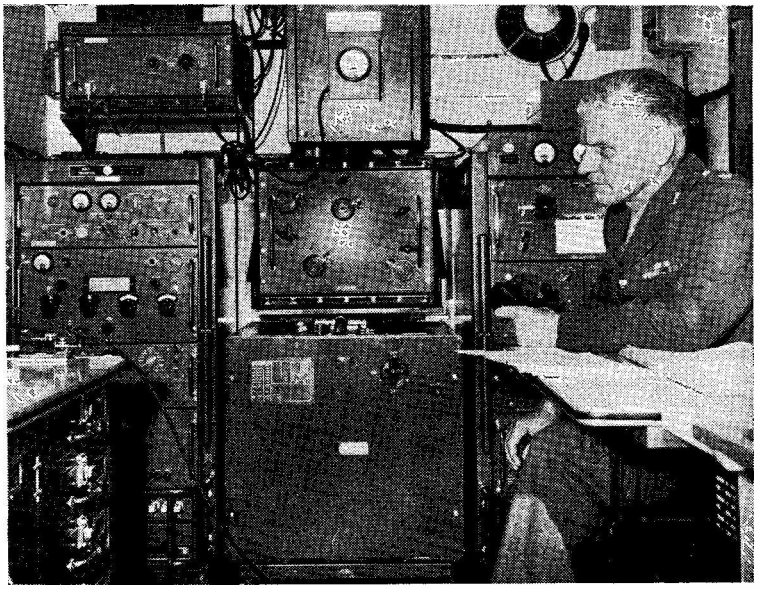
3/6

The SHORT WAVE Magazine

VOL. XXIV OCTOBER, 1966 NUMBER 8

ROYAL SIGNALS at SEYMOUR HALL

Radio Amateurs serving in Royal Signals have collaborated to provide the display which you will find on the stage at the International Radio Communications Exhibition from the 26th to 29th October, 1966.



Many of the soldiers who provide the communications for the Army are also keen amateurs and our photograph shows Major Leslie Beaumont G3RUS (ex- VS9ALB, SVØAA, 5A5TZ) operating G3CIO, the Headquarters Station of Royal Signals Amateur Radio Society at Catterick Camp. This equipment, presented to the society by The Marconi Company, will be among the examples of modern radio stations shown on the Royal Signals stand.

Radio Amateurs with an interest in modern techniques will find the use of transistors in compact SSB equipment has not been forgotten whilst old-timers may recall their youth at the sight of the earlier examples of military " wireless sets " loaned by the Royal Signals Museum.

All Part of the Service

Would you like to know the exact frequency of the crystals you have just bought? Our test equipment will include the latest type of Digital Frequency Meter and we will be pleased to check your crystals and provide a certificate of calibration.

Would you like to see how things have changed since you were in uniform? The stand will be manned by members of Royal Signals, specialists in their own fields, ready to discuss the equipment on show or just have a chat about Amateur Radio.

We Look Forward to Meeting You on the Stage at Seymour Hall

Would you like to have details of career prospects in Royal Signals? We shall have all the information available and will be pleased to talk it over.

INDEX TO ADVERTISERS

SHORT WAVE MAGAZINE

(GB3SWM)

Vol. XXIV OCTOBER, 1966 No. 276

CONTENTS

Managing Editor: AUSTIN FORSYTH, O.B.E. (G6FO/G3SWM)

Advertising: **Maria Greenwood**

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

Annual Subscription: Home and Overseas 42s. ($6.00 U.S.) post paid

Editorial Address: **Short Wave Magazine, BUCKINGHAM, England**

AUTHORS' MSS

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

FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT-WAVE Magazine

CHANGE OF PUBLICATION DATE

With effect from the November issue, the day of publication is being changed to the last Friday in the month, dated the month following. Hence, the November issue will appear on October 28; the December on November 25; and the January 1967 issue on December 30—and so on.

Because necessarily the November issue is already in preparation for publication on October 28, we are very short of time this month. Readers interested in the various features—" Communication and DX News," " VHF Bands," and " The Month with the Clubs "—are therefore asked to write in immediately (addressed SHORT WAVE MAGAZINE, BUCKINGHAM).

Similarly, those wishing their small advertisements to appear in the November issue should send them in straight away (addressed Advertisement Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1).

On publication of the November " Short Wave Magazine," the time available between issues will revert to normal. Our bookstall readers are advised that newsagents and wholesale distributors have already been informed of the change of publishing date, so that supplies should be on sale by the new date, starting with the November issue.

EDITORIAL

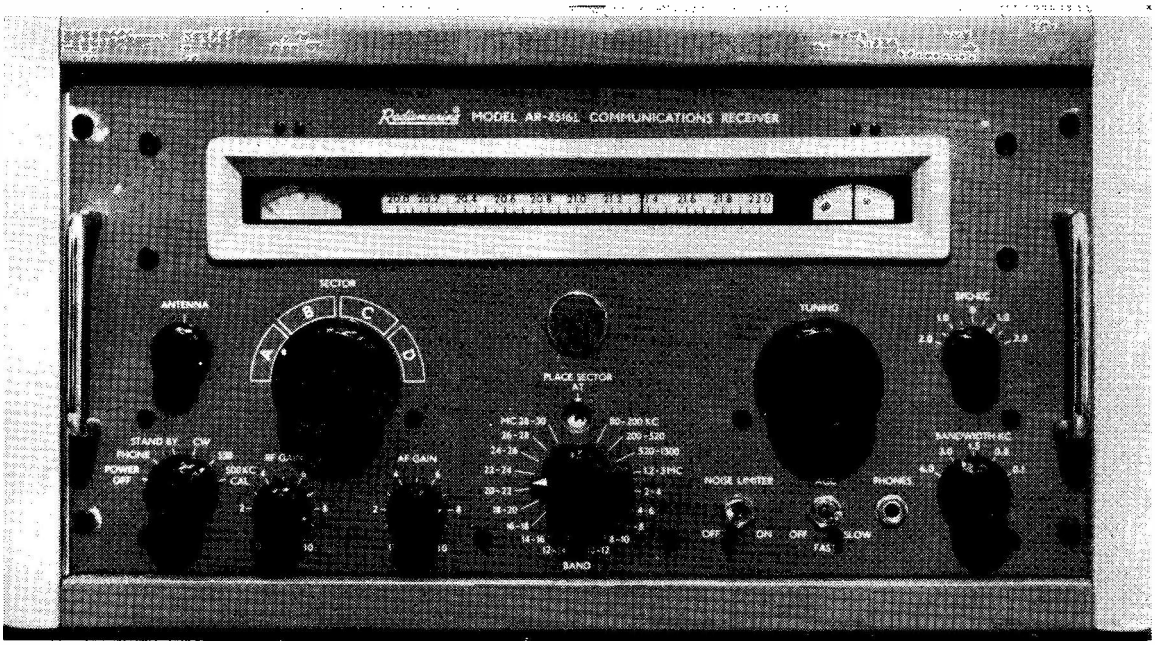
Exhibition *The great event in the Amateur Radio calendar is the Radio Communications Exhibition, to be held at the Seymour Hall, Seymour Place, London, W.1, from Wednesday, October 26 to Saturday, 29th. The Exhibition is to be opened at 12 noon on the Wednesday by H.R.H. The Duke of Edinburgh—and we congratulate the organisers on having secured such distinguished support.*

As always, there will be a fine array of all that is of interest from the Amateur Radio viewpoint—and, as usual, the event will also be a convention; a gathering of the clans from all parts; a meeting-place for old friends; and the opportunity for technical discussion and friendly argument on all topics that concern radio amateurs.

Whether you come to buy or to criticise; to see, and be seen; or just to have a look round, don't miss this year's Exhibition. As in all previous years, we shall be there, on Stand 19 as before, looking forward to seeing old friends and meeting new ones.

Austin Forsyth, G6FO.

WORLD-WIDE COMMUNICATION



Front view of the R.C.A. Radiomarine Receiver Type AR-8516L. The general arrangement of the controls is sensible and uncluttered. The 18-position band selector has an illuminated window lettered "Place Sector At" which indicates the setting of the large "Sector" knob below the S-meter. The "Sector" control is divided into quadrants lettered A, B, C, D and it selects the correct 45-deg. sectors of the RF tuning condensers to cover the desired frequency band. This control also interlocks the dial lights so that they only come on when the correct sector is reached. At frequencies below 4.0 mc the Sector control is inoperative.

THE R.C.A. AR-8516L COMMUNICATIONS RECEIVER

GENERAL DESCRIPTION — NOTES ON DESIGN AND CIRCUITRY

J. D. HEYS (G3BDQ)

In those circles able instantly to recognise a receiver of outstanding merit and importance from the amateur point of view, the R.C.A. AR-8516L is being much talked about. Though in the surplus category, it is a modern design. They are not cheap and there are not a great many of them—but even at that this article will make useful and informative reading for all who are interested in the design of high-grade communications receivers for the HF bands.—Editor.

IN recent months readers may have noticed in the end pages of their SHORT WAVE MAGAZINE advertisements offering the AR-8516L receiver, and wondered about its specification and performance on the amateur bands. The writer has been fortunate enough to use and examine one of these fine receivers for several months, and thought a brief report and comment on its circuitry and handling would be of interest to the many transmitting amateurs and SWL's who are always intrigued by new equipment. No laboratory test gear was available for comprehensive measurements, so this report will necessarily be of the proof-of-the-pudding-is-in-the-eating type. The receiver under test was new and had recently been thoroughly checked at the British RCA factory so it can be assumed that actual performance figures were close to those given in the instruction manual.

The old RCA AR88 receiver is probably one of the best known RCA models in Britain and the Commonwealth, and many G operators have handled one at some time or other. Stability and dependability are strong points of the AR88, and the writer knows of at least one that has performed admirably without breakdown for twenty years. The AR-8516L is the logical development of the AR88, incorporating many design features and techniques which have only been available to designers during

the past decade. The circuit diagram shown in its manual was drawn in 1960 and finally modified in 1962, so this is a really modern receiver—probably also the last in the line of RCA valved receivers—the present trend being towards compact transistorised versions. Described by its manufacturer as a "Raidomarine" receiver, the AR-8516L was expressly designed for modern ship or shore communication applications, and a curious feature in this respect is its power requirement of 115 volts AC or DC. Owners of old HRO's with their attendant TVI troubles will be surprised to learn that the radiation from the new RCA receiver is less than 400 micro-microwatts !

General Description

The AR-8516L has been variously described as "the poor man's 75A-4" and as a "heavy-weight frequency meter." Both these descriptions are apt and all that is lacking is some form of direct digital frequency read-out which seems to be a feature in the future course of receiver and transmitter design. The receiver tunes from 80 kc to 30 mc without gaps, and between 4 mc and 30 mc the spectrum is covered in two-megacycle sections with overlap. A horizontal scale indicates the frequency (from 4·0 mc to 30 mc) with markings at 50 kc intervals, and a circular logging scale graduated from 0-100 has a tuning sweep of 100 kc. This means that each one of its markings represents one kilocycle, and these markings are so open that it is possible easily to read dial frequency to the nearest 250 *cycles*.

Such a refinement of dial marking would be useless if the receiver had not outstanding frequency stability. This stability is of a very high order, being a drift of less than 500 cycles for external temperature changes of 10 degrees Centigrade, a ten point change in relative humidity, or a 5 per cent change in supply voltage. Under normal indoor amateur operating conditions the receiver stability has been found equal to that of a free-running crystal oscillator. There is no long warm-up drift, a feature which bedevils so many of the receivers

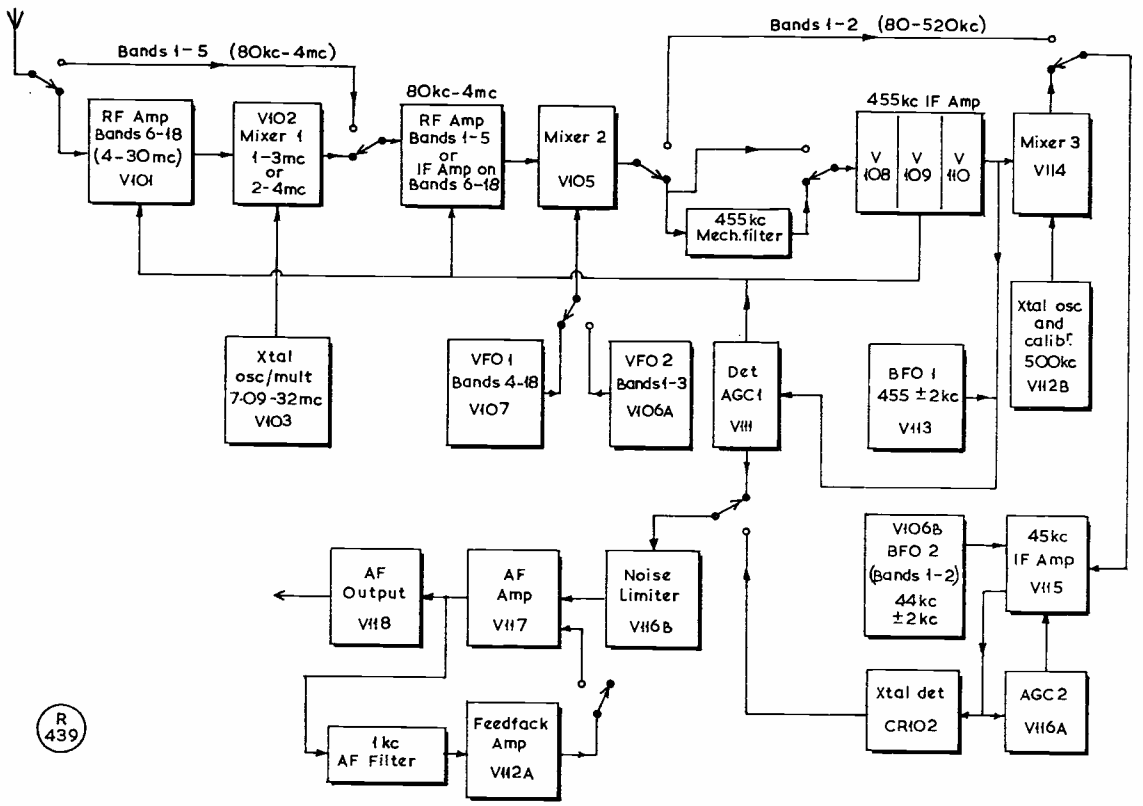


Fig. 1. Simplified block diagram of the R.C.A. AR-8516L, using the nomenclature from the manufacturers' manual. The functioning of the circuits is discussed in the text. The valve types are: V101, V104, V108, V109, V110, 3BZ6; V102, V103, V105, V107, 3CB6; V106, V112, V117, 7AU7; V111, V116, 3AL5; V113, V115, 5U8; V114, 3BE6; V118, 12CU5; CR102, 1N34A. The somewhat unfamiliar valve type numbering is simply because of the heater rating — for instance, the 3BE6 is exactly equivalent to the R.C.A. 6BE6, except that its heater is rated 3.15 volts, 0.6 amps.; similarly with the others prefixed "3." Since the heater chain is series-connected, one heater failure puts all valves down, and the replacement must have the correctly-rated heater.

and transceivers in common use. The AR-8516L is ready for stable SSB reception three minutes after switching on. From 4 mc to 30 mc the receiver employs a crystal controlled front end, and the two VFO's and two BFO's use many temperature-compensating devices and components. A frequency change liable to be brought on by line voltage variation is much reduced by the somewhat unusual practice of running all the valve heaters in series together with a dropper resistor. No heater transformer is required and the heater circuit connects across a partially smoothed 115 volts DC. In this way some self-adjusting barretter action takes place. The one unfortunate consequence of this arrangement is that should one of the eighteen valve heaters fail the whole receiver becomes inoperative ! Perhaps, however, this is a small price to pay for enhanced receiver stability.

Five degrees of selectivity are available : A " barn door " 6 kc for AM reception; 3 kc from a Collins mechanical filter for SSB and exalted carrier work; 1·5 kc, 0·8 kc and 0·1 kc for CW. Operating a receiver with a 100-cycle bandwidth and the stability to boot is a joy, especially under arduous QRM and contest conditions.

The mode switch has a separate position for SSB reception, and heavier BFO injection is then provided. Many modern receivers designed for SSB and CW reception have switched, fixed tuned BFO's for sideband selection and under these conditions CW reception is often a trial. On the AR-8516L the BFO is adjustable and calibrated plus and minus 2 kc from zero beat. In this way it is much more versatile and usefui to the CW operator. A noise limiter and both fast and slow AGC rates are provided, and there is an S-meter calibrated in dB above 1 microvolt. The manufacturers suggest that a reading of 40 dB represents S9, but the writer has still to find a signal capable of doing this, outside of course transmissions in the immediate vicinity.

A receiver sensitivity on CW taken at 6 dB signal-plus-noise to noise ratio is given by the makers as 3 μV between 80 and 520 kc, 2 μV between 520 kc and 4 mc, and 1 μV between 4 mc and 30 mc. A direct comparison using weak signals on the same aerial system as another receiver having a 1 μV sensitivity figure checked the accuracy of the maker's claims.

Front panel layout and disposition of the controls follows sound ergonomic principles (for a right handed operator); the knobs most often used (RF gain and Tuning) are ideally placed and not, as in some other equipments, where the tuning control is frequently knocked or brushed against. This can have dire consequences in the case of a transceiver as the writer knows to his cost! The complete receiver in its case weighs 91lbs. and is not a piece of equipment easily carried around or suitable for mobile or field day applications!

Frequency Conversion

Reference to the block diagram (Fig. 1) will show that the AR-8516L circuitry has a complexity not found in the average communications receiver. Its designers had to arrange for the receiver to tune from 80 kc to 30 mc without gaps and to have

Table of Values

Fig. 2. The Feed-Back Amplifier Circuit

C1, C7	= ·01 μF ceramic	R3, R5, R8	= 2,200 ohms
C2	= 470 $\mu\mu$F mica	R6, R9	= 1 megohm
C3	= 20 μF electrolytic	R7	= 22,000 ohms
C4	= 1,000 $\mu\mu$F mica	R10	= 1 megohm pot.
C5	= 2 μF electrolytic	R11, R12	= 220,000 ohms
C6, C13	= 1,000 $\mu\mu$F ceramic	R13	= 100,000 ohms
C8	= ·068 μF paper	R14	= 470,000 ohms
C9, C10	= 750 $\mu\mu$F mica	R15	= 150 ohms 1 watt
C11	= 510 $\mu\mu$F mica	V112A	= ½ type 7AU7 (or 12AU7)
C12	= variable 550–1,600 $\mu\mu$F mica	V117	= 7AU7 (or 12AU7)
C14	= 30 μF electrolytic	V118	= 12CU5 (or other output pentode)
R1	= 500,000 ohms pot.		
R2, R4	= 56,000 ohms		

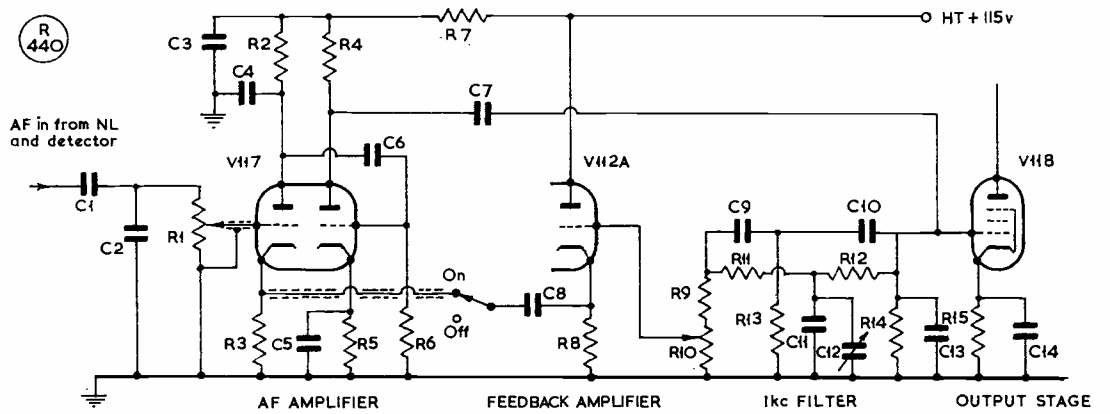
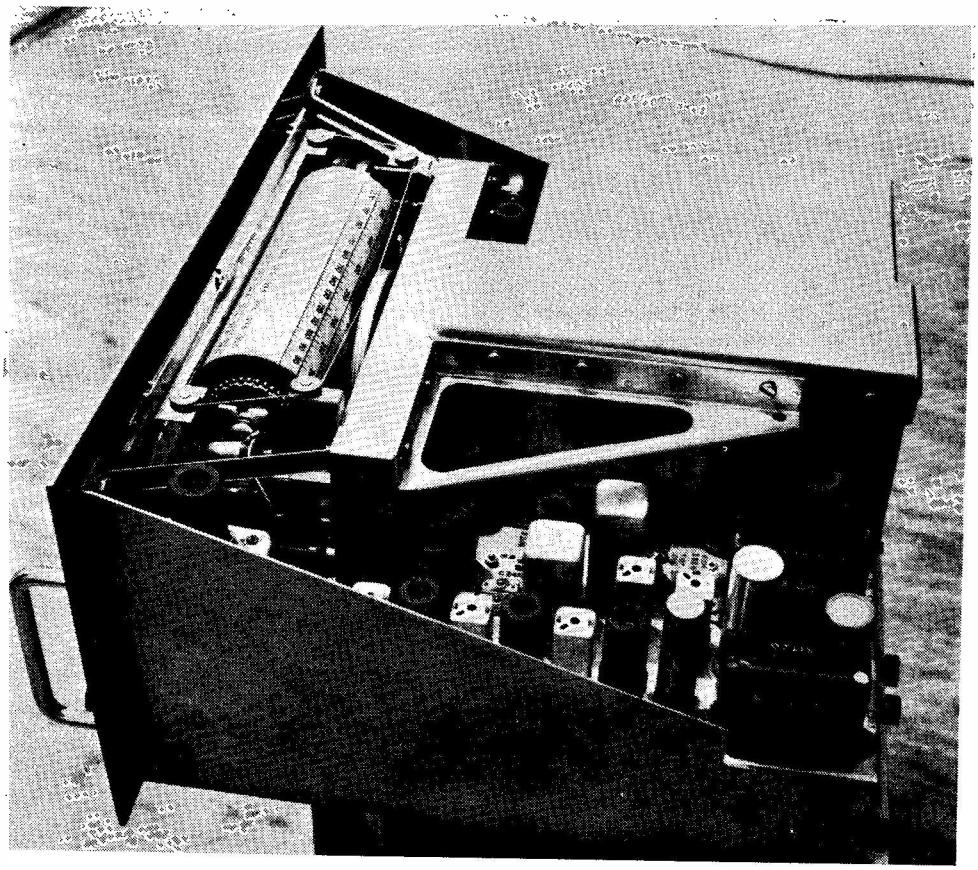


Fig. 2. Circuit of the R.C.A. AR-8516L Feedback Amplifier.



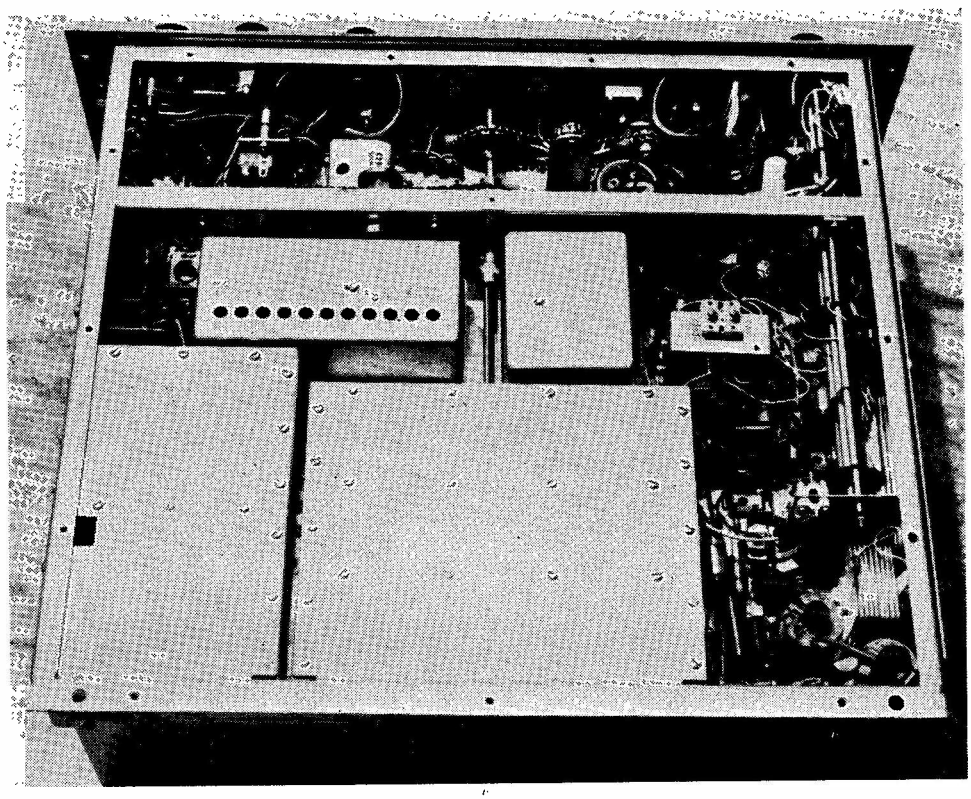
The rigid construction of the R.C.A. AR-8516L is obvious from this photograph. The two large screening boxes, housing the tuning packs, dominate the chassis. The eighteen valves used have their heaters connected in series. At the rear of the chassis can be seen the two 5 Hy smoothing chokes for the HT supply, one of which is in the negative line. (The Rx is designed for AC/DC operation.) The large drum-dial, carrying 18 band scales, is rotated by a chain drive and has clear and easily read markings.

uniform performance over this range. As a result we find two VFO's, two BFO's and considerable switching arrangements.

On Bands 1 and 2 (80-520 kc) the receiver operates as a single conversion superhet with an IF of 45 kc, and BFO2 (V106B) is used. On Bands 3-5 (520 kc-4 mc) operation is either as a single conversion system with a 455 kc IF or as a double conversion system using both 455 kc and 45 kc IF's, depending upon the degree of selectivity desired. On the higher frequencies, 4·0 mc upwards, the receiver is either a double or triple conversion superhet, again depending upon the selectivity required. On these higher frequencies (Bands 6-18) the crystal controlled front end comes into operation and also a tuned IF amplifier (V104) tuning 2-4 mc. This stage acts as an RF amplifier on the lower frequency bands. Some reference to Table I will be helpful in determining the function and operating frequencies of the different stages. (*see* p. 467).

Selectivity Circuits

The 6 kc and 3 kc bandwidths are obtained in the 455 kc IF system and are not available on Bands 1 and 2. On Bands 3 to 18 when the selectivity switch is set at 3 kc, 1·5 kc, 0·8 kc or 0·1 kc a mechanical filter is operative. This filter is switched out in the 6 kc bandwidth position and band-pass tuned circuits then come in. The three narrowest positions of selectivity are produced in the 45 kc IF system, the 0·1 kc bandwidth being obtained by a special AF feed-back circuit (Fig. 2). This circuit has much to commend it and is shown in full so that home constructors may incorporate it into their receiver or add it to existing equipment. V117 is a two stage RC-coupled audio amplifier which feeds a bridged-T filter network (C9, C10, R11, R12, etc.) and the grid of the output stage V118. The bridged-T filter has a *null* at 1 kc and its output is also fed to the grid of the feed-back amplifier V112A. The feed-back amplifier is cathode coupled to the first stage of AF amplification and



The RF switching and tuning circuits are enclosed in screening boxes. The smaller one seen to the right of centre contains the components for the main VFO, and the long perforated box screens the front-end crystal oscillator. The small tag-strip at top left betrays the British origin of this particular model. The general construction is reminiscent of all R.C.A. receiver designs, such as the AR88 and AR77. When the base-plate is in position, and the receiver is in its cabinet, the total screening is very good and helps to account for the exceptional stability and low radiation figure.

the effect is to give positive feed-back at frequencies near the *null* frequency and negative feed-back at frequencies well removed from the *null* of 1 kc. This gives a sharp peak to 1 kc signals and the frequencies below 700 cycles or above 1300 cycles are attenuated by about 20 dB. A BFO with variable pitch is needed with this circuit, and it must be set to give a beat note of exactly 1 kc for full advantage. The amount of feed-back is controlled by C12. This must not be too great or a "ring" will be produced on signals, making them hard to copy. Reducing the AF gain control can also give a "ring" should the feed-back be too great. In the AR-8516L, V117 and V112A are valve types 7AU7 which are not commonly used in this country, but the 12AU7 valve could be substituted and would give identical results.

AGC and Noise Limiter

Two separate AGC systems are employed in the receiver, each having a positive delay bias. One is in the 455 kc IF section and the other is tied to and derived from the 45 kc IF. Both systems operate independently of each other to maintain constant output, this being within plus or minus 5 dB for input signals between 10 μV and 1 volt. Two time constants are available, the slow one being effective for CW or SSB work.

The noise limiter is of the diode shunt type and is used with either the 455 kc or 45 kc IF stages. Its limiting effect is automatic and the negative peak-clipping level is proportioned to the strength of the signals from the detector diodes. The AR88 noise limiter is one of the best known for effectiveness and the AR-8516L limiter maintains the RCA tradition.

The 500 Kc Oscillator

V112B (Fig. 1) is a 500 kc crystal oscillator which performs several functions. The first of these is to give 500 kc calibration marker points throughout the receiver tuning range. In addition its output is used as injection to the third mixer stage (V114) to provide frequency conversion to 45 kc. Thirdly, it is used in a novel way in a beat frequency heterodyning system for dual IF operation. This cannot be made

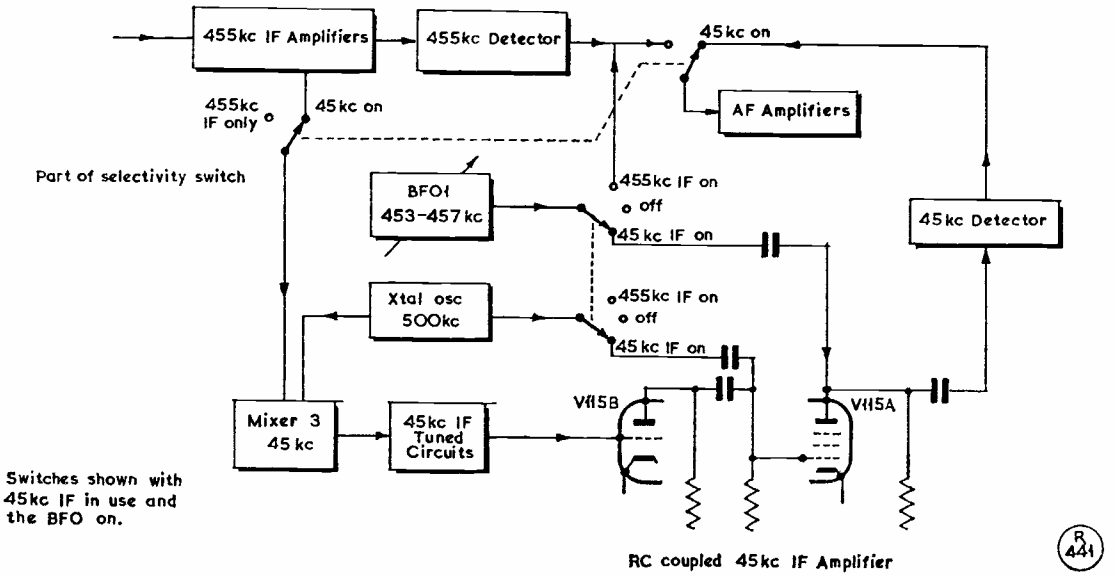


Fig. 3. Beat Frequency Heterodyne System for Dual IF Operation, Bands 3-18 only—see text.

clear in the simplified block diagram (Fig. 1) but examination of Fig. 3 should clarify its operation. On Bands 1 and 2 BFO2 (V106B) only is used but on all other bands BFO1 (V113) comes into operation, either alone or in conjunction with the 500 kc oscillator. BFO1 is used alone when the receiver bandwidths are either 6 kc or 3 kc, but at the narrower bandwidths when the 45 kc IF system operates, BFO1 (453 kc-457 kc) and the 500 kc oscillator outputs mix in the RC-coupled 45 kc IF stages to provide a 0-2 kc difference frequency at the IF. This clever circuitry gets over the quite difficult problem posed when two different IF's are used in a receiver and are switched for purposes of selectivity.

Additional Features

Intended for marine use, the AR-8516L is built like a battleship! Mention has been made in an earlier paragraph of its weight, and this is due to the really heavy gauge metalwork and extensive screening. The power pack is in two sections. For a 115v. supply (AC or DC) there is an internal rectifier and smoothing circuit. There is also a power pack mounted in the cabinet which gives 115v. DC output from AC input voltages of 115 or 230 volts. The writer uses both power packs and this means that the heaters are running from DC.

There is a phone socket arranged for high impedance phones, and output terminals at the rear for ¼-watt of audio at either 3·2 ohms or 600 ohms impedance. Also there is a jack at the back which provides 0·1v. at 455 kc into a 1000-ohm load for FSK or SSB adaptor applications.

As in most receivers not designed expressly for the amateur market the Send/Receive switching is

TABLE I

AR-8516L Receiver—Frequency Conversion

Band	Range	V103 xtal osc. output freq.	V104 RF/IF tuning	VFO Freq.	Fixed IF
1	80–200kc	——	200–80kc	245–125kc	45kc
2	200–520kc	——	520–200kc	564–245kc	45kc
3	520–1300kc	——	1300–520kc	1755–975kc	455 and 45kc
4	1·09–3·09mc	——	3·09–1·09mc	3·545–1·545mc	,, ,,
5	2–4mc	——	4–2mc	,, ,,	,, ,,
6	4–6mc	7·08mc	3·09–1·09mc	,, ,,	,, ,,
7	6–8mc	10mc	4–2mc	,, ,,	,, ,,
8	8–10mc	12mc	,,	,, ,,	,, ,,
9	10–12mc	14mc	,,	,, ,,	,, ,,
10	12–14mc	16mc	,,	,, ,,	,, ,,
11	14–16mc	18mc	,,	,, ,,	,, ,,
12	16–18mc	20mc	,,	,, ,,	,, ,,
13	18–20mc	22mc	,,	,, ,,	,, ,,
14	20–22mc	24mc	,,	,, ,,	,, ,,
15	22–24mc	26mc	,,	,, ,,	,, ,,
16	24–26mc	28mc	,,	,, ,,	,, ,,
17	26–28mc	30mc	,,	,, ,,	,, ,,
18	28–30mc	32mc	,,	,, ,,	,, ,,

Note:

(1) All bands have frequency overlap.
(2) The front end crystal osc. output frequencies are derived from 7 crystals.
(3) V104 is an RF amplifier for bands 1–5 and IF amplifier on other bands.

primitive, there being no provision for "listen through" when transmitting. Switching to "Stand by" merely earths the grid of the output stage. It would be possible to open the RF/IF gain control potentiometer circuit and connect to an external muting relay and resistor, but the writer has not yet attempted this. By wiring a small relay across the aerial and earth connections and turning back the RF gain control somewhat it is possible to monitor CW and SSB transmissions from a full power transmitter without receiver blocking.

On the higher frequency bands (4 mc and up) the slide rule main dial scale is not exactly accurate, and a note must be made of the dial settings on the circular logging scale for band edge marking. This slight inaccuracy amounts to about 5 kc at two of the 500 kc check points along the main scale, and as it is caused by a slight non-linearity of the VFO used on Bands 4-18 the errors repeat exactly on each of these fifteen bands.

The receiver is excellent for general amateur band use and also because of its extensive frequency range has other applications. One of these is in the checking of oscillators, etc. whose frequencies lie outside the amateur bands. The writer's two-metre converter fortunately has an output IF of 24-26 mc and the AR-8516L tunes this range on Band 16. As the converter uses a 30 mc crystal it is possible to read off frequencies on the 144-146 mc band with great accuracy. The stability and the 0·1 kc bandwidth capability of the receiver make it very suitable for VHF meteor and moon-bounce work. The logging scale has a circumference of 10½ inches which represents 100 kc of tuning. The reduction gearing of the tuning capacitors is 42 to 1 on Bands 1-5, and 160 to 1 on the other bands, a feature which makes tuning easy even when using maximum selectivity.

Birdies and unwanted spurious responses are often an unwelcome feature of multiple conversion receivers. In the AR-8516L all such effects have been cut down to a very low level, being less than a 2 μV equivalent signal. First image and IF rejection average 60 dB, the worst figure being a first image rejection of 30 dB on the higest frequency range of 26-30 mc.

Conclusion

The true story of how these receivers were released on the open market at prices as low as one third of the original true cost is beyond the scope of this article, but it is believed that more than 100 of them (built to American specification in this country by RCA) are in circulation. Any aspiring owners of the excellent AR-8516L must keep their eyes on the Small Advertisement columns of the *Magazine*, and it is hoped that this short review will be of interest to those looking for the best at a fair price.

PICTURE RECEPTION FROM THE WEATHER SATELLITES

SUCCESSFUL RESULTS WITH AMATEUR DESIGNED AND BUILT EQUIPMENT

J. B. TUKE (GM3BST)

All who read this article will be intrigued by the possibilities, as well as the results already obtained by our contributor. He has long since made a reputation for the original approach, to such practical problems as Facsimile Reception, Diversity Working on RTTY, and an Auto-Alarm for VHF Monitoring. Apart from its Wx significance, the particular interest of his present facsimile recording activity is that under clear-weather conditions, large areas of the Earth's surface are reproduced on the receiving equipment. Though we have seen interesting specimens obtained by GM3BST, unfortunately as yet—for reasons explained in his article—they are not quite good enough for reproduction here. But no doubt that problem will be solved in time.—Editor.

SINCE first reading some years ago about the various weather satellites orbiting the Earth it has been the writer's greatest wish to be able to copy these pictures direct on his facsimile recording equipment—as described in the April, May, June, October 1959, and January 1964 issues of SHORT WAVE MAGAZINE. Until recently it has had to remain just a wish because the pictures which the satellites took were "stored" and later released by radio-command from the ground when passing over various central controlling stations. This meant that for practical purposes there was little or no chance of intercepting any of these transmissions.

One of the earliest satellites to transmit pictures direct to Earth in "real time" was *Tiros 8*, but the picture transmission had ceased to function properly before any work on the GM3BST ground station could be commenced, and the same applied to the early *Nimbus I* transmissions. One of the reasons for this delay was lack of advance information about satellites and only after several attempts with various authorities was it found that W3ASK of *CQ Magazine* was able to supply the data soon enough for it to be of use. It is fair to say that without this assistance, the "space programme" at GM3BST

would still hardly have got off the ground.

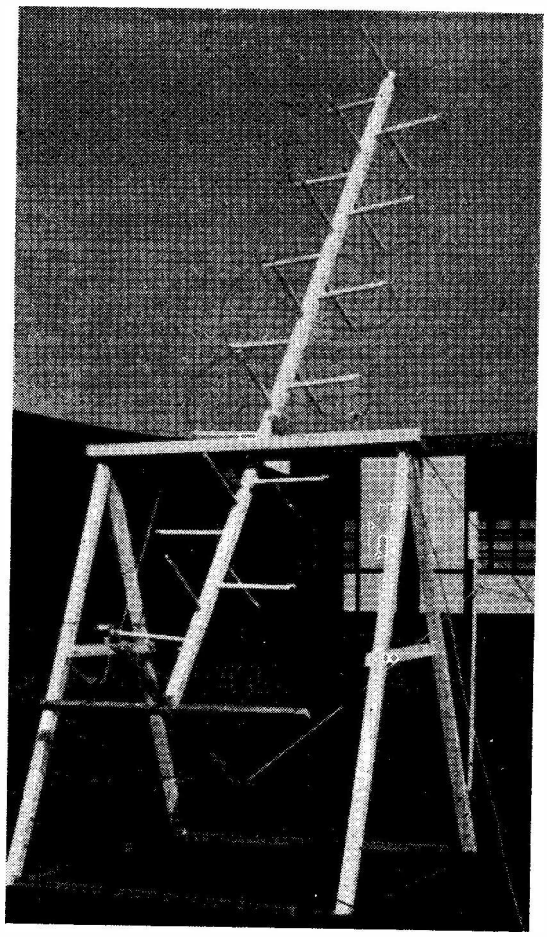
Information received from W3ASK early this year indicated that a Tiros Operational Weather Satellite (known as *TOS*) would be launched in March 1966 and that this would transmit cloud charts by *APT* (Automatic Picture Transmission). This type of transmission takes place on 137·5 mc and consists of facsimile-type signals which, after some adjustment to the equipment, can be received on standard facsimile recorders. The picture modulation consists of an AM sub-carrier of 2400 c/s which is frequency modulated on the VHF transmission with a maximum deviation of ± 10 kc. Pictures take approximately three and a half minutes to transmit, then there is a pause of a little over two minutes, and then the cycle starts all over again with the next picture. The satellite is about 750 miles high and transmits with a power of 5 watts. While most standard weather map facsimile transmissions are sent at a drum speed of 120 rpm, the satellite transmissions are at 240 rpm. This would mean if the fax. Rx were left unmodified, two pictures of half the size would be received side by side, and it was decided temporarily to accept this. Apart from anything else, the amount of sensitive paper used would be halved and it was considered that during the early experimental period this might not be a bad thing financially!

At the same time as all this technical gen. was being received from W3ASK, the periodic domestic upheaval which disturbs the GM3BST household from time to time took place—that is to say, the QTH was changed yet again—this time from near Glasgow to Stranraer in south west Scotland. The result of this was that little or no preparations had been made when GM3CEA of Stranraer, who had become interested in the project, announced one evening early in March that the "Voice of America" had said that the "TOS/APT satellite was up." No forecast orbital times were available, so a listening watch was commenced which was rewarded by hearing the satellite the same evening at 2300z. The receiving aerial in use was a simple ground-plane, and the signal seldom more than about S5, but the satellite *was* transmitting pictures, and when fed to the facsimile recorder, it *did* reproduce a "picture"—two solitary vertical bars! ! However, despair did not entirely fill the shack as the information received in advance indicated that under normal operating conditions pictures would only be transmitted on a daylight pass and it was thought that since the first interception had been during the hours of darkness no picture could possibly be received anyway and that probably the satellite was operating under some sort of test condition. The indicated programme showed that APT would not normally be operating at this hour.

First Results

A few calculations by GM3CEA gave a forecast time for a "pass" the next morning, and there was tense excitement in the shack when the equipment was switched on some fifteen minutes beforehand to be on the safe side. Sure enough, just at the time forecast, the APT and beacon signals could be heard. The receiving equipment then consisted of a low-noise VHF converter feeding into an AR88. The main receiver was operated in its widest selectivity position, and the signal tuned to one side of the band-pass, thus giving a crude FM modulator.

In the amateur field, there is probably nothing just quite as thrilling as working one's first station —and then later one's first DX. As the first images were built up on the fax. recorder, the writer's feelings were just like that all over again. (If you feel jaded with present day Amateur Radio, with its "packaged" stations complete with mike and mains plug, the writer can recommend breaking into the



The helix (beam aerial) for the 136 mc satellite band designed and built by GM3BST for his Wx chart recordings. Dimensions are given in the text. The mounting is on a simple wooden framework, with the boom pivoted near the point of balance, so that there is a slight bias of weight in the upper section. By counter-weighting the base, the swing of the aerial across the sky can be controlled by a cord. Thus, the beam can be swung to follow the satellite as it passes overhead, or within range. The alignment of the frame is such that the swing of the helix is, as nearly as possible, correctly in azimuth for the transit of the satellite.

"space" programme with largely home-made equipment to make the interest of one's first amateur days return.)

As the first series of three pictures came to an end and the signal faded down into the noise, the pictures were cut and pieced together to form the first complete cloud chart. An hour later, the Atlantic weather chart from Bracknell Met. was taken, over the air, to see how the two compared. Sure enough, depressions did look like large whorls, and areas of solid and broken cloud could be well determined. The pictures did, however, suffer from two major defects—poor contrast with absence of detail in the lighter portions, and marked variations in signal strength which caused the depth of the picture to vary in bands. It had been noticed during the reception period that the signal varied from practically *nil* up to S8, very rapidly. The reasons for the two defects were clear. The poor picture quality was undobtedly due to the use of the AR88 as an FM receiver, and the fading to the unsuitable aerial system. This last case was proved conclusively, when GM3CEA brought up a small 2-metre Yagi aerial, which was hand-held to "follow" the satellite on its next transmit. Not only was it necessary to follow it in direction, but the *polarization* also was changing through the entire 90 degrees during transit, due to the Farady effect, and in a completely random manner. In fact, it was evident that having the correct instantaneous polarization was more important than having really accurate directivity!

Improving The Gear

Each problem was tackled in turn. To demodulate the FM signals properly it was necessary to build an FM strip to follow the VHF converter. Some experiments were carried out with standard 10 mc FM strips (for normal broadcast use) but their excessive bandwidth meant sensitivity was poor and signal/noise ratio also suffered. It was therefore decided to build an FM strip suitable for the particular purpose required. An IF of 1·6 mc was decided upon—with the immediate difficulty that no discriminator transformers were available with ± 10 kc bandwidth. The final solution was to make one, and a standard *Denco* 1·6 mc transformer was modified. The secondary was removed and replaced with a centre tapped winding. Then, with wobbulator, 'scope and VTVM (to say nothing of at least 15 cups of tea at intervals) experimental positions of coupling and LC ratio were tried until a satisfactory solution was achieved. The final result was a discriminator with a maximum range of ± 15 kc, which gave a large AF output for a reasonably small deviation. The complete block diagram of the FM strip is shown in Fig. 1. Both this and the AR88 are fed split output from the VHF converter—the AR88 often being left tuned to the satellite beacon frequency (136·77 mc).

The next item to receive attention was the aerial. It was decided that if a system suitable for receiving useful pictures on most days was to be evolved, it would be necessary to employ a helical aerial, to be capable of following the path of the satellite. The apparent position and movement of the satellite over the earth's surface is such that it passes from roughly 20°E of North to 20°W of South when its transit is directly overhead. The daily change of longitude is almost 8° to the West and the difference in longitude between successive orbits is 28°. The satellite is sun-synchronous to cross the Equator going south at 0900 local time there. Conditions would therefore vary between the most favourable orbit when the satellite did indeed pass directly overhead to the least favourable, when one pass would be 14°E of the writer's QTH, and the next 14°W, *i.e.* successive orbits would pass equal distances either side. Ideally, the helical aerial should be steerable in both elevation and azimuth, but there were two other matters to consider—convenience and cost. It was thought that a reasonable compromise would be reached if the aerial were made steerable in elevation only, and permanently set on the correct track for optimum conditions. The "beam" is not particularly narrow and while weaker signals would be expected during unfavourable orbits, the *most* unfavourable condition would not obtain too often, and where one orbit was nearer than the other this would always be chosen in the interest of good results. While the early results had indeed been most exciting, once a picture had been received the aim was now to provide a reliable service which would genuinely assist the hobby of meteorology to which the writer is an addict.

The Helix Aerial (*see* p.469)

A six-turn helix was constructed and supported on a device not unlike that used to carry a child's swing. The centre boom is made of 2in. x 2in. seasoned timber, and the radials for the aerial are ¼-in. dowel terminating in nylon curtain runner brackets which act both as mechanical supports and insulators. The helix itself is made of ⅛-in. copper wire and is constructed to standard dimensions. (Diameter = $\frac{\lambda}{\pi}$ and pitch = $\frac{\lambda}{4}$). A chicken wire reflector is fitted at the end and spaced $\frac{\lambda}{8}$ from the end of the helix. Low loss coaxial cable is connected directly in spite of the mismatch—this is because it is intended to fit an aerial head amplifier shortly which will be made to work directly into the aerial impedance. This temporary arrangement does not introduce any great loss, as the SWR will not exceed 2:1. The picture shows the general construction of the aerial. The cross boom is free to rotate and the aerial will track from horizon to horizon throughout 180 degrees. It is set up to point 20°E of North. A weight biases it towards the North (it being supported on its centre of gravity) and a simple rope pull is used to swing it over to the South. Releasing the rope gently will allow it to track from South to North if this is required.

With these two modifications complete, the system

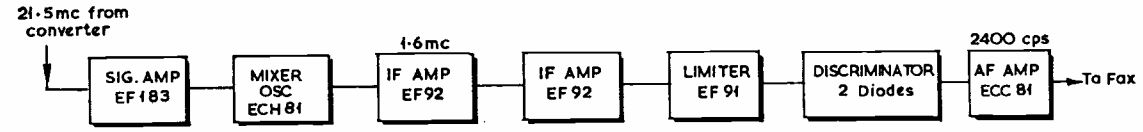


Figure 1. FM Discriminator Strip

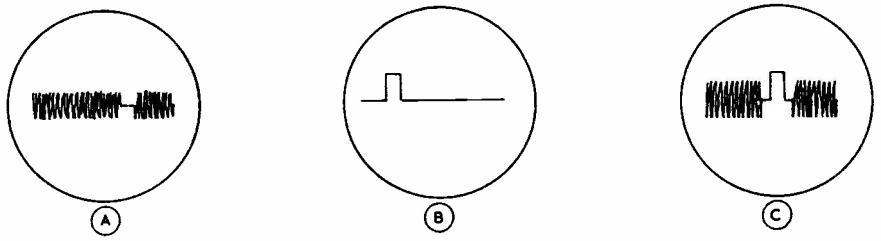


Figure 2. Use of Oscilloscope for Phasing.

S 68

has been proved quite effective. A really good picture can be obtained on at least three days out of five, and even under worst orbital conditions, satisfactory pictures are received.

Some thought has been given to modifications necessary to the facsimile recorder itself, to improve results even more. It had been observed on early pictures that details seemed to be missing in the lighter parts of the picture, and the writing amplifier was therefore modified to use two output valves in parallel (a pair of ECL83's) and this enabled the whole picture to write considerably darker. The conditions set up are such that the paper *just* starts to darken on the background noise—then any increase of signal however slight will cause corresponding darkening of the paper and fine details are not lost. It is likely that some of the variations close to maximum black are obscured—it is intended to alleviate this problem in due course by introducing some form of progressive audio AVC.

Notes on Recording

There is of course no doubt that to achieve best possible results it would be necessary to abandon the direct recording paper altogether and use a photographic system. As far as the writer is aware, this is what has been done by other amateurs in this field. The aim at GM3BST however, may be slightly different from that of others, since here the purely meteorological aspect is of prime importance. To reproduce results photographically requires either that the equipment can be loaded with light-tight cassettes of film for later development and printing in a dark room, or alternatively that the satellite signals be recorded on tape at the time of transit and then fed into the fax. recorder at some other time, say in the evening, when it is practicable to operate under darkroom conditions. To consider running the equipment direct from received signals whilst in a darkroom, is not practical. During transit, both aerial and receiver adjustments are necessary—for tracking and Doppler shift respectively. To copy signals directly would therefore mean complete reconstruction of the fax. recorder to allow it to accept pre-loaded drums of film, and the tape recorded method is ruled out since pictures are required for immediate study from the meteorological angle. Having considered all these factors the writer decided to accept the lower reproduction standard of the direct dry recording paper in view of its overwhelming other advantages. For future development there is a further possibility: This is the use of chemically impregnated damp paper as the recording medium—this will give almost photographic reproduction, but cannot be used satisfactorily on a drum recorder. A new facsimile recorder altogether may well be built at a later date.

Some modifications were made to the present recorder, however, apart from the increase of writing density mentioned earlier. The ratio of the gear box between motor and drum has been halved enabling 240 rpm to be achieved and full-size picture reproduction to be obtained if required. Those who have read the earlier articles on fax. (1959 issues, already listed) will know that the equipment at GM3BST uses a two-speed motor, and that the original gear ratio provided drum speeds of 60 and 120 rpm. The former has now been abandoned, and 120 and 240 rpm are available. For reasons mentioned earlier, 240 rpm is not in fact used to any great extent. A problem that did arise when wanting the 240 rpm speed was that of phasing. When running at 120, two identical pictures side by side are reproduced and one must therefore be clear of the join in the paper where it is wrapped round the drum. The other picture is surplus anyway, so there is not much point in bothering with phasing—but when using full size, phasing is of vital importance, or the join of the

paper may fall in any random part of the picture. The phasing signal sent from the satellite is of short duration, consisting in a number of continuous lines of signal, briefly interrupted at the edge of the picture. This type of signal will not operate the phasing solenoid on the GM3BST equipment, since it relies on a pulse of signal, not the absence of one.

Synchronising (*see* p.471)

Phasing is therefore achieved in a completely different manner. If the satellite signal is displayed on an oscillocope which has its time base running at 240 times a minute, the phasing signal looks like Fig. 2(A). If at the same time a pulse could be obtained from the recording drum, to coincide exactly with the moment when the writing stylus is passing over the join in the paper, and this was applied to an oscilloscope, it would look like Fig. 2(B). If the pulses were to coincide, the system would be correctly phased. To turn this idea to practical purposes it is first necessary to generate a drum pulse, and this is done in a very simple manner. A small lamp shines on to a photo-transistor, and the light is interrupted by a spigot on the rotating drum at each revolution. This produces the pulse. The paper is loaded on to the machine in such a position that just as the light is interrupted, the join is under the stylus. Both this pulse and the satellite phasing signal are now applied to the 'scope, and it is only necessary to apply light finger pressure to the rotating drum, thereby causing it to slow down slightly, to move one pulse relative to the other until correct phasing is achieved, as in Fig. 2(C). The phasing signal does not last more than a few seconds, so one has to work quickly, but after a little practice it is really quite easy, and results can be achieved successfully time after time.

The Results Generally

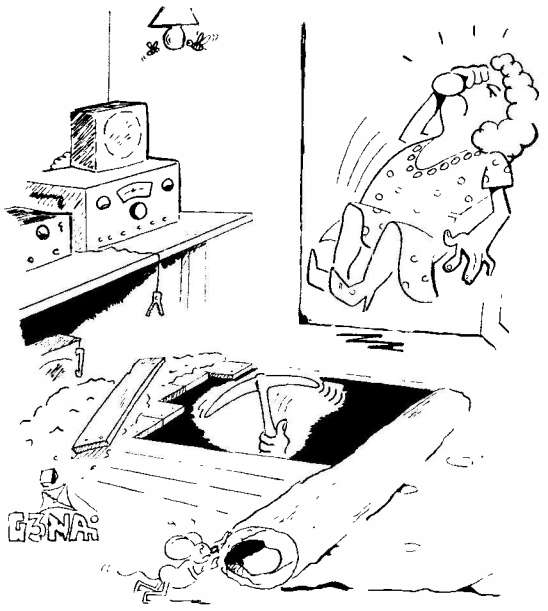
The system has been operating continuously since early in March and results are extremely interesting. During the month of April while much of the experimental work was being carried out, the weather conditions were such that Norway was visible on the received pictures day after day. With the final collapse of the anticyclone responsible for this clear weather (and the cold spell in the U.K. at that time), such good conditions have not been repeated. Although the aim of the system is to produce *cloud* pictures, everyone is interested in having this bird's-eye view of the Earth, and land forms from a great height are of considerable interest. The U.K. has been seen, though never completely clear, on a number of occasions. Iceland and the North African coast have also appeared from time to time.

Three consecutive pictures can usually be received in one transit. The first has its northern boundary about 72°N. The second has its top edge around 60°N, and the third about 40°N. There is considerable overlap on each picture, and when they are cut and joined together the northern edge is from 75°N to its southern edge about 30°N. The width of the picture is over 1,000 miles, so quite a large area is involved. The various weather systems can be plainly seen.

More recently, Satellite *Nimbus 2* has appeared on the scene, and is considerably lower than *Tiros* (approximately 450 miles high). The pictures will therefore contain greater detail. This satellite is on a track different from *Tiros*, and for best results the aerial has to be re-orientated. Also *Nimbus 2* is northbound, and not southbound as *Tiros*. Conditions have never been cloudless over U.K. since *Nimbus* appeared, but good ground pictures should be received under clear weather conditions.

As with most amateur projects, much work has been put in, some results have been achieved—yet the end is nowhere in sight. As mentioned earlier, it is intended to build a small aerial head amplifier, to improve signal/noise ratio even more (always of importance for any type of picture transmission). A recorder for chemical paper is nearly on the drawing board, and eventually the helical aerial will have to be made steerable in azimuth and elevation, and motorised as well.

Although this met. aspect of Amateur Radio has little or nothing to do with more conventional sides of the hobby (though the writer considers a cloud chart to be quite the most exotic QSL card that can be had) participating actively in the radio space programme is of very great interest, and will present problems to tax amateur ingenuity for some considerable time to come.



" . . . Are you sure we've got an earth-pipe in this room, Love . . . "

AMATEUR RADIO, 1966

HOW SHOULD THE FUTURE BE SHAPED?

A. R. WILLIAMS (G3KSU)

Readers who have opinions are invited to comment on the subject of this article. A selection of letters will be published.—Editor.

"THINGS aren't what they used to be," might aptly express any old-timer's opinion of Amateur Radio in this country today, 1966. Considering the changes that have taken place since the early days, this would in fact be a great understatement. But what about the changes during the last twenty, ten, or even five years—surely the same remark applies?

The most noticeable change to a casual observer, if such exists, must be the great increase in the number of those who have made Amateur Radio their hobby. Not only in this country have our ranks been swelling, but the entire world over. This, as we are only too well aware, has been accompanied by a corresponding increase in the amount of mutual interference, only to be made worse by a reduction in bandwidth of what were and, with the exception of 40 metres, still are our most popular bands.

Let us go back just twenty years. The resumption of Amateur Radio in 1946, after the end of Hitler's War was, to a great extent, aided by the wealth of surplus and ex-government radio equipment then available. Much of this was very cheap and some of it very useful, giving somewhat inadequate but reliable service to this day. A lot however, was far from suitable, requiring considerable modification. Commercially-built equipment, designed specifically for the amateur, was virtually unobtainable. In any case, the writer considers it doubtful that it would have found much of a market; Amateur Radio still had a true amateur flavour to it, even if it was becoming tainted. If nothing else, the conversion of surplus equipment did at least call for *ingenuity*.

Newcomers to our ranks were, for their first twelve months on the air, obliged to use CW only and limit the input to 25 watts. HF conditions during the late forties were excellent, while VHF was, for many, still a sphere to be wondered at. In general, life was good.

Advent of TV/TVI

But as with many good things it nearly came to an end, and the end in this case was represented by a patterned or even blank TV screen. Nationwide TV started to spread like the plague, only to be made worse by extended viewing hours. For a while it looked as though nationwide TVI was going to be a good second; 80m. became almost devoid of G's at 7.30 p.m., coinciding with the start of TV transmissions in those days. (Surely they were not *all* watching it?) Something had to be done, and this period about the early fifties must have seen more transmitters rebuilt than any other. For perhaps the first time in the history of Amateur Radio in this country, it became *essential* to have a sound knowledge of radio theory. Essential, that is, if local TVI problems were to be diagnosed and cured satisfactorily. Previous cut-and-try methods went out the back door, as the makings of a more advanced technical approach came in the front. Thus the neighbours were kept at bay.

The advent of ever spreading TV had to some extent been a blessing in disguise—and a very effective disguise it was, too. The latter half of the fifties saw the end of most TVI cases, together with the disappearance of the dreaded 14 mc IF. Our technical knowledge had improved and our varieties of communication modes increased. SSB, Amateur TV and RTTY were soundly established and a long overdue return was being made to the amateur constructed receiver. Again conditions were good, and this time activity was high on all bands, including VHF, where many had previously fled in despair of poor conditions and relative overcrowding on the HF bands. Although our hobby may have been described as "healthy," there was just one little thing that had started to grow in the early fifties and continued to do so with an ever increasing hold—*commercialised* Amateur Radio. Its inroads, during the last five years in particular, can only be described as amazing.

What Now?

This brings us to the present "state of the art." At one time commercial amateur gear would have been unimaginable. It had been almost traditional that most, if not all, of one's equipment, would be home built. Those who did otherwise were considered traitors to the cause! But how had this tradition developed? Was it just a "left-over" from the early days when all equipment *had* to be home built, there being no commercial gear available?

But now look at the scene! Just look at the advertising pages of SHORT WAVE MAGAZINE. Changed days indeed, but has it been a change for the better, or worse?

Let us imagine, if we can, what our HF bands would sound like, and what proportions TVI might reach, if we all, the totally incompetent included, insisted on "rolling our own." We all make mistakes at some time, and most of us learn from them, but our numbers are now such that there would be an awful lot of mistakes when there is, in reality, only room for a very few.

On the other hand, has Amateur Radio become just *too* easy? At one time, technical knowledge, mechanical skill and just plain ingenuity, counted for something. Now anyone can "join-in," the only limiting factor to the size and complexity of an amateur station being the owner's financial ability. Top Band to 70 cm., all modes (except A/TV and

RTTY—at least something is sacred!) even aerials—all over the counter, mail order and easy terms.

The Next Decade

How then can our standards be kept up, or better still, improved? Without wanting to make life more difficult for the novice, is the time ripe to re-introduce the discarded "CW only and 25 watt" limitation?—Or does this suggestion raise screams of horror from future members of the anti-CW brigade? Failing this, how about the introduction of an official "Amateur Radio Procedure" exam, to be conducted at the same time as the Morse test? This would at least ensure that all newcomers were familiar with the correct procedures, instead of picking up the incorrect ones from those who are themselves ignorant of the proper way to go about things on the air.

However, what of the future? Will 90 per cent of us have all-commercial rigs? Will we still go on sending those mostly unwanted pieces of coloured cardboard to each other? And busy ourselves collecting those mainly meaningless "awards"? Will some of us still spend hour after hour chasing those unlikely sounding and ever increasing numbers of new "countries"?

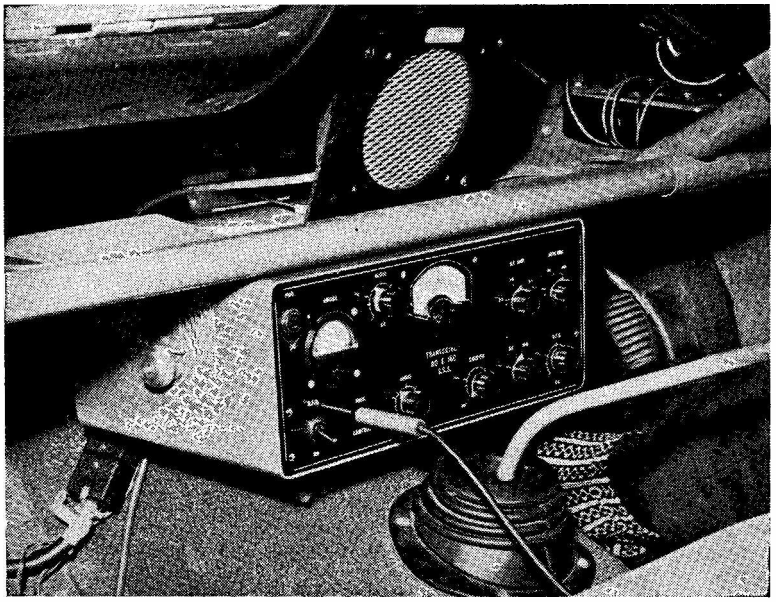
Not a very pleasant picture on the face of it, but things are seldom quite as bad as they seem at first sight. The writer does feel, however, that Amateur Radio in this country, today, has become the poorer as a result of this ever increasing commercialisation. Can this be compensated for by much improved operating techniques? After all, 90 per cent radio *operators* and 10 per cent radio *amateurs* need not be all that bad, provided the operators are really *good!*

• • • The Mobile Scene • • •

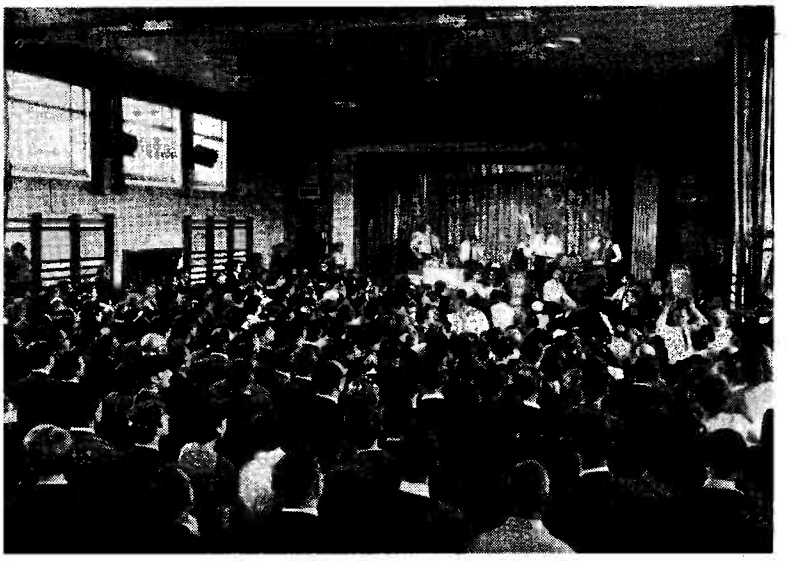
THE Rally season now having drawn to a close, it is interesting to note that this year there have been more than 20 Rallies scheduled, of which about ten could be classified as major events. Allowing an average total attendance at each of, say, 400 people, there because it was an Amateur Radio occasion, means that at least 8,000 made the journeys to be present. True, a proportion of these would be the same people going round several Rallies, and it is also true to say that at some—Trentham and Woburn are good examples—the totals are swollen by reason of the fact that there are parallel attractions having nothing to do with Amateur Radio.

According to the latest G.P.O. check, the total of mobile licences in issue as at August 31 was 2,170—out of 12,313 U.K. amateurs licensed (11,857 "A" and 456 "B") at the same date. These figures show a pretty healthy state of affairs, and the enthusiasm for Rally attendance is easily accounted for thereby.

The Derby Rally on August 14 was again a highly successful occasion—reaching the high standard that has come to be expected of the organisers of this event—and the RSGB gathering at Woburn on September 11 was similarly well attended. The only point of criticism here appeared to be that the talk-in stations on Top Band and two metres were unable to make themselves heard (or to hear mobiles) till the range had closed to the vicinity of Woburn itself.



The 80/160m. Transceiver for mobile, designed and built by G3JFH (Cheltenham), well known at Mobile Rallies up and down the country. The transmitter can run up to 40w. p.e.p., from a transistorised PSU. This picture shows how neatly the rig has been constructed and fitted.



At right, the crowd at the Derby Mobile Rally on August 14, when the auction and the junk sales were going on. This was again an overflow mobile occasion for the Derby Club group, with G2CVV as the prime mover. For nearly ten years the Derby Rally has been one of the big occasions in the Mobile Rally calendar.

(Upper left), talk-in station G3SMV/A for the Derby Mobile Rally. At upper right is a group shot at the Rally: Left to right, SWL Singleton, G3LEA, G3NVE, G3PQY, SWL Pat Longbone (on car), and G3UJT. At left is one of the proofs that radio amateur Mobile Rallies are becoming social occasions more and more. The scene in the right foreground (at Derby on August 14) may not be strictly Amateur Radio, but is of it.

VHF BANDS

A. J. DEVON

LAST month we were murmuring in this space about the few breaks there have been for VHF /EDX during the year till about the end of August, remarking "but there is time yet."

Well, since then we have had a magnificent Aurora manifestation, on the night of September 3/4 and, starting around September 19, a well-sustained tropospheric opening, bringing much of the U.K. and Northern Europe together for VHF working. Which all goes to show that the motto for VHF is (as it always has been) "Keep at it, and watch the signs."

As regards signs for the Aurora, it happened that your A.J.D. was cruising around the CW area of the 21 mc band during the early evening of September 3, his only thought being to snag some South Americans, prolific on 15m. at the time. Suddenly, a number of EU's, from well within skip-distance, started to come in with very-T6 notes, A phenomenon of this kind is a certain indication of Auroral reflection—it would be even more marked on ten metres. On pressing the go-switch for the two-metre gear (always running on heaters whenever any other equipment is in use), it was immediately evident that we were in an *Ar* situation. Broadly, it lasted from about 1600z on September 3 till 0500z on Sunday 4th, with a lull between 1900 and 2200z. (There is some diversity of opinion as to these limits, and it seems that different observers had differing results.)

Let some of the reports speak for themselves: UR2CQ (Tartu, Estonia) worked, between 2100 and 0200z, twelve EDX stations, including G3OZP (North Shields) at 0122, reports being 55A/59A—this was on a beam heading of 60°W. from UR2CQ, and is of course the first such contact G/UR2. This session represented six countries for Ilmo of UR2CQ, who also records as heard: G3KHA, G2FO, GM5HR, GW3BA/P and GM3TFY. These U.K. stations were all logged between about midnight and 0100z, with signals varying from 45A to 56A. (For those who may wonder, the *A* signifies an Auroral note, which can be anything from a broad T3 to a T8 with what sounds like ripple modulation. It all depends on where your beam is headed and the degree of reflection being obtained.) For the record, UR2CQ (who has sent in a most comprehensive report on his excellent results), runs an 829B in the PA, with a 6CW4 converter into an "8 tubes super," his beam being a 10-ele long Yagi. Frequencies available at UR2CQ are 144·187, 145·02, 145·715 and 145·625 mc. Ilmo has now worked 22C on two metres.

An equally comprehensive report comes from G3OZP (North Shields), who had a real field-day on this remarkable Aurora occasion. He says "This was my first experience of an Aurora, and very FB I found it!"—well he might; there are people who have waited years for such an opportunity. For him, it meant no less than 17 countries (*countries*, not counties) heard, eight of which were worked! At G3OZP, the party started about 1740z on September 3, with a fading-down until 2230z, when the band livened up again, with strong signals from GW, OZ and SM until around 0300z on Sunday 4th. Confirming the details of his fine QSO with UR2CQ (already mentioned), G3OZP says that the latter changed frequency from 144·187 to 145·02 mc just before they had their contact. G3OZP lists 51 different DX stations heard *via* Aurora during the opening; excluding a number in the purely GDX category, they total six LA's, two OH's, eight OZ's, ten SM's and SP2RO, not mentioned by anyone else. Congratulations to G3OZP, not only on a noteworthy achievement but also on being able to seize the opportunity when it came.

One of the VHF/DX men from whom we usually have a report when anything exciting happens is GW2HIY (Holyhead). For him, the big thing about the *Ar* opening

TWO METRES

ANNUAL COUNTIES

Final Placings, Year to August 31, 1966

Worked	Station
64	G3EDD
59	G3DY
54	G3HRH, G3RST
53	G3LAS
52	G3TLB
48	G3FNM (165)
47	G3UFA
46	G3TQZ
43	G3UCS
41	G3PTM (119)
40	G2AXI, G3OZP (194)
39	G3FIJ
36	G3IOE, G2CDX
35	G3KQF, G3UFQ
33	G3BNL
31	G3AHB
30	G5UM
27	G3W3PWH
26	G3JON (179)
23	GW3CBY (92)
18	G3THC
17	G3UTT
16	G3SLJ
15	G3TDL (54)
14	G3FVC (102)

This annual Counties Worked Table closed on August 31. The final Table for the year, made up from claims to that date, appears above. The new Annual Table for 1966-'67 opens again immediately, w.e.f. September 1st, 1966, and will run till August 31, 1967. Operators new to the two-metre band are particularly invited to join Annual Counties.

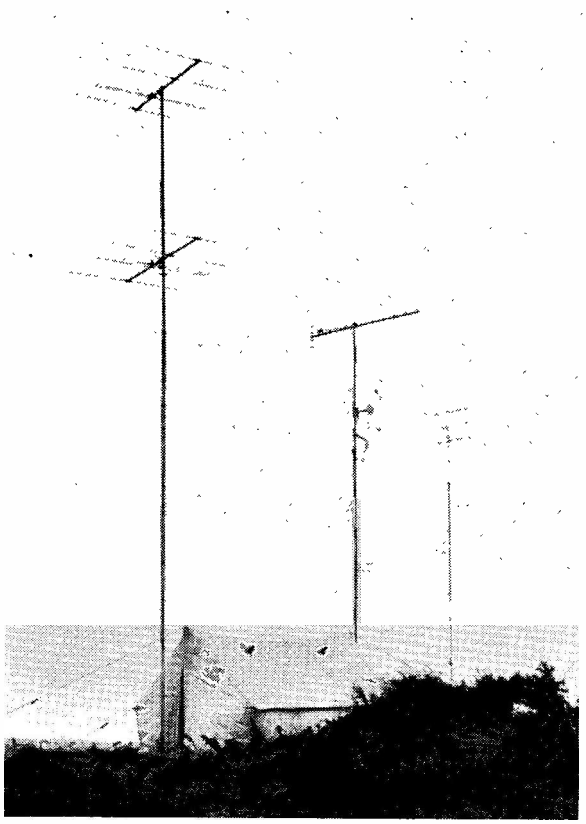
was that, after many years of trying, he at last worked GC! Eric mentions as heard during the Auroral phenomenon signals from HB, II, LX and SP; his "worked" list includes OZ9AC/P. He remarks that "a futile half-hour was spent calling SP5SM." (Which gives you some idea of what sort of EDX there was about on this occasion).

As a matter of interest, it might be added that A.J.D.'s own log shows a total of about 40 stations heard, from DJ/DL, EI, F, GM, HB, LA, OK, OZ, PA and SM, during this opening—all started by a session of casual DX working on 15 metres!

Perhaps it is also worth mentioning in this context that the *Daily Telegraph* of September 5 noted that a large solar flare became evident on Friday, September 2, followed by a considerable magnetic storm. The Aurora appearance affecting VHF was on September 3. Of course, all this is "wisdom after the event," because the condition could not be deduced until the flare was seen and reported. It follows that for the next year or two it will be worth keeping an eye on the Sun (through a heavily-smoked glass) to see what sun-spots are occurring. An interesting pointer here is that a large increase in general background noise on the 21 mc band often forecasts a solar disturbance. In the larger context of solar observation, it is probable that the right type of satellite, keeping a constant check on solar radiation activity, will be able to forecast propagation conditions. (And then, all the fun will go from working out the situation for one's self.)

* * *

There were lots of other interesting things happening over the weekend of September 3/4. It was the Region I VHF Contest, with a tremendous wakening of VHF activity over the whole of Europe. So far as the U.K. participants were concerned, conditions weather-wise can only be described as *terrible*. Many /P stations decided to cut their losses and go QRT, before they and all their possessions were blown away. It was not only windy, but it was very wet in some parts. For those under tents, it seemed like "Gales, Force 9"—though in fact Force 9 in areas inland very rarely happens. What can be said is that the WX was shocking. But in spite of flapping tents and wobbly beams, a lot of stations carried on. One /P was heard to say, at about 1745z on September 4, "We might as well last out for a few minutes —they're not open yet"! For special mention are those stations using CW during the contest: G3KDG and G3VER/P. Of particular interest was the Phone station signing FØAT/P, who had 138 stations worked by 1045z on September 4.



Impressive aerial array for G3REI/P, Reigate Amateur Transmitting Society, for the recent VHF field day, when they were knocking it out on all VHF bands, 4 metres to 23 centimetres — and there are very few Club groups able to do that. The two-metre array is at far right and the dish-like assembly on the 70 cm. mast is the 23-centimetre beam. Note that the masts are nicely in the vertical, with everything in square — so different from the sloppy antennae arrays too often seen in /P photographs.

The rate of scoring fell off somewhat during the Sunday mid-period (as it usually does in these contests). For instance, between 1120 and 1650z, G2HIF/P worked 25 stations; on the other hand, from 1700 to 1750, G3VER/P added 8S to their score. Conditions generally on the Sunday were pretty flat after the excitements of the previous evening, but an interesting signal heard at 1655 was G8OU, on CW, calling GM3RUL/P.

* * *

Though the general uplift in conditions, coinciding with the the spell of wonderful autumn weather, started about September 10,

with EDX getting into the South of England, it was from the 19th onwards that things really started taking a turn for the better. All the reports this month show that there was plenty of activity and quite a lot of interesting DX to be worked, almost up to the deadline for this piece. The met. condition during this period was Wx set-fair over southern U.K. and northern Europe, with a large anti-cyclone covering the whole of the area, producing warm days and cool, clear nights, a high glass showing little variation, and considerable fog formation in the evenings and early mornings—the classic Wx situation for good DX on VHF. This all faded away by September 26.

Which brings us down to some of the detailed reports. G3COJ, now at Flackwell Heath, High Wycombe, is regularly on two metres again after a long absence (since 1958, in fact) and is running 100w. with largely rebuilt gear. Getting in with the Aurora, Brian knocked off GM3TFY, G3OZP, EI2A and GM4HR, in that order. Continuing operations for the next few days till the 11th, the DX worked included F, ON, G3IGP in St. Austell for Cornwall, and then on the 11th before breakfast four F's were raised including F1MA down in the Pyrenees; later that day EA1AB (Santander) was heard at 1743z, and HB9QQ/P worked at 1913. Conditions continued good for EDX right up to the end of the period, with F, ON, PA and DJ/DL worked — including PAØBN, noteworthy because he was Brian's first 2m. PA contact for 17 years, the last being PAØBD in 1949. (They all come back to VHF in the end!).

Another who has returned to the fold is G3BDQ (St. Leonards, Sussex), who now has a much better QTH, justifying effort on VHF—in fact, his new two-by-4/4 has what John calls "optical clarity round most of the compass." Running only the 12w. TW-2 Tx, shortly to be boosted to full power with a linear, he is getting out very well and worked a great deal of DX during the recent openings; this includes nice stuff like F5DN near Geneva, HB9QQ/P, EI2A and GM3HLH, as well as numerous Midlands and northerly G stations. From where G3BDQ is, with a clear getaway and a mainly sea path, he will find the F's, ON's and PA's like locals. Anyway, John is now up to 14 in Countries Worked and with what appears to be a reliable all-conditions range of about 200 miles, he is on the look-out for the exotic stuff.

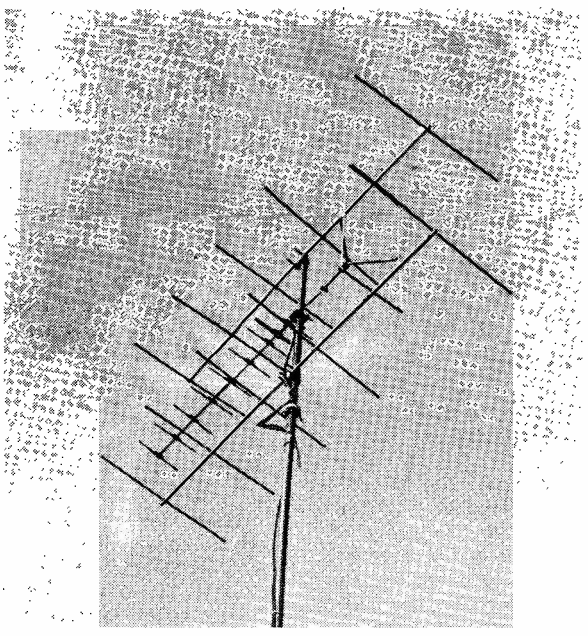
This month we also hear again, likewise after a long break with VHF, from G3DAH, Herne Bay, Kent, who has already worked 32C for the new Two-Metre Annual—that is, in just three weeks. Gp. Capt. Dormer says: "It's good to get back on the air after nearly 15 years." He finds the main difference between then and now

THREE-BAND ANNUAL VHF TABLE

Final Placings, Year Sept. '65 to Aug. '66

Station	FOUR METRES Counties	FOUR METRES Countries	TWO METRES Counties	TWO METRES Countries	70 CENTIMETRES Counties	70 CENTIMETRES Countries	TOTAL pts.
G3EDD	36	4	64	17	34	5	237
G3LAS	36	4	53	14	24	4	231
G3HRH	29	3	54	12	21	4	196
G3OWA	32	4	40	9	19	1	176
GM3FYB	9	3	42	14	22	10	176
G3FIJ	21	3	39	12	20	4	165
EI6AS	29	6	33	7	10	4	152
G5FK	22	3	12	3	21	2	134
G3AHB	6	1	39	11	20	3	133
G3NNG	—	—	47	11	21	4	133
G2AXI	20	3	40	10	11	1	132
G3KQF	—	—	35	8	26	3	130
G3PTM	—	—	41	10	23	3	129
G5UM	15	2	30	7	16	2	125
G3SKR	36	6	10	2	—	—	96
G3EKP	12	5	15	4	9	3	89
G3TLB	8	1	52	13	—	—	83
G8ACB	—	—	—	—	23	4	81
G3RST	8	1	49	17	—	—	75
G3HWR	12	2	14	2	8	1	71
G2CIW	—	—	14	9	32	6	61
G8ACE	—	—	—	—	19	1	60
G3UFA	8	1	40	10	—	—	60
G3FNM	2	1	43	8	—	—	57
G3KMI	15	1	18	4	—	—	54
GW3CBY	3	2	19	4	2	2	42
G3UCS	—	—	34	5	—	—	39
G3UFQ	—	—	28	8	—	—	36
G3OUL	8	2	14	2	5	2	33
GW3PWH	4	2	17	4	—	—	33

Scores are since September 1, 1965, and accrued till August 31 this year. Position is shown by last-column total, as aggregate of all scores. Own county and country score as one each. Entries may be made for a single band, any two, or all three. This Table reopens again immediately, w.e.f. September 1st.



Nice-looking aerial array put up for the VHF field day by the Purley & District Radio Club, signing G3GKF/P on two metres and 70 centimetres. The 70 cm. beam is placed between the main elements of the 6-over-6 slot-fed assembly for two metres.

the much higher power and more sensitive Rx's in use—and remarks that it is a pity some Phone stations are not observing the agreement to keep 144·0-144·1 mc for CW only.

G3BA (Sutton Coldfield) went out to bat for M.A.R.S. on the VHF field-day, with G3EJO, G3RJR and G4LU (whose work, says Stan, keeps interfering with his pleasure), and who could only stay part of the time. But by 0600 on Sunday morning, by which time GW3BA/P had made 80 contacts for 17,000 points, the weather had turned so foul that one of their tents was blown clean away—so they packed it in, as there was no sign of any improvement in their part of West Wales. From G3BA, later in the period, Tom worked DM2AUI (which is real EDX), HB9RG and DJ7ZS. He now has the 4CX250B linear amplifier pumping full bore, with all the 400 legal watts of RF peak output—Tom says it makes a difference on the long-haul paths. We should say! It makes a difference from where your A.J.D. sits, too. Incidentally, there is a regular SSB/VFO-type sked every Monday evening at 2200 clock, the participants being G3BA, G3OCB, GW3FSP and G3LOE, which is sure-fire, and on which others able to net on Sideband are invited to call in. The winter project at G3BA is to get the 70-cm. gear buttoned up for regular SSB working over long paths on that band. On this theme, Tom remarks that a number of the G8/3's, having progressed to full tickets, show a tendency to abandon VHF for the delights of the HF bands—he says he hopes the honeymoon will soon be over.

G3UFA (Welwyn, Herts.) mentions an interesting phenomenon during September 6-8, when Devon and Cornwall stations, notably G3IGV and G3CLW, were coming in at good strength and working easterly EDX as far as DL; yet these EU's were weak to the point of inaudibility at G3UFA, pretty well on the path. EI6AS (Dublin) picked up some new ones *via* Aurora, and men-

FOUR METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 8

From Home QTH Only

Worked	Station
65	G3SKR
60	G3EHY
56	G3OHH
52	G3IUD
50	EI2W
43	G3OWA (526)
42	G3MOT
41	G3TCT
40	G2OI
39	G3PJK
38	G3JHM/A
36	G3FDW, G3LAS
35	G3BOC, G3HRH, G3PMJ, G5FK (346)
34	G3UYB
33	G2BJY, G3FIJ, *G5JU*
32	G3NUE
31	G3PPG
30	G3BNL, GM3EGW
29	G3AYT
28	G3OJE, GC3OBM
27	G3RDQ
26	G3LQR, G3LZN, GI3HXV
24	G2AXI
23	G3HWR (281), G5UM (238)
20	G3EKP
17	G5CP
16	G3BJR, G3TOT (100)
15	G3UFS
14	G3OKJ
13	G3UUT
12	G3TKQ, G5DS
11	G3LHA, G3PRQ, G3SNA, G3UOR (110)
10	G2BDX, G3ICO
9	G2DHV, GM3FYB
8	G3NNO, G3TLB, G8VN

This table records Counties Worked on Four Metres, on an all-time basis. Claims can be made as for the other Tables, e.g. a list of counties with the stations worked for them, added to from time to time as more counties accrue. QSL cards or other confirmations are not required. Totals in excess of 100 different stations worked can be claimed and will be shown in brackets after the call.

TWO METRES

COUNTRIES WORKED

Starting Figure, 8

28 G5YV (DL, EA, EI, F, G, GC, GD, GI, GM, GW, HB, HG, I, LA, LX, OE, OH, OK, ON, OZ, PA, SM, SP, UA, UP, UQ, UR, YU)

27 ON4FG (DL, EA, EI, F, G, GC, GI, GM, GW, HB, HG, LA, LX, LZ, OE, OH, OK, ON, OZ, PA, SM, SP, UA, UC, UP, UR, YU)

27 G3LTF (DL, EA, EI, F, G, GC, GD, GI, GM, GW, HB, HG, LA, LX, LZ, OE, OH, OK, ON, OZ, PA, SM, SP, UA, UP, UR, YU)

26 UA1DZ (DL, DM, G, HB, HG, LA, LX, LZ, OE, OH, OHØ, OK, ON, OZ, PA, SM, SP, UA, UB, UC, UO, UP, UQ, UR, YO, YU)

26 OK2WCG

24 G2JF, UP2ON

23 G3CCH

22 G3LAS, UR2CQ

21 F8DO, G3HBW, OK1DE

20 G3BLP, OK1VR

19 G3EDD, G6RH, PAØFB

18 G2CIW, G5MA, G6NB, ON4BZ

17 G2XV, G3BNL, G3HRH, G3RST

16 G3AYC, G3BA, G3CO, G3GHO, G3KEQ, G3OBD, G3PTM, G6XM

15 G3DKF, G3FIJ, G3FZL, G3KQF, G3RMB, G4MW, GM3EGW, GW2HIY

14 G2AXI, G2FJR, G2HDZ, G3AOS, G3AOX, G3BDQ, G3FAN, G3HAZ, G3IOO, G3JAM, G3JWQ, G3KPT, G3NUE, G3OZP, G3PBV, G3SAR, G3TLB, G3WS, G4LU, *G5BD*, G5DS, G6LI, G8OU, G8VZ, GW3MFY

13 EI2W, G2CDX, G2HIF, G2HOP, G3DMU, G3DVK, G3EHY, *G3GPT*, G3GWL, G3IIT, G3LHA, G3NNG, G3OHD, G3PSL, G6XX, GC2FZC

12 EI2A, F8MX, G2BJY, G3AHB, G3BNC, G3BOC, G3FNM, G3GFD, G3GHI, G3GSO, G3JLA, G3JXN, G3OWA, G3WW, G5CP, G5JU, G5ML, G8DR

11 G2AJ, G2CZS, G3ABA, G3IUD, G3JHM/A, G3JYP, G3JZN, *G3KUH*, G4RO, G4SA, G5UD, G5UM, G6XA, PAØVDZ

10 G2AHP, G2DHV, G2FQP, G3BK, G3COJ, G3DLU, G3GSE, G3LAR, G3LRP, G3LTN, G3MED, G3OSA, G3RTF, G3UFA, G3XD/A, G5MR, G5TN, G8IC, GW3ATM, GW5MQ

9 G2BHN, G2DVD, G2FCL, G3BYY, G3FUR, G3OJY, G3SXK, G4LX, G8GP, GC3EBK, GI3ONF, GM3DIQ, GM3LDU

8 G2BDX, G2DDD, G2XC, G3AEP, G3AGS, G3CCA, G3EKX, *G3GBO*, G3HCU, G3HWJ, G3KHA, G3PKT, G3MPS, G3UFQ, G3VM, G5BM, G5BY, G8SB, GM3JFG

tions G3OZP as an outstanding signal on that occasion.

* * *

Looking now much higher in frequency, G3OBD (Poole, Dorset) reports on some of his 23-cm. results; the fixed stations worked are G3FP, G3MCS, G8ACE and G8AL, with G8AEJ heard. During the VHF field-day on September 3-4, additional /P's raised were G2RD, G3LTF, G3TND and G3TR, the "heard list" being G3PIA/P and GC3POI/P. These calls are given in detail because any news of developments on 1296 mc is useful and interesting.

Also about ready for 23 cm. is G3KQF (Barrowash, Derbys.), with only a tripler to finish off; his beam system is 8/8 over 8/8, at 42ft. mean height; and the converter has been tested with G3BNL. It is understood that two other locals have started building for the 1296 mc band.

And yet another report about this band, from none other than G5QA (Exeter). Herbert is one of our real old timers, and we were delighted to hear from him again —also to hear that he still keeps up the famous daily sked with ZL2OU on 20m., started in 1936, and now nearing the 9,000-mark! As regards VHF (to get back to the point), G5QA reports himself as very active on 70 cm. as well as 23 cm., with regular skeds in hand with G3MPS and GW3ATM, also his 430 mc partners. Herbert says there is plenty of 70-cm. activity in those parts, though as yet very little on 1296 mc. In developing these bands, the great thing is to get skeds going, which will encourage others to try them.

In this context, G8ADP (Teignmouth) writes that on going up to Haytor on Dartmoor on September 6, with his 70-cm portable gear, he was "overjoyed to work 32 stations straight off, most of them in the London area; it was a wonderful surprise." He only gets about 2w. of RF from the tripler, the Rx and mod. being all-transistor, with an 8/8 beam. During this same session, G8AGU/P was on Exmoor and worked 42 stations, running 70w. input.

G3OWA (Coulsdon, Sy.) claims for the Tables and mentions that he only runs very low power on the 70-cm. Tx—indeed, he reckons its output to be about a quarter-watt; the beam is a 6/6 and his converter the G2DD-type, *ex* SHORT WAVE MAGAZINE.

ZB2AP reports that the Gibraltar beacon on 4 metres, running 17w. and signing ZB2VHF on 70·26 mc, is now in continuous operation, with an aerial (presented by J-Beams, Ltd.) on top the Rock. This should surely have been coming through during the September openings? Reports are requested, as a lot of work has gone into this project. On two metres, ZB2AP himself has now worked his 10th station, EA7JW in Seville.

Those wanting Rutland on four metres might like to know that G3SRX (*QTHR*) will be there on October 16, also on 70·26 mc.

On quite a different tack, G2DHV (Sidcup, Kent) is embarking on an ambitious project —a 430 mc radio telescope of the drift-interferometer type, feeding into a 3-pen recorder for a solar observation programme. He already has a satellite tracking system working well on 136 mc, into a tape recorder.

All those many others reporting, mainly with claims for the Tables, and not actually mentioned in the text, have had their positions adjusted. And don't forget: The Annual Tables now open, and which we hope to show regularly each month, are the Three-Band, the Two-Metre and the 70-Centimetre. Though we have some claims for each, there is neither space nor time to start them this month.

Dead Line

Because of the changed date of publication for the November issue—to appear on October 28—it means that your harassed and perspiring A.J.D. needs your report right away (tomorrow, or as soon as you can make it). We shall revert to the normal interval after the November appearance, which will give a more comfortable dead-line. So, up with your pen, and dash to the post with a letter addressed simply: A.J.D., SHORT WAVE MAGAZINE, BUCKINGHAM. *Tnx, es 73.*

COMMUNICATION and DX NEWS

ONE of the best known methods of producing "instant QRT" is to have the aerial fall down; if one has a neighbour possessed of a greenhouse or conservatory, the magnetic influence between aerial poles and glass, not mentioned anywhere in the literature, is usually well (and expensively!) demonstrated. However, a more insidious problem arises with the slow deterioration of the receiver which occurs as its components age. A sudden fault arising is usually very obvious, an intermittent one likewise with the advantage that it can often be cured by the "drop kick" test, but this slow deterioration only shows up in the headphones as a spell of "poor conditions." In order to combat this sort of problem the best method by far is a regular check and overhaul routine at more frequent intervals than would seem to be justified by considerations of valve life; a frequent check of alignment in the IF amplifier; with records of voltages measured at each valve pin each time the routine check and overhaul is carried out. This latter is very useful information as an immediate give-away of such things as leaky capacitors but also, because the record is kept up-to-date, of any trends in the voltages which may give a lead to trouble before it occurs in acute form.

This latter process is, of course, the whole object of planned maintenance, to catch the faults before they get a chance to occur. The other school of thought (leave well alone!) have a point when they say that each time the receiver is operated on in this manner there is a chance of putting on further faults, but if the routine checking does not involve switching on the soldering iron unless a fault is found then their argument disappears. It is fair to say that a satisfactory check-over can be carried out in under an hour on any receiver, using no more expensive or complicated tool than a multi-range meter that would find any fault or slow deterioration. Having put it right, one may have to realign, and for this there is always the transmitter VFO as a signal generator, and the ear (used with extreme care, obviously) as the alignment instrument on the IF strip, particularly if it is possessed of a crystal gate, using front-end noise or a signal to choice. Such a check needs doing about once every six months at least, on most receivers of the valve variety, or more often if the receiver is used a lot. On transistor receivers, the same interval is about right, albeit there is no slow deterioration of valves—only resistors and capacitors and alignment drift due to shock, vibration, and so on, which is just as bad!

Great Big World

From VK6KK (Trigg Island, West Australia) we have a very interesting letter, which mentions especially the opening to U.K. on August 29, from 0630 to 0945z, during which Cec worked a whole crop of W, G and EU stations on SSB with reports of up to 5 and 9 both ways, on Twenty. The aerial in use at VK6KK is a Vee, a mere 25ft. above ground, and the QTH is only a few feet above sea level. Cec mentions he is on 14300 kc

FIVE-BAND DX TABLE

(New Cycle)

Starting date: January 1, 1966

Station	Countries	28 mc	21 mc	14 mc	7 mc	3.5 mc
G3UML	195	70	82	171	50	32
G3NMH	187	48	93	177	—	—
G3LZQ	141	6	52	120	29	18
GM3RFR	125	7	72	81	57	6
GM3SVK	115	22	101	54	43	4
G3IAR	113	30	64	77	43	30
G3IGW	110	1	59	68	46	43
G3UDR	104	9	43	68	2	20
G3VDW	29	13	66	52	24	9
GM3KLA	91	15	71	45	46	39
G3VDL	85	8	27	67	32	12
G3PQF	72	21	6	18	58	24
G3UBI	70	2	25	52	8	30
VP8HJ	67	3	8	65	5	1
G3RJB	51	—	—	49	—	13
9V1LP	35	14	22	24	21	21
GI3GTR	22	1	6	14	10	9

Note: Placings for this month are based on the "countries" column.

from 0730 to 1000 on most days looking for SSB contacts with the U.K. VK6KK is ex-G3EKK but has been in VK for sixteen years; he mentions the high cost of gear over there, and as an afterthought adds that if any G's are thinking of emigrating to Australia, he would be only too pleased to offer any advice he can if they drop him a line *(QTHR)*.

Another ex-G to write in this month is ZL2BDA, who is ex-G3PHO. Peter has been in ZL since February, and comments on the difference in conditions over there; Africa is very difficult, for instance, but on the other hand VK and W6 come under the heading of local QRM. Forty is reckoned to be the best band for working G stations, and if ZL2BDA comes on at 0600 GMT he is almost always called by G3JAG or G3SYC, usually 559/569 both ways. Peter is on from 0600-0700z on 7002 kc CW every morning.

Contests

The VK/ZL Oceania DX Contest for this year is right on us at the time of writing—indeed the Telephony event will be wrapped up before publication day. However, the CW end will take place over the weekend October 8-9, from 1000 GMT on the Saturday through to the same hour on the Sunday. The usual six-digit exchange applies, with serial numbers starting from 001. Two points for each VK/ZL worked, one point for each Oceania contact, and a multiplier which is to be the sum of the VK/ZL call areas, to calculate the final score. As to the logs, they are to show the following information, in this order: Date, Time (GMT), station worked, number sent and received, points claimed for the contact. In addition, underline each VK/ZL call area contact first logged, with separate logs for each band; the job to be finished off by a summary sheet showing name and address in block letters, and claimed score. The logs are to be addressed to the NZART Contest Committee, Box 489, Wellington, New Zealand, to arrive not later than January 21, 1967.

A further reminder of the *CQ* Worldwide DX Contest which is almost upon us again; from midnight Friday, October 21, through to midnight Sunday, October 23, both times GMT for the Phone end, and the same times over the weekend November 25-27 for the CW sessions, all six bands, Top Band to Ten in each case. The exchange is a four- or five-digit number, comprising RS or RST as appropriate, plus two digits indicating the Zone in which the competitor is located, starting from 01 through to 40 so as to avoid favouring Zones 1 to 9. Score one point for countries in the home Continent, three for contacts with another Continent. Multiply by one for each Zone, and by one for each country on each band. Thus, a single-band entry multiplies his points score by the sum of the countries worked and the sum of the Zones worked. For an all-band score, sum up the Zone and Countries Multiplier, and multiply this by the total of the contact points claimed on all bands. A minimum of twelve hours operating is necessary for a single-operator entry, or 24 in the case of a multi-operator entry. In the Logs, enter Zone number and/or country the first time only that Zone or country is worked on the band in question, all times in GMT, separate sheets for each band. The entrant is expected to do his own score-calculating, so book your computer *now*. A good rule in this Contest is that over 3 per cent duplicate contacts leads to disqualification. The reference will be the ARRL Countries List and the *Zone Map*. To round off it should be pointed out that of the thirteen awards, there are two special ones for the best European entry in the Phone and CW contests respectively. Logs to *CQ* WW Contest Committee, 14 Vanderventer Avenue, Port Washington, L.I., N.Y.11050, U.S.A., indicating Phone or CW, by December 1 for the Phone end, and January 15 for the CW battle. Some slight flexibility will be shown in the case of isolated areas.

Top Band

Probably the big 160-metre news this time is that VK5KO has been heard in this country, on 1802 kc. This was by SWL Lindgren of R.A.F. North Luffenham (Oakham, Rutland) on September 21 at 2011z, RST-339 at best and fading into the noise; he was using a Racal RA-17 with a 160m. dipole 45 feet high. Though confirmation is awaited, it can be said here and now that VK5KO is known to be trying (*see* p.411, September issue), the time is right, and the Rx/Ae set-up about as hot as one could wish for on Top Band. But any QSO with VK5KO will obviously be very difficult.

In his latest Top Band report, Stew, W1BB, regards the yearly 160-metre Tests as being reminiscent of the early efforts of Deloy, DeCoursey, Schnell and Reinartz in getting over the Pond in the years shortly after World War One, and symbolic of those times; in fact, as the Amateur Radio equivalent of the London-Brighton run for the early cars. This year the tests will be on December 4 and 18, and January 1 and 15, 1967, 0500-0730 GMT. The W stations will call for the first five-minute and odd five-minute periods, and the rest of us on the even periods, using 1825-1830 kc. The W stations will be on their authorised bands, VK/ZL's on the 1800-1860 kc segment, African stations mostly in the area 1800-1825 kc, and the JA boys in their little piece between 1907·5-1912·5 kc. If you want to know the optimum time for a particular path, drop a line to VE2UQ. A feature that was very popular last year and is to be repeated this

MAGAZINE TOP BAND DAYLIGHT TEST

Sunday, November 6, from 1000 till 1600 GMT.

Come on the band on CW and work all you can at distances of greater than 100 miles. Call "CQ MDT" and give your location when calling. Send in your logs for the Test to arrive first post Wednesday, November 9, addressed MDT, Short Wave Magazine, Buckingham.

time is the "First Timers" sessions, slated for December 18 and February 5 as far as the European and African side is concerned. It is to be understood that on these dates all those who have already got across will be QRT while the first-timers have a go at making the grade without QRM from the Big Boys.

In the line of news, we have first a letter from G3UBW, which indicates he will be probably unable to report so often in future due to his going to Cambridge during October; however, he has been after the DX in the way of VO1HN and W1BB/1, the latter signal being given a report of 579 by G3UBW. Other contacts were with DL9KRA on CW and SSB, 59 in the latter mode, and a query signing 9L1TZ heard but not certainly identified. As a matter of interest G3UBW mentions that it is believed that PAØBRM will come on SSB if requested on Sunday evenings around 1832-1835 kc, as will also DL9KRA. Your scribe has a suspicion that the air around Sevenoaks is going to sound awfully quiet during the coming term-time!

G3UAN (Kenton) writes to add no less than fourteen new counties for his ladder score, mainly the Scottish ones with a fair sprinkling of GW, and a couple of Channel Isles to round off. In addition, the usual crop of OK/OL stations and what-have-you were netted to make a very good month. G3UAN excuses himself for his absence from our midst in the previous month by saying he has been holidaying in EA6-land . . . and what better reason *could* he have?

A very new call on the band is G3VPS—just one week at the time of writing—who says he is eternally grateful to all the locals for the help and friendly advice they have given him in his 'prentice efforts to get going on Top Band. As a matter of interest, G3VPS was getting out of Hailsham quite well during the period, and your scribe had the hook ready-baited but decided to refrain as there seemed to be more than enough takers already. Let us hope we hear more of G3VPS in these columns.

Incidentally, that comment about balloons last month should have referred to the regulations about aerial height at a distance of less than half-a-mile from any aerodrome being under 50 feet, which, in effect, makes it clear that balloon operation is *out* near aerodromes. This, after all, is only common sense.

Another of the keen types as far as 160 metres is concerned is G3SGC (Hayes, Middx.), who uses a 70ft. top-loaded vertical in conjunction with *30 radials of a quarter-wave each,* and puts out a fair old signal, as your conductor can verify. Graham has worked both W1BB and VO1HN, and says he has not heard any other DX. However, we suspect GM3SVK (Unst, Shetland) Britain's most northerly amateur, would dispute Graham's assertion, insofar as G3SGC was 59+ on AM to Fred on September 11. GM3SVK also mentions that he has heard from ZC4GB to the effect that he hopes to be active on Top Band this winter.

The letter from G3TKN (Wallasey) says he has been pursuing the DX on Top Band in daylight, and has found it more and more fascinating. He mentions in particular a QSO that occurred while /A at Cowes, I.o.W., with G3UZW, with signal level that showed slow QSB from S8 up to about S9+ 15 dB. Vincent claims that the noise level in the South of England is far lower than the level noted near his home, a belief shared, we gather, with others of the Wirral fraternity; perhaps he has never heard the rumpus that goes on at your scribe's location which we laughingly describe as a "quiet band."

The caption to the picture of HB9YL in the last issue brought a response from G3TNN (St. Annes, Lancs.) who operates CW on all bands through to Four Metres. The reasons Ruth advances for being mainly a key-paddler could well be read out as part of the Riot Act whenever the old CW/Phone controversy is being debated. In the first place, she loves Morse, secondly people want to work G3TNN, not a YL, and thirdly she is heartily sick of "breakers" when she is trying to operate Phone, particularly naming the 11's in this context (albeit not on Top Band). Ruth has an amusing tail-piece to her letter in that she mentions her OM, G3UCA, as a VHF addict who has retired with his gear to a shack in the kitchen muttering dark words about "that on-off stuff." A great pity that we could not reproduce Ruth's photograph, sitting at the AR88 with a bug and a much-modified TCS transmitter.

TOP BAND LADDER

(G3T-- and G3U-- stations only)

Starting Date, January 1, 1966

Station	Counties	Countries
G3UAN	86	13
G3UTS	82	11
G3UBW	76	18
G3TXZ	55	11
G3TTK	43	12
G3USE	40	8
G3UMK	39	7
G3UCS	36	?

Anyone still looking for Rutland (are there any still?) should take note that G3SRX will be there on Sunday, October 16, from about 11.30 in the morning, and hoping to have the SSB rig in action in time for this occasion. Incidentally, in the context of county-chasing as a sport, GM3SVK is rather surprised at the few takers he has had during his activities on the band, and wonders where all the customers are. Where indeed?

Another station to get in amongst the expeditions on Top Band was G2NJ, who raised a total of seven during the period, and heard but did not work two more. Three Channel Islands, three of the Welsh counties and the rest GM's made a handsome addition to the tally indeed. It is interesting to look at this crop, all of course worked from Nick's home QTH, Peterborough, and note that only one of them could be described as a recent call, five being more than fifteen years old.

Top Band Daylight Test

And now, as you will see from the panel on p.482, we have an

MDT (" Magazine Daylight Test ") laid on for Sunday, November 6. The aim is to work CW/GDX—meaning stations over 100 miles distant, on the key, and in daylight—and it will be very interesting to see what sort of distances can be covered. There are no other rules; it is a Test and *not* a contest; and all you are asked to do is to let us know, immediately after November 6, what happened as far as your own effort was concerned. To save operating time and to emphasise the DX tang of the event, call *e.g.* " CQ MDT de G3XYZ, Glos.," or whatever.

When, some years ago, this event was first instituted, it used to be suggested that you draw on the map a 100-mile radius round your QTH, so that you could look only for stations calling " CQ MDT " outside this radius. Anyway, there it is—let's see how it goes.

Eighty Metres

G3UML (Ilford) reports on SSB contacts on this band, mentioning PA9KZI/M, W1, W2, W3 and ZL4LM, and has several acid things to say about the characters who complain about the operations of the DX-net on Eighty, detailing their demands as " lynch law, bring back the cat, etc., etc." All good solid old-time vote-catching stuff, Laurie will be Prime Minister yet!

A first, and very welcome, report from G3TLX (Edgware) who paddles a key to some considerable effect. On this band, he was able to ring the bell with PY7AKG, 4X4HF, and W1, 2 and 3. Ron uses a KW aerial which slopes down to only 6 feet at the western end, rising to 50ft. at the eastern extremity.

G2DC regards Eighty as very badly neglected from the DX point of view, and remarks that there is nearly always good stuff to be found if one is prepared to look for it a few layers down. To prove his point he cites the case of WØGTA/8F4, overlooked and QRM'd around 2230z during the WAE CW Tests. Two G stations sat on him to conduct a ragchew, and despite polite requests to move, declined to do so. As the redoubtable Mr. Barnum remarked once, " There is one born every minute!" Jack mentions PY7AKQ, W1 to 4, VE1, VE2, VO, UA9, ZC4 and ZL4IE as being worked on this band during the period.

Good Old Forty—Some Say!

G3UBI (Mytholmroyd, nr. Halifax) writes in to straighten out a slight hiccup in the Tables, whereby his score on 7 mc takes a nose-dive from 50 down to 13; all very sad and we hang our heads in shame. A brief note for the Tables also comes in from GM3RFR (Unst, Shetland Isles), enclosing a list which says the band has dealt faithfully by him: ZD8ARP, MP4MAW, VP6KL, UF6AW, UW9AF, 9J2DI and VP3JR are examples.

G3TLX reports all W call areas other than W7, VE's, PY's by the pound, VK/ZL, ET3GB/M (using a Drake TR3 and a ten-foot whip), PJ3, U5ARTEK, HK7, HI8, 9J2, ZS1, loads of Iron Curtain rarities, and much besides.

The letter from G3PQF (Farnborough) indicates that he is in the process of getting ready for a house-moving session and is gradually packing up the aerials and gear. However, the intention is to keep the forty-metre dipoles up until the end as these are the easiest to drop, and so the DX should be stirred up awhile yet. Incidentally, your scribe was in the area recently and was able to enjoy a brief personal QSO with Dave and look at the rig and aerial farm. Talking of aerial farms, the enormous signal in the U.K. from VK3ATN is attributed to his stacked rhombics!

ZL2BDA (Gisborne, N.Z.) is on the bands most mornings and looking for G contacts on 40m. Peter mentions W1 to WØ, JA, PY, HI8XL and loads of G's; the rig is a Heathkit Apache used in conjunction with the SB-10 SSB adaptor, with a 67ft. aerial fed with tuned line to permit its use on 14 mc also.

It may be remembered that last month G3IAR mentioned as the prize catch of the month " XU2HB "; this brought a chuckle from GM3SVK who also worked this " XU2HB " — but when the card appeared it turned out to be YU2HDE. In other words, awful Morse. G2DC (Ringwood) also mentions a character signing XU2ADE with Morse so horrible that Jack thought he was a YU and left him alone; your scribe begins to wonder whether all this little lot are not one and the same chap, in which case the eighth wonder of the world will be the day he gets a QSL card *via* one of the Bureaux.

The HF Bands

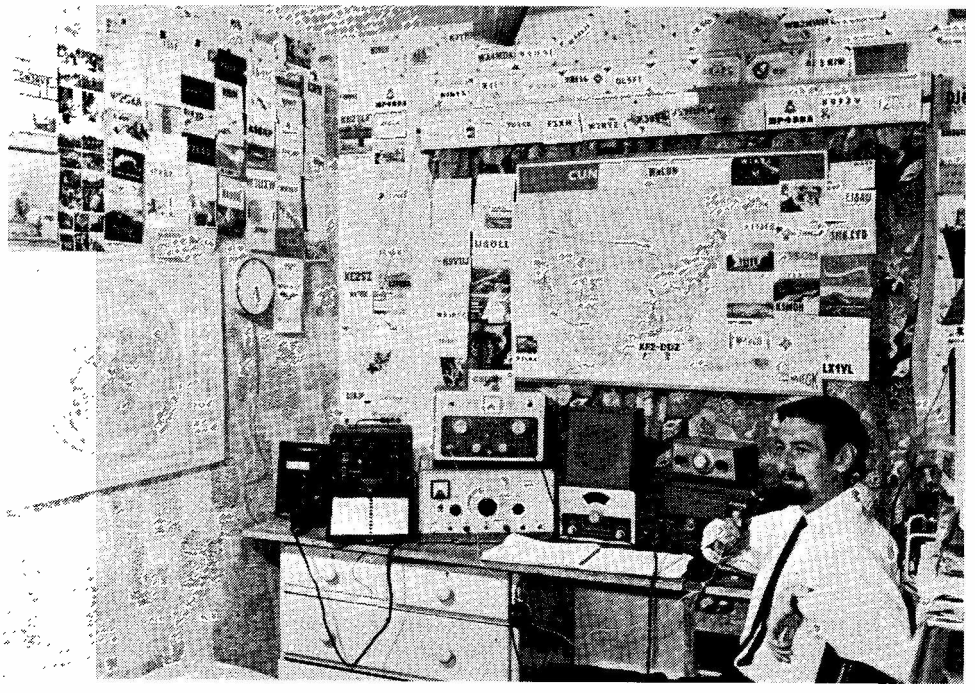
Conditions in general over the period have been good on 14 mc, patchy but passable on 21 mc, and just patchy on 28 mc; the latter band, to judge by the reports sent in, must have been subject to Murphy's Law in that it has been full of DX whenever your scribe was *not* around and dead when he was!

The ten-metre pile is topped by GM3SVK, who seems also to be suffering from Murphy; earlier in the month 6W8DD and UA3AZM on the key, and in the little opening on September 11 he heard CR6IE and a ZS2.

If there is anything doing at all, you may depend on G2DC to smell it out, hence Jack can report Africans most mornings from around 0830z, several openings to W in the late afternoons, and a touch of the real McCoy on August 14, the band seeming to be open in all directions. As far as G2DC was concerned this opening was the high spot, with WØGTA/8F4 for a new 10-metre country, 8F4 being Sumatra in Zone 28. In addition, he mentions CR6 and 7, ZD8RB (ex-G3VGW, using 75 watts to a groundplane), ZE1AS, ZS2, ZS6, 9J2BC and all the W call areas other than the elusive W7.

A nice meaty letter this month from Don, G3NOF (Yeovil), who has, however, only a small offering from Ten—PY1CK, ZP5KT and 9X5MH. There is no doubt that results on 28 mc depend to a large degree on the usefulness or otherwise of the hours when one can come on; however, there is always the other aspect that sometimes at the " wrong " time on a dead band something really interesting will pop up and fall into the net.

As far as G3IDG (Basingstoke)



Not many G3U's can show the sort of QSL collection pictured here, the father-and-son station of G3UBM/G3UBN, Robt. Marshall and his father, at 39 Grove Road, Leeds, 6. Most of their operation is on the 21 mc band, for which they have a Heathkit DX-40U with its VF-1U VFO, a National NC-125 Rx and a 2-ele beam. In a year on the air, about 80 countries have been worked, the objective being DXCC. Other gear includes a Labgear E.5051 Tx for Top Band — on which they are cramped for lack of aerial space — and a 21 mc mobile transceiver. Under construction for outside is a three-element close-spaced trap beam, to be rotated by the "hand-raulic" method.

was concerned, the period was effectively shortened for the best reason of all—a holiday. This did not stop Allan from hearing a total of 18 countries on CW, which included CR6DX, PY7AKQ, WØGTA/8F4 and 9Q5LJ. He agrees with the comment from G3PHS last month and instances as an example of what the band can do, his own first-ever QSO with a W, on a CC transmitter on 28056 kc, using just 10 watts to an indoor dipole. During the next month Allan expects to see some openings to W, as happened last year just before the Exhibition; he also has hopes of a few openings to VK/ZL.

The longest 28 mc list comes in from Laurie, G3UML (Ilford), including CE3, CE6, CR7, CX2, HC1, HK3, HP1, HR1, HR5, KV4, KZ5's, TI2 and a load of others of equal interest.

The shortest comment on 28 mc is from G3PQF, who simply says the band is a "bit odd at the moment."

As far as Fifteen is concerned, patchy or not, there is no dearth of news. We have a whisper that even A. J. Devon is on the run, and has been sniffing round on 21 mc. However, the Auroral opening on September 3 showed up on 15 metres by way of the odd EU with a rusty note in among the T9's from South America during the mid-evening period. Since A.J.D. takes a delight in rusty notes he retired smartly back to VHF, to find the Aurora in blazing progress.

G3UML has been in amongst the good stuff, and has various nice ones in his list, including all the JA prefixes, TI2, VS9's, ZS's, 5N2AAE, YV5, and a character with a delightful mouthful of a callsign, W6NMC/5V8/MM. Incidentally, the JA's have been so thick on the ground when the band has been really giving that calls like "CQ DX No JA" have been heard.

The Northern atmosphere has made Fred, GM3SVK, go all blasé where 21 mc is concerned; he heard quite a lot of interesting DX but says he couldn't be bothered to work it because none of it was new to him!

This is never the attitude of G2DC, who comments that 21 mc has been patchy but on some days quite brilliant, only to revert back to slumber the next. When the band was trying all-round DX was there for the asking, starting with the Far East as early as 0700z, and staying most of the day, joined by the W's as early as 1300z, followed by all the South Americans, including the CE and OA stuff. Even

as late as 2200z, turning the beam round on the long path was enough to produce the odd VK or Pacific call. WØGTA/8F4 was a new one for Jack on this band as well as on Ten.

GM3RFR has a few words to say on the merits of Fifteen; his list includes YA5RG, FL8RA, ZE3JJ, VP2GLE, ZD8RB, KG4AM, TN8AA, CT3AS (of whom more anon) 9X5, SVØWU (Rhodes), LU, and ZP5KB.

Don of G3NOF has not such a high opinion of the way things have gone; he regards it as having been patchy, and not as good as he had hoped. However he mentions FB8WW, IP1AA, JA3JXJ, KV4EQ, 9J2MM, and 9V1MY.

Away up in Golspie, GM3JDR has been giving the band a good going-over, and emerged from the fracas with a long list both CW and SSB. In the CW list we notice CN8FA, FG7XT, LX1LF, I1ARI /M1, VU2FB, 7XOAH, and a lot of others all of "interesting" status. As for Sideband, we note EL2NB, ET3GR/M, a couple of calls in M1, W6SZU/MM/5H3, and a lot of others.

G3VDW (Coalville) stuck to the band 100 per cent during the period under review and came out alive! The AM Phone list shows MP4BBA, SV1's, 9H1, EA8, CR7, ZE6JL, FL8AO, and various others of the same ilk, while the CW offering shows such things as VS9ASP, 6O6BW, MP4BFK, CR6, ET3, 9Q5, and all W call areas.

Twenty Metres

The final band to come under scrutiny is of course, good old Twenty, and the top of the pile this time is G3VDL (who never tells us his QTH). All of his crop were obtained with a key and include I1AV/M1, KV4AA, OH2AD /Ø, YV6, ZB2, 9V1MT, and ZA1BX. The latter said he was in Tirana, but was not sending very good Morse, and one wonders if he should be presumed to be a little bit "off." G3VDW also mentions an event for him, namely the hooking of his first PY on 14 mc; it seems that although the YV, HK, and Central Americans can more or less be worked to order, PY has only fallen into the net this month and he still awaits the first LU.

A sad story to relate from VS5JC, who drops a line to warn the 'chasers that he is being pirated, it would seem from somewhere in Europe, by a half-baked character who calls himself "Ted" or on occasion "John" whereas VS5JC himself always signs as Jack. It is also worth noting that the real VS5JC is almost always encountered on 20m. CW, with an occasional trip up to the Phone end of the band using AM only, *never* SSB. Jack also mentions that he is usually on around 1200-1730z, in the general area of 14035-14050 kc. It is suggested that QSL's go direct from U.K. where the airmail rate is reasonable, but others send QSL/IRC to W5VA, who will ensure a prompt reply.

G3UML seems to have connected with most of the good things on offer in the last few months, and his list this time includes CP1DR, FP8's, KH6, KJ6, KM6, W9WNV/HKØ at both Serrana and Baja Nuevo, PYØXA, ZL4CH (Campbell Isle), and others of interest.

The pile from ZL2BDA has a rather different shape from the sort of thing one would expect in U.K., naturally: VP2AC, VR2DI, ZL5AD (Scott Base), 5W1AZ (W. Samoa), and W9WNV/HKØ, all worked on SSB.

G2DC has much to say on the increase in commercial QRM on 14 mc, and believes that a lot of the junk now coming to the top was not audible before due to poorer conditions. One particularly irritating form of QRM comes on to the CW end of the band about 0800z, and wants to stay for most of the day. The beam shows it to emanate from somewhere east of the U.K., and Jack's enquiries tend to show it has world-wide coverage. It sounds rather like car ignition noise from an unsuppressed vehicle. However, in spite of this new hazard, the DX is still being worked, and an all-time new one on this band was provided by PYØXA.

GM3JDR offers without comment a list which includes, among others, CX3AN, HK3BAE, HKØAI, PYØXA, UAØLL, VP8HJ, all on CW. The SSB list includes CT2AN, HC1HB, HK3AWV, IE1PEE, IP1AA, IP1JT, W9QQR/M1, MP4MAW, and VS9AJH.

As for G3NOF, he says that conditions have varied from poor to good and proves it with a list as long as your arm, of which one has to admit that pruning would be impossible without leaving out something really good. Thus we will confine ourselves to mentioning one of them for the Zone-hunters—UAØEH on Sakhalin Is., who is in Zone 25, not Zone 19.

GM3RFR comments very simply on the results this month by just giving a list, from which we pick out the following: HS1HC, PX1IE, KM6CE, HR1SO, and VP5AR. Further comment seems superfluous.

GM3SVK has been proving out the capabilities of his new vertical dipole, and commences with a mention of the gotaways, followed by quite a long list to September 6; however, Fred followed this up by a later letter, giving another list which seems to indicate that most of the escapees were subsequently brought to book. Fred's "heard" list for the late evening of September 11 is interesting reading, including KZ5BC, XE1EO, KL7CVX, DU1VM, and VK8HA, all between 2230 and 0100z.

Here and There

Various of our correspondents mention CT3AS in their notes, operating from Funchal, Madeira. Most of us must have seen the name, in large letters in the *Magazine*, of Harold Whittaker, G3SJ, in connection with quartz crystals. CT3AS and G3SJ are one and the same, Harold having now retired and settled in Madeira, where he seems to be giving the 'chasers a run for their money. In particular, he is looking for G contacts—he is a nice CW operator.

We hear from Victor Cole, G3JOL ("jolly old landlord") that he is no longer at the Silver Plough near Salisbury, because at last he and his XYL have made up their minds and leave for Spain before this reaches print. Unfortunately there is as yet no reciprocity with EA, but Victor has all his gear

Reporting the HF Bands

going with him, and we may yet have the pleasure of hearing him on the bands from his new home in Alicante.

One of the amazing things about this hobby of ours is the odd bits of general knowledge that come our way. After all the music hall jokes about the Swiss Navy one tends to take it for granted that the joke is true and applies to most if not all the landlocked countries. One comes up with a start, therefore, when one hears of such a call as OK4BI/MM, crystal-controlled on 21·62 mc.

A letter from G3LWM points out that the Stevenage/Ware lads are going great guns in the way of shifting their local net from Top Band to Ten, mainly through the efforts of G3NRB (Watton-at-Stone) who was the technical type in the Stevenage Club right from the first time he turned up. Jeff probably doesn't realise that your conductor has a copy of the circuit of the "Fleapower Mark 1" which started them off three years ago, and has never got around to building it! The present state is that G3NRB, G3RTJ, G3IPG, and G3LWM are all mobile on the net frequency of 28·889 mc, and the first two are also equipped for fixed-station operation, with the others to follow soon. They are on each Wednesday at 2130z, and on Sundays at 1200z. They would welcome calls from other stations on the net frequency, so as to get some idea what the range of the gear is under normal conditions. For further information or to arrange skeds, drop a line to Jeff, G3LWM (*QTHR*).

Gravity, and Natural Phenomena

A note from G3NMH accounts for his absence from the DX scene of late; we understand that Hal was out visiting on August Bank Holiday, and in his absence lightning struck his aerial, and melted the 20-metre driven element of his Quad, blew all the coax down the tower to pieces and generally modified things. A disaster indeed and all of us will hope to hear G3NMH back on the band very shortly.

QSL's

Allan, G3IDG, refers to the letter in the September piece from Dave, G3UJS, regarding his low QSL returns, and comments that over the years his QSL return has remained steady at 67 per cent, all cards being sent off *via* the Bureau. As Allan says, it is sometimes a long time before the cards come back; he never writes one off in less than three or four years, and your scribe must admit to the same sort of experience. It only goes to show that Dave must sit in patience until the cards turn up, and make sure by *always* having envelopes in the Bureau.

Face-to-Face DX

G6CC writes to report a pleasant little gathering of the local lads to meet F8MW, which was held at Bishop Vesey Grammar School, Sutton Coldfield, by courtesy of the headmaster, for an afternoon's yarning, rounded off by a visit to the TV station at Sutton Coldfield. Apart from G6CC and F8MW, those present at this impromptu gathering were G3BA, G3CNV, G3LNN, and G3NCX.

DX Snippets

We hear that 9V1LP, who has been signing WØGTA/8F4 from Sumatra, will be coming on Top Band at 2300z, looking for G stations, which should make the addicts of this band happy.

Anyone who has a contact with VR4LN/VR1 in the log can forget about it; although VR4LN is legitimate, VR4LN/VR1 is not.

Lloyd, W6KG, is, at the moment of writing, signing CT3AU, and proposes to appear in 6W8 and then 5T5.

The exact situation as to the activities of Don Miller, W9WNV, seems to be shrouded in mystery and rumour. The last that was heard was that he was in Caracas, making out QSL cards, and then proposed to return to the States; what happens after that seems to be the subject of at least six different (and contradictory) rumours.

Scout DX/QSO Party

Many stations have mentioned in their reports activities in connection with this event, in a fortnight's time. Lots of interest has been shown by Scouts, and the general state seems to be there are not enough amateurs to go round! Anyone who can help by putting on a show for the local Troop should do so, and thus help the cause of international amity and goodwill, and at the same time expose a lot of boys of the right type to the Amateur Radio bug, with a fair chance that several of them will be infected; and what cause could be better than that? The Ninth Jamboree-on-the-Air is a worldwide affair, and takes place over the week-end October 22-23; the Hq. Station is VE3WSB, and will open up at 0001z 22nd, carrying on till 2359 on the 23rd, looking for other stations participating, on frequencies as follows: 14130, 7190, and 3790 preferred for transmission but the following may be used and will be monitored; 28490, 28510, 21195, 21350, 14310 (SSB), 14020 (CW), 7290 (SSB), 7020 (CW), 3805 (SSB), 3510 (CW)—all in kilocycles.

And that about wraps it up for this issue. Hope you find it readable, and to receive your letters, without which we cannot make the next piece, posted to arrive immediately, addressed, as always, to "Communications and DX News," SHORT WAVE MAGAZINE, BUCKINGHAM, England. Please note that this is the difficult month, in that the next CDXN is in preparation as you read this. So please report right away for the November issue, due out on October 28. See you at the Exhibition!

E.P.E.

RTTY Topics

SOME DX-PEDITION NEWS — WORLD-WIDE RTTY SWEEPSTAKES CONTEST, OCTOBER 22-24 — AUTOSTART NET SYSTEM — SWAN-SONG

W. M. BRENNAN (G3CQE)

Having contributed this feature regularly since April, 1961, since when a great deal of ground has been covered in the context of radio amateur teleprinter operating and technique, G3CQE now finds himself unable to continue on so regular a basis. As he explains, increasing calls on his time make it too difficult to meet deadlines. However, we shall be hearing from him again and, in the meantime, all those with the interest in RTTY that he has done so much to foster will agree, with us, that over the years he has made a large contribution to the art.
—Editor.

IT is with a great deal of regret that your scribe is typing this out for the last time, at least for the present. After some five years of writing the feature, the pressure of other demands upon the writer's time has enforced this decision. However, this is by no means the end of RTTY matters as far as SHORT WAVE MAGAZINE is concerned. You will certainly be seeing a lot more about RTTY in future issues. Having said this, on to the news.

RTTY was again well represented at the Northern Amateur Radio Societies Association Convention at Belle Vue, Manchester, during the weekend September 3-4. The RTTY side of the exhibition was put on by G3OVZ, G3RUB and SWL Witts. They arrived at the Convention with two estate-car loads of equipment which, when sorted out and assembled, turned out to be just about two of everything. The result was that they were able to set up a printer and auto Tx combination on a local loop circuit which permitted visitors to operate the various machines for themselves, whilst the second combination was used for a receiving-only "on the air" demonstration. G2FUD and G3MWI between them provided an all-day feed of material for the printer *via* 80 metres.

The DX-pedition to the island of Sark took place in mid-August. Three callsigns were used: GC3OUF on 2m., GC3OHH on 4m. and GC3PLX on the HF bands. G5ZT collected the two VHF contacts which enabled him to be on the G end of the first GC/G RTTY contacts on both 2 and 4 metres. The HF station on Sark did a very brisk trade with the RTTY gang abroad, being in great demand with the W boys. G3MWI had considerable difficulty in getting a QSO with this station on 20m., finding himself in the situation where he could hear the W stations working GC but could not hear GC3PLX himself! He finally managed a QSO by calling a W9 station and asking him to ask GC3PLX to turn the beam round a little!

G3MWI dug out a very rare one when he worked I1CAQ/M1 (San Marino) on 20m. I1CAQ operated from this tiny country from the 11th to the 16th September. Those fortunate enough to have caught him should QSL *via* Box 22, Solerno, Italy.

World-Wide RTTY Sweepstakes Contest

There are four annual RTTY contests but the World-Wide is generally regarded as the principal one. This year, the rules have been altered to provide a scoring system in which the points awarded for a given contact are in proportion to the distance involved. This change follows upon a scoring system evolved by the SSB & RTTY Club of Como (Italy) and used in the last contest sponsored by them. As all DX'ers know, the world is divided into forty DX zones — see *Zone Map* — for purposes of various Awards and Contests. The Italian Club devised this score table based on the distance apart between any two zones. Thus, for stations in this country (Zone 14), QSO's with New Zealand in Zone 32 produce the greatest number of points per contact—55. On the other hand, a contact with a station also in Zone 14 will only gain 2 points. The complete score-table is a rather large affair consisting of 40 x 40 columns. United Kingdom stations will only be concerned with the scoring from our Zone, as shown in the Table below, which should make all clear.

Incidentally, although the writer thumbed through a number of amateur *Handbooks* and *Call Books*, the only publication in the shack which gave a list of the countries in the zones and showed the boundaries of the zones was the SHORT WAVE

Zone 14 Score Card

Zone Worked ...	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Score *points* ...	21	12	26	19	18	27	26	22	23	31	26	35	33	2	3	6	10	14	18	7
Zone Worked ...	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Score *points* ...	14	21	19	25	27	27	30	32	42	49	34	55	5	10	15	19	21	26	26	6

MAGAZINE Great Circle *DX Zone Map.*

However, as will be seen from the Contest rules, the zone of the station that is being worked is transmitted as part of the exchange message. The rules are as follows :

(1) The Contest will take place in the 3·5, 7, 14, 21 and 28 mc bands during the period **0200 GMT 22nd October** to **0200 GMT on 24th October. 1966.**

(2) **Scoring :** All two-way contacts will score points in accordance with the tables shown. Stations may not be worked more than once on any one band but additional contacts may be made with the same station on a *different* band. A multiplier of one is given for each country contacted and this includes one's own country. A country may not be claimed more than once even if worked on different bands.

(3) The ARRL Countries List will apply except that KL7, KH6 and VO will count as separate countries.

(4) In order to qualify for points, stations must exchange messages consisting of a Message Number, Report (RST), Time in GMT, Zone Number and Country.

(5) Logs should show the Band, QSO Number, Times sent and received, Zones, Countries and Exchange Points Claimed.

(6) Certificates will be awarded to the ten highest scores.

(7) Logs and score-sheets should go to RTTY Inc., 372 Warren Way, Arcadia, California, 91006, U.S.A., to arrive not later than November 30, 1966.

Family Amateur Radio

An XYL operator, VE3AYL, created quite a stir in RTTY circles when, upon entering the recent BARTG Contest for the first time, she came up with a score that placed her as the leading Canadian station and put her in the ninth place on the contest score-board. Still better, VE3AYL performed this feat without losing any sleeping time during the 48-hour event.

A recent letter from VE3AYL produced some even more interesting information. VE3AYL is the wife of VE3GK, who was himself first licensed in 1929. The call VE3AYL was added to the family list a year later, and it was the first licence to be issued to a Canadian lady op. Today there are two more calls in the family, with their daughter signing VE3DYL and son-in-law VE3DSW. The whole family has over the years operated mostly on 15 and 20m. CW and Phone. However, after firing up on RTTY just over a year ago, they now think " This is the only way to fly." !

The equipment in use consists of a Teletype Model 19 printer and tape gear which is used on 15 and 20m. with a Valiant-2 Tx and a Collins 75A4 receiver. The aerial used on these bands is a Hy-Gain TH4 tri-band beam hoisted to some 75 feet. For 40 and 80 metres a completely separate station is available. This consists of a Model 15 T/P, a second Valiant-2, a 75S3 Rx and a Hy-Gain trap aerial. The terminal units are a Technical Materials Type CF1, and a VE3BAD. In addition, a Mainliner TT/L is under construction. The average power used on all bands is around 275 watts.

International Autostart

For the uninitiated, " Autostart " is a system whereby an operator at one station may, at certain pre-arranged times, come on the air and automatically bring into operation the complete RTTY receiving mechanism at all other stations in the Autostart Net.

[over

Though it might be supposed that RTTY — itself one of the way-out and more esoteric branches of Amateur Radio — would be beyond the (X)YL section of our fraternity, here is a picture that proves the contrary. Mrs. Gwen Burnett, VE3AYL, 85 North Fifeshire Road, Willowdale, Ontario, has a very fine range of equipment, and she bangs it out happily with the best of them.

He is thus able to pass a message to all other members of the net and finally close the receiving stations down again whilst they are completely unattended. This is, of course, a very useful facility that permits an interchange of information without the need for the owners of the stations to be tied down to skeds. Such nets as these have been running for some years on the VHF bands in some of the larger cities in the U.S.A., where there is a relatively large RTTY population and the district can be easily covered on VHF. In more recent years, Dutch amateurs have started an almost country-wide Autostart Net on two metres. Anyone who has tuned over the 144 mc band in Holland will know that due to the flat nature of the terrain there, coverage on 2m. is very good indeed. With considerable ingenuity, the PAØ RTTY'ers have developed a selective dialling system whereby autostart messages can be directed at only the people the message is intended for—this may be one station only, or a group of stations, or the whole net.

Now, an even more ambitious system is being proposed by PAØYZ, whose idea is to create an *international* Autostart numbering system which would, ideally, enable an operator in one country to dial direct into the Autostart Net of another country, or into a district net in that country, or to any individual in the net!

On the face of it, it looks to be something rather like a pipe dream and certainly only limited national coverage and definitely no inter-continental coverage could be achieved on the frequency of 145·8 mc that is proposed—at least until such a time as radio amateurs have access to one or more high power synchronous or semi-synchronous satellites! However, to a limited degree, the HF bands could provide world-wide autostart operation and this in spite of the crowded state of these bands. In the U.S.A., a small group of RTTY'ers has been operating East-to-West coast Autostart on the 80m. band very successfully for some time now—and Eighty is as full of weird noises as any band can be.

The circuitry which makes this possible was developed by K3NIO and described in *RTTY Magazine* for July, 1964. It has received very little mention in Europe and certainly in the light of possible developments it is worth examining.

The main problem to be overcome is obviously how to arrange for a complete RTTY receiving system to be left wide open without the thousands of spurious signals that would appear on any given frequency during a 24-hour period causing the T/P to print the whole paper roll full of garble and finally when all the paper was gone, set to work hammering away at the platten. Some device must be made to lock up the receiving set electronically and only unlock it when a recognisable RTTY signal is present. Briefly, the full requirements for this form of guard circuit are (1) That it should reject spurious signals caused by CW and Phone stations or even noise; (2) It should readily respond to a RTTY signal and not close down during short periods of fading or interference; (3) It should close down reasonably quickly upon the cessation of the RTTY signal. In practice there is some conflict between the second and third requirements and a compromise has to be reached. The circuit produced by K3NIO meets this very well indeed—so much so, indeed, that on average during a 24-hour period of operation K3NIO finds less than one line of spurious copy has been received.

The basic idea used by K3NIO is the fact that a T/P signal differs from all others in that a character always commences with the "start" pulse and finishes with the "stop" pulse. The "start" is always a *space* and the "stop" always a *mark* signal. Moreover, the time interval between the leading edge of the start-pulse and any portion of the stop-pulse is always the same—and to a very high degree of accuracy. The circuit is arranged to trigger on the leading edge of the start-pulse, activating timing multivibrator; 145 millisecs. later, when a genuine T/P signal would be at the mid-point of the stop-pulse, a gating circuit is opened and if the signal present is a "mark," the information is passed to a counting circuit which registers the presence of one character. Because spurious signals could from time to time produce these conditions, the counter is arranged to require 32 consecutive signals from the timing circuit before it opens a gate which in turn operates a control flip-flop oscillator; this activates the printer motor and releases the printing mechanism. Whilst the printing goes on, the guard circuit continues to examine the incoming signals for consistency of timing between the start and stop pulses and should a "space" signal be received when the "mark" stop pulse should be present, then a further gate is opened. This gate triggers further circuits which pass five down counts (or "wrong-signal" pulses) to the reversible counter. Seven incorrect timings will reduce the counter level to zero and the T/P will be closed down.

To sum up, the guard circuit demands 32 T/P characters before it decides that an acceptable signal is present. It will then allow printing to commence. If, due to fading or interference, less than seven incorrect characters are received, the circuit allows the printer to carry on. However, if more than seven characters are incorrectly registered then the printing stops until once again 32 acceptable signals are received.

The number of "up counts" required to switch on the T/P and the number of "down counts" needed to close it down were determined by experiment during normal band conditions. Though 32 characters may seem rather a large number to be sent in order to start printing, of course they only represent some 30 secs. transmission and half-a-line on the page. It certainly ensures that very few unwanted signals will activate the circuitry.

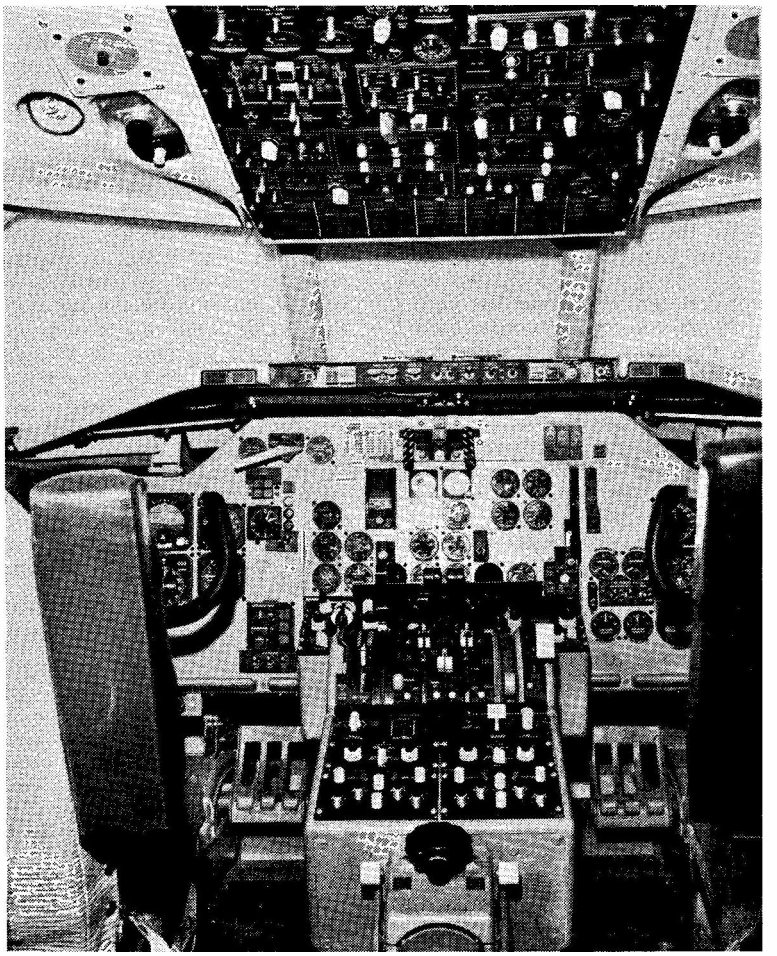
As can only be expected, a circuit which will perform these complicated timing and counting operations is in fact itself complicated. This one consists of three one-shot multivibrators, four gating circuits, a control flip-flop for the T/P and a five-stage reversible counter. The unit employs some 35 transistors (mostly of the cheap audio type) and 33 diodes. Apart from an input transformer and a T/P control relay, the rest are merely the usual resistors

and capacitors. Complicated though it may be, this circuit is the key to some fascinating aspects of RTTY and should be of great value not only for Autostart on crowded bands but also during normal conditions when bursts of interference or periods of fading can cause the printer to run wild. Transistors and diodes have been available for as little as 6d. each so this circuit need not be a very expensive one to build.

K3NIO has come up with something that makes DX Autostart a fact and though it seems rather unbelievable, it is only a question of net organisation and slightly more complex circuitry before you could dial the chap you want across the Atlantic and leave a message on the printer for him—provided the signal path is open. RTTY has a long way to go yet but it is certainly on the move !

Before leaving the chair, the writer would like to say his thanks to all who have helped to write this feature in the past by passing along information and encouragement. See you on the air, if not in these pages.

73 de G3CQE, AR SK.



Not just to show you the (simulated for training) flight-deck of a Douglas DC-9, but to suggest how space can be conserved—as it has to be in the control compartment of an airliner—by fitting a lot of the gear in panels placed overhead. This is the sort of constructional technique that could be adopted in many a small amateur shack. Of course, not all the knobs, taps and meters shown here are to do with the electronics of the DC-9—most of them are for engine and flight control. This simulator was built for training purposes by Redifon Limited, of Wandsworth, London, who are specialists in communications equipment for ships and aircraft.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for November Issue: Immediate!)

(Please address all reports for this feature to "Club Secretary," **Editorial Dept., SHORT WAVE MAGAZINE, Buckingham.)**

ONCE again, we come round to the time of year when Club meetings become over-heated, when the member with the best Top Band aerial system suddenly becomes the most popular chap in the room; as for the member with a transceiver that will go on Top Band, the committee is his to command—and all because of the imminence of MCC. Seriously, though, it is the writer's view that an entry in an affair such as MCC will do more to knit the Club together than all the lectures in the world; after all, it is hard for all the "Old Joes" to feel unwanted when for the good of the cause they have lent a transmitter, receiver, aerial pole, or what-have-you.

This is the twenty-first time the event has been fought out. In these twenty-one years the rules have varied quite a bit to the point where it seems we are nearly at an arrangement which gives all the competitors an equal chance of winning, as the results of the last couple of years show. Having said that, it is to be expected that this year the first twenty stations will all be from Rutland!

The rules are printed in full in this issue—*see* pp.493-494—and we would only add our plea for careful checking before you make the entry, a readable entry with the Club name and callsign on the top of each sheet, laid out in accordance with the rules, and in addition each sheet numbered—just in case the sheets get in a mess while doing the checking.

SPECIAL-ACTIVITY STATION REPORTS

We don't often hear of the results of the majority of the special-activity stations, except in passing references, but this month we have a welcome crop of reports.

The first of these concerns the GB3RED call, at the **Redbourn** Annual Fair. They got going at 1045z with the G3SBA transistor transmitter, which was later to be supplemented by a Viceroy and a Codar AT5. On Twenty some 60 contacts were obtained, including VK2AGR, and 90 QSO's on Top Band. Although bad weather reduced the attendance somewhat, the interest was high in the GB3RED efforts. Thanks are offered to G3LXP and the Verulam crew, Luton and District ARS and Luton College of Technology for the loan of the Viceroy, and to the Harpenden Scouts who erected and dropped the tent. All contacts are being QSL'd, as also are the SWL reports.

On now to **Southgate,** who ran a stand at the Southgate Summer Show, with activity on Top Band, 4m. and Two. A snag that cropped up during the course of the operation involved some brave soul in a midnight climb up to the four-metre dipole, and a commissariat slip-up resulted in a search for paraffin for the Tilley-lamp at 4 a.m., which must have pleased someone no end. However, all came out right in the end.

Salisbury and District were the instigators of the GB3WIJ effort at Ogborne St. George, near Marlborough, operated (in very bad Wx conditions) at the Wiltshire International Jamboree, from July 29 to August 6. Some 70 countries and 31 zones were worked, and the number of cards rolling in is such that the Club Hq. will have no need to wallpaper for a long time to come. On Twenty a G2DAF Mk. II transmitter and receiver were used, while the set-up on Eighty was a Heathkit DX-100U and RA-1 receiver. We understand the catering included the provision of a barrel of good Wiltshire ale in the sleeping quarters, which soothed many a savage breast! In conclusion, the members of the Salisbury and District group are on the record as hoping the next such event will be at a *Guide* camp—somehow we feel they are going to be disappointed.

CLUB NEWS ITEMS

At the Top of the Clip this month is **Newark** Short Wave Club, whose hon. secretary takes us to task for not giving him all the publicity he would like; however, we must come back to this one by commenting that we do our best, with the material available, to give all Clubs reporting fair coverage, especially as regards coming events. After all, your scribe has the task of persuading the customers to read the feature, otherwise none of the reports would serve a purpose! To this end, it is necessary to ensure as much forward programme news as possible and only general-interest matters in the way of "history"—and news-worthy history at that. In the case of Newark, just such an event occurred recently, when they waved goodbye to ZL3QH at a special Do attended also by MP4TBO and members of Nottingham and Grantham Clubs. The highlight of the evening was the presentation by ZL3QH of his parting gift, a rose-bowl trophy, to be competed for annually in a Club home-construction competition. Newark have meetings on three evenings in each

week, Monday being Amateur Radio night, Thursday R.A.E. tuition night, and on Fridays, Electronics, which we gather is to include all electronic interests outside the limited Amateur Radio context. All we need to add is that the programme to December is laid on, even if they won't tell us, and that they seem to be a lively lot of lads.

Another of our regular correspondents is Arthur, G3MDW, of **Northern Heights,** who mentions as history the near wash-out at the Annual Halifax Agricultural Show, when, we gather, the worry was simply to get the gear *off* the site without damage from mud or water. As for the month under consideration, on the 6th a visit to Emley Moor TV; 12th, Mary Shaw, G3OMM, on "Transmission of Sound on a Light Beam," followed on the 19th by a visit to Huddersfield Tech. to hear a lecture on Colour TV; then there is the Jamboree-on-the-Air over the weekend of 22/23rd, on the 26th a talk on "Radio Astronomy" by Mr. L. M. Dougherty, and on the 29th they make the lonk trek to the Exhibition, adding up to a well-filled programme for the month.

A new Club next: We are pleased to hear that the **Greenock** and District Amateur Radio Club has been formed, meeting fortnightly from August 19 onwards, the Hq. being at the Arts Guild, Campbell Street, Greenock. All the enquiries go to the hon. sec. at the address in the panel, as also offers of help. One would feel that here is a group that would need to import most of its lecturers, and anyone who can make an offer would be most welcome. It will be of great interest to see how this venture fares.

Skegness is the place to be on publication day, October 7, when the Autumn Junk Sale and Hamfest of the group will be held, at the Bull Hotel, Halton Road, Spilsby, Lincolnshire. A charge of 2s. 6d. is made for admission to an affair which usually has an attendance of 80-90 amateurs, and is acclaimed a "very good do" each year.

Over at **Guildford** a get-together twice a month is the rule, with this month a Natter Night at the Stoke Park venue on October 14, and a "Sale of Surplus-to-Requirements Gear" laid down for the 28th.

One of the few groups to boast a YL member is **South Birmingham;** they also provide the quote of the month—"The committee have started planning for the next (1967) NFD. Arrangements are to be made so that our entry will not be disallowed for the third year running; the member responsible for this year's boob is to be given away at the Christmas Surplus Sale." October 19 is the AGM, on 22/23rd they are involved in the J.O.T.A., in both cases at the Scout Hut, in the Selly Park area of Pershore Road.

Shefford and District ARS are one of the Clubs that have their being in places that one would not believe able to support a Club; thus they attract members from ten or fifteen miles away at least, and must do so if they are to survive—and Shefford are doing more than survive! The Church Hall, Shefford, is the spot to home on to, any Thursday evening, 7.45 till 8 p.m. for Morse, and after that the business of the evening. [*cont'd p.495*

MCC—TWENTY-FIRST ANNUAL TOP BAND CLUB TRANSMITTING CONTEST

RULES

1. ***Duration:*** Saturday, November 12 and Sunday, November 13; on both days between the hours of 1700 and 2100 GMT (eight operating hours in all).
2. ***Frequency and Power:*** All contacts to be made in the 1800-2000 kc band, using CW only, with a power input not exceeding 10 watts to the final stage. All reasonable precautions will be taken to avoid interference with other services using the band.
3. ***Call Signs:*** Where a Club has its own transmitting licence and callsign, that callsign is to be used. Clubs without their own call may nominate a member's station as their official entry.
4. ***Calling:*** Clubs will call "CQ MCC," using the "*three times three*" procedure. Infringement of this rule by the use of long CQ calls may entail disqualification.
5. ***Scoring:*** Other Club stations may be worked on each of the two days, and these contacts will count for three points each time. Non-Club stations may be worked once only, and will count for one point only. Inter-Club contacts will take the form of an exchange of five-character groups comprising RST and Club identification letters.
6. ***Non-Club Contacts:*** Contacts with non-Club stations, counting for one point, will take the form of logging the RST and the other station's QTH. The Club's own QTH, not the identification letters, should be sent to complete the QSO. (*See* p.494 for Club identification letters.)
7. ***Logs:*** Contest logs are to be neatly set out as follows: One side only of quarto or foolscap sheets should be ruled into eight columns, with *name and callsign of Club station on each sheet,* headed thus: Col. 1, *Date and Time.* Col. 2, *Callsign of station worked.* Col. 3, *Outgoing five-character group.* Col. 4, *Incoming five-character group.* Col. 5, *RST out-going* (to a Non-Club station). Col. 6, *RST incoming* (from a Non-Club station). Col. 7, *QTH of Non-Club station.* Col. 8, *Points claimed* for contact. Col. 8 is to be totalled at the foot of each page, and the running totals brought forward. The last page of the log should contain the following summary:

   Total score for Club contacts, at three points per contact; this figure then to be multiplied by the Zone multiplier (*see* p.494), *e.g.* a station in the GW Zone making 150 Club contacts would give the figure of 450, and then apply the multiplier of 1·1, giving a Club score of 495; total number of non-Club contacts; total score. Comments on the equipment used, number of operators employed, general impressions and experiences are also invited, and should be added at the end of the log.
8. Any Club station radiating a note consistently worse than T9 will be liable to disqualification.
9. Logs, addressed to "Club Secretary," SHORT WAVE MAGAZINE, Buckingham, must be posted to reach us not later than Wednesday, November 23, 1966. The Editor's decision on the results will be final, and will be published in the January, 1967 issue of SHORT WAVE MAGAZINE.

THE MCC ZONES

Although, under the rules, all Club contacts count for the same score of three points, and there is thus no need to know the Zone in which the station worked is located, it is necessary for each Club to know the Zone in which it is itself situated, for the purpose of applying the multiplier to its own final score of Club contacts. The Zones are as follows:

GM Zone: All Scottish counties.

Northern Zone: Northumberland, Durham, Cumberland, Westmorland, Lancashire and Yorkshire.

Midland Zone: Cheshire, Derby, Shropshire, Stafford, Hereford, Worcester, Warwick, Nottingham, Lincoln, Leicester, Rutland, Northampton, Bedford, Huntingdon, Cambridge, Norfolk, Suffolk.

Southern Zone: Somerset, Dorset Gloucester, Wilts, Berks., Hants., Oxford, Bucks., Herts., Middlesex, Surrey, Sussex, Kent, Essex, London.

South-Western Zone: Cornwall and Devon.

GW Zone: All Welsh counties.

GI/GD Zone: All GI counties and the Isle of Man.

GC Zone: Channel Islands.

Scoring

The score for Club contacts only will be arrived at by counting three points per contact (irrespective of Zones) and then applying to the total the following multiplier:

GM Zone: 2·0
Northern Zone: 1·25
Midland and GW Zones: 1·1
South-Western Zone: 1·5
GI/GD Zone: 1·6
GC Zone: 1·3
Southern Zone: 1·0

It is emphasised once again that all Club contacts count three points: but that the total of such points (not including non-Club contacts) is multiplied, at the end, by the appropriate factor shown above.

IDENTIFICATION LETTERS FOR CLUBS IN "MCC"

AB Aberdeen
AC Acton, Brentford & Chiswick
AG Ash Green (Surrey)
AI Ainsdale
AS Ashton-under-Lyne
BA Basingstoke
BB BBC, Lime Grove
BC Basildon
BE BBC, Evesham
BH BBC, Bush House
BI Bristol
BJ Bath
BK Bromsgrove
BL BBC, Langham Place
BM Blackwood, Mon.
BP Blackpool & Fylde
BQ Burnham Beeches, Bucks.
BR Barnsley
BS Burnham-on-Sea, "A"
BT Brighton Tech. College
BU Bury St. Edmunds, "A"
BV Burnham-on-Sea, "B"
BX Burslem, Staffs.
BY Bury St. Edmunds, "B"
BZ Bury & Rossendale
CA Cheltenham
CB City of Belfast
CC Cannock Chase
CD Cardiff RCC
CE Cambridge & District
CF Cray Valley
CG Cambridge University
CH Chesham
CI Chester
CJ Crystal Palace
CK Chippingham
CL Clifton (London), "A"
CN Conway Valley
CO Cornish
CR Crawley, "A"
CS Cheshunt
CT Crawley, "C"
CU 65th Sig. Regt.
CV Coventry
CW Cotswold
CX Crawley, "B"
CY Chorley & Leyland
DH Dollis Hill, GPO
DR Derby
DS Dursley
DU Durham City
EA East Lancs.
ED Edgware
EK East Kent
EL East Worcs.
ER Echelford
EW East Cheam
FA Fareham
FO Forfar
FY Fylingdales (EWS)
GC Govt. Comms. ARC, Cheltenham
GD Guildford
GE GEC Research
GF Greenford
GK Greenock
GN Grafton
GR Gravesend
GS GEC Apprentices
GY Grimsby
HA Halifax
HL Hull
HN Henley-in-Arden
HR Harlow
HS Hounslow
HV Haverhill, Suffolk
HW Harrow
HX Harwell (AERE), "A"
HY Harwell (AERE), "B"
IL Isle of Man
IW Isle of Wight
KC Kings Norton RCC
KY Kirkcaldy
LC Leicester
LD Loughton
LE Leeds
LF Leven (Fife)
LH Loughborough
LI Lichfield
LM Lymington, "A"
LN Loddon Valley
LO Lothians
LP 42nd Sig. Regt.
LR Lymington, "B"
LT Luton
LU Liverpool University
LV Liverpool
LY Leeswood
MA Macclesfield
MD Medway
MF Moray Firth, "A"
MG Magnus Grammar School (Newark)
MH Maidenhead
MM Melton Mowbray
MO Morecambe
MP Marconi Apprentices (Chelmsford)
MQ Moray Firth, "B"
MR Moray Firth, "C"
MS Midland
MU Mid-Sussex
MW Mid-Warwickshire
MY Maidstone YMCA
MZ Manchester
NF Norfolk
NH Northern Heights
NK Newark
NL Northampton College (London)
NM Newport, Mon.
NN North Notts.
NO North Kent
NP Northern Polytechnic (London)
NT Nottingham
NU Newcastle University
NW U.C. of North Wales
NY Newbury
OX Oxford
PD Paddington
PE Peterborough
PL Plymouth
PY Purley
RA Reigate, "A"
RB Reigate, "B"
RC Reigate, "C"
RE Reading
RF 92nd Sig. Regt.
RG No. 1 M.H.U. Middx.
RM R.A.F., Kinloss
RN Royal Naval A.R.S.
RO Roding Boys Soc.
RP Royal Sigs., Catterick
RS Radio Club of Scotland
RV Ravensbourne

(*NOTE:* This list includes all Clubs recently taking part in "MCC." Other Clubs desiring to enter for this year's event should write in for identification letters, enclosing a stamped addressed envelope. It will not be possible to print a supplementary list this year. Letters should be addressed "MCC," *Short Wave Magazine*, Buckingham.)

EXAMPLES FOR OPERATING

Coventry works Derby, sends 579CV; Derby replies 589DR. Or Oxford works Paddington, receiving 589PD and sending 569OX, etc.

EXAMPLES FOR SCORING

Blackwood (BM) in GW Zone makes 75 Club contacts and 10 single-point (non-Club) QSO's. The score for Club contacts is 75 × 3 (225) and the multiplier allowed is 1·1, bringing this up to 247. Total score is thus 247 + 10 = 257.

Radio Club of Scotland (RS), in GM Zone, makes 45 Club contacts and 10 single-pointers. The score for Club contacts is 45 × 3 (135) and subject to a multiplier of 2, bringing it up to 270. Total score is 270 + 10 = 280.

RW Racal, Wokingham
RY Rugby
RZ R.A.F., Sealand
SA St. Helens, Lancs.
SB South Birmingham
SC Scunthorpe
SD Sheffield, " A "
SE Stockport
SF Sunderland Tech. College
SG Stratford-upon-Avon
SH Shefford
SI Southgate
SJ Sheffield, " B "
SK Sole Bay
SL South London Mobile
SM South Manchester
SN Swindon
SO Southampton
SP Spen Valley
SQ Silverthorn
SR Scarborough
SS South Shields
ST Stroud
SU Saltash
SV Stevenage
SW South-West Essex Tech. College
SX Stoke-on-Trent
SY Surrey (Croydon)
SZ Sutton & Cheam
TO Torbay
TV Thames Valley
TX Skegness
TY Salisbury
TZ Salop
UK University of Keele
VR Verulam
VS B.A.C., Hurn
WA West Kent
WI Wirral
WK Wakefield
WO Wolverhampton
WR Worthing
WS Wimbledon
WT Worcester
WV Wolverton
WX Wessex
YV Yeovil
ZA 235 Sqdn. A.R.S., Stoke-on-Trent

If you are thinking of attending the meeting of the **Stratford-upon-Avon** gang, the date is October 20, but the venue is not decided, so ring G3RPJ. Does this imply a permanent shift of Hq.? Stratford is one of the groups that make a point of welcoming visitors, and meaning it.

Up in **St. Helens,** there is an Electronics Society, who report each month, this time with the good news of several passes in R.A.E. As to the programme, on October 4 they were to have heard G3LWY talking about RAIBC, to which she gives so much time and effort, and on October 18 the talk will be on Aerials—both meetings in the Hq. at the I.V.S. Centre, 55 College Street, St. Helens.

The **Roding** Boys Society are running an R.A.E. class in addition to the other activities outlined last month, and mention that they are now integrated with the local Youth Service, which should mean that they have the opportunity to expand their facilities. One of the interesting projects in hand is the provision of a Test and Calibration Service for the boys, which will be available to other amateurs as well. We wish them best of luck in their endeavours.

Surrey Radio Contact Club have a move of Hq. afoot, as and from the *November* meeting, on the 15th, when they will be hearing the W1BB tape lecture. (No details are given of the October meeting.) Anyone wanting an R.A.E. class, and Morse tuition, in this area, should contact G3OJE, Mike Bass, at 42 Cleveden Road, London, S.E.20. It is understood the venue will be Beckenham Evening Centre for this.

Southgate make no mention of their October meeting, but have obviously been up to something—the *Newsletter* ends with a reference to the local radio shop, which helps so many amateurs in the area, in these terms " Visit your local harem of radio components."

A questionnaire was recently sent out to the members of **West Kent** ARS, with the idea of finding what the lads prefer; a sound scheme, this, for stopping the groans of the chaps who never do any active work in running the Club! The 7th is given over to a Junk Sale, and on the 21st they have a discussion, chaired by G3PAH, on the topic of SSB.

Another Club with a good idea is **Spen Valley,** who have sent in a complete programme of events up to *next June!* For October, the 13th is given over to instruction in " How to use Meters " by Mr. L. W. Burkitt; 20th to " Inter-carrier Sound " at Baird TV, Lidgett Green, Bradford; and then a limited-number visit to Elland Power Station to round off on the 27th.

On October 13, Mr. Spankie of the BBC will talk to the members of the **Lothians** Radio Society, and on the 27th they will be holding a " Visitors Night," both at the YMCA in South St. Andrew Street, Edinburgh, at 7.30 in the board room. The idea of a special visitors' night seems to be one of the best heard for a long time.

A letter from G6CC informs us of **Midland** ARS doings for the month. The meeting will be held on Tuesday 18th, at the Birmingham and Midland Institute in Margaret Street, Birmingham, 3. The subject is to be advised to members later, but it is promised as being of great interest, and visitors will be welcomed, as always in this Club.

AGM's during the Show

We are asked by the **Royal Signals** ARS to mention that the Annual General Meeting of the Society will be held on October 28 at 4.30 p.m. at the Seymour Hall (all-same International Radio Communications Exhibition place and date), in the council room on the second floor. As it is thus timed, no member has an excuse for not being there if he is at the show on the Friday.

Another body requesting similar publicity is the **British Rail** ARS, who are to hold their inaugural meeting—election of officers, discussion of business, etc.—on Saturday, October 29, 2.0 p.m. at the British Rail Board Hq., 222 Marylebone Road, London, N.W.1. All interested, even if not already members of this new group, are asked to be there.

The **Pathfinder** Radio Group send us the first

Because of the change of publication date, with the November issue to appear on October 28, it will be in preparation by the time this issue is published. Hence, Club reports for November " Month With The Clubs " are wanted immediately. Send in yours straight away, to cover your November programme, to " Club Secretary," Short Wave Magazine, Buckingham. After appearance of the November issue, the period available between issues will revert to normal.

issue of their international organ, *Hemel Hempstead Radio.*

An open evening on October 10 starts the session for **Cambridge** University Wireless Society, with a talk about the Society and its aims, followed by a film or tape of general interest. Thereafter, they will get together fortnightly on Thursdays, in the Psychology Department Lecture Room on the Downing site, commencing at 8.15 p.m. It is of interest to add that the C.U.W.S. holds G6UW as their Club call, one of the real old-timer callsigns.

The *Cornish Link* is a little out of phase with us in the matter of publication dates, which is why we have no news of their October programme ; however, that does not alter the fact that Cornish is one of the liveliest groups to belong to in the country.

Southgate have their G6QM Trophy evening on October 13, which is a " home-construction " competition that always seems to be hotly contested—perhaps one of the best draws in the Southgate programme over the last ten or more years.

Weekly meetings are the routine at **Peterborough,** on Fridays at 8 p.m., to which visitors are welcomed. Their hide-out is in the old windmill, behind the Peacock Inn, which is opposite Murkitts Garage on the London Road. On the other hand, **Acton, Brentford & Chiswick** favour monthly meetings and hold them at 66 High Road, Chiswick ; the affair this month is slated for the 18th at 7.30 p.m., when they are to hear G5ZA on " Insulation Breakdown."

Aeronautical radio is the large, and extremely interesting, subject to be talked about at the next **Swindon** get-together on Wednesday, October 19, at the Redbourne Cheney Old Scout Hall, located behind St. Andrew's Methodist Church, Moreden Road, Swindon.

For **Fareham** and District, the big event recently was quite accidental—G3UZI/M broke into the local net, and in the course of the QSO it was realised that G3UZI is the U.K. call of 4S7IW, Ian Wollen, and he was duly roped in to give a talk at the weekly session of the Club, that very evening. Ian described Amateur Radio as seen from Ceylon, and described his own mobile rig in the course of a very well-appreciated lecture, which concluded with the presentation of a pennant with good wishes from the Ceylon Radio Club to the Fareham Club ; in reply, the president of Fareham Club reciprocated. The

Names and Addresses of Club Secretaries reporting in this issue :

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London, W.3.
BRITISH AMATEUR TELEVISION CLUB: D. Mann, G6OUO/T, 67 West Hill, Wembley Park, Middx.
BRITISH RAIL: H. A. J. Gray, Eleven, Swanton Drive, East Dereham, Norfolk.
BROMSGROVE: J. Dufrane, 44 Hazelton Road, Marlbrook, Bromsgrove, Worcs.
CAMBRIDGE UNIVERSITY: J. A. Lush, G3TGY, Queens College, Cambridge.
CHIPPENHAM: A. Hargreaves, G6NV, 20 Lords Mead, Chippenham, Wiltshire.
CORNISH: M. J. Harvey, Oak Farm, Carnon Downs, Truro.
CRAWLEY: R. G. B. Vaughan, G3FRV, Tralee, 5 Filbert Crescent, Gossops Green, Crawley (*23359*), Sussex.
CRAY VALLEY: C. W. A. Davis, 6 Braemar Gardens, Sidcup, Kent. (*FOOtscray 5077.*)
CRYSTAL PALACE: G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23. (*FORest Hill 6940.*)
EAST LANCS: J. Simpson, 1 Marsh Terrace, Darwen, Lancashire.
EAST WORCESTERSHIRE: J. Bazley, G3HCT, Brooklands, Ullenhall, Solihull, Warwickshire.
EDGWARE: G. S. Fitton, G3RAA, 18 Beverley Drive, Edgware, Middx.
EX-G RADIO CLUB: F. W. Fletcher, G2FUX, 53 St. Ives Park, Ringwood, Hants.
FAREHAM: N. Carless, G3EER, 16 Waterloo Road, Alverstoke, Gosport, Hants.
FYLINGDALES (E. W. STATION): W. Burton, G8ANQ, 14 Westbourne Road, Castle Park, Whitby (*935*), Yorks.
GREENOCK: R. Holt, GM3VCD, 13 Royal Street, Gourock, Renfrewshire.
GUILDFORD: M. A. Birch, G3KMA, Sorrento, Whites Lane, Ash Green Aldershot, Hants.
LEEDS: M. Goldman, 8 Nunroyd Road, Leeds, 17.
LICHFIELD: S. W. Williams, G3VIQ, 65 Wallfield Road, Alrewas (*491*), nr. Burton-on-Trent, Staffs.
LOTHIANS: A. J. Masson, GM2PSP, 20, Merchiston Park, Edinburgh, 10.
LUTON: A. W. Morgan, G8ADS, 97 Victoria Street, Dunstable, Beds.
MAIDENHEAD: E. C. Palmer, G3FVC, 37 Headington Road, Maidenhead, Berks.
MELTON MOWBRAY: N. Jolly, 23 Melton Road, Asfordby Hill, Melton Mowbray, Leicestershire.
MIDLAND: C. J. Haycock, G3JDJ, 29A Wellington Road, Handsworth, Birmingham, 20.
MID-WARWICKSHIRE: K. J. Young, 180 Northumberland Court, Leamington Spa (*26426*).
NEWARK: G. Francis, G3TWV, 93 Balderton Street, Newark, Notts.
NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden Halifax (*64329*).
NOTTINGHAM: Norman E. Down, G3SRX, 23 Lady Bay Road, West Bridgeford, Nottingham (*83106*).
PADDINGTON: N. G. Copperwaite, G8AQO, 62A St. Marys Mansions, St. Marys Terrace, Paddington, London, W.2.
PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.
PURLEY: A. Frost, G3FTQ, 62 Gonville Road, Thornton Heath, Surrey.
R.A.I.B.C.: Mrs. Frances Woolley, G3LWY, 331, Wigan Lane, Wigan.
REIGATE: D. Thom, G3NKS, 12 Willow Road, Redhill, Surrey. (*Reigate 45033.*)
RODING BOYS: R. T. Marchant, G3TAJ, 154 Essex Road, Leyton, E.10.
ROYAL SIGNALS: J. Hodgkins, 2 Sqn, 8th Signal Regiment, Catterick Camp.
ST. HELENS: B. Hardy, 198 Knowsley Road, St. Helens, Lancs.
SALISBURY: D. E. Hobbs, G3OBW, 5 Norfolk Road, Salisbury, Wiltshire.
SALOP: W. Lindsay,Smith, 22 Kingswood Crescent, Copthorne Crescent, Shrewsbury.
SALTASH: D. Bowers, 95 Grenfell Avenue, Saltash, Cornwall.
SHEFFORD: D. A. Pike, G3VMI, 32 Lawrence Avenue, Letchworth, Herts.
SILVERTHORN: V. W. Dobbs, G3SBX, 11 Horsley Road, Chingford, London, E.4.
SKEGNESS: Norman Hodgson, G2ABK, 26 Raithby Road, Hundleby, Spilsby, Lincs.
SOUTH BIRMINGHAM: A. Bishop 40 Cecil Road, Birmingham, 23.
SOUTHGATE: R. Wilkinson, G3TXA, 23 Ashridge Gardens, Palmers Green, London, N.13. (*PALmers Green 4592.*)
SPEN VALLEY: N. Pride, 100 Raikes Lane, Birstall, nr. Leeds (Batley 3925).
STRATFORD-ON-AVON: I. A. Cobbold, G3RPJ, 5 Avenue Road, Stratford-on-Avon.
SURREY: R. Morrison, G3KGA, 33 Sefton Road, Croydon, Surrey (*ADDiscombe 5982*).
SWINDON: D. Goacher, G3LLZ, 51, Norman Road, Gorse Hill, Swindon (*21740*), Wiltshire.
THAMES VALLEY: K. A. H. Rogers, G3AIU, 21 Links Road, Epsom.
W.A.M.R.A.C.: Rev. A. Shepherd, G3NGF, 1 North Street, Crewe (*2558*), Cheshire.
WEST KENT: R. Trevitt, G3SSE/G6SSE/T, 28 Delves Avenue, Tunbridge Wells, Kent.
WIMBLEDON: K. Alexander, 23 Pepys Road, London, S.W.20.
WIRRAL: A. Seed, G3FOO, 31, Withert Avenue, Bebington, Cheshire.
YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil, Somerset.

Group picture taken on the occasion of the Cheshunt & District Radio Club's field-day outing on Saturday, August 13. With their station signing their own call GB3CRC on Top Band and 2m./4m., the object was not so much to work a lot of DX as to have a good day out, in the air and on it. Which they did. Though 4m. was pretty unrewarding (two QSO's by sked), they worked plenty of locals and near-locals on the other bands. In the chair is G3TIO, and immediately behind him is G2DGW. Others in the group include G3EGD, G3FD, G3TXI, G8AHG and G8ASB.

group offer a welcome to visitors to the meetings held on Sunday evenings at 7.30, at the Portchester Community Centre, Portchester.

Nasty Accident

G8ANQ writes to inform us that the **Fylingdales** (Early Warning) Radio Club stand at the Whitby Regatta was in the wars, due to a gale which blew the marquee down in the small hours of the morning, slightly injuring an operator on duty, while one of the others was badly concussed. However, in spite of this, and the wrecking of the display in the process, the gear was quickly checked and installed at a nearby ticket office where operation continued with great success. It is to be hoped that all concerned are now " up and about " again and we must admire their spirit in carrying on after such a disastrous start.

The next on the clip is a national rather than a local organisation, whose members all either give to, or receive from, **RAIBC**—far more than we ordinary mortals ; in particular, the helpers, of whom there can never be enough. So, if Amateur Radio palls a little, and you want a new interest, try offering a helping hand to the Bedfast group. Even if you don't do this, it is as well to remember the details, in case you come up in contact with an amateur or SWL struggling against disability problems, and can do him a good turn by passing the information on to the RAIBC.

Another national organisation is the **British Amateur Television Club,** which caters for the A/TV enthusiast by way of local groups, the BATC magazine *CQ-TV* and, of course, the annual convention, which is slated this year for October 8 at 70 Brompton Road, London, S.W.3. This is short notice, but nevertheless it is well worth the effort to get there and see how the " other half " looks at the Amateur Radio game.

Next meeting of the **Melton Mowbray** lads is on October 20, at the St. John Ambulance Hall, Asfordby Hill, Melton Mowbray, at 7.30 p.m. The topic for the meeting is not known at the time of writing, as it is the usual habit to discuss this at the AGM in mid-September, and, indeed then to define the programme for the entire year.

An unusual routine of meetings is followed by **Silverthorn** Radio Club in that they foregather every Friday *except the first one in the month,* at Friday Hill House, Simmons Lane, Chingford, London, E.4. It is obvious that visitors are welcome in that the chairman, who reports to this piece, adds his own telephone number to the report. He is G2HR, and his number is (STD) 01-529-2932.

Thames Valley ARTS do not mention what they have laid on for Ocober, but on November 2 they will be judging the entries for their Caernarvon Trophy, the venue for this affair being the Prince of Wales, Bridge Road, East Molesey.

On to **Chippenham,** where they report with some amusement that the treasurer, G3UUV has become the proud father of triplets, and SWL Sparrow has stepped into the breach while G3UUV recovers from the shock ! Leg-pulling apart, on October 25 a Junk

Sale is set, and in addition there is a full programme of future events. Another Junk Sale, this time on October 14, is the one being held at **Wimbledon,** at the Community Centre, St. George's Road, Wimbledon. In addition, the fourth Friday of each month is filled by an informal session at the St. John Ambulance Brigade Hall, Kingston Road, Wimbledon.

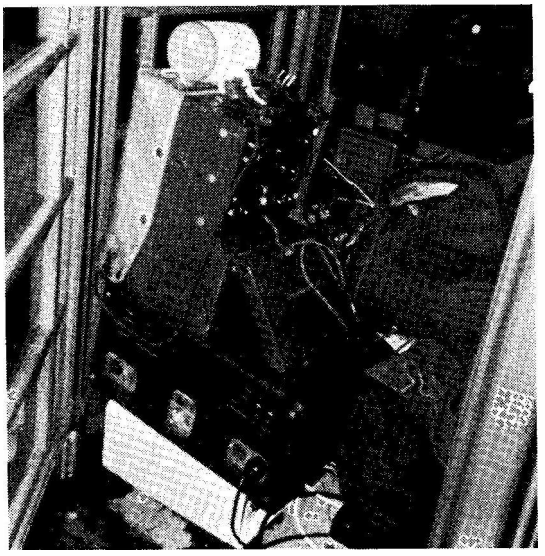
Another member of the SARA group of Clubs is **Purley,** who have *their* Junk Sale on October 21, at the Railwaymen's Hall, 58 Whytecliffe Road, Purley. The third SARA Club is, of course, **South London Mobile,** with yet another Junk Sale, on the following day, October 22. In addition, the topic for October 8 is SSB, with G3GKF in the hot seat, at Clapham Manor Baths, Clapham Manor Street, S.W.4, at 8 p.m.

Crystal Palace listen to Hi-Fi for the evening, on Saurday, October 15, as a change from the strenuous activities in September, and in particular VHF NFD, during the course of which we gather they Had Adventures.

Salop ARS have at last found themselves a permanent headquarters after no less than four years " in the wilderness," a condition with which your conductor can sympathise, having been a member of a Club that suffered in a similar way. They can now be found on the second and fourth Thursday at The Old Post Office Hotel, Milk Street, Shrewsbury, at 7.30 and they are pleased to welcome any visitors or new members at the meetings ; on October 13 the matter in hand is the very important AGM.

From **Bromsgrove** we hear of regular meetings on the 2nd Friday in each month, held in the Co-op Hall at Bromsgrove, which are to be supplemented by additional sessions at Burcot Village Hall on the 3rd Tuesday in the month, these latter being in the form of a series to be entitled " Radio Instruction and Construction." The subject for the meeting arranged to take place on October 14 is a demonstration of High Fidelity Stereo.

Before ZL3QH (left) returned to New Zealand after his caravan trip round the U.K., he presented Newark Short Wave Club (chairman, H. Gilbert) with a silver trophy to be competed for annually. This presentation took place on August 22, when members of the Nottingham and Grantham Clubs were also present.



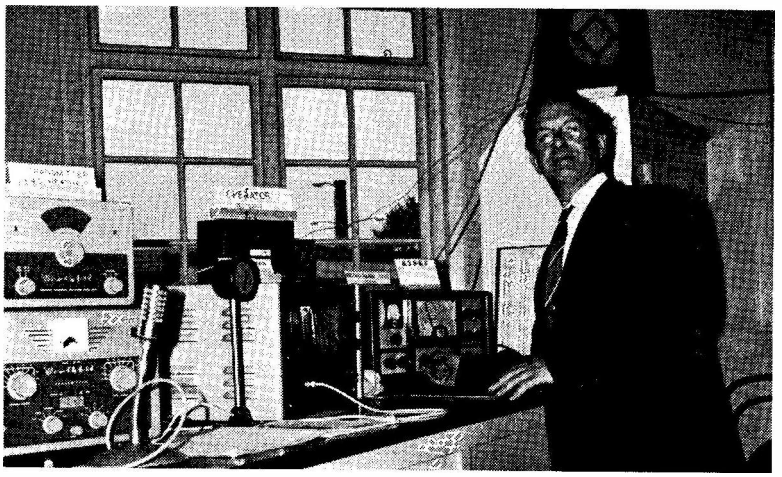
The Fylingdales, GBFRC, effort at Whitby on August 13 nearly ended in total disaster when a great gale flattened their marquee and wrecked the station. The salvage was stowed temporarily in a G.P.O. phone box (above) till the station could be reorganised, this time in a ticket office on the sea-front, adjacent to the exhibition site. The Fylingdales boys then "carried on as advertised" till the close of the exhibition, on Monday 15th. The operators contributing to this gallant effort — on which the wreckage shown here suggests but little — were G2FDF, G3AJB, G3NTA, G3UWP, G3VGN and G8ANQ. In the end, they were knocking off the DX with a KW-2000A and a dipole — well done!

Yet another group to report a tale of woe during the VHF Field Day is **Luton** and District ; however, they were able to stay on the air by setting five members to hold the tent down during the storm, while the sixth carried on operating. One wonders who the strong-nerved chap was who carried on while his chums were getting ready for an enforced flying lesson . . . they always say landing is the hardest part of learning to fly ! On October 11, G5AAT/K4GNM will be speaking to them, by invitation, and the 18th is given over to a surplus sale, the month being nicely rounded off by a talk on Transistors on the 25th.

Over at **Crawley** the Field Day report is terse and to the point—" licking our wounds ! " However, it is expected they will recover in time to hear a dissertation on October 12 by G3NVB, who will gaze into his crystal ball and talk about " Communications in the '70's."

On Mondays the **Mid-Warwickshire** crowd get together, the second and fourth being devoted to a set programme and the others given over to open and informal meetings. On October 10 Swanco Products are to demonstrate the Sommerkamp FR-100B receiver, and on the 24th they will hear all about personal radiotelephones.

Leeds ARS meet at the Swarthmore Education Centre, Woodhouse Square, Leeds, 3, at 7.30 p.m.



When the Doncaster group put on an exhibition station at the famous race-course locally, this was the array of gear available, with G3PAF operating under callsign GB3DGS.

The 19th is the date for the October meeting, intriguingly titled "Project: Amateur Bands Receiver." It sounds rather as though Leeds have been through one of those slack periods that afflict most groups at some time, but they are now working their way back again, if the secretary's letter is read aright.

East Lancashire had a meeting on October 6 for a film show, one which dealt with the ship-to-shore radio network. The November affair is devoted to the study of Amateur Television, on the 3rd, at the YMCA, Limbrick, Blackburn.

Reigate are booked in at the George and Dragon, Redhill, for their usual meeting on October 13, but at the time of writing the programme is still in the air.

Maidenhead is once again a happy Club. The local lads have sorted themselves out a new place to meet, and things can now be organised. On October 18, G3RQI is going to tell them about "Radio, Maritime and Aeronautical" in the new clubroom at Victory Hall, Cox Green, Maidenhead. In addition they will have a special-activity station, signing GB3MAI for the Scout affair over the weekend of October 22-23, working all LF, HF and VHF bands, at Braywick Road Sports Centre, Maidenhead; there is also a plot afoot to have a Do during November, to celebrate the Club First Birthday.

WAMRAC is probably more international than national in its boundaries, and of course cannot therefore have a regular series of meetings as do local groups. However, there is a chance for such groups as WAMRAC when the Radio Communications Exhibition comes round each year, and the majority of amateurs in the U.K. traipse up to Town to see what's new. The conference room in the Seymour Hall is the venue for the WAMRAC get-together, on October 29, between 2 and 3.15 p.m.

It is said that the early bird is the one that catches the worm. If this is the case there must be some point to be learned from the **Edgware** programme for this month: On October 10, G3KMO is to give a lecture which, we are informed, winds up a discussion started last July about the transmitters for *1967* NFD!

The **Ex-G Radio Club** *Bulletin* is always eagerly read, not least for the Black Country stories offered by G4MJ, and the mail-bag; however, this time part of the offering is a membership list which makes quite startling reading, and a couple of very interesting articles.

Over at **Nottingham,** we hear of a film show slated for October 11, at the Club Hq. at Sherwood Community Association, Woodthorpe House, Mansfield Road, Nottingham.

An unlucky state of affairs for the **Wirral** crowd; they report two meetings laid on for October, and both dates will be past history by the time this reaches the bookstalls . . . Ah, well, such is life!

Yeovil present a Junk Sale as the programme for the session on October 12, and preliminary arrangements for the MCC are already in hand.

Now to **East Worcestershire** ARC, who write to say that the September meeting programme had to be changed at the last minute, and they heard and saw G3NVA do his talk and colour slides of his recent trip to the United States, which they claim saved the day in handsome fashion. One wonders what G3NVA would do if asked to repeat this one by other Clubs?

Saltash seem to have things well under control, and the current month's offerings give some idea of the activity. On October 7, there is a film and social night, followed by G5ZT giving a lecture on October 21, which should be very interesting, as he is very active on VHF, RTTY and Mobile.

Finally to **Paddington** and District, who report a fortnightly lecture programme as being laid on till the end of the year, including in October the W1BB Top Band tape-and-slide lecture.

Sorry if we have been a bit brief with some of your notes, due to the pressure on space caused by MCC, but keep on sending in for the deadline which this time is: First Post Tomorrow, addressed as always to "Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM.

NEW QTH's

This space is available for the publication of the addresses of all holders of new U.K. callsigns, as issued, or changes of address of transmitters already licensed. All addresses published here are reprinted in the U.K. section of the "RADIO AMATEUR CALL BOOK" in preparation. QTH's are inserted as they are received. up to the limit of the space allowance each month. Please write clearly and address on a separate slip to QTH Section.

G3FSN, A. C. Butcher, 70 Hughenden Avenue, High Wycombe, Bucks. *(Tel. High Wycombe 24835.)*

G3TKN, V. C. Lear, 49 Cliff Road, Wallasey, Wirral, Cheshire. *(Tel. Wallasey 4174.)*

G3TKN/A, V. C. Lear, St. Vincent, Highfield Road, Cowes, Isle of Wight, Hants. *(Tel. Cowes 2850.)*

G3USP, J. R. Middleton, 2 Blythe Road, Mosspit, Stafford.

G3VDD, S. Moule, 27 Lowfield Road, Kilburn, London, N.W.6.

G3VGH, Dr. B. R. C. Hutchinson, *(G8AAN),* 78 Strensall Road, Huntington, York.

G3VIP, G. Wood, 9 Patrick Street, Grimsby, Lincs.

G3VJM, A. Wood *(G8AEH),* 8 Ashley Avenue, Epsom, Surrey.

G3VJV, C. P. Hartley, 23 Sefton Terrace, Pellon Lane, Halifax, Yorkshire.

G3VKK, Chesterfield & District Radio Society, c/o L. Millward, Oak Tree Cottage, Ashgate, Chesterfield, Derbyshire. *(Tel. Chesterfield 68117.)*

G3VKW, K. Evans, 21 Horne Road, Shepperton, Middlesex. *(Tel. Chertsey 4198.)*

G3VLQ, M. A. Tindal, Flat No. 51, 203 Wensley Road, Coley Park, Reading, Berks.

G3VMD, F. C. Reid, 12 The Heath, Lower Boston Road, Hanwell, London, W.7.

G3VMK, N. D. Chadwick, 40 Abbots Road, Abbots Langley, Watford, Herts. *(Tel. Kings Langley 3975.)*

G3VMQ, P. A. Tory, 10 Park Road, Burgess Hill, Sussex.

G3VMR, R. J. Redding, September House, Cox Green Lane, Maidenhead, Berks. *(Tel. OMA8 24929.)*

G3VNE, W. T. Coleman, 35 Coventry Road, Tonbridge, Kent.

G3VNI, S. C. Cammies, 5 Willingdon Place, Granville Road, Walmer, Deal, Kent. *(Tel. Deal 2169.)*

G3VNJ, C. H. Fowler, 33 Kenyon Road, Chesterfield, Derbyshire.

G3VNQ, M. G. Pritchard, 142 Forest Road, Southport, Lancs.

GW3VNO, D. L. Hughes, Mountain Air, Began Road, St. Mellons, Cardiff, Mon. *(Tel. Cardiff 78799.)*

G3VOA, R. H. Boydell, 4 Hanyards Lane, Cuffley, Herts.

GM8AOU, R. St. J. Andrew, Ingleneuk, 40 Brechin Road, Kirriemuir, Angus.

G8AQT, F. W. J. Neale, 27 George Lane, Marlborough, Wilts.

G8AQY, M. S. Gaunt, 2387 (Pudsey) Sqdn. A.T.C., Thornbury Barracks, Pudsey, Yorkshire.

G8ARD, G. L. Parris, 2 Ashford Grove, Yeovil, Somerset.

G8ARG, W. J. Clayton, 7 The Bancroft, Etwall, Derbyshire. *(Tel. Etwall 2121.)*

G8ARH, N. Blackmore, 39 Dorking Road, Gt. Bookham, Surrey.

G8ARO, P. M. Kerry, 19 Garford Close, Abingdon, Berks.

G8ARR, P. J. Edwards, 28 North Roundhay, Kitts Green, Birmingham, 33.

G8ARU, J. T. Lumb, 22 Hervey Road, Bury St. Edmunds, Suffolk.

G8ARX, A. J. Dunning, 4 Seymour Street, Wellington, Somerset. *(Tel. Wellington (SOM) 2084.)*

G8ARZ, K. J. Young, 180 Northumberland Court, Leamington Spa, Warks. *(Tel. Leamington Spa 26426.)*

CHANGE OF ADDRESS

G2BHZ, E. F. Gadsden, 125 Belle Hill, Bexhill-on-Sea, Sussex.

G3CMI, J. A. Scott, 17 Thornton Road, Littleheath, Potters Bar, Middlesex.

G3FQH, J. Clegg, 8 Hillside, Leak Hall Lane, Denby Dale, Huddersfield, Yorkshire.

G3GJY, J. O. Yarker, Fieldway, Whitby Road, Pickering, Yorkshire.

G3HFM, A. R. Vickers, 25 Freshfields, Knutsford, Cheshire.

GM3JNW, H. L. Fleming, B.Sc., 41 Ludgate, Alloa, Clackmannanshire.

G3JXN, Dr. J. E. Tindle, 30 Woodville Road, Ealing, London, W.5. *(Tel. 01-997-5181.)*

G3NNT, S. J. Pilkington, 1 Deansgate Lane, Formby, Lancs. *(Tel. Formby 2778.)*

G3OLV, A. S. Coombes, Sorrell Sykes, Sunnybrow, Reeth, Richmond, Yorkshire.

G3PGZ, F. J. Brookes, Arley House, Church Road, Bulphan, Essex. *(Tel. Orsett 300.)*

G3RJV, G. C. Dobbs, 75 Nettleham Road, Lincoln.

G3RJV/A, G. C. Dobbs, The Theological College, Bishop's Hostel, Lincoln.

G3RKH, J. L. Marshall, Flat 2, The Mitre, 17 Sadler Street, Wells, Somerset.

G3RSV, R. H. Dowsett, c/o WOs and Sgts' Mess, School of Electronic Engineering, R.E.M.E., Arborfield, Reading, Berks.

G3RYI, A. J. Simmonds, Hawthorne Cottage, 23 Millfield, Berkhamsted, Herts. *(Tel. Berkhamsted 4773.)*

G3SNA, S. J. Andrew, 38 Sheepfoot Lane, Oldham, Lancs. *(Tel. 061-633-1141.)*

G3SWU, T. Heeley, 5 Norman Drive, Wateroyd Lane, Mirfield, Yorkshire.

G3TGL, A. J. Fantham, 52 Calverley Road, Kings Norton, Birmingham, 30.

G3TRA, J. A. Wilkinson, 25 St. Helens Drive, Leicester.

G3TUN, J. B. Greenwood, 50 Brookfield Road, Aldershot, Hants.

G3UBL, C. L. K. Ledger, c/o Officers' Mess, R.A.F. Station, Andover, Hants. *(Tel. Andover 4181.)*

G3UMI, G. S. Milne, 23 Linacre Road, Eccleshall, Stafford, Staffs.

G6MK, Dr. R. L. Markham, R.A.F. Station, Manston, Kent.

SMALL ADVERTISEMENTS

(" SITUATIONS " AND " TRADE ")

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

SITUATIONS VACANT

YOUNG and Enthusiastic Trouble Shooters wanted immediately by EAGLE. Good prospects. Write or phone—Rex Toby, G2CDN, 32A Coptic Street, London, W.C.1. (MUSeum 9606).

TRADE

FIVE-TON FACTORY CLEARANCE: RADIO, TV AND ELECTRICAL COMPONENTS IN MIXED PARCELS. EXAMPLE: 22lb. MIXED PARCEL, £1 PLUS 7s. 6d. POST/PACKING — SPEAKERS, GRILLES, VALVE BASES, COVERS, CONDENSERS, ETC., HUNDRED OTHER ITEMS. — POSTAL ORDERS AND S.A.E. FOR LIST TO: P. NEWTON, 16 SHALLCROSS CRESCENT, HATFIELD, HERTS.

QSL Cards and Log books, GPO approved, cheapest and best. Prompt delivery. Samples from:—Atkinson Bros., Printers, Looe, Cornwall.

GOVERNMENT Surplus Electrical and Radio Equipment. Our new catalogue No. 16 ready now, 2s. 6d. post free. Cost refunded on first purchase of good over £2 value.—Arthur Sallis Radio Control, Ltd., 93 North Road, Brighton, Sussex.

QSL CARDS: Attractive two-colour designs, amateur and SWL, 25s. per 100, s.a.e. for samples.—Littlewood, G3OYI, Cotswold, Banks, Honley, Huddersfield, Yorkshire.

RESISTORS: Half-watt, 5 per cent, 2s. 3d. per doz., 17s. 3d. per 100, 4·7 ohms to 10 megohms, at your selection. Silicon planar transistors, from 2s. 9d.—Electrovalue, 6 Mansfield Place, Ascot, Berkshire.

WIGHT ELECTRONIC Manufacturers Services Co. Ltd. Now producing multi-band antenna traps for 10 to 80 metres. Made in the Isle of Wight and sure to be popular, they are cheap, completely waterproof, robustly constructed and weigh only 9 ozs. Price per pair, 50s. plus 2s. 6d. for post/packing. Trade enquiries invited.—WEMSCOL, 60 High Street, Cowes (3323), Isle of Wight.

LOOK! If you have an ambitious project, or you are a Club member, or you have any other reason for wishing to buy small components in moderate quantities, you cannot do better than send an s.a.e. to us for our sample price list. Come to that, our one-off prices are about the lowest. Try us. — Radiomatics, 140 Oak Street, Norwich (22390). Norfolk. NOR.83.K.

SINGLE COPY Orders: Reference this month's Editorial announcement, readers' single-copy orders (4s. postal order), must be received by Wednesday, October 26, for the November issue.—Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

LEARN The MORSE CODE IN A FEW HOURS with Parry's Method, as supplied to an approved Telecommunications School. — Name, address and postal order 3s. 6d. post free (no extra cost) to Dept. B., Doppler Press, 85 Grove Park, London, S.E.5.

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Add 25% for Bold Face (Heavy Type). Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 1/6 Extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, London, S.W.1.

WANTED: Eddystone S.640 receiver, unmodified. State price and condition. — Newey, 23 Lea-House Road, Oldbury, Birmingham.

FOR QUICK SALE: SSB Station, consisting of Eddystone EA-12 receiver; Gonset GSB-100 Tx, with mic.; Hy-Gain vertical aerial, 10 to 40 metres; all in excellent condition; price £198.—Quantrill, G3OPF, 10 Milford Avenue, Stony Stratford, Bucks.

REQUIRED: Circuit and gen for DST-100, help appreciated, will pay any deposit. Also WANTED transformer 250v., 100 mA, 4-5 amp.—Handy, 105 Humber Avenue, Coventry, Warks.

SELLING: Superb Eddystone EA-12 receiver, as new; now surplus to requirements (gone SSB transceiver), price £130. — Russ, Whitecliffe, The Grove, Birmingham New Road, Wolverhampton, Staffs.

IMMEDIATE Sale; Codar CR-66 receiver, with PR-30 preselector, RQ-10X Q-Multiplier, speaker, in matching cabinets, £20 o.n.o.?—Mercer, 51 Saltcotes Place, Lytham, Lancs.

SELLING: Table-top Tx, 50w. AM/CW, Geloso VFO, 807 PA, coverage 10 to 160m., price £17 10s., buyer collects.—G3TEJ, QTHR.

SALE: Hammarlund HQ-145X receiver, gives SSB reception, with built-in calibrator and matching Hammarlund speaker unit, in mint condition, price £80 or near offer.—Aye, 1 Avon Court, 34 Keswick Road, London, S.W.15.

FOR SALE: Hammarlund HX-50 SSB Tx, £120. Drake-2B receiver, complete with Q-Multiplier and calibrator, £100. LA-600 Linear Amplifier, £55. BC-221 Frequency Meter, with all charts, £18. —Beekar, G3WY, 18 Lincoln Close, Church Road, Tupsley, Hereford.

WANTED: For Beginner, an unmodified communications-type Rx, with coverage of 10 to 160m. amateur bands, such as CR-70A, SR-150 or similar. Full details, please.—Ross, Oakfield, Savile Road, Halifax, Yorkshire.

FOR SALE: Two-metre transmitter RF section, 15-18w., small unit, uses your 160m. power and audio, complete with aerial matching circuit, 6/12v. heaters: ideal for mobile, or as 70 cm. driver, price £8. Transformers, 60-watt, for 12 to 300v., or multi-voltage, transistor DC/DC converters for mobile, with or without bias supply, 300v, price 35s.; or in 25v. steps to 300v., 42s. 6d. WANTED: Leevers Rich tape-transport; any offers?—Sandall, G3LGK, 21 Dale View, Ilkeston, Derbyshire.

SELLING: At 1s. 6d. each post free, " Short Wave Magazine " copies Nos. 8, 9, 11 and 12 of Vol. XXI; Nos. 11, 12, Vol. XXII; Nos. 7, 8, 12, Vol. XXIII; and Nos. 1, 3 of Vol. XXIV.—Livermore, Flat 1, 15 Angel Hill, Bury St. Edmunds, Suffolk.

TICKET In The Post! I want a good, cheap Communications Receiver and any other useful gear, components and such.—Nias, G3V??. 49 St. Margaret's Road, Bishopstoke, Eastleigh, Hampshire.

SELLING: Latest model Mercury-200 transmitter, pair TT21's in PA, with microphone, price £65. New Heathkit OS-1 'scope, with mu-metal shield, £15. El-bug keyer, complete with paddle, £6. WANTED: Electrostatic voltmeter, 0-12 kV, with 3in. dial or larger.—Lawn, 20 Croft Road, Godalming (3606), Surrey.

SMALL ADVERTISEMENTS, READERS—*continued*

WANTED: All-Band SSB Tx, about 90 watts p.e.p., preferably commercial job.—Little, 28 Fitzgerald Road, St. Johns Lane, Bristol, 3.

WANTED: Two-metre mobile gear; either combined Tx/Rx, or as separate units. Also a BCC set for 4 metres. Will collect over reasonable distances. Details and prices, please.—Wilson, G3DSV, 14 Edgcumbe Park Drive, Crowthorne, Berks.

SALE: High-power components, up to 3 kW; valve 4-1000A; B. & W. roller-coaster, 22 turns, 5in. diameter, variable pitch; vacuum variable condenser, 9 mmF to ·0011 mF, 10 kV working; all brand new stock, £25 the lot. Spare 4-1000A, £5. Tx, Type ALT-7, coverage 24 to 170 mc, SEO, contains two 4X150A's, with 28v. blower and forward-reverse power meter, £15 complete. Frequency Meter Type AN/URM-32A, 125 kc to 1040 mc in three ranges (but could go higher), with optional modulation; an as-new modern precision instrument, price £100. ART-13B, £12. Foregoing items all buyer-collect. Also offering Collins mechanical filter Type F.455/J-05, new and boxed, £8. Superior nickel-cadmium cells and batteries; s.a.e. details, or call and inspect; plenty of other interesting gear for callers. WANTED: For X-band, a Grade 1 SW Meter.—Branson, 111 Park Road, Peterborough (67604), Northants.

WANTED: Heathkit RA-1 or any communications receiver in good order. Will collect to 50 miles. —Shelley, 36, Second Avenue, Heworth, York (25056).

SALE: Canadian Marconi 52 receiver, two years old; good, but does need attention, offers? Top Band Tx. 10-watt, with Mod. and PSU, price £5 or offer. R.220 4-metre converter, IF 4·86 mc, AF stages built in, 40s. All carriage extra.—Butler, 67 South Barcombe Road, Liverpool, 16.

SELLING: Panda Cub transmitter, a good one, at £30. Lafayette HE-40 receiver, in mint condition, £12. R.107 Rx, less case, but going OK, £7. Joystick aerial, with tuner, new, at £3.—Tee, G8UA, 406 Brunshaw Road, Burnley, Lancs.

SALE: RME-69 Communications receiver, with spare valves, bargain at £10.—Brookes, G5OI, 8 Featherston Road, Streetly, Sutton Coldfield, Warwickshire.

WANTED: Urgently, the original speaker for an HRO. — Edwards, 42 Kingswall, Malmesbury, Wilts.

FOR SALE: K.W. Viceroy Mk.III, with extra filter, £125; K.W. Linear, KW-600, hardly used, £90; or £205 the pair. Triangular section tower, 30ft., £20. VHF Signal Generator, 100 to 150 mc, £3. Black & Decker ¼in. drill, 50s. "Short Wave Magazine," 1953, '58. most of 1952, '55, '56, '57; RSGB "Bulletin," 1957 to '63; all at 7s. 6d. per year. "QST," 1961-'65 ('61 and '64 less Feb. issues), at 10s. per year. Mullard "Technical Handbook," Vols. I and IA, 20s. Lots of small components. Prefer buyer collects larger items.—Sykes, G3NFV, 8 Uplands, Ashtead (2546), Surrey. (Ring after 6 p.m.)

SALE: Marconi Crystal Filters, containing 3/100 kc crystals and 3/101 kc crystals (glass encapsulated type), trimming condensers and transformers, £3 3s. each, post paid. — Dickers, 2 Laura Place, Beaufort, Ebbw Vale, Mon., South Wales.

FOR SALE: K.W. Viceroy, Mk.II, with separate PSU, looks and operates as new. Rectifier and PA valves renewed; seven unused spare valves and new Geloso mic. Best offer secures, and buyer to collect (Surrey area).—Box No. 4366, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

HAVE You a faulty 888 to sell? Details price and condition, please. — Box No. 4367, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—*continued*

SELLING: Eddystone S.750 Rx, with matched Eddystone speaker and S-meter, set of spare valves, diagrams and instructions, all in excellent condition, price £45 or near offer. WANTED Urgently, B2 Tx/Rx equipment; also an Eddystone S.640.—Griffiths, G2DFH, 4 Westbourne Terrace, Saltash, Cornwall.

OFFERING: Heathkit Mohican receiver, one year old, with mains PSU, at £30 or near offer. Might take HRO or Tape Recorder in Part EXCHANGE.—Greene, 29 Oxford Road, Calne (2060), Wilts.

SALE: American Heathkits — Commanche MR-1 receiver, Cheyenne MT-1 transmitter, with all connecting cables, complete station 10 to 80m. coverage, price £85. Model 10-12 Oscilloscope, with demodulating probe, £30. Model IT-22 Capaci-Tester, £4. Model IT-21 Valve Tester, £22. Mosley TA-32Jr. Beam, £10. All items in as-new condition.—Donald, GM3SKS, 5 Woodrow Circus, Glasgow, S.1, Scotland.

FOR SALE: National HRO receiver, nine coils and PSU.—Baulch, 30 Lias Road, Street, Somerset.

TRANSCEIVER, 19 Set, completed modified with internal power modulator and output stage, with transmitter to run 35 watts on 40m. and 80m. Write for details.—Davies, 26 Chequers Way, Palmers Green, London, N.13.

CHRISTMAS Is Coming — Anyone want about £100-worth OO/HO model railway equipment? Send s.a.e. for details. For SALE: AR88LF, £35; Hallicrafters S.36. AM/FM/SSB over 27 to 145 mc, £35; SX-27C, AM/FM over 130 to 210 mc, £25; B.T.H. P.58, 280 to 650 mc, video and audio outputs, £8; all with PSU's, matched speakers and manuals. B.44 Mk.III, Tx unmodified, Rx modified to tune 4-metre band. 12v. DC pos. earth, price £9. Will deliver in U.K. by road.—Snoad, Spinney Hill, Marleycombe Road, Haslemere, Surrey.

WANTED: Hammarlund SPC-10 or MC-10. Full details, please.—Pountney. 1169 Pershore Road, Birmingham, 30. (Or ring Selly Oak 2504, 0472.)

GOING Transceiver: Selling Heathkit DX-100U and SB-10U, used daily, price £85. Heathkit RA-1 with xtal calibrator, new front-end just fitted, £35. Eddystone 840C, mint condition, £45. Buyers collect (Warwickshire).—Box No. 4368, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: K.W. Vanguard, coverage 10m. to 160m. Eddystone S.750 receiver. Both in good condition. Prefer buyers collect.—G3KWA, Cleckheaton 3122.

DO YOU WANT an Eddystone 940 Rx, with plinth speaker and Codar PR-30 Preselector (mains), almost new and in immaculate and perfect condition? The price is £90.—Harman, 4 Bredo House, Bastable Avenue, Barking, Essex.

SELLING: An R.107 receiver, coverage 1·2 to 17·5 mc in three switched bands, in mint condition, with BFO, AVC, sidetone, muting and S-meter price £15, buyer collects.—McAlister, 10 Woodfield Road, Shrewsbury, Shropshire.

WANTED: A good BC-453 as a Q5'er. State price and if any mods. (Lancs. area).—Box No. 4369, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Marine Radio-Telephone. Also a Pye "Ranger" Type PTC FM-8007 or any similar FM transceiver for VHF. For SALE: National HRO-MX receiver, with seven coils and PSU, price £15.—Box No. 4370, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: A B.28 receiver, in good condition.—Collins, 165 Honeycrock Lane, Salfords, Redhill, Surrey.

SMALL ADVERTISEMENTS, READERS—*continued*

BECAUSE of the Change of Publication Date announced in this issue—see Editorial—we should have single-copy orders for the November "Short Wave Magazine" by Wednesday, 26th of this month. Your 4s. postal order, with a note saying "For November issue, pse," will ensure that you have it, flat in an envelope, by Friday, 28th, the day of publication. And don't forget to write your name and QTH clearly!—Compliments of The Circulation Department, Short Wave Magazine Ltd., 55 Victoria Street, London, S.W.1.

SALE: Trio 9R59 Communications Rx, similar HA-230, late model, grey, with spun centre knobs, in mint condition, offered with matching speaker, £25. No. 10 Crystal Calibrator, with manual, 45s. Jap S-meter, new, 17s. 6d. Type 3BP1 CR tube, new, 17s. 6d. RF-25 Unit, new, 25s.—Weeks, 19 Burlington Road, Tilehurst, Reading, Berks.

BIG SHACK Clearance! G3FKE has following bargains for disposal: (1) Stabilised PSU, based on Marconi TF 1109A; has 600v. output, plus stabilised output, fully variable between 200v. 200 mA in three ranges, fully-floating, plus fully-floating centre-tapped 6·3v. 4A heaters twice, voltage and current permanently metered, fuses, worth £20, sacrifice at £7 10s.
(2) Stabilised PSU, fully metered, fully floating, commercial, output 200-250v. variable, stabilised, 50 mA, plus 6·3v. heaters at 3A; snip at £5.
(3) Sphinx SSB/AM/CW transmitter. Mint condition, just been overhauled and latest mods. by makers, coverage 160, 80, 40, 20 metres; price includes Delta Control Unit to C/O aerial, mute Rx, as good as a VOX, £65 the lot.
(4) HRO-5, subject of article in "Short Wave Magazine," complete with 9 coils, including BS80, BS40, BS20, and 6v. National power pack; a good receiver in good condition, electrical and mechanical, £20.
(5) BC-453, modified to Q'5-er, 12-volt heaters and usual other mods., tatty but works FB when hung on to HRO or similar, £5.
(6) Entire contents of junk-box, including 813, QQV06-40A, QQV03-20A, 807's, dozens of smaller type valves, semiconductors by the canful, including some power types, three Sideband filters all ready aligned, hundreds of fixed and variable resistors and capacitors, transformers, chokes, several reels of wire, including screened stuff, £25-worth at amateur valuation, including a going 13-channel TV and various books and magazines, £15 the lot to clear.
(7) Mobile rig, Top Band receiver with 230v. AC and 12v. power-packs and cables, many QSO's from home and car, £6 10s. Or as Part Of
(8) Austin 1100, August 1965, blue/grey trim, immaculate out and in, complete with the rig, £550 or would chaffer; HP might be possible.
(9) SWAP my entire darkroom set-up, enlarger (Paragon/Wray Supar) for 3¼in. x 2¼in., tanks, safelights, big and small dishes, chemicals, paper, various odds and ends for HF bands Rx, or sell £15. Many other Amateur Radio, domestic and photographic items for sale, also books and magazines. REASON FOR SALE: Buying new house, no shack, rig must co-habit domestically.—Phone HARLOW 26862 Ext. 352 day; HARLOW 28144 after 6 p.m. Buyers to arrange collection.

OFFERING: Heathkit RA-1 receiver, factory aligned, with Jap S-meter, £32 or near offer? Codar PR-30 Preselector, and Class-D Wavemeter, 70s. each. Woden UM1 mod. xformer, 50s. PSU, transformers and choke only, in rack-mounting enclosed cabinet, all Ferranti potted-type xformers, for 240v. AC input, giving 500-0-500v. at 500 mA; heater transformer outputs 6·3v. 3·2 amp. twice, 6·3v. 1 amp., 5v. 2 amp. twice, tappings, and choke 2·2 Hy at 500 mA, with fuse board, bargain at £7 with delivery 30-mile radius.—Landers, G3TTR, 34 West Park, Selby, Yorkshire.

SMALL ADVERTISEMENTS, READERS—*continued*

FOR SALE: K.W. Valiant Transmitter, all-band AM/CW 10 to 160m., on gimbal mounting, with PSU, price £27 10s. (This Tx is suitable for mobile or bench operation.)—Rogers, G3SYZ, 143 Phillipers, Garston (4577), Watford, Herts.

FOR SALE: Eddystone 870A Receiver, coverage 150 kc to 24 mc, 18 months old, price £20. Buyer inspects and collects.—Hinks, 1 Richard Joy Close, Holbrooks, Coventry, Warwickshire.

IMPORTANT! Small Advertisements should be drafted to our normal setting convention, as shown in these columns. This means trying two or three different versions of the same statement to make sure the most has been said for the minimum wordage, using the correct abbreviations. It saves you money (at 3d. a word) and us time and space.—Small Advertisement Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

CLEARING Shack: Transmitters, receivers, test equipment, aerial items, parts, magazines, etc. Send s.a.e. for list.—Hayes, GW3FPH, 3 St. Mary's Drive, Northop Hall, Mold, Flintshire, North Wales.

SELLING: Withers T.W. 70-centimetre converter, with A.2521 RF stage, IF 24 mc, in excellent condition and full working order. Offers?—Elliott, G8ADP, Woodridge, Woodway Road, Teignmouth, South Devon.

WANTED: A suit-case type Tx/Rx, and any radio gear, handbooks, operating instructions and disposal orders, as provided for Resistance Movements during World War II. Also REQUIRED: Miniscope double-beam unit Type BW.447, Cat. No. M862B, and Radio set Type 122. Good prices paid for these items.—Gee, 11 Whitehorse Lane, Stepney, London, E.1.

EXCHANGE: For Photographic Equipment or a Tape Recorder, Marconi receiver CR-100/2, with S-meter, speaker, and Joystick aerial; "Short Wave Magazine," 1959 to Sept. '66; "Practical Wireless," 1959 to Aug. '66. Buyer to deliver and collect.—Lyons, 5 East Street, Leigh-on-Sea, Essex.

SALE: Eddystone S.640 receiver, in good condition, with manual, price £15.—Sangster, GM3FIZ, 22 Raith Crescent, Kirkcaldy, Fife, Scotland.

OFFERS? For a Marconi CR-100/8 receiver, needing one valve to get it going.—Hay, Fernbank, Bankfoot, Perthshire, Scotland.

SELLING: R.216 VHF receiver, coverage 19 to 150 mc, with film-strip dial, crystal calibrator and manual, in perfect condition, price £35. A CCTV camera, Vidicon, and F 1·9 lens, £50. Spare Vidicon, £10.—Whitty, Fourways, Morris Lane, Halsall, Lancs.

MOBILE Prize Rig, winner last Cornish Rally, out of a Mini, consisting 160m. Tx with transistor PSU, Command Rx and speaker, microphone, G3FIF whip aerial for bumper fitting, and key, neat fit for any Mini vehicle, price complete £20 plus post/packing.—G3TFN, QTHR.

SALE: R.C.A. Triple-Superhet AR-5816L, brand new, with manual, price £150. Good 'scope accepted in part exchange (Lancs. area).—Box No. 4371, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Hallicrafters SX-100, R.C.A. AR88D or similar receiver in specimen condition. For SALE: BC-342N, in new and unmodified condition, price £25; another, identical condition but without internal PSU, £20. Both plus carriage (Lancs. area).—Box No. 4372, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: Hallicrafters Super-Skyrider SX-28 Rx, with manual and 20 spare valves, price £25.—Spence, School of Physics, The University, Newcastle-on-Tyne, 1, Northumberland.

SMALL ADVERTISEMENTS, READERS—*continued*

OFFERED: Mosley CM-1 receiver, with matching speaker, Q-multiplier and Top Band converter, £60. Hammarlund HQ-100A with matching speaker and clock, £55. Mosley two-element beam for 10-15-20m., £10. National HRO Junior with coil packs to cover all bands, £7. R.1155 Rx, coverage 160m. to 18 mc, with output stage and PSU, £6. Complete Station, suit Club: Panda Cub Tx and RME-69 Rx, covering all amateur bands with bandspread tuning, £35. Heathkit DX-40U, with VFO, £15. Near offers considered.—Edwards, 71 Deakin Road, Erdington, Birmingham, 24.

"GUIDE to Surplus Communication Receivers." This is a detailed guide to the 30-odd surplus receivers available in the U.K. since 1960. Limited number at 7s. 6d. per copy, postage 1s. By post only, please. — Adkins, 72 Courtenay Avenue, Harrow, Middlesex.

FOR SALE: Lafayette HA-63 receiver, 8 months old, price £16. — Edwards, 18 St. John's Avenue, London, N.11. (Ring ENTerprise 7586.)

SELLING: Trio 9R59 Rx, similar HE-30, but separate BFO, in excellent condition, price £20.—Down, G3USE, 59 The Crescent, Caddington, Luton, Beds.

WANTED: Sphinx SSB Tx with Delta control unit, also G2DAF-type Sideband Tx; will EXCHANGE for W.H.Y.? Items available for SALE: Cossor Type 1049 double-beam 'scope, £12. Eddystone 888A Rx, £65. Heathkit RA-1 receiver, £25. Audio wide-band Signal Generator, with 1in. 'scope monitor, price £4. Taylor Type 47A Valve Tester, £10. Battery charger, 12v. 6A, 20s. L.E.D. SWR indicator and output monitor, £3. Transformers: 500-0-500v. 350 mA, 6·3v. 5A, 5v. 3A, 20s.; 350-0-350v. 180 mA, 6·3v. 3A twice, 5v. 3A, 20s.—Lawrence, G3PDS, 9 Dunslade Road, Erdington, Birmingham, 23.

SALE: Eddystone 840C, mint condition, £35. Also shack clearance items, including 700v. 300 mA xformer, chokes, condensers, valves and two 19 Set receivers, mains powered.—G3VFG, Leeds 57692.

ROOM NEEDED! Offering an Eddystone 888A in mint condition, with S-meter, speaker and mounting blocks, price £85. National HRO, with set of coils and PSU, £22 10s. La Voie frequency meter, coverage 370 to 730 mc, £10. Hallicrafters S.20R receiver, £5. Grundig tape recorder, Type TK-1, as new, £12. R.T.S. Oscilloscope, £10. Buyer inspects and collects.—G5QA, QTHR.

OFFERING: Home-built 160m. Tx, in FB condition, at £10. A Class-D Wavemeter, £4. Crystal Calibrator, 50s. Radiocraft preselector, £4. The Lot for £15.—North, G8IO. 69 Redditch Road, Stoke Heath, Bromsgrove (2151), Worcs.

FOR SALE: Complete Station, comprising National HRO receiver; K.W. 10 to 80m. Tx; separate fixed/mobile Top Band Tx; Type D Wavemeter; it can all be seen working, with delivery to 100 miles. All-in price, £50.—Nurse, G3RBI, 10 Wenwell Close, Aston Clinton, Bucks.

SALE: Johnson Viking Valiant transmitter, factory built, in new condition, 275w. CW, 200w. AM, 150w. p.e.p. (with Sideband adaptor); this rig has worked more than 300 countries and, at £100, is offered at one-third of its cost. Drake-2B, in new condition, with xtal calibrator, price £85. Nuvistor two-metre converter, IF 28-30 mc, with built-in PSU, £9 10s. R.C.A. 30-watt amplifier, £5. TV turret tuners, 30s.—Webb, G6XY. 22 Southbank Road, Kenilworth (52679), Warwickshire.

SELLING Transmitters: Labgear LG.300 with home-made PSU and high-level modulator; Hallicrafters HT-37, 144w. CW/SSB and low power AM. These Tx's have worked DXCC, 325C plus, and are still going strong! Must clear. Offers?—Rourke, GI3IVJ, 63 Kirkliston Park, Belfast, 5 (653736), Northern Ireland.

SMALL ADVERTISEMENTS, READERS—*continued*

WANTED: An A.206 receiver, with or without PSU. —Page, Church Cottage, Tutshill, Nr. Chepstow, Monmouthshire.

CANNONBALL Tx, SSB/AM/CW, 160-metre, half-lattice LF filter, 10w. p.e.p., pi-tank output, really needs suitable linear, but barefoot has worked DJ, GI, GM and ZB2, with PSU, ideal basis for all-band Tx, or Tx/Rx, £25 10s., or offer? R.C.A. AR88D, cased, with manual, in good condition but needs aligning, price £26. Foregoing items can be delivered up to 60 miles. Also available: Pair of G.E.C. TT21's, new and unused, £3 post free. B.44 Mk. II Tx, 70·26 mc, 18w.; Rx, cascode E88CC RF amp., tunable over 4 metres but PSU u/s, otherwise OK, with circuit, cabling and mic., £5 10s., carriage extra. Pair of Tele-D Mk. V field telephones, in good condition, 50s. or near offer (carriage extra). Norton Jubilee 250 cc twin motor-cycle, 1960 de luxe model, blue/cream finish, rebored 1000 miles ago, in very good condition, M.o.T. certificate, carefully stored since Sept. 1964, price £55 or near offer?—Craig, G3SGR, Cauldwell, Horam (2520), Sussex.

MUST SELL: An R.C.A. AR88LF, in good condition. Price £20, buyer collects. Callers any evening after 6.30 p.m.—Morgan, GW3RYR, 3 Nibloe Terrace, Penydarren, Merthyr Tydfil, Glamorganshire, South Wales.

SALE: SB-34 Transceiver, in mint condition, for 110v. and 12v. input, price £120.—Box No. 4373, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

OFFERING: Ex-Equipment, twelve 4X150's and six 2C39A's. Offers or W.H.Y.?—Box No. 4374, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EXCHANGE: For a Communications Receiver, Grundig Type TK-20 Tape Recorder, complete with crystal mic., tape, spare jacks and manual, valued at about £14.—Gillvray, 89 Norwood Road, Sheffield, 5 (386962), Yorkshire.

WANTED: Cossor FM Alignment Generator, Model 1324, with manual. Price and full details, please. —Martin, 64 Green Lane, Middleton, Manchester.

WANTED: An amateur-band only Receiver, such as Geloso R.209, Minimitter MR.44/II, or similar. Must be unmodified and in good mint condition. Price and full details, please.—Box No. 4375, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: Eddystone S.750 Rx, with S-meter; recent complete overhaul by makers and in FB condition, price £45. G. & D. two-metre converter, Mk. III, IF 24 to 26 mc, £5.—Eckley, G3UFQ, 24 Fernwood Road, Sutton Coldfield, Warwickshire.

DON'T BLAME Us if you do not get your copy in time to catch the Small Advertising. All direct-subscriber copies (42s. for a year of twelve issues, starting any month and post free) are posted together the day before the date of publication. If you do not want to pay the two-guinea advance subscription, send in a 4s. postal order three days before publication date—October 26 for the November issue—and we will send you a copy flat in an envelope. We post on time every month. (After that, it is up to the Post Office.)—Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. (Remember to print your name and QTH!)

NO-OFFER SALE: An Eddystone S.640, with Codar PR-30 RF Preselector, in excellent condition and with matching speaker, price £25, buyer collects.—Freck, 90 Vancouver Drive, Winshill, Burton-on-Trent, Staffs.

SMALL ADVERTISEMENTS, READERS—*continued*

FOR SALE: Issues "QST" 1959-'65 inclusive, £6 6s. "CQ" 1960-'65 inclusive, £5 10s. RSGB "Bulletin" 1959-'65 inclusive (except April '59), £4 4s. "Short Wave Magazine" 1960-'65 inclusive, £5. All in good condition, and carriage paid.—Robinson, Brown's Farm, Holbrook, Ipswich, Suffolk.

NEW SPARES For AR88, BC-455, R.209. Receiver Handbooks: BC-454, £2; HRO, R.107, CR-100/B.28, 10s. 6d.; AR88, 18s.; 18 Set, 19 Set, 38 Set, 46 Set, 52 Set, 88 Set, 6s. 6d.; BC-221, Class-D Wavemeter Mk. I, Mk. II, Mk. III, BC-342, BC-348, BC-624, R.1224, 5s. 6d.; RF Units Nos. 24, 25, 26, 4s. Also ex-W.D. test equipment and similar items. Back numbers "Short Wave Magazine" 1946-66, in good condition. "Trader" Service Sheets, receivers only, three thousand, in good condition. Send s.a.e. with all enquiries, please.—Blake, 7 Warwick House, Southwold Road, Upper Clapton, London, E.5.

SELLING OFF: Heathkit Mohican Rx, needs alignment, best offer not less than £25. Codar PR-30X preselector, £5. Long and short ended resistors, total 1,100 rated 1/8th watt to 5-watt. value about 1s. each, in 18 partitioned boxes, £2 the lot. Codar CR-45, grey crackle case with slide door, 10s. Various potentiometers, 77 in all, 20s. Mixed lot of valves, 25 for 15s. Jennen 4½in. 50 microamp meter movement, unused, cost 69s. 6d., only 40s. BM-3 crystal microphone, on heavy base, with lead, 20s. Mixed condensers, electrolytic, paper and mica, 250 in all, 20s. Total of 65 variable and preset condensers, 15s. Odds-and-ends parcel of IF's, knobs, coils, resistors, meter parts, etc., 30s. Speakers, as new: 4½in., 7s. 6d. 4in., 6s.; 2½in., 5s. 6d. Marked cardboard drawers and holders, 5 x 2½ x 6in. deep, 6d. per unit. Copies "Practical Wireless," "Practical Electronics," "Radio Constructor" or "Wireless World"; send 2s. and state month and year required. Cash orders only.—Catton, 11 Granville Road, Hayes, Middlesex.

FOR SALE: R.C.A. Transmitter, Type CRV-52233 Model ATB, 50 watts output, in perfect condition and good working order; two precision-made plug-in tuning units are contained in the transmitter, each for continuous coverage between 3·0 and 9·05 mc, in six bands, hence suitable for operation on 40 and 80m. Price of the complete Tx, £15. Also for sale a Bendix communications receiver Type RA-1B, coverage 150 kc to 15 mc in six bands; this beautifully constructed Rx is in good condition and perfect working order, and the price is £15.—Collins, 1 Wharf Way, Frimley Green, Camberley, Surrey. (Ring Deepcut 5947.)

WANTED: BC-221 Frequency Meter, with charts. K.W. Vanguard, Mk. II version. Heavy-duty Morse key, Type 365 or similar. Price, particulars, condition and other details.—Longworth, Ballaghaue, Kirk Andreas, Isle of Man.

WANTED: Ceramic Transmitting Switches. Four at 2-pole, 3-way; eight at 1-pole, 3-way; two at 1-pole, 12-way; two at 2-pole, 12-way.—James, G3SKK, 36 Poplar Road, Rayleigh, Essex.

SALE: National HRO, complete with battery and mains PSU's, four band-spread coil packs and five general-coverage, modern type xtal filter, price £25. HRO with partly built xtal filter, four BS and five GC, with PSU, £15.—Holland, 164 Hook Rise North, Tolworth, Surrey. (Tel. LOW 3741.)

OFFERING: Eddystone 888A, as new, with mounting blocks, price £75. Eddystone EC-10 Rx, as new, £38. Eddystone S.740, £12 10s. Three National HRO's with coil packs and PSU's, £15, £18 10s. and £25. Codar PR-30X, £5. Marconi CR-100, £12 10s. NCX-D transistor PSU, new, £40. Hallicrafters SX-43 Rx, £45. Write, call or ring evenings.—G3MOE, QTHR. Cheltenham 24217.

SMALL ADVERTISEMENTS, READERS—*continued*

EXCHANGE, or SELL: Labgear LG.50 Tx, £28. Tiger two-metre nuvistor converter, £5. WANTED: Heathkit DX-40U with VF-1U VFO; also Z-match ATU.—Marshall, G3RKH, 17 Sadler Street, Wells (3549), Somerset.

WANTED: Rotator control unit with direction indicator. Must be mechanically sound and reasonably priced.—G5NN, QTHR. (Ring Winslow, Bucks., 2498.)

AVAILABLE: Four R.C.A. 813 high-power transmitting valves, with one heater transformer and valve holder, £5. Two 1200v. 200 mA very heavy power supplies, with relays, £5 each. One Geloso VFO, 10-80m., with PSU and extra driver, £7. One Geloso VFO Type 4/104, with valves and pi-output unit, £4. Four 1500v. 10 mF condensers, 8s. each. One 150w. Modulator, with PSU for speech unit and mod. xformer to match into 813 PA, price £8. And other oddments. All items shown and demonstrated, to callers only, evenings or weekends.—Hogg, G3NRZ, 20 Sunbury Avenue, Mill Hill (3161), London, N.W.7.

VALVES: Eimac boxed 4CX250B, 5 off, 50s. each; S.T.C. 2C39A, new but unboxed, 5 off, 35s. each. AF TRANSFORMERS: Single OC28/OC35 into pair OC28/OC35, 10s.; pair OC28/OC35 to modulate QQV03-10, 12s. 6d.; pair EL91's to modulate QQV03-10, 7s. 6d.; SCR-522 modulation xformer, 7s. 6d.; Woden DT-1, 20s.; Woden UM2, 60s. MANUALS: AR88D, 20s.; AR88LF (copy), 15s.; BC-375 Tx (TU5B's, etc.), 15s.; Hallicrafters HT-14 (Marine Radiophone), 17s. 6d.; Receivers SX-25, 10s.; and SX-28, 20s.—Box No. 4376, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

COMPLETE AMATEUR STATION for Sale: 1963 Heathkit DX-100U; Eddystone S.640; Minimitter and PSU; LP Morse record; headphones and Morse key. Offers? Deliver up to 50 miles.—Knight, 45 Wearish Lane, Westhoughton (3327), near Bolton, Lancs.

SALE: Transmitter Type TR.100B, 100-watt AM/CW, coverage 10 to 160m., in new condition, price £58. — Ring Walker, High Wycombe 28038, after 7.0 p.m. or weekends.

OFFERING: R.206 receiver, with PSU (mains and 12v.), coverage 550 kc to 30 mc, turret coil unit, 13 valves; in good condition, price £20 or near offer. —Downs, Alpha, Woodside, Duxbury, Chorley (3175), Lancs.

FOR SALE: TCS-12 with PSU, speaker and internal Q-multiplier, £10 or offer. — Barton, G3TYE, 23 Moss Side, Liverpool, 14.

TRANSISTOR TESTER: Beulah model D-909, 200/240v. AC, tests both PNP and NPN transistors in situ; checks AC gain, DC gain, leakage; also provides smoothed DC power supply, continuously variable 0-25v. up to 25 mA, centre-tapped. 5½ x 3 x 2¼ inches, complete with leads, mint condition (cost £10).—Offers to Watts, 62 Belmore Road, Norwich. NOR.72-T.

SALE: Ex-R.A.F. Mains PSU for T.1154 Tx, gives 1200v. at 200 mA, £2 to collect.—Buckingham, Denstone College, Uttoxeter, Staffs.

CUBICAL QUAD Kit, brand new and unused, consisting of Labgear spider and eight 14ft. bamboos, £10 all-in. Command Tx, 3·0-6·0 mc, unmodified and with valves, 40s. Top Band transimtter, CW, less PSU, in cabinet 8 x 6 x 5 inches, 50s. All carriage paid.—Hughes, G3GVV, 65 Harlands Road, Haywards Heath (50961), Sussex.

SALE: Heathkit DX-100U Tx and SB-10U Sideband Adaptor, in excellent condition; first £65 secures. —Trigell, G3JAF, 77 High Street, Lymington, Hants.

SMALL ADVERTISEMENTS, READERS—*continued*

URGENTLY required by Radio Club, commercial Tx, coverage 10m. to 80m., running 100 watts plus; must be in working condition, TVI-proof and handbook essential. Minimitter or similar might do. —Box No. 4377, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Eddystone 770U UHF receiver, coverage 150 to 500 mc; must be unmodified and in good condition. — Box No. 4378, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Eddystone Type 358 receiver, in good condition, including handbook. — Whittaker, 100 Crabtree Avenue, Edgeside, Waterfoot, Rossendale (3198), Lancs.

WANTED: Crystal for Class-D Wavemeter; also Command-type receivers for Top Band and 3·0 to 6·0 mc.—Crabtree, 4 Whittam Crescent, Whalley, Blackburn, Lancs.

SALE: Modified 19 Set, complete with mains PSU, variometer, mic., etc., in perfect condition, £7 10s. Transistor amplifier, 750 mW, 15s.—Amery, Foxley Lane, Purley, Surrey.

FOR SALE: Eddystone 688 speaker, as new, 30s.; Eddystone transmitting condensers, 2/150 mmF, 1/100 mmF, 1/20 mmF BS, 3s. each, 2/70 mmF, 2s. each. One 813 and two ceramic bases, price 25s. Rare Command Rx unit, 1·5 to 3·0 mc, complete with built-in PSU, £4 10s. Geloso 4/102 VFO, complete, as new, £4 10s.; HT line droppers and 160m. coils, 15s. extra. Plessey 1214 12-volt vibrator, new, 10s. Labgear E.5026 wide-band multiplier, £3. Two DEAC 450/45 mains chargers, new, 10s. each. Two pairs Maxi-Q IFT 11/465 kc, new, 10s. pair. Two pairs FT-241 crystals, Channels 35 and 36, unused, 10s. pair. Jason Mercury switched FM tuner. 10·7 mc IF, complete, as new, £3 10s. Raymart Band-checker wavemeter, as new, 12s. 6d. All items carriage extra.—Crane, G3ABH, 26 Highfield Road, Corfe Mullen, Dorset. (Tel. Broadstone 2452.)

SALE: Hallicrafters S.36A, recently overhauled and realigned professionally, complete with instruction manual, price £40, carriage extra.—Box No. 4378, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: Brand new unused National HRO-MX, with nine GC coils, price £35. R.C.A. AR88D, as new, with trimming tools and manual, £45. Cathode ray monitor CRM-1, £9. G.P.O. Type 26B 80-0-80v. PSU, price £3 15s. Crystal Calibrator No. 10, with manual, £2 15s. BC-453A unmodified, as new, £5. RF-26B Unit, brand new, 35s. HRO coil for 180 to 430 kc, 10s.; AR88D manual, 25s.—Reynolds, 5 Headland Way, Lingfield, Surrey.

Printed by The Courier Printing Co. Ltd., Tunbridge Wells for the Proprietors and Publishers, The Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. The *Short Wave Magazine* is obtainable abroad through the following: Continental Publishers & Distributors, Ltd., William Dawson & Son, Ltd. ; AUSTRALIA AND NEW ZEALAND — Gordon & Gotch, Ltd. ; AMERICA—International News Company, 131 Varick Street, NEW YORK. Registered for transmission to Canada by Magazine Post. *October 1966.*