

The

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SHORT-WAVE MAGAZINE

Exclusively for the
Short-Wave Listener,
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Transmitting Amateur

MAY

1938

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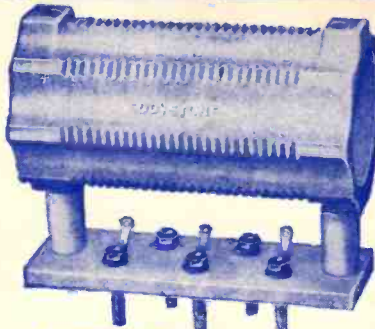
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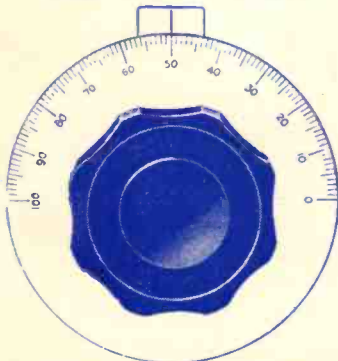
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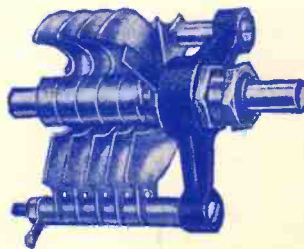
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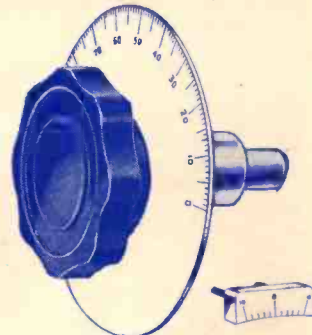
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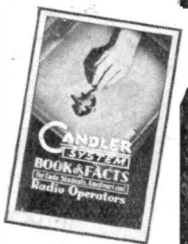
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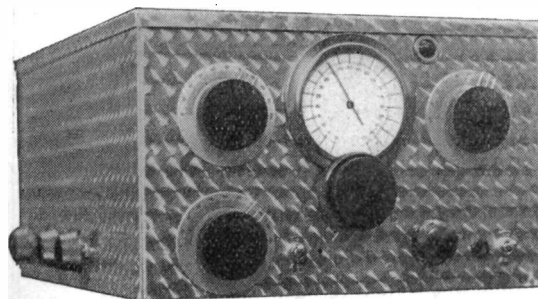
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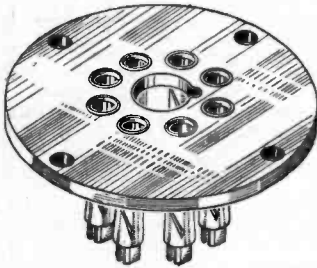
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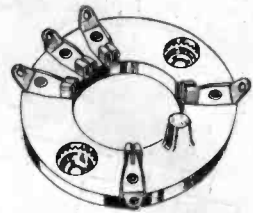
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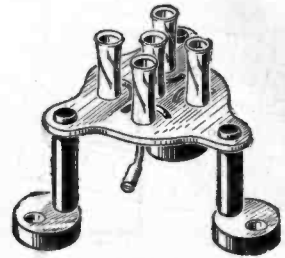
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THE SHORT-WAVE MAGAZINE

Vol. II.

MAY, 1938

No. 3.

Editor: AUSTIN FORSYTH (G6FO)

Editorial Asst.: S. W. CLARK (2AMW)

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THE AMATEUR IN EMERGENCY

From time to time, and in increasing volume lately, we have received suggestions that we should sponsor an Emergency Communications System to assist A.R.P. through amateur transmitting stations; the splendid work which has so often been done by American amateurs is cited as an example of the potential value of such a System.

For our part, we are in whole-hearted agreement with these ideas, but there are difficulties in this country which, as we see them, could only be overcome by a change in the law. While American amateurs have open licences covering both communication and experimental work, British transmitters are licensed solely for experimental purposes, i.e., organised communication is specifically forbidden. Further, all radio transmission is under the control, direct or indirect, of the Postmaster-General. Thirdly, in the event of a real national emergency arising, our licences as transmitters would be cancelled, our stations closed down and our apparatus kept under official surveillance. Lastly, the only basis on which British amateurs could be organised is for war—and organisation for war demands a high degree of efficiency—since in this country we are free from those cataclysms of Nature which so often afflict the United States.

The position is, therefore, that under the existing law no Amateur Emergency Communications System is possible unless it is sanctioned by the Post Office, and those transmitters who have already enrolled themselves under local A.R.P. schemes and have undertaken to maintain their stations for communication in emergency have actually given a guarantee which they cannot be sure of fulfilling, apart from the fact that they have jeopardised themselves as holders of experimental licences.

It is possible that some scheme may eventually emerge, but it cannot be anticipated. However, we commend to the notice of the authorities that there are many very competent amateur transmitters ready and willing to enrol and operate under official control, and that their accumulated ability and experience should not be lightly disregarded.

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HAVE YOU HEARD...?

Items of interest from the broadcast bands, and reminiscences, compiled and presented by

F. A. BEANE (2CUB)

SINCE MY LAST article appeared conditions have been decidedly variable, but despite this quite a number of interesting and new stations have been recorded in the log.

Perhaps the centre of attraction at the time of writing is, strangely enough, a European—the new Finnish station operating on 31.58 m., 9,500 kc. Unheralded, it made its debut at the beginning of April, being first heard one Friday at 18.00 BST. Normally programmes are derived from the long-wave station and the announcement is given as "Lahti, Suomi," the latter being, of course, the native name for Finland, but at the hour a feminine voice announces in English, French and German, and requests reports to be addressed to the Finnish Broadcasting Company, Helsinki, Finland. Actually the station is situated at Lahti and the lady's voice is recorded. Reception is generally excellent and identification characteristics include a short melody of ten notes, apparently made by a stringed instrument, and occasionally a somewhat similar chime signal. Incidentally, I am beginning to wonder whether this station has ever operated on any other band for during February I frequently observed a weak transmission with almost identical characteristics in the vicinity of 48.85 m., which I assumed was CS2WD on a new wavelength (see March issue, page 30).

● Salvador well heard

A most elusive country is the republic of Salvador; even on the amateur bands, but now any listener of average experience should have little difficulty in recording YSD, El Salvador, operating on 38 m. Although I first observed it at good strength during March, it was not until the middle of April that I definitely identified it, due to a miscalculation in wavelength. Reception is good from about midnight until "close-down" at 05.00 BST, identification is simplified by chimes at frequent intervals varying in number from one to six, and mention of "Radiofusora Nacionales." The excellent marimba music radiated constitutes an important feature of its programmes, and occasionally the wail of a siren or the distant hooting of passing motor-cars can be heard, presumably from a street adjacent to the studio. Programmes are derived from medium-wave YSS and reception reports should be addressed to "Radiodifusora YSD, c/o YSS, Radio Nacionales, Senor Victor M. Escobar, Director General Telephones and Telegraphs, San Salvador, Salvador." Linguists may be interested to know that this station has been heard broadcasting English lessons until 01.15 BST, and the non-linguist that occasional English announcements are made, although rather too infrequently. The programmes of YSS are sometimes taken by YSM on 11,710 kc or YSH on 9,520 kc, but only one channel is used at a time.

● The Cuban Secret Police

A thrilling announcement was recently heard from COCH (31.8 m.) at the conclusion of the second edition of "La Voz de las Provincias" at midnight, to the effect that the following thirty minutes would be devoted to the "programa de la Policia Secreta." The programme began well, a siren was heard and an English announcement made indicating that the programme was by the "National Secret Police at the Service of Justice," but then English was dropped, Spanish resumed—and I tuned elsewhere. Incidentally COCH has increased power to 5 kw, and was so powerful that I mistook it for a new station; however, the announcement "You are listening to long-wave station CMCF and short-wave COCH, General Electric, Apartado 41, Havana, Cuba" soon settled matters. According to the Cuban publication "Radio Guia" COCU operates on 45.52 and 30.15 m., relaying CMCU, while the wavelength of the popular COCQ has been increased to 47.6 m. So far I have not heard the former and, according to my log, COCQ is in the vicinity of 30.8 m. Furthermore, the erstwhile star COCD, "La Voz del Aire," is said to be on 32.08 m. instead of 48.94 m., and the wavelength of COCW is given as 30.76 m., whereas it has been reported on 47.47 m. However, perhaps these changes are a result of the recent radio conference in Havana.

● Argentina active

Although I handle a vast number of broadcast band reports I have only seen one in which mention was made of the new Buenos Aires station LRA, and the reporter actually introduced it to me. Possibly the lack of interest in this powerful newcomer is due to that the fact it operates in the immediate vicinity of the better known LRX (31.06 m.) and may quite easily be mistaken for it, the wavelength employed being approximately 31 m. Generally it is received around midnight announcing frequently as "LRA, Radio Villa Estado (or something similar), Buenos Aires, Republica de Argentina," with Westminster chimes at the hour. On another occasion it was received exceptionally well from 22.40 until 23.00 BST when it closed down, the programme consisting of short talks in English, German and Italian, each talk being interspersed by a familiar hymn or selection of sacred music, somewhat on the lines of the broadcasts recently radiated by LSX. Apparently it was a Government propaganda broadcast of an educational nature, for, in addition to the slogan "La Voz de Republica de Argentine," frequent reference was made to "Propaganda Exterior." LRX, a few kilometres below, and a much weaker signal, was also broadcasting the same programme simultaneously, but nothing was heard of LSX (28.98 m.). I do not yet know LRA's address, although

I have addressed my report to "Estacion LRA, Villa Estado (?), Buenos Aires," and am meanwhile adding LRA to my prayers!

● French broadcasts

By this time most listeners are familiar with the new channels recently occupied by the French short-wave service, although few can accurately name the call-signs, and so here they are direct from the responsible authorities. Times are BST:

FRENCH BROADCASTERS	
TPB— 3	17,765 kc 16.88 m. 14.30-16.00 for Asia and East Asia.
TPB— 6	15,130 ,, 19.83 ,, 00.00-02.15 South America.
TPB— 7	11,885 ,, 25.24 ,, 02.30-05.00 North and Central America.
TPB—11	9,570 ,, 31.35 ,, 07.00-10.00 Africa and Near East; and 16.15-23.00.
TPA— 2	15,243 ,, 19.68 ,, 11.00-16.00 for Asia and East Asia.
TPA— 3	11,900 ,, 25.24 ,, as TPB11 Africa.
TPA— 4	11,718 ,, 25.60 ,, 00.00-02.15 America; and 02.30-05.00.

The discerning listener will have noted that TPB11 actually operates much nearer to 31.45 m. than 31.35 m. however, with the result that the 31 m. band is rapidly becoming as chaotic as the 49 m. and more so since the inception of the Finnish broadcaster and the frequent attention of the "death-ray."

● Other Notes and News

Earlier I mentioned secret police, which reminds me of the mysterious German "Freiheit Sender" heard frequently in the neighbourhood of 30 m. until 23.00, but invariably subject to attack by a different species of the "death-ray." Preparatory to playing the "Internationale" when closing, the announcer makes some derisive remark to the "Gestapo" (German Secret Police) which always appears to be the equivalent to some vulgarity and "catch us if you can"! I have also observed a similar station on about 62 m. giving what appeared to be instructions, very much on the lines of an Edgar Wallace novel or the B.B.C.'s latest thriller!

Stamps are frequently mentioned in conjunction with short-wave radio, in fact the two seem to go hand in hand, possibly due to the fact that QSL's bring in many new issues, and therefore I expect SWL's-cum-philatelists will be interested to learn that a recent air-mail issue of Peru depicts "Radio Nacional del Peru," better known, perhaps, as OAX4A (854 kc), OAX4T (9,562 kc) and OAX4Z (6,082 kc), while Egypt commemorates the Radio Congress with an appropriate design.

In my last article I mentioned a mystifying Eastern station, heard near 48.94 m. from 03.30 and a reader (A.L.K. of Clacton-on-Sea) suggests that it may have been ZGE, Kuala Lumpur. Can anyone, or our Eastern readers, confirm this?

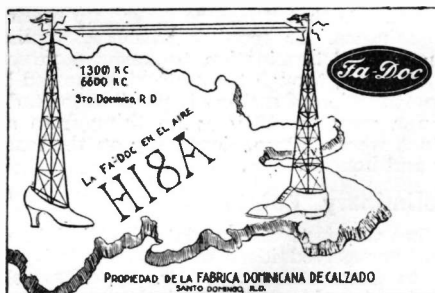
Turning to my log once more I offer the following "tit-bits":—TI4NRH, Heredia, who is celebrating his 10th anniversary and not 7th as stated last month, may often be heard working other Latin Americans at excellent strength until 07.30 or later; the Finnish broadcaster has, since this article was begun, been heard at 07.30; HCJB (33.5 m.) has been fair to good from midnight; VE9HX (48.92 m.) fair from 00.30; CXA2 (50 m.), irregular, but occasionally excellent at 23.00; CD1190 (25.2 m.) sometimes brilliant from 23.00 or earlier; the

diminutive HIIS, "La Voz de Hispaniola," Santiago de Caballeros (46.73 m.), fair when signing on at 23.40; HI4V, San Pedro de Macoris (46.51 m.) very strong at 02.20 and another Dominican, HIH, of the same city (44.25 m.) similarly powerful at 01.50.

Mention of the Dominicans reminds me of HI8A, a station which I heard twice only a year or two ago, and whose QSL I was fortunate enough to secure and illustrate herewith. The frequency on the card was altered to 6,479 kc (it doesn't show in

the reproduction) and I should be very glad to hear from anyone who can enlighten me as to its present whereabouts.

I have not listened to the 62 m. bunch of HJ's for some time, but am glad to note that HJ3ABF, Bogota, "La Voz de Bogota," the six-chime-non-QSLing station, has "crawled from its shell" and is now well received on 49.4 m. HJ5ABD, Cali, has made a remarkable "come-back" and may be heard on 49.3 m. from 01.00, or so, its repertoire of identification signals being expanded to include additional characteristics such as the cry of a baby, cock-crow and studio chimes at the hour. Reverting to the West Indies, I note that reception of HI3U, Santiago, D.R., on 49.83 m., was good until "close-down" at 01.25, heralded by a man's raucous



"Where is HI8A nowadays?"

laughter (another familiar Latin-American characteristic, presumably advertising some product), organ solo and the National Anthem. HIN still appears on 24.03 m. while HIG is fair on 32.26 m. from midnight; HRN, Tegucigalpa (51.11 m.), the notorious non-verifier, has been logged at 02.34; reception of Japan has proved spasmodic since the discontinuance of JVP, although JZJ (25.4 m.) has occasionally been good; VUD, Delhi, has been audible, though severely QRM'd, on 31.3 m. from 03.30; CJRX (25.6 m.) just audible around 01.00 and VQ7LO (49.31 m.) intelligible from 18.40. From Mexico XEWW has been observed on 19.78 m. at midnight and on 31.58 m. around 06.30, while the owners of HP5A inform me that their power is 300
(Please turn to page 7).

LEARNING MORSE

Some Ideas

By F. E. J. AUSTIN

THE TEARS that have been shed over the learning of the code are only equalled by the ink and "beans" which have likewise been spilt on the same subject.

Sooner or later, every enthusiastic SWL worth his salt longs to be able to decode the weak CW DX he so often picks out in his search for the 'phone stations. Who is that fellow, sending so slowly and with such a pronounced echo on his signal? Is he a VK, a W6 or just another G whose signals have been reflected right round the world to the place from whence they went forth? What a thrill to be able to identify Antipodean signals on 3.5 Mc, where they are still real DX! And what is all this chatter about on 600-metre spark, and what does Portishead say to the ships on the Atlantic run? We know that loud signal on about 140 metres is a police station, but what is he telling the patrol cars?

These and a thousand other questions must have flitted through the minds of nearly every listener with a CW receiver, always to be answered in the same way—"I don't know, because I can't read Morse."

While we cannot here give you the key to all this in so many words, we can at least make some suggestion as to the easiest way in which to tackle the problem. Note, however, that learning Morse is not so simple that it can be picked up by anyone in five minutes. It requires patience, application and the rigid determination to follow a prescribed course of study, though the method suggested below has the attraction of making it possible to read call-signs in a very short time; anything from a few days to a week or two, depending on the learner's ability and honest effort.

● Preliminary Points

The first step is to dis-associate the mind from any previously-conceived ideas or methods; it is no use trying to learn the code by opposites or by mnemonics (words suggesting letters) as is so frequently recommended. Or rather, it would be fairer to say that either of these two methods, while eventually giving results, also involve *secondary mental processes*: That of remembering A is opposite to N in the Morse sound equivalents, or that "Queen-Queen-the-Queen" suggests Q. It's all quite correct, but why worry the already over-burdened brain with lists which must first be learnt by heart and then unscrambled in order to get at the required letter!

It follows that if these intermediate processes can be eliminated, learning will be quicker and easier. The beginner should not even try to visualise the code, nor should he think in terms of "dot-dash" for A, or "dash-dot-dot-dot" for B.

What does one actually hear when listening to CW signals? "Dah-dit-dah-dit Dah-dah-dit-dah" in a

high-pitched singing tone, made audibly by the tongue and lips, would be readable instantly as CQ by any listener knowing Morse. Try it and see.

● Learning by Sound

This, then, gives us the key to the first part of the lesson. The Morse Code, consisting of the alphabet, numbers and most commonly used stops, is given with this article. Get it into your mind that a dash is "dah," and about three times as long as a dot, "dit." Also, that the space between the dah's and dit's of the same letter is one dit, between the letters of the same word two dit's, and between the words of the same sentence three dit's. It is quite permissible to increase this spacing a little, as

THE MORSE CODE

A .—	J .— — —	S ...
B — ...	K — — —	T —
C — . — .	L . — . .	U . . —
D — . .	M — — —	V . . . —
E .	N — .	W — — —
F . . — .	O — — —	X — . . —
G — . . .	P — . — .	Y — . — —
H	Q — — — —	Z — — . .
I . .	R . — .	

1 . — — — —	6 —
2 . . — — —	7 — — . . .
3 . . . — —	8 — — — . .
4 —	9 — — — — .
5	0 — — — — —

Bar (/) — . . — .	Question (?) . . — — . .
Full Stop	Exclamation (!) — — — — —
Break sign — . . . —	Ending transmission (SK)
	. . . — . .

(NOTE.—Above is only what is required for ordinary amateur working. Most amateurs use the "break sign" instead of a full stop.)

it makes for legible sending. Anyway, spacing comes with practice, and a little reading ability will help to give guidance in this.

The next thing to do is to learn the code thoroughly and by heart, so that the sound equivalent of any letter can be uttered—in that same high-pitched singing tone—at sight. The practice is carried out, not with key and buzzer or by the help of any friend, but by "singing" to one's self, audibly, the various letters in their Morse equivalents. In this way, the *sound* of the letters is gradually impressed on the brain, and there is never any question of visualising the list, remembering words, counting the number of dots and dashes, or

using any similar alleged "memory-aiding" process. You just go straight for what you want to know; the sound of each letter.

Of course, your family and friends will seriously consider sending for a specialist in mental diseases when they hear this singing business going on, but then all radio enthusiasts are generally thought to be "crackers" by the uninitiated.

● Practice

Having thoroughly learnt the code in this way—do not bother about numbers and stops at first—get the receiver going on CW signals, and listen for what you can pick out. Near the limits of the amateur bands, you will hear commercial stations "idling," i.e., sending "VVV de JNJ," "ABC ABC ABC de OXB," "VVV de WIK," and so on, the whole sequence being repeated over and over again. Sometimes, the sending is rather fast, but often the transmitter is slowed right down, and then a little concentrated listening will soon identify what is being sent and the call of the station. Note that you are definitely recommended at this stage to listen for repetition signals, such as the above, because in that way—particularly if they are commercials—your time values will be corrected and you will know how properly spaced Morse should sound.

In the amateur bands, "Test" and "CQ" calls can be heard at any time, though the sending is not always good from the point of view of formation and spacing. "Test," if it is a G station, and "CQ" in the case of a foreigner, is repeated several times, followed by "de" and the call-sign sent twice or thrice; the form is therefore "Test test test de G6ZE G6ZE G6ZE," all repeated three, four or five times, and sometimes with the hopeful "DX" slipped in between "Test" and "de." Foreigners use the same formula, except that it would be "CQ CQ CQ DX de W2XZX W2XZX W2XZX."

● A Minimum of Aid

It is in the reading of amateur calls that you can practice numbers, so that this should be the next thing to learn, stops and punctuation marks following when the last stage is reached, that of listening to complete QSO's. For QSL'ing CW transmissions, however, all that is required is to be able to identify the station—and preferably the one being worked as well—such matters as the RST, etc., not being dependent on further reading ability.

It will be seen that if this method of learning Morse is adopted, it is not necessary to have either outside assistance or to use a buzzer; it can all be done from the receiver after the Code itself has been absorbed. This has an important secondary result—the beginner who can read before he sends will develop into a good operator much more rapidly, because he will start with the advantage of knowing how properly sent Morse should sound. This brings out the obvious point that two beginners, learning together on the key and trying to send before they can read, are wasting time and impeding each other's progress, because neither can possibly send well enough to give the other really useful practice. Allied to this is the fact that they only learn to read one style of sending—that of the partner.

"HAVE YOU HEARD?"—continued from p. 5.

watts; theme song "Anvil Chorus" from the opera "Il Trovatore" (Verdi) and schedule 17.30-19.00 and 23.30-04.00 on weekdays and 16.30-19.00 and 23.00-04.00 Sundays (actually the latter, in BST, is Monday morning, of course); verification cards are sent against correct reports and a Reply Coupon, or 5c. U.S.A. stamps. They regret that CB1170 operates on the same band, consider it absurd, but cannot improve matters in any way. Correct frequency is 11,700 kc and QRA Apartado 954, Panama City.

● Long Distance Programmes—May

Regular listeners to America's fare will no doubt be thankful now she has changed to Eastern Daylight Time so that certain favourite items are again available at the accustomed hour, or in other words that it is once more "five hours back."

Unlike the normal British summer programmes, the American do not deteriorate, and one may rely upon the usual galaxy of stars to entertain and vivid eye-witness word-pictures of events to thrill, just as in the winter. Over here the popular items will be dropped from the local service, therefore let us hope for excellent conditions this summer, particularly from North America. Although I make no claim to being the average listener or that my views are in any way representative, I recommend for summer listening the popular W2XAD, undoubtedly the most consistently received of all North Americans. Unfortunately the N.B.C. Red network programmes are not audible in this country during lunch, despite their use of a 13 m. channel, and so I strongly commend W2XE (13.94 m.) with its mid-day broadcasts, especially "The Morning Almanac" and the following news reports. Later, generally at 13.30 or 15.00, the light organ enthusiast is favoured by a half-hour of popular music, sometimes with Lew White at the console.

In the later afternoon W2XAD is frequently worthy of attention with its "Words and Music" at 18.30 and at 21.00 "There was a time when—" (music of yesterday), also the Press-Radio News at 23.30. Generally speaking the average listener does not like late nights, but when reception conditions are good it is well worth while to tune to W2XAF for an hour's diversion, and to hear variety such as that offered during Rudy Vallee's Variety Hour (Fridays 01.00) or Bing Crosby's Music Hall (Fridays 03.00). Kaltenmeyer's Kintergarten (Saturday midnight) is full of rollicking good fun while the seriously minded listener can tune to the N.B.C. Symphony Orchestra at 03.00.

The Blue Network likewise presents numerous popular features, two of the outstanding being Marek Weber's Orchestra at Saturday midnight and the "Barn Dance" at 02.30, and for which one must tune to either W3XAL (49.18 m. or W8XAL (49.5 m.). Yet another popular feature just now is "Uncle Jim's Question Bee" available from W8XK (25.26 m.) at 00.30 on Sundays, while W2XE (19.64 m.) generally presents in the evening of the same day two "highlights"—John Barbirolli and the Philharmonic Symphony Society of New York at 20.00 and Guy Lombardo and his Dance Orchestra at 22.30.

Your ideas help us to help you

Adventures of an Op.

No. 5—"Blunderbuss"

By N. P. SPOONER (G2NS)

BEFORE BEING ADMITTED to the select membership of the Suicide Club we were put through a course of instruction in bombs and learned that the Spanish were the first to make them at Grenada in 1667, thus giving the dictionary the word "grenade"—(and some of the noises heard after dark in the 7 Mc band still sound suspiciously like it!). When not engaged in offensiveness we lived the ordinary life of that great army of rats, troubled in sleep or cautious in movement during daylight and, bent upon various schemes of evil at night, swarming out from countless funk-holes and dug-outs. Because of the retaliatory wrath that followed in our trail we were shunned by our fellow-men and a frequent moan greeting us was: "Don't you come near us with your b— bombs, stirring up Jerry just as we are getting a little peace!"

● First Experiences

After bidding farewell to Wailly we marched through Simencourt, Halloy and Hem to the railroad at Candas. From there cattle-trucks took us to Merricourt, where we headed into the inferno of "The Somme" and met the first of a great company of shadows stumbling back out of the Unknown as we, yet to be tested, swung past bloody rags and hanging limbs towards we knew not what. A handful of pitiful stumps, blasted and scorched by high-explosive, marked Trones Wood and there, with the stench of the dead exposed for weeks and the scattered brains, blood, entrails and bandages of the living, we crouched and waited.

The cries of the delirious wounded left out in No Man's Land mingled with the incessant roar of the artillery, maggot-infested eyeless corruption strewed itself everywhere, grisly messes splattered us in the battered trenches and stark, twisted limbs protruded suddenly from the sun-baked earth.

● The Attack

We were to go "over the top" for the first time and bomb the enemy out of a hundred yards of trench, so that enfilade fire could not be brought to bear upon the rest of the battalion, who were to push forward the position of the front line in another attack at dawn. Towards dusk we took up our positions with the other squads, each consisting of nine men who were termed the first and second Bayonet-men, first Thrower and Carrier, Leader, second Thrower and Carrier and in the rear, two Spare Men.

At zero-hour we found ourselves carried along with a blind fear to kill or be killed and, hardly able to distinguish friend and foe, were pitched into a pandemonium of bursting bombs, frenzied shouts and the curses of bellowing groups of hand-to-hand fighters. The sound of trench-daggers hacking, of helmetless skulls crushing like egg-shells beneath swinging rifle-butts, of Mauser and Webley revolvers spitting at point-blank range, had become familiar when suddenly an explosion, different in

sound from the rest, hurled back the two leading Bayonet-men and the Thrower with ghastly wounds. The enemy had gone one better in primitiveness than our own spring-gun and trench-catapult.

His leading Bomber was opposing us with a blunderbuss that inflicted terrible havoc in the narrow trench as it belched out its charge of nails and scrap. Luckily, our second Thrower pitched a Mills' bomb that silenced the highwayman before full advantage could be taken of our consternation. The advance then continued in a mist of cordite and ammonal fumes and, as each squad was wiped out, its place was taken by a fresh one.

Only one N.C.O. and a handful of bombers ever reached the objective, but the Club had done another job well and the rest of the battalion could walk out at dawn, loaded with picks, shovels and ammunition. Reaching an objective means holding on to it and we dug like maniacs to fill sand-bags for piling up with the litter of the trench, to form a blockade upon which a Lewis gun could be mounted. The living cuffed the sweat and grime from their faces as they pulled eagerly at their water-bottles, the wounded lay expectant in twisted positions, and the dead waited patiently for an exploding shell to bury their distorted bodies.

A day later, no doubt, many an armchair war-winner looked longingly at his wall-map and itched to move some of the little flags but read, with impatience, that there was really nothing of importance to note. Im Westen nichts neues . . . All quiet on the Western front.

● Signals again

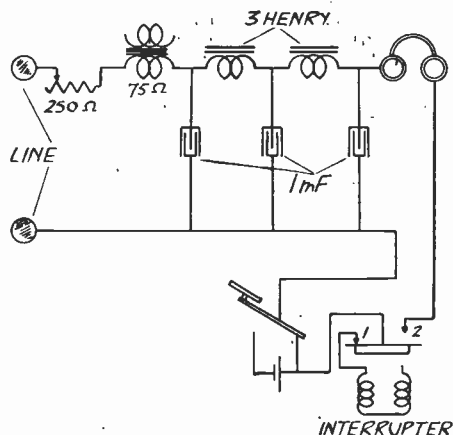
On the way out from the line a halt found us reclining in the mud near the entrance to a deep dug-out, from which issued the familiar sound of a buzzer superimposed upon "army language." We passed a few masonic signs that introduced us as one-time fellow-Ops. and fell down a dozen steps into a warm and welcome telephonic atmosphere. The burden of the day was apparently being borne by some Fullerphones, so we proceeded to investigate them. We were informed that they were designed to obviate the disadvantages of the various buzzer instruments that could be overheard by the enemy, besides causing QRM through induction. The Fullerphone itself could not be overheard through induction or earth leakage, could be used simultaneously with telephone or buzzer on one circuit and could work over lines with high resistance or poor insulation. The calling-up buzzer and telephone with the Fullerphone could, however, be overheard in exactly the same way as the Mark 3 telephone described last month.

The instrument weighed about 18 lbs., measured approximately 13-in. x 8-in. x 7-in., was housed in a wooden case and waterproof canvas and was designed to change, at the receiving end, a steady current into an intermittent one of audible frequency. The hand-set microphone, headphone re-

ceiver and interrupter (also termed chopper, buzzer or vibrator) were much the same as those of the Mark 3 telephone set.

● Operation

Upon looking at the circuit, we can see that when a steady EMF was applied between line and earth and the circuit closed at chopper contact No. 2, a steady current would flow through the choke coils and headphones. When the circuit was opened at No. 2, the current could only charge up the condensers. When the circuit again closed at No. 2, the condensers partially discharged themselves through the headphones. From this it is evident



General arrangement of the Fullerphone.

that whenever the interrupter was working there was an intermittent current in the headphones, giving an audible note, but the line current which flowed alternately through the headphones and into the condensers would remain practically constant. If we placed a single-current Morse key at the sending end it would give long or short notes in the receiving-end headphones, good signals being possible with about half a microampere. By closing the key we joined the sending battery in series with the interrupter, headphones, chokes and line. The condensers would become charged up to the voltage of the battery when bridged across the whole circuit during the time that contact No. 2 was "making," and the current was flowing from the battery through the distant station, back to line terminal, chokes, headphones, contact No. 2 and so to battery negative. Directly contact No. 2 "broke," no battery current could flow, so the condensers then discharged themselves and in so doing sent a current to line in the same direction as the battery. In spite of the fact that the battery current was being constantly interrupted at contact No. 2, the chokes and condensers maintained a steady line current as long as the key was pressed.

The obvious advantages of this system were that sending battery current, passing through the transmitting operator's headphones, enabled the sender to monitor his own buzzer signals and judge their strength going to line. As both outgoing and incoming signals were heard in the headphones, "duplex" could be worked and the receiving Op. could always stop the sender by simply tapping his own key. If the line became cut by shell-fire or

the distant operator's interrupter went out of adjustment, one only heard musical clicks instead of one's own buzzer signals, and if the home interrupter went on strike, one heard nothing at all. The signals were sharper than those from ordinary buzzer systems because the beginning and end of a signal did not depend on the starting and stopping of a vibrating armature.

The familiar choke and condenser "filter" could be credited with preventing, (1) appreciable variation in line current, (2) the passage of induced currents through the headphones, (3) the reading of code from overhearing the clicks and (4) the interference that clicks would have caused with telephony used simultaneously on the same line! A potentiometer at the receiving end counteracted QRM from stray earth currents and, by connecting it in series with the line, it impressed a portion of the battery EMF on the line. If the EMF thus applied was equal and opposite to that producing the interfering earth current, then the earth current and its consequent disturbance was eliminated.

Next Month - - - - - "BOOBY-TRAP."

DO YOU KNOW THAT . . .

. . . a PM speaker can be used very effectively as a microphone if the correct tone compensation network is incorporated?

. . . the Cuban prefixes CO and CM each have a special significance?

* * * * *

It is not often that we come in contact with a book dealing with Amateur Radio which will be of use to any one of us, whether we rank ourselves transmitter, DX listener or just "dabbler." An exception is "The 'Radio' Handbook," 1938 edition, by Frank C. Jones and the technical staff of the American publication "Radio," which has something for everyone within its 512 heavily illustrated pages.

● For the transmitter

A truly wonderful array of information that will keep for years is to be discovered, and re-discovered; commencing with radio fundamentals, it leads to just what you will, be it feed systems, UHF equipment, coupling methods, valve theory, etc., etc., not forgetting the multitude of transmitting constructional circuits with their associated photographs.

● The DXer

You, perhaps, would like some hints on learning the Code; require a map showing the World Zones; wish to know the "Q" code; international prefixes, or RST reporting system; maybe a new receiver is contemplated, anything from a 1-valver to a communication set is constructionally explained; or do you want to know which parts of any band American telephony may be heard? These are but a few of the many every-day requirements of the average listener that are covered.

Numerous hints, formulae, conversion tables, symbol explanations, "tube" data, and a hundred and one tips complete the ramifications of this 7s. book, which is obtainable from G5KA, 41, Kinfauns Road, Goodmayes, Ilford, Essex.

On the Amateur Bands

By "THE OLD TIMER"

WE SUPPOSE that more "pink tickets" are received from the G.P.O. for off frequency operation, due to the use of electron coupled oscillators, than for any other offence. We made certain remarks in March about the danger of ECO equipment, so that the supplementary information sent us by G2NS should be of interest to all.

A complete 6L6 ECO was built by G2NS. This performed according to his expectations, and he loaned it to a local G8 who returned it in disgust after having received a notice from the G.P.O. that he was operating off frequency.

The owner then tried the oscillator unit for himself, and found that although the resultant note was the purest of T9's, the local BCL suffered bad QRM all over the BC band when telephony was used with the ECO drive. With crystal control, the interference to the neighbour was negligible. Here is a problem. Was the ECO to blame, or something else? Another G3 received a notification from the authorities that signals from his station had been heard 50 kc outside the 7 Mc band when he was actually in contact with another G station, who was copying him inside the band! ECO was used here also, and the off-frequency signal could only have been a spurious one due to self-oscillation of the PA. As soon as CC was tried these spurious signals disappeared.

We believe we are right in stating that an ECO should not be used unless, (1) the station is equipped with a 100 kc oscillator to give marker points in the band, or (2) a separate calibrated frequency meter which will give known points, to which the ECO must be tuned. In the case of the 100 kc oscillator, do not forget that the crystal will be supplied with a possible error of 0.1 per cent, which may mean that it will give points on the 7 Mc band as much as 7 kc in error, or 14 kc on the 14 Mc band. Oh! The snags of amateur radio!

● QRP DX

During the wonderful conditions obtaining on the 28 and 14 Mc bands during the last two years, a great deal of very noteworthy QRP DX work has been achieved. By QRP we mean a maximum input of 10 watts. In the majority of cases this excellent work has been accomplished by careful study of aerial systems; in fact, we know that these low-power amateurs have placed their faith in their aerials rather than their power. The unfortunate part of it is that the QRO or "QRO'er" men have firmly refused to believe their results, and the idea has got about that most QRP stations are using 100 watts or so with a 10-watt licence. Of course, we know why: some of the QRO people put too much faith in power; they will not study the aerial in relation to a great circle map. All this has caused a certain amount of jealousy in some quarters we could name.

We go so far as to say that an operator on the 14 Mc band who does not use a great circle map in determining the directivity of his aerial is working entirely in the dark. Only the other day we

were listening to a G who was saying he was surprised that he was able to work Hawaii on 'phone, but, could not obtain replies from U.S.A. We're not a bit surprised! the difference in bearing between K6 and W2 is about 75°; therefore, if a half-wave aerial is radiating due north it will land a signal into K6 but no signal should be audible in W2, though on a Mercator's projection map (the ordinary kind) it would appear that the same aerial used for U.S.A. should produce a signal in K6 by continuing on right over the United States. How many amateurs realize that to put a signal into Alaska, it is necessary for it to pass over the most northerly tip of Canada, i.e., Ellesmere I., a few hundred miles from the North Pole? Now look at a Mercator's projection!

● Location

Continuing with low power DX, it must be agreed that the location of a station plays a most important part in the results obtained; the higher the better seems to be the general rule. All who work on 14 Mc have heard VK2XU "in the Blue Mountains of New South Wales." His 'phone signals are among the loudest from VK, and always have been, even when he used 10 watts to a simple half-wave doublet. Now he uses 28 watts to a flat top beam, and is even louder—location again. Take another case; I am sure G3DO will excuse us mentioning some excellent 10-watt work. With this power he worked K6 and VR6AY on telephony.

● Freak Locations

Sometimes other factors besides the height come into play. A steep hill behind an aerial will frequently act as a better reflector than any combination of wires. Ivan Miller, VK3EG, the B.E.R.U. Contest champion, is a case in point. His signals are very rarely heard during our evening, but listen to them from 15.00 GMT onwards—frequently S9. This is due to hill screening on one side and hill reflection on the other. Dunedin, in the fourth district of New Zealand, is another place where the same hill effect obtains, and hence the greater strength of ZL5's in our morning over other ZL's.

One freak case we have in mind is that of a real 10-watt 'phone man—G6ML. His signals are reported in the North American Continent as among the loudest from this country. It is not hills that affect his radiation, but telephone lines behind the aerial. He lives next door to the local telephone exchange, and they had to put RF chokes in their lines! Fancy having free use of the G.P.O. lines to act as reflectors! A queerer thing still is that G6ML receives reports of S7-8 on 28 Mc from U.S.A. when he is actually operating on 14 Mc, and works them on 28 Mc in this harmonic fashion! We are not prepared to offer any explanation on the behaviour of the wires under these conditions.

● Phone DX

It is quite conceivable that many amateurs have broken their hearts in trying to work DX 'phone on

14 Mc. The above remarks about aerial study may help them, but another point often overlooked is that although the carrier may be strong, and CW reports show that the signal is really getting over, it is the percentage of modulation that counts, that is, the audio power input. It is useless to attempt to pierce the QRM on 14 Mc to-day unless the signal is 80-100 per cent. modulated with quality.

Again, it is hopeless to obtain a report from a local station on your percentage of modulation unless the reporting station is equipped with a modulometer or oscilloscope. The best that can be said locally is that "your signals are S9," but at a few thousand miles (or much less) they are probably S1-2 with S5 carrier—or unreadable. And so the undermodulated man will call test for hours with a very brave hope on his heart, but will raise nothing except the ire of another local who is trying to work DX underneath his signal. The moral of this, of course, is to study what you are going to radiate before putting it on the air. We may think we are experimenting when we try to work across the Atlantic with 25 watts 25 per cent. modulated; but this experiment should have been tried 20 years ago when QRM did not exist on the high frequency bands; to-day it just won't work. But care is required. Don't go to extremes; over-modulation brings in distortion, and that makes the signal even less readable. Listen to some of the North African stations trying to raise DX with signals 50 kc broad; some of them are unreadable at this distance, let alone in the States!

● Licenced Power

This brings us to another point. We know that it is not easy to obtain high-power permits to-day; and we feel that some of you will blush unseen when we say that many are operating with 50 watts or even 100 watts, with a 10-watt licence. This may be very satisfying to those who do it, especially if they work DX more easily, but we want to champion the man who uses a strict 10 watts and works DX with this power. We want to hear from some of you genuine, honest-to-goodness "10 watters," and know what results you have obtained and how. Don't cheat us if you have worked VK on 'phone with 20 watts; that doesn't interest us at all. But if you have raised VK with 8 watts 'phone then let us know. We mention VK as an example, though it might have been YV, CE or any other country. So let's start a real QRP campaign; brains can always beat brawn and we'll show some of these high-power merchants where they stand!

● David and Goliath

A G5 was working a W2 on 'phone quite successfully, until a G2 started up calling "test DX." The W2 came back to the G5 and told him that reception was no longer possible owing to the G2's test call obliterating him. The same day the G5 rang up the G2 and asked him what power he was using. The G2 truthfully replied "20 watts"; the G5 said that he did not believe him and that it could not be possible, as he was using 350 watts of fully-modulated 'phone (with a 50-watt ticket). He did not admit the part in brackets, but the G2 knew. Moral again; the G2 had studied his aerial whereas

the G5 had not. He relied on brute force and—ignorance! This is a true story.

● More on Modern Radioese

Following our remarks last month we have received an interesting letter from Mr. F. W. G. Hodges, 11, Tangier Road, Richmond, Surrey. He speaks of the old spark and coherer days, and later on "2 Emma Toc" at Writtle. The Birmingham BC Station was DX then, and it was only possible to receive about two or three stations in the present medium-wave broadcast band! Mr. Hodges adds his objections to modern radioese by disliking the words "hams" and "shacks"—he asks how a room in a house can be likened to a wooden shanty built in the garden. In the way our old friend P. P. Eckersley used to say—"Please don't do it!"

● Cairo

We hope to have more definite news soon, but at the time of writing it would appear that we are not to lose any frequencies; a slight reshuffle may take place, but no precious kilocycles should be lost. Hail, G6UN.

WE HEAR THAT . . .

Alexandra Palace television has been consistently received at R9 in Phoenix, Arizona, U.S.A. So there's some hope yet for G/W 56 Mc contacts.

Messrs. Webbs have a full range of National sockets for American valves, at 1s. 6d. each in the commoner fittings.

A large number of American amateurs are now on 56 Mc, with inputs ranging from 15 to 400 watts, some with beam aërials directed on this country. Many of these transmissions are "taped," i.e., unwatched automatic.

There is a probability of our finding European broadcast stations legally occupying the range 7,200-7,300 kc of our 7 Mc band. Did we hear someone say that this would only legalise the existing position?

Readers wanting Morse practice will probably be able to get it from local 1.7 Mc stations, transmitting under an R.S.G.B. schedule.

Much of the drivel being talked on 7 Mc has now spread to 3.5 Mc 'phones, who used to set an example in telephony operation.

The 7 Mc 'phone fiend at the LF end, who always sounded to us as if he had a hot potato in his mouth, has been heavily jumped on at last by the Post Office. He was only using 100 watts with a ten-watt ticket. *Verb, sap.* You can't get away with it all the time.

The Editor offers a year's free subscription to the first reader who produces satisfactory proof of the reception of a Trans-Atlantic 56 Mc signal in this country, starting now.

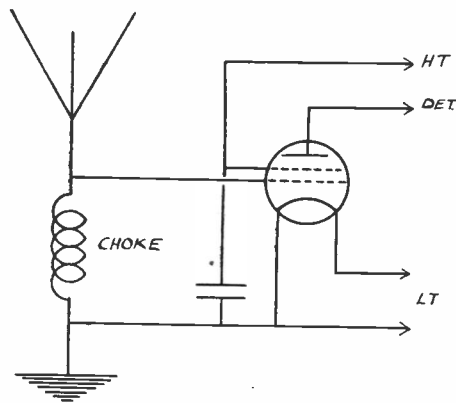
Read "The Short-Wave Magazine" regularly for the latest news

RADIOQUEST AND SIDE-SPLASH

By "CENTRE TAP"

MOST SHORT-WAVE listeners start off with a home-constructed receiver of unpretentious design, usually a simple detector and LF sometimes preceded by an untuned RF stage. The latter was a very popular arrangement a few years back when uncrowded short-wave bands did not demand very great selectivity, but although it is not so frequently encountered nowadays a large number of newcomers, after growing out of the simple detector, put on an untuned RF stage with the intention of adding coils, holder, condenser, etc., to convert to tuned RF at a later date. This is a very commendable practice. There is nothing like actual experience to learn about the behaviour and relative efficiency of different circuit arrangements.

A few words about untuned RF amplification will, no doubt, be particularly welcome by those considering the addition of such a stage to a simple receiver. Originally, the untuned stage was used principally as a buffer rather than for the sake of the little additional amplification obtained by this method. While effectively preventing dead-spots in the tuning and retaining simplicity of control, it also broadened tuning a little, at the same time preventing "swinging" signals due to aerial movement. Yes, that was an asset when large tuning condensers were in general use, and after all



broadening tuning is not quite the same thing as flattening the tuning! Although the untuned RF stage helps to give uniformity of efficiency throughout the range and a fair degree of amplification, from a technical point of view it cannot be warmly recommended as the additional valve does not "pull its weight." By tuning it we are able to peak signals, thus obtaining considerably more amplification whilst greatly improving selectivity.

Here is illustrated a typical arrangement of the choke coupled method, but a resistor may be used in the place of the choke, 250,000 ohms in the metallised type being the customary size. There is but little to choose between the two methods.

A compromise between untuned RF and tuned RF is sometimes effected by using a tapped coil

(aptly termed semi-tuned RF) which enables some part of the advantages of tuning that stage to be gained.

The tapped coil is, of course, connected similarly to the choke in the illustration and a suitable size for experiment would be 40 turns wound on a six-pin valveholder type former or other former of similar diameter which would give a range of approximately 18 to 80 metres. A rotary switch (or even crocodile clip) could be used for selection of tappings which should be made at 7, 10, 18 and 32 turns. Both the tapping and the end of the coil must be taken to earth to short out the unused turns or serious losses will occur. Experiment on these lines is worth the serious attention of beginners as such an arrangement permits easy subsequent conversion to TRF.

● Increasing meter range

Perhaps the only radio components that retain their value for a period of many years are meters, providing of course they are good moving-coil ones. You can always very nearly get your money back on them years later, and the best advice that can be given to an intending purchaser is to go to as much as you can afford and then spring a little more. One good meter is worth a cartload of cheap ones. No, that is not strong enough, a cartload of cheap meters is not worth anything!

Moving-coil voltmeters and milliammeters are basically identical instruments, the difference being only a matter of dial marking and method of connection. Articles for making multi-range instruments from one meter, usually 0.1 mA (a useful size and easy to calculate) have appeared many times, and even if it were necessary I should not have the space to repeat full details. It is equally simple to increase the range of a voltmeter. To do this, a resistance is connected in series with the meter and its value is found by multiplying the meter resistance by the number of times the reading is to be increased and subtracting the meter resistance, which has, of course, been taken into account once already. Thus a 50-volt meter of 5,000 ohms resistance may be required to read up to 250 volts, five times its scale reading. Five times the meter resistance is 25,000, less the resistance of the meter (which as previously pointed out cannot be counted twice) gives 20,000. This resistance is joined in series with the meter and the scale markings multiplied by five.

● RF Chokes

Constructors often use an unsuitable or inferior RF choke of doubtful age or efficiency, simply because it happens to be on hand, overlooking the importance of this component. This importance can better be realised when we consider just what we expect of it—a means of preventing RF from straying to other parts of the circuit via the high tension. Choke design is a comparatively simple business in ordinary broadcast receiver work where

(Please turn to page 15).

Transmission for Beginners

Part III.—This month our contributor deals with some queries and the problem of BCL interference

By A. A. MAWSE

BEFORE WE GET DOWN to business this month I want to thank those readers who responded to the note in April regarding our proposed "AA Corner." In consequence, space this time will be used in answering several queries which should be of general interest; each question has been answered by letter in, I hope, full explanation so that calls need not be mentioned here. More pleasing still have been those letters of a general chatty nature with perhaps no question at all, and a humorous experience thrown in. Let me quote 2DAJ of Slough so that we commence in a receptive mood.

After various tests for cutting out broadcast interference he says: "I tied a piece of wire on to the monitor for an aerial and went sailing down the road with the thing tucked under my arm. I don't know how far I should have got still hearing my sigs, but after a few hundred yards I found that I had three errand boys and two dogs in tow—that was enough!"

● BCL Interference

As 2DAJ testifies, this is a real problem. It is a fact, however, that many stations operate without causing trouble to a broadcast receiver working in the same house. First it is necessary to know what these thumps really are, then it is easier to set about their elimination, or at least minimise the havoc that can be caused to the unfortunate neighbour, who in time will most likely come to regard you as a "thumping" nuisance!

When the transmitter output is keyed, spurious oscillations of extremely short duration and with a wide frequency range are produced; "transients" is the usual term. In our original circuit we had no means of "slowing down" the application of power to give a cushioning effect and, as pointed out, such details as this are impossible of standardisation. A start should be made by arranging a small board to hold the components shown theoretically below with a method of easy change or removal of each, until the best combination is found. The thing to realise is that there is a time-factor involved in the keying process, and the key-thump filter must absorb any tendency for "crashing" at make and break. Hence the condenser-resistance network to give the cushioning effect.

If the absorbing process is overdone key operation will be adversely affected and in these tests it may be found that the five components given will be too many. Start with L1 only at first; this can be a choice of low inductance to start with. Next

add R and C2 (the former should of course be variable for experiments, while the condenser value may range between 2 mF and .1 mF). Another method is to use RF chokes for L1 and L2, insert C1 (about .1 mF) and remove R.

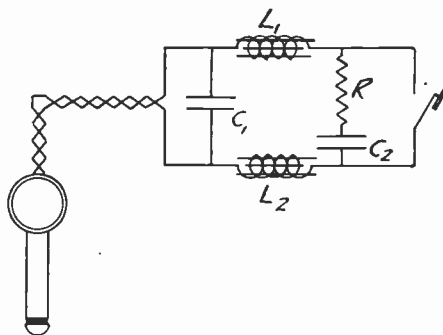


Fig. 1.

Note that the filter is at the key end of the leads to prevent radiations from these often long wires. All wires in the keying circuit must be short.

Obviously there are a multiplicity of values and circuit combinations with which to experiment, besides such expedients as shielding leads with earthed cable and changing the position of the transmitter to prevent nearby objects acting as reflectors. Which brings us to—

● Mains Borne QRM

It may seem surprising that signals will get out where they are not wanted—via the mains; but after all it seems like asking for trouble if a transmitter capable of handing messages across the world is not isolated from a veritable network of aerials contained in every room in the house.

The best we can do here is to use an earthed outer casing for supply wires and fit a mains filter at the transmitter end, as illustrated (Fig. 2).

Cardboard tubes of about 2½-in. diameter will serve as formers for the coils, which are wound with about 250 turns of 26 gauge enamelled wire. The condensers should be 250v. working, .1 mF, and above reproach; it is advisable to use a fuse in the live wire (or both) between C and the mains plug—in case!

AC transformers with shields between primary and secondary that are efficiently earthed are useful in keeping RF out of the mains. Good HT

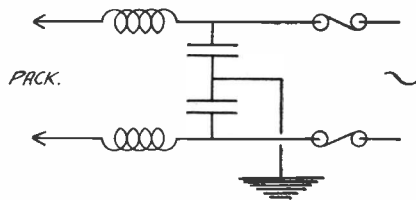


Fig. 2.

The mains filter should be connected near the power supply. Values are given below.

regulation is also an asset. As an instance that these precautions are not always necessary I might mention that 2BIM, using a 2A5 (equivalent to the British LF pentode) in his crystal-controlled 7 Mc oscillator, has gotten away without any filtering, but I have an impression that when he adds his RK25 he will find it essential to pay close attention to the power pack. His QRA is Church Street, Sidmouth, Devon; would someone like to correspond?

● Another Aid

For this final effort to overcome BCL QRM we must tackle our problem at the receiver end, which may mean your own or that of a complaining neighbour. Much has been written concerning this side of click suppression (an article by G2NS in our October, 1937 issue is of special use) so that Fig. 3, with its caption should suffice.

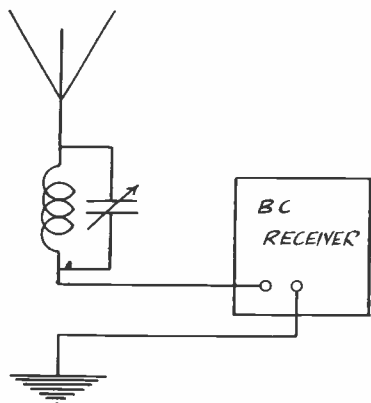


Fig. 3.

The trap is tuned to the transmitter frequency and is only satisfactory when this condition is effected.

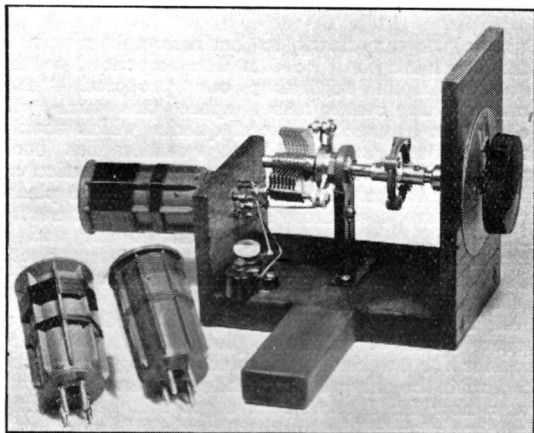
● Other queries answered

The Hartley oscillator described in the first of this series is suitable for other bands and would make a satisfactory CW stand-by transmitter for frequencies up to 7 Mc. Although we know of instances where the circuit has been used for telephony on even 14 Mc it is not recommended that

such experiments in less experienced hands should be tried.

"As there seems to be RF at each end of my tank coil, both similarly indicated in the tuning loop, why is it necessary to couple the AA to the plate end?" The coil is in effect two windings, similar to regenerative receiver practice; the grid winding certainly has RF, which drives the valve, and as we require as much efficiency here as anywhere it is obviously serving no useful purpose to draw on this side. Almost like placing a loudspeaker before the output valve.

Here is a "close-up" of the absorption meter mentioned and photographed in less detail last month. Simplicity of construction is clearly shown and should present no difficulties.



The Absorption Meter described last month.

I had hoped to find room for details of G.P.O. regulations as to the keeping of an "approved log"; however, this must be held over with the promise that next month an explanation will be given. The correspondents have of course been informed by letter.

● A good note is necessary

We must now take up the threads where we left off last month, at which stage a nice eight to ten watts gave us cause for satisfaction. However, this happy state of affair occurred before paying attention to the keyed note; and when final adjustments are made it will be found that an input of five watts is nearer the mark for the LF pentode used.

Tune the monitor or receiver to dead beat on the signal and see if a "tail" to the note is there; beats should only be heard either side of the zero setting. If everything is as it should be signals will be constant in pitch, with no variation at the ends; it is this change of frequency we may hear at "silent point," which puts a tail on the note and causes that peculiar blooming effect.

A signal with such a chirp will prove difficult to read at the distant receiver and is not to be tolerated these days, particularly if the station is

For more enjoyment of your hobby—read "The Short-Wave Magazine" regularly

to grow up with a name for putting out a decent signal. Listen for the chirpy stuff on any of the bands and compare it with a good straight note, and then make the resolution that the sacrificing of valuable watts shall come before a stronger but less readable transmission. With QRM at the other end a clean-cut five watt signal will get through better than a ten-watt blooper!

Many adjustments are possible: bias, aerial coupling, the tapping point, voltage regulation, etc., and in the various processes a watchful eye has to be kept on the plate current meter and each mA change noted so that if the signal is brought to perfection by two methods that giving away less output should be used. In this manner interest is gained; Amateur Radio would not be worth the effort if all one had to do was to put together a few parts and press the key; further, these experiments if recorded (as they should be) will form valuable data for the future.

Once again, space forbids enlargement; but it is felt that the points raised by readers will prove of benefit to most of us, so now that we are another step further on our way, with good clean signals causing no interference and a full understanding of the working of the Hartley circuit for 1.7 Mc, we can try some modulation experiments next month. In the meantime, don't forget the Morse Test, in which you will be assisted by reading the article on page six of this number.

Will Mr. Barrow of Halifax, who recently wrote with queries about the "All-World Two," kindly communicate his address.

"RADIOQUEST"—*continued from p. 12.*

the wavelength coverage is from 300 to 2,000 metres, that is 1,000 to 150 kc, a band of 850 kc. In a short-waver we expect to cover say 10 to 100 metres, or 30,000 to 3,000 kc, a band of 27,000 kc, a coverage well over thirty times as great! Coils are changed for each wave-band but the poor choke is expected to cover an enormous range.

This may sound very well, in theory, you say, but here is a method by which you can prove it for yourself. An effective RF choke acts like a resistance as far as high-frequency currents are concerned, so if connected between the aerial and earth of a receiver only a barely perceptible reduction of signal strength should result and this difference should be uniform throughout the tuning range. It works nicely on the broadcast bands but on the short waves it is a different matter, and you may in future give this often neglected component (the cause of so many troubles) the consideration it deserves if you try this test.

66-foot end-on. 2SO's gear is located upstairs, which allows of this type of aerial being worked at maximum efficiency. Whilst spending most of his time on 14 Mc, G2SO is often to be heard on 7 Mc and is always ready for a chinwag with any other station.

We feel that he is to be congratulated on having produced a compact and handy little rig capable of putting up an excellent performance.

The Other Man's Station

G2SO

G2SO, OPERATED BY MAL GEDDES at 44, Lindisfarne Avenue, Leigh-on-Sea, Essex is an interesting station in several respects. In spite of being QRP, the amount of DX worked in the last few months would please even the most hardened amateur: ZL3AJ, VK2HF, VK2ADE, ZS5Q, ZEIJG, FP8PX, U9ML, TF3C, TF5Q, VE2, VE3, VE4, and W6EPG among a host of W's! And believe it or not, this has all been obtained with a single-valve 6L6G transmitter and two-valve receiver!

The gear at 2SO is arranged in rather an unusual way. Both receiver and transmitter are built into the same assembly and the whole rig forms a compact unit which can be easily moved about from place to place without having to break and subsequently remake a lot of connections.

The wooden rack stands about three feet six inches high and is eighteen inches wide. The panels are of plywood and the whole is lacquered B.B.C. grey and presents a most business-like appearance. The receiver is in the base, the circuit used being



a conventional battery operated 0-v-1; activity is chiefly confined to 14 Mc CW, so it proves quite sufficient for the job. Anyway, with its vertical aerial, it seems to bring in as much DX as 2SO finds time to work.

Above the receiver is the power pack, giving 350 volts at 150 mA, with a number of meters mounted on the panel. They are arranged to read anode and grid currents in the 6L6 and an additional one is provided for the plate of a PA stage which is in course of construction.

The top rack houses the transmitter proper, with the 6L6G, used as a tritet, on the left hand side. When the transmitter was first constructed room was left in the rack for adding a PA stage later. This is now nearly complete and the controls can be seen to the right of the top panel. When it is put into operation great things are expected, in view of the DX worked using the 6L6G only.

Several aerials have been tried out from time to time but that most favoured is the "old reliable"

Building Short-Wave Receivers

Some Explanations to Help the Newcomer

By "TESTER"

IT IS PROBABLY SAFE to say that nowadays the activity of the great majority of home-constructors is concentrated on the short waves. Many of those who, during the "roll-your-own" boom of a few years ago, were enthusiastic set builders, subsequently lost interest in broadcast-receiver construction for the medium and long wavebands—partly because of the component situation, brought about by the exploitation of both readers and manufacturers by writers short of new ideas, and partly by the advent of the cheap factory-made set—and either gave up radio as a hobby or turned their attention to the high frequencies.

Most of the new recruits to home-construction have come straight to the short waves, and there seems little doubt that there is now a more progressive technical interest in reception below 200 metres than ever there was above it.

It is not just the receiver itself which provides so much scope, as what goes with it. Whoever bothered about the design of an aerial for broadcast reception above 200 metres—beyond making sure it was as long and as high as possible—or found it necessary to have a calibrated wavemeter for exploring the range between 200 and 2,000 metres? Yet in short-wave work all these things, and much else besides, are a fascination to the technically-minded amateur, while the new developments and the gradual penetration further into the unknown regions of the very high frequencies provide a never-failing source of interest.

There must be many who would like either to take up again their old interest in radio or to start short-wave work as a new hobby, but the very fact that the methods which used to produce results on the longer waves are likely to lead to disappointment on the short, deter them, while the latest ideas and different technique take time to absorb.

Actually, for those who have had a solid "grounding" on the normal broadcast bands, there is little to be feared when it comes to building short-wave receivers, so long as certain main points are understood, and it is the purpose of this article to discuss some of these, if only for the reason that all the signs indicate a new boom in home-construction, with the difference that this time it is focussed on the short waves rather than on the medium and long, as was the case in the years 1926-30.

To any reader of this paper, it will be known that the essential point about the waves with which we are concerned is that they enable relatively enormous ranges to be easily covered, due to their reflection at wide angles between the earth and the conducting surfaces caused by the action of the sun on the upper atmosphere. They therefore do not lose their energy, or "attenuate," as rapidly as do the longer waves, which are merely bent round the

surface of the earth and so grow weaker by an effect akin to ordinary friction.

● Points in Design

Owing to this behaviour of short waves, it is possible to get remarkable results with simple apparatus, but what is not so well known is that many commercial types of the so-called "all-wave" receivers do less than justice to these possibilities owing to design difficulties. The implication here is that the home-constructor can expect to get better results below 200 metres with his own receiver designed for the purpose that he can with all but the very best sets covering the short-, medium- and long-wave bands.

The reason for this is interesting and instructive, providing as it does the explanation of one of the main differences in technique as between short-wave and ordinary broadcast receiver design.

Because the velocity of radio waves is a constant whatever their wavelength (or frequency), and the higher the frequency the shorter the wavelength, it follows that as the wavelength decreases, so the rate of change in frequency rapidly increases. To express this in figures, for which the formula

$$\text{Freq. (kc)} = \frac{300,000}{w/l \text{ metres}}$$

is used, the frequency at a wavelength of 300 metres is 1,000 kc, and at 310 metres it is 968 kc, a difference of only 32 kc in 10 metres. Now consider wavelengths of 40 metres, at which the frequency is 7,500 kc, and 50 metres (6,000 kc). Here the frequency difference in 10 metres is 1,500 kc, nearly fifty times as much as before. The tuning condenser used in an ordinary broadcast receiver usually has a maximum capacity of .0005 mF, and each degree of an 0-100 degree dial covers about 3 metres on the medium waveband. In other words, to tune from 300 to 310 metres, the dial reading would change from, say, 20 to 23 degrees and, by previous reasoning, 32 kc would be covered; this frequency range of 32 kc allows room for about 4 stations on the medium waveband.

But what happens on the short waves? The same movement on that condenser, actually 3½ degrees, made in the neighbourhood of 40 metres, would tune from 40 to 41.47 metres and cover a frequency range of 266 kc, or the space required for about 30 broadcast stations!

This example proves several things—that tuning on the short waves is very much sharper than on the medium and long waves, and that it is not possible to tune nearly closely enough on the HF bands with an ordinary type of "all-wave" receiver because the same .0005 mF tuning condenser is used

from 19 to 2,000 metres, the wave-range claimed for most sets. Admittedly, some remarkable slow-motion mechanisms have been designed to give the effect of broad tuning, but the fact remains that near 40 metres 266 kc must still be covered by $3\frac{1}{2}$ degrees on that dial!

Further difficulties of design and inefficient compromises are introduced because the ratio of the values of inductance and capacity—the LC ratio, that is—is all wrong on the short-wave tuning range with the .0005 mF condenser, which *must* be used to get the necessary coverage on the medium- and long-wave bands. This capacity is about five times too much on 40 metres, and the effect is of course considerably intensified at the extreme HF end of the tuning range, 19 metres in most cases. This makes the tuned circuit normally used inherently inefficient for the short-wave ranges, and in cheap sets there is nothing much that can be done about it, where all-wave reception is required. There *are* methods of obtaining less sharp tuning—band-spread, as it is called—on the short waves, but without the circuit complications which one cannot expect in the ordinary mass-produced set, they do not lend themselves to one-knob control, which is apparently the aim of all manufacturers.

● Small capacities essential

From all this, it will be clear that small tuning condenser values are required on the short waves, and since the frequencies involved are very much higher, losses due to inefficient construction are proportionately greater; the higher the frequency, the smaller the capacity needed to by-pass HF. Looking at this another way, one can imagine a form of construction in a broadcast receiver which involves the detector grid lead being about 4in. long and passing within $\frac{1}{2}$ -in. of the metal chassis. Making it 1in. long with 2in. spacing from the chassis would cause no noticeable improvement on 300 metres, but on 30 metres such a change might be necessary for satisfactory operation, while on 3 metres, a long grid lead so near the chassis would simply "short" the HF energy altogether!

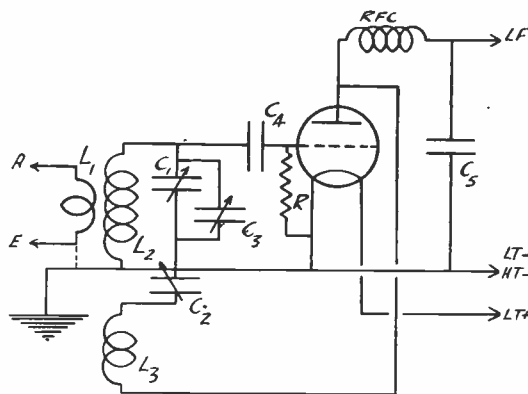
This brings out the fact that in the radio-frequency stages of the short-wave receiver, proper lay-out is essential for good results, and very often performance can be considerably improved by trying changes in the placing of the various components. All-metal construction is not always desirable owing to the losses caused by eddy-currents and the fact that metal lumped near tuning coils and HF chokes reduces their "goodness" or Q value on the short waves, this effect becoming rapidly more marked as the frequency increases.

● Lay-out

For an experimental short-wave receiver which is expected to give good results, it is best to use a wooden base-board and panel (which can be ebonite if appearances matter) and all components in the HF circuit should be mounted such that they are in the clear. In the case of condensers, which should always be air-dielectric, use insulated mounting brackets and extension rods to the panel controls. Coils must be of small physical dimensions and wound on skeleton formers, with low-loss coil-and valve-holders. It is also worth mounting these holders on small wood or ebonite spacers, so that they are clear of the base-board. The placing of all these components should be arranged to pro-

vide the shortest possible connecting leads, and construction is made easier and performance improved if parts such as chokes and fixed condensers are supported in the run of the wiring.

With regard to tuning, a simple and effective method of getting the required "spread" is to use two condensers in parallel. One can be, say, .0002 mF and the other .00002 mF, one-tenth the capacity. The latter will then cover a frequency range of only one-tenth that of the .0002 mF condenser. Thus, if it is desired to have broad tuning between 20 and 30 degrees on the tank or larger condenser, it is only necessary to set it at 20, with the small one—the band-spreader, as it is called—at zero. Then, tuning on the band-spread condenser from 0-100 degrees will search the frequency range covered between 20 and 30 degrees of the tank condenser. Obviously, this process is applicable to any setting of the latter, and provides easy and selective tuning over the whole range. The old hands will recognise this as the "verner tuning" of 1924 in a new guise.



C1, C2—.0002 mF; C3—.00002 mF; C4, C5—.0001 mF; R—3 megohms; L1, L2, L3—3-winding coil to cover required range; RFC—short-wave choke. Condensers should all be fitted with slow-motion controls and the rotors taken to earth. With an ordinary aerial, connect E of L1 to earth; doublet aerial feeders are taken to A and E, no earth connection being used for L1. It is sometimes better to return the grid-leak R to LT+ positive.

● A good circuit

A suitable circuit, which can be coupled to any LF amplifier, is shown above.

Every component and mechanical part required is available from several manufacturers' advertising in this paper, who specialise in short-wave apparatus, and their catalogues make interesting and instructive reading. From these, the necessary coils can be selected to cover any desired tuning range. Note that slight changes in condenser values may be involved with different makes. A full tuning range of about 10 to 160 metres, using five plug-in coils, is easily possible with this circuit; using a reasonably good outside aerial and one stage of low-frequency amplification, good headphone signals are receivable from all over the world, and some at least will be strong enough to operate a speaker.

A Straight Receiver for 56 Mc.

By ARTHUR C. GEE (G2UK)

NOW THAT frequency-controlled transmitters of reasonable stability are making their appearance on the 56 Mc amateur band, super-regenerative receivers are being rapidly superseded by the "straight" or superheterodyne types.

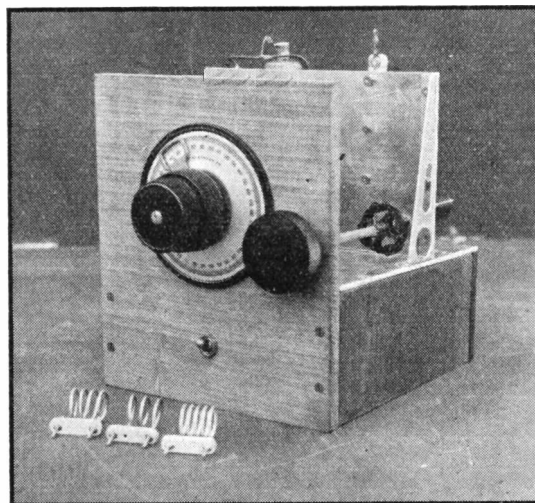
In most cases the standard receiver in amateur stations cannot be converted for use on such high frequencies, which means that a special set has to be built for 56 Mc work.

The receiver described here can be constructed both cheaply and easily, and the circuit suggested follows normal practice for the LF bands. With sufficient care and suitable components there is no reason why circuits effective for lower frequencies should not be used. The chief troubles to be met with in 56 Mc receivers are hand capacity and excessive aerial damping. The first can be avoided by fitting extension handles and keeping the amount of metal in the chassis at a minimum; the second is best overcome by having a good aerial and coupling it loosely to the detector coil. Tight coupling is not required on these frequencies in any case.

Another way of making the receiver easier to handle would be to use an RF stage. In view of the fact that its gain with the valves generally available is said to be practically nil and that the additional expense is considerable, it was decided to design a set consisting of detector and LF stages only. Subsequent trials have proved that such a circuit can be relied upon to give excellent results.

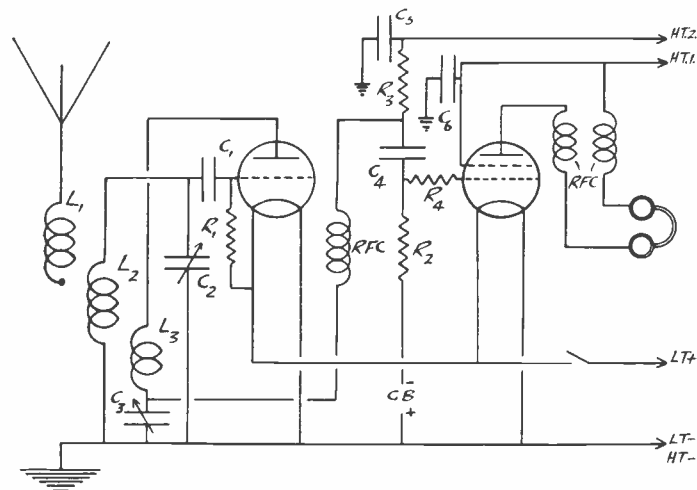
● Design

Going over the design, the important points to notice are as follows: The chassis is built up from half-inch plywood, with a base-plate of heavy gauge



aluminium. The front panel must be of wood as otherwise bad hand capacity effects will result, while the coils and variable condensers are mounted on an aluminium panel at the rear of the receiver. This serves to screen the detector stage.

By using a Utility "Micro-dial" for the tuning condenser, no band-spread condenser is necessary, the absence of which simplifies the layout considerably. An Eddystone slow-motion driving head controls the reaction condenser, giving smooth tuning. These controls are coupled to their respective



Showing the circuit of the two-valve five-metre receiver. See text for full details and list of parts for values. The detector valve is a Hivac D.210.SW.

LIST OF PARTS

- C1—.00005 mF mica, T.C.C. type 34.
 - C2—.00004 mF, Eddystone 900/40.
 - C3—.0001 mF; Webbs Economy type.
 - C4—.1 mF, T.C.C. tubular, type 341.
 - C5, C6—2 mF, T.C.C. type 50.
 - R1—5 megohm, Erie.
 - R2— $\frac{1}{2}$ -megohm, Erie.
 - R3—25,000 ohm, 1-watt, Erie.
 - R4—15,000 ohm, Erie.
 - L1, L2, L3—Eddystone two-, three- and five-turn coils, USW type.
 - RFC—USW chokes, Eddystone 1011.
- Hivac Valves, D210SW and Y.220; Utility Micro-dial; Eddystone S/M driving head, 3 coil bases (1051), two flexible couplers (1009), two sets extension controls (1003), one frequentite valveholder (949), two 5-pin chassis mounting valveholders. Bulgin on-off switch, S.80. Also plywood, ebonite, aluminium, panel brackets, nuts and bolts, screws, and wire.

condensers by extension handles, which can either be bought ready made or cut from quarter-inch diameter ebonite or "Trolitul" rod. Eddystone ultra-short-wave coils are used in the aerial, grid and reaction positions, mounted with the Frequentite bases available for the purpose. The tuning capacity is a 40 mmF Eddystone "Microdenser," with a 100 mmF "Economy" type, or other similar make, for the reaction.

The detector valve is, of course, a Hivac D210SW. This valve, which is reasonably priced, has its grid brought out on top of the glass envelope, allowing an excellent layout scheme to be obtained. The LF stage consists of a pentode (Hivac Y220) resistance coupled to the detector. All the components for this stage are placed below the baseplate and the valve is mounted between the front panel and the aluminum screen, as can be seen from the photographs.

● Construction

The chassis can be made of half-inch plywood or of oak, according to taste. It consists of a front panel, 7½-in. wide by 9-in. high; two side pieces 7-in. by 3½-in.; and a rear piece of ebonite, 7½-in. wide, 3½-in. deep and ¼-in. thick. Assemble these sections with one-inch wood screws. Next, cut out the baseplate from good thick aluminium sheet or plate; eighth-inch makes a very rigid job if it can be obtained, but use the heaviest available to give rigidity. A hole must be cut for the LF stage valve-holder, as shown in the drawings. The Eddystone Frequentite holder for the detector valve is bolted to the base plate and it is important to see that the anode pin is in the right position.

Then cut out and drill the aluminium rear panel. This should also be of thick sheet or plate, the dimensions and position of holes being shown in the drawings herewith. When complete, use it as a template to mark the holes for the extension handles on the front panel. Drill a ¼-in. hole for the slow-motion driving head and a ⅜-in. hole for a ¼-in. bore panel-bush to take the tuning dial extension handle, mounting these components and the Utility Dial. Instructions for fitting the latter are supplied with it.

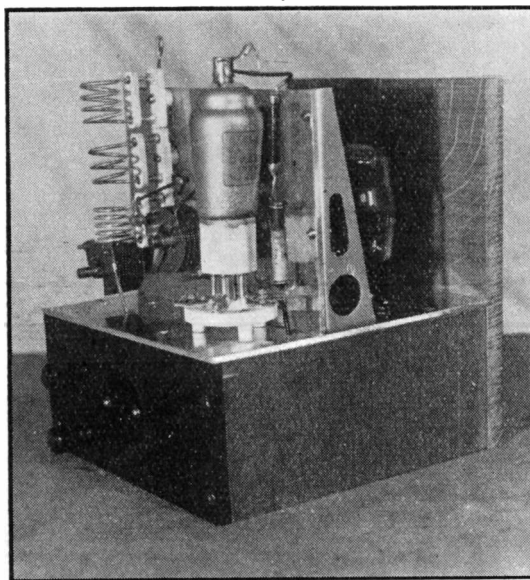
Next, fix the rear panel to the baseplate with three-inch panel brackets and mount the variable condensers and coil holders. Phone terminals and a five-pin chassis mounting type valve-holder to take a plug carrying LT and HT leads are arranged on the rear ebonite strip as shown, with a Bulgin toggle on-off switch on the front panel. Finally, make a small bracket to hold the grid bias battery and fix this on the underside of the baseplate.

● Wiring

Follow this through in some definite order and then nothing will be missed. Use 14 SWG bare copper wire for RF leads and 18 SWG tinned copper insulated with systoflex for the rest, taking all earth connections direct to the nearest point on the baseplate or rear panel. The leads in the detector stage are the most important and the arrangement shown should be adhered to, as follows:—The bottom coil is the reaction, and the lowest connection on it is taken direct to the nearest terminal on the fixed vanes of the reaction condenser. The other side of the reaction winding goes to the anode

pin of the detector valve holder. Above the reaction is the grid coil and its bottom connection goes to the nearest terminal of the tuning condenser stator. The other side of the grid coil holder goes to earth, at the bolt which fixes the holder to the panel. The top winding is the aerial coil, which will be dealt with subsequently. The other stator terminal on the tuning condenser is taken to one side of the mica grid coupling condenser C1, mounted on the rear panel near the detector valve. The other terminal of this condenser is connected via a short lead to the cap of the valve, together with the 5-megohm grid leak, which in turn earths to the LT positive side of the valve holder.

The diagrams should make all these connections clear. The LF stage is wired up in the usual manner, but care should be taken to see that leads are no longer than necessary. The circuit diagram gives the values of resistances, coupling and decoupling condensers, etc. and it is a good plan to use different types of RF chokes for each of the positions shown.

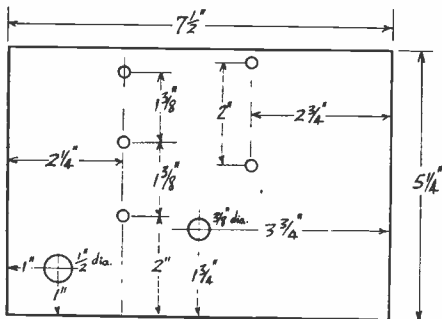
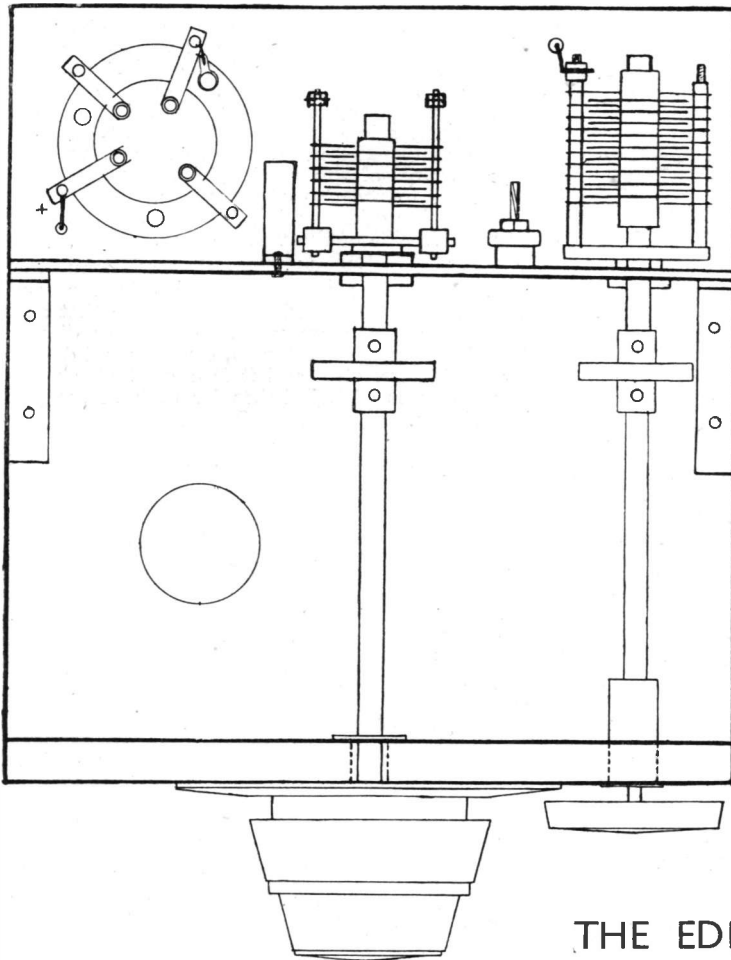


● Aerial Arrangements and Coils

With a dipole, attach the ends of the feeder to the two connections on the aerial coil-holder and plug in a one- or two-turn coil. If an inverted-L or a 66-foot end-on aerial is used, it should be clipped to the upper of the two coil-holder tags and the lower one either connected to earth or left free. A little experiment will soon show which is the best arrangement. With any type of aerial see that it is kept taut and does not swing or the signals will tend to vary.

As mentioned, the coils are of the Eddystone ultra-short-wave type. Use a five-turn for the reaction coil and a three-turn one for the grid. The aerial winding can be anything from a single turn to four turns and is best found by trial. With a three-turn grid coil and the condenser specified some part of the band should be tuned at about 60 to 70

Lay-out of the parts and general arrangement (plan view). The round hole behind the front panel is $1\frac{1}{4}$ " diameter, for the LF stage valveholder.



REAR PANEL.

Showing drilling detail of aluminium rear panel. This piece when completed can be used as a template for the front panel.

degrees on the dial. It is recommended that about 120 volts be used on HT1 and 100 volts or less on HT2.

● Results

Using this receiver and a "long-lines" transmitter, QSO's have been obtained with G2LC, G6NU and G6DH. 2LC was also working with a "long-lines," whilst 6NU and 6DH had crystal-controlled transmitters. G6DH is located thirty miles from the writer's QRA and schedules have been made and kept without any difficulty, signals both ways being about R6-7.

Among "Calls Heard" have been those of G2HG, G5QC and G2MV, all on CW. During these tests a 66-foot end-on aerial was used for both reception and transmission. The slow motion on the tuning condenser proved to be ample, even the sharpest of CC signals being held with perfect ease.

In conclusion, the writer would like to remind readers that the R.S.G.B. is running an International 56 Mc Contest during 1938 and it is hoped that as many listeners as possible will keep watch on the band. In view of the coming peak in the sun spot cycle, it is thought that 56 Mc may open up for DX signals at any time, and the more active listening stations there are, the less likely is it that any such DX will go unheard.

THE EDISWAN CHALLENGE

We are very glad to be able to say that Messrs. The Edison Swan Electric Co., Ltd., 155, Charing Cross Road, London, W.C.2, have produced for the British amateur in the new E.S.W.20 a low-power transmitting valve at a competitive price which, so far as our tests have gone, appears at last to give us an English-made T.20.

The characteristics are not only almost identical, but the E.S.W.20 is pluggable, i.e., changeable with the T.20 without alteration of connections. In a 1.7-3.5 Mc transmitter employing a T.20, the Ediswan valve gave exactly the same readings, only the slightest variation of tuning being required to accommodate it.

This test is, of course, scarcely sufficient for us to give a full report on the E.S.W.20, as its performance on 14 and 28 Mc has yet to be compared. The input capacity and doubling efficiency at these frequencies may not be quite so good theoretically, as a moulded base is used, though we have doubts as to whether any difference will be noticeable in an amateur-built transmitter. The E.S.W.20 is now priced at 17s. 6d.

More about the 56 Mc RF Amplifier

By A. J. DEVON

THE PA UNIT using the R.K.34 twin-triode as a straight-driven amplifier in push-pull, described last month, has been giving a very good account of itself.

Driven from the SHORT-WAVE MAGAZINE Exciter, with 250 volts on the plates of the R.K.34, —24 volts grid bias and 8 mA grid current, an input of 5 watts was obtained to a very loosely coupled di-pole, link-coupling being used at both grid and plate ends. Neutralisation proved to be rather tricky, the best method being to apply zero bias—to get a fairly high grid current reading—and then to move the neutralising condensers a little at a time till no kicks showed on the grid meter as the tank condenser was moved about resonance.

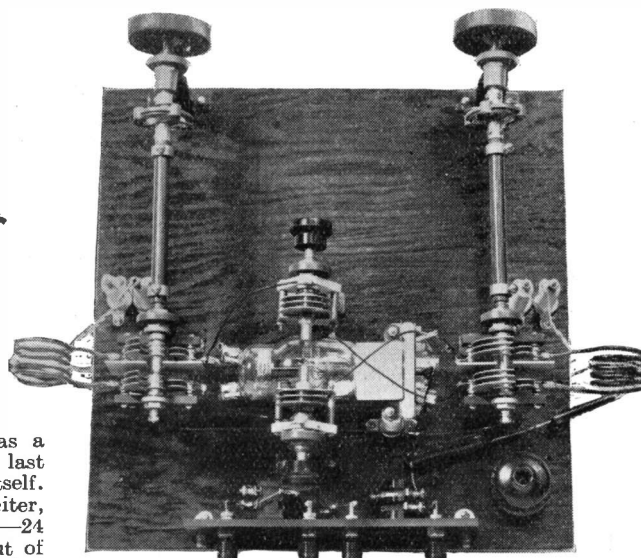
Operating under these conditions, RST-549 reports have been received over ranges up to forty miles, the aerial being assisted by means of a simple reflector, and the whole thing aimed in the desired direction. At a distance of about 25 miles, RST-579 was regularly obtained, and a QRA-to-QRA schedule easily maintained, though both receiving points are quite blind (in the visual sense) to the location of the transmitter, which was then being used exactly as pictured on p. 18 of our April issue.

● Improvements

As mentioned last month, the next step was to fit the "J.B." twin-midget condensers, double-spaced, the first result being that the coils had to be increased to five turns each to get resonance. This seemed a step in the right direction, as was proved by the fact that there was about 25 per cent. more RF in the tank for same low-voltage input and drive.

The plate supply was increased to 450 volts, the safe limit for the R.K.34, and then things began to happen. Neons glowed and loop-lamps blew in a most satisfying manner, and it was found that to limit the input to a reasonable figure, 20 watts or so, the di-pole aerial had to be very loosely coupled indeed, with plenty of RF left in the tank. Previous reports went up by from one to three R's, and the signal had altogether more "punch."

By careful attention to the Exciter tuning and better arrangement of the links, the drive was increased and the present operating conditions are: Plate voltage, 450; plate current, 47 mA, grid bias



Close-up of the re-built 56 Mc PA, using "J.B." midget-twin condensers. Self-supporting single-turn links are used, anchored to the insulated pillars.

—60 volts and grid current 5 mA, this latter figure becoming 12 mA with —24 volts bias.

The accompanying photograph shows the re-constructed five-metre PA, with the tuning condensers at their actual settings for resonance at 57,480 kc, the frequency being used at present. As an additional refinement, slow-motion has been fitted by means of Eddystone driving heads and flexible couplers. The nett result is an RF amplifier no more difficult to adjust than the 7 Mc job.

● Exciter Adjustments

For those who may be interested, the 56 Mc drive is obtained by working the Exciter to its 8th harmonic from a 7 Mc crystal; the first stage quadruples from 7 to 28 Mc, and the second doubles to 56 Mc. The 28 Mc tank coil is three self-supporting turns of No. 14 copper, 1½-in. in diameter and spaced ½-in. The 56 Mc doubler winding is two turns, all as before, but the spacing is one inch. These two little coils have pins soldered to the ends, and plug into the ordinary coil bases used for the standard formers, no other changes whatever being made to the Exciter, which is shown on p. 24 of the April issue.

In other words, from a 7 Mc crystal we are getting to 56 Mc with three valves only, the last of which is a straight amplifier which can be efficiently driven: to 25 watts input, all without any difficulty and using—with the exception of the 56 Mc coils and tuning condensers, which are readily obtainable—absolutely standard parts.

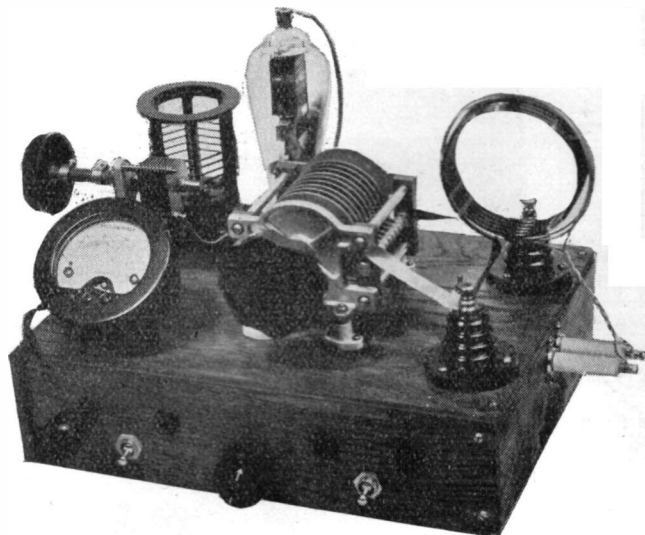
As we hope to be able to give you 56 Mc notes and news month by month, any comments or personal experiences would be welcome.

Read "The Short-Wave Magazine" regularly

A FIVE-BAND RF POWER AMPLIFIER

Using the new Tungram
OS-12/500 Pentode in a
PA unit matching the
Exciter

By AUSTIN FORSYTH (G6FO)



THE PHOTOGRAPHS and circuit diagram herewith illustrate a five-band PA unit which has been specially designed to follow the Exciter described in January and April, which it matches both in appearance and performance.

The basis of this PA is the new Tungram OS-12/500, an RF pentode intended for operation at up to 500 volts on the plate at amateur frequencies with an input of 30-35 watts. The combined plate and screen dissipation is 20 watts maximum, so the valve will not be damaged if accidentally used under conditions of poor RF efficiency. A ceramic base, American 7-pin, is fitted and the anode brought out to the top cap. Inter-electrode capacities are extremely low, and an internal shield is incorporated, which should be connected to the cathode at the base. The stated grid-plate capacity is only 0.2 mmF, a very minute quantity, and is one of the reasons why, in this lay-out, *no neutralisation is required*. The mutual conductance at 3.4 mA/V compares very well with other valves in the same class, and altogether our experience with the OS-12/500 suggests that it will not only give comparable American types strong competition, but that its very reasonable price will find it a ready market in this country.

The OS-12/500 can, of course, be suppressor-grid, anode or anode-and-screen modulated, though our present purpose is mainly to describe the unit and its operation under Class-C CW conditions, making 'phone working the subject of future articles. Further points to note here are that the three grids can be variously connected—in the manner of which our American contemporaries are so fond—to give different characteristics, and that the heater rating is the somewhat unusual one of 0.7 amps at 12.6 volts. This obviously means that in the majority of cases a special winding will be necessary, though it would be possible to arrange two 6.3 volt, or 5-volt and 7.5-volt, windings to get the 12.6. For our part, needing a good LT transformer, we had one giving a variety of outputs to suit American valves made up for us by Messrs. All-Power Transformers, which has turned out to be not only ex-

tremely useful, but also very economical, and we cannot do better than recommend readers to do the same.

● The Circuit

This is quite straightforward, and follows standard practice for a link-coupled PA. Link-coupling gives better efficiency than direct drive at the high frequencies, and is particularly convenient where either unit construction or rack-and-panel assembly are employed. The by-pass capacities C3, C5, C6, have all been made .002 mF, as being the best compromise for the desired frequency range of 1.7 to 28 Mc. As we have previously stated, this matter of by-pass values always causes us some thought, as the best for 1.7 and 28 Mc are .006 mF and .0003 mF respectively, so that one is faced with this necessity of compromising. However, the value specified is good for 7 and 14 Mc, the two most popular bands, so with that we must be content.

Notice that jacks are provided to read grid, screen and plate current, J2 being used either for plugging in suppressor-grid audio for modulation, or to apply positive bias under CW conditions; with S1 in the left-hand position, the suppressor goes straight to cathode. R2 is the screen-voltage control, its value being made high because it also "bleeds" the HT supply.

RF chokes are theoretically not necessary in this circuit, but we always find it well worth using them in order to prevent RF leakage into the power supply and stray coupling between plate and grid sides.

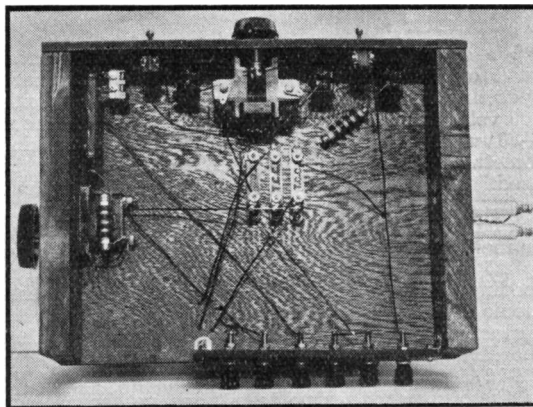
The final point about the circuit is the neutralising condenser C7, already stated to be unnecessary in our model illustrated here. But if there is any tendency for self-oscillation, the circuit shows the way to neutralise. L2 is centre-tapped, and the side remote from the anode coupled back to the grid through a *very small capacity*—probably a piece of wire from the rotor of C2 brought near the back of C1 will be sufficient. Where neutralising is found by test not to be required, centre-tapping of L2 is not needed, in which case HT is applied to the plate at the point X in the circuit diagram.

The Exciter intended for this PA stage was illustrated last month, and comparison of the two photographs will show that the same form of construction has been used for each. As we said when describing the Exciter, experienced readers need not necessarily adopt the particular arrangement we have found most convenient, as in some cases breadboard, rack-and-panel or box-frame assembly may be favoured. For general experimental work, we find the method illustrated can hardly be bettered, as it is at once convenient and reasonably good-looking.

● Construction

The shell is of varnished wood, using "Venesta" quarter-inch flooring squares for the top and front panel, and one-inch batten for the two side-runners. Over-all dimensions are 12-ins. by 8½-ins. by 3-ins. deep, allowing ample room for mounting all components; with the solitary exception of the valve-holder, every one of them is visible in either one or other of the two photographs, which show the general arrangement quite clearly, including the wiring. Just behind and to the left of the Eddy-stone tank tuning condenser C2 is the valve-holder; it can be of chassis mounting type, raised on short pillars so that the legs clear the baseboard, holes then being run through immediately underneath them to take the six wires which go to the sub-space. A tip here: Before mounting the holder, solder on all the required leads, making them amply long enough to reach their connecting points. Then hole the baseboard at the places over which the legs come, using the base of the valve as a template for this purpose, after which the ready-soldered-on leads can be pushed through and the holder fixed. The grid wire goes straight to the base for L1, and the valve-holder should be fixed so that the grid leg is looking towards it.

With the exception of the tank circuit C2/L2, which is connected with tinned copper strip of the kind used by electricians to bind joints in power cables and for earthing, all the wiring is in insulated No. 18.

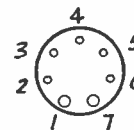


Showing placing of the parts and wiring underneath the wooden chassis. The three condensers in the middle are respectively C5, C4 and C6, from left to right. Note the Varley screen potentiometer. The terminal strip is fixed with Meccano brackets.

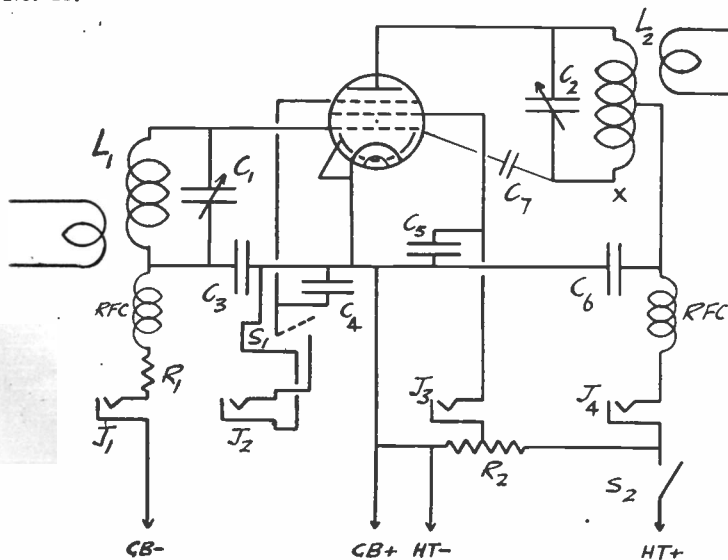
Note the output link; over the tank coil L2. It is made by forming three turns of "Glazite," or any similar stiff insulated wire, to a diameter slightly greater than that of the coil. These turns are held together with thread (obtainable from the YL's junk-box) the two ends being twisted to make a firm support for the whole, and are terminated to a pair of insulated pillars to which the aerial tuning network it taken. The tank coil can thus be changed without disturbing the link, and variable coupling can be obtained by bending the latter nearer to or further away from the plate end of L2.

Three link turns is a good value for 7 and 14 Mc, but two would be ample for 28 Mc, and something like four and six for 3.5 and 1.7 Mc. The link on the grid side is made by putting the turns over the bottom of L1, the Q.C.C. type of coil-former lending itself admirably to this purpose.

The Ferranti 0-100 . mA meter shown has not been fixed because it will be used for other apparatus to be described from time to time, the point here being that it is well worth while investing in at least one good instrument of this type, using plug-and-jack connections throughout. Incidentally, get the wiring to the jacks the right way round, or the meter will want to read "negative" in some positions.



Base connections of the Tung-ram OS-12/500, looking at the valve pins: 1, 7, heater; 2, internal screen; 3, screen grid; 4, control grid; 5, suppressor grid; 6, cathode; anode to top cap.



Circuit of the RF amplifier—discussed in the text.

● Operation

We shall deal more fully with this next month, but for the present, here is some preliminary operating data. Cut-off bias for the OS-12/500 with 500 volts on the plate and 200 on the screen is about -30 volts, so that for effective Class-C working something like -100 volts grid voltage should be used. Under these conditions, and with the leak resistor specified, the Exciter when working to its 4th harmonic will give nearly 9 mA of grid current, or more than twice that required to drive the valve to 25 watts input. At cut-off, the grid current reading obtained was 16 mA with the 14 Mc harmonic from a 3.5 Mc crystal in the Exciter; 8th harmonic drive is about two-thirds of this, so that the Exciter gives ample output fully to drive the OS-12/500 on any band. We do not include 56 Mc in these remarks, as no tests have yet been made on that frequency with this particular PA.

An important point in the preliminary adjustment is to get the screen voltage right by means of a voltmeter and manipulation of the Varley power resistor R2. The knob setting shown in the photograph is actually about correct if the arrow is lined up with the travelling arm during construction.

COIL DATA

Band	1.7 Mc	3.5 Mc	7 Mc	14 Mc	28 Mc
L1	45	25	10	5	3
L2	45	23	11	6	4

L1 is 2½-in. diameter for all bands except 56 Mc, where diameter is 1½-in. No. 16 enamelled wire should be used, with turns slightly spaced.

L2 is 3-in. diameter for all bands except 56 Mc, where diameter is 2-in. No. 12 enamelled wire is used with turns spaced ⅜-in.

(Note.—If using Q.C.C. coils for L1, it is only necessary to specify for, say, 7 Mc by "7 Mc 10-watt type." With R.V. Inductances, turns values and diameter should be quoted).

LIST OF PARTS

- C1—85 mmF Apex, Webbs.
- C2—100 mmF, Eddystone 1082.
- C3, C5, C6—.002 mF mica, T.C.C. type 340.
- C4—.001mF mica, T.C.C. type 340.
- C7—see text.
- R1—5,000 ohm 5-watt resistor, Erie.
- R2—30,000 ohm power potentiometer, Varley.
- RFC—RF chokes, Q.C.C. type A.
- L1—Q.C.C. 10-watt type for band(s) required.
- L2—R.V. Transmitting Inductances for band(s) required.
(See table for complete coil data).
- S1—SPDT switch, Bulgin, S.81.
- S2—SPST switch, Bulgin, S.80.
- One valve-holder (Webbs), one coil-base and two type A s/o insulators (Q.C.C.), 4 close-circuit jacks and two plugs to match (Webbs), 6 type B terminals (Clix), 2 insulated pillars (Eddystone, 1028), 1 LT transformer (All-Power) and one 0-100 mA meter, type 29F (Ferranti).

CLUB HISTORY

The secretaries of certain Clubs, selected by us, will be asked to send in a 400-word account of the founding, growth, membership, organisation, achievements and aims of their societies, which will appear monthly under this heading. There are no fees or obligations of any kind involved. We think the accounts will be of general interest, and we hope that they will awaken support for the Club movement and assist local membership.

EXETER

The Exeter and District Wireless Society was founded in 1929 and since then has been very active, until it is to-day the leading organisation of its kind in the South-West of England. It was in this year 1929 that Mr. H. A. Bartlett came to Exeter from Torquay and during his first week in the City he called on a well-known Exonian, Mr. C. L. Wood of Fore Street, Exeter. Both of them are very active transmitting amateurs, the former under the call sign G5QA and the latter G5WY. The Exeter and District Wireless Society owes its inception entirely to their efforts, and used first to hold its meetings in the premises of Messrs. Fieldews Radio House, Sidwell Street, but later the club moved into its own commodious rooms. The Society started with a membership of approximately 40 and this number still represents the active roll. The Presidency is now held by Sir Ambrose Fleming, F.R.S., an honoured supporter with whom members are privileged to be in contact.

The policy of the E. and D.W.S. is to cater not only for the genuine experimenter but also for those people who are only superficially interested in the science of radio.

The Society possesses a high quality amplifier and this is brought up to date from time to time, a set of test records being available so that members are able to check the performances of their own radio speakers against a standard instrument. It is also hoped that within the near future the Society will have a transmitting station of its own. During the last few years many interesting field days have been carried out with the co-operation of several local amateurs.

Every summer visits are arranged, and not only are B.B.C. installations covered but also the Beam Stations at Dorchester, Bridgewater, etc. Another high spot was the trip to the Start Point Radio Beacon.

The Secretary of the Exeter and District Wireless Society is Mr. W. J. Ching of 9, Sivell Place, Heavitree, Exeter, and it is undoubtedly due to Mr. Ching's unflagging enthusiasm that the club now stands at the peak of its progress. Meetings are held every Monday at No. 3, Dix's Field, Exeter, and intending members are assured of a very hearty welcome.

The entrance fee and annual subscription are very low when one takes into consideration the fact that such excellent lecturers are available as D. R. Barber Esq., B.Sc., F.R.A.S., W. Sydenham Esq., B.Sc., G5SY, M. Searle Esq., M.Sc., as well as the technical advisers of practically every well-known wireless organisation.

ADAPTING A PEAK PRESELECTOR FOR TEN-METRE OPERATION

By CHARLES WHEELER (2AMF)

FOR A GOOD MANY years now there has been a general tendency to make more and more use of the higher frequencies, until to-day almost every set can be used on the ten-metre band or even lower. My receiver would hardly be classed as obsolete, and it does function quite well down to about eight and a half metres, but the aerial which I use with it at present leaves much to be desired; as a matter of fact when it is disconnected there is no measurable drop in the QRK of ten-metre signals! Although I have a few QSL's from 10-metre W6 'phones, one of which was using only 45 watts, I began to think something ought to be done to get a little better reception after the shock I got over the inefficiency of the aerial.

As I have plans for a new aerial in the fairly near future, something else was required to last me for the few intervening months. I have a Peak Pre-selector which has done good service on the higher bands, but it is not designed to operate on wavelengths below fourteen metres; as a matter of fact it works quite satisfactorily on the thirteen-metre broadcast band, but as it will not go anywhere near ten I decided to adapt it to do so, thus making up for the aerial until the pending improvements were carried out. It seemed simple enough, just a matter of decreasing the turns on a couple of coils, so I set to work.

The chassis is fastened into the case by means of three screws down the front on each side and two more holding it underneath. However, before anything at all could be done, I disconnected the preselector from the receiver, not forgetting to make a mental note of the connections.

When these connections (and the screws) have all been removed the chassis is quite easily slid forward. The layout, as far as it concerns us, can then be seen quite easily, and one or two things can be taken out to make the coils more accessible. The two coils tuning the 14/40-metre range are those nearest the valves, so the latter are removed while the work is in progress. First take off the aluminium caps, then the small cap on top of the valve, the case round the valve lifting off; the small cap is usually fairly tight, but is only clipped on. When the two valves are out the coils are quite easy to get at, but have to be handled *in situ* as they are not of the plug-in type.

On both the coils the winding to be altered is the upper one, seven turns being used on each; these are reduced to five. It is advisable to unsolder the end of the wire and then remove two turns and resolder. Well, that didn't seem to be a very difficult piece of work, so I was a little apprehensive of the results, because it has been my experience that if things go too smoothly there is a snag somewhere!

It did not take long to connect up again, and in another ten minutes everything was back where it

had come from. My first thought was "Will it still function over the same range as before?" It did. Better I thought, but that may have been relief; then came the test. I switched the receiver on to ten metres and let it warm up; there was not a lot on the band, but sufficient to compare the strength of signals received on the Comet Pro alone with those heard with the preselector in use. I turned the Peak on, and louder came the signals, much louder. The setting of the preselector dial was approximately 90°, and that for 20 metres just over 40°, instead of 60° as it had been. Of course, there was a drop in the upper limit of the band to correspond with the drop to ten metres, but it made no difference to the range of the instrument as there had been sufficient overlap before.

That, I thought, was a satisfactory conclusion to an interesting experiment, and by the way, the aerial worked quite well after all.

DOES THIS OFTEN HAPPEN!

Scouting round on the 14 Mc band recently, I heard G2— on the air, chatting to somebody; in a few seconds he closed down, but before I started to move away, I heard VK3WA on the same setting calling "CQ DX." No sooner had he finished when G2— came back, of course on this same frequency, and answered the VK. The latter luckily heard G2—, and a most interesting QSO resulted. I think this a very unusual case of two stations working on exactly the same frequency contacting one another in this way, particularly as at the end of the QSO they both simultaneously remarked that they were "looking over the band!"—RAYMOND HARGREAVES, 49, Downton Avenue, S.W.2.

[This experience is interesting as a coincidence but not altogether unusual, as owing to the very crowded state of the HF bands these days, most stations only listen on and near their own frequencies. The "listening code" introduced to counteract this annoying but necessary procedure has done little to assist matters, i.e., during his "CQ" or "Test" call, the operator should send, for instance, QMH—meaning "I am going to listen from the middle of the band to the high-frequency end." Other codes in this "Q" group are QLH, QML, etc.—ED.]

A CLUB FOR PAIGNTON.

Could you help us in forming a Radio Club in Paignton, Torquay and District? We should be glad if you would announce that any readers interested in joining should apply as below, where we have nearly £200 worth of test equipment.—G. A. WILLIS, 86, Winner Street, Paignton.

LISTENERS' DX CORNER

By THE DX SCRIBE

FOLLOWING the request last month for logs to be neatly and clearly laid out on one side of a separate sheet of paper, let me congratulate you who have done this. Some exceptionally well written logs have been received; please continue this way and keep page 32 of the last issue beside your receiver. That notice will remind you what to leave out!

● Rare W9's

Kenneth A. Edge, 8, Bloomfield Road, Moseley, Birmingham, 13, suggests that rare W9's should be included in our calls heard lists. We entirely agree, but put the name of the State in brackets after the call. The States we have in mind are:—Colorado, Nebraska, N. and S. Dakota, and Kansas. We would also like to see such common countries as CN and FA omitted.

● Pitcairn Island

Following our remarks about VR6A, some of you may be wondering why you are hearing VR6AY, or even if it is another station in the same island. Just after we wrote about VR6A, official permission arrived on the island to operate a transmitter, assigning the call VR6AY. WIBES installed the equipment and has operated it since its inception, but he left during the middle of April, and we hope Andrew Young, the native operator, will continue to keep the station on the air. We have also learnt that to obtain a card you must send a British or New Zealand stamp, as there is no post office on the island. Power is 650 watts to a rhombic aerial directed on U.S.A. Frank Rutter, Merivale, 324 Wigan Road, Standish, Wigan, informs us that VR6AY was heard to say that he intends to broadcast programmes of interest about Pitcairn.

● Coupons

Frank Rutter raises an important point. WIJFG, who uses 600 watts and is very well received in Great Britain, has received a large number of Imperial Reply Coupons which are entirely useless to him, as these are only for exchange in the British Empire. Please note, all of you who did not know that U.S.A. is not part of the Empire! Frank uses an SS superhet, and wonders how some of the "straights" behaved during the DX 'phone contest? Even on his receiver the American 'phone band was one mass of heterodynes. He would like to communicate with anyone who has had experience with matched doublets for reception and he also intends trying a Collins coupler.

● QSL's Again

Much has been written this month on the ever-important and vexed question of cards. Apparently, some listeners have never seen one, or if they have, are not at all clear as to what data should be included in a report if it is to be of real value to the transmitting amateur or BC station. First, it is of little use to send a report saying only "your 'phone signals heard here on a home-made 0-V-1 at R6." That card is quite useless; it contains the minimum of information, and does not deserve a

reply, unless the amateur is very kindhearted. Always listen to a given station for as long as possible, and send a complete reception log of that one station with fading variations, phase distortion, interference (with calls of the interfering stations), details of the contacts heard while watch was being kept, with strengths of the stations being worked (if you can hear them). Also, it would be of interest to mention other transmissions received from the same locality as the observed station, with strengths. Such a report would probably earn a card without an I.R.C.! Don't forget to give details of your receiver, with direction and type of aerial.

N. L. Thompson, 26, Inchcape Terrace, Easington Colliery, Co. Durham, has a novel idea for the QSL problem. He suggests that a specially prepared card be printed so that the full report could be written on one side and the other side be left for the transmitter to fill in details of his power, etc., signing as confirmation of reception. The card would then be returned to the sender, an I.R.C. having been enclosed to cover postage. Advantages claimed are: (1) Uniform size of card; (2) no expense to the transmitter; (3) full details of reception and confirmation on one card. Of course, there is one disadvantage in the whole idea. The recipient may value the listener's report so much that he may not want to part with it; we presume he would send an ordinary station card in this case. This idea would certainly cover the difficulties of ZE1JA and IJR.

R. Dudley Montague, 155, Windsor Road, Ilford, Essex, agrees with "Another Silent Listener," but asks if a SWL would really get any satisfaction from a card obtained by a false report. Again, would the station believe the QSA5 R9 QSL if no other report had been received from the same country? This reader is satisfied if he receives 50 per cent replies to his cards, and mentions CN8MU, C08VZ, SU1RD and LU9BV as latest additions to his collection. Desmond M. Downing (aged 16), 30, Hawthornden Road, Belfast, N.I. reports for the first time, and the reason for so doing was Bob Everard's outburst in defence of QSL'ing! He agrees that a QSL does constitute the only proof of reception, but who wants proof anyway? He maintains that only a braggard wants cards; "the pot-hunter type" he calls them. He is perfectly satisfied to know that his home-made equipment is capable of receiving DX stations without wanting confirmation from them all. He assures Bob Everard that this is not a personal attack, but merely his opinion on the whole business. Well, well, well!!!

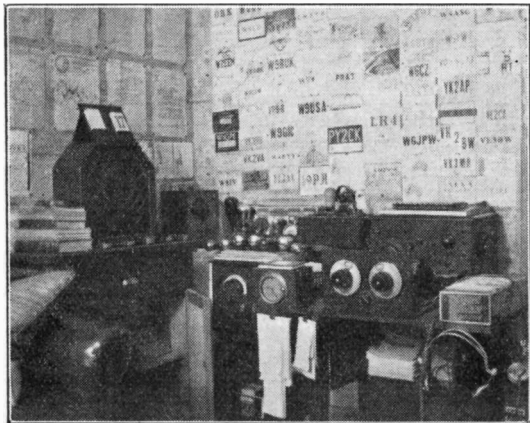
● New Guinea and China

Has anyone received VK9VR? I. C. Fletcher (BSR2908), 4, Cyril Road, Bexleyheath, Kent, heard a W9 and two W4's calling him and would like to have some details. XU9KT and XU9MK were working on the same frequency on April 9, at about 19.40 GMT, and he suspects that they may be one and the same station. However, we believe that XU9MK is ex-XU6MK moved from dangerous

Canton to Wuchong, Central China. Another Chinese station very active at present is XU8MY, who can be reached at Box 685, Shanghai. Most of the present active Chinese stations do not appear in the Call Book, possibly because they have altered their calls.

● Shack Photo

We promised to reproduce the photo submitted by Wm. Warner, 56, East Grove Road, St. Leonards, Exeter, and here it is. The neat lay-out



and easy chair should make SW listening a pleasure. We still have some photos in stock for future use, and will let you know when we want more.

● Phone versus CW

N. J. Rutter, 23 Bouverie Avenue, Swindon, Wilts, writes as follows: "So far, I notice that all opinions on the 'phone versus CW controversy have been voiced by advocates of the latter. May I put myself forward as advocating the former? I am, perhaps, too lazy, or have not the will-power, to make myself learn the code, but still I have another reason. To my mind, the very fact that DX is so much easier on CW seems to lower its value. After all distance is only relative, and I consider my reception of VR6AY far better DX than that of a VK." Mr. Rutter is quite sure he heard ZB1A on the HF end of 14 Mc on Nov. 14. Many have written in this vein, writing that they have heard ZB1A, so the following letter from W. Crossland, G5CI, will solve the mystery: "Mr. Cunningham no longer holds the call ZB1A, and G5CI (his old call) was relinquished in November 1935. Only about a dozen QSO's were made under this call, which I now hold. Mr. Cunningham has asked me to keep a 'look out' for this 'pirate' and I shall be pleased to receive any information as to his true whereabouts." G5CI's address is: 13, Queens Road, Tankerton, Whitstable, Kent.

● Reception on other Bands

95 per cent. of our reports are on 14 and 28 Mc. We know that these frequencies are producing the bulk of the DX, but do not forget that there are other amateur bands equally interesting and lively. Reception of DX on, say, 3.5 or 56 Mc, is more difficult and therefore much more noteworthy. Jack Wollacott (BSWL 69), 101, Bravington Road, W.9, would like to see more 7 Mc logs. You will

see his under Calls Heard. T. W. Moss, 22, White Street, Topsham, Devon, informs us that he has a card from W6DDA confirming reception on 75-metre 'phone, at 08.35 GMT on January 14, 1934. Congratulations; this is the first one your Scribe has ever heard of for reception of a W6 'phone on 3.5 Mc; furthermore the receiver used was a home-made 0-V-1. Mr. Moss asks if any listener has received a card from VPD2 at Suva, Fiji? He managed to pull him through on 31.45 metres from "amongst" Jeloy and Zeesen. We owe thanks to Mr. Moss for the information about stamps being sent with reports to VR6AY, which he obtained from the G.P.O., London.

E. W. Vaudin (BSWL 349) of Guernsey, C.I. reports hearing ST2FC in Sudan, but as this appears to be a very new station, details are lacking. Of interest is that known active ST calls are: 6KR, 2CM and 2LR, all in Khartoum. ST6KR has operated transmitters in Egypt, Transjordan and Iraq, while ST2LR is ex-G2LR. F. G. H. Macrea (NRS 271), 11, Brooklands Gardens, Potters Bar, Middlesex, managed to separate the London Regional and National transmitters from the SW bands, and reports some of these mysterious calls to be heard lately. ZA1CC and OX6OA are mentioned. I firmly believe that all ZA calls originate from Italy, where there are no amateur licences issued, Albania being the nearest country to them! No card has ever been received from the many ZA calls heard on the air, but an Italian station has been known to admit that he used a ZA call for some time. Some European amateurs have a very peculiar sense of humour, and in recent years there have been many cases (mostly on CW) of this poor kind of leg-pulling.

● 28 Mc Conditions

E. Hartley, 78, South Royds Street, Tottington, near Bury, Lancs, sends us the most comprehensive day-to-day log of reception on 28 Mc for February and March that we have ever seen. We regret that space does not permit publishing it *in toto*, but his summary will be of interest. February: The first half of the month was not as good as the second, nor did he notice the group effect, but did find that K4's came through when W's were poor or absent, or again W6's would "pop up" for about half an hour and then disappear. On other occasions all districts of U.S.A. were heard at the same time. March: Conditions very good up to the 22nd, after which they became poor. His best catches for the month were VE5RV, HR4AF and YT7MT. He also heard an XE2 and a Russian sounding like UKAH (probably UK5AH.—Ed.) and asks if anyone can enlighten him on their probable calls. An excellent list of 28 Mc calls heard shows what concentration on 28 Mc can produce.

● Scotland

Bill Anderson, 93, High Street, Newburgh, Fifeshire, wants some more Scottish logs, especially from his county; so what about it, Scotland? He finds conditions excellent at present, with S. America well to the fore, being receivable every night. A W6 was heard at the unusual time of 21.00 GMT working a G; we suspect this was W6GRL, who came though at great strength at this time in the South of England during the DX Contest. Almost in answer to Bill's appeal, we find a log from Hugh McKinnon, Drumchastle, by Pitlochry, Perthshire. He can only listen between

9-10.30 p.m., and as a result has only heard common DX, which does not quite qualify him for our new system in the Calls Heard section. But perhaps he will be able to produce for next month some of those Asian and Oceanic signals being received at the time he listens.

● The DX Phone Contest

Those of you who did not know about or were unable to be on during the DX 'Phone Contest sponsored by the A.R.R.L. between March 19-27 missed a grand opportunity of pushing up country totals. Your DX Scribe heard some amazing things, including VS2AK at 21.00 GMT, YV5AK giving numbers to Europeans, XE2BJ working G, and many rare States such as W7BJS (Wyoming), W6GUQ (Arizona) on 28 Mc and W5DWP in New Mexico on 14 Mc. In case there are some who did not appreciate what was happening, an explanation might be of interest. U.S.A. and Canada had to work the rest of the world on any band open to 'phone operation. Each completed contact where a five figure number had been exchanged counted 3 points. The total number of points obtained by each entrant was multiplied by the number of W/VE districts worked per band by that station. The first two figures in the number represented QSA and R, and the last three were the serial number used by the station throughout the contest; therefore a quick contact gave not only the number, but a brief report also. We believe that G6LK of Cranleigh, Surrey, scored the largest number of points for Great Britain. We will give your prior notice of this event next year, as these 9 days produce more 'phone signals per kc than any other similar period during the year.

● Set Listening Periods

G. H. Talbot of 5, Linden Avenue, Kensal Rise, N.W.10, is one of the keenest listeners we know. He is 17 and wants to correspond with someone of his own age using a simple 0-V-1 receiver. He wrote an 11-page letter full of interest, which we should like to publish, but Mr. Editor only allows us a certain amount of room; however, Mr. Talbot and Ronald L. Pattie, 11, Havergal Villas, Green Lanes, N.15, both suggest that we run a listening contest. Well, we may consider this for the future, but for the time being we have another idea. Why not have set listening periods each month, and the best 15 or 20 logs will be accepted for publication, anything heard to be included! This will give really useful comparative data for the whole of the country. Therefore, without more ado, here are some times for you all to listen:

May 7.	21.00-23.00 BST (14 Mc 'phone/CW)
May 8.	06.00-08.00 BST (7 Mc 'phone/CW)
May 8.	10.00-12.00 BST (1.7 Mc 'phone/CW)
May 8.	14.00-20.00 BST (56 Mc 'phone/CW)

Please send your logs to reach us not later than May 12, and separate 'phone from CW. We also want to know if you like this idea?

● Care in Listening

G. W. Barron of 39, Birley Road, Whetstone, N.20, stresses again the necessity of listening with greater care to fading 'phone signals. He cites from the published list of calls heard the following errors. VQ4KPB (for 4KTB), PI2HC (for PY2HC), VS2CQ (for VU2CQ), W6MNR (for W6NNR). I am supposed to cross out anything which looks impossible, but some are missed. Once again, please

do not include in your list any call of which you are not absolutely sure.

L. J. Grange, 11, Grenard Road, Peckham, London, S.E.15, wants to communicate personally with anyone interested in SW listening in his district. There is no local club and he feels lonely. He uses a Ferguson 8v. A.W. receiver. Leslie Morgan, 45, Parkwood Road, Bournemouth, also wishes to meet or correspond with other enthusiasts; he concentrates on Empire reception.

B. J. Roberts, Warblington, Reed Pond Walk, Gidea Park, Essex, reports for the first time. He is 17 and has been listening on the short waves for 18 months, during which time he has received 63 countries on 'phone. He now intends to enlarge his scope by learning CW. That's the way to talk! A 1.7 Mc log appears from him in our Calls Heard list. We could do with lots more of these, by the way. G. F. Keen of Hove has built a 56 Mc receiver and hopes to have something for a list next month! He does not agree with "Another Silent Listener" as he explains that the argument might apply to any hobby, such as "autograph hunting." He has received cards from ZE1JA, IJG, CM2AO, VU2FV, OQ5AE and FR8VX. Bryn Hammond of Abertillery, Mon., has heard, in 1½ months, 24 W5's, 49 W6's, 10 W7's, 24 VK's, 6 K6's, 15 VE4's, 10 VE5's, on 14 Mc 'phone, and W1, 2, 3, 4, 5, 8, 9, VE1, 2, 3, TI on 3.5 Mc 'phone; also XE, LU, CO, FA, CN, VP6 on 7 Mc 'phone. 98 countries to date—all on telephony. He is willing to send lists of "catches" and "QSL's received" to any other interested SWL.

● Ideas

Wm. Warner (see shack photo) suggests we concentrate on 14 Mc during the afternoons, as he has heard many very-weak VK's, W6 and 7's in between louder signals such as KA, XZ, FB8, etc. During peak conditions at this time of the day, he thinks we should get a surprising log. Gordon Birrell, Dundee, has been very busy. Since his last report he has heard: All continents, all VE districts, all U.S.A. Districts, all S. American countries except CP and ZP, and all on a simple 0-V-1! He is full of ideas, some of which should be of interest. Three lead-in wires run from one aerial; one to his den, one to the living room, and one to the bedroom. We could suggest a few other places, and then there would never be the necessity to be off the air at all! An indoor aerial in the attic is used when the weather is stormy to avoid signal swinging and he finds that the signal strength is not greatly reduced with this aerial. His other tip worth noting is to bring different voltage taps from battery or eliminator to 3 or 4 base-board type valveholders; advantages claimed are, (1) easy voltage change without poking about inside the cabinet, (2) rapid meter readings can be taken, (3) easy to couple up other apparatus, such as 10-metre converter, etc. Yes, it is possible to re-magnetize headphones with a battery. Connect the 'phones the right way round, and "flash" one side on 100 volts, on and off for some minutes, and the magnetism should be restored.

Reg. H. Greenland, 39, Kensington Road, Barnsley, Yorks, draw attention to G4FR (Yacht "Valdora") which cruises in the Mediterranean, and was heard in Alexandria Harbour. VP2AB is the new call of VP2CD; HR5C in Honduras is a newcomer and has been received by many on 14,020. Reginald queries ZS2AS as he has not heard a two-letter

ZS2 before. The answer is that all South African amateurs dropped the ZU/ZT series at the end of March, and therefore ZS2AS would have had a ZU or ZT call before that date. We have no news of KA2OV. D. C. Gordon, The Garden House Hotel, Folkestone, draws our attention to the fact that there is another Manchurian station active—MX2C heard working FA; he has also sent a card to MX2A. Therefore we now have: MXTA, B, C, and 5C.

G. W. Barron has no use for CW signals as he finds it impossible to separate them! Our reply to that is to ask him how operators at sea manage on 600-metre spark, which all sounds more or less the same?

Leo. A. Scoggins (BSWL725), Rookery, Framlingham, Suffolk, wants to see each station in Calls Heard set out in full. I'm sorry, Leo, but we simply can't do it; if we did, then many of you would not have your calls listed at all. He replies to "Another Silent Listener" by suggesting that the approximate frequency of the received station be included in the report. We think this would solve the difficulty. He asks why we bother to buy I.R.C.'s at 6d. per time when a stamp dealer will supply us with unused stamps of the country required for 2d.? His last suggestion is always to include (except where CQ is used) the call of the station being worked or called. A good idea!

Ian Bates, 85, Peanfield Road, Perth, is a wee Scot of 14 years, who wants to borrow a Call Book!! Any offers? He thinks that a station would be a "mug" to reply to such a report as "Another Silent Listener" quotes; it would only be necessary to choose any call and send such a report. (See earlier regarding type of reports that are appreciated by the recipients). L. A. Green of Canonbury, N.1, has not had time to send a full list this month, but records hearing CE and all districts of W on 28 Mc. He asks if others noticed the short and long skip obtaining on 14 Mc on Sunday morning, March 20? W1, 2, 3, 4, and GM, EI, GI and North England G's were audible at the same time. (This often happens.—Ed.).

● Calls Heard

Finally, you will notice that the "Calls Heard" section is set up in different style this month—we hope you like it. In case some of you misunderstood our request last month, we suggest that you write out your calls in exactly the same way as you would expect them to be published, with plenty of spacing. Some of you have headed each country list by the name of the country, which is not actually needed. It is not necessary to have a separate sheet of paper for each country. Try and imagine your list going straight to the printers without alteration!

CALLS HEARD

We are publishing this month edited lists of all "Calls Heard" that have been received. In future, however, the lists will be selected to occupy not more than two pages of this space.

W. ANDERSON, 93 High Street, Newburgh, Fifeshire. 1-v-1, home-constructed. 16.2.38-17.3.38.

14 Mc 'phone—VE3XQ. W6AH. GRL. VP9B. CQ2RA. 7VP. YV5ABY. 4AA. HH2B. PY2CK. 3BP. LUIDA. CT2AB. SUICH. KG. RD. VS2AK. F18AC.

H. AXON, 260 St. David's Road North, St. Annes-on-Sea, Lancashire. 1-v-2, home-constructed.

14 Mc 'phone—W5BVH. BNV. 6CAT. COQ. COI. DUW. EWD. FTU. GOL. LYM. NNR. NTX. NZD. 7CHT. VE3 AHN. AI. BV. HY. 4ZK. 50T. YV1AT. 5ABY. AZ. PY1GJ. 3BP. 4BL. LUIDA. HI. HK3LDC. CQ2EG. JJ. RA. RH. WM. WZ. 7VP. 8BC. VP2AB. VK2CU. VV. XU. 3AK. HV. KX. MX. WA. 4EC. K6NZO. OQE. VK2ADE. VR6AY. PK1MX. VS2AK. KALME. ZL. XZ2EZ. ZE1JA. JR. ZS2AS. VQ4KT. SUICH. RD. RH. 2TW.

28 Mc 'phone—W5EHR. DNE. GCE. GKZ. 6GUO. KG. NLS. NTH. 7GLX. VE4AW. GD. NI. SS. VU2CQ. K4SA. EPO. H17G.

GORDON W. BARRON, 39 Birley Road, Whetstone, London, N.20. 4-valve SH. 15.3.38-10.4.38.

14 Mc 'phone—W6AH. AM. APS. BAW. BYF. COL. COS. CBR. COQ. DUW. EJC. EWE. FJU. GRL. GRX. HKO. HFB. (CW). HOW. ITH. IXZ. IKQ. JT. KDC. LYM. LEE. IZ. MLK. MWD. MZD. MLG. NNR. NFX. NPW. NCW. OCH. OHP. PPK. PER. SJ. SZ. 5AKZ. AIJ. ATB. AXU. BMM. BEK. BCU. CXH. DEW. DNV. DQ. DUM. DWP. EHM. EWW. FHJ. FSS. PFF. FIY. FNH. RV. 7AMQ. ALZ. ALY. AFD. AXS. BKO. BVO. CBO. COV. CHT. DHC. EKA. EAV. EYD. FOK. GY (CW). GAE.

VK2AV. AHA. BK. GU. NO. NO. OQ. UY. VV. XU. XV. YL. 3AL. KX. KU. MP. TZ. VP. WA. XI. XD. ZX. 4AP. PY1FR. CK. GJ. UJ. GC. 2LM. BA. KT.

CW. ET. 3BP. 5AQ. AG. 7AI. LC. AG. LUIHI. DA. DJ. 4KA. BL. 5AG. AN. 7AG. 9BV. AY. YV1AP. 4AZ. AA. CE1AH. AR. BE. 2BR. 3CO. K6NZO. OQE. GAS. KGA. KMB. H13N. 4R. T12AV. HP. XE2AH. 3AR. XZ2EZ. F18AC. K7FBE. SU1KG. GP. RK. RD. RH. 2TW. 8MA. VQ4KT. ZS6Q. HK3LDC. CX3BL. CT2AB. BC. VR6AY. VP4GA. 6MY. MR. 9R. L. K4SA. DDH. ENY. FAY. HClJW. VE4AW. DG. OF. SS. ZK. 5JK. OT. ACN. VO. EF. ER. MQ. NY. ABD. VT.

28 Mc 'phone—"Junk" 0-v-1.—W6AGJ. GRL. ITH. LM. NLS. SE. 7BJS. 5EHM. YV5AK. HClJW. K4EZR. H12T. VU2CQ.

IAN A. BATES, 85 Jeanfield Road, Perth. 5-valve SH.

14 Mc 'phone—CQ3WM, 60M. HK3LDC. K4FAY. LUIHI. PY1GJ. VE3EO. TM. VK3TE. W5DNQ. DQ. 6GII. GRL. IGG. LYM. YV1AP.

GORDON BIRRELL, 1 Renny Place, West Ferry, Dundee, Angus, Scotland. 23.2.38-10.4.38. Battery 0-v-1.

14 Mc 'phone—W5AKZ. BOC. CND. DNV. DQ. DVE. EHM. EPL. FDE. FHJ. FSS. YF. 6AH. AM. APS. COI. GRL. IDV. IT. LYM. LYP. NCW. NNR. 7CHT (Oregon). VE3AAD. AAR. ABW. AEX. ACK. ADK. AFD. AGO. AGS. AI. ASD. ATR. BK. FD. GK. GS. HY. JY. MD. NE. NB. OL. YW. ZA. 4DU. SS. UK. ZK. 9AL. AF. AS. BW. K4DDH. EMG. ENY. FAY. SA. VP2AB. AT. 6LN. MR. TR. H1IC. 3N. 4O. 5X. HH2B. X. CQ2LD. EG. HS. JJ. JV. KM. LY. OY. OQ. RA. RH. UG. WM. XX. 7VP. 8BC. VS. VZ. YB. XE1GE. T12AV. FG. HP. K6SRA. VR6AY. HClJW. JW. OQ4M. R. CE1AH. AO. 3AA. HK1CY. GC. JT. P. 3LDC. 4AG. YV1AG. AP. 4AB. ABG. 5AA. AB. ABY. AF. AK. AN. AV. AZ.

PY1AL. BA. CK. ED. EQ. GJ. GR. HJ. MU. UJ. UK. 2BK. BP. BU. CK.

CP. CW. DU. EC. EN. EP. EW. EQ. FK. FU. GC. GU. KE. KT. LM. LU. 3BP. DZ. 4BC. BI. BL. BU. CH. CP. CT. ZV. 5AQ. BJ. 7LC. CX1AA. AH. DD. 2AK. 3BL. LUIAA. CH. DJ. 2BG. CA. DA. 3AU. 4AA. AB. AW. 5AN. 6KE. 7AG. 9FN. PL. Y12BA. VU2CQ. XZ2EZ. VK2ABD. AH. AZ. XU. 3MX. 4HA. ZE1JA. ZS3F. 6AJ. OQ5AA.

A. P. L. CASLING, 6 Ollerbarrow Road, Hale, Cheshire. 0-v-1, home-built.

14 Mc 'phone—CQ2JJ. HR5C. HClJW. VK3KX. YV1AG 5AN, 5AZ.

14 Mc CW—K5AA. U6ST. VK7KR. 5JS. XU8MR. ZS1CX. 6DY.

28 Mc 'phone—HClJW. LU9BV. VE4-ABZ. GD. SS. 5RV. VP5YB. W5GKZ. 6NLS. LEE. YV5AK.

28 Mc CW—K5AN. LU3DH. VU2AN.

17 Mc CW—F3KH. 8AJ. G2HW. 5TO. 6VC. FW. 8TR. OK1BM.

P. L. CHAMBERLAIN, 218 Norbury Crescent, London, S.W.16. 0-SG-Pen.

14 Mc 'phone—CE1AO. CQ2HS. LY. RA. RH. WN. WZ. 5OM. 7VP. 8BC. EO. CX2AJ. AK. AL. F18AC. HC1MM. FG. JW. HH2B. X. H15X. HK2LDP. 3LDC. HR5C. K4EJF. EMG. 6BNR. GAS. NLD. NZO. OQE. LUIDA. PA. 2BC. 5AN. 7AG. 9BV. PY1HJ. 2AC. DU. 4AK. BL. 5AQ. AZ. SUICH. RK. RO. KG. TG2GC. T12NV. AV. HJ. XJ. VE4NI. 5JK. OT. 9BW (Ont.). VK2XU. 3LA. ZL. ZX. ZZ. XJ. KX. VP2AB. 6MR. 9R. VR6AY. W5FTE. AMX. DNV. ECL. EHO. EXN. AKZ. BOC. CXH. EB. FNE. BEK. BCU. 6APN. AH. GCT. LR. BPT. LIM. GIL. ISV. CQS. FAG. AM. MVK. BML. GPT. ISA. NCY. COQ. FZO. MLG. OI. MZD. LYM. LK. MNR. GRL. 7ALZ. AVO. CHT. 9DNP (Durango, Col.). IMT (Col.). EOZ (North Dakota). UJS (Denver, Col.). FUH (Denver, Col.). XE1GK. LK. 3AR. YN1OT. 3DN. YV1ABE. YV5AK. AZ. AA. ABY.

G. DAVENPORT, 81 Springfield Av., Merton Park, London, S.W.20. 4-valve SH. 1.1.38-20.3.38.

14 Mc 'phone-W5FHI, DNV, DVE, 6COQ, COI, AM, MWD, MLG, MZD, NPW, GRA, BYP, VE3VW, BK, ACK, BJ, FB, JV, AXD, AFD, SG, 9BW, ZS6AJ, Q, 1AX, ZEJJA, VQ4CRE, KTB, FR8VX, ST6KR, FB8AH, ZD4AA, VU2CO, CA, VK2U, UY, VV, 3KX, WA, K4DDH, EMG, HH2B, 5PA, CO2RA, JJ, WZ, LY, AY, EG, RC, 8BC, RO, 7VP, AS, T12RC, VP6TR, XE1LK, LUIDA, DJ, JC, HI, 2BG, 3HA, 4BL, AW, EL, 7AG, VP3THE, PY2JC, FF, 3BP, 5AQ, 6AI, YV1AA, AQ, AP, 4AA, 5AZ, AQ, AUY, CE2AM, 3CO, CX2AK, BK. K. A. EDGE, 8 Bloomfield Road, Birmingham, 13. 0-v-1 battery.

28 Mc 'phone-W5ASG, AYH, EHM, EKF, FBC, GKZ, GMR, 6AFIH, GRR, MPS, NLS, H17G, K4DDH, EJG, EZR, SA, PY3BP, T12RC, VE4CY, GD, NI, ZE1JR, ZS6AJ, EF, T.

14 Mc 'phone-W5BOC, CHX, DNV, EAQ, EHM, EBP, FDE, 6COS, DUW, EWE, FTU, GCT, GRL, IDV, KQI, LEE, LYM, MLG, MZD, NNR, NTX, Z, 7DVO, CHT, VE3AEX, AIB, EO, SK, HX, HY, JE, JV, KL, LC, NB, YW, 4AW, 5ABD, JK, OT, VP, 9AL, BW, YV1AP, 4AA, AB, 5AK, AZ, PY2CK, ET, KT, LM, 3BP, 5AQ, BF, LUIEX, 2BG, 3HK, 5AN, 6KE, 7AG, 9BV, PA.

14 Mc 'phone-HK2LC, PY2CK, KB, SUIRK, VS2AK, W5ECL, 6AM, DUW, XZ2EZ, ZS6S.

J. C. FORROW, Welbeck, Worksop, Notts. 0-v-1. 26.2.38-26.3.38.

28 Mc-W5GKZ, JR, EB, 6EJW, HI, T, PDB, NLS, SUICH, H58PJ, JVP, W9XJL (26 Mc).

14 Mc-W5NSA, CSH, 6AM, LUICA, EX, 5AN, PY2ET, CK, LM, VE3QL, VU2CO, PK3VI, KAIME, ZL, SUICH, KG, RD, 2TW.

C. GIBBINS, 59 South Road, Herne Bay, Kent. 1-v-1. 12.2.38-23.3.38.

14 Mc 'phone-W5YF, DEW, 6NBW, BAW, ELL, AS, BRI, GRL, MVK, AH, NCW, BWB, 7FK, VE3KJ, GK, BY, CI, KR, EI, LP, KL, LR, ACK, 4KF, 5TO, EF, VP6TR, VK2GU, VS7MB, 2AK, K4ENY, EJE, XE1GK, LK, XZ2EZ, HH2B, 5O, H14O, 3N, HC1FG, T12AV, YV5ABY, 4AA, CO2RA, OY, JJ, KC, LY, SV, RH, SUIKG, VU2CO.

REGINALD H. GREENLAND, 39 Kensington Road, Barnsley, Yorks. 6-valve superhet. 13.3.38-11.4.38.

14 Mc 'phone-VR6AY, K6KGA, GAS, BNR, NZO, KMB, OQE, 7FBE, AOC, VK2GU, LU, OQ, BO, XU, OB, VV, YW, AHA, ADE, AZ, 3ZX, ZZ, LA, KX, 4VD, VS2AK, KA1BH, 2OV, VU2CO, CA, XZ2EZ, VS7RA, MB, PK1MX, F18AC, ZE1JA, JR, ZS1DR, 2AS,

FXD, GKZ, GSY, 6AGJ, BYB, CKR, DUW, FZL, GUQ, ITH, JRM, KC, KEL, KMG, LUB, MPS, NLS, PNB, PNX, SE, 7BJS, BME, BWH, EGV, EMP, FDL, FLT, GLX, XE2FC, ZS6AJ.

BRYN HAMMOND, "Toronto House," Alexandra Road, Abertillery, Mon. 6v. SH.

14 Mc 'phone-CE1AD, AH, 3AA, CO2BC, ED, HY, HZ, JJ, JV, KC, LY, OK, OY, RA, UP, WM, 6OM, 7VC, VP, 8BC, CT2AB, BC, CX2AK, 3BL, EA9AH, FA3HC, JY, OV, 8ZZ, FB8AH, FT4AN, 8AC, HC1FG, JW, HH2B, H12K, 4O, HK1CA, 3LDC, K4SA, ENY, 6BNR, KGA, NZO, OQE, 7FBE, KA1BH, LUIEX, HI, PA, 2BG, CC, 3AL, HK, 4AW, BL, 5AN, 6KE, 7AG, 9AX, BV, DV, OA4LM, PY1AD, GJ, HJ, 2AC, AK, AT, BJ, CK, DU, ET, FF, FS, HG, LM, LZ, RK, 3BP, 4O, 4BL, 5AQ, SUICH, GP, KC, RD, RH, RB, 2TW, 8NA, TF5C, TG9AA, T12AV, FG, HP, IS, RC, VE3ACK, AER, AFD, AR, BK, BF, BFR, DR, 1V, EI, EO, EZ, FB, GF, GK, HX, MB, NK, QL, QZ, WV, WW, 4AM, AW, BD, CV, DP, ET, HQ, HT, KF, OF, SS, TM, VD, ZF, SACN, BD, BF, EF, ER, MQ, NO, OT, UW, 9AL, AT, BW.

VK2GU, NO, OQ, OX, XU, 3KX, ZX, ZZ, 5AM, VP4GA, 5PZ, 6MR, TR, VR6AY, VS2AK, VU2CO, W5ADX, AMX, AKZ, AXA, ATB, AXF, BJO,

While we are always glad to publish DX logs, as a matter of general interest and for comparative purposes, our space is not elastic! We must therefore request that in future readers should (1) delete all W1-4, W8-9, VE1-2, VO, North African and European calls on 3.5, 7, 14 and 28 Mc; on 1.7 and 56 Mc they are still DX. (2) No logs can be used unless they are written in block letters on one side of separate sheets. (3) Sheets should be headed with the country, and the calls arranged alphabetically in columns under the appropriate number. (4) All log sheets must bear the name and address of the sender, and must reach us on the 13th of the month before the month of issue. (5) Letters to The DX Scribe should be written on separate sheets.

We would particularly welcome more 1.7 and 56 Mc logs, where ALL G CALLS should be included, also logs of C and Empire calls from overseas readers.

CO2FG, JG, JJ, RH, 7VP, 8VZ, VP2AD, 6AN, MR, MY, TR, YC, CE1AH, CT2AB, CX2AK, HC1FG, HH2B, H2LDC, K6BMR, GAS, OQE, 7FBE, OA4R, SUIGP, KG, RH, RK, 2TW, T12AV, ZS6AJ.

S. F. M. EDWARDS, Humbleton, Horntsea, Yorks. "Trophy" Mains 3. March-April.

28 Mc 'phone-W5CXH, BG, EIS, 6GCX, NLS, DUW, GOQ, 7BTS, PY5AQ.

14 Mc 'phone-VP2AB, 6MR, 9M, W6DNY, FFS, VE3FB, CM, JY, 5NW, AM, YV1AP, 5AK, AZ, T12AV, 4EF, LUIDA, W6GRL, PY4BU, 3BX, 2KT, CK, ICI, 2EY, EC, 3BP, 4CT, 8MA, K4ENY, EMG, CO2EG, WM, RH, RA, WZ, LY, JJ, 7VP, 8BC, VQ4KT, CT2AB, EA9AH, ZA1CC, CX2AR, HH2B, X, CE1AA, F18AC, XZ2EZ, VS2AK, VK2CJ, ZE1CJ, ZS3F, 6AJ, H13JA, H15X.

J. C. FLETCHER, 4 Cyril Road, Bexleyheath, Kent. SX16-Superskydriver. 1.3.38-10.4.38.

14 Mc CW-CM2AO, CN1AA, CR7AC, AK, AU, CT2BC, BM, FB8AA, HC1JW, KALAX, SL, K4ESH, 5AF, PK1MF, PY2DI, SUIAZ, DB, CT, HB, MW, TM, WM, 2TW, TF3C, VE3AGT, 4ABP, ADB, AFB, IG, RO, 5BE, YK2ADE, AHL, DI, EO, PX, VA, VN, 3YR, 5FM, JS, 7QZ, VP7NT, VQ2CI, VU2AN, ED, FV, FX, W5EXD, FGB, 6DOB, GCT, KQL, KUT, MCG, NVN, PKA, XU6MK, 8AG, 9KT, MK, Y12BA, ZC6AO, DU, ZE1JC, JJ, ZL1BR, MR, 2BX, SM, 3CT, KX, 4AF, FK, ZN2AA (Ship), ZS1AN, RC, BG, BM, CB, CN, CX, CY, 2G, 3G, 5B, BS, 6CZ, J, W.

6AJ, Q, VQ4KT, FB8AH, CT2AB, BD, CN8AJ, AU, AV, AM, AR, SUIKG, CH, GP, RH, RD, RK, AM, G4FR (Yacht "Valdora" in Alexandra Harbour), LUIHI, DA, 4AW, 5AN, 7AG, BK, 9BV, PA, YV1AP, 4AA, 5AZ, AK, HK3JA, LDC, 4AG, PYICK, MI, GR, GJ, 2CK, DU, KT, 4BL, CP, CT, 5AQ, 6AH, CX2AK, 3BL, HC1JW, OA4C, CE1AH, BE, XE1LK, 3AR, HR5C, T12AV, K4EMG, SA, FAX, ENY, DBH, VP6MR, FO, YB, 2AB, CO2RA, LY, JJ, WM, WZ, OK, 6OM, 7VP, 8BC, HH2B, S, X, H16O, VE3BY, NF, GS, GK, EW, NT, QZ, NP, AIB, AGS, AFD, WM, ZM, 4DM, VD, BD, KF, OF, AW, ZK, IT, 5EF, FG, OT, MO, ACN, NY, 9BW, AL, W5DNY, FDE, BE, EB, EBP, CXH, FTO, FNH, DPW, BOC, AXA, DO, 6GRL, COS, GCT, LR, DPT, LYM, NCW, DI, SJ, PER, YU, BYB, MLG, MZD, FZL, FTU, APS, DUW, ISH, YL, NNR, OM, IJI, MVK, 7AMO, EKA, BME, CHT, AXS, GAE, FOK, FT4AI.

ALEXANDER HALL, 66 Whitworth Crescent, Bitterne Park, Southampton. 1.3.38-10.4.38.

14 Mc 'phone-CO2LY, 7VP, HC1JW, 3LDC, HH2B, K4EMG, 7AOC, FRE, LUIHI, 2BC, PY2CK, ET, LM, BX, 5AQ, VE1SS, 5OT, VP6MO, MR, TR, VQ4KT, W5AXA, BEK, BOC, DNV, DVE, ECL, FSS, JR, 6AM, COS, DUW, FTU, HKO, IDY, IKA, IXJ, MZD, NCW, OI, SZ, 7BWI, EKA, XE1LK, JR, 2JO, XZ2EZ, ZS6AJ.

28 Mc 'phone-CO2WM, H17G, K4EJG, 6MVV, T12FG, RC, VE3AIW, 4ABZ, AW, GD, JV, NI, SS, VU2CO, W5ASG, CFQ, DFS, EB, EEI, EHM, ENZ, FOD,

BMM, BRO, CEB, CIP, CXH, DNV, DNU, DQ, EHM, FIY, FSS, JR (Portable), RZ, 6AH, AM, BAW, BRL, COE, COI, DUW, EHC, EJC, ETH, EWE, EYV, FOH, FTU, FWD, GCT, GRL, GTL, GTS, GTW, GWE, GYA, HLC, HKE, ICP, IMK, ITO, JDO, JP, LY, LYM, LYK, LYP, LEE, MLG, MWD, MZV, NCW, NNR, NPS, OCH, PPK, SWL, SZ, YSH, 7BMD, BTD, COE (Portable), CNU, DZL, EKA, EJA, FMR, 9KYV, DNP, LFN, FUS, WJ, CMF, GGS, XE1AK, CT, HA, HX, GK, GJ, PL, 2FP, JO, 3AR, XZ2EZ, YV1AB, AC, AK, AP, 4AB, 5AA, ABY, AK, AQ, AN, 5AZ, ZE1JA.

7 Mc 'phone-EA4RV, CO2RF, LU5CJ, YN1PR, XE1MA, T12XE.

E. HARTLEY, 78 South Roysds Street, Tottington, Nr. Bury, Lancs. HF Pen-Sig Det-1 LF. 1.3.38-2.4.38.

28 Mc 'phone-VE3AIB, AKY, ANF, DG, KE, LB, OP, 4ABZ, AW, FI, GD, JY, LO, NI, SS, 5RV, K4DDH, EJG, FAX, EZR, SA, H1VG, H1A1F, HC1JW, TG9AA, VP3NV, 6MR, YV, YV5AK, CO2JJ, WM, T12FG, RC, LU2DA, DJ, ET, 3EJ, 4EL, 7AG, 8BR, 9AX, BV, PY3BP, 5AQ, SUICH, 2TW, VU2CO, ZS1C, 2AF, N, 6AA, AJ, CT, DW, EF, S. T. ZE1JA, JR, JZ, W5AGD, AKZ, ALK, BEN, BLP, CCB, DNV, EAW, EB, EEL, EGU, EHM, EKF, ENZ, EPY, FNA, FMO, FRA, FXD, FZY, GGZ, GJS, GKZ, GLW, GMR, GPX, GSY, GUX, JR, ZA, 6AGT, AM, BYB, CAH, CKR, DEP, EJC, ERT, FZL, GBO, GCX, GRL, GRX, GUO, ITH, IWY, KPR, LEV, LLA, LUB, MPS,

NLP, NLS, NOG, OCH, PDB, SE, YU, EMP, FDI., FYO.

14 Mc 'phone-12.38-28.238-CT2AB, BC, ZS1B, 3F, 6AF, AJ, ZT2G, 6J, ZU5Z, ZE1JA, JR, XZ2EZ, DY, VS2AK, VU2CO, LL, FR8VX, VQ4KP, PK2WL, 4AU, KAIHS, ME, ZL, VK2ABD, W6A1, COS, VP6MR, VE3BG.

K. HOLYLAND, Swincliffe Side, Hampsthwaite, Harrogate. Battery 0-v-0.

28 Mc 'phone-W5BEN, BOC, BMM, DUQ, DXY, EBZ, EDY, EHM, EGU, EME, EKF, ESL, FPZ, GQP, JR, 6AK, CKR, CQR, CUU, ERT, GBO, KG, MPS, MWK, NDN, NLS, YZ, LUB, K4DDH, EPO, EJC, EZR, EZY, FAY, SA, 6MVV, T12FG, KC, VU2CO, CO2WM, HCL1W, VE3AFJ, AKY, NH, OD, H17G.

14 Mc 'phone-VE3AER, AFD, AFO, AIC, ANF, BK, GK, IX, JV, MP, NZ, PY, QI, 4AW, OF, ZK, 5BJ, 9AL, AT, W5AX, FLH, NMO, YF, 6AQO, DUW, FJ, LYM, NNR, OCH, ZA, 7AMQ, AXT, XE3AR, T12AV, CO2EG, GL, JJ, KL, LY, KC, WM, 7VP, 8BC, VPIAG, AP, AQ, 3AA, 4AA, AB, 5ABY, ABQ, AK, AN, AZ, PYIGO, 2CK, CP, ET, BC, KT, LM, 4CP, 5AQ, SUIKG, RD, RH, LU2BC, XZ2EZ, DY, VU2CO, VK3NJ, K6OOE, ZS1BV, BW, K, 6AJ, Q, OQ5AA, VQ4KT, ZAICC.

P. JACOBS, 63 Douglas Road, Goodmayes, Essex. 0-v-Pen. March.

14 Mc 'phone-VE3LF, CI, ACK, JV, QI, ABD, NF, GK, KC, MD, PM, 4SS, 9AL, VQ6J, VP2AB, 6TR, W5ECO, 6AM, GRL, LU1BA, GPA, VV4AV, 5AK, AZ, CO2EG, KC, RA, JG, LY, WM, 7VP, CX, HH2X, PYIGJ, 2LM, KF, 4CP, 5AQ, XE1GW, 2BJ, HB, SUI1D, KC, KB, GP, VQ4KT, ZE1JA, VK2ZC, BQ, VR6AY, VS2AK, XZ2EZ, VU2CA, KA1BH, ME, ZL.

RONALD M. JONES, "Silverdale," Irfon Road, Builth Wells, Breconshire. 0-v-1, Home Built.

14 Mc 'phone-CE1AH, 3AA, CO2EJ, JJ, LY, OK, OF, RA, 5EO, CX2AK, FB8AH, F18AC, FT4AN, HCL1W, HH2B, X, 5PA, HK3LDC, K4DDH, FAY, 6BNR, OQE, 7AOC, KALDH, ME, MG, HS, ZL, LU1HI, JC, UA, 2BG, 3HK, 4CZ, KA, 5AN, 6BK, 7AG, 8BR, 9BV, PK1ZZ, PYIGJ, UJ, 2CK, DN, ET, LM, 3BP, 4BU, 5AQ, 7AC, SUIAM, CH, KG, RD, RK, RN, 2TW, VE4EO, SS, 5ACN, JK, MO, OT, VK2HV, OQ, XU, 3KG, GO, VP6MR, YB, 9K, VQ4KT, VR6AY, VS2AK, VU2CO, DR, FV, W5AJC, AOT, AXA, BOC, BEK, CXH, ECE, 6BKY, DUW, FCL, FTU, GRL, GRX, IDU, JYH, LIP, LYM, MVK, MZD, NCW, NNR, OI, OSY, YU, 7AMT, BME, EKA, XE1LK, 2BJ, 3AR, XU8ET, RB, XZ2EZ, VVIAP, 5AK, ZE1JA, ZS2AJ, CT, 6Q.

W. R. JONES, 54 Alma Avenue, Dawley, Salop.

28 Mc CW-VU2CO, ZS1AX, FR8VX, W6BAM, FB8AA.

28 Mc 'phone-ZS1B, AX, 6AJ, ZE1JR, FR8VX, VU2CO, W6NLS, PDB, KG, CKR, GUQ, MPS, 5ZA, JR, H17G.

14 Mc 'phone-XZ2EZ, FR8VX, LU3DH, 8DR, 9BV, VK3WA, 2GU, BV, HV, F18AC, PK4DG, WS, W6BAM, EQR, BYG, 12NF, HR6E, VE3AEX, KL, F, Y12BA, PY2VK, SUIKG, RD, VR6AY, K4DNY, ZS6AJ, VS7RA, VU2CA, KA1BH.

R. E. LEATON, Kettering, Northants. Home Built 0-v-1. 2.3.38-2.4.38.

28 Mc 'phone-W5ASG, BAD, BEN, DNV, DNZ, EB, EHM, EKF, FAH, FOD, FZB, GPX, GKZ, GSY, CHG, 6AF, AGU, CKR, GBO, ITH, LUB, MPS,

NLF, NLS, 7BME, BJS, VE3ALW, SU2TW, ICH, PY2AK, KC, K4EZR, DDH, FAX, T12RC.

14 Mc 'phone-W5AMX, BTU, DNV, EPL, YL, YF, 6IBV, 8AMJ, BK, CNA, DPZ, PVF, GJL, GLY, HEN, LNW, NJP, RL, VE3AER, AFD, AB, AID, BF, JJ, MD, WM, 5EF, CT2AB, CO2WM, JU, 6OM, 7AS, CX2AK, FT4AN, AI, NY2AE, LU5AN, SUIRH, KG, VP6LN, TR, MO, PL, PY1KG, 5AQ, VQ4KT, VU2CA, VK4VD, YR5AA, VV, AK, HH2VR, PYIGJ, XU8ET, XZ2EZ.

M. D. LIPSCOMBE, 83 Stafford Road, Scaford, Sussex. 0-v-1. 5.3.38-15.3.38.

28 Mc 'phone-W5ED, JR (portable), 61PDB.

14 Mc 'phone-KA1BH, SUIKG, RII, RD, 2TW, VE3VO.

H. LISTER, BSWL, 579, 19 New Street, Pocklington, York. Home constructed 0-v-2.

28 Mc 'phone-20.3.38-10.4.38-W5BOC, FZB, 6FZL, OCH, MPS, 7BJS, DHV, EMP, K6MVV, VE3AKY, H12I.

14 Mc 'phone-12.3.38-12.4.38-VV1AP, 4AA, 5AE, CO2JJ, WM, 7CX, CX2AK, LU2BC, VP9R, XZ2EZ.

F. G. LLOYD, Gerault, Sychnant Pass Road, Conway. 1-v-2. 14.3.38-12.4.38.

VE3ACK, AER, AFD, AR, EL, FB, GK, HN, JV, KL, MD, TG, VK, YY, CO2AL, AM, AY, EG, HS, HY, JJ, LY, WM, KY, 7AM, BY, CX, YF, 8BC, VZ, VC, YB, CM2EG, SUIAM, CH, DP, GP, KG, MP, RD, RH, 2TW, VVIAP, AQ, 4AA, AT, 5AA, AB, AG, ABY, AK, AZ, CT2AB, W5DNY, PY4CP, CK, 5AT, VU5CA, CO, LL, LU1EX, DA, VK2HV, K4EMG, F18AC, XZ2EZ, OQ4R, T12AV, HC1SG, HH2F, YN1OP, VP6MR, ZE1JR.

F. G. H. MACRAE, 11 Brooklands Gardens, Potters Bar, Middlesex. (N.R.S. 271).

14 Mc 'phone-VS7RA, VU2CA, CO, EY, XZ2EZ, VQ4KT, ZE1JA, ZS6Q, OX60A (CW), VK2HV, K4SA, EMG, VP2AB, 6TR, YB, VE3AYL, MZ, FB, GK, PM, HY, AMD, XO, 4SS, HK3LDC, YV4AA, 5AK, AZ, PY1CG, 2ET, AC, 4BL, LU1EX, W6FZ, AQS.

R. DUDLEY MONTAGUE, 155 Windsor Road, Ilford, Essex. 0-v-Pen.

14 Mc 'phone-CE1AO, CO2JJ, JY, KC, RC, WM, 5EO, 7AS, 8YB, HH2B, X, HK3LDC, KAIZL, LU7AG, 9PA, PY2CK, FF, SUIAM, KG, RD, SG, T12AV, RC, VE3AEI, BK, FB, KL, NF, 4NI, VK3NP, ZX, VP2AB, W5BEK, BOC, BMM, ECL, EHM, 6AM, ITH, OO, SY, VVIAP, 4AA, AB, 5AB, AK, AZ.

LESLIE J. J. MORGAN, 45 Parkwood Road, Bournemouth, Hants. Hallcrafters "Sky Chief" SH. 22.3.38-11.4.38.

14 Mc 'phone-CO2LY, SH, WM, 6OM, 7CX, 8EC, CX3BL, 4AK, FB8AH, FT4AR, HK3LDC, LU1DA, EC, 2BD, 7AG, BK, OQ4R, PY1GJ, GU, 2CK, LM, 4CT, 5AQ, SUIAM, CH, KG, RD, RH, RK, WM, VE3GK, VR6AY, W6GRI, XE3AR, XZ2EZ, YV5AK, AZ, ZE1JR.

T. W. MOSS, 22 White Street, Topsham, Exeter, Devon. 0-v-2, home made.

14 Mc 'phone-CE1AR, AH, AO, BE, 3AJ, CK2AK, FB8AF, HCL1W, HK3LDC, 4AG, KAIMS, HF, BH, BS, OA4AN, PK1MX, 2WL, T12AV, VP2BC, 4DD, VQ4KT, VE1KE, VK2AHA, AQ, BK, NO, OQ, VV, YW, 3KX, PH, WZ, XD, ZL, ZZ, 4QR, 5WD, VR6AY, K4EMG, SA, W6AH, BAW, CC, COI, COS, FJ, GRL, LYM, LYP, MXD, NKW, OBE, PER, RF, SZ, K6GAS, BNR, KDV, KEF,

KRG, NZQ, W7ALY, K7FBE, W9DNI (Col.), FUH (Col.), UJS (Col.), YDC (Neb.), XE1GK, LK, 2BJ, BO, FC, XZ2EM, EZ, LU1DA, HI, 3HK, 4AW, 5AN, 8DR, 9AX, BV, SUIAM, RD, WM, GP, KG, CH, VU2CO, PY1GJ, 2AC, AK, LM, 4CK, 5AQ, YR5AA, AW, AZ, CF, PC, YV1AP, 5ABY, AK, AN.

G. W. OSBORNE, 5 Hurst Street, Oxford. AC 12 SH. 15.2.38-15.3.38.

W5ARA, BJO, FHJ, DEW, 6AH, COI, COS, 9DNP (Colorado), K4EJF, ENY, 7FBE, VK2VY, AHA, SX, XU, GU, 3TU, KS, KX, MP, WA, ZS1AX, 3F, 6AJ, ZE1JA, CO2BC, JV, EG, LY, 5EO, 6OM, 7VP, 8YB, FT4AN, AI, YV4AA, 5AG, ABY, AC, AZ, SUIKG, GP, PY2CK, 4BL, LU1DI, L, AW, XE1LK, GJ, T12H, HH2B, PB, CE1AH, KA1BH, VR6A, XZ2EZ.

ALAN OWEN (BRS 3209), Cartref, 3 Cawdor Road, Inverness.

28 Mc-VU2CO, K4EJG, CO2WM, W5CCB.

14 Mc-VU2CO, SUI5G, VS2AK, K7FBE, PK1KR, MX, VK2BQ, GU, NO, XU, 3KX, MX, 4JU, CO2JJ, HK5AR, F18AC, FR8VX, VVIAP, 4AA, ZB1L, VR6A, VO6D, FB8AF, W5DNY, 61TH.

LINDSAY G. PAIRMAN (2DKF), Ailsa View, Mary Street, Dunoon, Scotland.

'Phone and CW-CO2AJ, JJ, JL, JV, WM, 7VP, 8YB, CE2AJ, CT2AB, CX2AX, F18AC, HH2B, J2KG, K4EMG, EZR, SA (80), 5AC, AF, AH, LU1D, JC, 3EV, 5AN, 7AG, 9BY, PY1GJ, 2AC, AG, DC, ET, KX, LM, 5AG, 2FK, SUICH, KG, MW, TM, VE1GA, VK3VJ, VY5AK, ZE1H, ZS1AH, 6AJ (10), AM, DM, K, W6NAM, AMG, 7CVD, GDW.

F. E. PANNETT, 207 High Street, Lewes, Sussex. 0-v-1. 5.3.38-5.4.38.

14 Mc 'phone-W5AXU, BEK, BJO, BNE, BOC, BWB, DEW, DNV, EHM, VF, 6AN, APS, BAW, COI, DAW, DUW, FPC, HB, LYM, MLC, MNR, MWD, MZD, SJ, 7AMQ, AST, BJS, LU1HI, 5AN, VVIAP, XU8BR, XZ2EZ, ZE1JA, VE2AYL, EO, 4BF, SS, 5OT, K6BNR, NZQ, SUIAM, CH, GP, KG, RP, RK, 8MA.

P. PEMBERTON, 69 Langham Road, Wimbledon, S.W.20. 1-valve home-constructed battery. 31.3.38-10.4.38.

28 Mc 'phone-W1 (17), 2 (21), 3 (23), 4 (20), 5ASG, GAE, 6API, DEP, ERT, FAG, GRL, MPS, NLS, OJK, PDB, SE, 7AQO, BJS, W8 (25), 9 (12), H17G, K4EPO, 6MVV, SUICH, ZS6AJ.

28 Mc CW-W1 (17), 2 (18), 3 (9), 4 (8), 5AKZ, CTU, FTA, GMR, KC, 6ADP, AM, ANN, PVL, EMI, FZA, KLU, NLI, NRW, CYS, QC, 7AFS, BJS, BKF, BRU, CSW, EHR, ESN, GLH, W8 (29), 9 (16), CT2BC, FB8AA, K5AN, LU7AZ, PY1AZ, VE3AFV, ATW, 4SH, 5FU, HR, VP2AT, VU2FV, W6BOY (Ship), ZB1J, K, ZS2J, W2COB (Ship).

RAYMOND H. POUNDER, 36 Hythe Road, Thornton Heath, Surrey. 0-v-1.

14 Mc 'phone and CW-K7FBE, LU1EA, DA, 3DH, VK2ADE, A1B, KZ, YU, 3XD, PY1GO, 2LM, 5AQ, XZ2EZ, CE3AA, K6NZQ, ZL2FA, 3AJ, K4ENY, EZR, W5GKZ, 6COQ, LEE.

FRANK RABONE, 83 Farquhar Road, Edgbaston, Birmingham, 15. 29.3.38-11.4.38.

CO2JJ, OK, RH, SH, WM, 8VZ, CX2AK, 3BL, FB8AF, AH, HCL1W, HH2H, HK1DG, 3LDC, J5CC, K6BNR, GAS, KMB, MXM, NZQ, OQE, 7AOC, LU1HI, 7AG, 9PA, PY1EA, GJ, 2AM, CK, 4AW, CH, 5BJ, VE1AEF, KX, OF, 5ACN, CR, JK, MO, VK2AHA, BK, HV,

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OQ, VV, XU, 3KX, AL, VP6LN, MR, VR6AY, VU2CO, W6AH, AM, BKY, BYB, APS, COQ, DUW, EWE, GCT, GRL, INO, LEE, LYM, MLC, MZD, NCW, NNR, PER, PPK, SJ, SZ, 7BAE, ALZ, AMO, CHT, DHC, XEIDC, 2FC, 3AR, XZ2CZ, YV6AN, LZ, ABY, ZE1JA, Z55CL.

B. J. ROBERTS, Warlington, Reed Pond Walk, Gidea Park, Essex. 0-v-Pen.

14 Mc 'phone—VE3AAR, AOD, AE, EO, FB, GK, HK, HY, ME, NF, TH, 4ZU, SS, 5PB (Portable), AM, EF, W5HCU, BEK, BJO, BOC, DEW, EHM, FDE, FNH, GLU, 6APS, BA, BAW, CDY, CTI, DWW, ELR, GCP, GRR, GTL, QOD, ITH, LEE, LYL, MHB, MWD, NNR, PPK, 7COE, FB, 9DNP, GHY (both Colorado). OQ5AA, EA9AH, CT2BC, Z56AJ, Q, ZT1J, VQ4KTB, PY2LM, LUIHI, HK3LC, XE1LC, GA, 2BJ, YV1AP, CO21J, WM, 15AY, VU2CO, VZ2XU, 3ZZ, VR6AY.

1.7 Mc 'phone—G2CD, DQ, KT, PX, TN, WG, XP, 3CO, 51L, NC, RD, YL, MM, 6CT, GR, HG, IF, KB, KV, NN, NU, OR, SG, SQ, 8AB, BR, DS, SK, TL, NV, SK, WV.

FRANK J. RUTTER, "Merivale," 324 Wigan Road, Standish, Wigan. S.S.S. Receiver. 1.3.38-6.4.38.

14 Mc 'phone—W6AH, NZJ, AOD, COI, IDV, MVK, AM, DLL, SZ, MLF, 7FP, PY1CN, HL, GJ, MU, 2JET, CK, EY, ES, DC, KP, AG, 3BP, CP, 4RU, 5AG, CO2EG, RC, WM, JJ, RH, LY, 5ED, 8VZ, BC, MA, T12HP, AV, FG, RC, VK2GU, 3WE, BZ, WA, ZX, ZZ, KX, VE3BE, 3XT, AER, JV, YV, QL, JW, FB, 5OT, YV1AQ, AP, 2AR, 4AB, 5ABY, AK, AZ, H11C, 3N, 4F, 7G, 9I, VP6MR, 9L.

28 Mc 'phone—W5CKZ, 6NKC, NL, ERT, IKQ, 7AK, H17G, VU2CO.

14 Mc 'phone, miscellaneous—K4DDS, VR6AY, XZ2EZ, HK1GC, SU1KG, CT2AB, VP6MR, HK1JC, 3LDC, IJ, LUIHI, SU1CH, CE1AH, HH4AS, LK1U, K65V.

N. J. RUTTER, 23 Bouverie Avenue, Swindon, Wilts. 0-v-2 (pen's). 28.2.38-27.3.38.

14 Mc 'phone—CT2AB, BC, BD, TF5C, SU1GP, SG, FB8AF, FR8VX, ZE1JA, VE3AA, AER, AEX, APD, BV, GK, HX, JP, JV, KF, KJ, NH, QL, YW, YV, 5EF, 9AL, W5BEK, BOC, CXH, DNV, ECL, EWV, FNH, YF, 6AM, AK, EQI, FTU, GRL, 9FUH (Denver), XE1GK, CO2EG, JG, LY, RA, 7VP, 8VZ, HCLJW, HH2X, H11C, 9I, HR5C, K4ENY, SA, PY1EB, GJ, 2AC, CK, EW, FK, GC, HF, JC, KC, LM, LU, ZO, 3EN, 4CH, CP, 5AQ, AT, VP6MO, TR, YB, T12AV, AZ, YV1AA, AP, 4AA, AB, 5ABY, AK, AZ, LU2AQ, BG, 3AQ, AK, 5AN, 8JF, 9AX, BV, 12NF, K4IMG, VS2AK, XU8RE, XZ2EZ, K6OOE, VK2ADR, GU, OR, VB, XU, 3DH, IW, KX, MR, TZ, WA, XD, XJ, VR6AY.

L. A. SCOGGINS, Rookery, Framlingham, Suffolk. Eddystone "Everyman 4." (HF-Det-2 LF).

14 Mc 'phone—H13N, 5N, 6O, LUIEX, HC, YV1AA, AK, AP, 5AZ, CO2RC, RH, RY, XE1GK, HH2B, VP6MO, TR, YB, T12AV, W5AMX, BEK, BOC, DNV, GOU, 6COI, VE4SS, 3GK, WV, YV, SU1AM, KG, RD, RG, RO, VU2CO, VR6AY, ZE1JA.

I. W. K. SMITH, 264 Malden Road, New Malden, Surrey. 1-v-1. 9.3.38-3.4.38.

14 Mc 'phone—CO2HY, UG, KC, LY, EG, JJ, WM, 5DO, 7VP, CX, CT2AB, HC3JW, HH2B, X, 5PA, HK3LDC, K4EMG, ENY, SA, KA1BH, LU5AN, 7AG, PY1GS, 2KP, CK, 3KS, SU1KG, SD, RD, GB, RH, KP, CH, GP, T12AV, AZ, VE3FP, QL, APD, GK, KL, CR, BY, BK, JV, NB, OI, AEX, ACK, MF, XT, KM, WV, ZL, JD, 9AF, AL, AW,

VK3NP, VP2AB, 9R, VQ4KTB, VR6AY, VS2AK, W5FSS, DEW, YS, ECL, EHM, HAV, BJO, BOC, 6LMG, BAW, ITH, IDV, IDV, MZD, HX, GRL, LYM, COQ, XE2BJ, YN3DG, YV1AP, 4AA, 5ABZ, AZ, AC, AK, AQ, ABI, AV, ABY.

N. STEVENS, 59 College Road, Kensal Rise, London, N.W.10. 1.3.38-31.3.38.

14 Mc 'phone and CW—W1 (63), W2 (64), W3 (58), W4 (30), W5AKZ, YU, DAN, YS, GIB, EPB, BTC, DUK, EHM, HOC, BEK, BJO, GP, MZD, NEN, ATO, AM, NNR, COI, MZD, NCW, TTL, GRL, OB, LYM, COQ, FZL, IDV, SZ, LFD, OI, MZG, 7DNB, AMO, CHP, W8 (58), W9 (31), VE3BK, GK, AP, FB, IX, QL, JV, VK, HB, TC, ACK, AFU, AAZ, AEX, 4LX, 5EF, BF, OT, ACM, CO2EG, LY, RA, JJ, WM, JG, 6OM, 7VP, 8VZ, MA, BC, LUIEX, DA, 2CA, BG, 5AN, 7AG, 9BV, YV1AP, AQ, 4AA, AB, 5AC, AF, AK, AZ, ABE, AN, PY1EW, JG, 2UL, CK, FF, LM, ET, AZ, KT, 3BT, 4CP, T12AV, OA4AL, XE2BJ, YN1OP, HH2B, X, HR5C, CE1BE, VP2AG, 6MR, TR, K4IME, BH, HF, ZL, K4EMG, 6OOE, NZQ, GAS, KAG, 7FBE, G4FR, YL2SK, YR5AA, CF, DD, ML, WM, KW, SU1RD, RO, WM, CH, KG, RH, 2TW, CT2AB, BC, YT7MT, TF3P, 5C, U6SE, 9MI, VK2AP, XU, GU, ADE, CP, 3MR, ZL, ZX, BZ, KX, VU2CO, VS2AK, 7MB, VQ4KTB, ZE1JA, JR, ZS1B, AX, 2AF, 6AJ, AY, ZT1M, OQ5AA, PK1MX, ZZ, FR8VX, FB8AD, AH, F18AC, XZ2EZ, XU8RB.

H. SUGDEN, 15 Arcliffe Terrace, Legrams Lane, Bradford. 5-valve SH. 13.3.38-9.4.38.

14 Mc 'phone—CO21J, JV, KL, LY, RH, SH, 7CX, VP, 8BC, MA, VS, YB, CE2CO, 3AA, CT2AB, CX1AA, 3BL, FB8AH, HC1FG, JW, H16O, 7G, HK4AG, HR5C, K4DDH, ENY, 6BNR, OQE, LUIEX, HI, 3BAC, HK, 5AN, 7BK, 9AX, BV, OA4R, PY1EA, GJ, HJ, MU, 2AC, AK, EF, FF, GC, 3BP, 4BL, 5AQ, T12AV, RC, 3AV, VE3ACK, AER, AHA, BY, FB, GK, HK, IX, JE, JV, KL, XO, YL, YV, 4AES, AW, BD, KX, OF, 5ACN, ADG, EF, JK, OT, 9AL, BW, VK2BK, NO, OO, QR, VV, XU, 3KX, ZX, ZZ, VP2AB, 6LN, YB, VQ4KTB, VR6AY, VU2CA, W5AKZ, AMX, BEK, BCU, BJO, CXH, DEW, DNV, DQ, DVE, EBP, ECL, EHM, FNH, FMO, FSS, YF, 6BYB, CLS, COQ, COI, DL, DUW, EJC, FCL, GCT, GRL, HX, IKO, ISH, ITH, LAK, LEE, LYM, MCT, MZD, NLR, NTX, OI, SJ, SZ, 7ALZ, AMO, BZO, CHT, XE1GK, LK, 2FC, 3AR, YV1AP, 4AA, AB, 5AA, AK, AV, AZ, ABY, ZA1CC, ZS2AF, 6AJ, Q.

G. H. TALBOT, 5 Linden Avenue, Kensal Rise, London, N.W.10. 0-v-1. 1.2.38-28.2.38.

14 Mc 'phone—SU1CH, KG, RD, CT2BC, CO2EG, 8EC, LU4AW, PY4BL, K4IME, ZE1JA.

29.3.38-11.4.38—0-v-1—W5BNO, BOC, 6APS, LYM, NNR, YU, VE5OT, CO2CC, JG, WM, 8VZ, K4DDH, VP2AB, YV1AP, AQ, 5AA, ABY, AK, AZ, PY1GJ, 2CK.

OA4R, CE1AO, CX2AK, LU2BG, 4HK, 9PA, VR6AY, NY2AE, SU1AM, KG, RO.

V. H. THOMAS (2CUR), 59 Somerset Square, Aldershot, Hants. Eddystone "Everyman Four." 13.3.38-12.4.38.

14 Mc 'phone—W5GDX, 6QL, VS2AK, 7KA, VK3NP, RK, XV, SU1CH, KG, SG, KR, 5NK, CO2HY, WM, 6OM, MS, H14I, 6O, 7G, PY2EJ, YV5CA, 1AG, VE3ANJ, LL, YV, 41W, 51W, LUIUA, QO, CA, 7AG, 8BR, VU2CO, K4IME.

CONRAD G. TILLY, 95 Chesterfield Road, Bristol, 6. SG-v-2. 14.3.38-10.4.38.

14 Mc 'phone—YV1AP, AA, AQ, 4AF, 5AK, AZ, AB, AN, ABY, AM, W5DNV, BCL, ABQ, 6AM, COI, LYS, MZD, NZW, GRL, DUW, 7AXS, VP6MR, TR, Z56AJ, Q, 3F, VQ4KTB, ZE1JA, SU1CH, RD, KG, CP, WM, RH, KB, AM, OA4P, CO21J, LY, EG, AG, KC, WM, NA, SP, OK, 5EO, 7VP, CX, 8VZ, BC, EC, VE3AF, MD, GK, AAZ, XQ, BV, PY1GO, GJ, CK, 2CK, ET, DU, LM, FF, KT, GC, RC, 3BP, 4BL, CP, 5AQ, CX1AH, 2AK, HH2B, X, HK1GC, JC, 3LDC, 4AG, H15X, 6O, T12RC, KP, AF, K7AOC, VP9R, LUIDA, IX, EKE, JC, 2BC, 3AQ, 4CZ, AW, 5AN, 6KE, 7AG, 8BR, K4ENY, FAY, CE3BG, HC1FG, EA9AH.

R. F. WIBBERLEY, "Hazels," Tuesley Lane, Godalming, Surrey. 14.2.38-13.3.38.

14 Mc 'phone—W1 (26), W2 (21), W3 (27), W4 (16), W5DOV, FMS, BJH, GST, 6AQD, LKN, 7EPV, BGW, FON, EYD, DTE, W8 (15), W9 (8), VE9BW, 3BG, VK3ZZ, AZ, MR, 4DB, JU, 2FG, VL, CO7VP, 2LY, JJ, RD, YV1AG, 4AV, ZT1R, H17G.

JACK WILSON, 2 Harrison Road, Oulton Broad, Lowestoft. 0-v-2. 6.3.38-31.3.38.

28 Mc 'phone—W5BMM, CMR, EFY, EKS, EHM, FMO, FXT, GSY, PJ, TW, ZA, 6CKR, NLS, PDB, VE3AN, LB, ZR, 4NI, H17G, Z56AJ, T, VP3NV, K4EJG, SA.

14 Mc 'phone—W6AH, ATS, GRL, LYM, MGR, NTW, 7AMO, CO5BO, EO, 8VC, K6MZQ, OQE, VP6AN, MR, TR, XE1GK, LK, VE5ACN, ABD, EF, JG, JK, MQ, TA, H11PG, HK1AL, JC, YV1AQ, AP, 5AK, AZ, LU2BG, 4KA, 5EN, 7AG, 9AX, CE3CO, CX2AK, HC3JW, VK2GU, LQ, VV, 3BN, BU, KX, LA, MX, ZX.

JACK WOLLACOTT, 101 Bravington Road, London, W.9. 0-v-2.

14 Mc CW—VK2KZ, DA, AD, TD, 3OK, XU, ZR, NS, XN, CB, 5WK, JS, 7OZ, ZL4FB, EG, BR, RB, FV, FK, VU2AN, DR, HK5D, CM2AO, K5AF, W5CDC, PJ, RH, 6BUO, KUT, MCG, MT, GK, ONQ, BAU, KP, FRB, AG, HJT, QFC, AM, DOB, PFI, CMK, OUC, CEI, OFC, 7BSJ, JS, DXZ, EOI, DGN, VE5AEO.

7 Mc CW—W1, 2, 3, 4, 5FBH, 8 and 9, LU5AN, PY4BS, 5V6SP, PY2HH.

14 Mc 'phone—K6NCW, W6MLV, LEE, FZL, GRL, AM, VK2XU, VR6AY.

READERS' 6d. ADVERTISEMENTS

RULES:—

- 1 Advertisements must be accompanied by 6d. in stamps or P.O. made payable to "The Short-Wave Magazine" and crossed.
- 2 A maximum of four lines only will be allowed, or about 28 words including name and address.
- 3 Trade and Box Number advertisements cannot be accepted.
- 4 We reserve the right to refuse any advertisement.
- 5 We cannot act as an intermediary for an advertiser in this section.
- 6 Advertisements must reach this office not later than the 15th of the month preceding the month of issue.

SEE PAGE 35.

CLUB ACTIVITIES

CITY OF BELFAST Y.M.C.A. Radio Club

Secretary: FRANK A. ROBB (G16TK),
60, Victoria Avenue, Sydenham, Belfast, N.I.

Membership has increased by over 25; there are now 16 transmitting members and 13 AA licences besides a number of B.R.S. and B.S.W.L.'s. The fine club room has both AC and DC 220V mains, enabling members to test any type of mains apparatus. It is hoped to erect a new aerial for the transmitter, probably a 133 ft. end-fed Hertz or a 20-metre Johnson "Q." At present the transmitter is operated on 20 and 40 metres but is hoped to be on 28 Mc soon. Morse instruction is held on Monday, Wednesday and Thursday nights, also Saturday afternoons.

Meetings are held on the 3rd Wednesday of the month and club night is every Wednesday. All members are supplied with a key to the club which is open to Y.M.C.A. association members and the subscription is 5s. per year for those over 18, under 18 3s. 6d.

BRIGHTON Branch: World Friendship Society of Radio Amateurs

Secretary: F. R. JUPP, 12, Brading Road,
Brighton, 7.

The following programme has been arranged for May:—13th, Demonstration by Messrs. Lissen, Ltd.; 27th, Junk Sale. The March 18th meeting at 2, Cheapside, London Road, was the best attended since formation; a letter of encouragement was received from Mr. Duane Magill (W9DQD) with interest. The usual half hour's CW was followed by a demonstration of members' home-made receivers; one was a super-regenerative receiver on which the television signals from Alexandra Palace were received. At the meeting held on April 1 a well-known commercial all-wave receiver was demonstrated, also a two-valve portable constructed by a member.

CHADWELL HEATH & District Amateur Radio Society

Secretary: R. C. E. BEARDOW (G3FT), 3, Geneva Gardens, Chadwell Heath, Essex.

During April, Messrs. Belling Lee gave a successful lecture on the suppression of interference, demonstrating with a receiver, oscilloscope, and two fans. Mr. Cholot of Messrs. Lissen demonstrated an all-wave mains receiver and a battery SW superhet, and gave a talk on components. A news sheet is in the making which it is hoped to publish shortly. 2DBT is experimenting with a transmitter he has just built; G5KA has a new Tx which can be heard testing on 40 metres; G3CQ is now on 160 metres and is testing a W3EPD on 40 m.; G3FT is testing various systems of linking the aerial coil and the PA; G6ID, G8TV, G8PP, G8PI are active. H.Q.: Ralph's Cafe, Trolley Bus Terminus, Chadwell Heath.

DAVENTRY Short-Wave Radio Club

Secretary: L. W. BAZELY, 66, Warwick Street,
Daventry, Northants.

The first lecture was held on March 25, the subject being "Aerials and Aerial Design," which was

ably dealt with by Mr. A. Robbins. It has been decided to carry out the following programme during the summer and lectures have been arranged in the following order:—Measurements in Radio Apparatus, Old and New Loudspeakers, Thrills of Short-Wave Listening, Quality and Inferior Receivers, The Beginning of Wireless. Visits to local clubs are being arranged.

Rules and information of a DX contest can be had from the secretary. Morse classes under the direction of Mr. J. Ballard and Mr. W. Turner are a regular feature. Headphones are being collected for the Northampton Hospital; any residents in Daventry and district who have headphones hidden away are asked to help. New members are required, and all interested readers are cordially invited to attend the meetings at the Methodist Hall on Friday evenings at 7.30 p.m., or write or call on the Secretary, between 5 and 7 p.m. any evening.

EALING and District Short-Wave Club

At the general meeting on Wednesday, March 30, Mr. W. Colclough (2CKL) tendered his resignation as secretary. H.Q.: 31, Lancaster Gardens, Ealing, W.13 (until further notice).

EASTBOURNE and District Radio Society

Secretary: J. P. GLICKMAN, Kersal, Brodrick Road, Hampden Park, Eastbourne.

Two members, G3CX and 2AVQ, brought transmitters (TPTG and TNT respectively) to a recent Monday meeting held in the Science Room, Cavendish Senior School, at 8 p.m. They demonstrated how oscillation could be indicated.

EDGWARE Short-Wave Society

Secretary: F. BELL, 118, Colin Crescent, Colindale, N.W.9.

Mr. L. Gregory of G2AI recently gave a lecture on transmitting aerials for DX. This was followed by an enthusiastic discussion. A special general meeting was called before the lecture, when Mr. F. Bell consented to take over the secretarial duties. Will prospective members write direct to the above address or attend the Conservative Club, Edgware at 8 o'clock any Wednesday evening or from 11 a.m. to 1 p.m. any Sunday. Mr. R. Newland was also elected to the Committee and has accepted the position of librarian.

EXETER & District Wireless Society

Secretary: W. CHING, 9, Sivell Place, Heavitree, Exeter.

The past month's activities include a lecture on "Industrial Rectification" by Mr. W. S. Pyrah, who illustrated his talk with excellent slides and a "movie" of the B.C.C. Works showing the actual manufacture of some of the large rectifying valves described. Mr. Pyrah gave a description of modern power transmission and at question time many varied points were raised and answered.

March 28 saw a new departure when Mr. H. A. Bartlett conducted a talk entitled "Questions and Answers." The questions were chosen from a recent examination paper set by the New Zealand Government for intending amateur transmitters and

answers were given by members. The large attendance was unanimous in its request for a similar event.

On April 4 Mr. H. Ridge gave a talk on "Telegraphs, Wire and Wireless." The speaker illustrated his lecture by many excellent slides and fully described modern methods of communication by land line. Early types of instruments used were illustrated and discussed and the speaker took his audience right through the early days of sounders to the present high-speed teleprinter machines.

Mr. Rich of the Mullard Wireless Company lectured on April 11 on "Measuring Instruments." He had many types with him for demonstration including cathode ray oscilloscopes, frequency modulators and also a measuring bridge. Mr. Rich showed how these pieces of apparatus could be brought into good use by any enthusiastic experimenter. Meetings are held each Monday at No. 3, Dix's Field, Exeter.

HALIFAX Experimental Radio Society

Secretary: J. S. KILPATRICK (G5QS), Lynn Cottage, Lightcliffe, Yorks.

A visit was paid by members to the Bradford Society on March 29 to hear Mr. Voigt lecture on "Loudspeaker Design." All members are active: 2ABC and 2DGK are doing Army radio work whilst G5QS and G5DF are carrying out tests on 56 Mc, using a portable transmitter and receiver in a car to maintain contact with a fixed station at 5QS. Active stations include G5DF, 5QS, 8CB, 8GM, 2ABC, 2BHI, 2AKO, 2CKH, 2CYM, and 2DGK. Meetings are held in the Halifax Friendly and Trade Societies' Club (Room 15) every Wednesday evening at 7.30 p.m.

LONDON Transmitting Society

Secretary: G. YALE, 40, Raeburn Road, Edgware.

At a meeting held on April 10 it was decided to accept the offer of the Golders Green Radio Society to co-operate in their 40-metre field day on May 1. Further progress has been made on the new transmitter and a communication receiver is being built. 2CXU was welcomed as a new member.

All members must produce transmitting licences on joining, but membership is free; badges and fixture cards are supplied. Please enclose a stamp for reply to the secretary.

MAIDSTONE Amateur Radio Society

Secretary: P. M. S. HEDGELAND (2DBA), "Hill View," 8, Hayle Road, Maidstone, Kent.

On March 2 Mr. Parr of the Ediswan Co. gave a lecture and demonstration entitled "The Cathode Ray Tube and Its Applications," during which he explained some of the numerous uses to which the tube may be put. In conclusion, Mr. Parr showed a colour film of the process of valve-making in the Mazda factories.

Mr. O. P. Lowther on April 5 demonstrated the Voigt Domestic Corner Reflector Type Loudspeaker, used in conjunction with a tuning unit and high quality 5-watt amplifier from the Lowther Manufacturing Co.'s range. A general meeting will be held on May 10 to decide the summer programme.

Western Valley (MONMOUTHSHIRE) Radio Society

Secretary: J. M. R. SUTTON, B.Sc. (GW2NG), 15, Caradoc Street, Cwmcaern, Mon.

Since this society, inaugurated by GW2NG and GW3AJ, held the first meeting on February 23 regular fortnightly meetings have been held and the

total membership now is twenty-two. Short-wave receiving from the aerial and high-frequency end of the receiver to the low-frequency end is being dealt with in a series of papers and it is hoped later to pass on to the transmitting side. It is proposed to hold several field days in the summer, especially in connection with 56 Mc. Morse is regularly practised. All keen amateurs in the district are invited to communicate with the secretary.

THE NATIONAL RADIO SOCIETY

Secretary: C. F. BIGGS (2DQO), 86, Lordship Lane, Tottenham, N.17.

Membership is increasing, due in some part no doubt to the competition, which by the way closes September 30. Members' cards are now ready but some delay must be expected before issue. "Verified All Continents" certificates have been decided upon and will be found to be of distinct design.

Meetings: 24, Penrith Road, Streatham, S.W.16, Wednesdays at 8; Brampton Road Schools, East Ham, alternate Wednesdays (next, May 11th), 7.45; 24, Percy Road, Leigh-on-Sea, Tuesdays, 8 p.m., Morse. A new branch, known as the West Bromwich Radio Amateur Society, hold fortnightly meetings at members' addresses, the next being fixed for May 17th; Mr. H. H. Lugg (G8HC), 67, Bustleholme Lane is the secretary. All other areas report progress.

The Executive decided on April 7th to affiliate to the Radio Signal Survey League of America, which organisation announce that monthly surveys will be carried out on the reception of signals from Pitcairn Island (VR6AY) on 14,346 kc. Reports of reception should be sent direct to 16, East 43 Street, New York, N.Y., where they will be summarised and complete results showing reception of signals throughout the world will be published. Such world-wide surveys tend to show up dead spots, skip effects and other interesting scientific phenomena.

Application for N.R.S. membership should be sent to 2DQO with a S.A.E. and P.O. for ~~the~~

NORTH-WEST IRELAND Amateur Radio Society

Secretary: SYDNEY FOSTER (B.S.W.L. 876), 2, Florence Street, Park Avenue, Londonderry.

The inaugural meeting of the society was held on March 29. Mr. John Hargan (2DHB) outlined the development of short-wave radio and described the work being done in many cities in Great Britain by transmitters and listeners and felt this district should not lag behind. Mr. Hargan was appointed Chairman, and the Society intend to organise Morse classes, arrange for demonstrations of radio equipment, together with lectures.

SHEFFIELD Short-Wave Club

Secretary: D. H. TOMLIN, 32, Moorsyde Avenue, Sheffield, 10.

The club is flourishing in new premises, Institute Rooms, Ebenezer Street, Shalesmoor. An artificial aerial licence has been granted the club (2DPJ); other calls issued include: 2CYI, 2CZC, 2BQR, 2BQS, 2DNU, 2DGZ. The programme recently has included visits to the two Sheffield Power Stations. On April 6 a microphone night was held, when all types were tested on a standard amplifier. The voting showed that for sensitivity transverse current and M.C. tied, for quality moving coil was best as it also was for general performance. The winning

microphone was a home-constructed model owned by Mr. A. Stacey. On April 13 a lecture on crystal oscillators and buffer stages was given. Meetings are held every Wednesday at 8 p.m. (Morse class 7 p.m.). Subscription 10s. per year, payable quarterly. Please send all communications for the time being to the acting secretary, Mr. V. Adams, 150, Totley Brook Road, Sheffield.

SURREY Radio Contact Club

Secretary: A. B. WILLSHER (2CCZ), 14, Lytton Gardens, Wallington, Surrey.

On April 5 the club met at its headquarters at The Alhambra, Wellesley Road, Croydon for a demonstration by Mr. Pickard (G6VA) of Webb's Radio, of modern American communication receivers. The new Sky Challenger and RME69LSI, both fitted with crystal gates, impressed members. In the RME69 the crystal can be switched from its usual parallel position to series circuit when, although the wanted signal is not peaked any more, unwanted signals are lost in the crystal trough. The Harvey UXH10 transmitter also aroused interest. The summer programme includes a talk by a well-known VQ4 ham, and a social outing.

WEST HERTS Amateur Radio Society

Secretary: C. PECK, 2, Queens Street, Tring.

The society now has a total of 15 members and if there are any amateurs in the district who would be interested they may obtain information from the secretary. The April meeting was held at the residence of 2BTV (M. A. Birt), Kings Langley, when an interesting evening was spent, including a demonstration of duplex working on 56 and 7 Mc, and later a short programme from the television sound

band. A talk by Mr. R. Pegg of Chesham was given on the use of absorption wavemeters with a practical demonstration on 2BTV's transmitter.

WHITSTABLE Radio Amateurs

Secretary: W. CROSSLAND, G5CI, 13, Queen's Road, Tankerton, Whitstable, Kent.

Meetings are well supported by local members; the next will be held at the secretary's address on May 7 at 7.30 p.m. when Mr. W. H. Allen (G2UJ) will give a talk on some aspect of amateur work on the 56 Mc band, readers are cordially invited to attend. Local activity is quite high, several members are preparing for the 56 Mc field day; G3BD is active on 7 Mc CW and is being well heard over most of Europe; 2AAN is experimenting with neutralising methods on his T20 and G5CI is doing well by working W's on 7 Mc CW.

WIRRAL Amateur Transmitting and Short-Wave Club.

Secretary: J. R. WILLIAMSON, 13, Harrow Grove, Bromborough.

The annual meeting was held on March 30 when the chairman announced that a satisfactory year's activities had resulted in an increase in membership of 13, bringing the total to 34 members (18 hold licences). Since the formation of the club six members have obtained their full transmitting licences, these are Mr. Bretherton (G8NB), Mr. Rogers (G8OC), Mr. Taylor (G8PG), Mr. Chrostan (G8QO), Mr. Miller (G3BH), and Mr. Cumberlidge (G3CK). It was decided to continue the monthly meetings, to hold a field day in the summer and to draw up a programme of visits to transmitting stations and other places of interest.

READERS' SMALL ADS.

6d. each — for Rules see page 34.

Amplion MOVING-COIL SPEAKER, tapped input, unused. Cost 50/-. Will exchange for meters, 120 ohm headphones or sell 20/-.—HOLT, 18, Marvels Lane, Grove Park, S.E.12.

WANTED—Short-wave Set 4½-6 to 200 m.; Multi-valve (med. and long not required). Must be in perfect condition.—Particulars LAMSDEN, "Medina," Barling Road, Southend-on-Sea.

P/P A.C. AMPLIFIER, part finished, has A.F.5c. 25/-.—Particulars: C., 7, Moffat Road, London, N.13.

0-V-2 RX, 12-175 m. EDDYSTONE Coils and Condensers, less valves, 30/-. Midas 9.5 cine-camera projector, 200 ft. film, 30/-. Exchange 56 Mc RX or—? Appointment.—G. ALLEN, 50, Spencer St., E.C.1.

FOR SALE—Ericsson's 'PHONES, 2,000 ohms resistance and output transformer for all-wave set. Both brand new. 22/-.—L. P. HUTCHISON, West Bank, Woodbridge, Suffolk.

FOR SALE, Summer, 1936, issue of "Radio Amateur Call Book." In good condition, price 3/10, post free.—Send Postcard first to P. CASLING, 6, Ollerbarrow Road, Hale, Cheshire.

OFFERS WANTED.—Eddystone All-World 2, including valves and 3 coils; Ferranti 1-1 Output Transf.; J.B. .0001 SW Cond.—B.S.W.L.132, H. ALFORD, Sunny Mead, Berrow, Burnham-on-Sea.

1937 HALLICRAFTERS SUPER SKY RIDER, with Crystal Gate, £18.—19, Prospect Street, Leeds, 10.

FOR SALE.—Q.C.C. 600-0-600 120 Ma Transformer, 3 LT windings for American Tubes, also Thordarson Transformers 52 and 89. T6426 with A6, etc. Offers.—G2KC, 82, Hatherley Road, Winchester.

WANTED.—RK42, 43 1½ volt type; also Aluminium Chassis 8 x 5 x 2 inches and Panel 5 x 8 inches.—AUCKLAND, 69, Tottenham Lane, Hornsey, N.8.

BARGAIN: "Simplex" Three Chassis, Battery Model, with Coils. 12-94 M, less valves, £2.—CASS-FORD, 44, Sandringham Road, Portsmouth.

CALLING HAMS—Especially Old Timers! Ediswan EU5 7.5 volt Full-Wave Rectifiers, 500 volt (equivalent DW30-U8), New Original Cartons, guaranteed, 4/-.—DAWES, 541, Caledonian Road, N.7.

WHAT OFFERS? Two Cydon Transmitting Condensers, .0002 mfd., in Excellent Condition, cost 16/6 each.—2CUB, Ridgewell, Halstead, Essex.

FOR SALE.—Eddystone Condensers, Coils, Valve and Coil Holders, Mains and Battery Valves, Power Pack, as New. (Would exchange for good camera).—J. KAVANAGH, 63, Dawlish Avenue, Leeds, 9.

GUIDE TO THE WORLD'S S.W. BROADCASTERS

ALL G.M.T.

MODIFICATIONS AND CORRECTIONS.

COCM, Havana, Cuba, verifies reception by QSL card; frequency given as 9,833 kc, or 30.50 m.

HC2CW, Wavelength, 32.3 m, 9,280 kc.

COCH, Havana, Cuba, has increased power to 5 kw; a three chime signal precedes announcements, English used frequently, relays CMCF, and Apartado (P.O. Box) number is 41, Havana.

TI4NRH, Heredia, Costa Rica, has increased power to 500 watts; English programme Wednesdays, Fridays and Sundays 02.00—03.00 G.M.T.; programmes begun and concluded by the playing of "The March of the Toy Soldiers."

HJ5ABD, Cali, Colombia, now employs additional identification signals (presumably used in conjunction with advertisements) in the form of cock-crow and baby's cry, while a studio clock strikes the hour.

VP3BG, Georgetown, Br. Guiana, correct address is now:—"Radio Station VP3BG, Crystals Broadcasting Co., Philharmonic Buildings, Georgetown"; frequency 6,130 kc; schedule: 15.15—16.15 and 20.00—00.45 daily.

HRN, TEGUCIGALPA

(Honduras)

Metres: 51.06. Kilocycles: 5,875. Power: 500 w.

Operating schedule : 13.30—14.30 and 00.30—03.00.

Standard time : G.M.T. less 6 hours.

Distance from London : Approximately 4,800 miles.

Postal address : "Radiodifusora HRN, Snr. Rafael Ferrari, Tegucigalpa, Honduras."

Identification characteristics : Slogan "La Voz de Honduras" (The Voice of Honduras); occasional English announcements, sometimes as "This is station HRN, H for Honduras, R for Radio and N for Navy, in Tegucigalpa, capital city of Honduras"; signs off with Ted Lewis "Good-night Song."

Verification of reception reports : Notorious non-verifier; do not send Reply Coupons.

HH2S, PORT-AU-PRINCE

(Haiti)

Metres: 50.85. Kilocycles: 5,910. Power: 100 w.

Operating schedule : 00.00—03.00; sometimes closes at 02.30.

Standard time : G.M.T. less 5 hours.

Distance from London : Approximately 4,100 miles.

Postal address : "Radio HH2S, Societe Haitienne de Radiodiffusion, Immeuble Magebo, Boite Postal A-103, Port-au-Prince, Haiti."

Identification characteristics : Opens and concludes programmes with Saint-Saens' "La Cygne"; employs 4 chime signal each quarter-hour; English occasionally and when closing. Language used throughout—French.

Verification of reception reports : Confirms with letter 'veri.'

HRP1, SAN PEDRO SULA

(Honduras)

Metres: 47.24. Kilocycles: 6,351. Power: Unknown.

Operating schedule : 12.00—13.00 and 00.45—03.00; no transmissions Sundays. (Honduras Time)

Standard time : G.M.T. less 6 hours.

Distance from London : Approximately 4,600 miles.

Postal address : "Radiodifusora HRP1, Snr. Manuel Escoto, San Pedro Sula, Honduras."

Identification characteristics : Reference to the slogan "El Eco de Honduras," or full call "HRP1, El Eco de Honduras en San Pedro Sula, Honduras Centro America."

Verification of reception reports : The compiler does not know whether this station will confirm reception.

HRD, LA CEIBA

(Honduras)

Metres: 48.11. Kilocycles: 6,235. Power: 250 w.

Operating schedule : 01.00—04.00 weekdays; Sundays, 21.00—23.00.

Standard time : G.M.T. less 6 hours.

Distance from London : Approximately 4,800 miles.

Postal address : "Radiodifusora HRD, Dr. Tulio Castaneda y Emilio A. Crespo, La Ceiba, Honduras."

Identification characteristics : Signs on with marimba foxtrot "Solo Tuyo"; off with "Intermezzo No. 1," and sometimes Ted Lewis "Good-night Song." Announces as "HRD, La Voz de Atlantida, en La Ceiba, Honduras"; English at the hour.

Verification of reception reports : Confirms with unattractive QSL card.

"RADIO MARTINIQUE," FORT-DE-FRANCE

(Martinique)

Metres: 30.93. Kilocycles: 9,700. Power: 200 w.

Operating schedule : 16.15—17.45 and 23.00—01.00.

Standard time : G.M.T. less 4 hours.

Distance from London : Approximately 3,900 miles.

Postal address : "Radio Martinique, Boite Postal 136, Fort-de-France, Martinique."

Identification characteristics : Has carrier hum; programmes and quality of transmission typically French; signs on and off with the "Marseillaise"; call "Allo, allo, ici Radio Martinique" given several times at commencement of programmes; "Radio Martinique" referred to frequently; 6 or 7 chimes, usually at the quarter hour; signs 6 or 7 chimes, usually at the quarter hour; occasional announcements in Spanish, English, and German.

Verification of reception reports : By QSL.

XECR, MEXICO CITY
(Mexico)

Metres: 40.65. Kilocycles: 7,380. Power: 20 kw.

Operating schedule: Mondays 00.00—01.00 (listen from Sunday midnight).

Standard time: G.M.T. less 7 hours.

Distance from London: Approximately 5,200 miles.

Postal address: "Estacion XECR, Departamento de Publicidad de la Secretaria de Relaciones Exteriores, Mexico D.F., Mexico."

Identification characteristics: Signs on with anthem and chimes; English used every few minutes; programmes consist, generally, of Mexican music, prose and talks in English regarding Mexico; call "Ladies and gentlemen you are listening to XECR of Mexico City" or simply "Station XECR of Mexico City"; signs off with National Anthem, etc.

Verification of reception reports: Sends card depicting "El Nevado de Toluca."

XEXA, MEXICO CITY
(Mexico)

Metres: 48.62. Kilocycles: 6,173. Power: Unknown.

Operating schedule: Irregular, but supposed to be between 11.00 and 05.00 G.M.T. Heard in Gt. Britain Mondays 00.00—01.00, relaying XECR.

Standard time: G.M.T. less 7 hours.

Distance from London: Approximately 5,200 miles.

Postal address: "Estacion XEXA, Bucareli 12, Despacho 103, Mexico D.F., Mexico."

Identification characteristics: Signs on with "March of the Toys"; operated by Department of Publicity and Propaganda. Listeners are advised to tune to XECR (Mondays 00.00—01.00 G.M.T.) and then to search for XEXA, from whence the same programme is radiated simultaneously.

Verification of reception reports: Said to confirm with picture post-cards.

XETA, MONTERREY
(Mexico)

Metres: 25.51. Kilocycles: 11,760.

Power: Unknown.

Operating schedule: Daily 00.00—04.00 G.M.T.

Standard time: G.M.T. less 7 hours.

Distance from London: Approximately 5,100 miles.

Postal address: "Estacion XETA, Apartado 203, Monterrey, Mexico."

Identification characteristics: Relays medium-wave XET; five or six chimes each quarter hour, also between announcements, but varying in number from one to three.

Verification of reception reports: It is not yet known whether veries are issued.

XEWW, MEXICO CITY
(Mexico)

Metres: 19.79 or 31.58. Kilocycles: 15,160 or 9,500. Power: 10,000 watts.

Operating schedule: Daily 15.00—05.00 G.M.T. On 31.58 at present.

Standard time: G.M.T. less 7 hours.

Distance from London: Approximately 5,200 miles.

Postal address: "Estacion XEWW, Apartado 2516, Ayuntamiento 54, Mexico D.F., Mexico."

Identification characteristics: Relays medium-wave XEW; chimes, generally four, at each quarter-hour, coupled to station call and slogan "La Voz de America Latina"; chimes also used between announcements. Well heard in Gt. Britain from midnight, or earlier.

Verification of reception reports: Sends attractive card depicting Mexican elopement.

XEBT, MEXICO CITY
(Mexico)

Metres: 50. Kilocycles: 6,000. Power: 1,000 w.

Operating schedule: Between 15.00 and 05.00 (or later); seldom heard.

Standard time: G.M.T. less 7 hours.

Distance from London: Approximately 5,200 miles.

Postal address: "Estacion XEBT, Apartado 7944, Mexico D.F., Mexico."

Identification characteristics: Signs on with "Las Mananitas"; off with piano solo "Liebestraum" (Liszt); employs wail of siren, cuckoo calls, crowing rooster, etc.; slogan "El Buen Tono." Heard best around 04.00 until close down. Relays XEB.

Verification of reception reports: Confirms with QSL card bearing large call letters.

XEDQ, GUADALAJARA, JAL.
(Mexico)

Metres: 31.51. Kilocycles: 9,520. Power: Unknown.

Operating schedule: Daily 00.00—04.00 G.M.T.

Standard time: G.M.T. less 7 hours.

Distance from London: Approximately 5,350 miles.

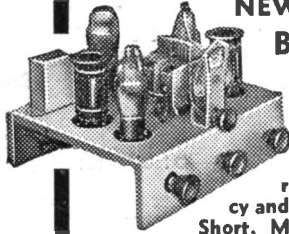
Postal address: "Estacion XEDQ, Radio Fonografica de Guadalajara, S.A., Apartado 197, Guadalajara, Jal., Mexico."

Identification characteristics: Relays medium-wave XED; signs on with Mexican dance; four chime signal; does not adhere to official frequency.

Verification of reception reports: Confirms by QSL card.

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NEW "WORLD" S.G.3
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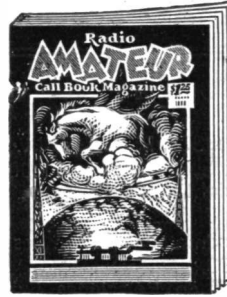
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Used exclusively by exacting manufacturers and amateurs, who place reliability and performance as a first consideration.

May we have the pleasure of quoting you too, for your next component.

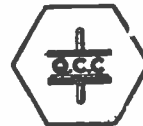
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For Readers' Advertisements
see page 35.

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List price £49 15 0. One model only at £37 10 0.

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RADIOGRAPHIC LTD. DEAN HOUSE, DEAN STREET LONDON, W.1.

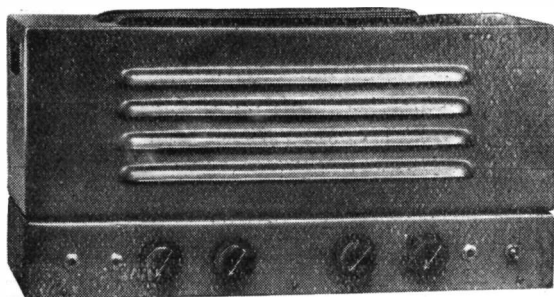
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6L6's in Negative Feed-back Class AB.

Exceptional driver and output transformer gives only 2% harmonic distortion at 35 watts. 15—20,000 cycles response. Independent electronic mixed pick-up and microphone inputs, fully load off D.104 crystal microphone or similar. Separate high and low cut volume controls; any output impedance matched to order.

Complete with steel cover suitable for rack mounting; 18" x 10" x 9" high, standard bronze finish, absolutely complete . . . £20.

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grey "Parex" Cabinet (Crackle or Mottled) for your "IDEAL" Receiver, as originally built for the "S.-W.M." Correct to the minutest detail of the designer's specification.

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Cabinet alone which includes chassis, boxed, etc., 2 gns. post free.

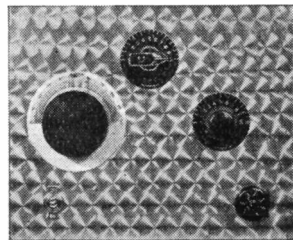
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S.-W.M. 5/38.

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Abbreviations: S—Sunday; M—Monday; T—Tuesday; W—Wednesday; Th—Thursday; F—Friday; Sa—Saturday.
All times B.S.T., twenty-four hour system.

M.	KC.	CALL SIGN, LOCATION, SCHEDULE.	M.	KC.	CALL SIGN, LOCATION, SCHEDULE.
15.93	21,540	W8XK, PITTSBURGH, 11.45-14.00.	31.28	9,595	VK6ME, PERTH, w'days 12.00-14.00.
13.94	21,520	W2XE, WAYNE, 12.30-15.00.	31.28	9,595	W3XA, PHILADELPHIA, 17.00-01.00.
16.97	21,470	GSH, DAVENTRY, 11.45-18.00.	31.83	9,580	VLR, LYNDHURST, w'days 03.35-14.30; S. 09.00-13.30.
15.77	19,023	H8SPJ, BANGKOK, M. 14.00-16.00.	31.32	9,580	GSC, DAVENTRY, 00.20-05.30, 18.20-19.15.
16.86	17,790	GSG, DAVENTRY, 07.00-24.00.	31.35	9,570	KZRM, MANILA, M. F. 22.30-24.00, 11.00-15.00; Sa. until 16.00; S. 10.00-16.00.
16.87	17,780	W3XAL, BOUNDBROOK, 15.00-01.00.	31.36	9,565	W1XK, MILLIS, 11.00-05.00.
16.88	17,770	PHI, HUIZEN, S. 13.25-16.00; M. 09.00-01.00, 13.25-15.30; T. 13.25-15.30; Th. 13.25-15.30, 00.00-09.30; F. 13.25-15.30; Sa. 13.25-15.30.	31.38	9,560	DJA, ZEESEN, 06.05-17.00.
16.89	17,760	DJE, ZEESEN, 06.05-17.00.	31.45	9,559	DJN, ZEESEN, 05.05-16.00.
16.92	14,970	HASS, BUDAPEST, S. 15.00-16.00.	31.46	9,535	JZJ, TOKIO, 20.30-22.00.
15.56	15,340	W2XAD, SCHENECTADY, 17.30-00.00.	31.47	9,534	VPEB, SUVA, 11.30-13.00.
16.00	15,310	GSP, DAVENTRY, 19.45-02.30.	31.48	9,535	LKC, JELOY, 11.00-14.00.
16.02	14,280	LRU, BUENOS AIRES, 13.00-21.00.	31.48	9,535	WEXAF, SCHENECTADY, 21.00-05.00.
16.03	15,380	DJQ, ZEESEN, 06.05-17.00.	31.49	9,530	ZBW3, HONG-KONG, 05.30-07.15, 09.00-15.30.
16.64	15,270	W3XE, WAYNE, 18.00-23.00.	31.50	9,523	ZRH, ROBERTS HEIGHTS, 05.45-13.30.
16.66	15,260	GSI, DAVENTRY, 03.20-05.20.	31.51	9,520	OZF, SKAMLEBAEK, 20.00-04.00.
16.68	15,243	TPA2, PARIS, 11.00-16.00.	31.51	9,520	HJ4ABH, ARMENIA, 13.00-17.00, 00.00-04.00.
16.68	15,243	W1XAL, BOSTON, 18.30-21.00, ex. Sa.; S. 15.00-16.00.	31.55	9,510	H8SPJ, BANGKOK, Th. 14.00-16.00.
16.70	15,230	OLR5A, PRAGUE, tests around 13.00.	31.55	9,510	GSB, DAVENTRY, 00.20-09.30, 22.15-00.00.
16.71	15,220	PCI, HUIZEN, T. 09.30-11.30; W. 15.00-18.00.	31.58	9,500	VK6ME, MELBOURNE, w'days 10.00-13.00.
16.72	15,210	W8XK, PITTSBURGH, 14.00-24.00.	31.58	9,500	PRF5, RIO DE JANEIRO, discontinued?
16.74	15,200	DJB, ZEESEN, 06.05-16.00 and 22.50-05.00.	31.58	9,500	XEWU, MEXICO CITY, 00.00-07.00 approx.
16.76	15,180	GSO, DAVENTRY, 07.00-09.30 and 22.15-00.00.	31.63	9,494	EAR, MADRID, 22.00-01.00.
16.80	15,160	YDC, BANDOENG, 04.30-08.00; 10.30-16.30; 00.00-01.30; S. 01.30-08.00; 11.30-16.00.	31.80	9,428	COCH, HAVANA, 13.00-06.00.
16.80	15,160	SBG, STOCKHOLM, M. to Sa. 17.00-23.00; S. 15.00-23.00.	32.15	9,330	OAXAJ, LIMA, 18.00-21.00, 23.00-07.00.
16.82	15,140	GSE, DAVENTRY, 07.00-18.00 and 22.15-24.00.	32.88	9,125	HATAJ, BUDAPEST, M. 01.00.
16.84	15,123	HVJ, VATICAN, 16.30-16.45.	33.32	9,030	COBZ, HAVANA, 13.42-06.03.
16.85	15,110	DJL, ZEESEN, 16.10-22.30.	33.50	8,950	HCBJ, QUITO, between 13.00-04.15, ex. M.
20.04	14,970	LZA, SOFIA, 12.00-13.30; 19.00-21.15; S. 07.00-23.30.	34.62	8,665	COJK, CAMAGUEY, 02.00-03.00.
20.64	14,535	HBJ, GENEVA, S. 19.45-20.30; M. 08.30-08.45.	40.65	7,380	XECR, MEXICO CITY, M. 01.00-02.00.
20.00	13,635	SPW, WARSAW, 00.00-02.00.	44.94	6,675	HBO, GENEVA, S. 19.45-20.30.
24.52	12,230	TFJ, REYKJAVIK, S. 19.40-20.30.	45.00	6,666	HCR1, GUAYAQUIL, S. 23.45-01.45; W. 03.15-05.15.
25.00	12,000	VZSPS, MOSCOW, from 12.00.	45.25	6,430	HIT, TRUJILLO, between 17.15-05.45.
25.27	11,870	W8XK, PITTSBURGH, 00.00-04.00.	45.31	6,618	PRADO, RIOBAMBA, F. 03.00-05.30.
25.23	11,890	TPA3, PARIS, 07.00-10.00; 16.15-23.00.	46.01	6,520	YV4RB, VALENCIA, 17.30-18.30, 23.30-02.30.
25.29	11,860	GSE, DAVENTRY, discontinued.	46.80	6,410	TIPG, SAN JOSE, between 13.00-05.30.
25.34	11,840	OLR4A, PRAGUE.	46.88	6,400	YV5RH, CARACAS, 00.00-04.00.
25.36	11,830	W2XE, WAYNE, 23.30-04.00.	47.10	6,396	YV5RF, CARACAS, 23.30-03.30.
25.40	11,810	IBRO, ROME, 11.00-21.00 and 00.05-01.30.	47.15	6,362	YV1RH, MARACAIBO, between 12.30-05.30.
25.42	11,800	COGF, MATANZAS, 22.00-04.00.	47.28	6,345	YV1RG, VALERA, 23.30-02.30.
25.42	11,800	JZJ, TOKIO, 20.30-00.30.	47.85	6,270	YV5RP, CARACAS, 23.00-04.00, approx.
25.42	11,800	OER3, VIENNA, 15.00-23.00.	48.05	6,245	HIN, TRUJILLO, 00.30-03.30.
25.45	11,790	W1XAL, BOSTON, 21.45-23.30; S. 20.00-23.30.	48.31	6,210	YV1RI, CORO, between 16.30-03.30.
25.49	11,770	DJD, ZEESEN, 16.40-05.00.	48.78	6,150	YV5RD, CARACAS, between 16.30-04.00.
25.52	11,750	GSD, DAVENTRY, 03.20-05.20; 07.00-09.15; 16.45-18.00; 22.15-24.00.	48.80	6,150	CJRO, WINNIPEG, as CJRX (25.6 m)
25.60	11,720	CJRX, WINNIPEG, 00.00-06.00; S. 19.00-04.00.	48.83	6,140	W8XK, PITTSBURGH, 03.06-06.00.
25.60	11,720	CR7BH, LOURENCO MARQUES, 18.10-22.00; S. 16.00-20.00.	48.88	6,136	CR7AA, LOURENCO MARQUES, sec CR7BH (25.6 m.).
25.61	11,710	TPA4, PARIS, 00.00-05.00.	48.92	6,135	VE9HX, HALIFAX, 16.00-06.00.
25.63	11,700	SBP, MOTALA, evenings.	48.94	6,132	COCD, HAVANA, between 15.00-07.00.
25.64	11,700	HP5A, PANAMA CITY, between 17.40 and 04.00.	49.02	6,125	LKJ, JELOY, 17.30-23.00.
25.64	11,700	CB170, SANTIAGO, 17.00-21.00; 23.00-06.00.	49.10	6,110	VUC, CALCUTTA, between 08.06-18.06.
26.01	11,530	SPD, WARSAW, as SPW (22 m.).	49.10	6,110	HJ6AB, MANIZALES, 00.00-06.00.
26.23	11,440	COCK, HAVANA, 14.00-07.00; S. 14.00-18.00, 00.00-04.00 (Mon.).	49.15	6,105	ZRK, KLIPHEUVEL, 18.00-22.00.
27.17	11,040	CSW2, LISBON, testing evenings.	49.18	6,100	YUA, BELGRADE, between 07.00-23.00.
27.26	11,000	PLP, BANDOENG, as YDC (19.8 m.).	49.18	6,100	W3XAL, BOUNDBROOK, 00.00-06.00.
28.93	10,370	E8AB, TENERIFFE, between 20.35-02.00.	49.20	6,097	ZRJ, MARAISBURG, between 05.45-17.30.
29.04	10,330	ORK, RUYSELDE, 19.30-21.00.	49.26	6,090	CRXC, BOWMANVILLE, 18.00-02.00.
29.24	10,260	PMN, BANDOENG, as YDC (19.8 m.).	49.31	6,083	VQ7LO, afternoons until 20.15.
29.25	10,220	PSH, RIO DE JANEIRO, 23.00-00.00; 01.00-03.00.	49.40	6,072	HVJ, VATICAN, 20.00-20.15.
30.18	9,940	CSW3, LISBON, testing.	49.42	6,070	VF6MR, GEORGETOWN, 21.15-01.15.
30.51	9,830	COCM, HAVANA, 14.00-05.00.	49.46	6,060	SBO, MOTALA, 19.30-23.00.
30.52	9,823	EAQI, MADRID, evenings.	49.50	6,060	W3XAU, PHILADELPHIA, 01.00-04.00.
30.50	9,740	COCQ, HAVANA, 13.00-07.00.	49.50	6,060	W8XAL, CINCINNATI, between 10.45-07.00.
30.93	9,700	"RADIO MARTINIQUE," Fort-de-France, 17.15-18.45; 00.00-02.00.	49.67	6,040	W1XAL, BOSTON, 00.00-02.00.
31.06	9,660	LRX, BUENOS AIRES, 15.30-05.00.	49.75	6,030	HP5B, PANAMA CITY, 23.00-01.00.
31.09	9,650	CSWA, LISBON, T. Th. Sa. 22.00-01.00.	49.75	6,030	OLR3B, PRAGUE, evenings.
31.10	9,645	HH3W, PORT-AU-PRINCE, 19.00-20.00; 01.00-02.30.	49.83	6,020	DJC, ZEESEN, 16.40-05.00.
31.13	9,630	IBRO, ROME, 21.00-24.00; 01.30-03.00.	49.82	6,010	OLR3A, PRAGUE, evenings.
31.15	9,630	HJ7AB, BUCARAMANGA, 00.00-04.30.	49.82	6,010	CJXC, SYDNEY, between 13.00-02.30.
31.21	9,612	HJ1ABP, CARTAGENA, between 13.00 and 04.30.	49.82	6,010	PRA8, PERNAMBUCO, from 22.00.
31.23	9,607	HP5J, PANAMA CITY, 18.00-19.30; 00.30-04.30.	49.82	6,010	COCO, HAVANA, 23.10-06.00.
31.23	9,608	ZRK, KLIPHEUVEL, 05.45-17.45.	49.94	6,007	ZRH, ROBERTS HEIGHTS, 16.00-22.00.
31.26	9,600	RW96, MOSCOW, evenings.	49.96	6,005	CXA2, MONTEVIDEO, 22.00-01.00.
31.28	9,595	PCI, HUIZEN, S. 20.00-21.00; M. 01.00-03.00; T. 19.45-22.00; Th. 01.00-04.00.	49.96	6,005	CPXC, MONTREAL, 13.45-07.00.
31.28	9,595	VK6ME, SYDNEY, S. 07.00-09.00; 11.00-15.00;	50.00	6,000	XEBT, MEXICO CITY, 16.00-06.00.
			50.17	5,990	CS3WD, LISBON, from 22.00.
			50.60	5,930	YV1RL, MARACAIBO, 00.00-04.00.
			50.90	5,893	YV3RA, BARQUISIMETO, between 18.00-04.00.
			51.28	5,850	YV1RB, MARACAIBO, between 16.30-04.30.
			51.72	5,800	YV5RC, CARACAS, between 16.45-03.45.
			58.31	5,145	OKIMP, PRAGUE, evenings.
			60.06	4,905	VUD, DELHI, 12.30-18.30.
			90.77	3,330	VUB, BOMBAY, 15.00-18.30.

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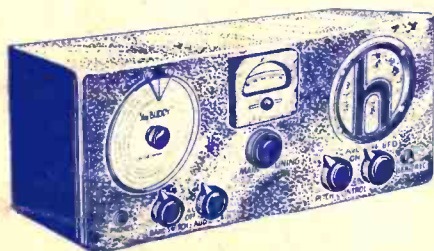
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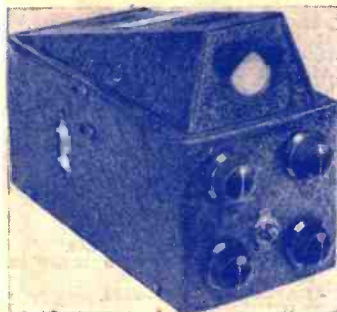
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