts.

Modified VFO/Buffer/Doubler HT Wiring

The HT to these stages, V101-V103, was originally controlled *via* switch S104. The lead from R125 to S104 must be removed; 225v. HT is now fed through the key socket, as shown in Fig. 1. The addition of a millia-

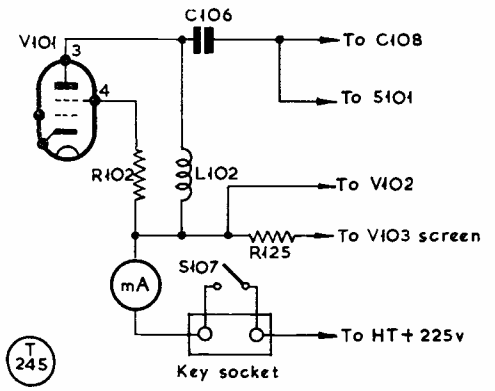


Fig. 1. The HT wiring to the VFO, as modified. All parts, except the key socket and milliammeter, are original; S107 is rewired and used as key shorting switch, and the HT 225v. pos. line is brought from the new 4-point Jones-type plug.

meter (reading not less than 0—75 mA) for these stages and for the modulator driver stage (discussed later) is a considerable asset under working conditions.

The only space available for mounting the meter is between the aerial current meter and the VFO tuning window—the distance between the panel and condenser gang-assembly is a mere threequarters of an inch! A miniature type flush-mounting meter might just fit in the space, but, a good clear scale being preferred, the choice was a $2\frac{1}{2}$ in. panel mounting instrument. This is fitted and secured as follows: First, remove the original tuning calibration chart and frame which occupy this space, and fit elsewhere on the panel (if required). Drill suitable clearance holes in the panel for the meter terminals, which must be fitted with good quality insulating sleeves; secure the meter by bolting insulated bushes and an insulated strip behind the panel (*see* photograph). (Be careful to cover the condenser assembly with a cloth before drilling the panel, to prevent metal chippings falling into the condensers.) Bolting the meter into position, together with the leads attached, is a little tricky in a space of threequarters of an inch, but it can be done.

Keying and Protective Bias for PA

In the original design, both HT supplies (225v./400v.) were keyed simultaneously, *via* relays. From the amateur viewpoint such an arrangement can hardly be considered conducive to BCI/TVI proofed operation! The method now adopted provides keying in the + 225 volt line (feeding V101-V103) through external relays and a key click filter, thus removing HT from the key contacts. The 400-volt supply to the PA stage remains "fully live." Since these valves must be held down (to plate current) in the "key up" position, protective bias of between – 60 and – 90 volts is supplied from a miniature HT battery. (The exact amount of bias voltage required will vary with individual valves and must be determined by experiment.) The battery can be fitted in the space below chassis, near T101. The arrangement at G2VV is to use the battery externally, situated at the side of the transmitter. The ends of R107, R112 (Fig. 2) are connected to chassis in the original circuit. These are now removed from earth and the common lead from the resistors is brought out at the front of the transmitter through the power connector plug cut-out. As the protective bias is not required for phone working (it can be left in circuit, but reduces the input power) a small SPDT toggle switch is mounted near the battery to enable the bias to be switched out for phone and in for CW operation. Connections are shown in Fig. 2.

Applying bias to cut-off point may reduce the input more than is desirable; in practice, the best results have been obtained with a standing current of about 15 mA in the PA stage. Here again, experiment will determine the required condition.

As an alternative to the protective bias method a clamper valve might be used. There would be just room to fit such a valve in the space near T101. (This a thought and has not been tried.)

The key socket is mounted in the position originally occupied by J101, on the front panel. Any 2-point connector with recessed sockets can be used. Ensure that these sockets cannot be touched from the front of the transmitter. One socket is wired to the milliameter, Fig. 1, the other being taken to the + 225 volt supply pin on the 4-point Jones connector. S107, originally the power on-off switch, is wired

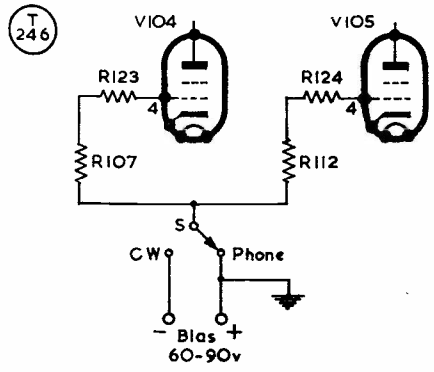


Fig. 2. The protective bias arrangement for the PA stage; in the phone position the bias voltage is removed and R107, R112 are connected direct to earth. Switch S is a SPDT toggle.

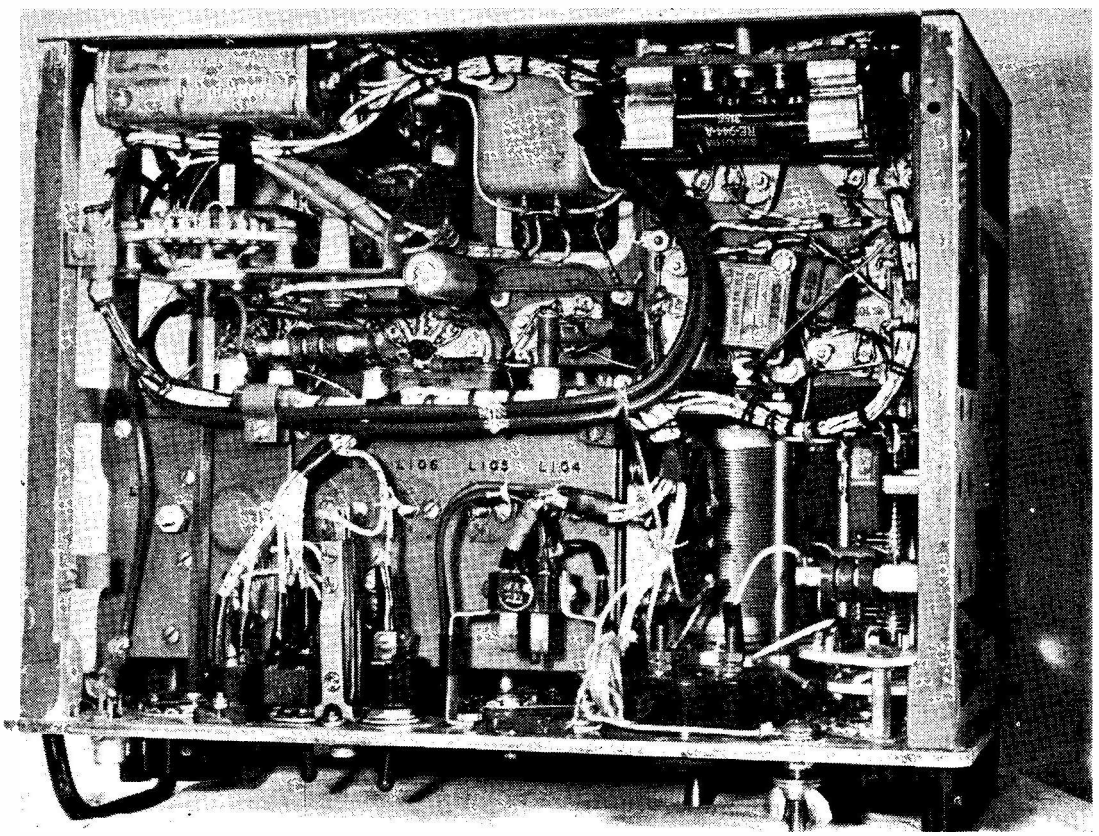
across the key sockets and provides a " key down " position when required.

Modulator—Addition of Driver Stage

In the original circuit (*see* p.410, October issue) the Class-B modulators, V106, V107, are driven *via* T101 and a carbon microphone. This method provides communication quality at a level of about 60-70% modulation. For permanent amateur-station work the inclusion of a high quality speech system seemed a " must." Much thought was given to the best way of providing for the use of a crystal microphone, to obtain 100% modulation. It seemed desirable to try and include the additional components necessary within the transmitter using, if possible, the existing 225-volt DC supply for the HT. Quite a problem, in view of the fact that the 52245A is so fully packed, as the photographs show! A compromise was eventually arrived at and has proved most satisfactory in service. Here, then, are the details.

Normally, the 52245A gives a choice of VFO or crystal oscillator operation with a selection of four switched crystals. For most amateur purposes to-day (in the bands covered by the transmitter) the VFO is almost invariably employed. It was, therefore, decided to modify the existing crystal oscillator valve, V102, for use as a modulator driver stage, with provision for input from an external speech pre-amplifier.

The 4-position crystal holder is removed, the space now being occupied by the driver transformer TM, Fig. 3. This is mounted in the manner shown in the top deck photograph, rear right-hand corner. All wiring must be cut away from S104 and V102, leaving one heater pin wired to chassis. The resistors and condensers associated with V102 as a crystal oscillator stage are no longer required. Modified wiring for V102 is given in Fig. 3. Components CM, RM1, RM2, should be wired as near to the valveholder as possible. This part of the work is not too easy as the valveholder



Under-chassis view, after modification. Compared with the original it will be seen that the wiring has been considerably simplified. The 4-point power plug, replacing the original 16-point power and inter-connection plug, is at bottom centre. The grid leads for the modulators V106, V107 are in coax and go to the DT1 driver transformer on the upper side of the chassis.

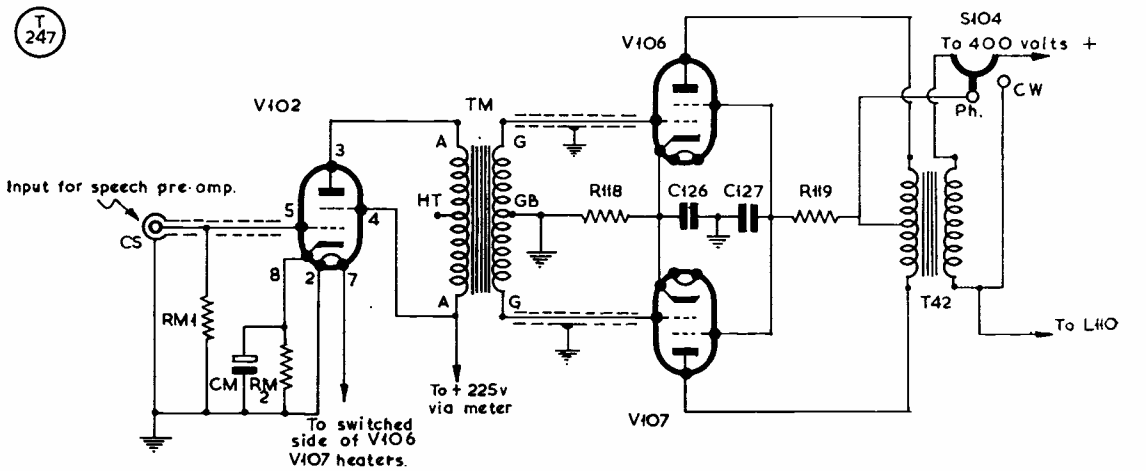


Fig. 3. The original crystal oscillator V102 is modified to serve as the modulator driver, so that a crystal microphone can be used. The original switch S104, intended for CO crystal selection, is rewired to work as the Phone/CW change-over in place of the relay K101.

is partly concealed! The live heater pin of V102 is wired to the *switched* side of the modulator (V106, V107) heaters; HT feed to V102 is taken *via* the VFO/Buffer/Doubler milliameter. As the heater of V102 is now switched with the V106, V107 heaters, V102 registers HT current only in the phone position. The consumption is in the region of 15-20 mA for this stage and is, of course, additive to the exciter stage current reading when operating on telephony. Audio input to V102 grid is through the co-axial socket now fitted on the front panel at the extreme right-hand bottom corner. Co-axial cable, with the screening well bonded to chassis, is used from the socket to the valveholder.

Similar leads are used from the grids of V106, V107 (after removing the leads from the grids to T101) to the driver transformer on the top deck. These leads can be clearly seen in the underchassis view and are bonded to the exciter (earthed) coil compartment for convenience. Because of the length of these grid leads it was feared that there might be the possibility of some hum pick-up. Fortunately, experience proved that there was none.

Although not indicated in Fig. 3, it was decided to leave T101 in circuit, with its components, so that the carbon microphone could be used if required for any reason at a later stage—such as in the event of a failure in the driver stage V102. Consequently, the leads taken off the grids of V106, V107 remain wired to T101 and are tucked away at the side of the transformer.

A single-contact jack (case earthed) is fitted on the front panel between switches S105 and S107. As can be seen in the photograph, there is just enough room to drill a hole and mount the jack in this position. The wire originally removed from J101 (and marked for reference at the time) is connected to the live contact on the new jack. This now provides for input to T101 for the carbon microphone, if and when required.

The original crystal oscillator—VFO selector switch S104 now operates, in its modified form, as a manual HT (400 volt) change-over switch for phone or CW selection, thus performing the function originally obtained by the action of relay K101. The leads removed from K101 (having at that time been noted) are wired to S104. Out of the numerous contacts available on S104, any two engaging with a common wiper arm may be used. The wiper arm is wired to the appropriate (400v.) HT supply contact on the 4-point Jones power connector plug. The two switch contacts of S104 are wired to the centre tap of T102 for one side, and for the other to L110 and T102. To avoid possible damage to the switch contacts by burning, always make the HT change-over, phone or CW, prior to applying the supply.

(To be Concluded.)

Table of Values

Fig. 3. Modified modulator circuit, TCS6

CM	= 25 μF 25v. electrolytic	TM	= Mod. drivert ransformer, Woden DT1
RM1	= 500,000 ohms		
RM2	= 1,000 ohms	CS	= Co-axial Input Socket

(The above are additional to original transmitter assembly)

Taking Facsimile Transmissions

DESIGN & CONSTRUCTION OF A SUITABLE RECEIVER

PART I

J. B. TUKE (G3BST)

It could be said that facsimile reception has little or no place in Amateur Radio, and that the copying of weather maps is of interest only to those who make a study of meteorology. Be that as it may, we feel that many readers will be very interested in this article because it displays an ingenious and original approach to the problem of taking down picture transmissions. Our contributor, who has an amateur interest in the inexact science of meteorology, wanted to be able to copy off, on his own drum, the weather charts radiated by Met. stations all over the world. Here is how he set about it.—Editor.

ONE of the main advantages of radio as a hobby is that it can be combined with other interests. The writer dabbles in meteorology and for some years has laboriously copied many thousands of 5-figure "met. groups" on CW, these later being transcribed on to weather charts. The CW groups are usually sent at an equivalent word-speed of 30 w.p.m. so that the whole thing is rather a slow business—though good Morse practice! The possibility of radio-teletype reception has often seemed attractive, but the cost of a teleprinter has made this course impossible to pursue, and even this method would still leave the long-drawn out transcription to be done.

A visit to the Meteorological Office station at Dunstable some time ago included a session in the facsimile room and immediately the idea of building a facsimile receiver was born. A facsimile receiver would give charts of all kinds from many different stations—not only simple surface observations but upper air and other complicated data which to an individual are particularly laborious to plot in quantity from five-figure groups. The Amateur Radio bug has a look in, too, as there was the possibility of having "DX" charts from U.S.A., Japan, the Pacific and so on. Once having seen facsimile, the other methods of obtaining weather charts were obviously out-dated, particularly for the amateur who just has not got time to plot many extensive charts. A receiver would obviously have to be built.

Basic Theory

Although facsimile communication is by no means new, it has never been very much discussed from the technical point of view, so it is perhaps advisable to outline the basic operating theory. The picture to be transmitted is wrapped round a rotating drum, illuminated by a light source and scanned by a photocell which moves slowly across the drum, thereby scanning the picture in a series of horizontal lines each one below the other. The electrical output from the cell is dependent on the picture brilliance under the cell at any instant, so that a fluctuating current corresponding to the instantaneous light value of the picture is obtained. This is easily converted into an output signal to modulate the transmitter—usually by shifting its frequency.

The receiver feeds demodulated signals to a stylus which is moving slowly across a drum, revolving at exactly the same speed as that in the transmitter, around which is wrapped a piece of electro-sensitive paper. The varying signal from the receiver is applied to the stylus, causing it to mark the paper and so reproducing the transmitted picture. So much for generalities, now for some detail.

The transmitter is effectively frequency-shift keyed by the electrical output from the photocell, the shift usually being 800 cycles between full black and full white. In some transmissions an intermediate frequency corresponds to grey and may be used for shading to indicate the difference between land and sea on the map. The drum speed is either 60 or 120 revolutions per minute — generally, stations in Europe favour 120 r.p.m., while most of the Americas and stations operated by the U.S.A.F. use 60 r.p.m.

On the receive side, the output from the receiver (which has the BFO switched on) is in the form of two audio tones separated by 800 c/s, the higher tone representing black, the lower, white. These tones are fed to a selective filter which removes the frequency corresponding to white so that only that representing black (and to a lesser extent that corresponding to grey, if the intermediate tone is used) will be passed on. These tones are amplified and fed to the stylus, causing it to make a black mark on the white paper in proportion to the received signal. The drum may be any convenient size, according to the size of picture required, but the circumference

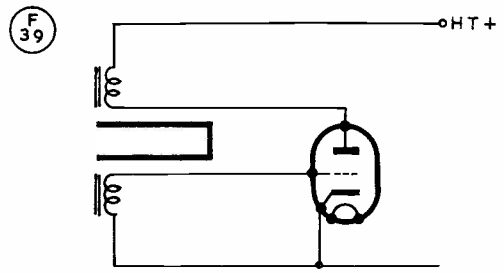


Fig. 1. The basic tuning-fork oscillator circuit. With careful construction and setting up, a high degree of frequency stability can be attained.

of the drum must have a ratio of $5\frac{1}{2} : 4\frac{1}{2}$ with its width to give the correct picture-aspect ratio; the drum must rotate at *exactly* 60 or 120 r.p.m., according to which type of transmission is being received. The stylus must track steadily across the drum at the correct rate.

From the foregoing it will be seen that the design of a facsimile receiver can be split up into two basic parts—(*a*) The mechanical scanning mechanism, and (*b*) An amplifier with a highly selective audio filter. Further, part (*a*) may be subdivided into two sections—the motor unit running at its exact speed, and the necessary reduction gearing.

The Constant Speed Drive

The first essential is a motor giving an absolutely constant speed. Unlike television, no synchronisation or locking system is provided between transmitter and receiver, so that the motor must maintain its required speed without any attention, either automatic or manual.

It is interesting to consider just what degree of stability is required. Suppose a picture runs for 15 minutes at 60 r.p.m.: The stylus will have travelled a distance equal to the drum circumference multiplied by the total number of revolutions. On the writer's equipment the drum circumference is about six inches, making a total travel of $6 \times 900 = 5{,}400$ inches. If the drum is running fast (or slow) so that the overall gain (or loss) in circumferential distance travelled throughout the picture is $\frac{1}{4}$-inch, then the accuracy required is $5{,}400 \times 4$, or 1 part in 21,600. If the accuracy aimed for is not less than one part in 25,000 it will be satisfactory, as the $\frac{1}{4}$-inch error referred to above is about the maximum that can be tolerated.

The prime mover must obviously be some form of synchronous motor, but unfortunately the commercial 50 c/s mains supply does not hold its frequency to anything like the required limits — so that the frequency to drive the motor must be generated locally and carefully controlled.

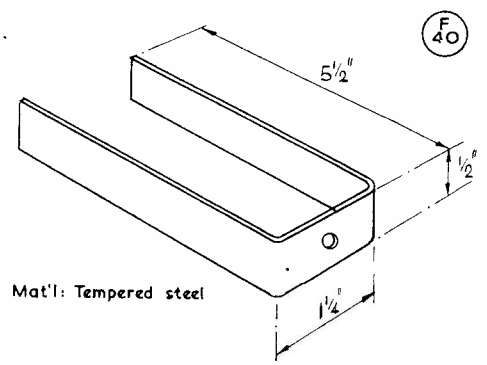


Fig. 2. Dimensions of the tuning fork used by G3BST. The total length is 13½ inches, with 5/8-in. allowed for the bends. The mounting is shown in one of the photographs. It can easily be home-made — see text.

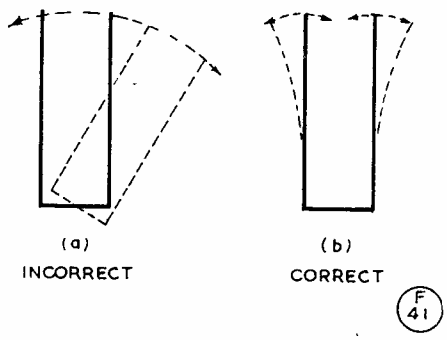
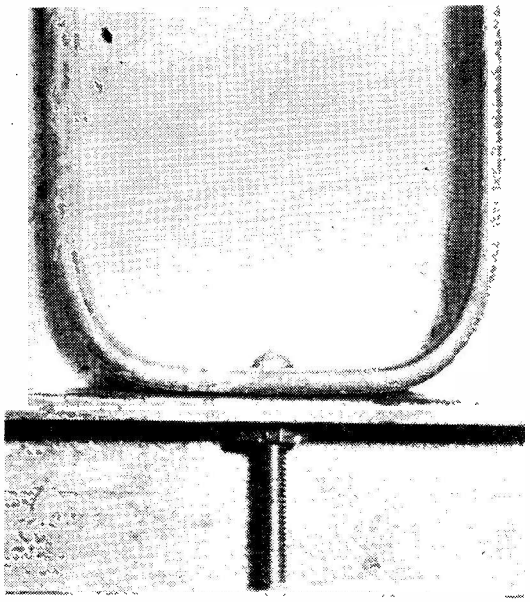


Fig. 3. As explained in the article, it is very important that the fork oscillation should be in the correct mode — it must "buzz" and not "swing."

The writer experimented with several methods of producing this frequency, including carefully designed LF oscillators, and beating between two crystals in the lower HF range, but none produced the required stability. The only practicable oscillator with the required frequency tolerance is a valve-maintained tuning fork. If a tuning fork is arranged as shown in Fig. 1, and the phasing of the coils is correct, the fork will maintain a vibration at its natural frequency. It must be made quite clear that the *movement of the fork* provides the only feed-back between anode and grid of the oscillator—if the fork is held still by the fingers there is no oscillator output. If there *is*, then it is due to direct coupling between the coils, and the output will not be controlled by the fork frequency (though in some cases it may lock-on to the fork frequency once this is released; such faulty operation will not



Mounting of the tuning-fork for the 50-cycle valve-maintained oscillator in the G3BST Met. receiver. As explained in the text, this mounting must be absolutely rigid.

give the high stability required).

The fork frequency chosen is obviously that required to drive the synchronous motor—in the writer's case, 50 c/s. A higher frequency would have the advantage that a smaller fork could be used, but high frequency synchronous motors do not seem easy to come by on the "surplus" market—at any rate, not unless one is willing to pay a high price — so a conventional 50 c/s motor was chosen.

The construction of a 50 c/s tuning fork did not prove as difficult as had been expected. A strip of mild steel, $\frac{1}{2}$-inch wide, $\frac{1}{8}$-inch thick and $13\frac{1}{4}$ inches long (obtained from a blacksmith) was bent cold into the shape shown in Fig. 2, and drilled with an $\frac{1}{8}$-inch hole in the centre of the "U." The lower portion was then tempered by heating it to red heat, and plunging into cold water to make it hard; it was then made into spring steel by re-heating it until a bluish tinge appeared on the metal when it was again plunged into cold water. (This operation is surprisingly simple and was carried out one evening at the sitting-room fire while the family were watching TV!)

The fork was then mounted by means of a bolt and washer through its central hole on to a substantial brass bracket, with the bracket itself firmly fixed to a small wooden baseboard, as shown in one of the photographs. Also mounted on this board is a metal sub-chassis carrying the twin-triode valve which acts as the oscillator.

It is essential to have complete rigidity at the central mounting, otherwise the fork may move bodily to and fro on its bolt (*see* Fig. 3a) instead of oscillating properly as shown in Fig. 3b.

The electro-magnets to drive the fork are simply relays with their armatures removed. These are laid on their sides so that the arm of the fork completes the magnetic circuit, with a small air-gap of approximately $\frac{1}{8}$-inch between magnet-face and fork. The relays are fixed securely to the baseboard with brackets specially made for the purpose out of scrap aluminium. In order to provide some improvement in the matching, a 5,000-ohm relay is used in the grid circuit and a 1,000-ohm relay on the anode side.

(To be Continued.)

M.I.R. — COMPARING MODULATION SYSTEMS

The United States Air Development Centre at Rome, N.Y., the design authority for U.S.A.F. communications, have recently completed a long series of tests related to comparing the intelligibility of speech transmitted by different modulation systems. These tests have made it possible to specify a new method of determining speech intelligibility for radio telephone systems. Known as M.I.R. ("mean intelligibility rating"), a series of phonetically-balanced word lists are transmitted over the system under test. These test transmissions are received and recorded during widely different propagation conditions. Similar signals from each system under test are recorded and played back at random for rating by a varied audience.

Topping the list is suppressed-carrier SSB with 80% M.I.R., with normal A.M. next at 50% M.I.R. The Motorola synchronous SSB system (single-sideband plus phase-locked synchronised carrier) is rated at under 50%, while double-sideband suppressed carrier (DSB) is bottom with less than 40% M.I.R.

R.L.G.

FOR SALE OR WANTED

Once again, this issue carries a considerable spread of interesting small advertising, proving that it is through SHORT WAVE MAGAZINE that the market in second-hand radio apparatus is established. Rates are low, coverage is extensive and, for worth-while gear offered at the right price, customers are waiting.

The First DX Result

THE MARCONI TRANS-ATLANTIC TEST, DECEMBER, 1901

B. M. JOHNSON (G3LOX)

This interesting article is based on some recent research into the facts surrounding Marconi's historic experiment. Radio men of every generation still, and probably always will, experience a mysterious thrill when communicating over distance. While nowadays we can take the DX for granted, it is a bare 60 years since the first signal was received across the Atlantic—and that is within the recollection of many still living. Unfortunately, the records of early experiments and their results were not kept in any very methodical fashion, and much research work has to be done to establish facts which are of great interest and importance from the historical point of view.—Editor.

THE current season has, by all accounts, been one of the most outstanding for DX, and as we sit in front of our efficient transmitters and highly sensitive receivers we may tend rather to take it all for granted—yet it isn't so very long ago since the first DX of all was achieved. The date was December 12, 1901, and the ends of the link a bleak cliff top in Cornwall, near the village of Poldhu, and a room in the hospital of the Military Barracks, Signal Hall, Newfoundland, 2,170 miles away.

Marconi, with his two assistants, Kemp and Paget, had sailed from Liverpool for Newfoundland in the liner *Sardinian* on November 26, 1901, taking with them a receiver of the coherer type, six kites and two balloons for supporting the aerial. Here is part of Marconi's own record of what became an historic occasion.

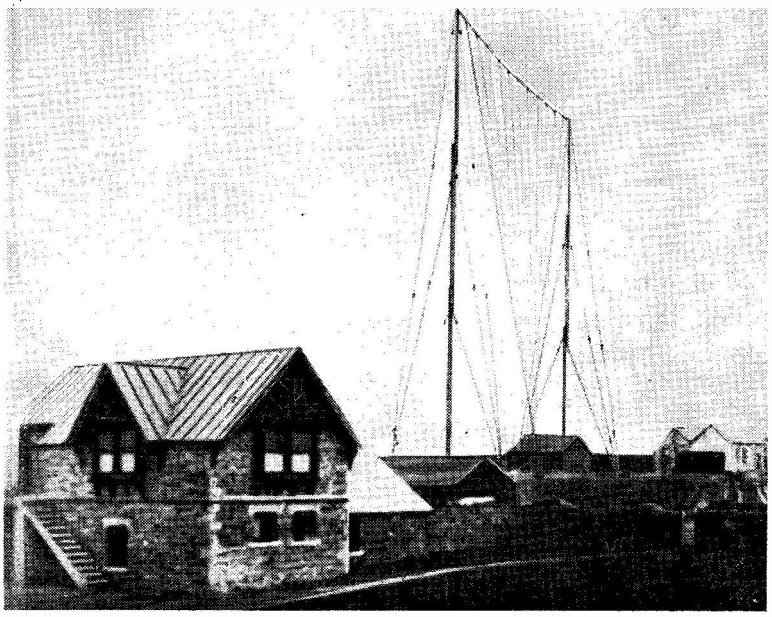
> "We landed at St. John's on Friday, December 6 [1901], and the following day . . . after taking a look at the various sites which might prove suitable, I considered that the best one was to be found on Signal Hill, a lofty eminence overlooking the port and forming the natural bulwark which protects it from the fury of the Atlantic gales. On top of this hill there is a small plateau of some two acres in area which I thought very suitable for the manipulation of either the balloons or the kites. On a crag on this plateau rose the new Cabot Memorial Tower which was designed as a flag signal station, and close to it there was an old military barracks which was then used as a hospital. It was in a room in this building that I set up my apparatus and made preparations for the great experiment."

Marconi's spark transmitter at Poldhu, Cornwall, in December 1901, operating on a wavelength of "1200 to 1800 metres, not known exactly." The voltage across the spark-gap (right background) was 20,000v. and the transmitter was rated at 25 kW. It was this transmitter that put the first signal across the Atlantic, on December 12, 1901. *(Photograph courtesy Marconi International Marine Communication Co., Ltd.)*

> "On Monday, December 9, barely three days after my arrival, I began work on Signal Hill, together with my assistants. I had decided to try one of the balloons first as a means of elevating the aerial, and by the Wednesday we had inflated it and it made its first ascent during the morning. Its diameter was about fourteen feet and it contained some 1000 cubic feet of hydrogen, quite sufficient to hold up the aerial, which consisted of a wire weighing about ten pounds. Owing, however, to the strong wind that was blowing at the time, after a short while the balloon broke away and disappeared. I came to the conclusion that perhaps the kites would answer better, and on Thursday morning, in spite of the furious gale that was blowing, we managed to elevate one of the kites to a height of about four hundred feet."

"It was a bluff, raw day; at the base of the cliff, three hundred feet below us, thundered a cold sea. Oceanward through the mist I could discern dimly the outlines of Cape Spear, the easternmost reach of the North American continent, while beyond that rolled the unbroken ocean, nearly two thousand miles of which stretched between me and the British coast. Across the harbour the city of St. John's lay on its hillside, wrapped in fog."

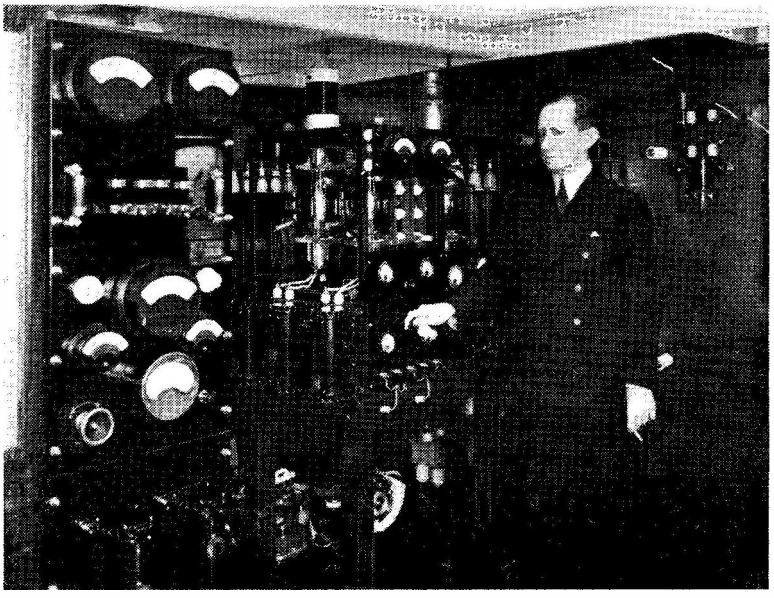
"The critical moment had come for which the way had been prepared by six years of hard and unrelenting work in the face of all kinds of criticisms and of numerous attempts to discourage me and turn me aside from my ultimate purpose. I was about to test the truth of my theories, to prove that the three hundred patents that the Marconi companies and myself had taken out and the tens of thousands of pounds which had been spent in experimenting and in the construction of the great station of Poldhu had not been in vain."



The vertical fan aerial used on the Poldhu spark transmitter for the successful Trans-Atlantic tests by Marconi in December 1901. Nothing now remains of the site except some foundations and the memorial column shown in another photograph.
(Photograph courtesy Marconi International Marine Communication Co., Ltd.)

"In view of the importance of all that was at stake, I had decided not to trust to the usual arrangement of having the coherer signals recorded automatically through a relay and a Morse instrument on a paper tape, but to use instead a telephone connected to a self-acting coherer, the human ear being far more sensitive than the recorder. Suddenly, about half-past twelve, there sounded the sharp click of the tapper as it struck the coherer, showing me that something was coming, and I listened intently."

"Unmistakably the three sharp little clicks corresponding to three dots sounded several times in my ear; but I would not be satisfied without corroboration. 'Can you hear anything, Mr. Kemp?' I said, handing the telephone to my assistant. Kemp heard the same thing as I, and I knew then that I had been absolutely right in my calculations. The electric waves which were being sent out from Poldhu had traversed the Atlantic, serenely ignoring the



Marconi himself, in the wireless room of his yacht "Elettra," from which much important experimental work was done in the early 1920's. The equipment shown is the high-power short-wave transmitter, on about 100 metres.
(Photograph courtesy Marconi International Marine Communication Co., Ltd.)

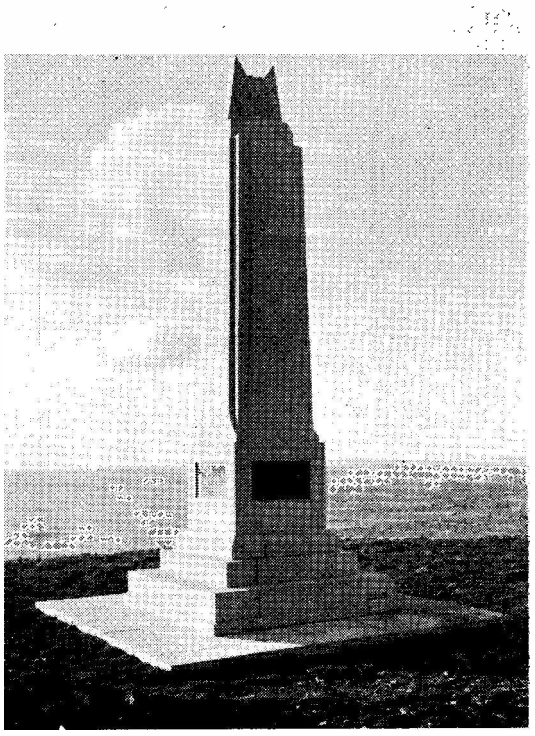
curvature of the earth, and were now affecting my receiver in Newfoundland. I knew that the day on which I should be able to send full messages without wires or cables across the Atlantic was not far distant . . . Further development of the sending and receiving apparatus was all that was required."

The Poldhu Transmitter

The world had suddenly become a smaller place. Though details about the receiving side for the experiment are fairly well known surprisingly little has been published about the transmitter, designed by John Ambrose Fleming and erected by the Marconi Company at Poldhu. The pioneers were poor log-keepers and most of the information about early equipment and experimental work is hidden away in letters and notebooks—these are now being sifted by Mr. G. G. Hopkins, the historian for Marconi's Wireless Telegraph Co., Ltd. The wavelength of the 1901 Poldhu station is not known exactly, but was "between 1200 and 1800 metres," which was probably not long enough to get the best range with the spark equipment used. The rating of a spark transmitter was the power available from the alternator. The power source at Poldhu was a 25 kW Mather and Platt 50-cycle alternator, driven by a 32 h.p. paraffin engine; the HT was stepped up from 2 to 20 kV by two Berry transformers in series; these are described in one paper as 20 kW transformers. The aerial was a fan, as shown in the photograph.

Later, the Poldhu station was taken over by Franklin, one of Marconi's collaborators, to investigate short wave propagation using beam aerials; the transmitter was on 100 metres or so with about 12 kW input. Signals were directed to Marconi's famous yacht *Elettra*, cruising in the South Atlantic. These tests were, of course, an outstanding success and led directly to the construction of the great beam stations for Empire communication. After these and other experiments the Poldhu station was demolished in 1933.

Last summer the writer visited the Poldhu site. Nothing now remains except for the foundations and a few faded red and black tiles amongst the grass, and in the surrounding fields on the cliff top the bases of the towers used by Franklin. From this historic place,



Visitors to Poldhu today will find this granite column, looking out over the far Atlantic and marking the site of the original Marconi station from which the very first experiments were made in long-distance communication by wireless. There is a corresponding memorial stone on Signal Hill, St. John's, Newfoundland (shown on p. 638 of our issue for February, 1958).

using a small KWM/1 (borrowed!) many countries were worked on SSB without any trouble. Would the pioneers who built the first DX station there have been surprised? One can hardly think so—for, as Marconi himself said: "The distance has been overcome and further development of the sending and receiving apparatus is all that is required. . ."

The site was given to the Nation in 1937, and on the cliff top stands a granite column on which there is a plaque: "*When the Poldhu station was erected in 1900, wireless was in its infancy; when it was demolished in 1933, wireless was so firmly established as to become almost indispensable for communication on land, sea and in the air, for direction finding, broadcasting and television.*"

The writer would like to thank the Marconi Company for information and photographs, and acknowledges *Wireless at Sea*, by H. E. Hancock, published by Marconi International Marine Communication Co., Ltd., as the source for some other details.

Avoiding Audio Transformer Breakdown

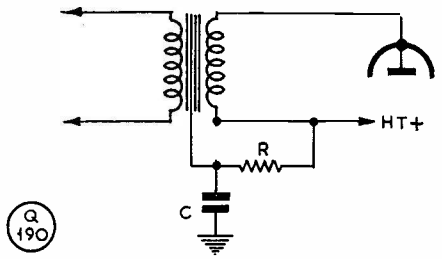
BY RAISING CORE POTENTIAL

AUDIO transformers and chokes are used by amateurs in all sorts of equipment. New components by reputable manufacturers, operated within their ratings, will give reliable service, but there may occasionally be a tendency to employ a choke or transformer under voltage ratings which exceed those specified by the manufacturer, whilst there is always the possibility of a surge of unexpected amplitude.

Chokes or transformers taken from the junk box or, perhaps, removed from "surplus" equipment, may have been attacked by damp. There is, therefore, a possibility, if not a probability, of a breakdown occurring when the component is subjected to a high voltage—in many cases, the working voltage between windings and core will not be known. Further, such a breakdown, whilst ruining the faulty component, is likely also to damage other parts of the equipment, including valves.

A voltage breakdown usually occurs between the inner turns of the winding and the core—only rarely does it happen between one winding and another. When putting into service a choke or audio transformer of doubtful reliability, or perhaps when the applied voltage is known to be somewhat excessive, a useful tip is illustrated in the diagram herewith. Instead of bolting the component directly to the chassis (presumed to be metal), it is insulated by means of strips of paxolin or by using small stand-off insulators, the metal-work of the component itself being connected to the HT line through a resistor R of moderately high value. In many cases, the by-pass condenser shown is not essential, but it is desirable to include one to prevent unwanted capacitative coupling. The rating of the condenser should, of course, be adequate for the voltages involved.

The idea is of particular value in the case of a modulation transformer, where both windings are usually at high potential above earth. With the core in electrical connection with the winding nearest the core, the potential gradients between each winding and core are much reduced and the reliability consequently increased. The same principle applies to a choke used, say, in series with the HT feed to the screen grid of a modulated PA valve.



By this simple circuit arrangement the core of an audio transformer can be brought up to an HT potential approaching the voltages being generated across the winding nearest the core, thus reducing considerably the danger of breakdown. Suitable values are: R, 100,000 ohms; and C, anything from 1 to 8 μF.

It will also be found that lamination "buzz" is minimised, chiefly because the vibration is not transmitted to the chassis, as happens when the component is bolted down directly.

Not for Mains Transformers

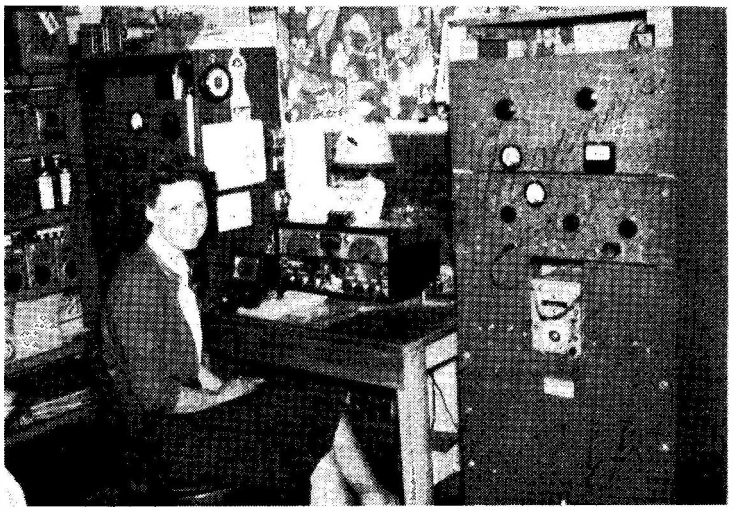
A few words of warning: The idea is not worth adopting when the inner winding is not the one connected to the HT line. The core of a mains transformer should always be at earth potential. And, finally, where the suggested circuit is adopted, it is necessary to remember that the exposed metal of the choke or transformer is "hot" with HT.

RUBBING IT IN

When G3COY (Stoke-on-Trent) saw that cartoon on p.631 of our February issue, he thought the artist, G3COI, must have heard about his experience recently when, during a QSO, a fire started in the kitchen; the smoke got so thick that he had to break off the contact, but not before the occurrence had been fully discussed over the air as the smoke was thickening. In G3COY's case, however, it was not necessary to call the fire brigade, and no damage was done.

DX COMMENTARY

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



K6ENL

CALLS HEARD, WORKED and QSL'd

TOGETHER with the first taste of spring-like weather, the bands have exhibited a kind of liveliness that has not been there during the winter months. There have been many times when one would not describe them as "open," and yet the hardened old DX-chaser has been able to sniff something in the air . . . a sort of feeling that *if* the VR4's and VR5's were on, they would be coming through. Don't ask us to explain it — we can't! But there have been many occasions on which we should have said the bands were "potentially open for anything."

With sundry DX-peditions making the headlines (the KS4BB affray is in full cry at the time of writing), it only needs the merest whiff of rare DX to start off a full-scale pile-up. On the night of March 15 the KS4BB team were on San Andres, and one of them was operating HKØAI. The W's were ten deep and continuous, with odd Europeans mixed in with them (a few got through, too), and the whole thing was a demonstration that there just isn't enough rare DX to go round. If HKØAI had given out QSO's at the rate of four a minute, he would still have been there all night without clearing the pile-up.

It's a curious phenomenon, this chasing of "rare" places, although one can work the chap next door to them on any day of the week. Try explaining it to an outsider some time, and you'll see the difficulty.

A horrifying thought, after listening for an hour or so to a real king-size pile-up, is the nightmare traffic in QSL's that goes on as a result of it. The number of cards and coupons travelling to and fro is truly horrendous, and later on in this Commentary you will note a plea from a rare DX operator for his customers *not* to use the bureaux, for what seems to be a very valid reason.

Sabotage

We may be quite wrong, but more than once of late we have gathered the impression that organised jamming is at work on our bands. A few days back there was a weak and rare station calling CQ Europe, and a T1 jammer-thing slid down the band, sat on his frequency and stayed there. On another occasion we had a fairly rare one back to a CQ, and on the second over the same thing happened. Luckily, the jammer concerned had such a shocking note that we were able to steer the DX station's T9 through it.

If this is really deliberate jamming, it is a menace which must not be under-estimated. It can only mean that there are a few stations, either amateur or otherwise, working with the sole idea of preventing QSO's. Whether someone hopes to clear the bands by this means, leaving them nice and empty for himself, or whether it's just one of those types who leave messages about radio-active parcels in cloakrooms, we can only use plain language and state that it stinks.

DX Gossip

Last month we mentioned the KS4BA - 4BB DX - pedition to Roncador Key and Serrana Bank. It is due to open up on the very day this is being written, so we hope that all goes well and that you all work them. They were planning to adopt the "multiple QSO" scheme, under which they would call CQ, state the frequency for replies, and then QRX. Stations would then call on this frequency, *giving the RST*, and the DX station would come back with five calls at a time, giving the call and RST of each, ending up with 73 and QSL instructions, and QRZ for the next batch.

The ARRL have given their blessing to this scheme for DX-peditions, and such "contacts" count as QSO's because an exchange of RST has taken place. They certainly will do a lot towards clearing the pile-ups around a new station, but doubtless we will still have the same Klots who call, and call, and call —mostly on the wrong frequency.

ZL3DX's tour, planned to start from ZL on May 12, now includes operation as ZM6AC (May 14-16), VR5AC (May 19-25), ZK2AC (May 26) and ZM6AC again (May 28-30). He will be in American Samoa, KS6, for one day, but no operation is possible — no licence. ZL3DX hopes to use 100 watts of SSB and CW. More news next month, we hope.

ZD7SA is being pirated on SSB, which he doesn't use . . . ZD7SE has been very active on 14 mc CW . . . YN4CB is going to Guatemala, where he will be a TG5 — the first such call to be issued (WPX'ers note!) . . . CEØZA, despite the apparent absence of pile-ups, made 3501 QSO's—*see* story in this issue . . . HV1CN is still the one and only licensed HV . . . VP2AR is preparing to come on the air . . . There is said to be a CR8 on 21 mc phone.

The ZL1ABZ (Kermadecs) affair is settled, and QSL's are now flowing freely . . . ZL5AF is in Antarctica; ZL5AC, 5AD and 5AE have left . . . PY7SC (Fernando de Noronha) is on 14 mc CW late at night, and 21 mc phone early mornings . . . There may be a Cocos Island (TI9) expedition some time in April, probably signing TI9CW and TI9SB.

Anyone short of KX6? KX6CO is back on the air after six years, with 600 watts . . . A character signing "7V2AA" and claiming to be on "Motorfordon Island" was the phoniest of phoneys. Other bad ones reported include VR7XR, SU1KH and 3A2BA . . . UB5KAB reports that he has actually worked UA1GR/UAØ in *Tannu Tuva!* This must, by now, be the least-worked country on earth, nearly all the other "impossibles" having opened up at some time or other. However, we gather from RAEM that there is *no* activity on Franz Josef Land or Wrangel Island at present.

ON4QX is licensed to work from Monaco at 3A2CZ, and will be there from May 1 until May 16. CW on 14020, 14050, 14090 kc and maybe phone on 14200 kc; similar frequencies on 21 and 28 mc. QSL to Box 331, Antwerp.

G3CVG tells us that his son Neville, VQ3GC, hopes to be active again from Tabora Airport, Tanganyika, by now. All bands, probably with a Cubical Quad for 14, 21 and 28 mc.

MP4BBW plans to operate from Trucial Oman on SSB, around April 11, after which he might get down to Oman . . . An SSB rig is due to arrive at VS9OM (Oman) any time now.

Socorra Island (XE4) may be on the air between April 10 and 15; only XE nationals are allowed to operate from there, but XE1CV and XE1CP are hoping to have a go.

VP9D is being transferred to Ascension Island, according to ZD7SA, and will shortly have a ZD8 call . . . FO8AX went QRT at the beginning of March, but is expected to be back there by the end of April.

There is a welter of FB8C . . . calls around these days, but only FB8CD resides in the rare and desirable Comoros . . . the rest are just plain Madagascar, but cause terrific pile-ups just the same.

VE3MR hopes to put TI9SB on SSB, all bands, on April 18 for the SSB Contest . . . XE4B may be the station operating from Socorra, late March or early April . . . UA1CK says he will be running all bands from Franz Josef Land during July and August, all being well . . . XQ8AC is an American in Chile; the prefix is OK (an XQ8AG was working a couple of years ago).

FIVE BAND DX TABLE
(POST WAR)

Station	Points	3.5 mc	7 mc	14 mc	21 mc	28 mc	Countries
DL7AA	921	113	171	249	203	185	267
G3FXB	783	73	131	219	205	155	253
G2DC	771	84	113	229	191	154	260
G5BZ	762	64	118	260	194	126	270
G3DO	677	24	47	244	185	177	271
GW3AHN	639	16	55	196	229	143	253
G3ABG	568	51	88	183	127	119	210
G3BHW	554	15	32	189	177	141	229
W6AM	524	30	58	294	86	57	294
G2YS	514	73	92	164	111	74	180
G2HPF	469	42	80	167	90	90	189
G8KU	431	26	57	162	86	90	?
G6VC	423	36	54	153	108	72	178
G3HZL	402	41	74	117	96	74	144
G3LET	390	20	73	163	96	38	179
G3JLB	379	43	51	101	90	94	168
W6AM (Phone)	376	13	52	271	39	21	271
G3IGW	375	44	70	107	66	88	142
G3FPK	364	36	76	122	79	51	147
G3JZK	355	17	57	82	124	75	168
ZB1CR	343	1	5	97	114	126	159
MP4BBW (Phone)	309	1	5	112	118	73	155
G6TC	307	17	67	128	59	36	145
G8DI	291	30	59	80	69	53	122
G2BLA	288	32	53	67	71	65	114
UR2BU	286	12	22	98	92	62	126
G3DNR	269	10	22	89	73	75	124
VO2NA	251	19	31	106	63	32	115
G3WP	249	17	34	80	24	94	134
G3MCN	241	4	6	55	114	62	144
G2DHV	236	21	27	126	46	16	137
UR2BU (Phone)	185	1	7	58	68	51	77
W3HQO	183	3	8	52	91	29	119
G3NBE	162	16	20	41	23	62	86
G3DNF	139	7	30	41	37	24	64
G3MJL	138	3	37	33	19	46	73
G3MMP	122	5	23	21	28	45	70
G3IDG	119	11	15	29	27	37	53

(Failure to report for three months entails removal from this Table. New claims can be made at any time)

DX Miscellany

G3JAF (Lymington) reports that JZØPB is rebuilding and will shortly be on 28, 21 and 14 mc; also that VS9MA has now left, but that VS9MB is allocated to some other chaps, with the possibility that some 4S7 types will also be signing VS9MC. G3JAF now handles the cards for VP8EP, who is active from Halley Bay on 14 and 21 mc with 450 watts and a reversible rhombic. Stations calling him during QSO's will go in the little black book and will *not* get cards.

G6UT (Bishops Stortford) says that DL9HF/Mobile/FE8 was genuine enough, working 28 mc phone from his Volkswagen near the Nigerian border of the French Cameroons. He will be visiting other African countries, whence he will operate with his 45 watts and a whip aerial.

GM3KRQ (Glasgow) mentions that VE8TO is ex-GM3HLD and his present QTH is c/o Federal Electric, Darval Airport, Montreal, with his station on Baffin Island; he wants to get his WAGM Certificate and has "a spot of trouble" with the QSL bureau, so would like the above QTH noted.

The "P6K" Sheepskin, issued by the USSR Radio Club, is not exactly intelligible, says G3BPE (Bexley). In fact, when he received his, the only thing he could understand on it was his call-sign! However, he has had it translated, and any other holders may have a copy if they forward him an s.a.e. (35 Bladindon Drive, Bexley, Kent).

G5VT (Bishops Stortford) passes on the following, *via* VK5MS: Ray Baty, VR3A, who returned to Sydney with a broken leg, is likely to remain there for two years. The leg is progressing OK, but has upset plans somewhat. Before the end of 1958 he had despatched all QSL's for European contacts, but should anyone not have received one, write to VK2ANS, 41 Lawson Parade, St. Ives, N.S.W.

G3FPQ, formerly of Bordon and now of Elstead, Surrey, has a new QTH to tackle, including the planting out of his aerial farm! His station will be entirely home-constructed, and his new (26-valve) receiver is nearly finished. The old 4-element beam is up, but at only 17 feet, and also the original 272-ft. centre-fed wire, at 30 feet. With this combination, he recently managed to work UA9CM on all bands, Ten to One-Sixty; if he is able finally to get ZC4IP on Top Band, it will be the sixth band for them, also. *(See* further remarks under Top Band Topics.)

G3WP (Chelmsford) would like to know how to extract a QSL from VP6— he's worked half-a-dozen, but nothing happens, even with IRC's . . . G3JHH (Hounslow) wants to know whether there are any SM1's on *any* band? He needs one for his WASM award.

VK2AXH/ZL1AUL, on right in this photograph, was licensed in 1908, was the founder of the Wireless Institute of Australia, and was the first man to use radio in the Antarctic — with the Mawson expedition of 1912. VK2AXH is on a 12-month tour of New Zealand as the guest of the ZL's, 27 of whom he has visited so far. Here he is at the station of ZL3RB, Canterbury, where he heard about the success of the W6KIP/ZL3RB schedule on 160 metres.

A GD Visit

Somewhat nearer home, a trip to the Isle of Man is planned for early April by G3CQE, G3IOR, G3LDI and G3MPN (all of Norwich), who hope to be on the air by April 11, signing GB3GD from one station (for which a special QSL card is being done) and their own calls, suffixed /A, from another. The gear will include a Collins KWM-1 and a K.W. Vanguard, and all bands will be worked. QSL to any of the call-signs mentioned (QTHR in *Call Book),* and those wanting a card direct should enclose sufficient return postage.

News from Overseas

W6ZZ (Menlo Park, Calif.) is, of course, Miles Weeks of pre-war W1WV fame. In his 72nd year, he has now abandoned AM and gone entirely SSB (which has cut down his G contacts quite a lot!). He runs 100 watts with no linear amplifier and has worked 43 countries in six months without doing any serious chasing. Miles says the main trouble now is "rabid competition by AM operators who resent SSB's presence and refuse to co-operate . . . some of them are fighting it by deliberate QRM-ing of SSB frequencies. (There really are some *nice* chaps about.)

VO2NA (Goose Bay) mentions PAØLB on 3·5 mc, GW3JI on 7 mc and no less than nine new ones on 28 mc, putting him up to 32C worked on 10 metres. VO2NA is one of the all-rounders, in that he keeps a place in our Five-Band Table, and shows steady progress.

VK9AD (Norfolk Is.) is a welcome visitor to these columns. Running a tri-band Quad, he uses CW, AM and SSB on all bands, and enjoys working G's best of all, but the going is tough when Europe is in full cry. He has another six months on the island. Stan says that the G amateurs are the unfairest in the world when it

comes to expecting QSL's—a very small percentage send along an IRC, and he finds it hard to keep up with the demand. He doesn't like the use of the bureaux (would *you* like 400 cards arriving in one batch?), and from now on the technique is a QSL by airmail, if enough IRC's are enclosed to cover its cost.

(We heard over the air, at the very last moment, that VK9AD lost his mast and his Quad in a severe gale, and is now transmitting on a dipole and receiving on 12 feet of wire. Hard luck, Stan, and may you soon be back as before.)

ZL2GX (Gisborne), recently mentioned as being right up among the top scorers, writes to say that there's only one direction in which to go from there—downwards! He didn't hold the top spot for long . . . He has just finished sorting out the 1958 VK/ZL Contest logs, despite convalescence after some surgical work, and we shall be hearing from him again soon.

VK9AD is on Norfolk Is. in the South Pacific, at 28° 58′ S., 168° 3′ E. (Zone 32), the location for the trans-Pacific cable relay station of the Overseas Telecommunication Commission. VK9AD runs a Viking Valiant at 150w., with a Central Electronics SSB exciter, and his receiver is an SX-100; the aerial is a tri-band Quad, and he operates CW, AM and SSB on all bands. He complains of the very poor return on U.K. cards — he sends QSL's to G's, but simply does not have them back. VK9AD, who is one of those in distant parts who get "Short Wave Magazine" by airmail, has another six months to serve on Norfolk Is., but remarks that he will probably extend his stay for a further two years. So, if you owe him a card. . . .

Ten Metres

It is almost impossible to tell whether the sub-standard behaviour of 28 mc has been due to conditions or to lack of activity, but we rather blame the latter. All sorts of quite interesting phone DX is there for the asking, but very little CW appears unless there is a contest of some sort. So, on the whole, we think the band is in fairly good shape, and definitely improving as "spring conditions" move in.

G2DC (Ringwood) found some CW activity from Africa around mid-day, with FQ8 and OQ signals peaking at S9; he worked FQ8AP, FQ8HA (Fort Lamy, Tchad), OQ5IG, PJ2AX, VP3HAE and all districts W and VE.

GW3AHN (Cardiff) raised VQ8AV on phone, and VQ8AQ on both phone and CW (he quotes the latter as Rodriguez . . . but when we worked him he was on Mauritius). New for G3DO (Sutton Coldfield) was XW8AL, who puts in excellent phone around lunch-time.

G5BZ (Croydon) hardly used the band at all, apart from a short spell during the ARRL Contest, when he worked masses of W's and VE's. G3MCN (Liverpool) collected FF8BL for a new one. G3MMP (Pinner) lists 9K2AP, HK7AB, OQ5PU, ZD2AMS, CT2AI, CR7's, VQ2, ZS, 9G1BA and VK4EJ (the latter at 0830, the others early evenings). Near-misses on 28 mc were XE2DO, CX1VD, VU2DR, VP6's and ZB2A.

G3FXB (Southwick) worked UAØKKB on phone for his fortieth Zone on A3, and joins the select company of the WAZ-on-phone characters. Others, also phone, were FD8DZ, FM7WQ, KR6CGA, XW8AL and 8AN, and ZD2AMS. On CW, UF6FB and UI8AG.

G3BHJ (Norwich) raised BV1US, CR9AI, KZ5WR, HP1CC and 1EA, HI8CJY, TG9AD, TI2CAH, VP5FR, VP6's, VS6AE, XW8AL, 9G's and 9K2AP. G3DNR (Broadstairs) worked HK7AB, VU2ED, CT2AI on phone, and VO2NA on CW gave him a new Zone.

G3ABG (Cannock) exchanged phone with FA2VB, 5A2CV, VS1BB, ZE, ZS, CX1BY, HH2Z, PZ1AH, 9K2AN and 2AP. G3WP (Chelmsford) has worked this band exclusively for four years; recent contacts have been ZD2GUP and 2HAH, VK9DB, KR6AK and CEØZA.

G3FMN (Frimley Green) worked phone to DL9HF/FE8/Mobile (QSL to his Stuttgart QTH), ZS5RO/ZS7 (QSL *via* W1FFO or home QTH), HZ1AB, CEØZB. ØZC and ØZD, KA5MC, CR7EO and FQ8AE. A nice one on CW was FB8ZZ (New Amsterdam), 1400 GMT, March 5—QSL *via* FB8BC.

Fifteen Metres

Practically anything can show up on 15 metres nowadays, especially during the early evening period, and the band has on occasions been open well after midnight, even to W6 and the like. G2DC managed to find HM1AD (Korea) for a new one, others being VP2SW, VP8CV, KZ5AC, XZ2TH (very nice signal daily around 1600), XE1PJ, HC4IM, VS1, VS6, VS9 and most VK and ZL districts.

GW3AHN, on phone, made it with FG7XE, KL7, VP8CC, 8DG, 8DI and 8EP, VP9DC, VQ4GQ,

VR2BC and 2AZ, and ZE7JY; on CW he scored with KL7, UAØ, VP1AW, LA1VC/G, VP8CC, 8CV, 8CW, 8DL, 8EG, 8EJ and 8EP, and 4S7FJ. (Dig those VP8's! We've never even heard so many . . .) Interesting point about 4S7FJ is that Frank Johnstone (ex-VS1FJ) seems to have beaten the ban somehow. We hope the others will all be back, too.

G3DO raised CEØZA and UN1AE, both new, both CW. G3LET (Westcliff) finally accounted for VP8CC (after "months of chasing"), and was possibly his last QSO — '8CC arrives back home in June. HL2BO was also raised, along with XZ2TH, ET2VB, KR6AK, VK9DB, and GC3HFE.

G5BZ didn't use Fifteen much, but did work W6 and 7, ZL, XZ2TH, VQ2's and VP2SW. G3MCN collected VQ5EZ, VQ8AD, XW8AL and VP2AB—all new ones — *plus* ZD6DT, 9M2DW and HS1E.

G3MMP's list includes CN8BM, FA2TW, OY2AB, SM7CTA/MM, ZB1's, UC2AD and UA9KCC. G3JAF (Lymington) sends a longish list for this band only; among the best are ZD7SA, VP8's, 9G1AA, FF8BF/SG, YS1IM, ZD1's, XW8AL, 9M2DW, VS1's, VS9AD, CEØZA, VR2AZ and 2DE. VQ5EZ and "stacks of VK and ZL."

G3FXB's phone fetched in HL9KS, VK9AD, XW8AJ, 8AK and 8AL, YJ1OM and YN1SV; CW collected BV1USB, HL2BO, LA2JE/P, UAØGF, UAØKFG (Sakhalin) and YK1AT.

G3BHJ, on phone, raised CT3AN, DU1FR, KR6QB, VP5AK, VP6WR, ZS's and 9G1AA. G3DNR worked KL7, JA, ZL and VK, all on phone, but his only new one was ON4CI on CW! G3ABG, on CW, mentions VS9MB, VE8TO and ZS4IO; again, two new ones for the band were locals—a GD and a GI.

Twenty Metres

G5BZ used this band most of all (as always) and singles out for mention VQ3HD, VQ4HE, VQ2's, ZE's, FB8CE and 8CK, KX6CO, KH6's, VS1's, OQ5JQ and the usual W and VE, all districts. G5BZ has been rather QRL with other things, and not quite as active as usual.

G3FXB, by contrast, sends a shorter list for Twenty than the others—it comprises ZK1AK and ZD7SA, both CW. G3MIX (Maidenhead) quotes FF8CC, FQ8HD, OQ5JR, VQ3 and 4, VP9EP, VE5QC, and ZL's and ZS's.

G2DC thinks conditions greatly improved; the morning 0700-0900 periods haven't come back to the autumn standard, but between 1700 and 2300, as he says, we have signals from all continents coming in at about equal strength. He finds ZL3GU (14075 kc) well worth listening to, not so much for his own signal, but for the DX that comes back to him! FB8XX has been very active and usually S9 (1400 onwards), and even shatters the "short-skip rubbish that piles up around him." Best of the month were FB8XX,

Short Wave Magazine

DX CERTIFICATES

The following have been awarded since the publication of our last list, in the December 1958 issue:

WFE
No. 38 YU1AG (Belgrade)
39 W6CHY (Santa Monica)

FBA
No. 138 SM5DX (Stockholm)
139 SP5AA (Warsaw)
140 G3HQX (Mitcham)
141 OZ7BW (Aarhus)
142 F3ZU (La Frette)
143 G2BLA (Welwyn)
144 DL6VM (Munich)
145 OK3DG (Bratislava)
146 GC3HFE (Guernsey)

WNACA
No. 189 DL3LL (Ludwigsberg)
190 VK7CH (Moonah)
191 SP5AA (Warsaw)
192 PAØTC (Zwolle)
193 PAØLOU (Rotterdam)
194 G8CD (Huddersfield)
195 OK3DG (Bratislava)
196 YV5FK (Caracas)
197 G2CVY (Barnstaple)
198 G3BYM (Crowborough)
199 G3AMM (Scunthorpe)
200 ON4CY (Brussels)

WABC
No. 176 G3DVY (Hexham)
177 G3APA (Coventry)
178 GW8PG (Cefn-y-Bedd)
179 G3JVI (Ongar)

WBC
No. 119 LA6CF (Sarpsborg)
120 SM5AWJ (Norrkoping)
121 ON4AJ (Assebroek)
122 W2RA (Brooklyn, N.Y.)
123 F9DW (Longwy-Bas)
124 OK3DG (Bratislava)
125 W8KPL (Royal Oak, Mich.)
126 EA8BC (Tenerife)

Details of MAGAZINE DX AWARDS and CERTIFICATES, and the claims required for them, appeared in full on p. 84 of the April, 1958 issue.

Overseas claimants may send either (*a*) A check list, without cards, duly certified by the Hq. of their National Amateur Radio society, or (*b*) An uncertified check list, from which any or all cards may be called in by us.

U.K. claimants must send the relevant cards for each award.

All claimants must include sufficient return postage for the cards and Certificate — five IRC's in the case of overseas claims.

G3BCI of Bournemouth, Hants. was licensed in 1947, and is CW-only, running 30 watts to a home-built TVI-proofed transmitter, band switched for 14 and 21 mc. A separate QRP rig is used on 40 metres, and the receiver is an Eddystone S.640. Aerials are a dipole for 14 mc and a Zepp for the other bands.

HH2LD, KZ5EM, TI2LA, VP2SW, VP3HAE, VP5RG, VP7BT, VP8CC, VP9EN, VS1HY, VS6DS, VS9AC and VS9OM, *plus* the usual VK, ZL and all. G2DC is amazed how few G stations seem to be working the evening DX, and presumes that TVI is the trouble (or perhaps they're all happily watching the Quiz programmes!)

G3LET spent most of his time on this band and raised JZØDA (first G), VS9OM, W7AHW/KG6, FK8AH, FQ8HD, VS9AC and 9AD, FB8ZZ, CR4AH, VQ6AB, DU1DR, PJ3AB, VE8JW and UAØKKB (Vladivostok). FM7WP was consistently missed, owing to pile-ups . . . he's so strong that *everybody* calls him.

G3MMP found a new one in ZD1FG (0740) and also worked several new Europeans to push up his Five-Band score.

G3FPQ, very seldom active on the band as yet, raised VS9OM and K6QPG/KW6, both on CW. G3FMN is another who reports a single QSO — with LA2JE/P (2150). Two all-time new ones for G3DNR were SVØWB (Rhodes) on phone and SU1MS on CW.

Forty Metres

The fact that 7 mc is rapidly improving as a DX band is rather depressing—it means that we may be slipping down the far side of the sunspot cycle at last! But there's a long, long way to go before the HF bands really decline.

G3JHH (Hounslow) has been working W's with his 30 watts, and getting 559 reports; two new countries were UC2KAO and LZ1KBL. G3LNR (Nottingham) also raised W's, as well as working PY1DB, but he didn't think conditions good.

G3LET pulled in VU2JA at 0200; others were TF5TP, ZB2A, EA8BC, UAØAA, VK, ZL, all districts W, and PY. DL5AE (who counts for DUF) was also raised. G2DC only worked the band during the early mornings, and then he collected all districts W and most VE. He says that W6 and W7 are workable as late as 0800 GMT.

G3FXB's offering consists of HZ1HZ, UA9CM, UF6AA, VQ6LQ and ZD2GUP, all on CW. G6QB, at 1100 one morning, heard "VS6DV" calling CQ DX, but thought he sounded rather like Mittel-Europa; a few minutes later there was a CQ from PX1CD, also looked on as rather doubtful.

G3DNR found UB5KII for a new one, but says the "shocking noises" put him off the band. G3ABG raised ZD2GUP and GD3FBS. G3MJL (London, W.7) filled in gaps with UQ2BA, UC2's, UA9KCK, UAØAA. Another one was LA6FE/P, QTH unknown at present.

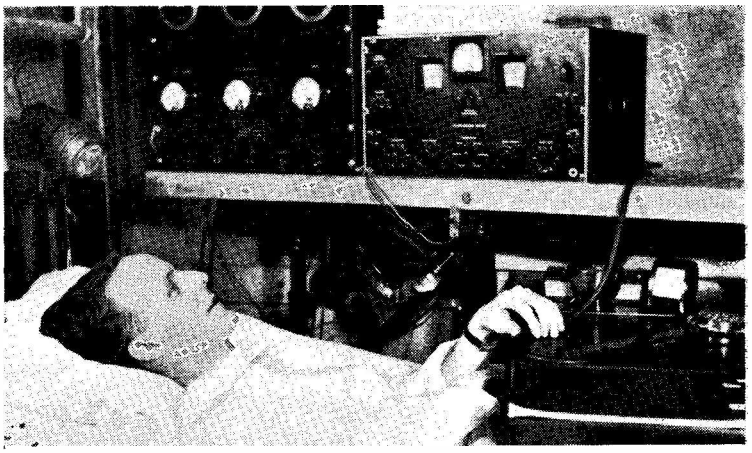
G3LPS (Blackburn) spent more time on the band and raised CO2WF (0750) and VU2JA (0200) for new ones, others being UA9's, PY1DB, VE8TO, W6's, ZL2 and 3, IT and RAEM. ZA1KAB was heard—obviously phoney, because he signed "KBA" a few times before making up his mind! G3LPS asks for times in brackets after good 7 mc DX—successful 'chasers, please oblige.

Eighty Metres

The collection of fearsome noises that is spread from end to end of this band, like jam (and what else is it?) has frightened away all but the faithful few—and how few they are! The strange thing is that the 300 kc between 3500 and 3800 kc seem to be the concentrated target for all the strange things going, and *outside* the band, at either end, there is comparative calm and quiet. This is, presumably, what "sharing" means.

If you haven't listened up there recently, please do so—it will be an education. Most of the creepy-crawlies are quite indecipherable; they are definitely non-amateur, and their purpose must for ever remain obscure. In between them, diehards like G2DC manage to work all W districts except 6 and 7, in the early mornings. For the rest of the day one can work anyone who manages to put a steady, clean, S8-9 signal through the rest of the horrid miasma, but there are few who do.

Any unbiased outsider who would like to compare "amateur" and "professional" technique in radio ought to be given the opportunity of a well-explained conducted tour round the 3.5 mc band; so ought anyone who has ever been heard using the word "amateur" in a derogatory sense.



W1LSZ of Barre Plains, Mass., runs a 160-metre transmitter and is also active on 28 mc; on the latter band he has kept a schedule with ZS5MP which has run to over 600 contacts. W1LSZ is one of the bedfast fraternity, and, unhappily, is at present in hospital.

Photograph W1BB.

SWL Logs

P. G. Harris (Rotherham) listened on 21 mc only, and logged KZ5CM, VP8EP, CR5AR, LA2JE/P and BV1USB on CW, with VP9DC, YJ1OM, VP8DI, VP2GV, HI8GA, ZS8O, OQØPD and VP5RD on phone. E. Baker (Whitley Bay), covering 21 mc phone, heard HC5MT, HZ1AB, YN1AB, VP2AB, CE2CC and

VP7NB; 28 mc phone fetched in UA9CM, HZ1AB, 9K2AZ and OD5BU.

J. E. Paterson (Hatch End) followed the flight of W3CGZ/DL4RL from Germany to Tripoli; he read him for over an hour on 21 mc phone; several 5A's from Tripoli were logged on the band, also ZB1DC, due to go QRT on March 11.

J. F. E. Grogan (12 Downs View, Isleworth, Middx.) offers to monitor and tape any phone transmissions on the 3·5, 7 or 14 mc bands; his times are mostly after 1830 GMT, week-days, or any time at week-ends. He will record any transmission, either by pre-arranged sked, or if he happens to hear anyone calling him and asking him to do so.

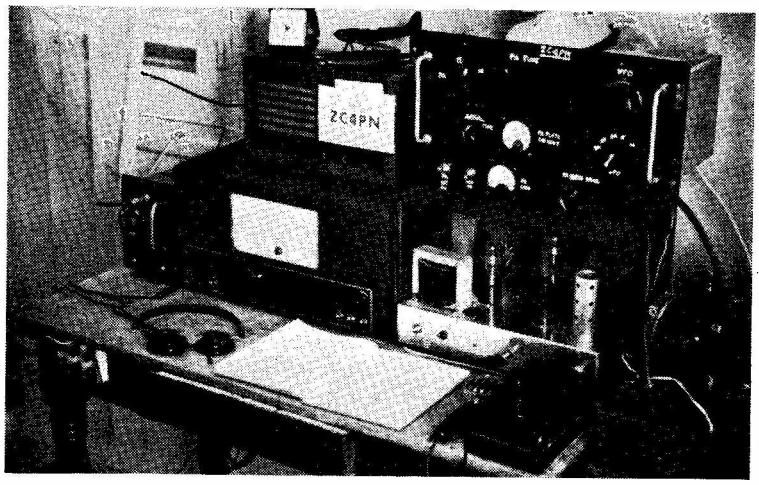
P. Linsley (Cleethorpes) sends a log from which we extract FQ8AT, CR4AV, ZP5MQ.

TOP BAND COUNTIES LADDER

(Starting Jan. 1, 1952)

Station	Confirmed	Worked
G2NJ	98	98
G3JEQ	96	97
G6VC	96	96
G3JHH	93	93
G2FTK	91	94
G3FNV	91	92
G2AYG	88	88
G3KEP	85	85
G3KOR	82	86
G2CZU	80	81
G3DO	76	76
GM3COV	71	73
G2CZU (Phone)	63	65
G3LBQ	61	67
G3KQN	60	72
G3KEP (Phone)	60	62
G3APA	60	61
G3JSN	57	64
G3LHJ	56	66
G3LEV	55	61
G3MCY	47	54
G6QN	46	54
G3MCP	46	54
G3LNR	44	52
G3LNO	23	41

(Failure to report for three months entails removal from this Table. New claims can be made at any time.)



ZC4PN, Nicosia, Cyprus is G3ICH and has also been DL2SU. He started up under the ZC4 call in November 57, running a Geloso VFO with an 807 PA on the 7-28 mc bands, and an Eddystone S.640 receiver; aerials are dipoles for each band, with a 2-ele beam for 10 metres. In about a year's not-too-concentrated operating, 100 countries have been worked.

PJ2CA (Ten phone); VE3EGD/P/SU, 9M2FX, FO8AX (Fifteen phone); and HZ1AB, I1EZZ/M1, HC1FG and 3A2BF (Twenty phone). From the log of J. Baxter (Hull) we can quote FF3AP, ZD1FG, TF3KA (28 mc), ET3XY, OD5AT, VK9SB (21 mc), SVØWT, VU2SL, 3A2BA and 5A1TA (14 mc) and LX2SJ and 1WK (7 mc).

I. M. Stewart (New Barnet) heard KV4AA, KC4USG, 9G1BF, ET2DM, KG4AD, KL7AIR, 3A2AF and I1EZZ/M1 (all 14 mc SSB); SU1AS and MP4DAA (14 mc AM); VE2AGW/VE8 (21 mc SSB); EA9EI, VP8DL, VP8DI, VU2NR, HS1E and FG7XE (21 mc AM); KR6HI, 6QM and 6CA, VE7ZM and VE8SB (28 mc AM).

C. N. Rafarel (Birmingham) received phone from XZ2SY, FB8CJ and 8ZZ, VP8DW and 8DS, VU2PS and XQ8AC (Chile) on 28 mc; from FO8AX, VQ8AD, ZS8K, XW8's, VP8's, XZ2SY, OY2AB, HL9KS, 15FL and three 9M2's (21 mc); and from XE1BBC, XE1HC and YS1IM on 14 mc; he thought 21 mc showed a marked improvement this month.

P. Day (Sheffield) covered his usual seven bands and quotes W1BB, ZC4IP, SP2FT, YU1IJ and DL7EN (1·8 mc); UC2AD and W's on SSB as late as 0730 (3·5 mc); OX3RS, ZC4IP, KP4AMT, FA9VN and UA9OM (7 mc CW); VS9MB and UL7HB (14 mc CW); XZ2SY, XW8AL and 8AN, and ZD1EO (21 mc phone); HI8CJY, XE1KQ and VP5AB (28 mc phone); and sundry unusual pieces of DX on 50 mc, where ZE2JV puts out automatic CW every evening at 1630 GMT, and runs a sked with ZC4WR and LA7Y at 1645. ZE1JN gets the European TV at S9 *plus* and has been heard to relay it back on 28 mc!

Top Band Topics

Despite the apparent failure of this year's Trans-Atlantic Tests, there is a lot of DX interest on this band still. For instance, ZL3RB and W6KIP made it at last; for months ZL3RB had been receiving W6KIP, but not getting back. He returned the signals on 14 mc phone, time and time again, but it was not until after *ten months* of trying that he was rewarded with the full Top-Band QSO.

On January 31, ZL3RB received WØGBV on *phone*, together with several others—it was the greatest 160-metre opening he had ever known. Even so, it was not until February 16 that he got his own signals back to W6-land. The path from W6KIP to ZL3RB seems extraordinarily reliable, and ZL3RB has a wonderful QTH, far

from man-made QRM ; on the other hand, W6KIP, in Los Angeles, has possibly the highest noise-level anyone could ever have to cope with.

Other news from W1BB is that *he* was heard by ZL3RB on February 8 ; that W6KIP and K6HXT both worked HC4IE on March 1 (all heard by ZL3RB!) ; that W8ANQ worked ZL3RB on the same day, when VP7BT was also heard in ZL ; and that VP3AD has been hearing loads of W's but not making contact.

SWL N. C. Smith (Petts Wood) achieved a notable piece of DX on February 22, when he logged VP5FP (0558 GMT) at 449 ; he was N.C.S.'s 37th country on the 160-metre band! W1BB was heard the same morning, but only for a few minutes at 439.

G3FPQ, now in his new QTH at Elstead, Surrey, pulled a nice one out of the hat, too. On March 5 he worked UA9CM on 3.5 mc, and the UA said he had been hearing him on Top Band ; so they QSY'd straight away and made a QSO of it (449/559). G3FPQ has also heard UA3BS on One-Sixty, and has, of course, worked the usual DL's and OK's, as well as EI8J. He reports that UA9CM only uses a 40-metre Windom 30 feet high, and that his 11-valve receiver isn't too good for One-Sixty ; he also has " bad industrial QRM " and the only G he has even *heard* is G3FPQ, who uses a centre-fed 272-foot wire, which he hopes eventually to raise to a height of 60 feet.

G3LEV (London, S.W.16) managed to get a contact with ZC4IP on March 1 (0200), and has also worked DL1YA, DL3OO, OK1AEH, 1FT, 2ID and HB9NL; a welcome arrival was a QSL from YU3EU. On March 1, G3LEV also heard an SP3 calling " CQ G " around 1780 kc. and UA3BS calling CQ on 1850 kc. GDX on phone included GM2UU, 3OM, 3JFG, GW3DIX and 3IQO/A, also G3CSG and 3LRV in various rare counties.

G3IQO (Liverpool) just missed the boat last month, or we should have been able to publicise his Easter expedition to rare Scottish or Welsh counties. We hope you found him, wherever he may have been.

G3JSN (Watford) has a new QTH just inside the Herts. border, better than his previous location and 250 ft. a.s.l. He needs cards from GW8CT, GW3KCQ, GI3KVD/A, GM3JDR, G3JRL, G3WW and GW3CBX to give him WABC and a score of 64/64. So, if those of them who see this . . .

G3LNR worked Hereford and Banff for new counties, also OK1JJ ; he heard DL7DZ and DL7EN. G3JHH has been absent from this column for some time, owing to an accident on New Year's Day, resulting in a fractured shoulder. He's making good progress and hopes to be " in harness " again soon ; meanwhile, he has had a left-handed QSO with DL2AH and has received a card from Kincardine which makes his score up to 93/93. His new target is the WALT award.

The DL's have now lost their permits for the band until next winter, but, just before the QRT, DL1FF told us that he had worked ZC4IP, UB5FJ and UA9CM, and also that HA2CV and HA5AM were supposed to be active on the band.

A last-minute item of hot news, from SWL Day (Sheffield) is that 5A2CV says he hopes to be working the band with 75 watts—with his eye on G contacts, of course. SWL Day also logged ZC4IP, UA3BS, YU1IJ, DL7EN and, of course, W1BB.

Late Flash : G3IXZ (Billericay) will be operating from St. Mary's **Scilly Isles,** for three weeks from May 14 onwards. Phone and CW, mostly the latter ; evenings and late evenings, odd mornings and week-ends thrown in. Daytime working will depend on the state of the band *and* the weather, since this is a holiday and not a working DX-pedition! Polish up your contest-type operating in time for May 14—everyone will want him.

Museum Piece

We have on many occasions betrayed amusement at the efforts of various people to " create " new countries, on the assumption that the main target in view was to make it possible for someone to work 300 of them.

Imagine our surprise, then, at discovering a *pre-war* List of Countries which runs to a grand total of about 326! And this is done without the inclusion of any of the recently-arrived ones such as Aves Island, Fernando de Noronha, Navassa, Clipperton, Danger Island and the rest. All the Leewards and Windwards were listed separately, though.

The explanation? Well, for a start it was found that the FF8 prefix counts for six different " countries " — Dahomey, French Sudan, French Guinea, Ivory Coast, Niger Territory and Mauritania. (All these six French colonies used to issue their own stamps, by the way.) Then we find FQ8 listed as Chad Territory, Gabon, Middle Congo, Senegal, Ubangi-Shari and Upper Volta (the same remarks apply).

Asia fares almost as well—CR8 appears as Daman, Diu, or Goa, and FN1 as Chanderagore, Karikai, Mahe, Pondicherry and Yanaon. Interesting, too, to note that, under Oceania, Lord Howe Is. (ZK1 !) appears, as well as such unfamiliar ones as Manihiki Is., Ogasawara Is. and Santa Cruz Is. And FO8 is given as Marquesas Is., Society Is., Tuamoto Archipelago and Tubuai Is.

One of these days the fashionable question will be " How many *pre-war* countries have you worked? "

And so we must end another month's review, with the usual thanks and acknowledgments to all who have helped us to compile it. Particularly we are indebted to *DX* (W4KVX) ; the *WGDXC Bulletin* ; W1BB for Top Band DX news ; and our own regulars, not forgetting the SWL's. But our appetite is insatiable and we should like to have still more news from still more people. Every scrap of DX gossip is worth retailing . . .

More time in hand this month, and you have until **Friday, April 17,** to meet the deadline. Spring DX should be at its peak by now, and there ought to be plenty to write about — so let us have a record mail, and address it all to " DX Commentary," *Short Wave Magazine,* 55 Victoria Street, London, S.W.1. Until next month, we wish you Good Hunting, 73.

THE JUAN FERNANDEZ DX-PEDITION

RADIO CLUB DE CHILE, JANUARY-FEBRUARY, 1959

Luis M. Desmaras, CE3AG (CEØAA - CEØZA)

ON the initiative, last year, of the Radio Club of Chile, efforts to get the Juan Fernandez Archipelago recognised as a "new country" by the ARRL were successful. This archipelago is a group of three islands—Mas à Tierra and Santa Clara at 400 miles, and Mas Afuera at 500 miles, out in the Pacific, west of the Chilean coast.

Of the group, only Mas à Tierra, also known as Juan Fernandez Island, is inhabited, with a population of around 500 people living mainly by lobster fishing, with some agriculture and cattle raising. It was on this island that a Scots sailor, one Alexander Selkirk, was marooned in 1704, living there alone for five years. His adventure was the inspiration of the famous novel by Daniel Defoe, "Robinson Crusoe."

Normally, the level of Amateur Radio activity on Juan Fernandez is low; for some years, there has been one active amateur, CEØZF (ex-CE2BM), but he cannot keep much on the air due to the lack of electric power; this is supplied only for about four hours daily, at night.

Having obtained the DXCC approval, four members of the Radio Club de Chile—CE3AG, CE3GI, CE3HL and CE3QG—decided on a DX-pedition to be undertaken as a "summer vacation." CE3AG got quick delivery of a 32S1 and 75S1 from the Collins Radio Co., to operate on CW and SSB; CE3GI supplied his 32VI, CE3HL his 75A1, and CE3QG provided a transmitter and receiver for the 50 mc (6-metre) band. For power supply, two petrol-electric generating sets were available, one of 500 watts belonging to CE3AG (and previously used for CEØAA, on the Easter Island expedition of 1953) and another of 2 kW, lent by CE3CI. The aerial systems as planned were simply dipoles, with 52-ohm feed, two for each of the bands 14, 21 and 28 mc, so that there would be one set of three aerials for each of two stations—it being intended to operate continuously on CW, SSB and AM phone. From the outset, it was decided not to run 7 and 3·5 mc, because in the Pacific area DX on these bands is poor, with a high static level, and time would be lost in coping with South American stations, impossible to avoid on AM phone.

The CW/SSB operating position, signing CEØZA, with CE3AG in charge of the Collins 32-S1 and 75-S1 equipment. At the end of the 23 days the expedition spent on the air from Juan Fernandez, the CEØZA log showed some 3,500 contacts made in 84 countries on the 20-metre band.

After various difficulties and delays, we sailed from Valparaiso on January 22 in the *Aka Pinto*, a transport of the Chilean Navy. Juan Fernandez was reached on January 24, and we were enthusiastically received by CEØZF, who put at our disposal a beautiful house to instal the gear and live comfortably. During a lobster lunch with CEØZF, immediately after our arrival, a sudden great storm of rain and wind broke without warning, as is

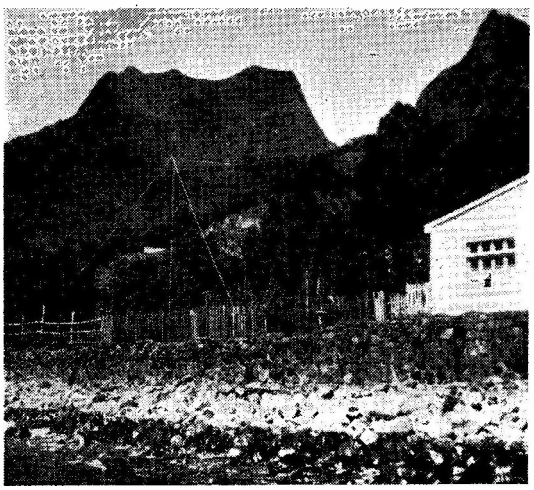
These three keen chaps were the phone operators on the 10/15 metre station for the Radio Club of Chile's DX-pedition to the "Robinson Crusoe" island of Juan Fernandez, during January-February this year. Left to right: CEØZB (CE3HL); CEØZD (CE3QG); and CEØZC (CE3GI). They worked a large number of U.K. stations and an account of the Expedition is given in the accompanying article.

customary in those regions. By mid-afternoon, the weather cleared and we were able to set up the gear; the aerials could only be erected at a height of about 25 feet, but results were excellent—far better than expected, for we had been somewhat doubtful about not having more elaborate radiating systems.

On the evening of January 24, the first "CQ de CEØZA" went out on 14030 kc, producing an awful pile-up. W2ADP was the first contact in the CEØZA log, at 2354 GMT, followed by 42 more U.S. stations, until G6YQ broke the sequence of W's as QSO No. 44. In the meantime, the other station was being operated as CEØZB, CEØZC or CEØZD for spells of one hour by each of the other three operators, running AM phone on 10 and 15 metres, and resulting in great pile-ups of stations calling from all over the world.

During the 23 days of activity from Juan Fernandez, running two stations on three bands, a total of 5,657 QSO's was made, the break-down of which is as follows: CEØZA (CE3AG), 3,501 contacts, including 3,201 on CW and 300 on SSB phone, in 84 different countries; CEØZB (CE3HL), 742 contacts, all on AM phone, in 70 countries; CEØZC (CE3GI), 754 AM phone contacts in 66 countries; CEØZD (CE3QG), 660 contacts on AM phone, including 30 on 6 metres, in 68 countries. The total of different countries accounted for by the expedition as a whole was 120. For the record, U.K. stations worked totalled about 150, the respective "firsts" being G6YQ, GD3UB, GI3AXI, GM3ITN, and GW3AHN, with EI9Y for Eire.

We arrived back from our DX-pedition on February 20, happy that everything had turned out as we had planned and expected, only too grateful to our Navy for providing the transport and to our good friends Sergio Rosa, CEØZF, and his XYL Eugenia for their generous co-operation. We also greatly appreciate the letters and complimentary comments on the operation of the CEØZ stations, which have reached us with the QSL's. It is impossible to acknowledge these individually, but, of course, all cards received are being promptly QSL'd with our own cards printed specially for the Expedition.



The CEØZ station location on Juan Fernandez, with Mt. Yunque, 2,950 ft., in the background. The aerials used were ½-wave dipoles, two each for 14-21-28 mc, so that two stations could be operated simultaneously on different bands.

In 1704 a Scots sailor named Alexander Selkirk was marooned on Juan Fernandez (Mas a Tierra) island, and his experiences are said to have inspired Daniel Defoe's great romance "Robinson Crusoe." Here we see, left to right, CE3AG (author of the accompanying article), CE3QG, CEØZF (who is resident on the island but cannot be very active for reasons explained in the text), and CE3HL. They are standing at the mouth of the cave in which Selkirk is supposed to have lived.

GI MAGAZINE VENTURE

On the initiative of a group of GI's, a duplicated publication has been launched, called *Gee-Eye*. The idea is to develop a periodical of direct interest to radio amateurs in Northern Ireland. The first issue consists of nine foolscap sheets, with a cover, and the contents deal mainly with matters of GI interest and activity. The cost is 1s. 6d. per copy, or 7s. 6d. per annum, and as the minimum economical production is 200 copies, it is hoped that *Gee-Eye* will be well supported by Ulstermen at home and overseas. The honorary editor is GI3KYP (Belfast) and the hon. treasurer W. E. Caughey, GI2DZG, 35 Gilnahirk Park, Cherryvale, Belfast, N.I., to whom subscriptions should be sent.

COSSOR PRICE REDUCTIONS

Cossor Instruments, Ltd., announce that the price of their Model 1071 DB Oscilloscope Kit has been reduced to £49 17s. 6d.; of the Model 1045 SB Oscilloscope Kit to £35; and of the Model 1044K Valve Voltmeter Kit to £15 12s. 6d. All these instruments can also be obtained factory-assembled and tested at prices of £60 10s., £55 2s. 6d. and £22 5s. respectively. The saving on taking them as kits is considerable and construction is made easy by very comprehensive instructions.

SSB Topics

HF CRYSTAL FILTERS — FEATURES OF THE HT-32 TRANSMITTER — NOTES AND NEWS

Conducted by **J. C. MILLER, DJØBX (W9NTV)**

THE development of new spectrum-saving techniques, especially those which will compress more and more intelligence into narrower bandwidth transmissions, has been stimulated by the ever-increasing number of uses and users of the available communications frequencies. Government and commercial communications services have been hard-pressed in an effort to obtain adequate channels for their requirements. New countries have demanded space in the already overcrowded spectrum. Interference between services has become a major problem. No one familiar with the field of communication can deny that immediate action is necessary to develop systems which will increase the usability of the available communications channels. Many believe that single-sideband techniques, with the prime advantage of reduced spectrum occupancy, may provide an answer.

And how does this affect the radio amateur? Our family is also growing. In fact, the amateur fraternity has increased by leaps and bounds during the last ten years, creating unprecedented activity on the amateur bands. The surging interest in radiotelephone communication has produced interference levels of fantastic proportions. We are not only bothered with conflicting speech signals, but have the piercing shrieks of heterodynes added to the general snarl of QRM. As if this were not enough of a problem, we find that we must share certain of our frequencies with other services—not to mention the numerous intruders who frequently slide into our bands to add to the confusion.

We amateurs must therefore also be interested in a system which will increase the usability of our frequencies. Let's imagine that a dream condition exists—one in which all AM phone transmissions were reduced to half their normal bandwidth and no carriers were radiated. We would immediately enjoy better communication, with double the number of phone channels per band and the complete absence of heterodynes! A system is available to all of us which could begin to make this dream come true. It will reduce the interference, increase the effective width of our band assignments and increase the reliability of our contacts. What is this system? Single-sideband, *of course!*

Some Thoughts on Switching Sidebands

In the U.S. 75-metre phone band — where the sideband population is extremely heavy — the QRM problem is somewhat eased by an interesting method: The ability to select either upper or lower sideband at will. It has become common practice for all stations engaged in a net to transmit on the same (suppressed) carrier frequency using the same sideband. As the net becomes overcrowded, or if several of the stations wish to carry on a personal chat without taking the other net operators' time, they switch to the other sideband and continue with their QSO. When they have finished their discussion, they flip back to the original sideband and rejoin the net.

With two nets operating on the same virtual frequency—one on the upper and one on the lower sideband—the unwanted sideband suppression of all transmitters must be quite good. Under these operating conditions, a station with poor suppression receives prompt advice of the fact! Of course, the receiving equipment must also have good sideband rejection and sideband selectability.

Why Not Use Both Sidebands?

When your conductor is not operating on one of the sideband frequencies, he enjoys a second hobby—that of experimenting with a "high-fidelity" audio reproducing system. With the advent of stereophonic recordings, interest and equipment expanded to include two complete audio channels — from the record pickup to the loudspeakers. From time to time it was jokingly mentioned that the next step in these experiments should be to convert the sideband transmitter to permit stereophonic transmission, with one audio channel on each sideband. (No, the writer *does not* advocate stereophony on the amateur bands!)

It seems that others have had the same idea of

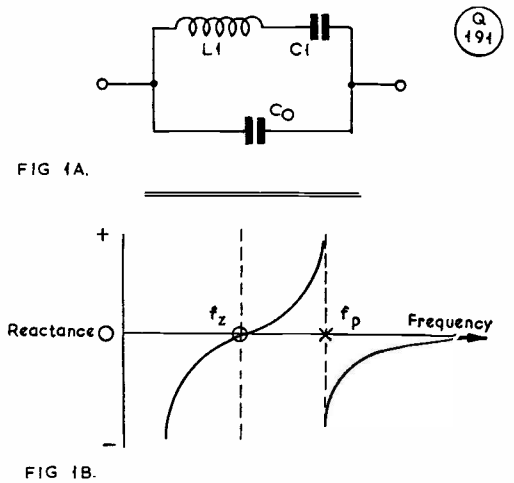


Fig. 1. At (A) is the equivalent electrical circuit of a crystal. The effective mass and "stiffness" of the crystal is represented by L1 and C1; Co is the shunt capacity of the holder. At (B) is shown the reactance characteristic of a crystal. C1, L1 are in series resonance at Fz; C1, L1, Co are in parallel resonance at Fp. These two resonances are very close together.

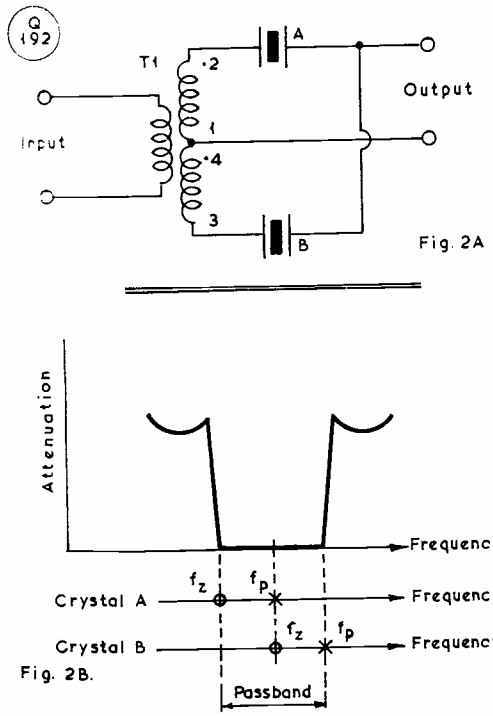


Fig. 2. (A) is the popular half-lattice crystal filter. Crystals A and B are selected so that the parallel-resonant frequency of one is the same as the series-resonant frequency of the other. Optimum results are obtained with very tight coupling between the two halves of the secondary of T1.
(B) Theoretical attenuation characteristic of a half-lattice crystal filter. The pair of crystals produce a flat pass-band between the lower series-resonant frequency and the higher parallel-resonant frequency.

utilizing the SSB technique for stereo transmissions. An experimental broadcasting system that provides stereophonic sound through a single receiver and dual loudspeakers on the medium-wave broadcast band was recently demonstrated by the Radio Corporation of America. In this system, the two separate sound channels making up the stereo programme were fed to an SSB transmitter with each stereo channel carried by one of the sidebands. Full carrier was also transmitted.

In the special AM-stereo receiver common RF, mixer and IF amplifier stages are used. Following the common IF amplifiers, the composite signal is applied to two separate sideband "selectors," detectors, audio amplifiers and loudspeakers. While the actual method of sideband selection is not known, it is believed that the receiver used in the demonstration employed the new RCA mechanical filters. This method of transmission can be received on a conventional AM receiver without the stereo effect.

All SSB operators are invited to write in for this feature, with a note of bands worked on SSB, equipment used and results to date, expressed as two-way SSB contacts by countries worked.

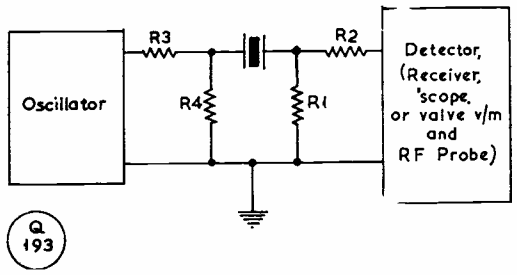


Fig. 3. Suggested test circuit for measuring the series- and parallel-resonant frequencies of a crystal. Erroneous results will be given if the test circuit adds capacity in shunt across the crystal; for this reason, the crystal holders should be soldered directly in circuit for the test. R1, 250 ohms, is used to eliminate input capacity of the measuring detector; R2, of 1,000-2,000 ohms, isolates the crystal from the detector. When the oscillator is tuned from lower to higher frequency a sharp rise in output will indicate the series-resonant frequency Fz; this will be followed by a dip at the parallel-resonant frequency Fp. Resistors R3, R4 are each 50 ohms.

The special stereo receiver will, of course, receive non-stereo broadcasts, reproducing them through a choice of either speaker, or both, without the stereophonic effect.

High-Frequency Crystal Filters

This is a subject in which many of our readers have indicated a great deal of interest. Eliminating the need for multiple-frequency conversion, the high-frequency filter is already finding applications in SSB receivers and generators. A number of new transmitting and receiving techniques using filters in the 4-to-10 mc range have appeared in the amateur literature. One of the commercial manufacturers of amateur sideband exciters uses a crystal filter with a design frequency of 5 mc. Filters in the 9 mc region are available from a few of the crystal companies—priced at from £9 - £18. With prices in this range, thoughts turn to war-surplus stocks for material and the work bench for experimentation.

An excellent article describing high-frequency crystal filter design techniques appeared in *Proceedings of the IRE*, February, 1958, by D. I. Kosowsky. The author deals with crystal-lattice theory in a fairly simple manner, with adequate formulæ and design information to provide those interested with sufficient data to develop several types of filters.

A method of designing and constructing crystal filters, using surplus FT-243 crystals in the HF range, appeared in the January 1959 issue of *QST*. In this article, W3TLN reviews a few of the fundamental concepts of crystal lattice design that appeared in the Kosowsky treatment, with an interesting description of his experiments with filters for amateur applications. As little information has been made available to the amateur on this subject, the following review of the mentioned articles should be of interest to those who contemplate the design and construction of amateur filters.

The approximate equivalent electrical circuit of a crystal is shown in Figure 1A. This circuit has a series-resonant frequency or "zero" of impedance

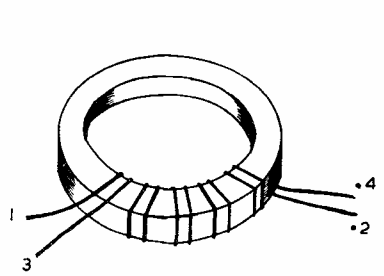


Fig. 4. Ferrite toroidal core with bifilar winding. Use of a ferrite material designed for the operating frequency will produce the best results. (Lower frequency ferrites can be used for experimental purposes, but the efficiency will be lower.) The winding numbers correspond to Figs. 2 and 5; for the secondary centre-tap, ends 1, 4 are connected together. If a toriod is not available, a pot-core or a rod of ferrite is suggested as an experimental substitute.

and a parallel-resonant frequency or "pole" of impedance. This is shown in graphical form in Figure 1B, where the reactance of the equivalent circuit is plotted for all frequencies between zero and infinity. The symbols for the zeroes and poles are also shown. These symbols are convenient in network design, particularly where one is dealing with a circuit containing several poles and zeroes. The object is to juggle circuit values so that some of the zeroes each cancel out a pole.

The simple half-lattice filter is shown in Figure 2A. The impedances of the two crystals must be approximately equal for the lattice to present a high insertion loss between its input and output, and for the voltage at the common output connection to equal that at the coil centre-tap. If the crystal holders have the same capacity, the only problem is to construct a coil which will have exactly the same voltage from terminals 1 and 2 as that from 3 and 4.

In half-lattice design, crystals A and B are different in frequency. If we analyze this condition, using poles and zeroes, we find: At the zero point of crystal A the impedance balance of A and B is upset and a voltage appears between the common output connection and the coil centre-tap. At the pole frequency of crystal A this also occurs. The same statements hold for crystal B, except the unbalance is in the opposite direction. At this point it is clear that the pass-band of the filter is as wide as the spacing of all poles and zeroes. Referring back to Figure 1B, the way in which the impedance change around the zero differs from that around a pole may be seen, which will suggest how the crystals can be arranged to produce a flat pass band. In Figure 2B, the desired arrangement—a flat pass band from the zero of crystal A to the pole of B—is obtained by arranging the series-resonant frequency of crystal B to coincide with the parallel-resonant frequency of crystal A.

We are now ready to determine the pole-zero spacing for our FT-243 surplus crystals. To measure the series- and parallel-resonant frequencies, the test arrangement shown in Fig. 3 is suggested by W3TLN. The oscillator or signal generator can be almost any kind that might be available, as long as it covers the frequencies of the crystals to be measured and has a slow tuning rate. The series- and parallel-resonant frequencies are, of course, at the peak and null of the signal across R1. The actual frequency difference may be read from a calibrated oscillator or good communications receiver dial.

In actual crystal measurements, two 5645 kc crystals showed a pole-to-zero spacing of 2·2 kc on one and 2·4 kc on the other. Their series-resonant frequencies were about 560 cycles apart. The upper frequency crystal was moved to a frequency 1500 cycles above the lower by using an ammonium bifluoride etching bath. The crystals were tried in the circuit of Figure 2A, using a $\frac{3}{4}$-inch ferrite toroid. with the secondaries wound bifilar for the push-pull coil, T1. This coil, shown in Fig. 4, must have very tight coupling between its two secondaries and a high enough inductance to avoid resonance with the crystal shunt capacitance near the pass band. In this coil 25 bifilar turns, or 50 turns total, were used to provide an inductance of 50 microhenrys for each half of the secondary coil. The exact inductance is not critical; however, the tight coupling is very important.

In the initial test of this filter, the input was fed from a low impedance and the output fed to a valve grid. Satisfactory flat pass band characteristics were not obtained until the filter was terminated in a proper resistance; 1500-ohm termination gave the best results.

The half lattice sections can be cascaded to give better rejection off the skirts. For example, crystals of the same frequency can be paralleled on the half-lattice arms, or two sections can be used with an isolating valve placed between them. A more interesting method of using two half-lattice filters is to connect them back-to-back, as shown in Fig. 5. In this connection, spurious off-frequency responses are reduced, as there is little chance of the spurious responses of crystals A and B lining up with those of A^1 and B^1. The coil L1 is wound bifilar as before. and the terminating resistors are chosen experimentally to provide the best pass band. The crystal

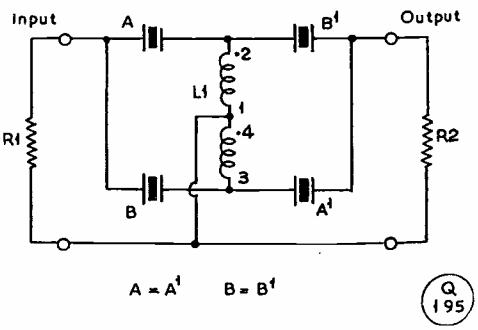


Fig. 5. Two half-lattice filters cascaded in a back-to-back connection. The attenuation curve of this filter shows better selectivity and fewer spurious responses than the simpler single half-lattice, but the pass-band is the same for both. Terminating resistors R1 and R2 are non-inductive types and the exact value must be determined by experiment to produce the best pass-band. Crystals A-A^1 are on the same frequency, with B-B^1 on another equal frequency.

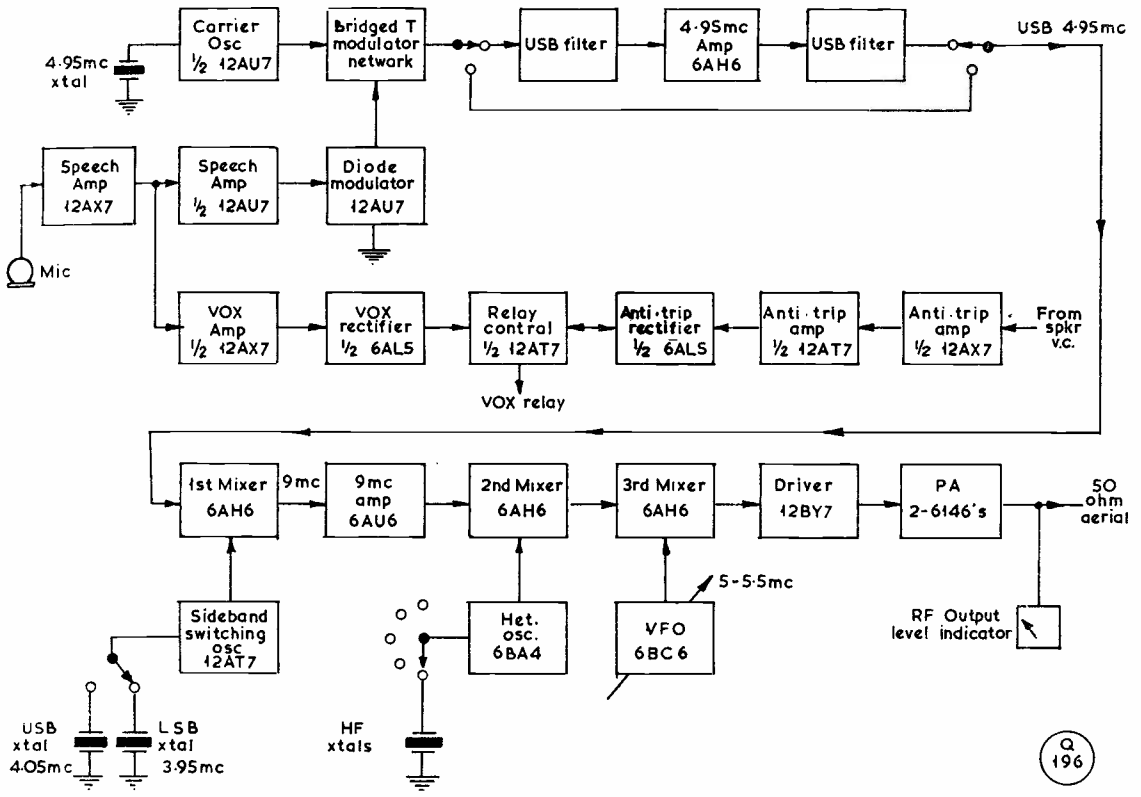


Fig. 6. Simplified block diagram of the Hallicrafters Model HT-32 transmitter-exciter. This equipment will operate in the 80, 40, 20, 15 and 10 metre bands, on either SSB, DSB or CW. An HF crystal sideband filter of unusual design, working on 4.95 mc, is a feature of the HT-32.

(Note : In this diagram, the LSB crystal frequency should be marked as 13.95 mc.)

frequencies should be matched as closely as possible. With four 7300 kc crystals (the pairs separated 1500 cycles) in the back-to-back circuit, W3TLN measured the attenuation outside the pass band as better than 60 dB. The bass band was approximately 2.5 kc, which is adequate for phone use.

It is hoped that this simpler technique for connecting half-lattice filters in cascade will provide many of our readers with the information required to continue with the experiments. It is believed that there are many interesting applications for high-frequency crystal filters in sideband work. FT-243 crystals are readily available in the 5 to 9 mc range, at very reasonable prices. It is suggested that you obtain a handful and give these ideas a try. And don't forget to advise "SSB Topics" of the results of your efforts!

21 mc Operation with the "W2EWL Special"

The very popular "Cheap and Easy Sideband" SSB transmitter, a simple BC-458 Command Transmitter conversion described in *QST* for March, 1956, and May, 1958, may be easily and inexpensively modified for operation on 21 mc.

The original 1626 VFO valve is replaced with a 12SN7GT dual triode. One half of this valve is used as a VFO, calling only for valve socket rewiring—no other changes are required in the original oscillator circuit. The second triode section is used as a frequency doubler. Any conventional triode doubler circuit will be satisfactory.

The oscillator is tuned between 6200 and 6225 kc to produce doubler output between 12,400 and 12,450 kc. When mixed with the 9 mc SSB signal, the transmitter output will cover the 21,400 to 21,450 kc SSB portion of the 15-metre band.

The HT-32 Transmitter

A number of requests for information regarding this well-known Hallicrafters Sideband transmitter have been received. As several new techniques of interest to the sideband group are used in this equipment, such as a high-frequency crystal filter and bridged-tee sideband modulator, a few of the details are being discussed this month.

A block diagram of the H.T.-32 appears in Fig. 6. The basic SSB signal is generated in a 4·95 mc crystal oscillator and is fed directly to the bridged-T balanced modulator. The modulating signal passes through several stages of amplification and appears across the diode modulator which is part of the grounding leg of the balanced modulator network.

The 4·95 mc double-sideband suppressed-carrier signal from the balanced modulator is then passed through two crystal filters where the lower sideband is suppressed. The circuit by-passing the filters is switched in when AM or CW is desired. The upper sideband is fed to the first mixer where it is combined with either 4·05 mc or 13·95 mc from the sideband selecting oscillator. The resultant 9 mc signal is either maintained or inverted through the selectable sideband principle. The 9 mc signal is fed straight through to the third mixer for 80-metre operation, or is heterodyned to an appropriate frequency in the second mixer. This frequency is one which will combine with the 5 mc VFO to give the proper output frequency, *e.g.* for 40-metre operation the 9 mc signal is heterodyned to 12·5 mc by beating against a 21·5 mc crystal; 20-metre operation is essentially the same as on 80 except that "sum" mixing is used in place of "difference" mixing at the third mixer; on 15 metres the 9 mc signal is heterodyned to 16 mc by beating against a 25 mc crystal. As the VFO covers only 500 kc, it is necessary to use four crystals to accommodate the ten-metre band. The crystal frequencies for this purpose are 32, 32·5, 33 and 33·5 mc. Following the third mixer, the on-frequency SSB signal is amplified by the driver stage and fed to the parallel 6146 linear amplifier. The output stage uses a pi-network coupling circuit with only one control—that is, the plate tuning control. The familiar pi-network loading control is taken care of by the band switch, which selects the required value of fixed capacity to give proper matching to the RF amplifier when a 50-ohm load is used. An RF output meter is connected across the line, serving as a resonance indicator for the driver and amplifier tuning controls as well as a voice level monitoring meter. This circuit was described in "SSB Topics" for December, 1958.

The VOX circuit obtains audio ahead of the audio level gain control, amplifies it, rectifies it and applies the voltage to the relay control tube. The anti-trip signal is obtained from the receiver output transformer. The audio is amplified through two stages, rectified and applied to the VOX diode rectifier as a bias voltage.

The HT-32 crystal filter is of interest, primarily because of the unusual circuit arrangement; this is shown in Fig. 7 and has appeared in several of the manufacturer's advertisements. It will immediately be seen that this very simple circuit consists of only two crystals and one coil. While specific information is not available, the manufacturer has advised that the circuit is actually as simple as shown, but that the crystals must be carefully selected in production.

The filters are assymmetrical, cutting off sharply on the carrier side (4·95 mc) and rolling off gradually on the other. The stated audio pass band is 3 dB down at 500 and 3500 cycles, which might be an indication of the filter pass-band.

Based on a quick analysis, it would appear that the coil must be very high-Q and resonant with the capacitance of crystal X1, its holder and its circuit

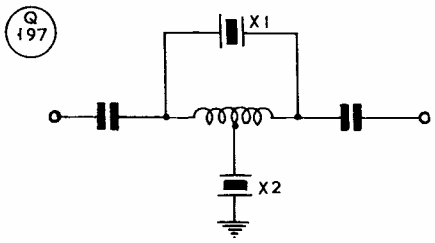


Fig. 7. The HF crystal-filter circuit in the Hallicrafters HT-32, actual values for which have not yet been released. It can be assumed that the assymmetrical curve of this filter is determined by crystal X2 on the sharp cut-off side, and by X1 on the other side. Two of these filters are used in the HT-32 to select the upper sideband.

strays, at the pass-band frequency. The two crystals are probably normal for a half-lattice filter, with X1 the roll-off frequency and X2 the sharp cut-off or carrier side of the filter. The filter terminal impedances are high, estimated at about 50,000 ohms. Your conductor would appreciate hearing from any of our readers who may have further information or ideas pertaining to this interesting filter circuit.

News and Views

A good tip on a method to improve the activity of those sluggish FT-241A low-frequency crystals has been passed on by G2DAF. He has found that a commercial product named "Silver Dip," designed for cleaning household silver-plated tableware, will clean the silver-plated crystals and noticeably increase their activity. The process is simple—just dip the crystal into the solution, wash thoroughly in hot water and dry.

A note from G2CWL advises that he is enjoying his first taste of sideband activity. After 178 QSO's with W3HQO, AM to sideband, he was finally persuaded to take the plunge. One day recently he appeared on schedule with SSB instead of AM, which was a real surprise for W3HQO!

An excellent addition for your sideband library has been made available in the form of a new SSB handbook. This book presents the subject in an easy-to-read manner, covering the theory, operation and construction of sideband gear quite thoroughly. It is called the *New Sideband Handbook*, written by W6TNS, and published by *CQ's* proprietors. The book is available from SHORT WAVE MAGAZINE, Publications Dept., at 25s. 6d. post free.

In Conclusion

The next "SSB Topics" will appear in the June issue, for which all correspondence should be received by April 30. Address "SSB Topics," c/o Editor, SHORT WAVE MAGAZINE, 55 Victoria Street, London, S.W.1, or direct to your conductor at Mauerkircher Strasse 160, Munich 27, Germany. Remember to send in your contribution—we want the news, views, ideas, results and suggestions of *all* the Sideband fraternity, together with notes of SSB contacts of particular interest, on any band, and photographs to illustrate this feature.

Until June, all the best and Good Sideband ing! *Vy 73 de Jim, DJ0BX.*

FRED CURES TVI

THE LOGICAL APPROACH

By G3COI

THERE was a knock at the door. Fred started guiltily. Was this the summons he had been waiting for all these years? He descended from his roof-space shack and opened the front door. There in the gloom stood a large man. "You won't know me," began the Large Man. "I am your new neighbour; we moved in last week, and this (he brandished a heavy object)—this is my telly aerial." He paused as if nothing more need be said. Fred's pulse quickened as he saw a channel of escape. "Oh! you've heard I know something about radio and you want me to—to fix it for you?" he vouchsafed.

The Large Man moved his head closer to Fred's face until there was imminent danger of a collision. "You don't understand," he hissed. "It's your activities what have done my telly in—go and twiddle your set or whatever you do and come and see it." It was an order, not a suggestion; a command, not an invitation. Fred obeyed.

It was TVI all right—a really bad case. The Large Man's set vibrated from flower-pot to carpet, and its screen was as empty as Aberdeen on a flag day. The alarm clock that Fred had left in front of his microphone to modulate his transmitter came ticking over the TV with rich, deep quality. "What are you going to *do* about it?" grated the Large Man. "We'll soon have it fixed," said Fred, with a brave show of confidence he did not feel. "You leave it to—to me. It'll only take a few minutes." Fred fled.

Back in the security of his own house, he decided that there was only one way to tackle the job—put his own TV set in the shack next to his transmitter and keep making adjustments until there was no trace of TVI. So ignoring his XYL's protests, he humped his ancient nine-inch console upstairs and switched his rig to "transmit." The picture immediately vanished with a howl of feedback which filled the room. Fred manipulated this-and-that in a vain attempt to alleviate matters, but nothing appeared on the screen except the odd speck of light, while the ear-splitting pure-sine-wave note persisted. He switched off his transmitter and sat hypnotised by the sight of a pneumatic female singer who happened to be performing at that time. When her place was taken by the unctuous voice of the announcer, he bestirred himself and settled down to some deep thought. A low-pass filter! That was it! (Or was it a high-pass he needed?) He thumbed excitedly through his stock of borrowed magazines for a suitable constructional article.

When Fred gets down to a building job, it is really something; he works like a fiend, and within a fortnight he had finished, except for fitting in the coils and coax plugs and making the outer box or cover. He then thought that perhaps the outer cover would be a bit superfluous and he could always knock one up later, so he completed the wiring and stuck the contraption between 813 and aerial. "The Tests" began again, with results identical to the set-up without filter. Fred laughed lightly. "It's having no screen on that filter," he thought, ruefully. So he wrapped the assembly carefully round with silver paper and rolled-out milk-bottle tops. (Rather enterprising, he thought, as he switched on again.) I expect you would like me to say that from here on the TVI was cured and so let you resume your close study of the Small Advertisements. But that would reduce this report to the level of a fairy story. Of course, the interference was as bad as before—in fact, although there was no means of measuring the radiation in Fred's shack, he suspected that it was even *worse*.

"Here's a right steamer!" breathed Fred, as he forlornly lit a cigarette and drew deeply. He picked up the magazines again and started to read such gen-soaked articles as "The Easy Way to Kill TVI," "TVI gone for £23/4/9," "How to lose friends with TVI," "I've Had that Fringe Area Trouble." In the end, he came to the conclusion that there were two main ways of solving the problem: *(a)* Rebuilding the Tx from scratch; and *(b)* Reducing power. There *was* another way he had in the back of his mind, but that was unthinkable. He knew he would never be able to resist staying away from the rig until after eleven o'clock each night.

So he put into operation Method *(b)*. Fortunately, the HT for his 813 was supplied by an isolated transformer and he was able to insert an electric lamp in series with the mains and the primary. Over went the usual switches. The lamp lit up nicely, but the TVI was still there in spite of the drop in PA input. Fred wired in another lamp. Imperceptibly, things improved. He put in another lamp and then, desperately, another and then another.

The shack was beginning to look like a fairground by night when Fred exhausted his stock of lamps. And the TVI was still bad enough to be dreadful. Regretfully, he disconnected his much-loved

". . . like fairy lamps at a fairground . . ."

813 PA and tried the aerial direct on the output from his exciter. There was not a lot of difference. Eventually, he was forced to cut down stage by stage until he was left with his VFO only. Even with that, the patterning on the TV screen was pretty severe. As we left Fred that night, he was fitting a lamp in the mains side of the supply circuit to his VFO.

So if you are on the band at any time and should happen to hear a minute, even *teeny-weeny* signal, stay clear of that frequency and give him a break, chaps — it's bound to be Fred with his TVI-proof rig.

RE-EQUIPPING OF ONGAR RADIO

The seven new transmitters recently installed in "D" Station at Ongar were designed and manufactured by Standard Telephones and Cables Ltd. to a Post Office specification. They incorporate the latest developments in high-power, HF transmitter design and provide for maximum flexibility in use. To make this possible the transmitter equipment is divided into two groups : The first is arranged to receive land-line signals from the sending office, to convert them to a standard frequency (3·1 mc) and to deliver them to the second group, the radio transmitter proper, at a standard power level (0·25 W.). The transmitters can each radiate a peak power of 30 kW at any frequency in the range 4-27·5 mc and remote-control facilities allow a transmitter to be run up on any one of six spot frequencies, the change from one frequency to another taking less than a minute. Similarly, the transmitters can be closed down by remote control. Facilities are provided for full monitoring of the transmitters, and a pick-up from the output of any transmitter can be fed back to the Control Room in "C" Station for inspection by a spectrum analyser and other monitoring apparatus to ensure correct operation.

The transmitters are the S.T.C. Type DS13D and employ linear RF amplifiers ; they are designed for multi-channel CW and telephony working and can handle four different system-channels simultaneously. The transmitters can also be picture-modulated. The QRO stages are air-blast cooled and the hot air can be re-circulated for space heating as required. The whole of the equipment is designed for automatic non-attended working and, with the almost complete automation achieved, expensive and unnecessary operating personnel have been eliminated.

Elaborate steps have been taken to ensure safety. All the oil-filled apparatus is enclosed in a fire-proof room, and the transmitter cubicles are fully interlocked with the main power supply switch, so that access to the interior of the equipment cannot be obtained until the power is disconnected. The power supply is taken from the public mains with standby diesel alternators in the event of a mains failure.

21st ANNIVERSARY YEAR — R.A.F. AMATEUR RADIO SOCIETY

The first Amateur Radio Society to be formed in the Royal Air Force was the Cranwell Amateur Radio Transmitting Society, in 1936 ; it was allotted G8FC. Widening interest in Amateur Radio throughout the R.A.F. resulted in the formation of the Royal Air Force Amateur Radio Society (RAF-ARS) in April, 1938. The society has always enjoyed Air Ministry support and has also had considerable financial assistance from the Nuffield Trust. Patron of the R.A.F. Amateur Radio Society is Air-Marshal Sir Raymund Hart, the distinguished signals officer, and the president is always the Officer Commanding, R.A.F. Locking, *ex officio*. At Air Ministry level the society is represented by a vice-president, now W/Cdr. A. R. Gilding (G3KSH).

RAF-ARS owes much of its success and progress to W/Cdr. W. E. Dunn, O.B.E. (G2LR). Other well-known members are G3IDC (VS1FJ, 4S7FJ) for his prowess in the DX field ; G3IRS, until lately very active on VHF ; and VP8BO, who was a member of the Advance Party at Shackleton Base.

Much of the present work of RAF-ARS devolves upon A. E. Seymour, M.B.E. (G3GNS), who produces the society's own bi-annual magazine *QRV*, free to the membership. This is open to all ranks R.A.F.—serving, retired or civilian Air Ministry employed—and RAF-ARS has affiliated branch-clubs at many R.A.F. stations in the U.K. and in other parts of the world. Applications for membership should be addressed to: Hon. Secretary (Admin.), R.A.F. Amateur Radio Society, No. 1 Radio School, R.A.F. Station Locking, Weston-s-Mare, Somerset.

AMERICAN MAGAZINE SUBSCRIPTIONS

We can accept renewal and subscription orders, in sterling, for the American radio magazines *QST* (43s.) and *CQ* (44s.), the prices quoted being post free direct from the American publishers. Both *CQ* and *QST* are Amateur Radio monthly publications, of interest to all radio amateurs, *QST* being the official organ of the American Radio Relay League (publishers of the *Radio Amateur's Handbook*) and now in its 43rd volume. Orders, with remittance, should be sent to: Publications Dept., Short Wave Magazine, Ltd.

CHANGE OF TITLE — I.E.E. RADIONICS SECTION

The Institution of Electrical Engineers has always had a very strong and representative Radio and Telecommunications Section, the name of which has recently been changed to the Electronics and Communications Section. The change of name is to emphasise that the I.E.E. is the professional institution for those who, properly qualified, regard themselves as electronic engineers rather than electrical engineers in the heavy-current field.

VHF BANDS

A. J. DEVON

The Zone Plan Revised—

Discussing VFO's for VHF—

Notes, News and The Tables—

WHILE there is something to be said about conditions and EDX results, probably the most important matter for discussion this month is the revision of the Band Plan.

This Plan, based upon an original idea by G3CYY discussed in the May, 1949, issue of SHORT WAVE MAGAZINE, was finalised by G2XC in "VHF Bands" for August, 1949, and by the end of that year had been generally adopted by the VHF fraternity. There is no need here to go into the details of the Plan, which aimed at rationalising the use of the two-metre band in the interests of all concerned—though it might be remarked that had it not been for the Editor of SHORT WAVE MAGAZINE, the Plan would never have seen the light of day! (And the reasons for *that* need not be discussed here, either!) Broadly speaking, the Plan has served us well over the nine years since its inception and, though there have been hardships in it for some (the HF-end allocations have never been very popular, for instance), the zone system has been generally satisfactory. At any rate, it has been the Zone Plan that has helped to prevent the LF-end chaos that would otherwise have ensued, with everyone trying to get as near 144·00 mc as possible in order to be heard first by the DX, always presumed to be tuning QLH.

The situation has now changed and, without going into all the details, we have been faced with the necessity to revise the Zone Plan in order to avoid the possibility of interfering with certain R.A.F. aircraft communication networks, as two metres is a shared band. For those who may feel that "sharing means sharing, and why should it be we who have to move?" let it be said that the authorities concerned—the G.P.O. and the Air Ministry—were most co-operative and, as far as possible, the R.A.F. allocations have been adjusted to meet our requirements. Nevertheless, for us major frequency changes are involved, and for most two-metre operators it means another crystal frequency.

As now revised, the new Two-Metre Zone Plan is set out in the adjacent panel. This also gives a list of spot-frequencies which should be avoided, as these are for emergency working in connection with the safety of R.A.F. aircraft.

The new Plan having been agreed and published, it is now for all concerned to get into their new Zones as quickly as possible. Fortunately, crystals are cheap and easy these days, and in some cases, at least, exchanges should be possible. A long time ago, through SHORT WAVE MAGAZINE, we initiated a crystal exchange scheme (called "Xtal Xchange"), and if there is any real need for it, this can be revived. So far, only two such requests have been received — from G3JGJ (new QTH: Ponsford House, Moretonhampstead, Devon), and G6NF, Shirley, Sy. (QTHR). Actually, it seems doubtful whether there is really time to go through the motions of receiving requests and getting them into print, as that implies a delay of about six weeks in getting shifted.

VFO on VHF?

This new situation must turn the thoughts of many to the possibility of going VFO on two metres. This does not mean that we are suggesting people should start swishing about the band, but there is a lot to be said for the idea of a really stable oscillator-driver unit that can be set up on a chosen frequency within the operator's zone.

It hardly needs saying here that there are already several VHF operators who are using VFO's with conspicuous success — of course, these are well-designed pieces of apparatus, built by people who know what they are doing. But the very fact that it is demonstrably possible to produce a VFO for two metres capable of giving a signal indistinguishable from crystal drive proves the point.

Before considering the VFO, however, there is a need for an accurate and reliable frequency standard, so that Zone areas can be determined, the vulnerable (a/c safety) frequencies avoided, and the VFO itself set up accurately on a given frequency within the zone area.

[over

BRITISH ISLES TWO-METRE ZONE PLAN

Revision, March 1959.

Zone A: **144.0 to 144.1 mc.**	Cornwall, Devon, Somerset.
Zone B: **144.1 to 144.25 mc.**	Berks., Dorset, Hants., Wiltshire, Channel Islands.
Zone C: **144.25 to 144.5 mc.**	Brecknock, Cardigan, Carmarthen, Glam., Gloucester, Hereford, Monmouth, Pembroke, Radnor, Worcester.
Zone D: **144.5 to 144.7 mc.**	Kent, Surrey, Sussex.
Zone E: **144.7 to 145.1 mc.**	Bedford, Buckingham, Essex, Herts., London, Middlesex.
Zone F: **145.1 to 145.3 mc.**	Cambridge, Hunts., Leicester, Norfolk, Northampton, Oxford, Rutland, Suffolk, Warwick.
Zone G: **145.3 to 145.5 mc.**	Anglesey, Caernarvon, Cheshire, Denbigh, Flint, Merioneth, Montgomery, Shropshire, Stafford.
Zone H: **145.5 to 145.8 mc.**	Derby, Lancs., Lincoln, Nottingham, Yorkshire.
Zone J: **145.8 to 146.0 mc.**	All Scotland, Northern Ireland, Isle of Man, Cumberland, Durham, Northumberland, Westmoreland.

Special Note: **Within certain Zones, there are vulnerable frequencies which should be avoided, as follows:**

144.00, 144.09, 144.18, 144.27, 144.36, 144.45, 144.63, 144.72, 144.81, 144.90 mc.

These are spot frequencies reserved for aircraft safety purposes, and are for emergency working only.

TWO METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14

From Fixed QTH Only

Worked	Station
78	G5YV (787)
73	G3CCH, G6NB
70	EI2W (316), G5MA, G6XM
68	G3BW, G3GHO
66	G3NBW, G3IUD (302), *G5BD*
64	G3BLP, G3KEQ
63	G2FJR (542)
61	GM3EGW (232)
60	G2OI (402), G3DMU
59	G3EHY, G4SA
58	G3FAN (637), G3IOO, G8OU
57	G8SB
56	G3WW (770), G5DS (654)
55	G2HDZ (495), G2HIF, G5BM, GW5MQ
54	G3HAZ (450), G8VZ
53	G2AJ (519), G4CI
52	G2NH, G3FZL, G3JWQ (429), G3LHA (350), G6RH, G6XX, GW2ADZ
50	G3ABA, G3GSE (518)
48	G3FIH, G5ML, G6TA (487)
47	G2CIW (282)* G3DKF, G5WP
46	G4HT (476), G5BY, *G6YU*
45	G2AHP (647), G2DVD (362), G2XC, G3BJQ, G3GFD, G5JU
44	G3BK, G3DVK (282), G8DA
43	G2DDD, G2FCL (322), G3BA, G3COJ, G3DLU*, G3HWJ, G3KHA (262), *G3KUH*, G3WS, G4RO, G5DF
42	G2HOP, G3BNC, G3IER G6CI (220)
41	G2CZS (282), G2FQP, G3DO
40	G3CGQ, G5MR (366), G8KL
39	G2IQ, G3GBO (434), G3LTF, G3VM, G8IL (325)
38	G3APY, G3CKQ, G3HTY, G3KPT*, G3KQF, G8VN (190)
37	G3FNW, G2FZU (180), G3DLU, GC3EBK (260)
36	G2DCI (155), G3CXD, G3DLU*, G3IIT, G6CB (312), G8IP
35	G3FYY (235), G3GSO (266), G3HCU (224)
34	G3AEP, G3CKQ (162), G8IC, GM3DIQ

Thus we see that the two pieces of apparatus—the VFO and its frequency standard — are interrelated, and might even be combined into a single unit, with a large tuning dial, accurately calibrated through the appropriate Zone, perhaps to within 2 kc. At any rate, there is much scope for interesting and productive bench work along these lines, and there are plenty of circuit ideas from which to work — one such is discussed in an article in this issue, a suggested arrangement for an accurate VHF frequency standard appeared on P.658 of the February 1959 issue of SHORT WAVE MAGAZINE, and there is also the crystal-mixer/osc. VFO as another possible approach.

At this stage, all we are doing is to offer suggestions — another important one is that the preliminary work should be confined strictly to the bench! Establish the accuracy of your frequency standard and the stability of your VFO *before* trying it on the transmitter. In any event, you will probably find that stability on the bench and stability with the transmitter under drive are two quite different things — the snag is RF feed-back. There is only one standard at which to aim, and that is crystal stability in the transmitter output, not only on CW but with phone as well (these also can be two different things!).

Worked	Station
33	G3FUR, G3HHY (125)
32	G3HIL, G8QY, G8VR, GC2FZC
31	G3HXO, G3KPT (180), G3MAX, G5RP
30	G2AHY, G3FRY, G3GOP (208), G3GVF (129), G3IRA, G3KEF (110), G5NF, GW8UH
29	G3AGS, G3AKU, G3FIJ (194),
28	G3ITF, G8DL, GM3BDA
27	G3CVO (231), G3DAH, G3ISA (160), G3LTF/A, G6GR, G8DR (178), GI3GQB, GW3GWA
26	G2BRR, G3CFR (125), G3MED, G3SM (211), G3YH, G4LX, G4MR (189)
25	G3JHM, G3JMA, G3JXN (220), G3MPS, G5SK, G6PJ
24	G3FD, G3FXG, G3FXR, G3ICO
23	G3CWW (260), G3HSD, G3IOE, G4JJ/A, G5PY
22	G2DRA, G3AGR (135), G3ASG (150), G3BPM, G5AM, G8NM
21	G2AOL (110), G3DVQ, G3IWJ, G6XY, GW3MFY
20	G3EYV
19	G2HDR, G3FEX (118), G3GCX, G5LQ (176)
18	G3DBP, G3JGY, GC2CNC
17	G3EGG
16	G3FRE, G3MLS
15	G3IWA
14	G2DHV. G3CYY

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 accrue.

* New QTH

Some DX Comment

On the general theme of transmitter (and receiver) stability, we have an interesting letter this time from G3FZL (London, S.E.23). It will be remembered that, in connection with his IGY activities, Geoff has been keeping a long-term schedule with GM3EGW; he makes the point that, for weak-signal reception, it is essential not only to be able to find the frequency exactly, but also that there must be very good frequency stability in both transmitter and receiver; he adds: "I have found that a self-excited local oscillator is useless for serious DX work." The fact that seems to emerge from the G3FZL/GM3EGW schedule — it being remembered that GM3EGW uses no more than 60w. to a slot-fed 6/6—is that almost any station having reasonable equipment and a good take-off should be able to work DX, even under what appear to be bad conditions. But, as Geoff explains, this does involve what he calls "self-training" — the ability to search carefully and to hear weak CW under noise. On the Rx side, this means minimum band-width on the receiver and knowing, in terms of dial setting, where the signal is likely to appear.

Your A.J.D. can endorse fully all G3FZL's comments, and those who have ever kept a schedule with a station at or near the limit of range would undoubtedly agree. For real DX working, as during the big Continental opening in February, CW must always be the preferred mode. As G3FZL indicates, though most U.K. stations were calling their hearts out on phone during this opening, the EDX operators at the limit of range were, quite rightly, on CW. Many phone operators do not appear to realise that, under such conditions, the key will nearly always give a quicker and more accurate contact than the microphone. As regards telephony working, it is interesting (and heartening) to find that there are several U.K. operators who are now giving a very good account of themselves on SSB on two metres—notably G3CCH, G3EVV and G3MED.

Arnold of G3HBW (Bushey) had a fine time during the February opening—*see* his calls h/w list. (Incidentally, we had hoped and expected to see more such lists for the Activity Report.) On February 18, he was able to start operations at 6.00 p.m. and was very surprised to hear the SM's coming in at that time; Arnold's best DX worked was SM7YO, at 760 miles.

With the exception of the long-haul daily test with G2NY (Preston, Lancs.), all the regular PE1PL schedules with U.K. stations have been discontinued. The reason is that, having been run for two years or more (G6FO had 225 contacts "in a row" with PE1PL, and G2HCG many more), enough data have been collected to establish certain facts about VHF propagation over distances up to 300 miles or so—broadly speaking, the main fact is that such contacts are always possible! However, PE1PL will be coming on for amateur contacts from time to time, and will usually be there when conditions are specially favourable for U.K. working. For those who wish to hear the PE1PL signal, it can be found any week-day morning, on 144·00 mc, during 0900-0915 clock time.

Higher in Frequency

An interesting letter from G3JHM (Worthing) reports that he has now "built a complete system for 3 cm. (10,000 mc) consisting of a reflex klystron as local oscillator or transmitter, fed to a single mixer through a directional coupler. Output from the mixer is fed to a cascode RF stage using an E88CC as a low-noise head amplifier, into a 45 mc IF strip. Aerial is either a 10-in. or an 18-in. dish." The gear complete is working in the laboratory at Battersea Polytechnic, where G3JHM is making noise-factor measurements on the receiver side, using fluorescent noise sources and noise klystrons.

As soon as outdoor work is

TWO METRES

COUNTRIES WORKED

Starting Figure, 8

18 G5YV (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, LX, OK, ON, OZ, PA, SM, SP)

17 ON4BZ (DL, EI, F, G, GC, GI, GM, GW, HB, LA, LX, ON, OZ, PA, SM, SP, 9S4)

16 G3GHO, G3HBW, G5MA, G6NB

15 G3CCH, G3FZL, G4MW, G6XM

14 G2FJR, G2HDZ, G2XV, G3IOO, G3JWQ, G3KEQ, G3WS, *G5BD*, G6LI, G8OU

13 G3BLP, G3DMU, G3DVK, *G3GPT*, G5DS, G6XX, GM3EGW, PAØFB

12 F8MX, G2HIF, G3FAN, G3GFD, G3GHI, G3HAZ, G3WW, G6RH

11 EI2W, G2AJ, G2CZS, G3ABA, G3JZN, *G3KUH*, G3LHA, G4RO, G4SA, G5UD

10 G2AHP, G2FQP, G2HOP, G3BK, G3BNC, G3DLU, G3EHY, G3GSE, G3KQF, G3MED, G5MR, G8IC, GW5MQ

9 G2DVD, G2FCL, G3DKF, G3FIJ, G3FUR, G3GSO, G3IUD, G5ML, GC3EBK, GM3DIQ

8 G2CIW, G2DDD, G2XC, G3AEP, G3AGS, G3BDQ, G3BOC, G3GBO, G3HCU, G3HWJ, G3KHA, G3MPS, G3VM, G5BM, G5BY, G8SB, G8VZ, GC2FZC

TWO-METRE ACTIVITY REPORT

Lists of Stations heard and worked are requested for this section, set out in the form shown below, with callsigns in strict alphabetical and numerical order.

G3HBW, Bushey, Herts.
WORKED: DJ4EZ, DL1FF, 1RX, 3YBA, 6WUA, F3AL, 3ND, G2HOP, 3AYJ, 3CCH, 3EHK, 3EKX, 3HAZ, 3IWJ, 3JZG, 3LLE, 3MED, 5YV, 6ZP, GI3GXP, GW3MFY, ON4SK, OZ9AC, PAØGW, ØLQ, ØVHF, ØYVS, SM7BAE, 7BOR, 7AED, 7PQ, 7YO.
HEARD: DL6QS, F8KF, 9XG, G3IKV, 3JGJ, 3KHA, 6XM, GW8SU, ON4BZ, 4DY, OZ7BR, PAØDEF, ØDG, ØFB, ØJPQ, ØMZ, ØROX, ØWAR. (*February* 17 *to March* 16; *all over* 100 *miles*).

SWL Winters, Melton Mowbray.
PHONE: F3LP, G2FNW, 3APY, 3BA, 3EKX, 3GSO, 3HBW, 3IRA, 3JGY, 3JMA/P, 3JWQ, 3JXL, 3JXN, 3JZG, 3LHA, 3MNQ, 3MPS, 4MK, 5GN, 5MA, 5YV, 6XM, 6XX, 8CZ, 8VZ, GB2RS.
CW: G2FNW, 2XV, 3AKU, 3APY, 3CCH, 3ENS, 3GSO, 3HAN, 3HBW, 3JWQ, 3MED, 5YV, 8MW, 8VN, GB3IGY. (*February* 17 *to March* 8).

G3ICO, Yeovil, Somerset.
WORKED: F3LP, 9JY, G2ADZ, 2BRQ, 2HOP, 3AST, 3FIH, 3GNR, 3HAN, 3HBW, 3JGJ, 3JZG, 3KAZ, 3LOK, 3MHD, 3MVI, 4OZ, 4PS, 5DW, 6FN, 6OX, 6TA, 8DR, GC2FZC, GW3HAW, 8SU, 8UH.
HEARD: G2BV, 2FQP, 2JM, 2RY, 3BDL, 3DVV, 3FAN, 3FZL, 3GSE, 3HBW, 3IRA, 3IRS, 3IUL, 3JGJ, 3JVV, 3KHA, 3LBM, 3LHA, 4DC, 5BM, 5LF, 5NF, 6NF, 8AL, GW3ATM, 3DDY, 3MFY. (*February* 16 *to March* 15).

G3JGJ, Paignton, S. Devon.
F8AL, G2BD, 2BRQ, 2DZH, 2JF, 2MR, 2RY, 3BVU, 3CGE, 3CGU, 3CLW, 3EFT, 3FAN, 3GNR, 3GSE, 3GVU, 3HBW, 3HKV, 3HXJ, 3ICO, 3JMA, 3JQN, 3KEQ, 3KHA, 3KMD, 3KSR, 3LAR, 3LTF, 3MVI, 3NR, 4DC, 4OZ, 4PS, 5BM, 5DW, 5MA, 5NF, 5OB, 5QA, 6NF, 6OX, 6TA, 8AL, 8SK, GC2FZC, GW3MFY. (*Heard or worked, January* 17 *to March* 14).

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1958

Starting Figure, 14

From Home QTH Only

Worked	Station
49	G5MA
41	G3HBW
38	G3JWQ
37	G3MED
32	G3KPT
27	G3GSO, G3KQF, G3LTF
26	G3MAX
25	G3DVK
23	G3ICO
22	G2CIW
21	G3LTF/A
20	GW3MFY
19	G3JGJ

This Annual Counties Worked Table opened on September 1st, 1958, and will run till August 31st, 1959. All operators who work 14 or more Counties on Two Metres are eligible for entry in the Table. The first claim should be a list of counties with the stations worked for them. The list can be added to as additional counties accrue.

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/GI	G3DA-GI2HML	29/6/49
G/GM	G3BW-GM3OL	13/2/49
G/GW	G5MQ-GW5UO	22/10/48
G/HB	G6OU-HB1IV	12/9/53
G/LA	G6NB-LA8RB	29/6/53
G/LX	G5MR-LX1AS	23/7/55
G/OK	G5YV-OK1VR/P	27/10/58
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
G/SP	G5YV-SP6CT/P	28/10/58
GC/DL	GC3EBK-DL3VJ/P	22/3/53
GC/EI	GC2CNC-EI2W	8/10/51
GC/F	GC2CNC-F9OK	17/11/53
GC/GI	GC3EBK-GI3GXP	14/9/56
GC/GW	GC2FZC-GW8SU	16/6/54
GC/ON	GC3EBK-ON4BZ	4/3/53
GC/OZ	GC3EBK-OZ2FR	2/3/53
GC/PA	GC3EBK-PAØHA	16/7/55
GD/EI	GD3DA/P-EI2W	30/7/51
GD/GM	GD3DA/P-GM3DA/P	29/7/51
GD/GW	GD3DA/P-GW5MQ	28/7/51
GI/DL	GI3GXP-DL1SE	5/1/56
GI/EI	GI3GQB-EI2W	13/6/51
GI/GD	GI2FHN-GD3DA/P	29/7/51
GI/GM	GI2FHN-GM3OL	1/7/49
GI/GW	GI2FHN-GW3ELM	8/7/49
GI/OK	GI3GXP-OK1VR/P	27/10/58
GI/ON	GI3GXP-ON4BZ	5/1/56
GM/DL	GM2FHH-DJ1XX	29/5/55
GM/EI	GM3BDA-EI2W	12/6/51
GM/HB	GM3HLH-HB1RG	4/8/57
GM/ON	GM3EGW-ON4BZ	21/11/53
GM/OZ	GM2FHH-OZ2IZ	18/6/57
GM/PA	GM3EGW-PE1PL	22/4/53
GM/SM	GM2FHH-SM6ANR	22/7/55
GW/DL	GW5MQ-DL4XS	22/9/51
GW/EI	GW2ADZ-EI8G	19/4/51
GW/F	GW2ADZ-F3LQ	14/5/50
GW/HB	GW2ADZ-HB1IV	14/9/53
GW/ON	GW2ADZ-ON4YV	13/5/50
GW/PA	GW2ADZ-PAØHA	13/5/50
GW/SM	GW2ADZ-SM6QP	1/7/53
CN2/CN8	CN2AO-CN8MB	26/6/55
DL/OZ	DL6SW-OZ2FR	4/3/51
DL/SM	DL2DV-SM7BE	10/3/51
EI/DL	EI2W-DL3VJ/P	29/8/52
EI/F	EI2W-F8MX	9/8/56
EI/ON	EI2W-ON4BZ	21/9/51
EI/PA	EI2W-PAØFC	10/10/53
ON/LA	ON4BZ-LA1KB	4/7/53
ON/LX	ON4TR-LX1MS	? ?
ON/OZ	ON4BZ-OZ2FR	3/6/51
ON/SM	ON4BZ-SM7BE	2/3/53
ON/SP	ON4BZ-SP6CT/P	28/10/58
ON/9S4	ON4UD-9S4BS	19/8/56

possible, G3JHM will be testing this equipment with G3GNR (who has assisted with the mechanical side) and would be very glad to hear from anyone else who may be interested in 3 cm work; G3JHM adds that he is in a position to assist with the calibration of centimetric equipment.

Some Station Reports

GM3EGW is now at 61C in the All-Time, with 232 stations worked—though he has been long on the band, this is very good going from Dunfermline, G3MPS is making progress from Aldershot, with 25C now worked. G3KPT (West Bromwich) goes up six in the All-Time, to 38C. In the Countries table, G3CCH (Scunthorpe) moves up two with OK and SP.

G3IOE (Newcastle) writes to say that there are now five local stations—G2BDQ, G3IOE, G4LX, G4QA and G6JY—active on VHF, all within three miles of one another, which makes the state of two metres up there "better than it has been for years." G3IOE has improved his beam, now a slot-fed 8/8 and higher than before, and finds he can work into GM with gratifying regularity.

G3IRS (R.A.F. Locking) has had his passage booked to Aden and will, we hope, give VHF at least a try from that arid spot. The G3IRS signal from Somerset will be missed on the two-metre band. Also from Somerset, G3ICO (Yeovil) writes with claims for the Tables, and some notes on his results during the February opening when, notably, F3LP and F9JY (Cherbourg) were worked; he runs but 20w. to an 832, and has a G2IQ-type converter into an R.1224A, with a 5-ele flat-top only 15 ft. up; nevertheless, nice GDX like G5YV and GC2FZC have been worked. G3MAX (Manchester) chalks up another four in Annual Counties, a good QSO for him being GC2FZC. G3JGJ (Paignton) will be at his new QTH at Moretonhampstead by the time this appears; he achieved a total of 19C worked from Paignton and says that he will gladly QSL anyone who may want a card.

Our regular correspondent, SWL Winters, will be taking the next R.A.E. and, as he already has the Morse, we hope that it will mean a new two-metre station on shortly from Melton Mowbray.

SEVENTY CENTIMETRES

ALL-TIME COUNTIES WORKED

Starting Figure, 4

Worked	Station
32	G2XV
27	G3HBW, G3KEQ, G5YV
26	G3JWQ, G6NF, GW2ADZ
23	G3BKQ, G6NB
20	G3HAZ
19	G2CIW
13	G3IOO
16	G3MED
15	G4RO
14	G2DDD, G2HDZ
13	G3MPS
12	*G5BD*
10	G2OI, G3IRW
9	G3KPT, G3LHA, G5DS
7	G2HDY, G3JHM, G3LTF
6	G3FAN, G3JMA, G3KHA, G3WW
5	G3FUL, G3IRA, G3IUD, G5ML
4	G3JGY

On working four Counties or more on the 70-Centimetre band, a list showing stations and counties should be sent in for this Table, and thereafter new counties worked notified as they accrue

VHFCC Elections

We are glad to announce the election of D. R. Aston, G8DR, London, N.W.2, with VHFCC Certificate No. 238; and of H. J. Swienink, PAØOTC, Zwolle, with No. 239. These claims are almost unique in that G8DR's is phone-only, with F9XG as his sole EU, while PAØOTC includes only two G's!

In Conclusion——

Deadline for the next issue is **Wednesday, April 22,** which means that there is ample time to get in a full report—send it to A. J. Devon, "VHF Bands," *Short Wave Magazine,* 55 Victoria Street, London, S.W.1. 73, and CUAGN on May 8.

A VHF VFO

70-72 MC OSCILLATOR-DRIVER

J. C. FOSTER (G2JF)

With the Zone Plan changes—as explained in "VHF Bands"—much frequency adjustment is called for on the part of two-metre operators throughout the U.K. For many, the change will be a relatively simple matter, but some at least will turn to the possibility of VFO working, with the frequency fixed in the appropriate band area. In the present state of the VHF art, there is no reason why stable, drift-free oscillators should not be produced for transmission on two metres—but let them be both stable and drift-free! In fact, there are several such already in use, and indistinguishable from CC drive. Our contributor's own immediate problem was TVI, but his article is opportune because the solution he has found will interest those who are thinking in terms of VFO's for VHF.—Editor.

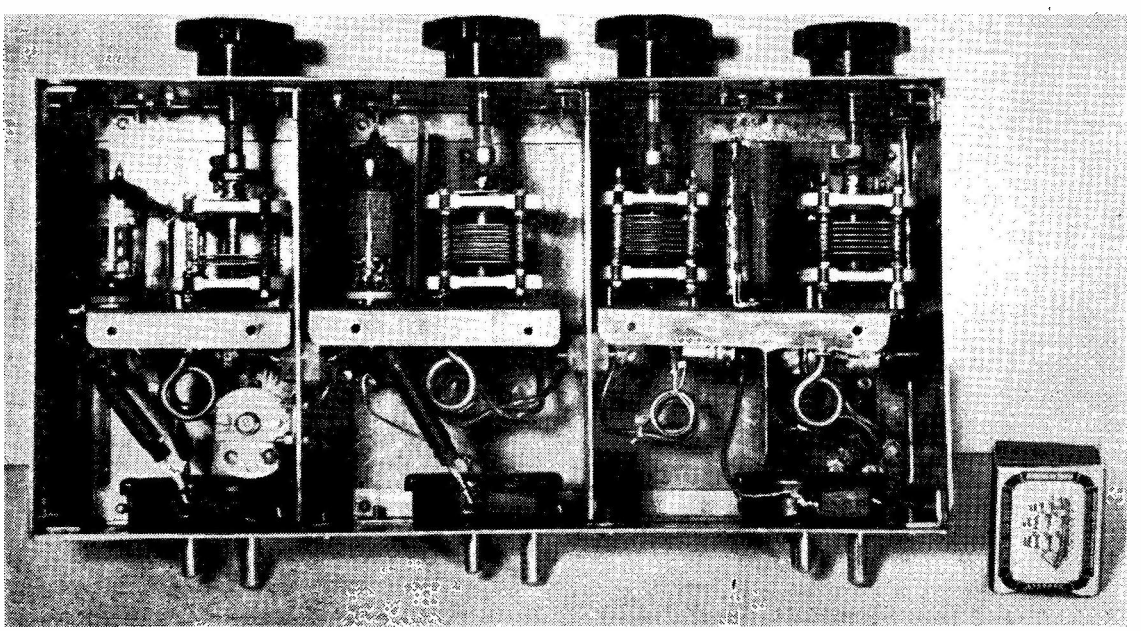
WHEN the Channel 9 I.T.V. service opened up in South-East Kent, the writer was immediately in trouble with the 24th harmonic from his 8 mc crystal oscillator. This led to a search being made for the best method of eliminating *any* possible harmonic interference on *all* the broadcast sound and television channels.

Eventually, it was decided to investigate the possibility of using the fundamental type of oscillator in the 70-73 mc area so as to cover the two- and four-metre bands. As can be expected, what with lack of published information, many problems both electronically and constructionally had to be overcome before the finished product was placed in service in March, 1958, some six months after the starting date. It is now functioning as the RF drive source for the writer's two-metre transmitter, and TVI has been eliminated.

Results

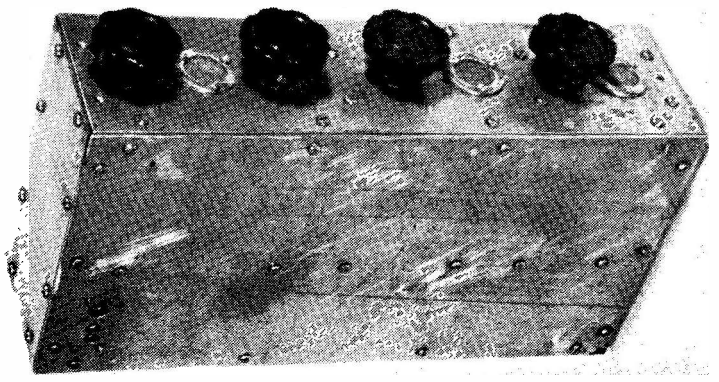
Whilst no attempt has been made to measure frequency shift on starting up, it can be stated that the drift is so slight that no adverse comment in this respect has ever been received; indeed, the stability has been commented upon very favourably ever since the unit was installed, and it compares well with its HF counterpart.

The quality of the note is described as T9 to T9x with a tendency to slight frequency



Interior construction of the VHF oscillator described in the article. The layout follows logically from the circuit, each stage being treated as a separate screened section. A screening plate bolts on to the bottom of the chassis.

shifting on peaks of modulation exceeding 100%—otherwise the transmission is described as perfectly satisfactory. In passing, it should be noted that the PA stage runs at a power input of 150 watts on two metres, whilst comparable equipment is used on four metres except that the PA input is 40 watts.



Finished appearance of the 70-72 mc VFO designed by G2JF; it gives a T9 drift-free output for a two-metre transmitter.

Oscillator Unit

Before passing on to the constructional detail of the unit an outline of the oscillator circuitry is necessary. From the circuit diagram it will be seen that there are three stages involved, all operating in the frequency band 70-73 mc. The first compartment when viewed from left to right in the photograph is the Kallitron oscillator, well known amongst the *cognoscenti* for its exceptional frequency stability. This B309 push-pull oscillator stage V1 is capacity-coupled to a pair of Z719's, V2, V3 as a buffer stage, followed by a link-coupled single-ended Z759 final stage V4 capable of giving about one watt of RF.

As in all variable frequency oscillators, the mechanical construction has a considerable bearing on the stability and quality of the transmitted signal — therefore, it should not be necessary to mention that to attempt VFO construction for VHF in a hook-up manner is a sure way to disappointment. Rigid construction of the chassis, with stiff wiring, and following the usual VHF constructional techniques, are all absolutely essential; attention should also be given to possible localised temperature changes, which should be avoided. A slight warm-up drift is inevitable, but does not matter if the oscillator is absolutely stable after warm-up.

Referring to the photograph, it will be seen that the unit is in three compartments, each compartment having its own 3-pin plug for feeding the associated stage; furthermore, each stage is constructed on its own chassis, to which the valve holder and variable condensers are fitted. These chassis are held in position by four self-tapping screws and are withdrawable.

The unit measures 12 ins. by 6 ins. by 3 ins. wide and is formed out of 14g. hard brass. Ventilators are cut on the side and top to give a natural flow of cool air over the valve in each compartment.

General construction details are as follows: The B309 valve (12AT7) twin-triode used in the push-pull Kallitron oscillator is cross-connected in the usual manner for feed-back purposes. The 72 mc coil L1 consists of 5 turns and is tuned by a midget 30 $\mu\mu$F condenser C8 for band setting and a split stator of 3 + 3 $\mu\mu$F, C9, to give the band coverage. The heater circuit is decoupled using a $\frac{1}{4}$-wave choke and ·0005 μF decoupling condenser. Decoupling is rather important if one is to avoid severe frequency modulation and a capacity of 500 $\mu\mu$F seems to be effective at these particular frequencies. The RF chokes are made by winding o $1\frac{1}{4}$-in. length of a $\frac{1}{4}$-in. diameter former with 26g. enamelled wire, one such choke being inserted in each valve heater feed.

The push-pull Z719 buffer stage following the oscillator proved to be docile but is inclined to pull somewhat, even after reducing the coupling condensers from the oscillator down to 1 $\mu\mu$F (C6. C7) but this was not considered serious. Again, the usual decoupling precautions were taken and also special attention was paid to keeping input and output sides apart. The coil L2 for this stage is similar in construction to the oscillator and is tuned by a "surplus" type split stator condenser of 25 + 25 $\mu\mu$F, C13.

The final Z759 stage V4, which is link-coupled to the previous stage, was in the earlier work somewhat unstable and tended to go off as a TPTG—but by thoroughly screening the input from the output it was eventually tamed. The grid coil L3 differs from the others and has 4 turns of 16g. tinned copper wire, tuned by a 30 $\mu\mu$F condenser. A one-turn link

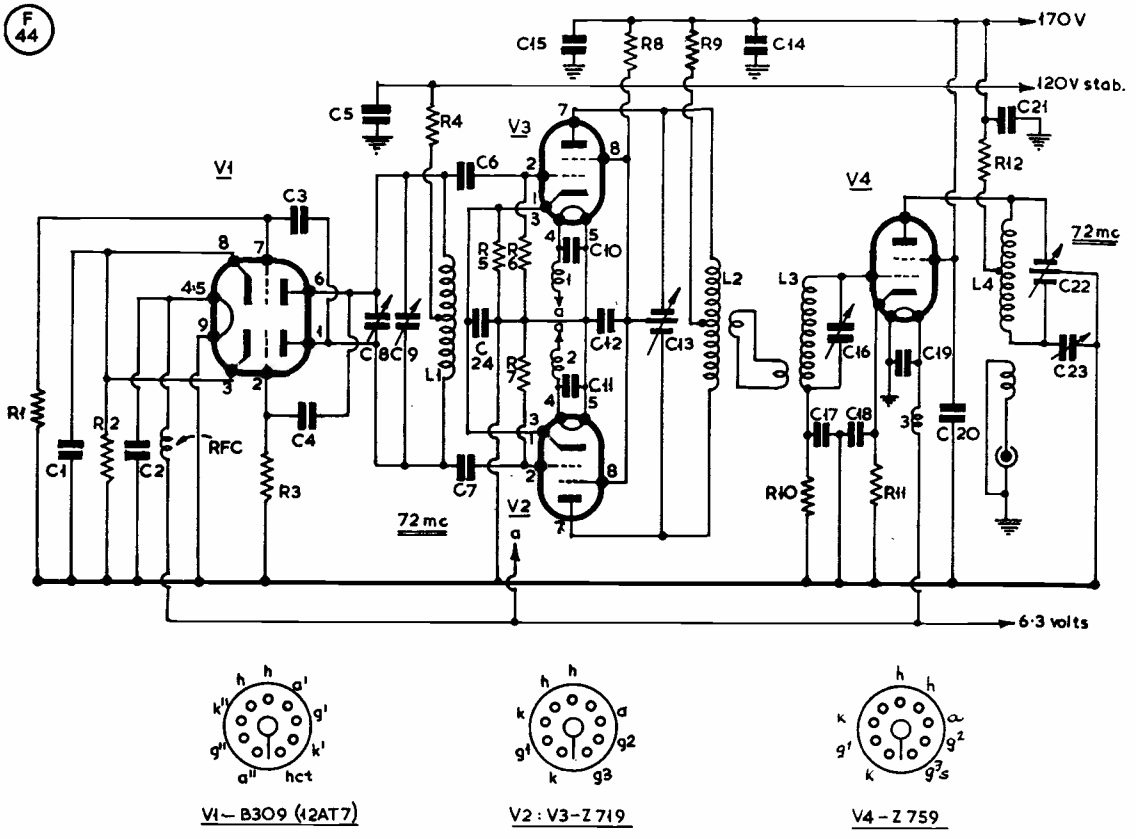


Fig. 1. Circuit of the 70-72 mc VFO unit designed and described by G2JF. A Kallitron oscillator is used to generate the fundamental frequency, the other two stages being buffer-isolators. All three stages are on the same frequency, very loose coupling and careful screening being used between stages. An RF output of about one watt is available for doubling into the two-metre transmitter, with excellent stability. A stabilised HT supply should be used for V1.

(Note: In this circuit the windings marked 1, 2 in the cathodes of V2, V3, and 3 in the cathode of V4, are RF chokes similar to RFC in the cathode of V1 — see coil data.)

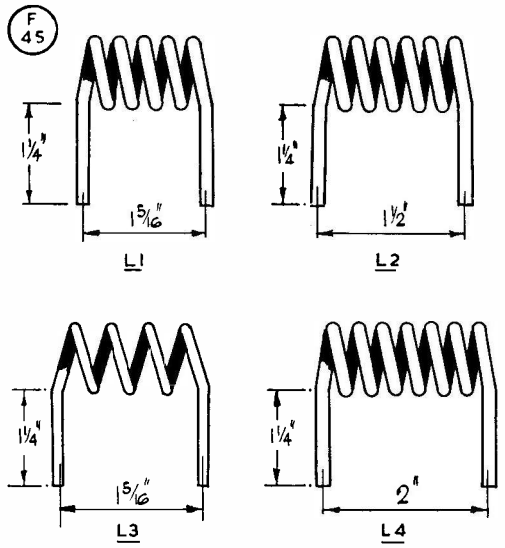


Table of Values

Fig. 1. Circuit of the Kallitron 70-72 mc Oscillator

C1, C2, C5, C10, C11, C12, C14, C15, C17, C18, C19, C20, C21	= 500 μμF	C23	= 8 μμF
C3, C4	= 20 μμF	R1, R3	= 25,000 ohms
C6, C7	= 1 μμF	R2, R4, R5, R8, R9, R12	= 1,000 ohms
C8, C16	= 30 μμF	R6, R7	= 47,000 ohms
C9	= 3 + 3 μμF	R10	= 22,000 ohms
C13, C22	= 25 + 25 μμF	R11	= 80 ohms
		V1	= B309 (12AT7)
		V2, V3	= Z719 (EF80, 6BW7)
		V4	= Z759, G.E.C.

COIL DATA

L1 = 5 turns ⅛-in. brass rod, ½-in. internal diameter.
L2 = 6 turns ⅛-in. brass rod, ½-in. internal diameter.
L3 = 4 turns 16g. tinned copper, ⅜-in. internal diameter.
L4 = 7 turns ⅛-in. brass rod, ½-in. internal diameter.
RFC = Four RF chokes, consisting of a 1½-in. length of ¼-in. former wound full of 26g. enamelled wire.

[over

Fig. 2. Detail of the coil windings for the VHF VFO, the sizes for which are given above.