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R.S.G.B. BULLETIN

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Current Comment

discusses topics of the day

Piracy

IT must have been obvious to the General Post Office and to other Government departments that the unrestricted sale of war-surplus transmitting equipment would, inevitably, lead to unlicensed operation on frequencies assigned to the Amateur Service. That the position has never become really serious in the past is a tribute to the efforts of many experienced amateurs who have regularly sounded words of warning to anyone in their circle who has shown a tendency to " jump the gun " before passing the Radio Amateurs' Examination and Post Office Morse Test. Unfortunately, during recent months there have been several cases of unlicensed operation of a type which could have led to difficulties if it had not been reported promptly to the G.P.O. Unlicensed operation inside amateur bands is bad enough, especially when the wrongdoers " pirate " the calls of active stations, but when it takes place outside amateur bands then it can become quite serious.

A month or so ago three unlicensed stations were heard operating in the general area of the East Hampshire-West Sussex border. All three claimed to be using ex-Army Type 19 sets. The trio apparently started their activities on a frequency around 1930 kc/s, but within a few minutes one station had drifted to 2100 kc/s which is 100 kc/s outside the band United Kingdom amateurs are *privileged* to use. Even more serious was the fact that at one point all three stations were spreading over the marine guard band around 2182 kc/s. At that moment those three unlicensed stations were putting Top Band into jeopardy, besides endangering an important maritime service.

Reports of Top Band piracy have come to hand from other parts of the country, including the London area. Ironically, it is believed that some of these pirates attend local R.S.G.B. meetings. One young man, recently licensed to operate from a North London address, admitted that he had been working as a pirate for months past.

The question may well be asked " Why do not the G.P.O. take action more promptly when cases of unlicensed operation are brought to their attention? " The answer, we surmise, can be summed up in the words " lack of money."

As far as is known the G.P.O. have never published an official statement on the cost of administering the Amateur Service, or of investigating unlicensed operation, but a figure of £100 for a difficult case would not be surprising.

There are today about 8,000 licensed amateurs in the United Kingdom who pay £2 a year each to the Postmaster General. Sixteen thousand pounds is, of course, a lot of money, but normal administrative expenses probably account for at least half that amount—bearing in mind that the Amateur Service is organized by the G.P.O. on a regional basis.

It is clearly to the advantage of every licensed amateur to do all in his power to assist the G.P.O. to keep down the cost of administering the Amateur Service. This can be done by helping to remove the canker of unlicensed operation, thereby avoiding the high cost of investigations. Many unlicensed operators are probably youngsters still at school. In most cases the parents are in ignorance of what is going on in their own home and are seriously distressed when their son is finally brought to book. R.S.G.B. representatives and club officials can do much to clear up piracy by calling upon the parents of the suspect or, if certain of their grounds, by reporting their suspicions to the boy's headmaster. The latter course seems to have worked wonders in one or two difficult cases in London.

The young man who has sufficient interest in radio to make it a hobby should find no difficulty in passing the R.A.E. and the Morse Test. Until he has qualified, he must curb any inclination he may have to break the law.

Call Book

PUBLICATION of the 1960 edition of the *R.S.G.B. Amateur Radio Call Book* emphasizes once again how quickly a register of names and addresses becomes out of date. Since the 1959 edition appeared a year ago more than 350 new calls have been issued and more than 900 changes of address recorded. In addition about 100 calls have been reissued and about the same number have been cancelled. Thus in the short space of 12 months nearly 1,500 additions or amendments have taken place.

The active amateur cannot possibly afford to be without an up-to-date copy of the *R.S.G.B. Call Book* in his shack. The fact that the Society is able to maintain the retail price at 3/6d. is due largely to the excellent support which it receives from advertisers. To them—and to the Radio Services Department of the G.P.O.—the Society records its best thanks.

Xmas Memo to Wives and Sweethearts

A copy of the Call Book will fit neatly into the O.M.'s stocking.

J. C.

R.S.G.B. International Radio Hobbies Exhibition 1959

A Review of some of the Highlights

THE R.S.G.B. International Radio Hobbies Exhibition held in the Royal Horticultural Society's Old Hall, Vincent Square, London, S.W.1, from November 25 to 28, 1959, was another landmark in the history of Amateur Radio. Although the attendance was fractionally down compared with that for the 1958 Exhibition (when the colour television demonstration attracted many members of the public otherwise unconnected with the hobby), the 1959 event was undoubtedly the best in the long series of exhibitions sponsored by the Society since the second world war.

Opening Ceremony

The exhibition was opened by Rear Admiral K. R. Buckley, Director of Engineering and Electrical Training, Admiralty, in the presence of the Society's President (Dr. R. L. Smith-Rose) and a number of distinguished guests including Major-General E. S. Cole, C.B.E. (G2EC), Director of Telecommunications, War Office, Brigadier W. R. Smijth-Windham, Chief Signals Officer, Eastern Command, Air Commodore H. G. Blair, C.B.E., Director of Radio Engineering, Air Ministry, Lt.-Col. E. W. Milner, T.D., Officer Commanding No. 65 Signals Regiment, Royal Signals, Mr. W. J. Bray, Radio Branch, G.P.O. and Dr. F. E. Jones, Mullard Ltd.

In the course of his speech Admiral Buckley paid warm tribute to the Amateur Radio movement and said that the hobby was not one for the faint-hearted: those who engage in it must have great skill and patience as well as knowledge. Amateur Radio has always been an exciting and absorbing hobby.

Behind Admiral Buckley as he spoke were many fine examples of the fruits of the virtues he had mentioned, in the form of beautifully designed and built equipment.

Home Constructed Gear

The Silver Plaque for the best piece of home constructed gear was won by W. J. Colclough (G3XC) of Farnham Common, Bucks., with his transistorized communications receiver covering 1·9 to 29·5 Mc/s. Altogether, 15 transistors and two crystal diodes are employed. The first prize for the best exhibit by a member living outside the London Region was won by J. D. Heys (G3BDQ) of St. Leonards-on-Sea, Sussex, with his single sideband receiver for 14, 21 and 28 Mc/s. This receiver incorporates a crystal lattice filter and Q multiplier and has a crystal controlled front end. Second prize in this section was won by E. St. B. Sydenham (G3LOK) with his all-band table-top transmitter, the v.f.o. and multiplier stages of which are a modified Geloso unit. A pair of 807s are used in the p.a.

A 420 Mc/s parametric amplifier *which really works* was an interesting exhibit by G3HBW. Using a good varactor a n.f. of 2db is realized. The pump frequency is 1550 Mc/s and the idler frequency 1115 Mc/s. The insertion gain is 20db and the bandwidth at the 3db points 3 Mc/s.

An interesting 144 Mc/s transmitter using a 3B/240M as a grounded grid linear p.a. was shown by G3BPM and G3NHR. The unit was designed for use on d.c. mains or similar low voltage h.t. supply. Modulation is applied to the driver stage. In the high power class, G3FZL exhibited his 500 watt 144 Mc/s p.a. using a pair of 4X150A valves. G3AEX showed his 144 Mc/s transmitter using an 829B. A beautifully built but simple front-end for a 144 Mc/s receiver was shown by G3IIR. An ingeniously constructed noise generator was another item by G3FZL. G2AHL exhibited a simple 144 Mc/s transmitter using an ECL80, EF91 and QQV03-10. Two odd looking items were high power 70 ohm

loads for the h.f. bands and 144 Mc/s built by G8GP. One of these units may be seen in the photograph on page 265.

Transmitter-receivers for 144 Mc/s were displayed by both G3XC and G3MEV while microwave equipment, including a precision wavemeter for 9·6-11 Gc/s and 3cm crystal controlled transmitters and receivers were shown by G3JHM and G3LRH.

Other gear on show included a crystal controlled signal generator (John Gazely, B.R.S.20533), a dry battery reactivator (N. Hearsey, A.1981), a 0·07 watt transistor transmitter (K2GVQ), a home-built bug key (G3JPT), a resistance/capacity bridge and double beam switching unit for an oscilloscope (both by J. Perring, B.R.S.19427), a stabilized power supply using thyratrons (G2HBQ) and a crystal frequency marker for 10 and 100 kc/s (J. Atkinson). Members of Aldersbrooke County Secondary School (Wanstead, Essex) Science Club exhibited a number of pieces of simple gear: a Morse practice oscillator, 1 valve battery receiver and a g.d.o.

The Exhibition station, GB3RS, was in action on all bands using a G8KW multiband dipole and equipment loaned by G3LOK and K.W. Electronics Ltd.

Demonstrations

The TVI/BCI Committee showed some simple high- and low-pass filters built by G3BCM and a test set designed by G3IIR. The effectiveness of the filters could be readily demonstrated with the test set and aroused much interest. Another working demonstration was G3BGL's set-up showing the calibration of a grid dip oscillator using simple Lecher lines that anyone can make in a few minutes. The g.d.o. itself was worthy of close inspection as it uses only one scale for all coils necessary for covering 1·5 to 220 Mc/s. A pocket instrument for testing transistors, built by G3JLH, aroused much attention and scores of leaflets describing its construction were distributed.

Another novelty was a "see your own voice" demonstration using an oscilloscope loaned by G3HWG.

Mobile Operation

The increasing interest in mobile operation was reflected in the first appearance at the Exhibition of the recently-formed Amateur Radio Mobile Society. In addition to copies of the society's journal, *Mobile News*, and membership supplies, a number of transistorized power packs and other items of equipment were on show.

Geoff Stone, G3FZL, operating the Exhibition Station GB3RS. (Photo by G2AHL.)

Rear Admiral K. R. Buckley opening the R.S.G.B. International Radio Hobbies Exhibition, 1959. Also in the picture, left to right, are the Society's President, Dr. R. L. Smith-Rose, C.B.E., Mr. Norman Caws, G3BVG (Honorary Treasurer), and Brigadier W. R. Smijth-Windham. At the rear, standing, is Mr. Austin Forsyth, O.B.E., G6FO, Editor of "The Short Wave Magazine." (Photo by the Tella Co. Ltd.)

Amateur Television

The British Amateur Television Club has a reputation for having at least one new idea on its stand at every R.S.G.B. Annual Exhibition. This year was no exception when slow-scan television was shown for the first time. The system is somewhat similar to that used by the B.B.C. for sending television pictures over the transatlantic cable but instead of re-constituting the signal by first recording it on movie film, the amateur slow-scan system uses a long persistence cathode ray tube. The advantages of the system, from the amateur point of view, are that the signals can be recorded on a standard tape recorder at an economical tape speed ($3\frac{3}{4}$ i.p.s. or $7\frac{1}{2}$ i.p.s.) or transmitted by an ordinary narrow-band amateur phone station. Thoughtfully, the club had prepared an excellent leaflet on the subject. The equipment was built by G3AST.

Other gear on the stand included John Ware's home-built colour receiver for B.B.C. transmissions, a live camera by G3MEO, a wideband oscilloscope for television work by Mike Cox and a colour bar generator by Bill Hipwell.

Vic Frisbee, G3KVF, and Norman Fitch, G3FPK, on the Amateur Radio Mobile Society's stand. (Photo by G2AHL.)

Dr. A. C. Gee, G2UK, Honorary Secretary of the British Amateur Radio Teletype Group, explaining the operation of a receiving converter for f.s.k. teletype signals. (Photo by G2AHL.)

Radio Teletype

Radio teletype is a newcomer to the modes of transmission used by radio amateurs in the U.K., but nevertheless the British Amateur Radio Teletype Group had an interesting display of the equipment necessary to receive and transcribe signals sent in the international five symbol code. Items on show included a Creed No. 3 tape teleprinter of the type used by amateurs (because small quantities have been made available as surplus), a teleprinter power supply and a receiving converter for f.s.k. signals. Throughout the Exhibition, Dr. A. C. Gee (G2UK), Hon. Secretary of the Group, was available to answer questions about the system.

Receivers

A Silver Plaque for the most interesting piece of new equipment for the radio amateur manufactured by a commercial concern was awarded to the **Minimitter Co. Ltd.** for its new communications receiver. It was the first time a plaque had been offered to manufacturers.

The Minimitter MR44 is an 11 valve double superhet covering all the amateur bands from 1·8 to 30 Mc/s. Each band is spread across a slide rule scale, the tuning mechanism having a reduction ratio of 60:1. In many ways, this receiver is quite unlike any other available to the British amateur in the moderate price range: it has a half lattice crystal filter to give a steep-skirted response curve to the i.f. amplifier and a Q multiplier for variable selectivity; it has an audio derived a.v.c. circuit and separate a.m. (diode) and s.s.b. (product) detectors. An accessory socket is provided for supplying power to other units and provision is made for either remote control of the receiver or for remote control of the transmitter from the receiver send/receive switch.

A new Eddystone receiver—the 880 high stability type for communications purposes—was shown for the first time on the **Home Radio** stand. This equipment covers the frequency range 500 kc/s to 30·5 Mc/s and has a crystal controlled first oscillator. Tuning is at the variable i.f. which employs a very high stability oscillator for converting the signal to the second i.f. of 500 kc/s. A half lattice crystal filter is incorporated. The receiver uses 19 valves, three germanium diodes and four silicon rectifiers. The price is believed to be in the region of £400.

American receivers making their first public appearance in Britain since before the war attracted a great deal of attention. The 75S-1, the receiver in the new S-line, was exhibited by **Collins Radio Co. of England Ltd.** This receiver covers all amateur bands from 15 to 80 metres and a choice of three 200 kc/s portions of the 10m band. Selectivity is provided by a mechanical filter.

James Scott & Co. of Glasgow had a wide variety of Hallicrafters receivers on show, ranging from the S38E, a 5 valve receiver covering 540 kc/s to 32 Mc/s in four bands, to the SX101A, a double superhet employing 15 valves and providing complete coverage of the 3·5 to 28 Mc/s bands plus a special band for use with 2 and 6 metre converters. Other facilities include selectable sideband switching, a Tee-notch filter and separate a.m. and s.s.b./c.w. detectors. The SX110, in the moderate price range, covers 540 kc/s to 34 Mc/s in four bands. It has a bandspread dial, S meter and crystal filter and uses seven valves plus rectifier.

The "**Communications Receivers of the World**" feature presented an unusual opportunity to try for oneself a selection of the finest receivers available.

Apart from those mentioned above, others on display included the latest models of the Airmec C.864, Eddystone 888A, G.E.C. BRT400/2/K, Geloso G209R, Racal RA17 and the American Heathkit Mohawk RX1 (a kit receiver covering amateur bands only and using 15 valves in a double conversion circuit) and the National NC303 (a double conversion receiver covering 1·8 to 29·7 Mc/s with calibrated scales for use with v.h.f. converters). Also in operation were the Marconi Atlanta Marine type (continuous coverage from 15 kc/s to 28 Mc/s), the Pye "CAT" (frequency range 60 kc/s to 31 Mc/s) and the Siemens Edison Swan G.2 general purpose marine receivers.

In rather a different category but of great interest to the newcomer to Amateur Radio was the "Globe-King" one valve short-wave set shown by **Home Radio.** For the junior op. there was the "Kidset"—an inexpensive crystal diode plus transistor receiver for well under £2, obtainable from the same firm. **Daystrom** also showed a kit receiver for the youngster, the Heathkit UJR-1, and a six transistor portable in a leather case, the Heathkit UXR1. **Jason** exhibited a kit for a transistor portable which has an r.f. stage.

A useful receiver accessory, the re-styled Multi-Q, was shown by **Minimitter** while the latest version of their Geloso converter for the amateur bands was displayed by **K.W. Electronics.**

Transmitters

A number of new transmitters were exhibited for the first time.

K.W. Electronics introduced their new single sideband transmitter in which the filter, based on the G2NH design, uses crystals in evacuated mounts. Unwanted sideband

The Minimitter MR44 communications receiver which won the Silver Plaque for the most interesting new commercial product for the amateur.

rejection is claimed to be better than 40db. Two 6146 valves in class AB1 are used in the p.a. Printed circuits are employed extensively in this transmitter. K.W. Electronics also displayed the American Heathkit single sideband adaptor for use with a.m. transmitters.

Printed circuits are also used in the new **Labgear** LG50 and Topbander transmitters. The v.f.o. controlled LG50 covers 3·5 to 28 Mc/s at inputs of up to 60 watts on c.w. and 40 watts on phone. Linear screen modulation is provided by an EF80 speech amplifier and one half of a 12BH7, the other section functioning as the clamp valve for the QV06-20 p.a. valve. The Topbander is capable of inputs of up to 12 watts on c.w. and 10 watts on phone to a 5763 valve in the p.a. The EF91 v.f.o. is followed by an EL91 class A driver while modulation is provided by a 12AU7 and 6BW6.

Daystrom exhibited the Heathkit DX100U which employs a pair of 6146 valves in the p.a. modulated by a pair of KT88s. The transmitter covers all bands from 1·8 to 28 Mc/s, special provision being made for power reduction on Top Band. The frequency may be controlled by a crystal or the internal v.f.o. The modulator provides 100 watts of audio via a 500 ohm tapping on the output transformer for use in p.a. work. Another interesting item on the same stand was the Heathkit v.f.o. type VF-1U for use with transmitters such as the DX40. The tuned circuits in this unit are entirely enclosed in a screening box.

Another new transmitter (shown by **Home Radio**) was the HQX30, a low power c.w. rig employing a modified Geloso v.f.o. unit driving an 832 p.a. The cabinet measures only 12 in. by 6¼ in. high by 7 in.

Minimitter introduced the Mercury " 200 " which uses a pair of the new TT21 valves in the p.a. and is capable of a maximum d.c. input of 240 watts. The p.a. runs at 150 watts input on a.m. Negative cycle loading of the modulator is claimed to increase considerably the effective speech power. The Mercury " 200 " is the latest version of their well-known all-band transmitter.

The KWM-2 transceiver for s.s.b and c.w. was exhibited on the **Collins** stand. Measuring 7¾ in. high, 14¾ in. wide and 13¼ in. deep, the transmitter section will take 175 watts p.e.p. input on s.s.b. or 160 watts on c.w. The entire unit weighs only 18 lb. The receiver section is a double-superhet, selectivity being provided by a mechanical filter.

Aerials and Accessories

A useful item noticed on both the **Home Radio** and

The Labgear LG50 table top transmitter for 3·5 to 28 Mc/s. (Photo by G2AHL.)

The new K.W. Electronics filter-type single sideband transmitter which uses printed circuits. A typical sub-assembly is shown on the right of the picture. (Photo by G2AHL.)

K.W. Electronics stands was the new Mosley plastic line made of stranded polythene and intended for supporting long-wire aerials. It is claimed that this material is quite unaffected by moisture so that aerials need no attention in wet weather. Both firms showed examples of Mosley aerials.

Minimitter introduced a new beam rotator and indicating system for use with their telescopic mast as well as the Minibeam for 10 and 15 metres. The indicator shows the position of the aerial by means of a beam of light on a miniature great circle map of the world.

Labgear and **K.W. Electronics** showed s.w.r. meters. The Labgear unit, reviewed in the November BULLETIN, uses the Monimatch type of directional coupler while the K.W. Match uses a piece of coaxial cable to which a pick-up wire has been added for measurement purposes. Labgear introduced a three band quad aerial kit for 14, 21 and 28 Mc/s. The elements for each band are independent and each has its own feeder. **Richard Maurice** showed a wide range of aerial fittings and materials for the " build-it-yourself " enthusiast.

Around the Stands

Kits for all types of equipment were again a most marked feature of the Exhibition.

Jasonkits had a fine display of hi-fi equipment, including stereo amplifiers and several different types of f.m. and other tuners, as well as a selection of test gear (available in both kit and ready built form) such as the AG10 audio generator, OG10 oscilloscope and the CC10 crystal calibrator. One of the most popular of this firm's products is a tuner for both f.m. broadcasts and B.B.C. and I.T.A. television sound.

Daystrom displayed a representative selection of Heathkit audio equipment, test gear (the resistance/capacitance bridge model C3U was an interesting new item) and a kit for making a wideband balun coil unit to match 75 ohms unbalanced to 300 ohms balanced or to 75 ohms balanced from 3·5 to 28 Mc/s. The unit will handle r.f. powers up to 150 watts.

Home Radio showed kits for f.m. receivers and hi-fi amplifiers and printed circuits for the Mullard 5-10 and 3-3 amplifiers. A special feature was a display of Wilkinson tools for the radio constructor including cutters particularly suitable for use with printed circuit components.

Most of **K.W. Electronics** products are available in kit form. Components on show for the first time included a pi-network coil for use with a pair of 6146 or similar valves. Another new item was the KW40 transistorized power supply employing a pair of OC35 transistors and four silicon diodes. An output of 300 volts at 140 mA is provided for an input of 12 volts at 4 amps. This unit measures only 4 in. by 4 in. by 1¾ in. deep.

Mayra Electronics, makers of the Maykit car radio kit, introduced the Mayklite light switch for automatically

David Deacon, G3BCM, Chairman of the TVI/BCI Committee, showing simple high and low pass filters to J. Douglas Kay, G3AAE. (Photo by G2AHL.)

turning on car lights as darkness falls. A prototype of an electronic revolution counter for use in cars was also exhibited.

The **Mullard** stand was devoted in the main to the dissemination of technical information for the amateur and to showing some of the ways in which the Mullard Educational Service operates by the provision of such things as films and film strips. A very rugged looking valve on this stand was the QV08-100 which has a 6·3 volt 3·9 amp. heater and will take an input of 385 mA at 750 volts in class C. Driving power required is 2·5 watts and the power output 200 watts. Its comparatively low h.t. voltage requirement suggests it should be interesting to the amateur but its retail price at the present time is likely to make this interest somewhat academic. Also seen on this stand was the new QQV04-16 double tetrode, usable up to frequencies of the order of 900 Mc/s. A new transistor on show was the OC170, a diffused alloy p.n.p. type for use in r.f. applications up to 70 Mc/s.

Another firm distributing some well-produced technical information was **Siemens Edison Swan.** Products displayed included drift transistors for use at frequencies up to 100 Mc/s and audio power transistors. A further useful item was a transistor Beta tester.

Enthoven Solders demonstrated the Superspeed low voltage soldering iron and aluminium solder as well as displaying a wide range of solders and soldering fluxes.

One of the most popular displays was that on the **A.P.T. Electronics** stand where the Lektrokit chassis construction system (a review of which appeared in the November BULLETIN) was on show. Several typical pieces of amateur equipment, including the R.S.G.B. Two Metre Converter, were available for inspection.

The publishers of *Hi-Fi News*, newcomers to the Exhibition showed a variety of publications for the audio and tape recording enthusiast. **Short Wave Magazine Ltd.,** a supporter for many years, displayed a wide selection of American publications for the amateur. An interesting piece of equipment on this stand was G3CCA's medium powered transmitter described in recent issues. *Wireless World* and *Electronic Engineer*, were shown on **Iliffe & Sons'** stand. Equipment displayed included a transistor receiver described in *Wireless World.* A wide selection of data books and publications as well as the well-known panel signs were shown on the **Radio Constructor** stand while another very comprehensive range of books was displayed by **Norman Price (Publishers) Ltd.**

Taylor Instruments had a fine display of test gear including their Model 127A multimeter with a sensitivity of 20,000 ohms per volt. The Model 100A is even more sensitive—100,000 ohms per volt. On the **Avo** stand there was a most interesting demonstration of the final testing of the Avominor test instrument.

Components, test gear and surplus equipment was featured by **Relda Radio.**

The Services

All three Services were again exhibitors. The **Army** was represented by the 65th Signal Regiment, R. Signals, T.A., and by members of the Women's Royal Army Corps Signal Squadron. The technical exhibits included teleprinters of modern design.

The **Royal Navy** staged a fine display of the equipment used by the Communications Branch of the Royal Naval Reserve. Here again radio teletypewriting equipment was much in evidence.

The **Royal Air Force** stand showed radio controlled models loaned by the R.A.F. Halton Apprentices Modelling Club and equipment built by members of the R.A.F. Amateur Radio Society which has just celebrated the 21st anniversary of its foundation. An unusual item was G3IVZ's 1·8 to 28 Mc/s transmitter which uses two v.f.o.'s—one for 1·8–2 Mc/s, the other covering 3·5–3·8 Mc/s for the other bands. Another interesting item was G2FQP's field strength meter for all bands from 1·8 to 28 Mc/s *and 144 Mc/s.* A polar diagram indicator loaned by No. 1 Radio School, Locking, was a good demonstration on this stand. During the Exhibition GB3RAF was operated on a.m., c.w. and s.s.b.

Conclusion

The Eddystone 888A receiver, offered in connection with the Exhibition was won by D. Vivian (A.1402) of Poole, Dorset.

The success of the Exhibition was a tribute to the great efforts made by everyone concerned to put on a good show. To the exhibitors, the organizer, Phil Thorogood (G4KD), and the members of the Exhibition Committee go the thanks of every visitor for arranging a Great Show.—J.A.R.

Sid Chapple, G6SC, John Gazeley, B.R.S.20533, " Pip " Elton, G3GOZ and Jimmy Mathews, G6LL, discussing some of the home constructed equipment. In the foreground is G3XC's transistorized communications receiver which won the Silver Plaque. G3BDQ's single sideband receiver is also in the picture. (Photo by G2AHL.)

Single Sideband

By G. R. B. THORNLEY (G2DAF)*

SINGLE sideband offers to the enthusiastic amateur a vast new field for experiment, a challenge to initiative and the opportunity to try techniques that are still new and incompletely explored.

No two sideband operators have identical views on any subject. Dr. A. H. Koster (G3ECA) suggested that the limiting factor to sideband progress among the amateur movement in general is the ability or inability to receive it. Possibly someone else could put up a convincing case to prove that the difficulty lies in the transmitter.

Whatever your own views, on this or any other s.s.b. subject, there is no doubt that differences of opinion, friendly arguments and open discussion, add materially to the interest and the attraction of sideband as a hobby.

The Product Detector

Having listened to conversations on the air in which the product detector method of detection was being discussed, the writer is amazed at the unfounded and exaggerated claims being made for it. This is not itself of very great importance, but when these statements appear in print they are accepted at their face value by a large majority of readers, who are likely to undertake modifications to their receivers in the hope of making, from the point of view of s.s.b. reception, a material improvement.

The product detector has been endowed in print with miraculous properties. Statements have appeared to the effect that it will improve c.w. reception; that it is a tremendous advantage in s.s.b. reception and that it will reject a.m. signals. The authors are not to blame—they are repeating in good faith statements that have appeared in technical literature elsewhere.

This type of detector de-modulates the signal by a process of heterodyning or mixing. The two input voltages, *F1* (i.f input) and *F2* (carrier insertion oscillator) are fed into the mixer. The output is usually taken through a resistance capacity low pass filter (to by-pass the *F1*, *F2* and other higher frequency components) so leaving the difference frequency output (*F2-F1*), to be fed into the following audio amplifier stages. The valves most commonly used are either 6BE6 or 12AT7. With the 6BE6 mixing is obtained by modulation of the electron stream within the valve. In the double triode version, mixing takes place across the common cathode resistor which must therefore be un-by-passed.

All signals (repeat—all signals) within the pass band of the receiver i.f. stages will be heterodyned with the carrier insertion oscillator (b.f.o.) to give an output that will be passed on to the receiver audio stages. This includes s.s.b., a.m., f.m., p.m., c.w., car ignition, the vacuum cleaner next door, static, receiver shot noise and anything else that might happen to be there.

Certainly, if an a.m. signal is tuned in to zero beat and the carrier insertion oscillator is switched off there will be no (or very little) audio output, but this does not mean that the detector has offered any discrimination. If this experiment is repeated on a s.s.b. signal there will be no audio output either! A mixer cannot work with one of its injection voltages removed—there is nothing left to mix.

The writer came to the conclusion some time ago that there was nothing whatever wrong with the humble diode as a detector for single sideband reception and has not found any occasion yet to change his mind. Over the years the diode—or its variant the infinite impedance detector—has proved its worth. Any distortion it might produce is at a low level and its output is in fact acceptable to the hi-fi quality enthusiast. The bigger the signal input the more the diode likes it: it cannot normally be overloaded and its output is high. For satisfactory sideband reception it requires only that the carrier insertion oscillator voltage be greater than the peak sideband input.

* *5 Janice Drive, Fulwood, Preston, Lancashire.*

Disadvantages of the Product Detector

The product detector has one advantage—that of lower intermodulation distortion. Unfortunately it has a number of disadvantages too: (i) It is easily overloaded and only capable of accepting an input signal of a fraction of one volt; (ii) Its low output requires higher gain in the audio amplifier; (iii) It is susceptible to microphony and heater cathode hum. (This will depend on the following audio gain); (iv) It is not capable of normal a.m. reception with the b.f.o. switched off. (If this is required it means that the receiver must be equipped with two detectors); (v) The receiver cannot be used with front end injection.

Intermodulation distortion in s.s.b. detection has now become the latest bogey. The writer would be very interested to know at what level, and at what percentage this distortion exists in the two types of de-modulators—mixer and diode.

After all the effort of constructing a 20-valve amateur band receiver equipped with everything possible for the reception of s.s.b., the best possible detector was naturally a requirement. The receiver was accordingly fitted with a normal diode for a.m. and a product detector for s.s.b. with a change-over switch operated from the front panel to select the required audio output and feed it to the input of the volume control. By the simple expedient of leaving the carrier insertion oscillator on all the time, and feeding some of its output through a Philips 3-30 pF trimmer to the a.m. diode, the switch enables rapid change-over to be made and it is possible to compare the output of either detector on any kind of signal from weak DX to local, whether a.m., s.s.b. or c.w. The writer is prepared to demonstrate to any seriously interested amateur that it is absolutely impossible on switch-over tests to tell which detector is working. It is humbly suggested that those readers who cannot believe that this is true should equip their own receivers with a change-over switch, adjust each detector to give its best performance, and do the experiment for themselves.

Receiving S.S.B.

In an effort to help all those who are having difficulty in receiving s.s.b. it is suggested that the requirements are as follows (in order of importance): (i) A slow tuning rate; (ii) A stable front end oscillator and a stable b.f.o.; (iii) Adjustment to the b.f.o. tuning to enable it to be correctly set at either side of the i.f. pass band; (iv) Sufficient carrier insertion oscillator voltage to enable the *existing diode* to de-modulate s.s.b. without distortion. (Try using a Philips 3-30 pF trimmer as the coupling to the diode instead of the existing small capacitor, and adjust for best results. If the diode is still unable to handle the stronger signals try feeding the injection into the last i.f. amplifier grid.); (v) Improvement to the receiver selectivity by incorporating half-lattice filter sections.

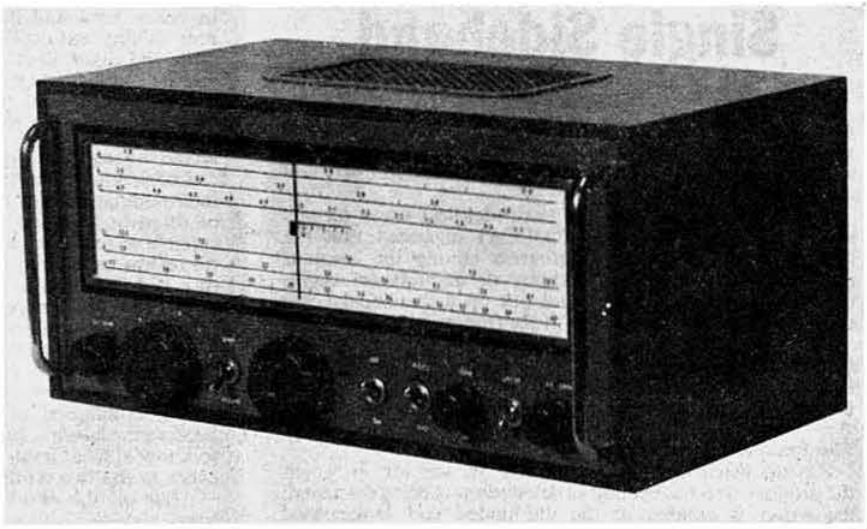
Finally, it is important to conduct all tests with a completely unbiased and open mind. Forget preconceived ideas, past propaganda, and the other man's enthusiasm: and try a little change-over switching yourself!

R.S.G.B. Recorded Lecture Library

A COMPLETE list of lectures available on loan to R.S.G.B. Groups and Affiliated Societies may be obtained from Headquarters on request. Applications to borrow recordings should be made to the Hon. Librarian, Mr. F. H. Lawrence (G2LW), 78 Venner Road, Sydenham, London, S.E.26, as far in advance as possible.

A Home-Built Communications Receiver

By E. St. B. SYDENHAM (G3LOK)*



A three-quarter view of the home-built communications receiver in its wooden cabinet. The controls, from left to right, are r.f. gain, bandswitch, send/receive switch, tuning, main on/off, a.g.c./b.f.o. switch, b.f.o. tuning, noise limiter on/off and a.f. gain.

THE receiver to be described, which was one of the prize-winning exhibits at the 1958 R.S.G.B. Radio Hobbies Exhibition, was designed primarily with a view to producing a piece of amateur equipment which, with the materials normally available, would have as nearly as possible the appearance and performance of the professionally built article. Constructional details rather than the actual circuitry will therefore be given most attention.

The object was to cover all the amateur bands from 1·8 Mc/s to 30 Mc/s with reasonable bandspread and also to provide a continuous coverage of 20 Mc/s in the high frequency range to allow the receiver to be used with converters for the 2m and 70cm bands. This was achieved by dividing the tuning ranges into the following bands: Band A, 1·8-2 Mc/s; Band B, 3·5-4 Mc/s; Band C, 6·5-7·5 Mc/s; Band D, 12·5-15·5 Mc/s; Band E, 20-27 Mc/s; Band F, 27-40 Mc/s.

* *Ivy House, Sun Hill, Cowes, I.o.W.*

It will be noticed that bands C and D are unnecessarily broad, but in the absence of special tuning capacitors, they could not be made narrower without spoiling the L/C ratio of the tuned circuits or " bunching " the scale calibration at one end. The tuning scale was made as long as possible and has a length of 13 in. for each band.

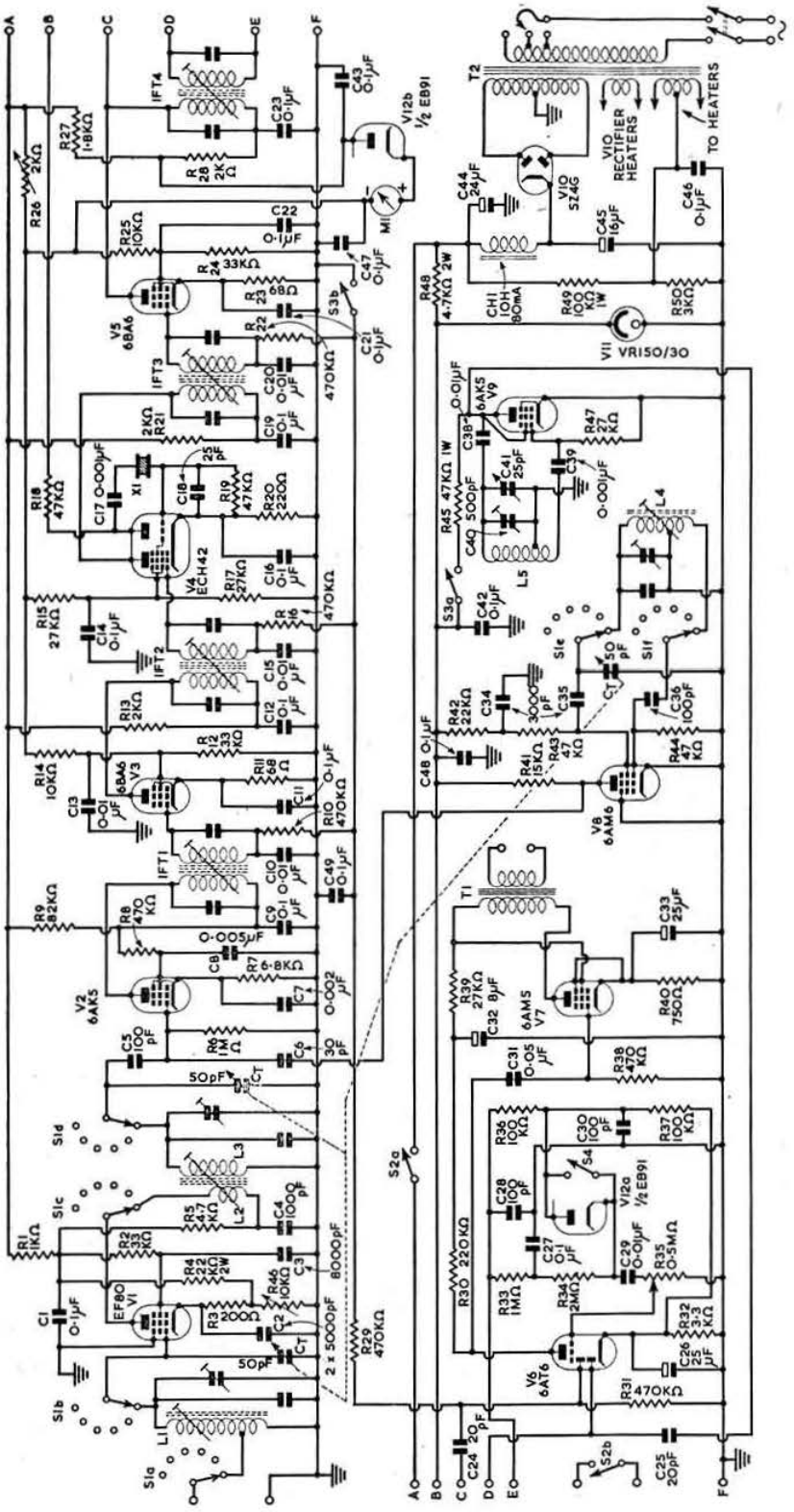
The performance of the receiver is adequate for most purposes, being able to resolve a 1 μV signal with 50 per cent modulation at loudspeaker strength. The signal strength meter which uses a 1 mA movement is arranged to read S9 for an input of 100 μV, each S point being 6db. The bandwidth is $\pm$ 2·5 kc/s for 6db down.

Most of the components were obtained on the surplus market making the total cost of the receiver about £10 10s. If the components had been bought at the normal retail prices, the cost would obviously have been much greater—probably double this figure. The alignment

TABLE I—COIL WINDING DATA

Band	R.f. coil (L1)		Tapped at	Adjustable Trimmer	Fixed capacity	Mixer coil (L3)		Coupling coil (L2)	Adjustable Trimmer	Fixed capacity	Oscillator coil (L4)		Tapped at	Adjustable Trimmer	Fixed capacity
	Turns	S.w.g.				Turns	S.w.g.				Turns	S.w.g.			
A	42	26	6t	30 pF	150 pF	40	26	80	30 pF	120 pF	36	26	14	30 pF	330 pF
B	25	24	4t	30 pF	100 pF	27	24	55	30 pF	100 pF	26	24	11	30 pF	150 pF
C	19	24	3t	30 pF	65 pF	17	24	40	30 pF	47 pF	19	24	8	30 pF	80 pF
D	8	19	2t	30 pF	30 pF	8	19	20	30 pF	30 pF	10	19	4	30 pF	47 pF
E	7	19	2t	30 pF	20 pF	7	19	18	30 pF	10 pF	9	19	4	30 pF	20 pF
F	4	16	1t	30 pF	Nil	4	16	12	30 pF	Nil	8	19	3	5 pF	Nil

B.F.O. Coil L5 550 turns, pile wound, tapped at 100 turns, trimmer capacity 500 pF.



is straightforward and will not be described in detail.

The Circuit

The circuit (Fig. 1) is fairly conventional and employs a r.f. amplifier, pentode mixer with separate oscillator, two i.f. stages at 2·1 Mc/s, a second frequency changer with crystal-controlled oscillator section, two i.f. stages at 85 kc/s, a double diode triode detector—a.v.c.—a.f. amplifier, and pentode output.

The first oscillator circuit is a modified Hartley arranged so that the actual oscillator uses the grid and screen of a 6AM6. Output is taken from the anode so that sufficient injection may be obtained at the mixer with the minimum of pulling of the oscillator frequency. The b.f.o. uses a 6AK5 strapped as a triode in a Hartley circuit.

The heater leads of all three oscillators—the first and second frequency changers and the b.f.o.—are decoupled direct to the chassis by miniature ceramic capacitors and the entire heater line system is biased about 7 volts positive with respect to chassis to reduce hum pick-up at the cathodes by emission from the heaters.

The r.f. and oscillator coils are wound on ½ in. diameter paxolin formers with adjustable dust cores, each coil having a Philips concentric type trimmer with additional fixed capacitance where necessary. Details are given in Table I. The tuning capacitors are 50 pF each with double-ended spindles and are ganged together with flexible couplers. Polar type C28-141 or similar are suitable.

One half of a double diode is used as a noise limiter and its other section connected in series with the "S" meter to prevent damage to the movement by reverse current in the event of failure of a decoupling capacitor.

The first i.f. chain has a nominal frequency of 2·1 Mc/s and the second a frequncy of 85 kc/s. The second frequency changer oscillator should therefore work at 2·185 Mc/s. The nearest available crystal was a 10X type at 2·196 Mc/s, so the first i.f. was made 2·111 Mc/s which proved to be a negligible deviation as far as the efficiency of the i.f. transformers was concerned.

Fig. 1. Circuit diagram of the home-built communications receiver described by G3LOK.

IFT1, 2, 2·1 Mc/s i.f. transformers; IFT3, 4, 85 kc/s i.f. transformers; L1, r.f. coil; L2, r.f. to mixer coupling coil; L3, mixer grid coil; L4, first oscillator coil; L5, b.f.o. coil (for coil winding details see Table I); M1, 0-1 mA m.c. meter; T1, output transformer (6000 ohms to 3 ohms); T2, 250-0-250 volts 100 mA, 6·3 volts 3 amp, 5 volts 2 amp.; X1, 2·196 Mc/s crystal. All resistors are ½ watt rating unless otherwise stated. S1a, b, c, d, should short out the coils not in use. In the diagram, there should be a link between the junction of R39 and T1 and the h.t. side of 2a.

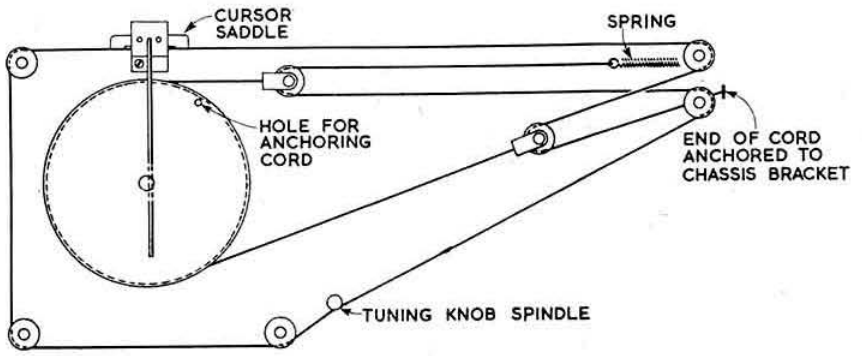


Fig. 2. The tuning drive showing the arrangement of the pulleys, cursor and cord.

The use of 2·1 Mc/s for the first i.f. was considered with some apprehension as it seemed possible that instability would occur towards the h.f. end of the Top Band, but in practice the arrangement has proved to be quite satisfactory, provided that the receiver is not tuned above 2 Mc/s on Band A.

The S meter is arranged in a bridge circuit of which the two upper arms are a 1·2 K ohms fixed resistor and a 2 K ohms variable resistor; the lower arms are the cathode/anode resistance of the last i.f. amplifier on one side with the combined parallel resistance of three screen circuits on the other. The screen circuits are arranged with potential dividers which improve the linearity of the meter readings.

A double pole switch brings the b.f.o. into operation by switching on the stabilized h.t. supply to the oscillator and at the same time short-circuiting the a.v.c. line to chassis.

The send-receive switch is of the double-pole type arranged so that one half cuts the h.t. supply in the " SEND " position and the other half connects a relay circuit which may be wired by means of two terminals provided at the rear of the chassis. It will be seen from the circuit diagram that the h.t. supply to all valves is not cut by this switch but that the oscillators and a.f. section remain in operation. The object of this arrangement is first to reduce any tendency for the oscillators to cool off during the sending period, so helping to maintain the calibration, and secondly, so that the a.f. section may be used for monitoring if desired. Incidently the current drawn by the a.f. section is also useful for keeping the h.t. voltage within reasonable limits.

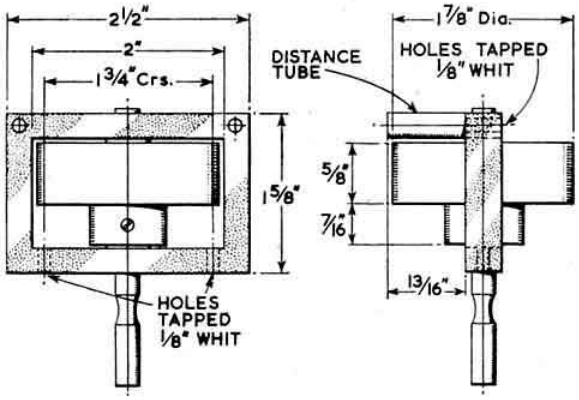


Fig. 3. Mounting of the flywheel.

Tuning Scale and Drive

The tuning drive provided an interesting problem. An elaborate precision gear drive entirely free from backlash was rejected as being beyond the scope of home manufacture, so the cord-and-pulley system was considered. If the cursor has to move over the 13 in. length of the tuning scale for half a revolution of the tuning capacitor, it would appear that the tuning capacitor spindle would have to be fitted with a pulley with a diameter of $\frac{2 \times 13.}{\pi}$ This works out at a little over 8¼ in.—a size which is impractically large. It was therefore decided to make the drive pulley half this size and to incorporate an arrangement of smaller pulleys to halve the movement; the arrangement is illustrated in Fig. 2. The drive pulley was cut from ¼ in. thick duralumin plate with the central boss pressed in, the whole being machined all over in the lathe after assembly.

The small pulleys were turned from ¾ in. diameter duralumin bar and the tuning knob spindle made from a piece of ¼ in. diameter silver steel rod turned down to $\frac{5}{32}$ in. diameter in the form of a neck where the drive cord passes round it.

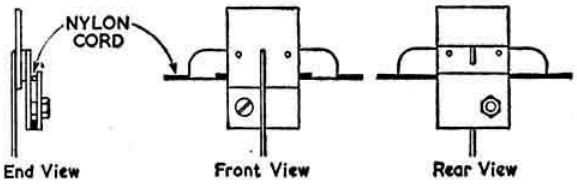


Fig. 4. The cursor assembly.

The cord is of nylon and its tension is maintained by a small coil spring at one of its anchor points so that variations in its length will have the least possible effect upon the calibration. The tuning knob spindle carries a lead flywheel which was made by casting the lead in a plaster mould into which a piece of ¾ in. diameter mild steel bar had previously been placed so that the latter formed a boss for attachment to the spindle. The boss was tinned with solder before insertion into the mould to ensure that the lead would be completely bonded to it. The flywheel was finished in the lathe and with its spindle was then assembled in the bearing frame made from ⅜ in. thick duralumin plate. The holes through this frame which form the bearings were first drilled under size and then carefully reamed to ¼ in. diameter in order to produce a smooth fit to the spindle. Fibre washers, one on each side of the flywheel take up the end float and make the spindle run quietly. The arrangement is shown in Fig. 3.

The tuning scale is of 18 s.w.g. duralumin sprayed with several coats of white cellulose enamel over a surfacing primer; it has a central window for the signal strength meter and cut-outs into which are fitted three perspex prisms for illumination of the scale by the dial lamps which are fitted behind it. The scale figures are ⅛ in. Decal transfers, and the scale marks were put on by hand in black cellulose enamel with a fine brush. The horizontal lines were put on by means of home-made transfers which are quite easy to make and will be described later.

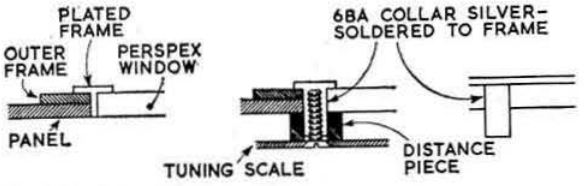


Fig. 5. Method of fixing the various parts of the tuning scale frame.

The tuning scale cursor is a straight piece of wire attached to a saddle which is made of three pieces of paxolin sheet. The saddle is held together by passing the cursor wire through the three pieces and bending it back to form a rivet. The drive cord is clamped to the cursor saddle by a fourth piece of paxolin held down by a 6 B.A. countersunk screw. The assembled cursor slides along the top edge of the tuning scale which was carefully smoothed for the purpose. Fig. 4 shows the cursor assembly. A small piece of polythene taken from the inside of TV type coaxial cable is threaded on the lower end of the cursor wire to keep it clear from the scale and the window.

The frame surrounding the tuning scale was made from brass curtain runner rail: this frame also holds the window which is a piece of $\frac{1}{8}$ in. perspex sheet. The assembly is shown in Fig. 5. A length of curtain rail was sawn down its length so that one piece was $\frac{1}{8}$ in. deep, great care being taken to make the cut accurately because the narrow piece is very difficult to correct by filing without risk of damaging it. This was then cut into four pieces, the cuts being made at 45° to form the mitred corners of the frame. The corners were then joined by silver soldering. Each corner has a small sleeve, tapped with a 6 B.A. thread, silver soldered to the frame as shown. Two intermediate sleeves are also soldered to each of the long sides. This frame and the two handles, which were made from $\frac{5}{16}$ in. diameter brass rod, were polished and nickel-plated as described later.

An outer 18 s.w.g. duralumin frame $\frac{3}{8}$ in. wide and sprayed black surrounds the plated frame to improve the appearance and to make up the panel thickness to approximately $\frac{1}{8}$ in. to equal the thickness of the perspex window. The most satisfactory tool for cutting out the centre of the frame and the window opening in the front panel was found to be a fine toothed fret saw as no buckling of the material was caused by this method.

Chassis and Cabinet

The chassis, which measures 15 in. long by $8\frac{1}{2}$ in. wide by 2 in. deep, is made of 16 s.w.g. duralumin and is constructed of separate pieces joined together by thin angle of the same material. Duralumin was more readily obtainable than pure aluminium and was purchased from the local scrap dealer, as also was the material for the front panel which is 14 s.w.g. A small quantity of 18 s.w.g. material of a softer grade was used for making the panel brackets and screening pieces as these had to be bent to shape. The layout of the main components is shown in Fig. 6 (above chassis) and Fig. 7 (below chassis).

All the holes were drilled in the chassis parts whilst still in the form of flat plates. After the burrs had been carefully removed, the whole was slightly roughened on both sides by rubbing with medium grade emery cloth to provide a "key" for the paint. The chassis, panel brackets and screens were then assembled using $\frac{1}{8}$ in. Whitworth countersunk steel screws and nuts and then sprayed with two coats of battleship grey cellulose enamel. This avoided the danger of poor contact between the pieces which might have given trouble had each piece been sprayed before assembly. Where electrical connections were to be made to the chassis as at the valveholder fixings, for example, the holes were first drilled to tapping size and then tapped with the appropriate thread after spraying.

The front panel was sprayed with three coats of battleship

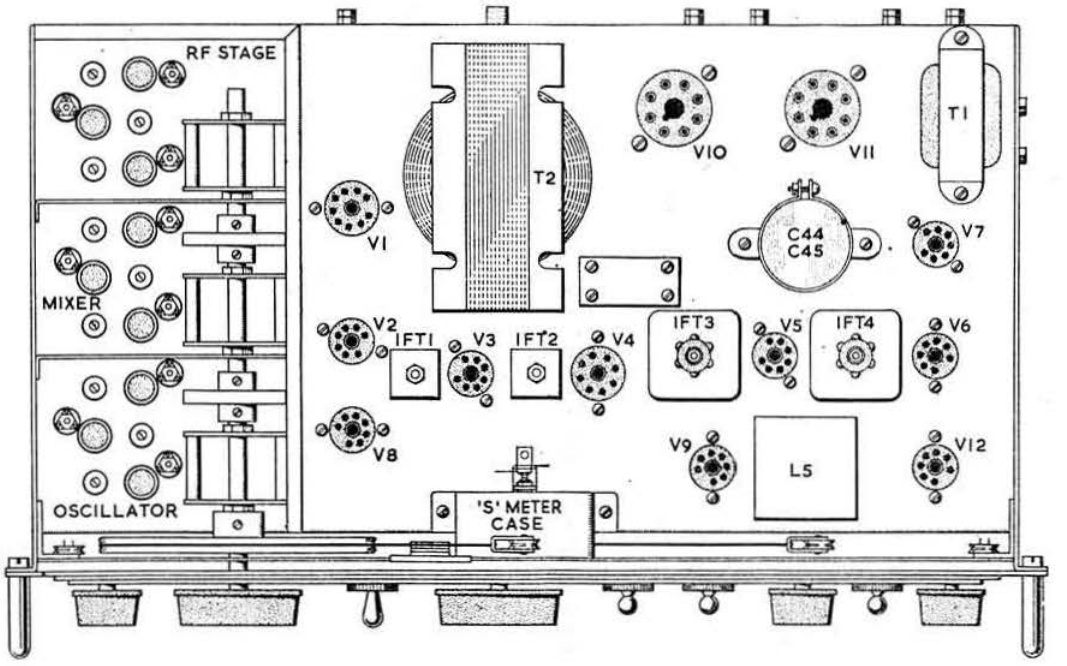


Fig. 6. Layout of the components above chassis.

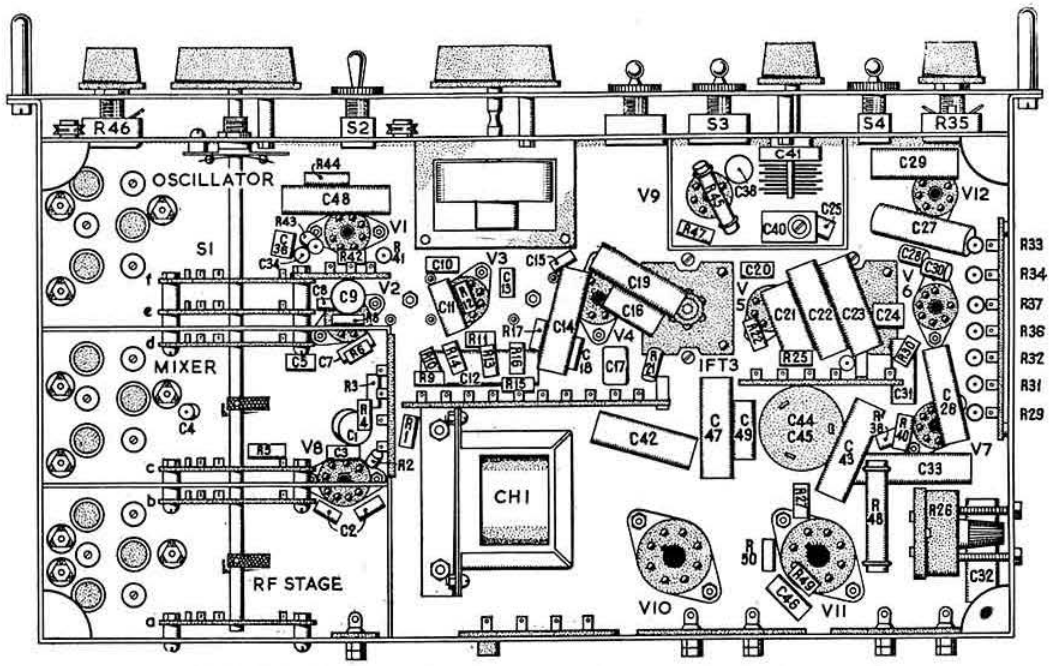


Fig. 7. Arrangement of the principal components on the underside of the chassis.

grey over a coat of surfacing primer and finished off by fixing $\frac{1}{8}$ in. Decal transfers to provide the titles.

The wooden case was made of 9mm. plywood coated in oak veneer and sprayed with cellulose clear lacquer.

The joints are simple and take the form shown in Fig. 8; they were fixed with synthetic resin glue and securely clamped together until the glue had set. A frame was made of $\frac{1}{8}$ in. thick oak strip and glued to the front edges of the case. When this had dried, all edges and corners were trimmed and smoothed ready for the veneering.

A piece of veneer was cut to a size slightly larger ($\frac{1}{4}$ in. all round) than the surface to be covered and the surface evenly coated with " Croid " glue using a good brush (no loose bristles!). The veneer was gently pressed on to the glued surface and then ironed down using a thermostatically controlled household iron set to minimum temperature. This ironing was continued until the veneer was firmly fixed all over and the glue thoroughly set. The gluing was tested by gently tapping the surface all over with the finger nail when any portion not completely fixed could be detected by its " loose " sound. The edges were finally trimmed by means of a razor blade and finished with glasspaper on a wooden block. The ends of the case were veneered first and then the top.

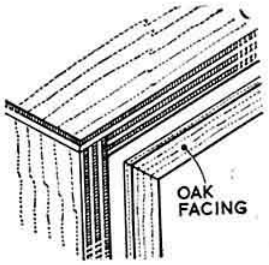


Fig. 8. Joints in the wooden cabinet.

After all edges had been carefully smoothed with glasspaper, three coats of cellulose lacquer were sprayed on and allowed to set thoroughly. The surfaces were then rubbed down with fine " wet-or-dry " rubbing paper applied wet until a smooth surface was obtained. After being set aside to dry thoroughly, two final coats of lacquer were sprayed on. The inside of the case was then painted matt black.

The S Meter

The signal strength meter consists of a 1 mA movement removed from its original damaged case and mounted in an aluminium box which is fitted behind the tuning scale. The meter scale is visible through a small window in the centre of the tuning scale and is illuminated from below by a panel light which by virtue of the perspex prism also assists in illuminating the tuning scale. As the meter is at h.t. positive, it is mounted in its box on a block of paxolin to insulate it from the box and chassis. A cut-out near the bottom of the box provides clearance for one of the tuning drive pulleys. The prisms were cut from $\frac{3}{16}$ in. perspex sheet and after being trued up by rubbing on fine glasspaper were polished on a cloth with metal polish. Each prism is slotted into the edge of the tuning scale as shown in Fig. 9. The maximum reflection of light is obtained by using the original highly-polished surface of the perspex sheet as the reflecting surface. The less accurate hand-finished surfaces then provide a measure of diffusion which with the aid of reflection

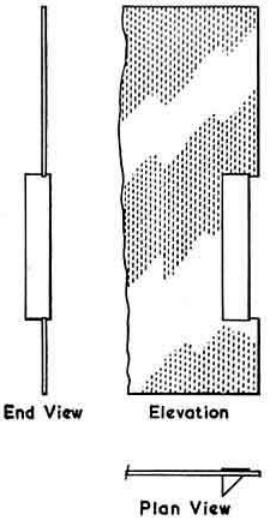
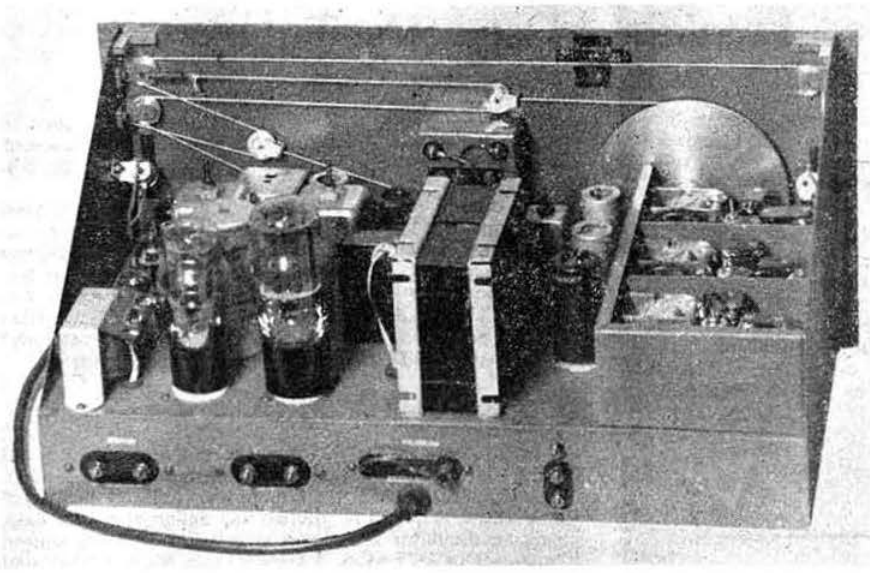


Fig. 9. Fixing of the perspex prisms to the edge of the tuning scale.



An above-chassis view of the receiver from the rear. Note the arrangement of the pulleys for the tuning drive. The S meter is housed in the box mounted in the centre of the front panel behind the mains transformer.

from the inner surface of the front window, give an even illumination of the tuning scale.

Nickel Plating

Nickel plating at home is not difficult provided that suitable precautions are taken. Basically, the process consists of immersing two electrodes in a solution of nickel salt and passing a direct current: the negative of the supply is connected to one electrode, which is the article to be plated, and the positive to the other, which is a piece of nickel.

The solution is made up as shown below:

Nickel sulphate ($NiSO_4$) ..	3 lb.
Nickel chloride ($NiCl_2$) ..	3 oz.
Boric Acid	2 oz.
Water	1 gallon

If the water is slightly warm the salts will dissolve more quickly. Any sediment which forms should be allowed to sink to the bottom of the container and the clear solution poured off.

The plating solution should have a clear green colour, and should be used when cold. It must not be allowed to come into contact with a metal container. Glass or glazed earthenware are satisfactory and the glass container from an old storage cell is excellent.

Absolute cleanliness is essential and the article to be plated must first be polished and then completely cleaned of polishing compound and degreased. After polishing, a wire is attached to the article; this wire serves two purposes: first, as a means of holding the job without letting it come into contact with the fingers, for no matter how clean they are, they will still leave a greasy fingerprint, and secondly for suspension in the plating bath. The degreasing agent may be a hot strong solution of any of the household detergents. The job is first placed in this, well agitated and if necessary brushed to remove all traces of dirt and grease (an old tooth brush is a useful tool here). Sufficient liquid to cover the job completely should be used. From here on, the job must not be allowed to come into contact with the fingers or any other object which has not been completely degreased nor must it be exposed to the air for longer than is absolutely necessary. From the degreasing solution the job is transferred (by means of the wire) to a bath of clean water to remove the detergent and from there to a bath of dilute sulphuric acid (1 part of acid to 10 parts of water by volume).

Immerse the piece of nickel in the plating solution so that the area covered is approximately equal to that of the job. Connect the positive terminal of a 2 volt accumulator through a 50 ohm variable resistance to it, and the negative terminal to the job (still in the acid bath). Quickly transfer the job to the plating solution, immersing it completely. With a voltmeter connected across the bath, reduce the resistance until the meter reads 1 volt. Leave for 6 to 8 hours. Wash the plated article in water after removal from the bath and finish by polishing. If the plating has been done correctly, very little final polishing will be necessary. The arrangement of the plating is shown in Fig. 10.

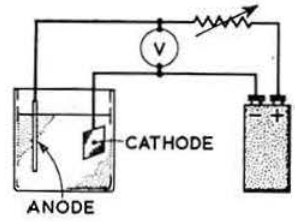


Fig. 10. Nickel plating of the bright metal parts.

Home-made Transfers

Home-made transfers are quite simple and very useful in cases where one may not be certain of making a good job of writing a title; a number of attempts may be made on the transfer and the best one selected for use. The aim is to write in paint on a medium which is readily soluble in water and which does not absorb the paint. Any gummed surface such as stamp-edging or gummed paper strip will do, but the paper base is a little heavy for many purposes and a light tissue makes the work easier. To prepare this base, coat a suitably sized piece of tissue paper with a 50 per cent mixture of office paste and water ("Gloy" paste works well). At this stage the tissue is fragile and must be handled very carefully; lay it over a frame such as an old photograph frame and gently pull it out flat. Wrap the edges down on to the frame and leave it to dry for 24 hours. As it dries, the paper contracts and pulls itself tight and absolutely flat. With a razor blade cut the paper out of the frame, and paint on the desired design or lettering remembering that it must be backwards, i.e. will look correct when seen in a mirror.

When the paint is just "tacky" (not sticky) the transfer may be applied to the panel. Press it down firmly all over the design and then remove the base tissue by sponging with water. After removal of the tissue sponge over the design to remove all traces of paste from the surface.

If the transfer is to be used some time later, or is made with a paint which does not become tacky such as cellulose enamel, the design should be carefully coated with a thin coat of pale varnish. The transfer may be applied as described above when the varnish has become "tacky."

* * *

It is hoped that the information given in this article will prove helpful and encourage other members to build their own receivers.

A Keyed Franklin Master Oscillator

By J. MACINTOSH, F.C.C.S., A.M.BRIT.I.R.E. (GM3IAA, ex-VS1AA)*

TWO subjects which have always interested the author are master oscillators† and aerials‡. Frequency stability and tone depend on the oscillator; ability to work DX is greatly dependent on an efficient aerial system.

The Franklin Oscillator

During the earlier part of internment under the Japanese (1942-1945), a special study was made of the Franklin oscillator. Apart from the article on pages 93 to 95 of *The R.S.G.B. Amateur Radio Handbook* (second edition), no other literature of any consequence could be found on this subject. After release, and on return to Malaya in 1946, a new transmitter—licensed as VS2AA—was built, incorporating the Franklin oscillator.

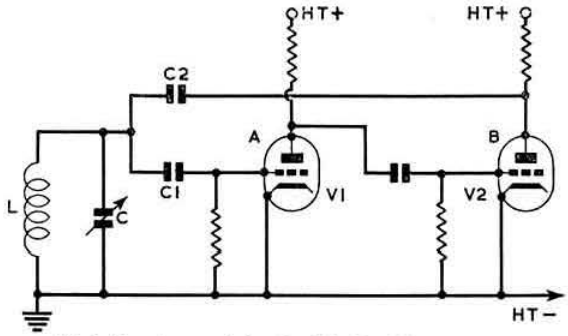


Fig. 1. Fundamental circuit of the Franklin oscillator.

Fig. 1 gives the circuit. During experiments the following valves were tried in turn: 6J5, 6SH7, 6SS7, 6SK7, 6F6, 6V6, 6AB7, 6AC7 and 6AG7; the last three named proving to be the best. Some work was done with respect to the possibility of satisfactorily keying the oscillator but it was found extremely difficult to eliminate chirp. Both cathode and screen keying were tried in V1 and in V2.

Operation as VS2AA continued until July 1951 but although GM3IAA was licensed in December of the same year, further research was not commenced until the end of 1954, when work was begun on a small transmitter using an RK34 (DET19) in the final stage as a neutralized push/pull p.a. This transmitter originally was intended solely for work on Top Band, but using plug-in coils the frequency range was extended to the 28 Mc/s band. The transmitter incorporated a Franklin oscillator using an EF54 and an EF50 (Fig. 2).

Cathode Keying Circuit

Keying was effected in the cathode of V1. RFC was first introduced in the hope that the circuit would cease to oscillate with the choke in circuit, but the arrangement did not work. Nevertheless, the choke was left in circuit in series with the keying jack and by-passed with C4. Various values of grid leaks in V1 and V2 were tried. Gradually it became clear that the values of these leaks were *most important* and differed considerably from the more conventional values used in a circuit of this type. The values given in Fig. 2 are those found most suitable. R1 could be as low as 3·9 K ohms although r.f. output would then be slightly less. A value of R2 as high as 25 K ohms has been used. The miniature ½ watt type of resistor gave the best results.

This circuit worked extremely well and gave chirpless keying on Top Band. This was most encouraging as the majority of radio handbooks do not recommend oscillator keying. Owing to slightly inadequate drive to the p.a. on 28 Mc/s, the EF54 and EF50 were replaced by two 6AK7/6AG7s while an 815 replaced the RK34. Further extensive experiments covering many months were instituted and eventually the circuit given in Fig. 3 took shape.

Screen Keying Circuit

The arrangement for keying in the screen of V2 was so successful that the oscillator in the main transmitter was rebuilt on the same lines and no difficulties were encountered.

A three valve Table Top v.f.o. has been built on the lines of Fig. 3 and it is hoped to publish this design at a later date. Using an oscillator LC circuit covering 1·75 Mc/s, output frequencies of 1·75 Mc/s, 3·5 Mc/s, 5·25 Mc/s, 7 Mc/s and 14 Mc/s are obtainable in the anode circuit of the tuned buffer V3, provided the anode circuit of V3, i.e., L1-C13 in Fig. 2, is tuned to the frequency concerned. As would be expected, the eighth harmonic on 14 Mc/s is somewhat weak, yet in the 815 transmitter this harmonic drives the doubler (a 5763), which in turn drives the 815 p.a. to full output on 28 Mc/s. P.a. grid current runs up to 10 mA on this band.

Chirpless Keying—Important Points

To ensure chirpless keying, it is essential to adhere closely to the conditions detailed below.

A choke input filter should be used in the oscillator power unit, which should provide high tension current only for V1, V2 and V3 but for no other stages in the transmitter. Suppressor grids should be connected directly to an earth connection. Bypass condensers of 0·005 to 0·01 μF should be connected across the valve heaters. These condensers are of the ceramic disc type. Screened cable was used for heater wiring and indeed, wherever possible, but not of course for leads carrying r.f.

A VR105/30 must be fitted to control the screen voltages. A VR150/30 should not be used; it may cause a chirp.

The values of the grid leaks for V1 and V2 in Fig. 3 could be varied a little without affecting results. The values shown gave optimum results however. A value of 100 K ohms for R2 produced a slight chirp. R1 could be increased in value to 8 K ohms. Different specimens of 6AG7 were found to be remarkably alike.

The two small condensers C2 and C3 could be combined in one condenser. Both types, separate single and two-gang, have been used successfully. For the original experiments, Sydney Bird Ltd. made up two variable condensers with a minimum capacity of 1·28 pF and a maximum of 8 pF. Condensers with much metal in their framework should be avoided. The lowest capacity value, consistent with good oscillation and r.f. output, should be employed. If too low a value is used, the circuit may stop oscillating when keyed. Increasing the capacity of these two condensers increases the r.f. output until an optimum value is reached. Increasing the capacity also increases the voltage at the anodes of both V1 and V2. The circuit will oscillate with C2 and C3 set at minimum, but in the interests of stability and good keying the plates are generally set one-quarter meshed.

Condenser C7 (Fig. 3) could be up to 100 pF but a value

* "*Broom Park*," *Cradlehall, Inverness.*

† " An Electron-Coupled Transmitter," *T. & R. Bulletin*, September 1934.

‡ " Some Experimental Work with Aerials," *T. & R. Bulletin*, November 1936.

around 50 pF was found to work well. The condenser may be variable. For a given set of conditions, using a small value of capacity at C7, say 25 pF, the r.f. output at point A was found to be rather better than at point B.

The cathode resistor of V1, R3 in Fig. 2, does not require to be bypassed. The value can be varied from 25 ohms to 85 ohms. An optimum value of 68 ohms was decided upon. The purpose of R3 is to prevent the anode current of V1 soaring when the key is " up." If it is omitted, the anode current may rise from around 20 mA to over 30 mA, depending on the anode voltage. With R3 in circuit, the anode current runs about 20 to 24 mA under key " down " and key " up " conditions. The anode current of V2 runs about 8 or 9 mA. When the key is " up," the anode current of V1—not oscillating—rises, while that of V2 drops to zero. The value of R3 can be so chosen that the anode current of V1 will remain almost constant during keying, but it was considered more desirable to allow the anode current of V1 to rise a little in order to balance the cut-off current of V2. Under key " up " conditions, the anode voltage on V2 soars to around 380 volts or more but apparently no harm results. This rise in voltage could be prevented to some extent by the use of a combination of voltage regulators from the h.t. side of R6 but this was considered to be an unnecessary complication.

It is necessary to provide a source of negative bias to the keyed screen of V2, otherwise the anode current of V2 will not drop to zero, so that when the key is " up," a weak signal of very poor quality will be radiated so preventing break-in working. A value of about 30 to 45 volts negative is ample and may be derived from any other grid bias in use. In the author's 815 transmitter, this negative bias is derived from the unit supplying grid bias to the power amplifier. The decoupling resistor R4 is not critical and although values as high as 1 Megohm have been used, recommended values for this resistor lie between 200 and 500 ohms per screen volt. In practice, a permanent negative voltage is applied to the screen grid. When the key is up, the negative voltage takes over and the anode current is completely cut off, provided, of course, that sufficient negative bias is being applied to the screen. When the key is down, the negative voltage is swamped and has no effect whatsoever; the anode current rising to its working value. The negative voltage does not modify the positive voltage on the screen, as might well be imagined; the explanation being that the source of positive voltage is much better regulated than the negative, being derived from a voltage regulator.

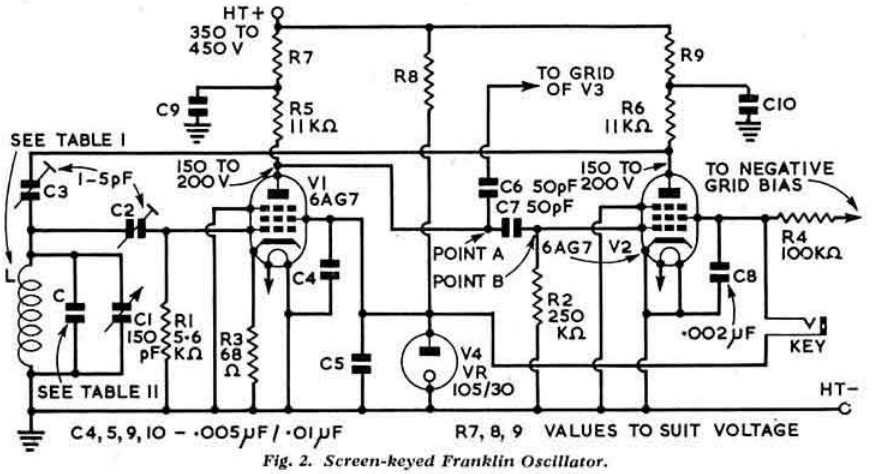


Fig. 2. Screen-keyed Franklin Oscillator.

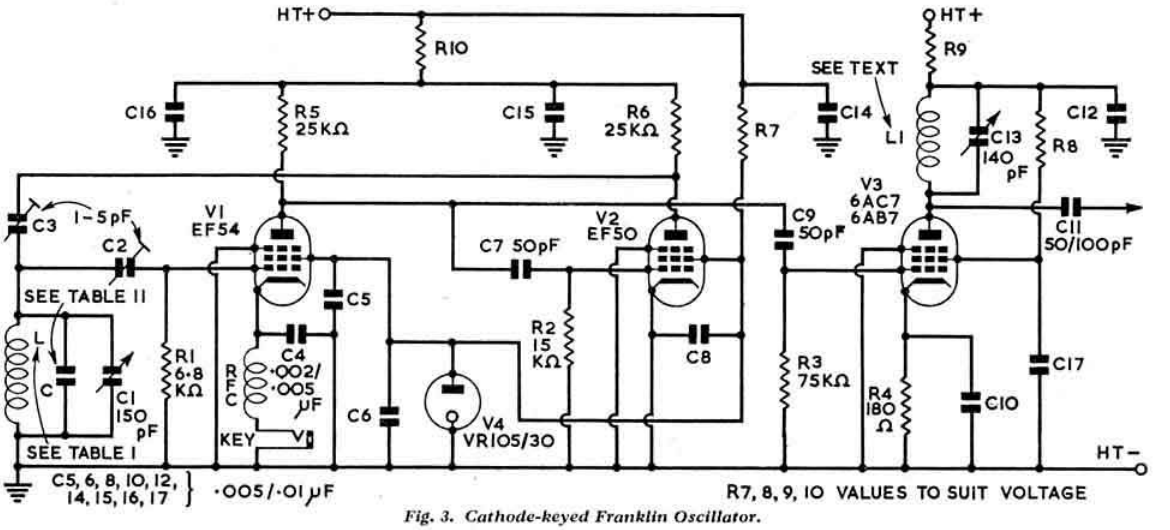


Fig. 3. Cathode-keyed Franklin Oscillator.

The bypass condenser C8 (Fig. 3) should not exceed 0·005 μF, otherwise the keying constants may be affected.

A click filter was found to be necessary and an effective circuit is given in Fig. 4. Variations may be necessary in different layouts. There is no reason, of course, why a valve keying circuit should not be used. However, this was not considered necessary as the key breaks only about 110 volts at 4 mA. A screened keying cable 9 ft. in length is in use at GM3IAA. Coaxial cable works equally well.

Oscillator Coils

It needs to be stressed that only the very best components should be used in any oscillator and this applies particularly to L, C and C1 (Fig. 3).

Particulars of suitable coils and condensers to cover the three following frequencies, 0·9 Mc/s, 1·75 Mc/s and 3·5 Mc/s are shown in the Tables I and II.

TABLE I

Freq.	No. of Turns	Wire
0·9 Mc/s	37, close wound	16 s.w.g. enam.
1·75 Mc/s	24, single spaced	16 s.w.g. enam.
3·5 Mc/s	12, single spaced	17 s.w.g. enam.

All coils are wound on 1½ in. diameter ceramic formers (Raymart type BTX). As this type is grooved, a sheet of insulating material is used to cover the outside surface in order to accommodate the 37 turns required for the Top Band coil. The BTX is of the plug-in type; two plugs only being necessary.

TABLE II

Freq.	Capacitors	C Total
0·9 Mc/s	0·001 μF mica and 30 pF mica	0·00103 μF
1·75 Mc/s 3·5 Mc/s	200 pF mica 300 pF mica and 10 pF ceramic	0·00051 μF
	250 pF mica and 20 pF ceramic	0·00027 μF

Capacitance (C, Fig. 3) required for each of the oscillator coils detailed in Table I. These are permanently connected across each coil concerned.

To the total capacitance of C shown in the last column of Table II must be added the capacitance of the tuning condenser C1. When tuned to the low frequency edge of the different bands, almost all the capacitance of C1 (150pF) will be in circuit. A good slow motion dial is essential for the best results to be obtained.

Choice of Valves

The choice of valves is a most important factor when it comes to keying this type of oscillator. The 6AG7 was found to have no equal but unfortunately, it requires considerable anode current. If the anode resistors R5 and R6 (Fig. 3) are to be not less than 10 K ohms in value, provision must be made for a somewhat larger power unit than is generally necessary for running an oscillator. The total current required, including that taken by the VR105/30 and V3 (6AC7) should not exceed 55 mA.

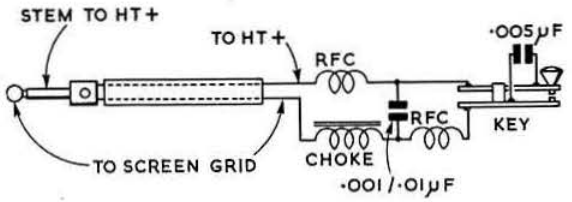


Fig. 4. Key click filter. The connecting cable should be screened and the screening earthed. The small a.f. choke may not be necessary in some cases.

Optimum Frequency

All three oscillator ranges may be keyed successfully, although there would appear to be an optimum frequency around which the Franklin works best. This frequency is 1·75 Mc/s. When using the 3·5 Mc/s coil, it is often necessary to increase the capacity of C2 and C3 slightly, in order to maintain oscillation when keying. The 0·9 Mc/s coil was made up, because, using an oscillator frequency of 1·8 Mc/s on Top Band, there was a slight tendency to " pull " the oscillator frequency. This tendency is not present when using the Table Top v.f.o., with an oscillator frequency of 1·8 Mc/s, as the output from V3 is then loosely coupled by a link to the coaxial cable which drives the cathode of the 5763.

The Tuned Buffer

The choice of valves for V3 is not so conservative. The 6AB7, 6AC7 and the 6AG7 all work well. In the original experiments in Malaya, an 807 was used as V3 but at times a T8 note was reported. The 807 was ultimately replaced by a 6AG7 and this cleared what appeared to be a slight a.c. ripple on the note. With V3 switched out of circuit, the note was excellent: the 807 caused the trouble and several specimens were tried. In this stage it would appear that a well screened valve is required, capable of good harmonic production and working well within the anode voltage and anode current recommendations for that type of valve. The anode current should remain almost constant under drive or no-drive conditions, when the stage is dealing with harmonics. A 6AM6 was tried successfully, but unless the screen was run at about 200 volts, the r.f. output was considerably down when compared with a 6AC7, the screen of which was run at 110 volts. The buffer may be screen keyed, provided negative grid bias is applied as in the case of the screen of V2 (Fig. 3). The same source of bias will do for both V2 and V3, separate decoupling resistors being used in each screen grid lead.

Stability and Tone

The tone should be comparable with that obtained from crystal control, while stability should leave nothing to be desired. If necessary, the unit can be completely screened. In the main transmitter, the coil L and condenser C1 are housed in a shielded metal box but in the case of the Table Top v.f.o., the entire unit is enclosed in a screening box. The usual precautions have been taken to prevent interference to television reception.

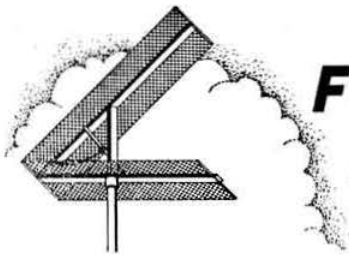
Modifications

It has been suggested that such a relatively high-powered oscillator might well cause trouble through TVI in certain parts of the country. That being so, the following modifications could be tried if trouble is experienced.

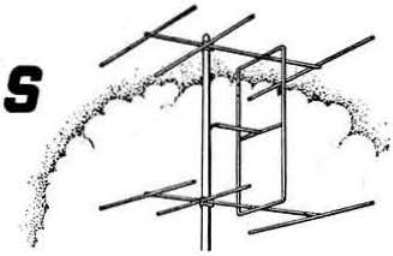
A VR75/30 could be substituted for the VR105/30 and the anode voltage on V1 and V2 reduced to 100 or 120 volts. With reduced anode voltage, the VR105/30 could be retained, provided the anode voltage is not allowed to drop to less than the screen voltage.

If it is required further to reduce the anode current of V1, the resistor R3 (Fig. 3) could be increased in value to 100 ohms. If interference is caused by the screen keying, blocked-grid keying could be tried.

Finally, and this is not a modification, V1, V2 and V3 could be built into a well-screened metal cabinet and all wiring entering the cabinet filtered to prevent the radiation of harmonics.



FOUR METRES AND DOWN



By F. G. LAMBETH (G2AIW)*

FROM time to time lately reference has been made to a method of special value in locating the positions of stations in little-known areas which are sometimes not marked on maps. The idea came from DL3NQ, and has had wide acceptance on the Continent, where, it seems, there is a great objection to sending QTHs during contacts. Briefly the "QRA Locator" (or "QRA Kenner" in German-speaking countries) is based on Greenwich Meridian. The first 2° Eastwards are marked as "A," the second two "B" and so on. Westward, the first 2° are "Z" the second two "Y" and so on. Vertical lettering starts at 40° N., and thenceforth every degree bears a letter, commencing "A" up to "Z" at 66° N. These markings take in most of the effective European area. A map marked in this way will provide great rectangles. These are subdivided to give smaller ones (designated by two letters and a number) so that any location can be determined, with a very small margin of possible error. All Region I v.h.f. managers have undertaken to produce maps of their own countries based on this scheme, and indeed we already have one from Czechoslovakia which is very useful. The small squares on the map are ten per section east/west, and eight per section north/south. Small squares are subdivided with eight dots on the borders thus lessening still further the possible error (see Fig. 1).

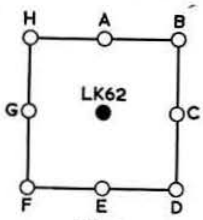


Fig. 1.

The location of QTHs by this means is already very much in use on the continent of Europe, and the Hague Conference in October recommended its use generally in I.A.R.U. Region I. It will be noticed that the British Ordnance Survey is produced on similar lines, but the direct readings of the QRA Locator are much simpler.

* *V.H.F. Manager, 21 Bridge Way, Whitton, Twickenham, Middlesex.*

V.H.F. Activity in Estonia

Welcome news item of Estonian 2m activity comes from **G3NOF** of Yeovil, who recently worked UR2BU on 14 Mc/s. Until recently, the only 2m activity there has been low power portable on Field Days, but UR2BU is now active on the band, looking for Gs and other Western European stations. He will be calling and listening for British stations on the first Tuesday in each month at 18.00/21.00 G.M.T., on 144·18 Mc/s c.w. using a slot beam.

Two Metre News

Recent conditions on 2m have been very poor, with one or two notable exceptions (October 23/24 and November 1). Such conditions must of course be expected now, and explain the scarcity of reports this time.

B.R.S.20133 (Melton Mowbray) writes to say he is now **G3NVK**. Congratulations Richard, and we hope now to hear of some exotic QSOs from time to time.

G3LTF (Danbury) is running a 4X150A p.a. at 150 watts on 144·11 Mc/s. The receiver uses a 417A r.f. stage followed by a ECC85 cascode. The aerial is 6-over-6 spaced Yagis at 33 ft. There has been more construction than operation lately, but skeds are running with G3ILX (Barrow) and GW3MFY (Bridgend) whose signals are almost always receivable. Conditions have been very poor, but bright spots occurred on October 23/24 and November 1. The site at Danbury is a good one to the west, north and east. GM3HLH/A and GM2FHH have been worked recently. When the beam rotator has been installed G3LTF hopes to be on both 2m and 70cm nightly and would welcome any

(*Continued on page 271*)

Part of the v.h.f./u.h.f. stand at the R.S.G.B. Radio Hobbies Exhibition 1959. Equipment shown in this picture includes a 144 Mc/s transmitter-receiver (G3XC), a 144 Mc/s cascode converter (B.R.S.20533), a 144 Mc/s transmitter using a 3B/240M as a grounded grid linear (G3BPM and G3NHR), a simple front end for a 144 Mc/s receiver (G3IIR), a 500 watt 144 Mc/s p.a. (G3FZL), a high power 70 ohm dummy load for 144 Mc/s (G8GP), a 144 Mc/s transmitter-receiver (G3MEV), a noise diode unit for 144 Mc/s (G3FZL) and a 144 Mc/s transmitter with separate control unit (G3AEX).

(Photo by the Tella Co. Ltd.)

The MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By J. DOUGLAS KAY (G3AAE)*

FIRSTLY, grateful thanks to G2AHL and G2BVN who came to the rescue last month when the writer was despatched to Geneva when in full verbal flood. There was a most gratifying number of amateurs taking part in the I.T.U. conference, including that great contest operator **HZ1HZ** with whom G3AAE, like many other British amateurs, has had contacts on five bands. The HZ1HZ rig is situated in Mecca, the "forbidden city," and has thus never been visited by any non-Mohammedan. However, Ahmed has promised to send a photograph of his shack for *M.O.T.A.* when he returns home after the conference.

Which leads us quite naturally to:

News From Overseas

Korea. Leo Fitzpatrick **K2MZM,** who used to cause no end of a stir on the bands when operating **BV1US,** writes to say that he will be on from **HL9KT** from the beginning of 1960. He has QSLed all the 1628 "G" contacts he made from Formosa, and will continue his commendable 100 per cent QSL policy from Korea.

Utah. Richard Caldwell **K7HHH** writes from Utah—still one of the rarest states for W.A.S.—that he has a kilowatt of c.w. and a.m. and twice that p.e.p. on sideband available on any of the h.f. bands at any time. He invites interested operators to write to him for a sked: his address can be found in *QTH Corner*.

Christmas Island. Both **VR3V** and **VR3X** are now back in the United Kingdom, and the latter provides the following interesting information about his activity from Christmas Island. The transmitter consisted of a 6L6 crystal oscillator driving an 807 power amplifier running between 40 and 50 watts on c.w. and 30 watts on 'phone. The receiver was an AR88 and the aerials dipoles and ground planes (a cubical quad had just been erected when he left). Active from October 2 to November 7, 118 stations were worked in 23 countries. The only two "G" stations worked by VR3X were G3AAM and G3AAE, but VR3V worked several more including G2DC, G3AAM and G6XL. **VR3W** is still active from Christmas Island and two more stations are expected to be on the air in the very near future.

Vatican City. Via G2MI and G8IG comes information that QSL cards for **HV1CN** contacts between September 11 and 15, 1958 should not be sent either to HV1CN or A.R.I. but to W1TYQ, who has the HV1CN logs covering this period and will be pleased to confirm all worthy applicants. Incidentally, should this catch the eye of ex-**VU2PB** or of anyone who knows of his present whereabouts, will he please get into contact with G2MI.

Nicobar Islands. The latest information on the Indian DXpedition to Nicobar Island is that a KWM-1 was air-freighted from the U.S.A. in mid-November, and that operation will probably commence on Christmas Day. So there is every prospect of a Christmas present of a new country for some of us this year.

Togoland. Up to the time of writing there is no confirmation that **ZD2AMS** has received his FD8 licence from the Togoland authorities, but there is still plenty of time as operation is not now expected before early February. At the request of ZD2AMS, G3AAE recently wrote to R.E.F. asking for its backing of his licence application.

Yasme. From W3SW comes news that **Danny Weil** will very shortly be setting sail in *Yasme III*, and that early in the New Year he will be heading towards rare locations in the South Pacific. This will not be a single handed venture, and the crew will include W2HQL. So if you hear a terrific pile-up, remember to listen 10 kc/s higher for Danny's flashing bug.

Netherlands New Guinea. Writing to G2MI J. R. Copley (G3DYD, VR3N) reports that he is now licensed as **JZ0PC** from Netherlands New Guinea. The rig runs 40 watts to a dipole, and the receiver is a CR100. A Geloso v.f.o. is on order, while a ground plane aerial is under construction. Operation at present is crystal controlled on 14,010 and 14,036 kc/s on most days between about 09.00 and 15.00 G.M.T.

WGDXC. From the West Gulf DX Club come the following interesting briefs: **ZD2JM,** at present on leave in Scotland, is about to return to Nigeria for another year. K9EAB has all the ZD2JM logs to date and all QSL applications should be sent to him. **VQ8BBB,** who operates on 14 Mc/s c.w. most afternoons, is located on Cargados Island in the St. Brandon Group about 250 miles from Mauritius. **CR5AR** asks for all QSL applications to be sent to him direct; it appears that he does not QSL unless a dollar is enclosed. (This business of "buying" confirmation of a contact is quite deplorable, and those who acquiesce only encourage the spreading of a practice completely contrary to the spirit and ethics of the hobby). **JT1AB** now says that

DXotic Showcase

Call-sign	kc/s		G.M.T.	
VS9OM	3,501	c.w.	21.20	Oman
UM8KAB	7,026	c.w.	18.55	Kirghiz
PZ1AR	7,038	c.w.	23.48	Surinam
KG4AG	7,004	c.w.	23.45	Guantanamo Bay
UL7DF	7,016	c.w.	19.00	Kazakh
AP4M	7,010	c.w.	22.40	Pakistan
8J1AA	14,050	c.w.	18.43	Antarctica
FR7ZD	14,085	c.w.	17.00	Reunion Is.
ZS2MI	14,180	a.m.	17.00	Marion Is.
VK0RH	14,060	c.w.	08.00	Wilkes Base
ZD7SA	14,332	c.w.	00.30	St. Helena
CR5AR	14,025	c.w.	19.45	St. Thomas Is.
FG7XC	14,005	c.w.	23.50	Guadeloupe
VQ8BBB	14,038	c.w.	17.00	Cargados Is.
FM7WP	14,040	c.w.	23.50	Martinique
ZS8O	21,130	a.m.	17.35	Basutoland
HS1B	21,190	a.m.	13.46	Thailand
FB8ZZ	21,130	a.m.	14.50	Amsterdam Is.
XW8AL	21,130	a.m.	15.45	Laos
VS5GS	21,135	a.m.	15.00	Brunei
MP4DAA	21,165	a.m.	14.43	Trucial Oman
VQ8AD	28,400	a.m.	16.00	Mauritius
VP2AB	28,275	a.m.	17.55	Antigua
FE8AR	28,375	a.m.	14.20	Fr. Cameroons
VP3MC	28,284	a.m.	18.00	Br. Guiana
YS1IM	28,354	a.m.	17.42	Salvador

* *40 Fryston Avenue, Coulsdon, Surrey.*

G3JLF of Blackpool uses an RME45 receiver and a Minimitter transmitter with a half-size G5RV-type aerial and indoor dipoles for 21 and 28 Mc/s.

FP8BI (left) and FP8BH operated from St. Pierre during October 1959. Using Collins " S" Line equipment and a folded dipole, 900 contacts were made on c.w. and s.s.b. with stations in 46 countries in 25 hours of operation. At home, FP8BH is W1PFA.

he has no QSL manager in Prague, and that all cards should be sent to him direct.

DM3IGY. Geoff. Harrison **B.R.S.22344** (Sandiacre) received a letter from one of the operators of the German ionospheric station **DM3IGY** which, manned entirely by amateurs, transmits automatic Morse continuously on 28,000 kc/s. The transmitter runs 150 watts to a dipole. Reception reports are always welcome and are of great assistance in their investigations.

Russian Novices. Desmond Shepherd **G3LCS** (ex-VS1HQ) had a long QSO with UR2BU who stated that in the U.S.S.R. there are two grades of amateur licence. It is very much easier to get a licence to operate on v.h.f. than on the lower frequency bands and, in fact, the v.h.f. licences (which used to be assigned to 38-40 Mc/s) are more or less equivalent to the novice licences in the U.S.A. with the exception that holders are permitted to use 'phone. On September 1 permission was given for these novice operators to use the 28 Mc/s band: with what ghastly results we all know only too well! Let us hope that they will soon learn some of the rudiments of how to modulate a carrier correctly.

28 Mc/s

Really at its peak now, and at weekends almost completely bogged down by QRM, 10m fails to produce the rarer variety of DX still to be found on 15 and 20 while the band is often open to those areas where the rare DX is situated. Even so there has been a lot of very presentable stations heard and worked as the following bears witness.

Norman Miller **G3MVV** (Romford) talked to VQ8AD (16.00, '400), FQ8AT (12.56, '250), ZB2A (15.59, '300), CR6DB (15.17, '340), RN1AA (14.20, '420), RP2ABA (13.58, '350) and VU2NR (14.30, '350), while Alec Gilding **G3KSH** (Kenton) used c.w. for FQ8HA (14.30) and 'phone for OQ5IG and sundry W6 and VE4 stations. Leslie Hill **G8KS** (Farnborough) spoke to CR5SP (14.00, '320) while **G6UT** (Bishop's Stortford) found ZS8I (17.00, '300).

G3AAE had a.m. contacts with YS1IM (17.42, '354), ZS3B (16.25, '286), FB8CG (13.22, '380), VP3MC (18.00, '284), VP1EE (16.55, '304), HH2AR (17.40, '368), FE8AR (14.20, '375), RL7ABI (12.34, '484), W5OXJ/KG6 (10.15, '552), PJ3AB (13.10, '382), VP8BN (17.12, '386), CR9AK (12.18, '186) and sundry RN, RP, RC, RD, RH gentry, while on c.w. VU2BK (11.33, '032), 7G1A (11.58, '056), ET2US (12.08, '080), XZ2TH (12.52, '062), FQ8HA (14.50, '040), FE8AH (14.58, '052) and UL7HA (11.44, '056) were called and worked.

Bill Wilkinson **B.R.S.20317** (Bromley) heard VP2AB (17.55, '275) on 'phone and UL7HB (11.30, '065) RH8ABA (11.20, '060) and OX3RH (13.43, '050) on c.w. Charles Harrington **B.R.S.2292** (Hounslow) reports 'phone signals from CR5SP (14.00), CR7AG (14.00), HK7AB (12.30), HI8GA (14.00), PJ3AB (12.00), RO5AGA (10.00), TI2MS (18.00), VE2AIG/SU (14.00), VQ3HG (12.00), ZD2CKH (12.00) and various 9G1 stations, while on c.w. he located CR7IZ (16.00), EL4A (14.00), FQ8HA (13.00), HH2AR (17.30), OA4FM (12.00), RH8ABA (12.00), VE6AAE/SU (16.00) and OQ5IG (13.00).

21 Mc/s

Suffering slightly perhaps from the increased attractiveness of 28 Mc/s, this band has none the less produced a choice selection of DX stations.

G8KS reports c.w. signals from KW6CGA (10.05, '140), JZ0HA (12.45, '080), UA0GF (10.42, '050) and SP1JN/MM/ZA (probably not counting as Albania unless he had removed the rig ashore, 12.15, '080), while on A3 he found ZC5AF (14.15, '130), VS5GS (15.15, '115), VP8DW (20.00, '110), HV1CN (20.05), VK9RO (11.30, '160), FK8AU (12.10, '240), HS1B (13.46, '190), MP4QAO (16.25, '215), FB8ZZ (16.25, '215), FB8CD Comoro Is. (17.28, '160) and FB8XX (15.05, '140).

A most interesting and welcome report comes from Syd Phillips **G8DL** (Christchurch) who runs the phenomenal power of 7 watts (5763 v.f.o. doubler, 5763 p.a.) to a quad 20 ft. high. On September 12 Syd made W.A.C. with the exception of a European, including the following: ZL1, UA9, XE, W5, EL4, CX, LU. On other days the 7 mighty watts have raised 7G1A, VS9OM, OX3NK, DU2VQ, UA0KUV, UL7GL, FY7YF, LA1NG/P, LA3SG/P and ZD2GWS, etc. In a QSO with K4HRG, which was solid

QTH Corner

CR5AR. Amarillo Ramalho, St. Thomas Island, Portuguese West Africa.
FB8CE. Box 730, Tananarive, Madagascar.
I5GN. Pat Nudson, Post Office Box 16, Mogadiscio.
JT1AB. Box 369, Ulan Bator, Mongolia.
JZ0PC. via R.S.G.B. or G3DYD.
KR6DZ. Okinawa Amateur Radio Club, A.P.O. 331, San Francisco, California, U.S.A.
K7HHH. Richard Caldwell, 1590 West 2320 South, Salt Lake City 4, Utah, U.S.A.
SU1AL. Ahmed Labib, 42 Refat Street, Shobra, Cairo.
TG5HC. P.O. Box 10, Akaque, Guatemala.
VP4WI. via W4ORB.
XW8AI. Marceau Agastin, Box 115, Vientaine, Laos.
YV5EB. P.O. Box 3, Calabozo, Venezuela.
ZS3B. via W0VXO.
9G1CX. via G3ELW.

* * *

R.S.G.B. QSL Bureau: G2MI, Bromley, Kent.

for 65 minutes, the latter was so amazed and impressed with the 7 watt signal from G8DL that he progressively reduced his own power with the following results: 900 watts—RST599, 50 watts—579, 10 watts—569, 1 watt—54/59.

Certainly a most convincing argument against the advocates of higher power and, *ipso facto*, more QRM on our already over cluttered bands.

Frank Hooson **G3YF** (Chingford) found XW8AL (15.45, '130), KA2BW (11.00, '175), UA0LA (10.30, '205), KG6AIH (10.40, '220), FB8ZZ (14.50, '130), VS5GS (15.00, '130), KA9JG (10.50, '120) and VK9BS (10.30, '180) on a.m. while **G3MVV** used the same mode for ZS8O (17.35, '130), UQ2AN (11.00, '145) and MP4DAA (14.43, '165).

Philip Reynolds **A.1930** (Essex), who is 16 years old, reports for the first time. Philip listens on a home-made four-valve superhet, to which he has added an RF24 unit on 21 Mc/s. On this band he logged phone signals from VP2AB (12.00), VE2AIG/SU (11.20), VP3MC (11.05), IS1TDW (15.55), VP4MM (17.00), PX1AC (10.40), KC6JA (16.05), VS1AF (16.46), VU2CQ (17.10), FQ8AF (23.00), ZD2CKH (17.05), VS9AZ (16.27) and DU1AT (15.20). Your receiver certainly works very well Philip.

B.R.S.20317 reports c.w. signals from VS9OM (12.48, '025), VQ8AM (16.00, '060), UN1AH (11.55, '100), and ET2VB (12.00, '050) while **B.R.S.2292** logged c.w. from KR6MD (11.00) and YV5ACP (11.00).

G3AAE used c.w. for contacts with VK9XK (10.44, '024), BV1USB (10.38, '076), KR6JM (10.23, '064) KR6ZT (10.11, '120), ST2AR (08.40, '048), YA1AO (12.18, '100), WG6LV, a novice in Guam (10.30, '152) and VS9OM (12.18, '034).

Incidentally, several correspondents have already asked where the **G6ZO** log was last month, and as there was nothing from him this month either, enquiries were made by telephone: Jim has been making frequent trips to New York and Paris recently and has consequently not been very active on the bands. However, he promises to continue reporting regularly whenever normal operation is resumed.

14 Mc/s

The c.w. operator's paradise lives up to its name and although reports this month are fewer in quantity, the quality remains of the usual high standard.

G3YF reports the following on c.w. FK8AV (08.45, '020), UA0KSA (09.00, '025), FB8ZZ (16.30, '038), KM6BR (10.30, '020), UM8KAA (11.00, '035), UH8KAA (11.05, '040), ZD7SA (00.30, '332), 7G1A (19.00, '055), VP8AI (22.30, '035), MP4TAF (17.30, '082), XZ2TH (17.50, '080), CR5AR (19.45, '025), VP4WD (01.45, '050), LA5AD/P (15.15, '055) and VU2DR (15.25, '050).

G3KSH heard c.w. from VU2SX (15.40, '085), FB8XX (16.20, '045), FB8CE (16.05, '075), ZS3AH (19.40, '020), FQ8NH (20.50), and sundry KL7, VK and ZL stations. **G3AAE** worked VR3X (09.30, '080), VK0RH Wilkes Base (08.00, '060) and VP4WI (01.30, '025) on c.w.

G8KS, also on c.w., located FB8ZZ (16.25, '080), FR7ZD (17.00, '085), OX3DL (17.30, '050), FO8AC (08.30, '095), VK0RT (18.40, '085), VR2DK (09.00, '087), UM8AD (17.30, '090), VK9RH Norfolk Island (08.30, '090), VQ8AF (16.10, '110), 7G1A (20.11, '057), MP4BCS/AP (20.45, '028), F2BC/FC (21.10, '050), ZP5LS (21.15, '070), OR4VW (19.00, '028), FB8CK (17.02, '025), VU2SX (17.05, '023), CR9AH (14.00, '041), AP2BH (14.50, '030), FB8XX (17.30, '042) and VQ8BBB (17.00, '038) while on a.m. he found ZS2MI of Marion Island (17.00, '180) and on s.s.b. SV0WV Rhodes (19.50, '315).

G6UT, now an ardent s.s.b. fan, used that mode to work CR9AH (15.27, '300), SV0WV (16.56, '300), OK7HZ/OD5 (17.35, '300), LA3SG/P Jan Mayen (16.10, '305) and PI1LC/MM (17.20). PI1LC is a Dutch weathership located 400 miles west of Ireland.

A cordial welcome to Peter Tremaine **G8PB** (Cambridge) who reports for the first time. At 22.45 G.M.T. on November 22 Peter listened on 14.025 kc/s and heard VP8AI, OR4RW, VP4WI and LA1NG/P, all trying to work on the same frequency and, in his own words, "causing a fair bit of chaos." He managed to winkle VP4WI and OR4RW out of the confusion, and 10 minutes earlier worked KV4AA on 14.075 kc/s.

From across the Atlantic Ian Turner **VE2BAT** reports the following A3 activity: OX3KW (20.00, '195), VP1WS (01.30, '180), 4S7YL (01.45, '190), VP5RA (01.55, '190), YS1O (02.15, '195), YS1MS (03.55, '200), FP8AP (21.30, '200), TG5HC (13.40, '200) and VP5DX (02.10, '170).

B.R.S.2292 reports CR4AX (19.00), ET2VB (19.00), PJ2AW (19.00), VE2AIG/SU (06.00), while **B.R.S.20317** found UA0BC Dickson Island (19.30, '050), LA3SG/P (17.05, '094), 8J1AA Japanese Antarctica (18.43, '050), 4S7EC (19.40, '050), VK0RT (18.30, '080), XZ2TH (15.20, '010), DU1AJ (15.20, '013), FG7XC (23.50, '005), FM7WP (23.50, '040), FB8XX (16.50, '012), VU2GE (17.00, '061), AP2AC (15.25, '019), ZD1AW (18.45, '050) and VR2DK (08.17, '003) on c.w. with SU1MS (15.10, '300) and CR9AH (15.14, '307) on s.s.b.

A.1930 reports a.m. signals from VP3IG (22.20), VS9OC Oman (22.00), SU1KH (19.00), XE1RE (08.15) and HV1CN (21.00).

7 Mc/s

The sudden welcome upsurge of activity on this band may

Karl Kallemaa, UR2BU, of Tartu, Estonia, with his son Tommy, who hopes to obtain his novice licence during 1960, and his daughter Ulle, a ballet student. UR2BU is well-known on the DX bands and a regular participant in the R.S.G.B. 21/28 Mc/s Telephony Contest.

Empire DX Certificate Holders as at November 30, 1959

No.	Name	Call-sign
	1947	
1	R. G. D. Holmes	G6RH
2	P. Pennell	G2PL*
3	J. M. Kirk	G6ZO
4	A. O. Milne	G2MI*
5	C. G. Allen	G8IG*
	1948	
6	F. A. Robb	GI6TK
7	R. A. Bartlett	G6RB
8	W. R. Joss	G2AJ*
9	H. Caunce	G6KS
10	H. B. Gortz	PA0GN
11	J. R. Letts	G8IL
12	D. A. G. Edwards	G3DO*
13	R. W. Rogers	G6YR
14	H. A. M. Whyte	G6WY
15	L. F. Coursey	G4JZ
16	G. Brown	G5BJ
17	D. Brown	ZL1HY*
18	W. H. Dyson	G8TD
19	L. H. Thomas	G6QB
20	J. Clarricoats	G6CL
21	G. Howard Williams	G3BI
	1949	
22	J. A. Hunt	G2FSR
23	W. T. Pickard	G8KP
24	H. A. G. Shepherd	G8II
25	H. S. Bradley	W2QHH
26	E. S. Cole	G2EC
27	G. F. Cole	VK2DI
28	T. W. Copleston	GW4CX
29	J. Mathis	W3BES
30	S. M. Gambles	G4GI
31	C. Amundsen	LA7Y
32	F. B. Jones	G2AKQ
33	R. L. Glaisher	G6LX
34	K. Hopkinson	G8QX
35	L. F. Viney	G2VD
36	H. Beaumont	G5YV
37	A. C. Simons	G5BD
38	S. Herbert	G3ATU
39	H. Scholz	VK4HR*
	1950	
40	R. Palmer	G5PP*
41	T. Martin	G2LB
42	H. J. Hunt	G5HH
43	D. R. Macadie	GM6MD
44	H. J. Gratton	G6GN
45	I. Hamilton	GM3CSM
46	W. W. W. Peat	GM3AVA*
47	D. A. V. Williams	G3CCO*
48	C. R. Shaffer	W3JKO
49	S. Southgate	G8FF
50	H. W. Green	ZS6CT
51	J. M. Reed	HC2JR*
52	F. Hooson	G3YF
	1951	
53	J. Hunter	G3AZ
54	J. M. Gady	VP9G*
55	H. A. Chenik	ZS6Q*
56	L. Hardie	GM2FHH
57	B. H. Stephenson	G2ZF
58	W. Schreuer	G3DCV
59	W. G. Johnson	G2BJY
60	P. R. Solder	G5FA
61	C. D. Abbott	G6TA*
62	F. Cropper	G6XS
63	T. F. Hall	ZD4AB
64	H. LeDain	GC4LI
65	L. W. Ensor	ZS6BJ
66	A. H. B. Bower	G3COJ
	1952	
67	G. Webster	G5GK
68	R. G. Wilson	W3GHD
69	D. E. Davies	GW3FSP
69a	P. J. Broom	G5DQ
70	D. J. Beattie	G2WW
71	G. A. Bird	G4ZU*
72	B. Case	W5FNA
	1953	
73	P. A. Tremaine	G8PB
74	A. E. J. Cooper	G5VT*
75	J. M. Ivison	G3BKF
76	T. A. St. Johnston	G6UT
77	A. J. Perkins	G6KP
78	J. E. Bazley	G2BOZ
79	J. Bieberman	W3KT
80	F. J. North	VP6CDI
81	R. F. B. Featherstone	VQ4RF*
82	S. R. Baxter	VK4FJ*
	1954	
83	J. M. Ahumada	LU8CW
84	Rev. J. A. Stone	EI4Q
85	B. M. Scudamore	G6BS
86	J. W. Swinnerton	G2YS
87	R. Faessler	HB9EU
88	G. W. D. Brown	GM3DHD*
89	Rev. A. B. Trewin	ZS2AT
90	W. F. Meyer	ZS6DW*
91	A. H. Mason	GM6MS
92	A. Sachs	ZS6BW*
93	A. M. Hix	W8PQQ*
94	C. R. Perks	G4CP
95	E. G. Bright	G3JW
	1955	
96	H. V. Wilkins	G6WN
97	F. H. Cooper	G2QT
98	M. W. Weeks	W6ZZ
99	A. J. Slater	G3FXB
100	J. H. duBois	K2CPR
101	G. L. Brownson	G5CR
102	L. J. McDougall	GM3CIX
103	W. H. McGee	ZL3LR
104	J. Drudge Coates	DL2RO
105	T. Higginson	GW3AHN
106	E. W. Mayer	KP4KD
107	J. B. Castenera (ex- K4ESH)	KP4CC
108	J S. Nicholson	VU2JP
109	J. D. Kay	G3AAE
110	T. E. Wilson	G6VQ
111	J. Mahieu	ON4AU
112	V. G. Mellor	G5MR
	1956	
113	H. Biltcliffe	G5HB
114	J. Drudge-Coates	G2DC
115	G. A. Wafer	VQ2GW
116	D. E. Scarr	G6XX
117	D. L. Courtier-Dutton	G3FPQ
118	E. Neal	G8GP
119	J. N. Walker	G5JU
120	H. L. Wilson	EI2W
121	F. Suter	HB9MQ
122	V. J. Williams	VE3KE
123	D. R. Aston	G8DR
124	F. W. Garnett	G6XL
125	S. L. Hill	G8KS
126	R. F. C. Crowther	G3DOG
127	J. D. Wightman	ZL1AH
128	F. G. Jupe	G3EYN
129	J. Knight	W6YY
130	W. D. Manson	G8PW
131	K. E. Walters	G8FW
	1957	
132	G. F. C. Layzell	G3AMM
133	G. C. Eyre	G8OJ
134	S. E. Fraim	W3AXT
135	R. J. Boal	GI3AXI
136	J. Hunter	G3IMV
137	L. Parker	G5LP
138	E. M. Wagner	G3BID
139	G. Hutson	G6GH
140	S. G. Mercer	G2DPY
141	J. Mann	G3AAM
142	H. Swift	G3ADG
143	F. J. Devenish	VE3ADV
144	J. C. Pershouse	VS2DQ*
145	Rene Dumas	HB9MU
146	E. J. Allaway	G3FKM
147	L. A. Morrow	W1VG
148	R. H. Webb	G6XY
149	F. Robathan	G2CNW
150	F. G. Bail	VK3YS
151	C. Des Portes	W4ANE*
152	R. P. Cole	G6RC
153	J. Orr	G8JO
154	H. Lowe	G2HPF
155	T. A. Maguire	G4TM
156	J. S. Bell	GM3WO
157	S. A. Mann	K2CJN*
158	E. J. Hancock	G3BHW
159	A. N. Ringler	W2SAW
160	N. P. Haskins	G8JR
161	J. M. Heisey	W3MDE
	1958	
162	A. E. Sinclair	GM3EST
163	G. C. Newby	G3EBH
164	L. Hamilton	GM3ITN
165	G. F. Barrett	ZC4IP
166	T. M. Moss	W4HYW
167	E. R. Boothroyd	G3GYH*
168	P. B. Briscombe	G8KU
169	H. F. Lewis	G3GIQ
170	H. J. Lawn	G3HLY
171	F. Bissett	VE3AIU
172	J. Burgess	G3KKP
173	D. Roberts	G3FKH
174	K. T. Whithorn	G3BDS
175	D. E. C. Lockyer	G3HCL
176	T. A. Hurley	EI3R
177	C. J. Morris	G3ABG*
178	J. D. Clement	W6NTR
179	W. W. Simpson	W8KPL
180	D. R. Payne	G3GFG
181	R. Shadlock	G3US
182	F. Johnstone	VS1FJ
183	C. F. Sherrit	GM3EOJ
184	N. L. Carpenter	GW3BNQ
185	F. H. Chambers	G2FYT
186	J. C. van Wyk	ZS6R
187	W. N. Burgess	9K2AZ
188	C. P. Ross	W9ABA
189	A. Brown	G2WQ
190	J. S. Tempest	G3GSZ
191	T. K. Stewart	ZL1RD
	1959	
192	B. King	G3CEG
193	E. D. Wills	ZB2I
194	H. W. Stark	W3CGS
195	W. E. Waring	G3GGS
196	W. W. Jones	G3CSL
197	F. D. Cawley	G2GM
198	Lee R. Scott	W3PGB
199	C. C. Olley	G3AIZ*
200	F. H. Bliss	G3IFB
201	H. A. M. Whyte	VE3BWY
202	C. C. Usher	G2CCD*
203	H. O. Sills	G8QZ
204	R. H. Newland	G3VW
205	V. H. S. Curling	G6VC
206	J. P. Vesper	VK2PV
207	A. E. Dowdeswell	ST2AR
208	J. W. Booth	G2AJB
209	H. Leishman	GM2TW
210	W. J. Vincent	G4OI
211	H. J. Withers	G6XA
212	H. W. McNeill	VO3X
213	P. A. Hobbs	G3LET
214	J. P. Hawker	G3VA
215	L. J. Coupland	G2BQC
216	F. J. King	W7NRB
217	J. Thorpe	G5TO
218	J. B. M. Stewart	GM3EDU

* Denotes Telephony endorsement

Telephony only

	1948	
T1	D. Lamb	GM2UU
T2	E. Robson	VQ4ERR
	1950	
T3	S. W. Bridges	WINWO
T4	K. Wydler	HB9DS
T5	C. Collins	VQ4SC
	1952	
T6	M. H. Carragher	MF2AA
T7	W. J. Prestidge	G2BXP

have some connection with the apparent decrease in the number of reports on the three higher bands, and there is no doubt that the quality of the DX reported this month approaches that reported on ten metres: something which has not happened for quite a few years.

Peter Broome **G5DQ** (Cambridge) is an old hand with the DX and a very welcome first report lists these stations worked on c.w.: VS9OM (19.30), VP7BB/MM Port Said (18.40), PY7SR (20.00), VK3YD (20.00), VK5KK (18.50), UM8KAB (18.37), UJ8KAA (21.48) and VQ4GU (19.10), while **G8PB** worked AP4M (23.00, '010).

G5KT (Bristol) worked KL7CDF, TF3AB, VE3BLU, VO2NA, UA9CM, UB5KBB and had 60 contacts with stations in W1, 2, 3, 4, 5, 8 and 9. G5KT also heard several PY, LU, VK, ZL, TI2, VP4, ZS1 and ZS5 signals.

B.R.S.20317 logged UM8KAB (18.55, '026), 4X4FU (18.55, '025), EA8CU (23.50, '012), PZ1AR (23.48, '038), VK3YD (19.47, '029), PY7SR (20.09), KG4AG (23.35-00.05, '004), CX2TU (23.40, '002), ZL1NG (06.45, '009), OX3RH (20.20, '015), UL7DF (19.00, '016), VK3YD (19.15, '023) and UD6FA (19.22, '033). **B.R.S.22261** (Twickenham) reports UA9CM (21.10), while **B.R.S.2292** found KL7CDF (06.00) VK3AK (06.00) and various LU, PY, W and VE calls.

3·5 Mc/s

This band is given its own section this month as it is quite productive in a modest way, although the reports are mainly of the " heard " variety.

B.R.S.20317 reports UP2AA (19.20, '503), UA6MK (20.15, '507), UA9JY (20.20, '508), UA9CM (21.28, '538), UR2AI (20.40, '522), UQ2AN (21.50, '525), VS9OM (21.20, '501), VO1AE (00.12, '508), UA9MC (18.15, '514) and ZC4LL (20.07, '502). Bill is compiling a call-book of QTHs of rare Russian stations and would be pleased to exchange information with anyone similarly interested.

Alan Stenning **G4JA** (Shrewsbury) worked a station signing PK4LB at 23.40 on November 20 on 3,515 kc/s, and requesting QSLs to be sent c/o V.R.Z.A., Box 190, Groningen, Holland, and not direct to Sumatra. Alan says that signals appeared to be coming from DX but is not too happy about the possible authenticity of the station. G3AAE seems to remember a bogus PK4LB lurking around 14,095 kc/s a few years ago, and this might well be the same pathetic soul. Has anyone any information or theories?

As might be expected, Charles Boegel, Jr. (W0CVU) of Cedar Rapids, Iowa, uses Collins equipment. His receiver is a 75A4 and the transmitter a KWS-1. Telrex wide-spaced beams are used on 10, 15 and 20m. Charles has 150 countries confirmed on two-way s.s.b.

Art Trigell (G3JAF) operates from Lymington in Hampshire. The home-built transmitter uses a pair of 807s with clamp modulation, while the receiver is an HRO modified for 6BA6s in the r.f. stages and preceded by an RF24 Unit on 10 and 15 metres. The aerial is a two-band quad 43 ft. in the air. Art has 182 countries confirmed from 204 worked, WAZ and WAS and is only one confirmation short of EDXC.

Alan also worked UA9CM (00.30) who is quite definitely pukka.

Top Band

Although no trans-Atlantic contacts have been reported yet, quite a few European DX stations have been worked and heard.

Edwin Hodson **A.1491** (Palmers Green) reports that LX1BE appeared on the band for one night only, while UO5AA, YU3GP, ZB1FA and sundry GC, GD, DL, OK and HB stations have been logged. Edwin hears that 5A2CW is active and has worked into " G " while 5A2CV will be QRV very shortly.

G3MGS (Chislehurst) worked HB9T (20.30, '845) and GW3LXI Pembroke; the latter on 'phone. He says that HA5KFR has been worked on c.w. on the band.

B.R.S.20317 logged HB9J (22.25 '827) and various DL stations.

Due to typographical errors the address given for 9M2GA in *QTH Corner* in the September *M.O.T.A.* is that for 9M2GB, while in *Late News* the letter " G " was omitted from Stan Crow's Kenya call-sign which was VQ4SGC. Sorry.

FLASH! Late News

From the West Gulf DX Club's *Bulletin* come several items of last minute news.

Tokelau Islands. Barring unforseen incident W5PQA and VR2DA will put these islands on c.w., a.m. and s.s.b. for a seven day period commencing about December 23. W5PQA is taking a KWM-2 transceiver and Hy-Gain aerial, while the VR2 gang are supplying an 80 watt all-band transmitter and a petrol driven generator. W5PQA will do the talking while VR2DA will do most of the c.w. operation. Frequencies used will be: s.s.b. 14,305, 21,405 and 28,605 kc/s; c.w. 14,040, 21,040 and 28,040. A.m. frequencies will be announced later. Responsible authorities have given assurances that licensing permission will be granted, but the actual call-sign will not be known until shortly before operation commences. A.R.R.L. have been approached about the possible country status of Swain Island, so there is the possibility that W5PQA and VR2DA may appear from there also. If W5PQA is delayed along the line ruling out a December 23 start, the next most likely date for the commencement of operations is January 4. All QSLs should be sent to W7PHO with s.a.s.e. or I.R.C.s.

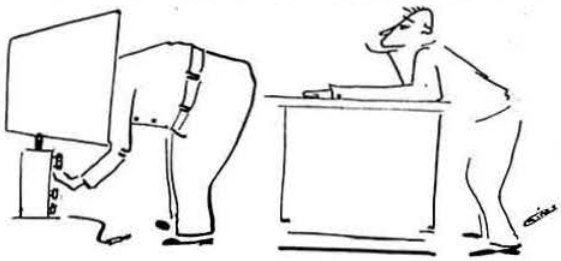
Galapagos Islands. HC1JU has been issued with the call-sign HC8JU, and, leaving Ecuador on December 26, he intends to operate HC9JU/MM during the three day outward voyage. Two operators will work 10, 15 and 20m c.w., a.m. and s.s.b. during the period December 29 to January 10.
St. Margaret Island. VK9XN has been worked on a.m. on 28,235 kc/s and gave his QTH as St. Margaret Island, near Christmas Island, in the Indian Ocean. The operator, who appeared to be English, stated that he was installing cable on the island. There seem to be cause for doubt about the authenticity of this station, whose signals do not peak in the right direction.
Nepal. 9N1GW has been on s.s.b. on 14,300 and 14,320 kc/s. Operating hours are 01.30-06.00 and 12.30-16.00 G.M.T. The operator is Glen Ward (K4KMX) who expects to be in Nepal for the next two or three years. The rig is a Pacemaker and Courier feeding into a three element beam. 9N1FV will be active within a very short while, to be followed later by several other stations. QSL cards for 9N1GW should be sent to Glen Ward, Box 9136, Washington, D.C., U.S.A.
Nicobar Islands. The starting date for VU2ANI has now been put back from December 25 to January 1.

* * *

Well that just about winds up the last of the three week "months" on the air, and from January things revert to normal with the deadline for contributions the 18th of each preceding month. Please do not forget the Commonwealth Competition, the rules for which were outlined last month, but ensure that your entries are postmarked not later than the 17th of each month. All that remains now is to wish you all a very happy Christmas and sincere wishes for continued good DX in 1960.

Physical Society Exhibition 1960

THE annual exhibition arranged by the Physical Society will be held at the Royal Horticultural Society's Old and New Halls, Westminster, London, S.W.1, from January 18 to 22, 1960. The Exhibition will be opened by the President of the Physical Society, Mr. J. A. Rateliffe, C.B.E., M.A., F.R.S., at 11 a.m. on January 18.



AT THE SHOW

A SLOW BACKWARD SCAN AT COLOUR TV

London Meeting
Friday, January 22, 1960
Presidential Address
by W. R. Metcalfe Esq., G3DQ
followed by a lecture entitled
"Radio Aspects of the I.G.Y."
by Dr. R. L. Smith-Rose, C.B.E.
(Immediate Past President)
at the
Institution of Electrical Engineers
Savoy Place, Victoria Embankment
Buffet Tea 6 p.m. Address 6.30 p.m.

GDX skeds in the above directions. G3LTF ends by asking "how about some quick type winter contests to liven up the band a bit during the coming months."

We were very pleased to hear from **G5QA** (Exeter) confirming that he is again on 2m, but, as he says, "with only 40 watts." Herb has had quite a few contacts with the Continent, and with stations in the London, Midlands and North Midland areas. A regular sked is now in operation with GW3ATM near Chepstow (Mon.).

DL3FM reports that conditions have been very poor lately but that G6OX (Egham) is always audible on phone, even in what DL3FM calls "ordinary" tropospheric conditions.

There were a few occasions of good conditions in France during October, notably on October 24, when F9AJ/F3YE (Le Mans) worked F9LD (Lille). **F2DE**, who sent this report, heard both sides of the QSO, but heard nothing from the north.

Seventy Centimetre News

G3LTF (Danbury) has a G3BKQ-type converter, a temporary indoor aerial (7-over-7 slot) and a QQV06/40A p.a. running 60 watts input. The outside aerial will be working soon and G3LTF will then be looking for GDX.

G3HAZ (Northfield, Birmingham 21) thanks heaven for the peaceful acres of 2m and 70cm after a hectic M.A.R.S./Bristol contest on 160! The v.h.f. bands were not quite so lively on that occasion. G3HAZ gets the impression that too many people miss contacts on 70cm due to the fact that signals are too spread out. It is possible to find stations at 432·5 and 436·3 Mc/s which seems rather too much to tune over if one uses a good slow-motion drive or bandspread receiver. Would it not be more logical that northern area people should have one part of the band, southern area another, and EDX another? The sub-bands could be worked out. (A Zone Plan harmonically related to the British Isles 2m Band Plan was agreed on in July 1953.—EDITOR.) G3HAZ says "draw the line where you will" between north and south areas, but at least it would make QSOs more likely from "blind" CQs. Possibly "south" should include London, Essex, Sussex, Surrey, Kent, Hampshire, Dorset, Cornwall, Somerset, Devon, Wilts., Berks., Bucks., Herts. and Middlesex. Suggestions and criticisms are invited.

DL3FM reports that towards the end of October DL3YBA worked DJ3ENA, DL9GU, HB9RG and SM7BAE at distances of 400-600 km. on 420 Mc/s.

Four Metre News

G3LTF (Danbury) has a QQV06/40 p.a. running at 50 watts, which will go on the air as soon as the aerial is up.

1260 Mc/s

Congratulations on the fine efforts in August 1959 which resulted in the reception of F8OL's signals on several occasions at a distance of 160 km. at St. Valéry-en-Caux by F9CH and F8MX. It is hoped soon to report a QSO.

A Happy Christmas to all v.h.f./u.h.f. addicts, and a hope that the New Year will bring more worlds to conquer! Deadline for January: December 18, please.

V.H.F. ACTIVITY NIGHTS
MONDAYS FROM 8 TO 10 ON TWO
WEDNESDAYS FROM 8 TO 10 ON FOUR

See how many stations you can work, and report the results to G2AIW (V.H.F. Manager).

Talking Books and Radio Sets

An account of how Cambridge Radio Amateurs help the Blind

By A. W. Tomalin (B.R.S.22400) *

> " It is with sincere pleasure that we record the grateful thanks, not only of ourselves but of our members, to the two thousand Amateur Radio and sound recording enthusiasts throughout the country who render us such magnificent help in servicing the [talking book] machines. Their generosity in giving so freely of their time and skill not only frequently reduces the period during which a faulty instrument may be out of use, but also relieves the owner of the cost of the necessary repairs." From the report of the Executive Council of the Royal National Institute for the Blind, 1959.

AN appeal was published in the August 1956 issue of the R.S.G.B. BULLETIN inviting local radio societies to help with the maintenance of the " Talking Books " used by blind people. The " Talking Book " consists of a record player having speeds of 24 and 33 r.p.m., giving a playing time of about one hour. The records are readings of various books made, in most cases, by B.B.C. announcers and are supplied by post from the Nuffield Talking Book Library. The amplifier is conventional; two stages plus valve rectifier.

The BULLETIN appeal stimulated Mr. F. A. E. Porter (ex-2CDX) who was then Hon. Secretary of the Cambridge & District Amateur Radio Society to respond. He invited club members to join him in operating a comprehensive scheme which would cover Cambridgeshire and later part of the Isle of Ely. Mr. Porter has ever since remained responsible for co-ordinating this side of the Club's activities on behalf of the blind.

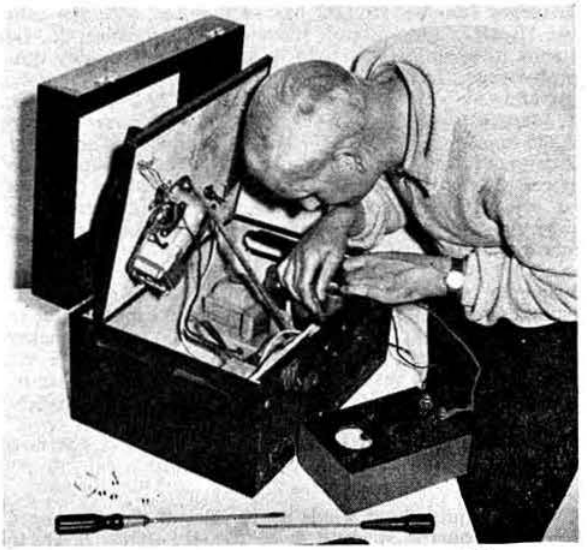
The original idea was that each sightless person in possession of a " Talking Book " should have a club member assigned to him who would look after the equipment. This has not been possible in practice because many of the " Talking Books " are located in parts of the county in which members are not resident. In the larger towns the problem of transport and distance is naturally rather less.

Generally, remarkably little trouble has been experienced with the machines but when a fault *does* develop speedy service is essential because of the sense of loss experienced by the blind person. So far it has not been possible to point to any one component as being persistently faulty.

Over the three years that local members have been providing a maintenance service about six visits per annum have been made. This has usually entailed the removal of the machine for servicing. In some cases preventative maintenance has been possible as club members call regularly in an endeavour to spot incipient trouble.

After the scheme had been running for some time it was found that the local society for the blind was in difficulties over the servicing of radio receivers provided by the " Wireless for the Blind Fund," of which there are about 250 in Cambridgeshire. The club thereupon offered, on a trial basis, to undertake maintenance of these sets. It was quickly found that once the backlog of defective sets had been dealt with, club members were able to give prompt and effective service.

* *6 Winders Lane, Histon, Cambs.*



F. A. E. Porter (B.R.S.15091) at work on a " talking book" instrument.
(Photo by John Carter, Cambridge.)

As a matter of expediency it has been found desirable for most of the repair work to be carried out in the shack of one member (A.W.T.) to facilitate provision and storage of spares. The necessary test gear used for maintenance is that to be found in most amateur stations, i.e. multirange meter and a.f./r.f. test oscillator. It often helps if various small items can be made especially for the particular sets handled.

From the inception of the scheme records have been kept and these have provided considerable information on the most prevalent types of fault. It was found that the spares requirement could be predicted with considerable accuracy, leading to economy. Spare components are obtained through the local society for the blind.

The Wireless for the Blind Fund provides both battery and mains receivers, a.m. and f.m. plus a.m.

Table I (taken from the records for 1957 and 1958) lists the receivers by type together with total component replacements. From the start it was realized that it would be false economy to repair to anything but the highest standards of which members were capable and so it has been a case of " if in reasonable doubt—replace it."

Receiver Model A is a long/medium wave set having provision for three pre-set stations. Model B is a v.h.f./medium-wave type, while Models C, D and E are all-dry

TABLE I

Fault	1957					1958					Totals	
	A	B	C	D	E	A	B	C	D	E	1957	1958
Valves	6	0	7	3	2	13	5	16	2	2	18	38
Volume Controls	7	0	0	0	0	10	1	1	3	0	7	15
Miscellaneous ...	13	1	2	2	0	17	7	5	2	4	18	35
No. of sets inspected ...	20	1	5	7	1	21	8	10	8	4	34	51

battery portables, of which Model C is the oldest and Model E the latest, being only about two years old.

It will be seen from the Table that defective valves have been the largest single cause of trouble, mostly due to age. This is probably accounted for by the fact that blind people tend to listen to radio more than sighted persons. The second

(*Continued on page 275*)

Society News

Society Trophies and Premiums

THE Council has made the following awards for 1959:

ROTAB Cup: Mr. J. A. Mann (G3AAM) in recognition of his consistent DX work over a period of many years.

Courtenay Price Trophy: Mr. H. F. Smith (G2DD) for outstanding technical development especially in connection with miniaturized v.h.f. and u.h.f. equipment.

Founder's Trophy: Mr. C. E. Newton (G2FKZ) in recognition of his dintinguished services to the Society in connection with the I.G.Y.

Calcutta Key: Mr. F. G. Lambeth (G2AIW) in recognition of his outstanding services to the cause of international friendship through the medium of Amateur Radio.

Ostermeyer Trophy: Messrs. P. J. H. Matthews (G3BPM) and H. T. Rogers (G3NHR) for their description of a " Versatile V.F.O./Transmitter " published in the June 1959 issue of the R.S.G.B. BULLETIN.

Bevan Swift Memorial Premium: Messrs. R. C. Hills (G3HRH) and P. M. Elton (G3GOZ) for their description of " A Cubical Quad Array for the 144 Mc/s Band " published in the April 1959 issue of the R.S.G.B. BULLETIN.

Norman Keith Adams Prize: Mr. C. F. Hubbard (G5OX) for his description of " A 72 Mc/s V.F.O. for 144 Mc/s Drive" published in the September 1958 issue of the R.S.G.B. BULLETIN.

B.E.R.U. Senior Rose Bowl: Mr. James T. Hepburn (VE7KX) winner of the High Power Section of the B.E.R.U. Contest 1959.

B.E.R.U. Junior Rose Bowl: Mr. Jac C. van Wyk (ZS6R) winner of the Low Power Section of the B.E.R.U. Contest 1959.

B.E.R.U. Receiving Rose Bowl: Mr. Frank Johnstone (G3IDC/4S7) winner of the Receiving Section of the B.E.R.U. Contest 1959.

Col. Thomas B.E.R.U. Rose Bowl: Mr. P. J. Broom (G5DQ) leading U.K. entrant in the High Power Section of the B.E.R.U. Contest 1959.

1950 Council: Mr. E. L. Mollart (B.R.S. 10977) winner of the D/F National Final 1959.

Edgware: Stourbridge and District Amateur Radio Society, winners of the Affiliated Societies' Contest 1959.

Houston Fergus: Mr. D. G. Alexander (G3KLH/P), winner of the Low Power Field Day 1959.

Braaten: Mr. C. R. Perks (G4CP), leading English R.S.G.B. member station in the 1959 A.R.R.L. DX Telegraphy Content.

Milne: Mr. R. Jones (GW3JI), leading U.K. R.S.G.B. member station (other than English) in the 1959 A.R.R.L. DX Telegraphy Contest.

Whitworth: Mr. D. A. G. Edwards (G3DO), winner of the R.S.G.B. 21/28 Mc/s Telephony Contest 1958.

Metcalfe: Mr. R. B. I. Rutherford (A. 1495) who submitted the best check log from a non-licensed British Isles member for the R.S.G.B. 21/28 Mc/s Telephony Contest 1958.

Maitland: Mr. W. G. Cecil (GM3KHH), the Scottish entrant having the highest aggregate score in the Second 1·8 Mc/s Contest 1958 and the First 1·8 Mc/s Contest 1959.

European V.H.F.: Mr. N. H. Hales (G2DTO/P) winner of the National 144 Mc/s Open Contest 1959.

1930 Committee: Mr. I. T. Cashmore (G3BMY), winner of the Low Power Contest 1959.

N.F.D. Shield and Miniature Replica: Gravesend Amateur Radio Society.

N.F.D. Shield Miniature Replicas: Stourbridge and District Group (1·8 Mc/s); Chelmsford Group (3·5 Mc/s); Gravesend Amateur Radio Society (7 Mc/s); Wirral Radio Society (14 Mc/s); Stamford and District Group (21 Mc/s); Croydon Group (28 Mc/s).

Scottish N.F.D. Trophy: Aberdeen Town Group.

Bristol N.F.D. Trophy: Brentwood Group.

Somerset Trophy: Mr. W. H. Wells (G3HVX), winner of the First 1·8 Mc/s Contest 1959.

Mitchell-Milling: Mr. N. H. R. Munday (G5MA), winner of the 144 Mc/s Open Contest 1959.

Miniatures

First 144 Mc/s Field Day 1959: Midland Amateur Radio Society (G3MAR/P).

Second 144 Mc/s Field Day 1959: Mr. R. C. Taylor (GW2HCJ/M), winner of both the Portable and Mobile Sections of the Second 144 Mc/s Field Day 1959.

Second 1·8 Mc/s Contest 1958: I. T. Cashmore, G3BMY, W. W. Wells, G3HVX, W. R. Stevenson, G3JEQ. (The Victor Desmond Trophy has been engraved with the above names but held at Headquarters.)

420 Mc/s Contest 1959: Mr. G. A. Jeapes (G2XV).

The R.S.G.B. Amateur Radio Handbook

THE Council have appointed Mr. J. P. Hawker (G3VA) General Editor of *The Amateur Radio Handbook* in succession to Mr. S. K. Lewer, B.Sc. (G6LJ). Mr. Hawker edited the current edition of *A Guide to Amateur Radio*. He was for several years Assistant Editor of the R.S.G.B. BULLETIN.

Enquiries Regarding Bulletin Articles

MEMBERS who write to the authors of BULLETIN articles are asked to enclose stamped addressed envelopes if they require replies.

The President, Council and Headquarters Staff

send Christmas and New Year Greetings to all

Members of the Society

Representation 1960-61

THE Corporate Members listed below have been duly elected to serve, in the offices indicated, as from January 1, 1960.

Regional Representatives

Region	Name, Call-sign and Address
1	*B. O'Brien (G2AMV), 1 Waterpark Road, Prenton, Birkenhead, Cheshire.
2	*J. R. Petty (G4JW), 580 Redmires Road, Sheffield 10, Yorks.
3	*W. A. Higgins (G8GF), 28 Kingsley Road, Kingswinford, Nr. Brierley Hill, Staffordshire.
4	F. C. Ward (G2CVV), 5 Uplands Avenue, Littleover, Derby, Derbyshire.
5	*T. A. T. Davies (G2ALL), Meadow Side, Comberton, Cambridge.
6	*L. W. Lewis (G8ML), 117 Fairview Road, Cheltenham, Gloucestershire.
7	*F. G. Lambeth (G2AIW), 21 Bridge Way, Whitton, Twickenham, Middlesex.
8	Office vacant from January 1, 1960. No nomination received.
9	*R. E. Griffin (G5UH), 13 Alexandra Road, Uplands, Bristol 3.
10	*C. H. Parsons (GW8NP), 90 Maesycoed Road, Heath, Cardiff, Glamorganshire.
11	*F. G. Southworth (GW2CCU), "Samlesbury," Bagillt Road, Holywell, Flintshire.
12	*A. G. Anderson (GM3BCL), Helford, Pitfodels, Aberdeen.
13	*G. P. Millar (GM3UM), 8 Plewlands Gardens, Edinburgh 10.
14	*D. R. Macadie (GM6MD), 154 Kingsacre Road, Glasgow S.4.
15	*J. William Douglas (GI3IWD), 54 Kingsway Park, Cherryvalley, Belfast.
16	*H. H. Lowe (G2HPF), "Akabo," Main Road, Boreham, Chelmsford, Essex.
17	*M. P. Nicholson (G2MN), 80 South Leigh Road, Warblington, Havant, Hants.

* *Nominated by the 1959 Council.*

Town or Area Representatives

Region	Town or Area	Name, Call-sign (or B.R.S.) and Address
1	**Lancashire West**	
	Blackpool	H. G. Newland (G5ND), 161 Penrose Avenue, Blackpool.
	Crosby	F. W. Clasby (G3KFC), 78 Selby Road, Orrell Park, Liverpool 9.
	Southport and Formby	N. Horrocks (G2CUZ), 34 Sandbrook Road, Ainsdale, Southport.
2	**Co. Durham**	
	Darlington	F. Burns (G3ABK), 48 Stooperdale Avenue, Cockerton.
	Yorkshire North	
	Middlesbrough ..	Brian B. Wilson (G3LYG), 18 Holdenby Drive, Park End.
	Yorkshire West	
	Barnsley	C. T. Malkin (G5IV), 5 Whitehill Terrace.
4	**Derbyshire**	
	Derby	J. Anthony (G3KQF), 56 Sherwood Street.
	Leicestershire	
	Melton Mowbray ..	S. Clark (G8CZ), 125 Thorpe Road.
	Lincolnshire	
	Boston	L. J. Coupland (G2BQC), Watsons Bridge, Stickney.
	Lincoln	G. C. Newby (G3EBH), "St. Minver," Sudbrooke Lane, Nettleham.
	Northamptonshire	
	Peterborough ..	D. Byrne (G3KPO), Jersey House, Eye.
	Nottinghamshire	
	Mansfield	A. W. Fowler (G3FR), Cavendish House, Skegby Road, Sutton-in-Ashfield.
	Newark	W. A. G. Davidson (G3EVG), 4 Orston Avenue.
	Nottingham	A. Davis (G3LXL), 76 Wendover Drive, Aspley.
	Retford and Worksop	E. Prince (G3KPU), 12 Lidget Lane, Retford.
5	**Bedfordshire**	
	Shefford	G. R. Cobb (G3IXG), Western House, Ampthill Road.
	Hertfordshire	
	Stevenage and District	C. Kenny (G3LJK), 290 Chertsey Rise, Stevenage.
6	**Buckinghamshire**	
	High Wycombe ..	P. M. Carment (G5WW), Nethercote, Totteridge Lane.
	Gloucestershire	
	Cheltenham	J. J. Yeend (G3CGD), 30 St. Luke's Road.
	Stroud	A. A. H. Sparrow (G3EKD), Janarth, Farmhill.
7	**London North**	
	Enfield Area	J. R. Gazeley (B.R.S.20533), 192 Haselbury Road, Edmonton, London, N.9.
	Southgate and District	W. A. J. Smith (G3MXQ), 57 Oakwood Crescent, Winchmore Hill, N.21.
	Welwyn Garden City	J. H. Hum (G5UM), "Wyldes," Bulls Green, Nr. Knebworth, Herts.
	London South	
	Croydon Area ..	R. A. Hislop (B.R.S.20162), 40 Benhurst Gardens, Selsdon, Surrey.
	Mitcham	D. Johnston (G3NFA), 59 Acre Lane, Carshalton, Surrey.
	London South-West	
	Kingston Area ..	D. White (G3JKA), 31 St. James Road, Kingston-on-Thames, Surrey.
	London West	
	Acton, Brentford and Chiswick	R. P. Cole (G6RC), 18 Chatsworth Road, Chiswick, W.4.
	London East	
	Brentwood	R. A. E. Fronius (G3MCW), 168 Coxtie Green Road, Brentwood, Essex.
	Ilford	F. Ruth (G2BRH), 579 High Road.
	Romford	N. Miller (G3MVV), 55 Kingston Road.
8	**Kent**	
	Medway Towns ..	W. Althorp (G2CBA), 85 Copperfield Road, Rochester.
	Thanet Area	J. P. Barnes (G3BKT), 18 Grange Road, Ramsgate.
	Sussex	
	Brighton and District	F. R. Jupp (G2FAD), 55 Brading Road, Brighton 7.
9	**Bristol**	
	Bristol	C. N. Chapman (G2HDR), "Yeovil," Stoke Hill, Bristol 9.
	Devonshire	
	Exeter	P. M. E. Pavey (G3NFT), 45 Mincing Lake Road, Stoke Hill.
	Somerset	
	Bath	J. W. Russell (G2ZR), 45 Shakespeare Avenue.
	Weston - super - Mare Area	N. E. Ashman (G3FIT), "Tolpenin" Westaway Park, Yatton, Bristol.
10	**Glamorganshire**	
	Cardiff	T. J. Brook (GW3GHC), 32 Elgar Crescent, Llanrumney.
	Penarth	F. Hattemore (B.R.S.21476), 20 Baroness Place.
	Port Talbot and District	G. E. Evans (GW2AVV), "Springfield," Penycae Road, Port Talbot.
12	**Aberdeenshire**	
	Aberdeen	Geo. Jamieson (GM3HTL), 93 Craigton Road.
13	**Midlothians**	
	Edinburgh	Colin W. Davidson, B.Sc. (GM3LAV), 9 Wilfred Terrace, Edinburgh 8.
	North, East, and Central Fife	Dr. Randolph Webster (GM3MOR), "Meric," Woodmuir Terrace, West Newport-on-Tay, Fife.

15	Belfast	J. T. McMillan (GI3JXS), 32 The Green, Dunmurry, Co. Antrim.
16	Norfolk Great Yarmouth ..	D. Hare (G3NHV), *Aux. Ketch* "*Polaris*," Fishers Quay.
17	Hampshire Portsmouth	A. C. Cake (G3CNO), 7 Wheatstone Road, Southsea.
	Southampton ..	E. R. L. Bassett (B.R.S.16075), 42 Norham Avenue, Shirley.

Affiliated Society Representatives

THE following Corporate Members of the R.S.G.B. have been nominated and elected as Affiliated Society Representatives for the year 1960.

Ainsdale Radio Club: R. J. Woodroffe (G2DQX), 72 Burnley Road, Ainsdale, Southport, Lancs.
Aberdeen Amateur Radio Society (GM3BSQ): I. C. Sinclair (GM3ICS), 46 Braeside Terrace, Aberdeen.
Acton, Brentford & Chiswick Radio Club (G3IIU): W. G. Dyer (G3GEH), 188 Gunnersbury Avenue, Acton, London, W.3.
Clifton Amateur Radio Society (G3GHN): C. H. Bullivant (G3DIC), 25 St. Fillans Road, Catford, London, S.E.6.
Derby & District Amateur Radio Society (G3ERD): B. J. C. Brown (G3JFD), 196 Abbey Street, Derby.
Derby Short Wave Experimental Society (G3EEO): J. Anthony (G3KQF), 56 Sherwood Street, Derby.
Kingston & District Amateur Radio Society: D. White (G3JKA), 31 St. James Road, Kingston-upon-Thames, Surrey.
Portsmouth & District Radio Society (G3DIT): T. R. Mortimer (G3JZV), 26 Hampshire Terrace, Southsea.
R.A.F. Amateur Radio Society (G8FC): Sgt. K. Smethurst (G3GPE), R.A.F. Locking, Nr. Weston-super-Mare, Som.
Reigate Amateur Transmitting Society: K. J. Wheatley (G3BBR), 2 Hazel Road, Reigate, Surrey.
Slade Radio Society (G3JBN): N. B. Simmonds (B.R.S.21873), 5 Bowling Green Road, Stourbridge, Worcs.
South Manchester Radio Club (G3FVA), C. M. Denny (G6DN), 18 Willoughby Avenue, Didsbury, Manchester.
South Shields & District Amateur Radio Club: D. Forster (G3KZZ), 41 Marlborough Street, South Shields.
Stourbridge & District Amateur Radio Society: F. A. Bills (G3CLG), 48 Church Avenue, Vicarage Road, Amblecote, Nr. Stourbridge, Worcs.
Wolverhampton Amateur Radio Society (G8TA), R. W. Tomkys (G3NOW), 30 Church Road, Bradmore, Wolverhampton, Staffs.
Yeovil Amateur Radio Club (G3CMH): B. J. Clark (G3BEC), 107 Eastland Road, Yeovil, Som.

R.S.G.B. QSL Bureau G3/G4/G5 Sub-Manager

FOR business reasons, Peter Jones (G3ESY) is having to relinquish the duties of QSL Sub-Manager for the G4, G5 and G3 two letter series. With effect from January 1, 1960, E. G. Allen (G3DRN), 65a Melbury Gardens, London, S.W.20, will be responsible for the dispatch of QSL cards to members with call-signs in these groups.

R.S.G.B. Letter Headings for Members' Correspondence

THE Society has recently introduced a slightly smaller type of letter heading for use by members. The new design measures 8 × 5 in. and is available from Headquarters in packets of 100 sheets, price 6/-, post free.

New Members

IN the list of New Members published in the September 1959 issue of the R.S.G.B. Bulletin, the call-sign of Mr. C. Whelan of 14 Llandinam Crescent, Gabalfa, Cardiff, should have read GW3NJW. The call-sign G3NKW is held by Mr. H. White of 23 Edale Grove, Sale, Cheshire.

Talking Books and Radio Sets (continued from page 272)

main cause of trouble has been due to defective volume controls, which usually become noisy. The mains sets have plastic cases which are a liability if the set is dropped but the advantage of being able to scrub the cases in the sink when necessary outweighs this disadvantage. The incidence of minor faults in 1958 is largely due to rather protracted teething troubles associated with the introduction of a new type of set i.e. Model B.

The defects listed under " Miscellaneous " include broken cases, short circuits in the wiring and defective small components.

The advantage of having only a limited number of set types to deal with is very great. Experience has enabled the average repair time for one set to be brought down to 20-30 minutes. Model C is notable for the high valve replacement rate, due principally to the fact that the valves used have a marked tendency to microphony.

The introduction of Model B, with its v.h.f. range, brought with it the problem of providing aerials. An internal aerial is supplied with the set but is non-effective in Cambridgeshire, which is almost equidistant from either Wrotham or Norwich. In most cases a picture rail dipole, made from opened-out twin feeder, proved sufficient but in some cases an external two-element array had to be provided. Some trouble with second-channel interference from local business radio in the 70-80 Mc/s band has been experienced. In these cases, traps in the aerial feeder, kindly provided by the set manufacturer, have usually alleviated the trouble.

In conclusion it can be said that this is a worthwhile activity which is appreciated both by those concerned with the welfare of blind people and by the blind themselves. The Cambridge group would like to acknowledge the help of the set manufacturers in providing technical manuals and advice, and to thank the Royal National Institute for the Blind, for their prompt attention to requests for help. The writer would be glad to hear from any other radio club operating a similar scheme.

" Technical Topics "

IN Fig. 3 on page 208 of the November Bulletin, L3 and L4 were inadvertently transposed. The smaller inductance coil should of course be connected across the outer ends of the split stator capacitor and the larger across the top half. Thanks to G2ZP for drawing attention to this.

Silent Keys

JAMES LAMB (GM4TL)

It is with deep regret that we record the passing of Mr. James Lamb (GM4TL). The holder of an A.A. licence before the 1939-45 war he was a keen u.h.f. enthusiast and did a good deal of experimenting with 420 Mc/s gear.

He was a member of the R.S.G.B. and of the Aberdeen Amateur Radio Society and was liked and respected by all who knew him.

Our sympathies are extended to Mrs. Lamb and her son Bruce in their sad loss. G. M. J.

PATRICK H. CHAPMAN (G3GCC)

We regret to report the death of Mr. P. H. Chapman (G3GCC) at the age of 53 years, only 14 months after the death of his wife. " Pat " was a member of the Great Yarmouth Radio Club, and maintained his interest in radio from the early days. His cheerful voice will be greatly missed on the air.

Sympathies are extended to his family. A. D. B.

Rules for National Field Day 1960

RULES for N.F.D. 1960 are practically the same as for the 1959 event, the only change being to scoring on 1·8 and 3·5 Mc/s. Details are given in Rule 17.

1. **Duration.** The Contest will commence at 17.00 G.M.T. on Saturday, June 11 and end at 17.00 G.M.T. on Sunday, June 12, 1960.

2. **Eligible Entrants.** Any group of members within the British Isles, which for the purposes of the contest comprise the prefix zones G, GC, GD, GI, GM and GW, may enter. The group may be a local R.S.G.B. group, a club or an Affiliated Society.

3. **Operators.** Operators of portable stations competing in the contest must each hold a current British Isles (G.P.O.) Amateur (Sound) Licence and must be fully paid-up Corporate Members of the Society at the time of the contest.

4. **Stations.** Each competing group will be permitted to place two stations ("A" and " B ") in operation. "A" stations must select any three of the six frequency bands in use in the contest (1·8, 3·5, 7, 14, 21 and 28 Mc/s); the other three frequency bands will be allocated to the " B " station, i.e., no group may operate two stations on any one frequency band. Both stations may operate from the same site or from different sites, provided that they are located within the agreed limits of the area covered by their Regional Representative. It will be permissible for two groups within a single region, each operating a single station, to amalgamate for the purpose of scoring; if this is done, frequency bands must be allocated between the two stations as detailed above. Single-station entries will be accepted from stations operating on not more than three of the frequency bands listed above.

5. **Licences.** Each station must be licensed to use a different call-sign.

6. **Applications.** Each group intending to compete must notify the R.S.G.B. Contests Committee, New Ruskin House, Little Russell Street, London, W.C.1, of the name of the group, location and the name and full postal address (in **BLOCK LETTERS** please) of the T.R., A.R., A.S.R., or member responsible for their entry, not later than **MONDAY, MAY 2, 1960.** Stationery and the latest information on the contest will be sent to this member.

Details should be set out as follows:

Call-sign station "A"..... Call-sign station " B "..... The bands to be used by these stations are:

Band	1·8 Mc/s	3·5 Mc/s	7 Mc/s	14 Mc/s	21 Mc/s	28 Mc/s
Call-sign						

7. **Tents.** Stations must be operated from tents.

8. **Apparatus.** No apparatus may be erected on the site prior to 12.00 G.M.T. on June 11, 1960. This rule includes aerials and aerial fittings as well as tented accommodations for the stations, but does not apply to a tent to be used for storage purposes.

9. **Aerials.** Any aerials may be used, subject to the following limitations:
   (*a*) All aerials must be constructed from wire of total cross-sectional area not greater than 14 s.w.g. with the exception, however, that masts may be used as vertical radiators.
   (*b*) No part of the aerials shall exceed a height of 45 ft. above ground level.

10. **Transmitters and Receivers.** Equipment at any "A" or " B " station must not exceed three transmitters and one receiver. Reserve equipment may be kept available, but not connected.

11. **Power Input.** Total d.c. input power to the anode circuit of the valve or valves energizing the aerial, or to any previous stage of the transmitter, shall not exceed 10 watts.

12. **Power Supply.** Power for any part of the station shall not be derived from supply mains.

13. **Type of Emission.** The contest is restricted to the use of c.w. (A1) only.

14. **Contest Exchanges.** An exchange of reports must be made and acknowledged before points may be claimed. In contacts made between competing stations the report must include a rising serial number commencing with 001 and increasing by one with each successive contact, irrespective of band, made by the station (e.g., RST579001, etc.), and such serial numbers, both incoming and outgoing, together with signal reports, must be entered on the log sheets. Proof of contacts may be required.

15. **Contacts.** Only one contact with each specific station, whether fixed, portable or mobile, may count for points on each band during the contest. Duplicate contacts should be logged without claim for points.

16. **Group Contacts.** Points must not be claimed for contacts made by a competing station with other stations within its own town or area or with members of its own group, whether fixed, portable or mobile.

17. **Scoring.** Points will be scored on the following basis:

(*a*) Fixed stations in the British Isles	1 point
(*b*) Fixed stations in the rest of Europe including Eire	2 points
(*c*) Fixed stations outside Europe	3 points
(*d*) Fixed station in the British Commonwealth and Empire	6 points
(*e*) Portable and mobile stations in the British Isles	*3 points
(*f*) Portable and mobile stations in the rest of Europe including Eire	4 points
(*g*) Portable and mobile stations outside Europe	6 points
(*h*) Portable and mobile stations in the British Commonwealth and Empire	12 points

* An additional 2 points may be claimed **on 1·8 Mc/s and 3·5 Mc/s ONLY** for contacts with a portable or mobile station in any other British Isles prefix zone (e.g., GM-G, GM-GD, G-GI, GW-GC contacts on 1·8 and 3·5 Mc/s score 5 points). The six British Isles prefix zones are listed in Rule 2.

18. **Summary Sheets.** An entry will be accepted as valid only if the completed summary sheet has been signed by the T.R., A.R., A.S.R., or member whose name has been notified to the Contests Committee in accordance with Rule 6, who will be solely responsible for the conduct of the event within his group, however constituted.

19. **Operators' Signatures.** Contacts made by an operator whose personal signature does not appear on the cover sheet(s) of the appropriate log(s) may be disallowed.

20. **Entries.** Each station's entry shall consist of extracts from the station log on the printed log sheet, a separate extract being submitted for each band worked, together with a cover sheet for each band, and a summary sheet. Forms for this purpose will be supplied by Headquarters. Entries must be addressed to the R.S.G.B. Contests Committee, New Ruskin House, Little Russell Street, London, W.C.1, **postmarked not later then June 27, 1960. LOGS MUST BE KEPT AND ENTRIES SUBMITTED IN G.M.T.**

21. In addition to the ***National Field Day Trophy*** and miniature replica, which will be awarded to the group obtaining the highest combined score, **miniature replicas** will be awarded to the groups with the highest score on each frequency band.

22. **A certificate** will be awarded to each of the following:
   (*a*) The chief operator of the overseas station whose check log shows that he contributed the most points to competitors.
   (*b*) The chief operator of the British Isles station whose check log shows that he contributed most points to competitors.
   (*c*) The non-transmitting British Isles member whose check log is adjudged the most useful by the Contests Committee.

23. The ***Scottish N.F.D. Trophy*** (together with miniature) will be awarded to the Scottish group scoring the highest number of points.

24. The ***Bristol Trophy*** will be awarded to the group which, having entered only one station, shall obtain the highest number of points in comparison with other groups entering on a similar basis.

25. The Trophies will be handed to the representatives of the groups concerned, who will be responsible for their safe keeping until their return is requested by R.S.G.B. Headquarters.

144 Mc/s C.W. Contest, 1960

RULES for the 144 Mc/s C.W. Contest to be held on January 31, 1960, are the same as for the first event of this type with the exception that the system of scoring has been simplified by adopting that used in the 144 Mc/s Open Contest. This method has already proved popular with members.

When: 10.00 G.M.T. to 22.00 G.M.T. on Sunday, January 31, 1960.

Sections: (*a*) Low Power (up to 30 watts input to the p.a. stage); (*b*) High Power (up to 150 watts input to the p.a. stage).

Eligible Entrants: All fully paid-up members of the R.S.G.B. resident in Europe.

Contacts: May be made on A1 only.

Scoring: For each completed contact within the United Kingdom 10 points may be claimed; in addition a bonus of 25 points may be claimed for the first contact in each new county in accordance with the list on page 451 of the March 1959 issue of the R.S.G.B. *Bulletin*. The whole of the London Postal Districts will count as one county only. For contacts outside the United Kingdom, a flat rate of 25 points for each completed contact may be claimed.

Contest Exchanges: RST reports followed by the band identification letter A, the contact number and location (e.g. RST559A001 5NE Luton).

Logs: (*a*) Must be tabulated in columns headed (in this order) " Date/Time (G.M.T.)," " Call-sign of Station Contacted," " My Report on His Signals and Serial Number Sent," " His Report on My Signals and Serial Number Received," " Location of Station Contacted," " Points Claimed."

(*b*) The cover sheet must be made out in accordance with R.S.G.B. Contests Rule 5 and the declaration signed.

(*c*) Entries must be postmarked not later than Monday, **February 8, 1960.**

Awards: At the discretion of the Council of the R.S.G.B., certificates of merit will be awarded to the leading station in each section.

The General Rules for R.S.G.B. Contests published on page 348 of the January 1959 issue of the R.S.G.B. *Bulletin* apply to this contest.

CONTEST NEWS

RESULTS — REPORTS — RULES

144 Mc/s Open Contest 1959

ALTHOUGH conditions were generally reported to be poor, the 144 Mc/s Open Contest held on March 7-8, 1959, was well supported. There was little c.w. activity and only three continentals were worked—PA0LQ (by G5YV), F8NS (by G2DTO/P) and F3LP (by G2DUS/M, G3FD and G4DC).

The accuracy of log keeping was extremely good. No adverse comments on the contest were made by the first 10 contestants but G2XV, in eleventh position, said conditions were bad, the weather was bad and the time of year was bad—he suggested the event would be better supported in July. G2XV commented favourably on the new log sheets.

The contest was won by N. H. R. Munday (G5MR) with N. H. Hales (G2DTO/P) in second place. The best check log was submitted by Richard Winters (B.R.S.20133).

Posn.	Call-sign	Points	Posn.	Call-sign	Points
1	G5MA	1,725	17	G3MNR/A	935
2	G2DTO/P	1,610	18	G3DVV	900
3	G4DC	1,580	*	G3IRA	855
4	G5YV	1,425	19	G2MR	850
5	G3GHI	1,405	20	G3MLS	785
6	G3LAR	1,245	21	G5DW	770
7	G5DS	1,180	22	G3CO	750
8	G3MPS	1,175	23	G3MHD	675
	G3HCU	1,175	24	G6SC	670
10	G2DUS/M	1,135	25	G3FIH	640
11	G2XV	1,045	26	G3NGS	610
12	G3FD	1,040	27	G3JZW/P	340
13	G3MEV	1,020	28	GW3MFY	320
	G3JZG	1,020	29	G3IBI	310
15	G3JYT	1,010	30	G8VN	300
16	G3LCH/A	980		* Late entry.	

(It is regretted that due to an oversight the above report was not published earlier.—EDITOR.)

National 144 Mc/s Open Contest 1959

THE results of the National 144 Mc/s Open Contest held on September 5-6, 1959, were as follows:

Posn.	Call-sign	Points	Posn.	Call-sign	Points
1	G2DTO/P	30,805	13	GM3HLH/A	9,150
2	GW3KMT/P	23,654	14	G3EGK	7,248
3	G5YV	21,980	15	G5DW	6,661
4	G3MED	20,988	16	G3BDQ	6,505
5	G3HBW	19,622	17	GM3EGW	6,050
6	G3LTF	17,364	18	GM2FXN	4,367
7	GW2FVZ	16,781	19	G5MR	4,116
8	G3FAN	15,409	20	G3HWR	2,496
9	G3FZL	13,513	21	G3AYC	2,155
10	G3ION/P	11,737	22	G3LTN	614
11	G6GN	9,686	23	G3JKY	275
12	G6LI	9,251			

Check logs from G2AIW, GC2FZC, G3ICO, G4LX and B.R.S.20133 are gratefully acknowledged.

National 420 and 1250 Mc/s Open Contests 1959

ONLY two entries were received for the National 420 Mc/s Open Contest held on September 5-6, 1959. G2XV scored 1,299 points and G5MR 318 points.

No entries were received for the National 1250 Mc/s Open Contest held at the same time.

R.S.G.B. Contest Forms

SPECIALLY printed log forms and cover sheets for the use of members taking part in contests are available from Headquarters on receipt of a s.a.e.

G.P.O. Radio Amateurs' Examination

CANDIDATES who sat for the G.P.O. Radio Amateurs' Examination on October 3, 1959, were required to answer both questions in Part I of the paper and six out of the eight questions in Part II. A copy of the paper is set out below. Of the 210 candidates who sat for the examination 159 (76 per cent) passed. The examination was held simultaneously in London (173 entered, 129 passed), Leith (24 entered, 19 passed) and Cardiff (13 entered, 11 passed).

Part I

1. (*a*) What are the conditions under which recorded messages may be retransmitted?
   (*b*) What are the Licence requirements for the receiver at an amateur transmitting station?
   (*c*) What are the conditions under which an amateur transmitting station may be operated by persons other than the licensee?
   (*d*) Who may inspect an amateur transmitting station?
   (*e*) What records shall be kept in the log of an amateur transmitting station?
2. With the aid of diagrams explain the precautions that are taken in the construction of a transmitter for use at an amateur station in order to minimize the radiation of harmonics.

Part II

3. Describe the construction of an aerial and its associated feeder for use on the 3·5 Mc/s band. Explain its action.
4. A battery of cells, whose e.m.f. is 12 volts on open circuit, has a potential difference of 9 volts between its terminals when it is connected to a resistor of 24 ohms. Calculate the value of the current flowing in the resistor. Why does the terminal p.d. of the battery fall when current is being taken from it?
5. Explain the superheterodyne principle of reception.
6. Describe, with the aid of diagrams, a method of keying a telegraphy transmitter. Why is it not advisable to key the oscillator stage?
7. Describe the construction and action of a meter suitable for measuring radio frequency currents at frequencies between 2 and 10 Mc/s.
8. Draw a diagram of a low-power amplifier using a pentode valve. Indicate the values of the chief components. What value of cathode bias resistor would be required if the anode current is to be 12 mA, screen current 3 mA and grid bias 5 volts? What would be a safe wattage rating for the resistor?
9. What is meant by "an alternating current of sine waveform"? What is the effect of (*a*) inductance and (*b*) capacitance in a circuit in which an alternating current is flowing?
10. Explain how the anode volts/anode current and grid volts/anode current curves of a thermionic valve are plotted.
    How are the mutual conductance, anode resistance and amplification factor of a valve calculated?

G.P.O. Appointments

MR. A. H. MUMFORD, O.B.E., Deputy Engineer-in-Chief of the General Post Office, is to succeed Brigadier Sir Lionel Harris, K.B.E., as Engineer-in-Chief, when the latter retires at the end of January.

Mr. Mumford played a prominent part in the Atlantic City Radio Conference and was the United Kingdom spokesman in the Frequency Allocation Committee. He was also closely associated with the development of the first transatlantic radio-telephone service.

Capt. C. F. Booth, C.B.E., who led the United Kingdom delegation at the Geneva Radio Conference, 1959, and Mr. D. A. Barron are to become Deputy Engineers-in-Chief as from February 1, 1960. They are both at present Assistant Engineers-in-Chief.

R.A.E.N. Notes and News

BY E. ARNOLD MATTHEWS (G3FZW)*

THE past month has seen widespread activity of a largely "domestic" character, many groups being engaged in reorganizing, practising procedure and generally consolidating progress made during the year now ending. Several groups are also in the first stages of liaison with user-services. Progress involves overcoming problems, and it is clear that groups are much more willing to discuss questions which they would have tacitly ignored a year or so ago. The character of the network becomes more purposeful as the former enthusiastic but somewhat isolated membership expands into organized, cohesive groups which are always aiming to reach higher standards.

New members are joining at a satisfactory rate and there is an increasing tendency for Controllers to "write off" strength those members who have shown no interest over a long period. We do not wish to lose any member who is prepared to assist in emergency work, but few groups have any wish to carry "passengers," and a proper procedure is followed to ensure that no member is written off strength without his knowledge or consent.

Meeting at Oxford

Officers residing within 60 miles of Oxford were invited to attend a meeting held at the Cherwell Hotel, Oxford on November 15. Despite the considerable danger of fog there was an excellent attendance.

After a short study of the newly-issued procedure booklet the meeting received a résumé of each group's activity from the senior officer of each contingent present. This gave the meeting a good overall picture of R.A.E.N. in the Midlands and South of England and was followed by a short discussion of relations with the user services. Group finance was then discussed at some length. It is evident that, although many members hold strong views on the subject, there are considerable differences of opinion as to how the cost of R.A.E.N. activity should be borne.

The best use of listener members was considered and arrangements for inter-county links via the Western Trunk Route (the Southern Section of which will be transferred to 2m), and the rather complicated requests of several police forces were dealt with before the meeting closed. Considerable interest was shown in the Hampshire Group's 2m equipment—particularly when it was learned that these highly efficient little sets had been built for a total cost of £5 per set, including valves!

There was considerable interest in the suggestion that a R.A.E.N. Convention be held sometime next year.

Around the Groups

Norfolk groups met at St.J.A.B. H.Q., East Dereham, on November 8 primarily to consider a new operational plan suggested by G3KAY. County Controller G3HRK guided the meeting through a considerable agenda and he was supported by his A.C.s and a good attendance of members. It was agreed to divide the county into a coastal belt, ten miles deep; an area within 20 miles radius of Kings Lynn; and another area within 20 miles radius of Norwich. By this plan the majority of the county would be within the service range of one or other of the bases, and the need for relay stations would be reduced to a minimum. The danger area of the Waveney Valley was given some discussion and it was agreed that a joint plan should be worked out in consultation with Suffolk Group. The group has a high proportion of listener members, most of whom are working for their licenses, and the group has the maintenance of their interest much at heart. This has resulted in a very novel suggestion being forwarded to the R.A.E.N. Committee. Amongst those present were Inspector Dodds, of County Police H.Q. (better known to the group as G2AQO), whose informed comment was of much assistance, and G3FZW who had taken the opportunity to renew acquaintance with this very happy group.

A recent demonstration given by **East Yorkshire** Group was noteworthy for the help given by the signals section of Bridlington School C.C.F. The demonstration was given to observers from B.R.C.S.; St.J.A.B.; W.V.S.; and Mr. J. E. Young, the Regional Communications Officer, Home Office. From a supposed disaster site by the railway at the foot of Dotterel Hill, links were made to stations at hospitals in Bridlington, Scarborough and Driffield. The net was in operation seven minutes after the starting signal, and the cadets put up a 40 ft. mast in 4½ minutes. Fifteen members operated five stations, including two mobiles, and four cadets not in the mast team operated issue equipment to provide the disaster site medical staff with their own intercommunication.

Hull Group wishes to hold exercises with other groups liaising with police forces, reports A.C., G4LH.

A recent meeting of the **Wirral** Group decided to consider the formation of separate groups in the Wallasey Hoylake and Bebington/Birkenhead areas; to polish up message handling by means of exercises every Wednesday evening; to form a sub-committee to produce an effective call-out plan; and to start a 2m net, using T.R.1986s.

Further work has been carried out on the equipment at B.R.C.S. H.Q., London, and a start has been made on 2m equipment. **London** C.C., G3IIR reports that this will be a low power set to act as a link to G3FZL, who can work direct to a number of distant groups.

* * *

The R.A.E.N. Committee wish to thank all members for their support and interest during the past year and to wish them a Happy Christmas.

* *1 Shortbutts Lane, Lichfield, Staffs.*

Regional and Club News

Amateur Radio Club of Nottingham.—Meetings are held at Woodthorpe House, Mansfield Road, Nottingham on Tuesday and Thursday evenings, commencing at 7.15 p.m. and on Sunday mornings. R.A.E. classes, conducted by G3LXL, are held on Thursdays. Constructional facilities are available. The Christmas Party is to be held on December 22 while a visit to Nottingham University for a talk by Mr. Porter on "Electronics in Modern Chemistry" is arranged for January 12. The club station, G3EKW, has now worked all zones. Membership continues to rise and prospective members are always welcome. The club would particularly like to hear from members of the pre-war Nottingham and District Short Wave Club. *Hon. Secretary:* E. C. Weatherall, 16 Avebury Close, Clifton, Nottingham.

Blackburn Amateur Radio Club.—The club is now licensed with the call-sign G3NTJ and is active on Top Band and 7 Mc/s. Details of meetings are given in *Forthcoming Events*. *Hon. Secretary:* F. W. Bird (G3GZE), 14 Old Bank Lane, Whinney Heights, Blackburn.

Bradford Amateur Radio Society.—Recent events have included a talk on "Tape and Disc Recording" by D. G. Enock (G3KLZ) and a visit to Mains Radio Gramophones Ltd. A film show has been arranged for December 29 and a talk on colour photography by Arthur Bailey (G3IBN) for January 12. The Annual Display of Members' Gear will be held on January 26. Arrangements can be made for Morse classes to be held prior to meetings which commence at 7.30 p.m. *Hon. Secretary:* David M. Pratt (G3KEP), "Glenluce," Lyndale Road, Eldwick, Bingley, Yorks.

Bristol.—More than 50 members attended the November meeting at which E. H. Page (G3HKV), Managing Director of R.E.E. Telecommunications Ltd., gave a talk on "Communications and Electronics in Business." A demonstration was given of closed circuit television using an E.M.I. camera. Two visits took place, on November 26 and December 3, to the B.B.C. West Regional Television Studios in Bristol. At the meeting on January 15, D. H. Collins (B.R.S.19638) and G. E. Thompson (B.R.S.20190) will be giving the second part of their talk on "Atoms and the Amateur." *Hon. Secretary:* D. F. Davies (G3RQ), 51 Theresa Avenue, Bishopston, Bristol 7.

Civil Service Radio Society.—Members of the society operated GB2SM at the Science Museum, South Kensington, during the *CQ* Phone Contest when an excellent score was made. Skeds can be arranged for the third Tuesday evening in each month for those requiring S.W.7 for the "Worked All London Town" award.

Cornish Radio and Television Club.—The November meeting was held at the Y.M.C.A., Falmouth, when G3LPB gave a talk on radio and TV servicing. The G2AYQ Shield and Short Wave Listeners' Cup contests are to be held between January 1 and 14. The Sunday morning club net has been transferred to 7 Mc/s. *Hon. Secretary:* G. Hubber, 9 Cardrew Terrace, Redruth, Cornwall.

Competitors in the South Manchester Radio Club and Stockport Radio Society's Joint Mobile Rally on August 30, 1959, being briefed by G3LQQ.

During the recent Shipley Shopping Week, local amateurs operated GB3SSW on 1·8, 3·5, 7 and 14 Mc/s. A total of 304 contacts were made with 250 different stations. Those taking part were G3BOR, G2BXS, G3KSS, G3LED, G3LZZ, G3NFH, G3NDG and G3MAB. In this picture, left to right, are G3BOR and his junior op., G3LED and G2BXS.

(Photo by Arthur Blakey, Shipley.)

East Kent Radio Society.—Recent activities have included the Christmas Social and the building of a new Top Band transmitter for the club station, G3LTY, with which a modified BC348 receiver is used. *Hon. Secretary:* D. Williams (G3MDO), "Llandogo," Bridge, nr. Canterbury, Kent.

Grafton Radio Society.—A visit to the London Fire Brigade Headquarters proved very successful. Interesting talks have been given by G3AAN ("Civil Aircraft Headsets"), G3KQZ ("Useful Receivers") and G3AFC ("Tools in the Ham Shack"). Meetings will re-commence after the Christmas break on January 8. *Hon. Secretary:* A. W. H. Wennell (G2CJN), 145 Uxendon Hill, Wembley Park, Middx.

Halifax and District Amateur Radio Society.—Meetings which are held at the Sportsman Inn, Ogden, have been arranged for December 19, January 5 (talk on TVI by G3ADG) and January 8 (Annual Dinner). G3IBN recently gave a talk on aerials with demonstrations. *Hon. Secretary:* A. Robinson (G3MDW), Candy Cabin, Ogden, Halifax.

Leicester Radio Society.—At the A.G.M., the following were elected: *Chairman*—J. Worth (G3KKV); *Hon. Treasurer*—R. D. MacQueen (G3DVP); *Hon. Secretary*—P. G. Goadby (G3MCP), 535 Welford Road, Leicester; *Committee Members*—G. H. Addison (G3BAY), D. Hoff (G3AWM) and W. Mead (G5YY). Meetings are held on the first and third Mondays in each month at Old Hall Farm, Braunstone Lane, Leicester, commencing at 7.30 p.m.

Midland Amateur Radio Society.—At the meeting on January 7, Ron Rew (G3HAZ) is to give a talk on the construction of a 70 cm. transmitter while H. Buckley of Bradmac will give a lecture on high quality recording and reproduction on January 19. Meetings, which commence at 7 p.m., are held at the Birmingham Midland Institute, Paradise Street, Birmingham. *Hon. Secretary:* C. J. Haycock (G3JDJ), 360 Portland Road, Edgbaston, Birmingham 17.

Mitcham and District Radio Society.—In view of the considerable interest in the two fields, the setting up of D/F and V.H.F. Groups is being considered. On January 8 a member of the G.P.O. Technical Staff is to give a talk on cable link systems. Meetings are held at "The Cannons," Madeira Road, Mitcham. *Hon. Secretary:* D. Johnston (G3NFA), 59 Acre Lane, Carshalton.

Reigate Amateur Transmitting Society.—Regular monthly meetings are held at The Tower, High Street, Redhill, on the third Saturday in each month, commencing at 7.30 p.m. At the December meeting, R. Wade, A.M.I.E.E. will give a talk on "Transistors applied to Amateur Radio." The first A.G.M. has been arranged for January 16. The Annual Dinner will be held

at Laker's Hotel, Redhill, on February 6 and tickets, price 15/- each, may be obtained from G3NKT. R.A.E. and Morse classes are held regularly. A visit to the B.B.C. station at Tatsfield is due to take place early in January and details may be obtained from the *Hon. Secretary:* F. D. Thom (G3NKT), 12 Willow Road, Redhill, Surrey.

South Birmingham Radio Society.—This is the new title of the South Birmingham R.S.G.B. Group. Meetings are held on the third Thursday in each month at the Friends' Meeting House, Moseley Road, Birmingham, commencing at 7.30 p.m. Regular mobile rallies are also arranged. *Hon. Secretary:* G. E. Simonite (G3JAO), 19 Wistaria Close, Northfield, Birmingham 31.

South Yorkshire Amateur Radio Society.—Meetings of this newly formed society are held at the home of Mr. Albert Field, 3 Coppice Avenue, Hatfield, Doncaster, on Sunday afternoons from 3-4 p.m. All radio amateurs, shortwave listeners and radio enthusiasts in the district are invited to contact Mr. Field.

Torbay Amateur Radio Society.—At the November meeting, representatives of the S.W. Region of the P.O. gave a most useful and instructive lecture on the many aspects of television interference. At the December meeting, GI6TK was due to give a talk on "Amateur Radio at Home and Abroad." *Hon. Secretary:* George Western (G3LFL), 118 Salisbury Avenue, Barton, Torquay.

Visitors to Chicago

BRITISH radio amateurs visiting the Chicago area are invited to contact Mr. Raymond P. Birren (W9MSG), President of the Chicago Radio Traffic Association and Vice-President of the Chicago Council of Amateur Radio Clubs. Mr. Birren whose address is 1702 Spring Road, Elmhurst, Illinois, has a limited number of copies of the Chicago Area Radio Club directory which he will be pleased to send to members expecting to visit the U.S.A.

Can You Help?

- G. A. Breed (B.R.S.22422), The Oaks, Runwell Chase, Wickford, Essex, who requires the service manual, circuit diagram and any other information on the ex-Navy B.36 tuner amplifier?
- A. D. Lowden (G3FIA), 69 Woodfield Road, King's Heath, Birmingham 14, who requires information on the U.S. type *R-3A/ARR/2X receiver (also known as the Receiver type R1584, Ref. No. 10D/2653) and the ex-Air Ministry receiver type R3118A?
- H. H. Crew (G8CB), 14 Uplands Avenue, Clayton Heights, Queensbury, Bradford, Yorks., who requires the technical manual for the Bendix V.H.F. Signal Generator type I-130-A?
- H. Edge (G6GD), 8 Church Street, Malpas, Cheshire, who requires information on the assembly of the HRO dial?

New Catalogue

HOME Radio (Mitcham) Ltd., of 187 London Road, Mitcham, Surrey, has recently published a 127 page illustrated components catalogue for the amateur and home constructor. Printed on excellent quality paper, the catalogue costs 2s.

Receipts

RECEIPTS for subscriptions paid by cheque, bankers' order or postal order are not now issued unless specially requested. Receipts are drawn, however, and kept on file at Headquarters for six months.

R.S.G.B. Amateur Radio Call Book

LOCAL R.S.G.B. Groups and Affiliated Societies may obtain copies of the 1960 edition of the *R.S.G.B. Amateur Radio Call Book* on special terms, provided orders are for a dozen or more.

CONTESTS DIARY

January 16-17 B.E.R.U. Contest
B.E.R.U. Receiving Contest
(see page 226, November, 1959)

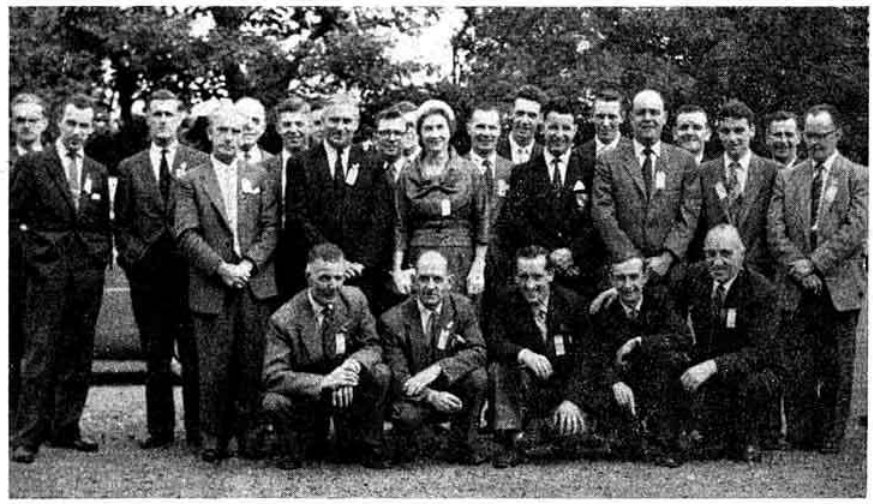
January 31 144 Mc/s C.W. Contest
(see page 276)

February 6-7	- Affiliated Societies' Contest
February 6-7	- A.R.R.L. DX Contest (Phone Section)
February 20-21	- A.R.R.L. DX Contest (C.W. Section)
February 27-28	- First 1·8 Mc/s Contest
March 5-6	- 144 Mc/s Open Contest*
March 5-6	- A.R.R.L. DX Contest (Phone Section)
March 19-20	- A.R.R.L. DX Contest (C.W. Section)
March 26-27	- 1250 Mc/s Tests
April 9-10	- Low Power Contest
April 24	- D/F Qualifying Event
May 8	- First 144 Mc/s Field Day*
May 15	- D/F Qualifying Event
May 22	- 420 Mc/s Contest
May 29	- D/F Qualifying Event
June 11-12	- National Field Day
June 19	- 70 Mc/s Contest
July 3	- Second 144 Mc/s Field Day*
July 10	- D/F Qualifying Event
September 3-4	- European V.H.F. Contest
September 3-4	- National 144, 420 and 1250 Mc/s Contests*
September 4	- D/F National Final
September 25	- Low Power Field Day
October 2	- R.A.E.N. Rally
November 6	- Second 1·8 Mc/s Contest
November 19-20	- R.S.G.B. Telephony Contest R.S.G.B. Telephony Receiving Contest

* To coincide with Region 1 I.A.R.U. v.h.f. contest dates.

A.R.M.S. Meeting

THE programme for the meeting of the Amateur Radio Mobile Society to be held in the Small Hall of the St. Bride Foundation Institute, Bride Lane, London, E.C.4, on Saturday, January 30, 1960, will be as follows: 3 p.m. Informal Discussions: 3.45 p.m. Business Meeting; 4.45 p.m. Lecture; 5.30 p.m. Tea; 7 p.m. Film Show (including "The Phoenix Tower" and the Scottish Television Amateur Radio film); 8.15-9 p.m. Informal Discussions. Admission will be 1/-, or 3/6 including tea. Further information may be obtained from the Hon. Secretary, George Storey (G3HTC), 10 Avon Road, Sunbury-on-Thames, Middlesex.



A group photograph taken at the South West Scotland Regional Meeting at the Towan's Hotel, near Prestwick, on September 13, 1959.

Forthcoming Events

Details for inclusion in this feature should be sent to the appropriate Regional Representatives. T.R.s and club secretaries are reminded that the information submitted must include the date, time and venue of the meeting and, whenever possible, details of the lecture or other event being arranged. Regional Representatives are requested to set out copy in the style used below.

DATES FOR YOUR DIARY

January 22, 1960.—Presidential Address.
January 30.—Amateur Radio Mobile Society London Meeting.
March 11.—London Lecture Meeting at the I.E.E.
April 24.—North Midlands Mobile Rally.
May 15.—Harwell Mobile Rally.
June 15-18.—Region 11 A.R.U. Conference, Folkestone.
June 26.—Longleat Mobile Rally.
August 14.—Derby Mobile Rally.
September 15-18.—R.S.G.B. National Convention, Cambridge.
September 20.—Lincoln Hamfest and Mobile Rally.

REGION 1

Ainsdale.—Wednesdays, 8 p.m., 37 Hawthorne Grove, Southport.
Blackburn.—Fridays, 8 p.m., The Corporation Park Hotel, Revidge Road.
Blackpool (B. & F.A.R.S.).—Tuesdays, 8 p.m., Squires Gate Holiday Camp.
Bury (B.R.S.).—January 12, George Hotel, Kay Gardens.
Chester.—Tuesdays, 8 p.m., Y.M.C.A.
Crosby (C.A.R.S.).—Tuesdays, 8.30 a.m., "Colonsay," Crosby Road South, Waterloo.
Liverpool (L. & D.A.R.S.).—Tuesdays, 8 p.m., Gladstone Mission Hall, Queens Drive, Stoneycroft.
Macclesfield (M. & D.R.S.).—December 29, January 12, 26, "The Bruce Arms," Crompton Road.
Manchester (M. & D.R.S.)—January 11, 7.30 p.m., The Wellington Hotel, Nicholas Croft, High Street, off Market Street.
Manchester (S.M.R.C.).—Fridays, 7.30 p.m., Ladybarn House, Mauldeth Road, Fallowfield.
Preston (P.A.R.S.).—Wednesdays, 7.30 p.m., 145 Hammond Street.
Southport.—Thursdays, 8 p.m., The Esplanade, Southport.
Stockport (S.R.S.).—December 23, January 6, 20, 8 p.m., The Blossoms Hotel, Buxton Road.
Wirral (W.A.R.S.).—December 18, January 8, 22, 7.45 p.m., 4 Hamilton Square, Birkenhead.

REGION 2

Bradford (B.A.R.S.).—December 29 (Film Show by Mullard Ltd. and G3KLZ); January 12 ("Colour Photography" by A. R. Bailey, M.Sc., G3IBN); January 26 (Display of Members' Gear), 7.30 p.m., Cambridge House, 66 Little Horton Lane, Bradford 5.
Cleckheaton (S.V.A.R.S.).—January 6 ("From the Grid to Your Meter" by the Assistant Engineer, Area Development Board, Y.E.B.); January 20 ("Tape Recorders" by Philips Electrical Ltd.); January 23, Annual Dinner. 7.30 p.m., George Hotel, Cleckheaton.
Halifax (H. & D.A.R.S.).—December 19 (Informal); January 5 ("TVI" by G3ADG); January 8 (Annual Dinner); January 19 (Ragchew), Sportsman Inn, Ogden, Halifax.
Leeds (L.A.R.S.).—January 6 (Visit to Electronic Computer, Leeds University); January 13 (Junk Sale); Swarthmore Education Centre, 4 Woodlands Square, Leeds 3. January 20 ("Tape Recorders" by Philips Electrical Ltd.), George Hotel, Cleckheaton. January 27 (Film Show), Psychology Dept.
Scarborough (S.A.R.S.).—Thursdays, 7.30 p.m., Chapman's Yard, North Street, Scarborough.

REGION 3

Birmingham (M.A.R.S.).—January 7 ("70cm Transmitter" by Ron Rew); January 19 (Talk by H. Buckley), 7 p.m., The Birmingham Midland Institute, Paradise Street, Birmingham.
Birmingham (Slade).—December 18 ("Fun and Games"), January 1, 7.30 p.m., The Church House, High Street, Erdington.
Birmingham (South).—January 21, 7.30 p.m., Friend's Institute, Moseley Road, Birmingham.
Stourbridge & District.—December 18 ("Christmas Informal"); January 5 ("Electronics in Industry" by G3HVX), 8 p.m., Brotherhood Hall, Stourbridge. January 22 (Informal), 8 p.m.
Wolverhampton & District.—December 21 (R.A.E. Class); December 28 ("Communications Receivers" by G2JZ); January 4 (R.A.E. Class), 8 p.m., Nechells Cottage, Stockwell Road, Tettenhall. January 11 (New Year Party), 7.30 p.m., "Rose & Crown," Penn Road, Wolverhampton.

REGION 4

Derby (D. & D.A.R.S.).—January 6 (Open Evening); January 13 (Members' Exhibition); January 20 (Open Evening), 7.30 p.m., Room No. 4, 119 Green Lane, Derby.
Derby (D.S.W.Exp.S.).—Sundays, 10.30 a.m., December 31, January 7, 14, 21, 7.30 p.m., Club Room, Nunsfield House, Boulton Lane, Alvaston, Derby.
Leicester (L.R.S.).—December 21, 28, January 4, 11, 18, 7.30 p.m., Old Hall Farm, Braunstone Lane, Leicester.
Lincoln (L.S.W.C.).—December 30, January 13, 27, 7.30 p.m., Technical College, Cathedral Street.

REGION 6

Cheltenham.—First Thursday in each month, 8 p.m., Great Western Hotel, Clarence Street.

LONDON MEMBERS' LUNCHEON CLUB

will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road,
at 12.30 p.m. on Fridays, December 18, 1959, January 15 and February 19, 1960
Telephone table reservations to HOL 7373 prior to day of luncheon. Visiting amateurs especially welcome.

REGION 7

Acton, Brentford and Chiswick.—January 19 (A.G.M.), 7.30 p.m., A.E.U. Rooms, 66 High Road, Chiswick.
Barnet (B. & D.R.C.).—December 29 (Junk Sale and Talk), 7.30 p.m., Red Lion Hotel, Barnet.
Bexleyheath (N.K.R.S.).—January 14 (Film Show), 8 p.m., Congregational Hall, Bexleyheath, Kent (near the Clock Tower).
Croydon (S.R.C.C.).—January 12, 7.30 p.m., "Blacksmith's Arms," South End, Croydon.
Dorking (D. & D.R.S.).—Second and fourth Tuesdays, 8 p.m., Star and Garter Hotel, Dorking.
Ealing.—Sundays, 11 a.m., ABC Restaurant, Ealing Broadway, London, W.5.
East Molesey (T.V.A.R.T.S.).—January 6 (A.G.M.), Carnarvon Castle Hotel, Hampton Court.
Enfield and District.—January 28, 7.30 p.m., George Spicer School, Southbury Road, Enfield.
Harlow and District.—Thursdays, 7.30 p.m., rear of G3ERN (G. E. Read), High Street, Harlow.
Holloway (G.R.S.).—Mondays, Tuesdays and Wednesdays (R.A.E. and Morse); Fridays (Club); 7 p.m., Montem School, Hornsey Road, N.7. (Closed until January 4). January 22 ("K.W. Products" by R. Shears, G8KW).
Kingston.—Lectures alternate Thursdays, Theory and Morse Classes weekly, 7.45 p.m., Y.M.C.A., Eden Street, Kingston.
New Cross (C.A.R.S.).—Fridays, 7.30 p.m., 225 New Cross Road, London, S.E.13.
Romford (R. & D.R.S.).—Tuesdays, 8.15 p.m., R.A.F.A. House, 18 Carlton Road, Romford.
Slough.—January 4 ("The Reduction of TVI" by Brian Bower, G3COJ), 8 p.m., "Stag Hotel," Wexham Street, Wexham.
South Kensington (C.S.R.S.).—January 5 ("Tape and Disc Techniques" by E.M.I. Ltd.), The Science Museum, South Kensington.
Welwyn Garden City.—January 14 ("Bring-and-Buy" Sale), 8 p.m., I.C.I. Restaurant, Blackfan Road, Welwyn Garden City.

REGION 9

Bristol.—January 15 ("Atoms and the Amateur," Part 2, by D. H. Collins B.R.S.19638, and G. E. Thompson, B.R.S.20190), 7.15 p.m., Carwardine's Restaurant, Baldwin Street, Bristol 1.
Yeovil (Y.A.R.C.).—Wednesdays, 7.30 p.m., Grove House, Preston Road Yeovil.

REGION 10

Cardiff.—January 10, 7.30 p.m., "The British Volunteer," The Hayes, Cardiff.
Penarth.—December 28 (Debate), Y.M.C.A. Hall, Penarth.

REGION 12

Aberdeen.—January 5, 12.45 p.m., Aberdeen Members' Luncheon Club, Royal Atheneum Restaurant ('Phone GM3HTL, Aberdeen 34928, for reservations).

REGION 13

Edinburgh (L.R.S.).—January 14 ("DX-working, Certificates and Awards" by J. Taylor, GM2BDX); January 28 ("70cm Equipment: Construction and Operation" by GM3DDE), 7.30 p.m., Y.M.C.A., 14 St. Andrew Street, Edinburgh 2.

REGION 14

Falkirk.—December 18, 7.30 p.m., Temperance Café.
Prestwick.—January 24 (Lecture by G12KR), 7.15 p.m., Royal Hotel.

High Quality Sound Broadcasting

MR. K. R. STURLEY, B.Sc., Ph.D., M.I.E.E., Head of the Engineering Training Dept. of the B.B.C., will lecture on "High Quality Sound Broadcasting" at the meeting of the Radar and Electronics Association to be held at the Royal Society of Arts, John Adam Street, Adelphi, London, W.C.2, on December 29, 1959, at 7.30 p.m. Tea will be available, price 2s. per person, from 6.30 p.m.

Bulletin Stencil Plates

IT occasionally happens that a stencil plate used for the preparation of a particular BULLETIN wrapper becomes worn or loses ink, with the result that the Post Office experience difficulty in tracing the address.

Members who notice that the address on the wrapper used for their copy of the BULLETIN is indistinct, or in any way faulty, are asked to advise Headquarters.

EXCHANGE AND MART SECTION

ADVERTISEMENT RATES. Members' Private Advertisements 3d. per word, minimum charge **5s. Trade Advertisements 9d. per word** minimum charge **12s.** All capitals **1s.** per word, minimum charge **18s.** Write clearly. No responsibility accepted for errors. Use of Box number **1s. 6d.** extra. Send copy and remittance to **National Publicity Co.Ltd., 20-21 Red Lion Court, Fleet Street, London, E.C.4, by 22nd** of month preceding date of issue.

ALL perfect and post-free. Microammeters 4½ in., FSD 100-0-100, 3½ scale marked 2-0-2, 10-0-10 and 50-0-50 V, 30/-. Mains transformers, shrouded, input 205, 210, 220, 230, 240, 250, electrostatic screen, output 445-0-445 at 120 mA, 6·6 at 1·6A, 6·6 at 1·3A, 6·6 at 1A, 25/-. Parmeko chokes, 10H, 120 mA, 260 ohm, 10/6. 12AT7, 6/- each. R17, 10/- each. EF50 Red, 2/- each. Pre-set pots, ¼, 5, 10 and 50K, 6d. each. Spindled pots, 2½, 5, 10, 50 and 500K, 1/6d. each. Toggle switches (single hole, 250V3A) DPDT, 2/-, ditto biased, 1/-, SPST, 1/-. Fuseholders, single hole panel fixing, 6d. each.—Box No. 1021, The National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (1021

ALL types of valves required for cash. State quantity and condition.—Radio Facilities Ltd., 38 Chalcot Road, N.W.1 (PRImrose 9090.) (236

ALL types valves, from 1/6. Radio, television, books, service sheets, components. Lists, 3d.—Hamilton Radio(r), 237 Sedlescombe Road, Nr. Hastings. (1048

A RADIO enthusiast is disposing of a wide selection of attractive radio gear and components, valves, relays, sets, transformers, etc. S.a.e. for full price list.—Box No. 1050, The National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, London, E.C.4. (1050

BC221, excellent condition, £30. Three each 813, TZ40; other valves and components, £6 the lot. Buyer collects.—Frampton, 33 Christine Avenue, Rushwick, Worcester. (1049

COMPLETE relay controlled station, comprising Elizabethan transmitter, modulator, power-unit and Hallicrafter S40A receiver, in 6 ft. enclosed rack, £60, o.n.o. S.a.e. for photographs. —G3KBO, Crombie Villas, Halstead, Sevenoaks, Kent. (1047

EDDYSTONE Marine receiver 657/670 for sale. In excellent condition. Purchased some time ago, but only used on one foreign-going voyage.—Apply G3GDZ/A, 690 Kenton Road, Harrow, Middlesex. (1040

FOR SALE.—Westinghouse power packs 200-250 volts 50 c/s input, outputs 1200 volts, 200 mA, 220 volts, 110 mA and 6·3 volts 13 amps., £10; 150 watt transmitter in two 6 ft. racks dismantled, £12; 12-24 volt 288 watt Jap generating set, £9.—Houlston, 11 Dawlish Avenue, London, S.W.18. (1045

GUARANTEED valves: 150T, 25/-; 35T, 10/-; 829B, 30/-; RK34, 4/-; RL18, 6A3, EF80, 6G6G, 12A6, OZ4, 5/-; 6N7, 12SK7, 12SF7, 12SR7, EB41, 6AQ5, EZ41, EAC91, 6/-; 6L6M, 7/6.—165 Cambridge Road, Great Shelford, Cambridge (1046

HEATH "Mohawk" receiver for sale, almost brand new, 160-10m, 1682 and 50 kc/s double I.F.'s. Steep skirt, five position, 5, 3, 2, 1 and 0·5 kc/s selectivity. "T" notch filter, 100 kc/s crystal calibrator, USB and LSB crystal switching and separate product detector for s.s.b. Each band on slide-rule dial, noise limiter, "S" meter,—in fact everything the critical "Ham" desires, including superbly attractive appearance. Complete with spare valves, £110.—Phone G3LB, Ripon 737 day, 1033 night. (1052

MAKE ready for the coming DX season with one of the our high quality log books. Space for 6,000 entries, 23/-, post paid. QSL's—a wide range to choose from. Send for complete list of our stationery.—Dee-ex Products, 93 Craigton Road, Aberdeen. (1051

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