

The SHORT WAVE Magazine

VOL XXI

MAY, 1963

NUMBER 3

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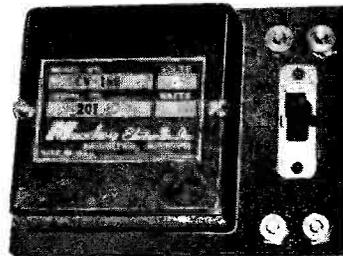
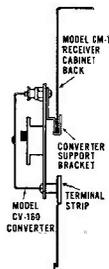
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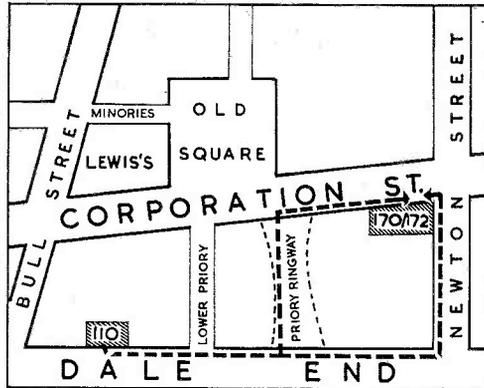
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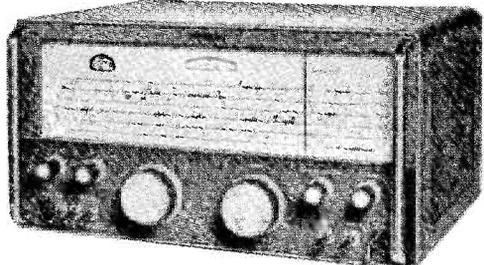
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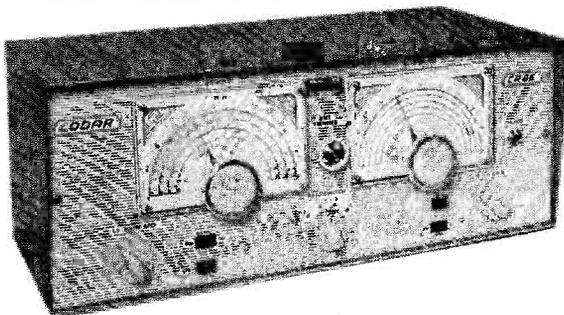
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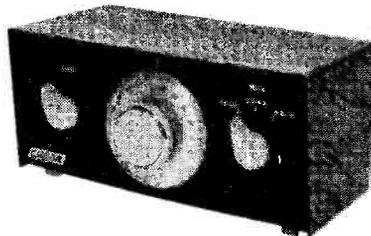
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The SHORT-WAVE Magazine

EDITORIAL

Action

Elsewhere in this issue we ventilate the problem of "Clearing the Air" — the article might also be sub-titled "Band Cleansing," for that is what must be put in hand, as a matter of urgency in the interests of all active radio amateurs. The situation existing, the argument and the reasons for proposing a positive line of action to improve operating standards and on-the-air procedure, on an international basis, are set out clearly enough by G6QB in his discussion.

What we are concerned with here is how penetration to the backward countries — in the strictly Amateur Radio sense — is going to be achieved. Given that it is agreed much could be done by amateurs' own efforts to make our HF communication bands more tolerable, useful and interesting, the problem is that of getting the idea through to those who are at once the worst offenders as well as being among those most likely to benefit from the cleansing process.

There is in existence what we have always contended to be a somewhat ineffectual body known as the International Amateur Radio Union, to which all nationally-organised Amateur Radio groups are supposed to belong. In fact, the I.A.R.U. does not get anything like the support it could have, and its member-societies do not include many of the anti-Western countries.

However, to make the most of what international organisation there is, it seems to us that Region I of the I.A.R.U. (which means the European membership) could give a lead to the Amateur Radio world by calling a conference to discuss this matter of creating more space for us all on the HF bands; deciding on standards of operating procedure; and laying down recommendations aimed at ensuring more reasonable and considerate on-the-air behaviour.

Much of the trouble with which we are all now afflicted is due to no more than honest ignorance — the average operator of a Mittel-European Klub station just does not know how to conduct himself on the air, because nobody has ever told him. He can only get experience of a sort after a long period of slap-happy operating, in the course of which he succeeds in making the band he occupies a nightmare for other users — who, with admirable tolerance and fortitude, go on contending as best they can with a situation that should never have been allowed to arise in the first place.

To get it under some sort of control demands action on an international basis, with wide and continuing publicity throughout the Amateur Radio press for the decisions of a conference devoted to this sole purpose of Clearing the Air. Once the principles are established, the world will follow.

And it is for Region I of the I.A.R.U. to start this particular ball rolling, and that without further delay.

*Arthur Foster
G6FO.*

IMPROVING THE QUAD

SOME EXPERIMENTS, AND THE RESULTS

F. F. DODSON (G3NVA)

This interesting article, presented as a factual account of the writer's own experiments and findings, shows how a two-element multi-band Quad can be considerably improved as regards gain, and sharpened up in respect of discrimination. While a three-band Quad with a reflector-director array added, all mounted on a crank-up tower, may not be a practicable proposition for everybody, the idea is a good one for those who can use it, and will be of great interest to those who cannot but yet have a passion for aerial work and investigation.—Editor.

DURING one of the gales in early 1962 the mast holding the writer's Tri-band Quad, situated on top of a three storey building, was badly bent. Before the mast was damaged the Quad was left in a position firing towards North America, and after the gale, was found to be practically on its back, with the lower section of the twenty-metre wire reflector about 2in. away from the mast section that went through the roof.

The beam was used in this position for two or three months, on 15 and 20 metres. The only time transmitting was not practicable was when during high winds the reflector touched the mast, causing local TV1. Equipment used was a Heath "Apache," with Heathkit SB-10U Adaptor and 813 linear PA.

Reports received from the States were surprisingly good right from the start, and as time went on appeared to be as high as some of the leading U.K. stations were getting. These reports gave rise to speculation. Was it the altered angle of radiation suiting the propagation condition at that particular period, was it added reflector action from house wiring and guttering, or a combination of these effects? Quite a few W stations kept observation over a period of many weeks, and W4QD offered to maintain a log of the G3NVA signals received—after a couple of months it was obvious that he found signals well above average, and consistent.

It was then decided to install a crank-up, lean-over type tower, and when this had been completed, the Quad was removed from the roof of the house and mounted on the tower, which when fully extended gave the Quad a height of 50ft. from ground to the boom, but this was 15ft. lower than when the Quad was on the roof top. On making contacts with the States and in particular W4QD, it was apparent that both transmitting and receiving signals were down on previous results. The angle of the Quad was then altered to fire in a position similar to how it had

been on the roof with a bent mast. No improvement was noticed and after a couple of weeks the system was re-arranged to a normal position. Band conditions at this period (July/August, 1962) were beginning to deteriorate.

Quad Modification

The writer had heard of someone in the States fitting a parasitic director in front of a Quad with good results, so it was decided to try this idea out. The director was made of light dural tube, 31ft. long mounted on an extension strapped to the Quad boom—see diagrams. The spacing between this added element and the driven element of the Quad was 6ft. 6in. Results were favourable but the system was used for two days only as the added element caused the Quad to lean over badly.

A parasitic reflector was then fitted, mainly to act more or less as a counter-balance, as according to the books it appeared that the addition of an extra reflector to a two-element Quad would not justify itself.

However, after fitting the parasitic reflector, which was 36ft. long, spaced 8ft. from the wire reflector section of the Quad, results were amazingly good, and although band conditions had fallen off, reports and reception were improved. Front-to-back checks were made with local and W stations, and 35 dB or better was reported. At this stage it was suggested that some traps that were available be incorporated in the director and reflector. This work was completed, and the director was now 25ft. 10in. and the reflector 28ft. 2½in., spaced at 7ft.

Final Design

The system now consisted of a parasitic director fitted with traps for 20 and 10 metres, a plain director for 15 metres, driven wire elements for 20 metres, 15 metres, and 10 metres, with wire reflectors for each driven section, and a parasitic reflector trapped for 20 and 15 metres—all as shown in Fig. 1. The next step was to check for SWR; this was found to be very poor—about 3.5:1 on 20 metres and 4.9:1 on 15 metres—and it was obvious that the parasitic elements would have to be adjusted.

Checking and adjusting the SWR proved a very tedious operation indeed. To make each adjustment the aerial mast had to be telescoped down, the tower tilted over, adjustment made, tower returned to vertical and mast wound up to full height. This was done no less than seventeen times the first day, and many more times during subsequent tests!

On 15 metres, the system was adjusted for best results between 21.35 and 21.45 mc, and on 20 metres between 14.28 and 14.34 mc. The SWR on 15 metres now came out as 1:1 and 1.2:1 on 20 metres, figures considered pretty satisfactory and well worth the labour involved. (Note: 10-metre tests have not yet been carried out.)

Results

Further transmitting and receiving checks were made, and reports indicated that remarkable gain and front-to-back ratio had been achieved. On 20 metres it was found to be possible to work a VK station

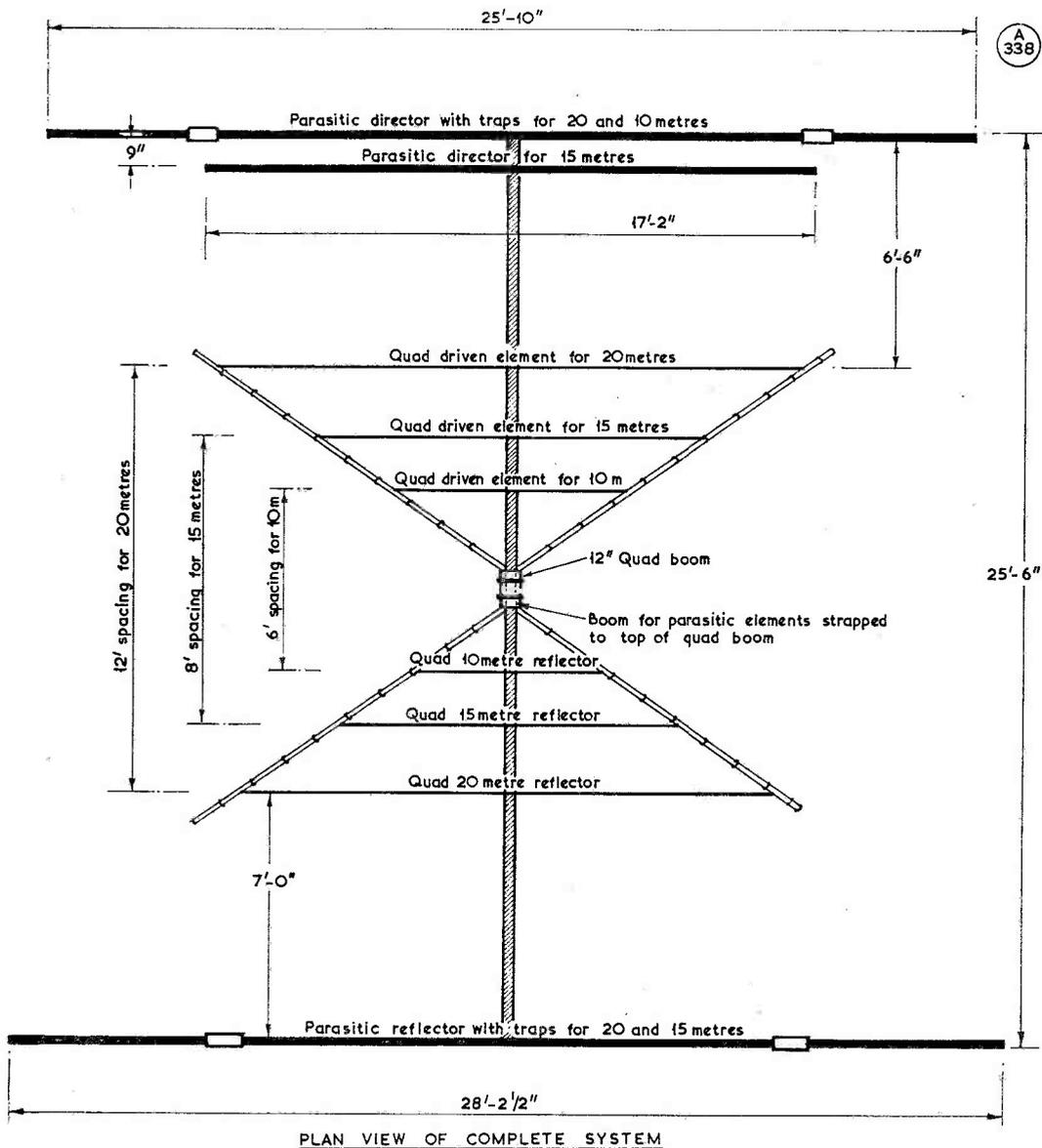


Fig. 1. The layout, in plan view, for the final Quad assembly described by G3NVA, using parasitic reflector and director elements to enhance the performance of a two-element three-band Quad — and see Fig. 2. Though this appears a large and somewhat complicated structure, it is hardly more so than a standard Quad or a 20-metre trapped beam, as the same vertical support is used and the parasitic assembly is in balance on the Quad boom. As explained in the article by G3NVA, the increase in gain and the improvement in back-to-front ratio are such as fully to justify the installation.

(short path) on the same frequency as a 9+ W station who was working a G, without any difficulty with the reception of the VK and no trouble to the W station. This experiment was tried with the following stations: WIJFG and VK2FU, and W1ZFV and VK2FU.

Checks with VK stations have been carried out every day since September 19, except for a short

period when over on a visit to the States during October. While over there, the writer was able to take in the DXCC dinner-meeting, and it was obvious from the remarks and enquiries made on this occasion, regarding the signal they had been receiving, that the system had a tremendous gain. On returning to the U.K., the rig was changed to HT-32B and HT-41 linear, and tests were resumed with W and VK

stations.

The front-to-back ratio and side-discrimination were much greater on reception than on transmission. Receivers used were Mohawk and HQ-170, and it was found that signals of the same strength as WIJFG, on 15 or 20 metres according to conditions, were 20 to 30 over S9 on the front, and S3 to 4 on the back, and in most cases were unreadable. Front-to-back checks on transmission varied from 15 dB to 35 dB. When a poor front-to-back report was received, the distant station was requested to make a long transmission. During this, the incoming signal was tape recorded, while the beam was rotated from front to back. In the majority of cases, when playing recordings back to W's, VK's, ZS's and other DX stations, they reported 9-plus on the front, unreadable on sides, S3 or lower on back. However, it was noted that the front-to-back difference altered considerably with conditions, as on a check made in February with W4QBP on 15 metres (who on many previous occasions could not be heard at all on the back of the beam) it was found that there was a difference of only two or three S-points from front to back, either on reception or transmission.

Nevertheless, under all conditions it was obvious that the supplement to the Quad was a worth-while experiment, justifying the time and trouble taken with it.

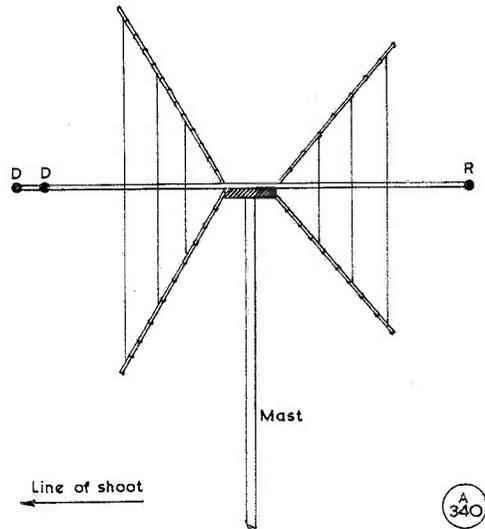


Fig. 2. Sketch to show side-view appearance of the G3NVA beam array consisting of a three-band two-element Quad with parasitic reflectors and directors. The assembly is mechanically in balance and the dimensions of the reflector and director elements are kept down by the use of traps—see Fig. 1, p. 121.

TONE MODULATOR FOR THE GRID DIP OSCILLATOR

EXTENDING THE USEFULNESS OF THE GDO

THE applications of, and the necessity for, a good GDO in the amateur test kit are already known well enough, and various designs for the construction and calibration of grid-dip oscillators have been published over the years.

But what is not so well known is that—where the instrument in use (whether a commercial product or home-constructed) is a really good one as regards its stability and calibration—its usefulness can be considerably extended by converting it to a modulated oscillator. It can then be used as a simplified signal generator, in addition to all its other applications for checking tuned circuits, working as an absorption wavemeter or RF probe, as a modulation monitor and an RF generator.

There are two possible ways in which tone-modulation could be applied to an existing GDO—either by an internal modification to the GDO itself, so that it would be self-contained, with its mod. brought in by switching, or from an external tone-modulator as a separate unit, coupled into the GDO when required. Since it is probably better not to proceed to dissect the interior of an already-good

GDO and because there might anyway not be enough room inside it for more circuitry and switching, the other approach is to make up a 1,000-cycle generator as a separate unit, which can be used when needed (and which also has applications of its own).

Modulator Circuitry

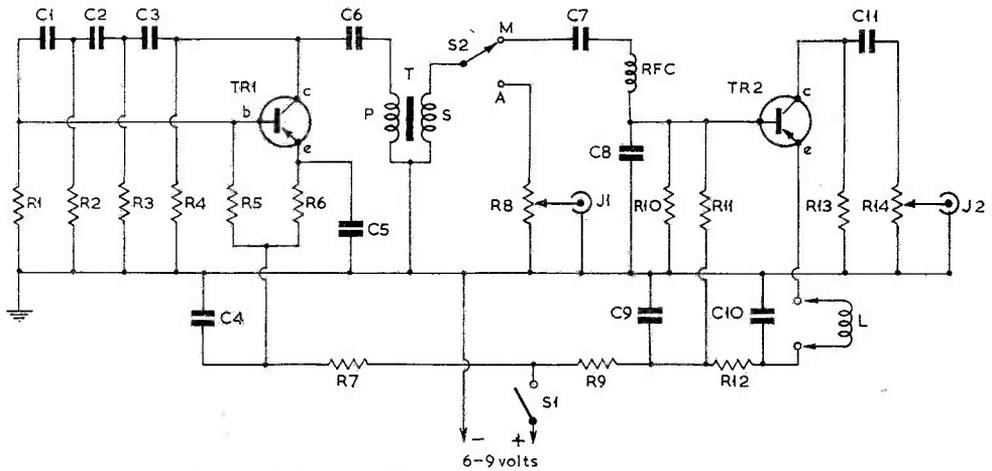
This is what is shown in the circuit here—due to W6NJV, and discussed in the March issue of the American *Popular Electronics*—in which TR1 is a phase-shift audio oscillator producing a tone of about 1,000 cycles by virtue of the C1, R2, C2, R3, C3, R4 network; the pitch of the note can be altered in the usual way, by variation of the values of C1, C2, C3. With S2 at position A, this audio output can be taken off at J1, and controlled by R8, for use separately.

With S2 in the M position, the 1,000-cycle tone is fed to TR2, in the emitter of which is coil L, made up as a probe lead and consisting of two or three turns of stiff insulated wire of a diameter large enough to couple to the GDO coil. TR2 then functions as a mixer—of the 1,000-cycle audio from TR1, and the RF from the GDO. The resultant modulated RF output then appears at J2, with R14 as the level control—and that's about all there is to it.

The whole contrivance can be put together in a small aluminium box, with the switches and the two variable resistors as panel controls.

Operating Points

Output level, at both J1 and J2, is naturally low, but ample for practical purposes in that J1 can be



D
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fed into any low-impedance audio amplifier, and J2 coupled into a receiver. The degree of coupling between the pick-up coil L and the GDO is a matter of experiment for the best results ("depth of modulation") and since J2 output is at low impedance, any coupling to this point can be through quite a long lead without appreciable loss. In practice, satisfactory operation with any normal type of amateur-band GDO can be expected right up into the VHF region.

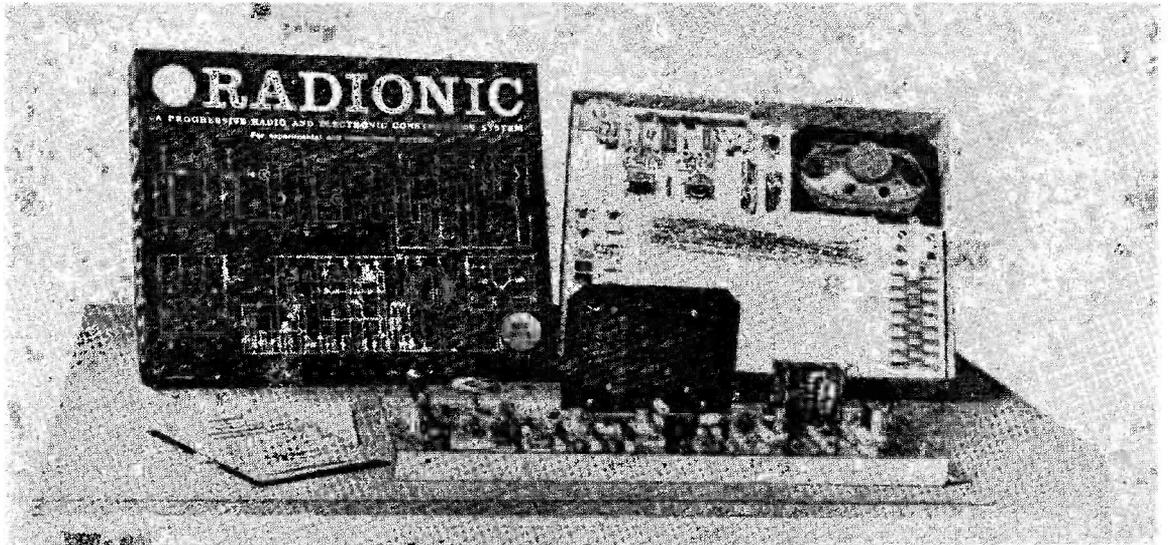
Actual output levels are: At J1, about 0.3v.; at J2, 0.5v., but dependent on GDO coupling. Over-coupling should be avoided, as it could affect the calibration of the GDO. Before bringing the device

Table of Values

Circuit of the GDO Modulator

C1, C2,	= .01 μ F	R8, R14 =	1,000 ohm
C3, C8 =	.01 μ F	R10 =	6,800 ohms
C4, C5 =	25 μ F, 10v.	R11 =	1 megohm
C6, C11 =	0.1 μ F	R12 =	680 ohms
C7 =	2 μ F	R13 =	68 ohms
C9, C10 =	.05 μ F	RFC =	2.5 mH RF choke
R1 =	22,000 ohms	L =	see text
R2, R3,		T =	Transistor o/p
R4, R5 =	10,000 ohms		xformer, pri. to
R6 =	4,700 ohms	TR1 =	OC44
R7, R9 =	470 ohms	TR2 =	OC72

into use, some experimental work is called for to ensure correct operation.



The Radionics constructional system is a very interesting new kit-of-parts-with-instructions method for the teaching of radio and electronics, and for independent experimental work. It consists basically of a transparent panel drilled to a standard pitch, with a variety of pre-mounted components and brass strip to effect the connections, which are made by nut-tightening and not soldering (so that components can be kept "clean" and continually re-used). One of the main advantages is that circuits can be laid out to follow the diagram, and checked through the transparent panel. The kits include only best quality components and Mullard transistors and, apart from the instructional aspect, the system lends itself admirably to bread-board layouts for laboratory development, in the modern manner. The kit illustrated here is the Radionics Set No. 4, which will build 26 circuits up to a 6-stage transistor superhet.

CLEARING THE AIR

CAMPAIGN TO IMPROVE OPERATING STANDARDS AND LESSEN THE QRM

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

WITH 370,000 licensed amateurs in the world, and an average increase of over 50,000 a year, there could well be a doubling of our numbers by 1970. This would be fine if some beneficent authority were to double the width of our bands, although even in those improbable circumstances we should still be facing the same QRM levels as we are today.

Everyone realises that the congestion on certain bands, at certain times, has got beyond a joke, and that complete strangulation is sometimes very near. Therefore, since no one is going to widen them for us, we must take the matter in hand and do it for ourselves.

How could we double the effective width of the amateur bands, as we know them today? One answer would be a world-wide agreement whereby every amateur restricted himself to working for only half of the available time—either by going on the air on alternate days, or by restricting his operation to alternate periods of one hour or two hours. (Suggestions on the latter lines are already beginning to appear in *QST*—see March issue, p.45.)

This method would be effective (if it could be enforced), but would obviously be extremely unpopular. And it would be an admission of defeat—rather like improving the roads of England by allowing motorists out on alternate days!

How else, then? Well, there *is* another method. If we were all to talk less, that would be equivalent to increasing the space available on the bands. And this should be pretty easy, when one notes the enormous amount of long-winded natter that drools on and on without imparting any information whatever. And, of course, the use of long calls when a short, snappy one would be more effective. And the use of phonetics repeated *ad nauseam*, like “I spell for you” and so on. QSO’s would be no less enjoyable—far more so to the many good operators who, praise be, are still with us. And the sloppy ones would just have to behave better or be ridiculed, for *they* are the supreme wasters of air-space.

So far it sounds pretty easy, doesn’t it? But when we pass on from operating to technical know-how the picture clouds up a little. Bad *handling* of the station is one of our enemies; and a bad *station* is the other.

It is our special misfortune, in the U.K., that thoroughly bad stations abound within the first-skip area of 1000 miles or so. We are not concerned with technical or sociological implications here, but merely stating the fact. In several European and near-Asian

countries it is obvious that a semi-trained operator can be let loose with the most primitive gear, without the fear of the equivalent of a “pink ticket” ever entering his head. Either these countries do not go in for monitoring, or their authorities simply do not care what happens as long as it happens within the amateur bands.

Our own house is comparatively clean but by no means faultless, especially since SSB has come along with its more exacting demands for perfection on the technical side. But a G with a bad signal is relatively easy to deal with; how do you cope with an HA, an LZ or a YU (three typical instances) who, apart from having a thoroughly wicked signal, is virtually impossible to communicate with on the subject?

Nine times out of ten, if you tell one of these types that his signal is a bad T6, with chirp and clicks, he will reply “Tks for FB report, OM, my QSL sure”—and *then* where are you? The nearest the writer ever got to success was when a UA3 was reported as “597” and he replied “Everybody gives me T9”—which was, unfortunately, all too true. And there is one of the root causes of the trouble,

The Main Faults

It is not intended here to be so destructive as merely to reel off a long list of faults; rather, the idea is to suggest how they can be put right. But first we must examine them in more detail, so refer to Table I, which gives us enough to work on, and to form the basis of a clean-up crusade.

They have been categorised as “Time-Wasters” and “Space-Wasters,” but the effects on our effective band-space are similar. An operator who uses up twice the necessary time to complete a QSO wastes just as much of our narrow bands as another man whose signal is twice as broad as it should be. When the two turn out to be the same chap—well, there is someone we might really go to work on, with some profitable results.

First, the time-wasters. But please get this straight—it is *not* the intention that QSO’s should be reduced to the rubber-stamp standard. On the other hand, what one might call “unnecessary prattle” and



“... break, break ...”

"clever badinage" can be cut down without leaving only the bare bones. Listen to a great many phone nets, at some length, and if you are honest you will be forced to admit that a lot of people keep on talking for the sake of talking; that after an unbroken ten minutes' enforced listening to one member of the net, the others have come out of it with nothing except irritation and impatience; and that the next words will be "I'd better keep it short"! And the wind-bag concerned probably thinks, quite genuinely, that he has only been talking for a couple of minutes!

Too often one person in a net will work up some private joke with one other, and this will be flogged to and fro between them, with all the others wondering what on earth it's about. A two-minute limit "per speech" might well prove a healthy thing.

The Long Good-Bye

A friend's small daughter (aged seven) recently heard some QSO's going on, and was perspicacious enough to ask "Why do they take so long saying good-bye?" Why, indeed—three finals and a "final-final" still left two of the perpetrators working out variations on 73, see you again, thanks for a 100 per cent. enjoyable QSO, hope to meet you soon, all the best . . . they simply couldn't drag themselves away. And the other horror "This is G 9 Blah-Blah over, off, and in the clear with DJ4 Blah-Blah, located 25 kilometres north of Munich, and by for any possible call" . . . what does all that lot mean but "G 9 Blah-Blah Over"?

SSB's Advantage Lost

The vast majority of SSB operators, it must be admitted, are pretty slick nowadays. But there are always those who deliver long monologues and do not listen-through at all. Recently, a high-powered DL4 was heard to talk for over twelve minutes non-stop, using *aaaah's* and *uuuugh's* to hold his Vox in all the time. Several weaker stations broke in on his frequency (evidently trying to sign out of the QSO), but of course he didn't hear them. At the end, he rattled off a long list of calls and went over "for the group." Dead silence—there wasn't a soul on the frequency! Waste of precious band-space? Do you agree?

Many rude things have already been written about the unnecessary use of phonetics. To sum them all up, the doctrine is this: When you have been given a 5 and 9 report by someone, he hardly needs to be told that "John" is spelt "John Otto Henry Nancy," or even that you are located in "Lewis Otto Nancy David Otto Nancy." (If you happen to live in Paramaribo, or Tananarivo, or even Blagoveschensk, the horror is more complete!) Use phonetics when plain language cannot get through, by all means. At other times they are merely pretentious and make us all sound like a lot of Charlies (or Bakers).

CW Faults

Passing on to CW, we are confronted by a completely different list of time-wasters. The long-winded caller and the CQ DX'er are undoubtedly the worst, because in the very act of wasting time, they spoil

their own chances of a QSO and make their whole transmission pointless.

In cases where a snappy call such as "K4ZZZ de G3XYZ K" would probably raise the other man, "K4ZZZ" sent fourteen times will merely overlap someone else's snappy call and leave you still sending it after the other fellow has already started a QSO. Many, many times a "two by two," or even a "one by one" will prove the best way of hooking your man. If you miss him through being too long-winded, then every dot and dash you have sent is wasted and merely an addition to the QRM on the band. Of course, this does call for a snappy change-over system at both ends—which brings in the technical aspect of the problem.

The long CQ DX call is, perhaps, the worst curse of the lot. How often have you been in the middle of a DX contact when someone has swished on to the frequency and virtually blotted him out with a blind CQ DX call? And how often you would find, if you were free to listen to exactly what happens, that a weak DX station actually replies to this caller but is not heard at all. After a minute, *another* CQ DX, and on and on. The sad feature of this is that it is the chap who is not achieving anything who makes all the noise. Those who are actually working DX are usually in and out so quickly as to be unobtrusive . . . those who make the futile calls cause all the trouble.

For the rest—sending, on the key, "back she comes to you" instead of "K"; signing off with multiples of 73 and oft-repeated "bcnu agn, gb, 73, cuagn, tks for QSO . . ." A quick "Tks, 73, bcnu" is no less courteous, much more clean and tidy. And when you finally send SK, you should *mean* it, so that anyone can legitimately call you then without getting snarled up in still further good-byes.

The Bad Signals

Those notorious signals of the 1929 type—what can we do about *them*? Well, this is the stickiest part of the whole problem. We all know where the majority of them originate, and it's not in the U.S.A. or Australia or, in fact, most of the English-speaking countries. Consequently their owners are not likely to read these words or anything similar, but we *must* find a means of getting through to them somehow.

The Mittel-European character who replies to your "CQ DX" with a ghastly T7 creeper, in most cases simply doesn't know any better. His receiver matches his transmitter, and your signal is possibly the only one he can hear—so you *are* DX to him. In any event, most of them seem to imagine that "DX" is a necessary part of the CQ-calling procedure.

This, above all, is a matter for the I.A.R.U. and its member societies. Could an I.A.R.U. (Region I) Conference be more profitably employed than in this matter of bringing light to the more backward member-societies, towards a grasp of the fact that band-cleansing is necessary for the good of all? Not just for the benefit of a few DX-chasers who are getting annoyed, but for the mutual benefit of all, including the types who are continually fouling up

TABLE I

<i>Telephony</i>	
TIME-WASTERS	SPACE-WASTERS
<p>Unnecessary prattle, "clever" badinage.</p> <p>The long good-bye.</p> <p>Over-off-and-in-the-clear, etc.</p> <p>AM-type monologues despite using SSB.</p> <p>Er-r-r-r's and a-a-a-h's to "spoil" Vox.</p> <p>Unnecessary phonetics for words already known.</p> <p>"I spell."</p> <p>Unnecessary repeats with strong signals.</p>	<p>(AM)</p> <p>Over-modulation.</p> <p>Unnecessarily wide frequency-response.</p> <p>Inaccurate netting.</p> <p>(SSB)</p> <p>Overdriving, resulting in distortion products and broad signal.</p> <p>Unstable VFO.</p> <p>Inaccurate netting.</p>
<i>CW</i>	
TIME-WASTERS	SPACE-WASTERS
<p>Unnecessarily long calls.</p> <p>CQ DX calls on a busy band, missing the DX through not listening for it.</p> <p>Unnecessary repeats of words, reports, names, etc.</p> <p>Use of phone technique—e.g. "Back she comes to you, om."</p> <p>Long and repetitious sign-off.</p>	<p>Broad signals (overcoupling, etc.).</p> <p>Heavy AC modulation of signal.</p> <p>Instability : (a) Wobbles. (b) Chirps. (c) Drift. (d) Clicks.</p> <p>Bad netting (occupying two channels instead of one).</p> <p>Failure to observe instructions from a DX station —e.g. "Call 5 dwn."</p>
<i>All Modes</i>	
TIME AND SPACE-WASTERS	
<p>Use of unnecessarily high power for solid QSO's.</p> <p>Cross-town contacts on a band open for DX.</p> <p>All "blind calls" made without really studying the situation on the frequency first.</p>	

the bands because they don't know any better.

This is not a matter for abuse or invective. It's all very well talking over the air about Klub stations with Klot operators, about Lids and Charlies . . . but they have got to be *educated*. It's not enough to suggest that they should be boycotted on the air, for that happens already, to a certain extent. Very rarely will the good operators be bothered with them; but that doesn't worry them, for they carry on happily with others of their own kind, with equally shocking signals and operating.

Line of Action

It would seem that the best—and, indeed, the only—way in which the problem can be tackled is for the I.A.R.U. societies to be impressed with the need for spreading the doctrine of cleaner signals, better operating standards and a much tighter control over (and the education of) the inexperienced and

ignorant element. This applies particularly in those countries which licence collectives—always recognisable because the first letter of the suffix is a K, e.g. LZ2KZG, UA3KAE, HA5KFT, YU3KAD, etc.—permitting any member of the Klub to operate, whether he knows anything about it or not.

This would require a conference devoted to the formulation of standards and agreement on the rules of procedure to be observed and applied, and then the reiterated publication of these rules and standards in the various national Amateur Radio periodicals—of which every country has at least one. Even this would not meet the whole case, however, for the reason that not all EU national societies are members of the I.A.R.U. But if the principles could be established, and they begin to be observed by the majority, all will tend to work to them.

At the moment we are in danger of being swamped out of existence by operating which is

thoughtless, uneducated and unintelligent, to put it no lower than that. And it should be remembered that these stations are increasing *every day*.

Once we can get in among them with the right sort of propaganda, and explain to them that they will be more successful if they clean up a bit, then there may be some hope of results.

If only the relevant member societies of the I.A.R.U. could institute their own band-monitoring schemes, what a change might come about. Even the QSL Bureaux could be pressed into action to

apply the sanctions!

This subject is very big, and tremendously important for us all. The present intention is to return to it again and again, until some kind of action is agreed upon. Meanwhile it is up to every single user of our bands, first to put his own house in order and then to be honest but ruthless in his reports on other people's signals. Passive tolerance will get us nowhere . . . active participation in a campaign may, at least, stand a chance of producing ultimate results.

PEAK AUDIO LEVEL METER

INTERESTING MONITOR DEVICE

R. G. FENBY (G3PLS)

ONE of the essential requirements today is adequate and proper control of modulation—which should always be enough, but never too much, with anyway a narrowed frequency-response in the speech amplifier.

The circuit here shows a simple but extremely useful test instrument for speech-amplifier monitoring and modulation percentage checking—its primary use is for modulation monitoring because it does not respond to average, or mean, levels nor to r.m.s. voltages as do other meters, but directly to the *peak* modulating voltage within a certain time-period, after the manner of a correctly-connected oscilloscope. Essentially, it is a modified valve voltmeter.

To look at the matter in another way: If a usual type of indicator were fed with the speech-voltage waveform shown in Fig. 1, it would give a reading such as "A," which is the average or r.m.s. value. If this waveform-input were being used to modulate a transmitter, the reading "A" would not tell anything about instantaneous modulation due to the speech peak "P," since "A" is of lower amplitude than "P"—and it is "P" that does the damage. If, however, we had an indicator capable of reading always the peak value "P" of a modulating waveform, we have a measure of the quantity which is of most importance in the modulating process—for it is the speech-peaks which cause over-modulation; not the average speech level (such as is indicated on Class-B modulator anode current meters, or plate meters of SSB PA's).

It is clear, therefore, that a *peak* level meter would be a very useful adjunct to a speech-amplifier or modulator, either for AM or SSB phone. It comes into its own for monitoring the audio level into the reactance modulator of an NBFM transmitter, where it is otherwise almost impossible continuously to check the frequency deviation. Another application is as a monitoring device for audio equipment such as tape recorders and for adjusting the level in mixer layouts.

Circuit Points

The full circuit of the peak audio level meter is shown in Fig. 2. V1A, half a 12AU7, is a low-gain buffer amplifier which produces around 5 volts peak output for about 1v. peak in, and feeds the silicon diode D1, which performs two functions: First, it rectifies the audio to provide a DC output; this quickly charges up C6, the voltage on which follows very nearly the peak voltage of the input waveform, as it charges up; in order to make use of this peak voltage to actuate an indicating meter, it is arranged that C6 discharges only relatively slowly through R9; this gives a characteristic such that the meter needle rises quickly to the peak value, but drops back only slowly after that peak has passed; in fact, C6 is not recharged until another input peak occurs greater than the voltage across C6 at any particular instant, accomplished by D1 also acting as a gate; this is the secondary function of D1. The "charge time-constant" of the network R8, D1, C6, R9 is of the order of 50 milliseconds, and its "discharge time-constant" is about 2 seconds.

Operation of the meter is by V1B, connected as a DC bridge amplifier; this gives forward reading (if the meter is connected the right way round, positive side to anode V1B), and there is no chance of the meter needle smacking the stop.

Setting Up

Remove V1B cathode lead and connect all supplies, including LT to V1B. Check that V2 is striking and then adjust R12 for full-scale reading. Reconnect V1B cathode and adjust R11 for zero meter reading.

[over

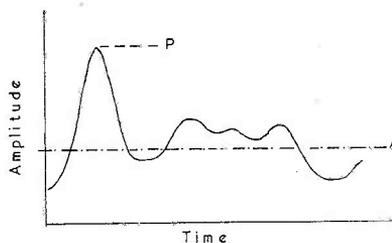


Fig. 1. Speech waveform showing a peak "P," which is indicated by the device shown in Fig. 2. At "A" is the average level, as measured by most monitoring devices. It is the peak voltages which cause over-modulation effects and splatter.

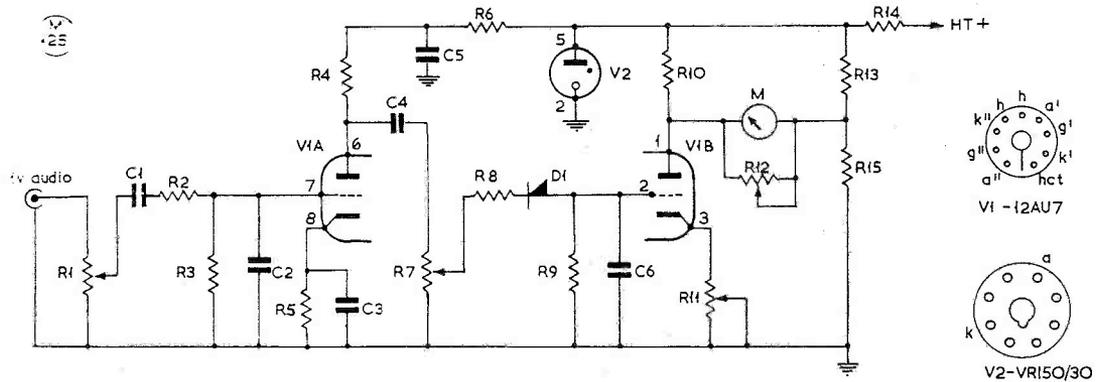


Fig. 2. Circuit of the Peak Audio Level Meter. A speech voltage input of about 1v. is taken off from some point in the speech-amplifier/modulator chain, and the action of the device is such that speech peaks only are indicated on the meter in the anode of V1B. V1A is a low-gain amplifier, D1 rectifies the audio for charging C6, and V1B is in bridge with the meter. Circuit function is explained in the article and all values are given in the table.

Table of Values

Fig. 2. Circuit of the Peak Audio Level Meter

C1 = .05 μ F	R8, R10,
C2 = 100 μ F	R13 = 4,700 ohms
C3 = 25 μ F, 25v.	R9 = 2.2 megohms
C4 = 0.1 μ F	R11 = 5,000 ohms
C5 = 8 μ F	R12 = $\times 3$ meter rest.
C6 = 1 μ F	R14 = To suit V2
R1 = 100,000 ohms	R15 = 56,000 ohms
R2 = 15,000 ohms	M = 0-1 mA, m/c
R3 = 330,000 ohms	D1 = Silicon or
R4, R6 = 10,000 ohms	germanium
R5 = 1,000 ohms	V1 = 12AU7
R7 = 25,000 ohms	V2 = VR-150/30

Notes: Value R12 depends on internal resistance of meter used; R14 should be calculated for V2 and actual HT voltage. D1 can be a silicon diode of not less than 50v. p.i.v., or a germanium rectifier having a reverse resistance greater than 10 megohms. R1 is only necessary if peak input voltages much over 1v. are likely. R7 and R11 should be pre-set type. R13 is rated 2w. and all other resistors except R14 can be $\frac{1}{2}$ -watt.

Connect the input end of the device by a screened lead to the point at which it is intended to monitor the audio; an output of at least 1-volt peak should be available at this point. Probably at the driver of the modulator would be the correct stage to use, but the amplifier gain control must always be at some point in the circuit earlier than that at which the check voltage is being taken off. If this monitor point is giving much more than 1-volt peak output, it can be adjusted down by the input gain control R1.

The next step is to set up the speech amplifier, modulator and the transmitter itself until it is operating under 100 per cent modulated conditions. Since this adjustment need only be done once, it is as well to carry it out using a tone generator and an oscilloscope (borrowed for the purpose, if necessary).

Finally, of course, peak level indication is obtained by adjustment on R7 with the transmitter running under 100 per cent modulation, the setting on R7 being to bring the meter up to rather less than full-scale deflection. Thereafter, the transmitter should never be operated in such a way that the meter needle is pushed beyond the "100% mod." point. Any

major change in the operating conditions of the transmitter itself would, naturally, involve going through the setting-up procedure again to find the new 100%-modulation reading for the Peak Audio Level Meter.

(This article is based on notes by G3PLS in the February 1963 issue of the M.A.R.S. News Letter.—Editor.)

ANOTHER NOTE ON SILICON DIODES

Further to the article, "Notes on Silicon Diodes" in the April issue, G3NSU (Manchester) writes that another possible failure to be guarded against when using silicon diodes is that of damage by overheating, the source of the heat being the surge-limiting resistor. This can be obviated by connecting the diode to the resistor through 4 or 5 inches of 18g. wire, looped to save space.

AMERICAN HEATHKIT RANGE ON MAIL ORDER

We are asked to announce that Daystrom, Ltd., Gloucester (who supply Heathkit equipment in the U.K.) have made a special arrangement with the American Heath Co. by which Daystrom's can accept orders for any of the wide range of American Heathkit models for direct delivery to customers in the U.K. This opens up to British buyers what is unquestionably the world's greatest selection of electronics kit models, covering a great variety of equipment, much of which was previously unobtainable in this country. All these models are offered at attractive prices due to the saving in costs effected by direct delivery. To facilitate business, copies of the latest American catalogue with full details of the scheme are available from: Daystrom, Ltd., Dept. S.W.M., Gloucester, at 1s. each, post free. Whether you buy anything or not, this catalogue is well worth having for reference.

ON THE ISLE OF MAN AGAIN

STORY OF GB3CUW/GD6UW,

MARCH, 1963

M. C. W. Sandford (G3PIT)

(Cambridge University Wireless Society)

THIS is the fourth year that the Cambridge University Wireless Society has mounted an expedition to the Isle of Man during the Easter vacation. It might perhaps be pertinent to explain why the C.U.W.S. repeats its trip to GD. Unlike proper DX-peditions, the primary aim is not to hand out large numbers of QSO's for DXCC or WABC, or whatever. The active stations on the Island do much more of this than ever we could hope to—our aim is to have an enjoyable holiday and at the same time gain operating experience. The improvement after ten days on the Island in a recently-licensed operator's technique on the air has to be believed.

Every year there are new members of the University wanting to go somewhere and a few members who know the ropes on GD, so it is only natural that we should again make for the Isle. The Easter vacation is the best time except from the point of view of the generally rather poor VHF conditions. However, the Summer Vacation is out of the question, since members of C.U.W.S. may be doing anything from hiking around the States to selling ice-cream on the beach!

This year we travelled over to the Isle by ship from Liverpool on 21 March. Miraculously, all the gear got to our boarding house in Douglas without any losses. In the party were: G3NUH, G3OQP, G3OYW, G3PIT, G3PKB, G3RSE and SWL's Bibby, Burden and Towers. G3MZM and G3PWT joined us later. We managed to get two stations running simultaneously—on 160m. and on the HF bands, both under the call GD6UW (with the approval of the G.P.O.). For Snaefell, where our VHF station was scheduled to operate from March 26, the Post Office had issued the special call GB3CUW.

HF Bands, GD6UW

The Hammarlund Co. of New York very kindly sent over a new HX50 transmitter so that we could try our hand at SSB and this, coupled with a K.W. Electronics KW 77 receiver made a very fine set-up. However, initially we had some trouble on SSB, and got back comments such as "I think that funny noise is calling me." The fault was not in the loading of

the Tx, which was very simple due to the ingenious circuitry, but a bad connection in the microphone lead was introducing a tremendous hum. This foxed us for some time, until with the help of GD3GMH it was put right. Reports on the quality of the Sideband signal were then excellent (even from those stations who did not want a GD QSL!). In the time that remained we had a good number of QSO's including over one hundred in the CQ SSB Contest. Surprisingly, we were not able to establish any prolonged pile-ups in the Contest. Presumably our low power 50 watts p.e.p. got lost in the tremendous QRM, and there were a great many EU prefixes in competition with us.

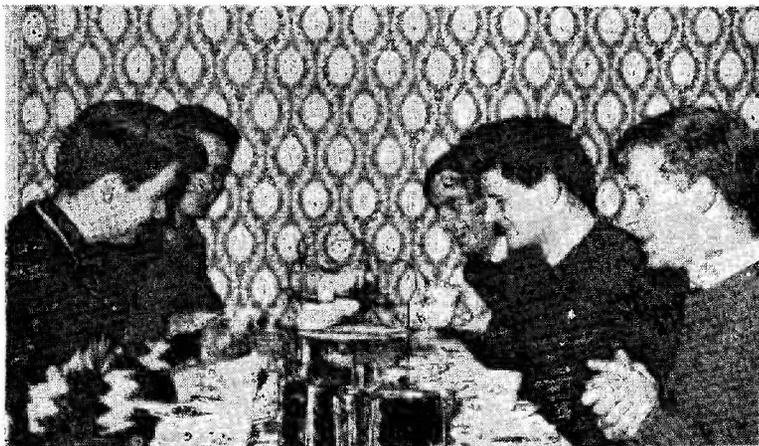
The HX50 also performed excellently on CW. Frequent reports of T9x were received (and not all from QSL seekers, either). Several times we made more than 30 QSO's an hour and the record was 50 contacts during one hour of the ARRL Contest.

The KW 77 performed magnificently, whether on SSB or CW. And we soon became adept at tuning in an AM station in the SSB position and dodging the QRM simply by switching to the other sideband. Judging by the amount of DX we were hearing on the KW 77 we thought propagation conditions were excellent. However, the locals all said conditions were fair only, and when they handled the receiver they realised why we had been misled!

The Mosley V3 Junior trap vertical, mounted at the top of the house, worked as well as ever, giving us all-round coverage and low-angle radiation. As an efficient, compact aerial for 10m., 15m. and 20m. it is hard to surpass. For 80m. and 40m. we used a tuned doublet.

In all we made about 920 QSO's, mostly on 20m., but with a few W/VE stations worked on 80m., both SSB and CW, and experienced some nice EU and W pile-ups on 40m. CW. We managed 52 countries and would have worked more if we had searched for DX rather than fished by calling CQ.

[over



The boys who did the work to keep GB3CUW/GD6UW on the air during the C.U.W.S. Easter DX-pedition. Left round to right: SWL's Towers, Bibby, G3PWT, G3MZM and SWL Burden — there were several others in the party, not included in this particular tea-time group. Between them, they made more than 1,200 QSO's on all bands 2-4-20-40-80-160 metres — and had a very good time into the bargain, with much valuable operating experience gained.

Top Band

Here we were using a Labgear Topbander Transmitter end-feeding a bent 264ft. wire through an ATU, with the voltage node about 30ft. above the ground. This combination worked very well, both for G's and EDX. We had good U.K. coverage on CW from about 1600. On phone we worked into the London area with S8 reports when conditions were good. In Europe we worked quite a number of OK's and also DL's, HB9T and OH3NY. Heard but not raised (despite much patient work by G3PKB) were ZL3RB (peaking RST-559), 5A3CJ and of course W's. An old S.640 was used on the receiving side, except of course for the real DX pulled in on the KW 77. In all about 250 QSO's with 9 countries resulted on 160 metres.



A general view of the HF and Top Band station at Douglas, I.o.M., signing GD6UW, with G3RSE at the 160m. rig on the left, and G3MZM operating on the HF bands, for which the gear consisted of a Hammarlund HX-50 CW/SSB transmitter and KW-77 receiver. For 160m., the transmitter was a Labgear Topbander and the Rx an S.640.

VHF—GB3CUW

At G13HXV's suggestion we decided to go on four metres this year. However, the converter we built refused to neutralise, and progress on the transmitter was very slow. G3EDD came to our rescue, and through the Pye Telecom. Amateur Radio Group (G3PYE) the loan of a 4m. Tx (35 watts) and a converter (IF 3.2 to 3.4 mc) was arranged.

On passage to the Island the converter collected a heavy blow and the RF amplifier neutralising coil was completely smashed. Another former was

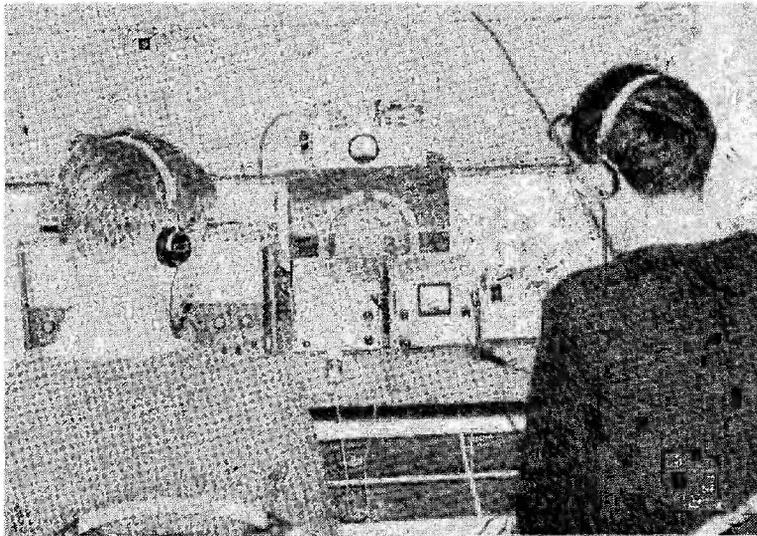
obtained from an old TV set, the coil rewound, and with the help of GD3FXN and his signal generator the coil was trimmed.

Everything was connected up on the top floor of the house, but no QSO's resulted from GB3CUW/A as the second-channel QRM from the BBC TV transmitters two miles away was overwhelming. But G3PJK in Manchester reported us S6 on 4m. when the aerial was resting on an iron bedstead and firing through a terrace of houses!

A party from the expedition arrived at the Ministry of Aviation Radio Station at the summit of Snaefell at about 2 p.m. on the Tuesday, March 26, and had a very busy time erecting aerials. The J-Beam 5-ele 4m. Yagi was mounted on a make-shift mast about 12ft. off the ground. Rotation was a two-man job. The J-Beam 6-over-6 for 2m. was put inside a wooden lattice tower about 25ft. up or 2,060ft. above sea level. Manual rotation was very easy, due to the light weight of the assembly, but it did involve climbing up a ladder, which in darkness with a gale blowing and everything iced up, was not too pleasant. Both these J-Beam arrays stood up to the conditions very well and worked excellently.

Four Metres

At 1820 we switched on and heard G13HXV calling on sked at S9 off the back of the beam, which was then firing SE. He was duly worked for what is believed to be the first 4m. QSO ever made from GD. Immediately after-



The VHF station at the Ministry of Aviation site on the summit of Snaefell, I.o.M., with G3RSE in front of the 4-metre gear (lent by the Pye group) and SWL Burden (left) doing the logging. GB3CUW was the callsign on four and two metres, the gear for the latter band being Withers throughout, with an Eddystone S.940 receiver as IF/AF strip. Some 17 stations were worked on 4m., and 45S on two metres.

wards G3PJK was worked S9 both ways, then G3AYT/M, mobile in Hyde, Cheshire. Later that evening GM3FYB was raised (S9 both ways) on the 130-mile path over the Scottish hills. Subsequently, a number of G's and GI's were added in, also GW3MDY for our first GW QSO. Despite GI3HXV's attempts to arrange a sked for us, we didn't manage to get into EI.

We worked 17 different stations on 4 metres and the best DX was G3EHY at about 210 miles. Unfortunately, we had not arranged any skeds with the Home Counties and despite calls on C and careful listening, we heard nothing from the south-east.

Those who wondered at the shocking quality of the audio on the first few nights will be interested to learn that this was due to the use of a pair of headphones as a microphone. The 2K moving-coil mike was temporarily inoperative as a result of someone pulling the lead off the insert!

One point to would-be 4m. operators we suggest from experience is that the surplus crystal that gives a frequency of 70.29 mc be avoided, for this is the QRM channel, which we have heard sounding just like 80m. on a Sunday morning—four or five deep.

Two Metres

Here we were using the very compact Withers gear, a TW2 10-watt Tx with PSU, and a Nuvistor converter. This performed excellently both on phone and CW and all the QRP seemed to be getting out despite the poor-to-average conditions. We used Bob Towers' 416B preamp. (complete with forced-air cooling) to give that extra dB or two on DX signals, and we were receiving stations very loudly. As the IF/AF strip, 28-30 mc for two metres and 3.2-3.4 for Four, we had an Eddystone 940, with which we were very impressed. Its good selectivity and crystal filter made all the difference on weak signals. SSB stations were very easy to resolve, and the smooth drive mechanism and the logging scale were a joy to use. The latter once calibrated made possible accurate frequency checking for skeds.

After several "half" QSO's we raised G3FAN who, with G3EVV, was our best DX at about 280 miles. G3EDD of Cambridge and some Midlands stations were worked, the remaining contacts being in the 60-100 mile category.

We actually heard several Home Counties stations and we know a few heard us, so we should have raised much more DX. The reasons why we didn't probably lie in the fact that only two of us had any previous experience of VHF working (and that was one evening on last year's trip). To be convinced of this you only had to hear us "working"



A close-up of the Top Band station for the GD6UW Easter vacation expedition, G3RSE of the Cambridge University Wireless Society in charge. Some 250 contacts were made on 160m. and many U.K. operators made it with GD for the first time.

a DX station who was not hearing us, or not copying the reply from a station to whom we had given an S7 report! The first evening when conditions were best for DX, there were so many local stations calling us that we went on to phone to work them, and later—what with up to 3 inches of snow, gales, rain, and water in the coax connectors—DX signals seemed to go down.

By Sunday night, March 31st, when we closed down, GB3CUW had worked 45 stations in the five surrounding countries.

Conclusion

Monday, April 1st, was taken up in packing the equipment, and the main party left Douglas on Tuesday morning after a very enjoyable trip. By the time this is published, all QSL's should have been sent out *via* the bureaux. Any direct cards should go to G6UW (QTHR).

Our thanks to the locals for their help and advice, particularly, in addition to those already mentioned, GD3EGF, GD3HQR, GD3PRO, and the local QSL manager GD3ENK.

To the manufacturers: Hammarlund Co.; K.W. Electronics, Ltd.; Stratton & Co. Ltd.; Withers Electronics; Labgear, Ltd.; J-Beam Aerials Ltd. and Mosley Electronics Ltd. (and of course the G3PYE group) our sincere thanks for the generous loans of equipment, without which the 1963 C.U.W.S. foray to GD would not have been possible.

The most outstanding thing that a trip like this teaches one is that the nebulous thing called the "Amateur Spirit" really exists and can be relied on to come into play when difficulties arise or help is wanted.

OPENING OF THE MOBILE RALLY SEASON

BY the time this appears, one of the most important Rallies in the season's programme will be in the past—it is not possible to cover the Trentham Gardens event here and now, but there may be a mention of it in the Stop-Press column on p.149 of this issue.

Information has been received about three further Rally meetings, and they have been taken into the calendar. Starting in the June issue, we shall be resuming the regular "Mobile Scene" summer feature, reporting on the Rallies and other matters of /M interest until the end of the Rally season. Events scheduled are as follows:

May 5: Thanet Mobile Rally, cliff-top site at Cliffsend, Ramsgate, Kent, with talk-in by G3DOE/P on 160m. and G3BAC/P on two metres. Further details from: R. A. Bastow, G3BAC, 31 Canterbury Road East, Ramsgate, Kent.

May 11: Mobile Rally arranged by Radio Club of Loughborough, at Southfields Park, Loughborough, Leics., in conjunction with the Toc-H Brass Band Contest. Talk-in stations G3RAL/A on 1920 kc and G3PSL/A on two metres, in operation from 10.0 a.m. Admission 1s., juniors 6d., for Toc-H funds; free parking. Take A.6, entrance to ground near town centre. Refreshments available on site. Further details from: J. S. Davis, hon. secretary, Radio Club of Loughborough, 12 Avon Vale Road, Loughborough, Leics.

May 12: Hamfest organised by the Grimsby Amateur Radio Society, Birds' Nest Café, Boating Lake, Cleethorpes, Lincs., to which visiting mobiles are invited. Assembly is at 2.0 p.m., and tickets at 10s. each are obtainable from: B. Walster, 47 Richard Street, Grimsby. Cleethorpes is a seaside town with all the expected by-the-sea attractions.

May 26: Peterborough Amateur Radio Society bucket-and-spade party at Hunstanton, Norfolk, another by-the-sea venue and right on The Wash. Talk-in, from 10.0 a.m., will be by G3ANM on 1980 kc. Contact D. Byrne, G3KPO, Jersey House, Eye, Peterborough, Northants, for further information.

May 26: Cheltenham Mobile Rally, to be preceded by a Mobile Dinner on the evening of Saturday, May 25.

May 26: Rally at Harewood Park, near Leeds, organised by the Northern Amateur Radio Mobile Society.

June 2: Organised by R.S.G.B. Mobile Committee, at U.S.A.F. Base, Wethersfield, nr. Braintree, Essex, with a comprehensive programme of attractions for all ages and interests. Ample indoor accommodation if wet, and catering on site. Talk-in by GB3RS on two metres and 160m. The U.S.A.F. authorities are co-operating in staging displays, and there will be a trade show and an exhibition station.

June 2: Reading Amateur Radio Club mobile picnic at the Childe Beal Memorial Trust, Basildon, Pangoourne, Berks.

June 16: Amateur Radio Mobile Society Rally at Barford St. John, near Deddington, Oxon.

June 23: Bridlington Amateur Radio Society Mobile Rally now cancelled.

June 30: West of England Mobile Rally at Longleat House, near Warminster, Wilts.

June 30: Rally organised by Pembroke Radio Club for all GW amateurs, at Regency Parish Hall, Saundersfoot (by the sea), Pembs. Talk-in by GW2OP/M and G3LXI/M on 1876 kc. Tea will be provided at 5s. adults and 2s. 6d. juniors. Lunch facilities available locally. Bookings, by June 25 latest, to: G. C. Price, GW2OP, hon. secretary, Pembroke Radio Club, Hillcourt, Freshwater East, Pembs., West Wales.

July 7: The South Shields Mobile Rally.

July 14: Chiltern Mobile Rally, West Wycombe, Bucks.

July 28: Mobile Rally at R.A.F. Stradishall, Newmarket, Suffolk. Details later.

August 11: Mobile Rally at the Royal Naval College, Dartmouth, South Devon, where for the last 40 years officers of the Royal Navy have received their early indoctrination. Organised jointly by the Torbay Amateur Radio Society and the R.N.C. Amateur Radio Club. Rally details will appear in later issues.

August 18: Derby Amateur Radio Society annual Mobile Rally.

August 25: Reading A.R.C. Rally at Pangoourne, Berks. (as for June 2).

September 15: Lincoln Short Wave Club Rally and Hamfest.

Organisers of the events listed after May are asked to let us have any final details—programme, catering arrangements, call signs of talk-in stations, and other relevant information—in good time for appearance in the appropriate issue. The firm closing dates are: For June, *May 21*; for July, *June 18*; for August, *July 16*; and for September, *August 20*. These dates apply only in respect of the Mobile feature.

NEW CO-AXIAL TETRODE FOR BANDS IV AND V

Mullard have announced a new co-axial tetrode (type YL1140) intended for use as a high gain UHF amplifier at frequencies up to 900 mc. in the driver or output stages of television transmitters operating in Bands IV and V. Under typical operating conditions in a Class-B grounded-grid television transmitter on at 800 mc, an RF power output of 500 watts can be obtained with a drive power of 50 watts. When used in this way the YL1140 requires an anode voltage of 2.5 kV and a screen grid voltage of 500v. Anode current is 560 mA and the heater is rated at 9 volts, 10 amps. The valve incorporates an integral radiator and requires forced air cooling.

ANTARCTIC ACTIVITY

LOCAL SITUATION AND CONDITIONS

From Notes by

K. J. RANDALL, G3RFH/MM-VP8HF

G3RFH left the U.K. last autumn aboard H.M.S. *Protector*, bound for the Falkland Is. and licensed as G3RFH/MM, which allowed him to use 28 mc only. Despite this cramping of his style, he persevered with his Heathkit DX-40, spending several hours on the band on both CW and phone. The first reward came on November 17, off the Brazilian coast, when VQ2W was worked on CW; half an hour later came the first phone contact, with LU3DVN. Soon a daily sked with VP8GO (Port Stanley) was in operation. Many W's were also worked on phone during the passage southwards from Rio de Janeiro, and ZSIAB was the one and only easterly station worked thereafter.

Around the VP8 territories, nothing was heard for several days, but in mid-December a surprise contact with EA8AH cheered things up. Then it was found, in Port Stanley, that a VP8 licence, covering the whole vast area of the British Antarctic territories as well as the Falklands and Dependencies — see *DX Zone Map*—could be supplemented by an /MM permit down there, so the calls VP8HF and VP8HF/MM were acquired, and the other HF bands became available.

VP8HF soon found that his call was in brisk demand on 14 mc CW, and long strings of W's could be worked every evening, but some all-night sessions were necessary to find out how to get into Europe. Eventually it was established that the best times for Western Europe were between 1830 and 2100 GMT and again from 0700 to 0830 GMT, and several contacts were made (all will be QSL'd when the cards come to hand).

Active VP8's

All VP8's in the Antarctic are the radio operators at the British bases there, and most have only the evenings free for amateur-band work. Some are further restricted by local power-supply difficulties. Probably the most active, and best-known, is VP8GQ on Signy Island (South Orkneys); VP8HD and 8FJ (both Falklands) are also on regularly, the first on CW and the second on phone, mostly 14 mc.

VP8GF is on South Georgia and now has an assistant operator using the same call, mostly on 7 mc CW. VP8GB on Adelaide Is. is moving back to Deception Is., where he will be spending the winter (our summer, of course).

General impressions by VP8HF are, first, the complete lack of QRM and the freedom from ignition noise and all forms of man-made static! Really

weak stations can be winkled out far more easily than in the Northern Hemisphere. Though many of the VP8's operate only rarely, and then only among themselves, those who are DX-minded are in great demand and quickly snapped up.

Constructional work is not easy, owing to shortage of equipment, and anyone lucky enough to have anything in the nature of a junk box has to guard it jealously. Very high winds make aerial erection a hazardous business, so most of them are only 25 feet or thereabouts.

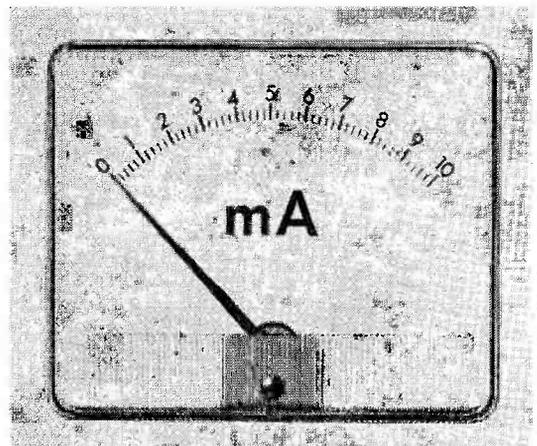
Future Plans

When *Protector* left the Falklands, G3RFH/MM was again confined to the 28 mc band, using both CW and phone. The ship will be following the west coast of South America, through the Panama Canal to Bermuda and thence to Portsmouth, where G3RFH/MM should be arriving on May 15.

But another trip is to follow, later in the year, and VP8HF/MM will be taking the air again from distant parts.

BRISTOL TECHNICAL COLLEGE, G5FS

In the late 1920's, a well-known amateur in the Bristol area was W. A. Andrews, G5FS, lecturer in electrical engineering at what was then the Merchant Venturers' Technical College, a privately-subsidised educational institution, open to all who could benefit from it. Merchant Venturers' has become the Bristol Technical College, within the State educational system, and W. A. Andrews has long since gone on. One of his students in those days was R. Griffin, G5UH, and now himself a lecturer at the College. Most appropriately, therefore, he has been able to get the old G5FS callsign re-issued for the Bristol Technical College.



The rather nice faces on the new design of moving-coil meters now being manufactured by Taylor Electrical Instruments, Ltd. In three different sizes, the scaling is from 10 microamperes upwards into the milliammeter and voltmeter ranges. The styling of the case and scale is such that readings are shadowless with maximum lighting.

SSB GENERATOR USING R.206 FILTER

SURPLUS RECEIVER UNIT GIVING
40 dB SIDEBAND SUPPRESSION

A. R. PREEDY, Grad. Brit. I.R.E. (G3LNP)

THE R.206 which has recently appeared on the surplus market at a reasonable price, is an Army communications receiver employing two switched crystal filters in a 465 kc IF amplifier. These give passbands suitable for reception of CW, and teleprinter or phone signals. The "wider" of the two filters has a passband suitable for use in an SSB generator. A plot of the results obtained for one of these filters adjusted correctly is shown in Fig. 1.

The circuit of the wide filter is as Fig. 2, and will be seen to consist of two tuned circuits of very high "Q" coupled together and tuned to 465 kc. Coupling is achieved by the mutual inductance of the two coils and by the combined reactance of the crystal and its parallel capacitors. The nett effect is that at two frequencies either side of the resonant frequency of the crystal coupling is zero (theoretically). Hence the very steep sides of the curve—see Fig. 1. The small resistor R1 forming a common coupling impedance at the bottom ends of the coils gives a fine control of the shape of the top of the passband, *i.e.* single or double hump, or flat. R1 is actually a short piece of resistance wire, visible at the top of the filter unit and it will not usually require adjusting.

Practical Considerations

A simple arrangement, used by the writer and found to give good results, is shown at Fig. 3. A single 12AX7 is used as audio amplifier with a crystal

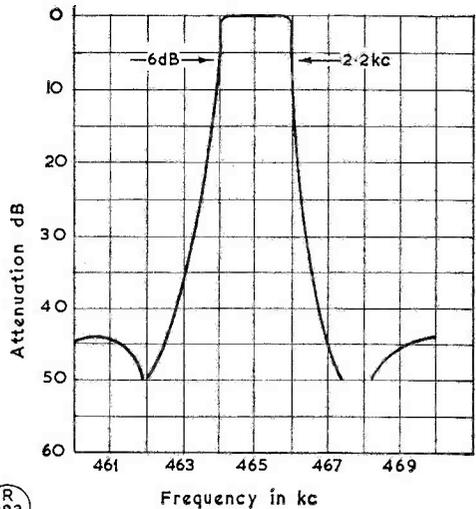


Fig. 1. Resonance curve of a typical R.206 filter unit. This is good enough for use in an SSB generator giving 40 dB unwanted sideband suppression—see Fig. 3.

Table of Values

Fig. 3. Circuit of the Sideband Generator

C7, C13 = .01 μ F	R4 = 500 ohms
C8 = .002 μ F	R5, R6,
C9, C10 = 22 μ F	R10, R12 = 100,000 ohms
C11, C17 = 50 μ F	R7 = 20,000 ohms
C12, C19 = 100 μ F	R9, R11 = 4,700 ohms
C14 = 10 μ F	RFC = 2.5 mH RF choke
C15, C16 = 0.1 μ F	X2 = See text
C18 = 200 μ F	T1 = Triode to 600 ohms
Ct = As fitted IF xformers	D1, D2 = Matching OA91's
R2 = 680 ohms	V1 = EF80
R3, R8 = 1,000 ohms	V2 = 12AT7

NOTES: All resistors are $\frac{1}{2}$ -watt. L1 is half IF transformer; L2, L3 are IF transformers; L4 is half IF transformer with 25 turns 38g. near tuned winding; L5 is tuned to 3.7 mc.

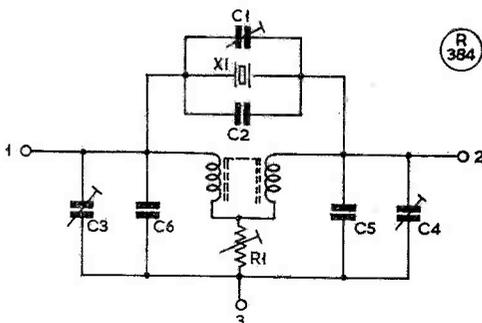


Fig. 2. Circuit of the R.206 filter discussed in the text. The nominal values are: C1, 30 μ F; C2, 15 μ F; C3, C4, 100 μ F; C5, C6, 746 μ F. R1 is explained in the text, and the crystal is a 465 kc bar.

microphone. The filter loss is quite low and this set-up when followed by a Class-A 6CH6 stage will provide ample drive to a pair of 6146's in Class-AB1.

The carrier frequency crystal is an FT-241A ch. 335, edge-ground to 300 c/s above the upper 6 dB point on the filter response curve—in this case 466.3 kc, but this will not be correct in every instance as the band-width of these filters varies with different specimens and it will be necessary to adjust the oscillator frequency after the unit has been aligned.

Alignment

A signal generator or BC221 will be needed to provide a signal for alignment in place of the carrier crystal in the oscillator circuit. Damage will be done to the filter if an input signal greater than one volt or so is used. Therefore, a sensitive valve voltmeter or receiver S-meter should be used as output detector. This may be on the filter frequency or

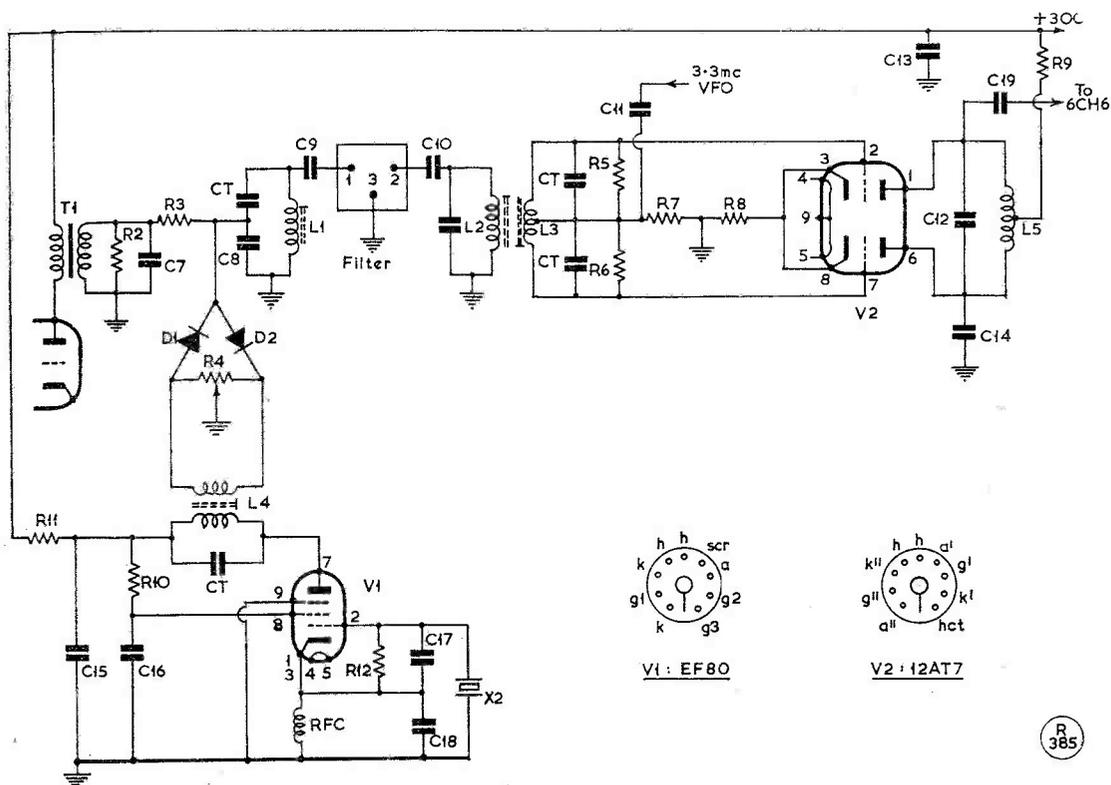


Fig. 3. The circuit designed by G3LNP to use the filter from an R.206 surplus receiver in an SSB generator. The filter unit, the characteristics of which are shown in Fig. 1, comes between C9 and C10 in the circuit and the arrangement will give sideband suppression of better than 40 dB, superior to the usual half-lattice configuration. This unit will give sufficient output for a 6CH6 to drive a pair of 6146's, making an economical SSB rig having adequate power rating in the PA. All values are given in the table, and it should be noted that D1, D2 are matched 0A91's.

on the output frequency in the 80-metre band. The procedure is as follows:

(i) Set the signal generator to 465.0 kc and adjust C3, C4, L1, L2 and L3 for maximum output (see Figs. 2 and 3).

(ii) Tune to 468.0 kc and adjust C1 for minimum output. Repeat (i) and (ii) several times because they interact.

R1 will not require adjustment unless the top of

the passband has any irregularities.

Results

On-the-air tests have given sideband suppression measurements of better than 40 dB, these results being superior to those obtained from a half-lattice filter on the same frequency. Users of the R.206 may find the system of alignment useful when adjusting the filters in the receiver.

LATEST AMATEUR LICENCE FIGURES

We are informed by the G.P.O. that the total of U.K. amateur transmitting licences in issue was 10,047 as at March 31. Of these 1,284 were endorsed for mobile operation, and 129 were for amateur TV transmission. The figures show a nett increase of 127 AT operators licensed in the three months January-March, 1963, with 33 more /M's and 11 ATV permits (which in most cases really means a licence to operate on the 70-centimetre

band without having to take the Morse Test). It is not possible to pin-point the issue of the actual 10,000th licence, because of the general ebb-and-flow of renewals, non-renewals and cancellations, but somebody who got his callsign during February holds the 10,000th U.K. amateur station licence. At the present rate of progress — a nett increase of about 500 a year — it is going to be some time before we see the next ten thousand!

DX COMMENTARY

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

ONCE again there are few grumbles about the month's DX. Conditions over the period have been fairly consistent, with the seasonal improvement really beginning to make itself felt. At the time of writing (mid-April) the Pacific DX season seems to have opened up, and *Twenty* in the early mornings is a happy hunting-ground once more. As one 'chaser was heard to say, there can't be much wrong when you find an SSB net with a KS6, a KB6 and two KH6's—and a G can actually break into it!

The only really noticeable effect of the declining sunspot cycle has been the deterioration of *Fifteen*, but in some ways that band is more interesting than it was last year. Being quieter, because of the scarcity of W's, a lot of tolerable DX has emerged at the CW end. On one snap check we heard a ZD3, a ZD8, a 6W8, a KP4 and some PY's at a time when most people assumed that the band was dead.

Forty and *Eighty* are less useful now than they were in the winter. Many parts of the world are too static-ridden to show much interest in these bands, and the noise level is undoubtedly higher. *One-Sixty* is recovering from its rather breathless spell of super-DX and is falling into place as a nice band for working up to 500 miles or so with the minimum effort . . . it is also pleasantly devoid of all the Clottery that makes the HF bands so painful at times.

We have left *Ten* until last in this quick survey, because there is still a chance that it will come



5B4CZ

CALLS HEARD, WORKED and QSL'd

back into use for various purposes. The Activity Period on April 21 is very briefly covered in "Stop Press" on p.149, but the main batch of reports will be reviewed next month. DX from South Africa and South America can still be worked on Ten, but no one really expects any East-West openings this year.

In short, with six bands to choose from, the average DX enthusiast hasn't much to grumble about, and the newcomers who never knew what a sunspot *maximum* was like are pretty happy.

Predictions and Actuality

There is still a certain amount of puzzlement about these good conditions, the level of which remains well above that suggested by usually reliable predictions. The two curves shown here are pretty interesting in this respect.

The upper line gives the actual figure sent by WWV each day (taken at some time during the afternoon), whereas the lower one shows the forecasts of WWV readings made by W3ASK in CQ. This is not in the slightest degree an attempt to "knock" these predictions of his, which have been

going on for years and have made for themselves the reputation of being pretty reliable.

Note, though, these two outstanding points: (a) At no point on the curves did the actual level fall below the predicted level; and (b) only on seven days out of fifty-five did the actual figure fall even as low as the predicted figure. On five occasions when "3" was forecast, the actual figure was "6." On four occasions (February 20-21, March 27 and 31) WWV was sending "N7"—which is as high a figure as he reached during several long spells of really good conditions during the past three years!

We hope to keep up these observations for some time, for what they are worth. WWV's figure applies only to the North Atlantic path, and even if it falls to a low level, DX from other parts of the world may still be tolerable or even good. What is fascinating is the obvious discrepancy between the forecast and the actual figure for the day.

There are enough active amateurs in the world to get together a wonderful correlation of results over various paths . . . we have an opportunity to carry out tests that the commercial circuits could never duplicate. But some central body is needed to undertake the sorting and classification of several thousands of reports, and such an organisation is not easy to find, or to keep together.

DX-Peditions

Last month we left Gus (W4BPD) on the Comoros, signing FH8CE. That was on March 14-15, and his stay was very short. His next appearance was from 5R8CM, whence the word got around that he would be on Tromelin by March 29. This did not happen, but about that date he turned up as FR7ZI (Reunion), promising the Tromelin affair by April 8. This turned up to schedule, and FR7ZC/T duly put that very rare spot on the map.

It seems that his future plans include the Glorieuses (FR7ZC/G), further operation from the Comoros (FH8CE) and then off to

FL8 and 4W1, followed by AC5, AC4 and AC3. After that, back to VQ9 and all parts of VQ8. We recently heard Gus described as a "portable QSO factory," which, while not doing justice to his phenomenal energy and operating ability, is not a bad description!

Other noteworthy sorties during April were various onslaughts on GC and GD; a Galapagos expedition by a big group of W's; PX1IR, Andorra, activated by DJØIR and DJ5KW; TC3ZA, Turkey, managed by our old friend Rundy (W3ZA) and a more-than-possible effort from the Yemen. M1VU—DL's in San Marino—was also active.

JA1EEB/KG6 and KH6PD/KG6 both kept Marcus Island in business, while W9WNV/KG6R was on from Rota Island (Marianas). CEØAD, a new operator on Easter Is., was winkled out on 14 mc CW.

Hammarlund DX-Pedition Plans

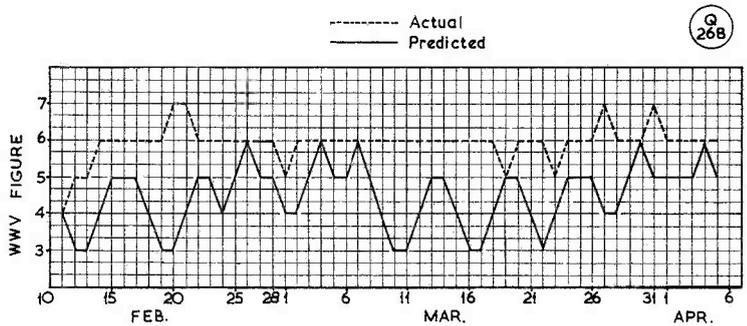
As mentioned last month, the Hammarlund DX-Pedition in the Pacific area (signing VR1N, VK9BH and VR4CB) will continue to the end of June. But this is only part of a regular DX-pedition programme, and it is planned later to cover some 14 countries in the Middle Eastern area, and for this 5N2AMS has been appointed the official operator by W2BIB of the Hammarlund Company.

It should be emphasised that this Hammarlund project, while

obviously intended to draw worldwide attention to that Company's amateur-band Tx and Rx equipment, will be absolutely "clean." That is to say, all genuine contacts and SWL reports will be QSL'd without any pre-payment, IRC's, or even s.a.e.'s being required; photostat copies of all expedition licences and proofs of actual operation from the countries covered will be made available for publication; and to heighten the sporting interest in the expeditions, Hammarlund's will be offering certain prizes in connection with their activities. We shall in due course be publishing further details of these plans. In the meantime, the QSL address for the stations already out is: Hammarlund DX-Pedition, General Post Office, P.O. Box 7388, New York, 1, N.Y., U.S.A.

Other Future Sorties

Promised for the near future are all sorts of trips, including Willis Is. (VK4) and Christmas Is. (VK9), operated by ZS6LM and sponsored by the Yasme Foundation . . . Trinidad Is. (PYØ), by PY4AS and others (early July) . . . Jan Mayen (LAILG/P returns there for a year) . . . Socorro Is. (XE4), possibly during May . . . San Marino (M1 and now apparently 9A1), by DJØIR during May . . . and possible PK4 operation from Sumatra by VS1LP—this will help those who are after our WFE award. (over



Curves to show the remarkable disparity between the conditions forecast for the DX bands (solid line) and the propagation report as actually transmitted by WWV (dotted line). The observations were made daily for the period covered, and seem to prove that long-term propagation forecasts have become valueless—the question now is, why? It is of the utmost importance that an answer be found, as propagation forecasts are used by radio authorities throughout the world to plan transmitting schedules on a long-term basis. On the amateur bands, DX conditions daily have been fully in accord with the WWV report-figure.

DX Strays

Rumours and threats of new prefixes abound; some have already taken the air. 7X2 now seems to be settled for Algeria, but what does one make of 7Q2AB, heard on CW among the SSB's on 14300 kc, and giving QTH as "small place near Sahara"? And we have already mentioned a possible DX-pedition to San Marino signing 9A1, but this may not be official. There have also been mentions of 5W3 as the new one for Western Samoa (replacing ZM6). There are times when one feels like suggesting that the whole thing should be started again, beginning with AAA!

ST2AR has been very active on

FIVE BAND TABLE

Station	14 mc	21 mc	7 mc	3.5 mc	1.8 mc	Countries Worked
W6AM	316	87	59	30	8	321
G2DC	289	271	149	102	14	310
G3DO	288	223	64	73	10	305
G3FXB	277	270	163	104	9	307
G3FPQ	269	256	139	113	26	296
G3NOF	193	184	23	33	2	240
G2YS	184	130	99	75	22	208
G3KMQ	182	77	65	47	12	202
G3HZL	155	125	90	51	9	182
G8VG	154	80	85	38	12	176
G3LHJ	174	139	54	24	12	206
G3PEU	134	72	22	26	4	154
G3IGW	132	127	102	53	28	184
G3NFV	102	122	44	57	17	172
G2BLA	100	99	77	40	10	153
G3JVJ	89	77	72	41	4	129
G3PEK	81	36	56	30	12	95
GW3CBY	80	32	54	36	19	100
G3BHJ	67	165	29	16	1	180
G3IDG	53	63	27	17	9	92
GW3PSM	47	19	38	24	1	69
G3RFE	47	58	4	24	1	83
G3PMR	35	19	19	5	7	44

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

SSB, and has been in great demand . . . VKØDM (Macquarie) is said to be on 14080 CW, or 14120 kc AM most mornings around 1000. . . ZL4OG (Campbell Is.) is active on 80-metre phone only . . . ZS4PB/9, whose home QTH is only 15 miles from the border, works 21 and 14 mc AM . . . ZD8DW continues to keep them busy on 14040 kc CW most evenings.

PJ5CG and 5CH (KØGZN and his XYL KØGZO) were very active at the beginning of the month from Curacao. If anyone worked either of them signing /B, that was from Bonaire Island, 30 miles east . . . Another probable April stunt—AC4TD, name Joan! . . . 9M2GV still plans a two-month trip covering VS4, VS5 and ZC5.

4UISU, in the Gaza Strip, now works SSB on 21385 (1130) and 14300 kc (1830) . . . UAØKYA and ØYE are both in Zone 23; UAØEH in Zone 25. JT1KAA is, of course, also Zone 23 and is on 14040 to 14060 kc CW around mid-day . . . PY4AS expects to operate from Trinidad Is. during June; no call-sign yet.

KG6AAJ/P is on Saipan . . . ZK1BS is retiring, and leaves in September. Meanwhile ZK1AR is said to be on 7010 kc CW (0800)

. . . The Hammarlund DX-pedition should be active from VR1N, May 1-15; VK9BH (Nauru) May 15-30; and VR4CB June 1-30. All bands — even including Top Band on occasions — CW and SSB.

"CQ" World-Wide DX Contest, 1962

Results for the Phone section of the CQ Contest are through. Top place for *All-Band Single-Operator* stations was occupied by XT2Z (647,836) followed by HC1DC, KP4CK, 5N2JKO and ZL1AIX. Top station for the *Multi-Operator, Single Transmitter* category was CX2CO (991,728) followed by DJ1ZG/M1, DJ3VM and DL1JW. And the highest scorer for the *Multi-Operator, Multi-Transmitter* group was W3MSK (547,768). And here a G station comes into the picture, GB2SM having made fifth place in this group and therefore appearing

in the Roll of Honour.

Also in that enviable spot was G3FXB, who emerged not only as Continental Leader in the 21 mc section, but also the world leader for that band, as his score of 80,940 was the highest of the six continental scores. Congratulations to these two stations.

Also to the following, who distinguished themselves in various categories: G5ZT (top G for all-band operation); G5HZ (top G for 28 mc only); and G3NNT (top G for 14 mc only, and beaten by only one station, UC2AA, who therefore appears as continental leader for 14 mc). There appear to have been no entries from GC, GD, GI or GW, but GM3BCL was top-scoring Scottish station in the all-band group, and GM3JDR in the 14 mc only group.

Of all the hundreds of stations heard participating, only twelve G's and three GM's sent logs in! But the same goes for many other European countries, and this year we hold our own numerically with Finland, France, Italy, Netherlands, Norway, Poland and Switzerland. Not, however, with Germany (37) or Sweden (19). Hardly any of our top DX men appear in the list at all . . . are they all getting too old for contests?

Next month we shall see what the CW half of the event brings forth, but we have a feeling that the level of representation will be about the same. After all, it isn't compulsory!

Mail from Overseas

G3PEU/ZB1BW hopes to be on SSB from St. Helena, signing ZD7BW, by August. He will have a KWM-2, 30L-1 and a 312B-5, backed up by a Viceroy-KW77 combination, which may mean that ZD7SE will be able to come on SSB as well.

VQ8BT (Vacoas) forwards news of Gus and also mentions that VS4RS gives his QTH as Sibiu, an island off the east coast of Malaya. And he adds that UA1KAE (Mirny, Antarctica) seems vitally interested in getting a QSO of any description.

Phil Zeid, who used to be very well known as VS2CP but has been in Australia for a long time,

tells us that he is back in Malaya and has the call 9M2CP. He hopes to be more active than before, and (if the XYL permits) will get up a good aerial for the LF bands.

G3PLQ, at sea in the m.v. *Sobo*, reports from Ghana and says that he can still hear G stations down there on Top Band. Static plays things up, and the best time is now 0200-0700 GMT. In Bathurst, Gambia, he heard G3GRL; around Freetown, Sierra Leone, and in the region of Monrovia, Liberia, he logged G3PU, 3OUV, 3MYI and 3LYW. And while in Monrovia he heard W1BU, W2FYT and W1BB—but just missed a personal QSO with EL4A.

ZE2JA (Borrowdale) reports working the following G's on *Ten* during March: G3OHP, 5JZ, 8UT, 2PX, 3FXB, 5GL, 3LIG—also several II's and CT1E.

The *MARTS News Letter* (Malaya) reports that VSILP is on the top of a block of flats with a ground plane (he has been worked by G's on 7 mc and possibly 3.5 mc by now). New calls allocated are VSILM, 1LL and 1LT. With the arrival of TV in the region, the VS1's and 9M2's have lost both two metres and six metres—a great blow to them, as they used those bands extensively.

ZB1BX reports that ZB1BY returned to Malta at the end of March and got cracking on Top Band right away. This inspired 'BY to do likewise. He put up a 132-ft. vertical at his place of work (on Gozo) and made 36 Top-Band contacts the first night (16 of them with G's, the best being G6BQ, 3ORH and 3OUV). On Eighty CW he worked OH5TM/Ø, JA6AK, VO1DX and VE1ZZ. Twenty has been the best band, with worldwide DX worked, but Fifteen has been "rather sad," conditions to the U.K. not being good very often.

DX News from Readers

Some of the following may confirm the earlier "strays"—some may even contradict them. But as it is all at first hand it is worth quoting.

From *GW3AHN*: HC8CA active on 14347 kc SSB (QSL to

W2MES) . . . W3ZQ/KS4 was on SSB, mid-April . . . 3V8CA leaves Tunis but will be active from Bangui with a TL8 call, May 25 onwards . . . 9N1DD and 9N1ME both offering on CW . . . VP2SY on SSB from St. Vincent.

From *G3RFE*: EP2RH (ex-G3FNF) reports that the Radio Amateur Club of Iran will hold their Field Day on June 28, operating from a height of about 8,000 ft., 30 miles North of Tehran; all bands, Ten to One-Sixty.

From *G2DC*: ZS6LM all set for Christmas Is. and Willis Is., two weeks on each, and should appear any day after May 1. This is sponsored by the Yasme Foundation . . . VS1FJ's hoped - for Christmas Is. sortie was cancelled, and in any case Frank is now posted to VS6 . . . KG6AAY/P

was on Saipan. Any excitement about KG6AAY/PK was due to sheer misreading of the call! . . . SVØWZ, "Sarge," probably the most active operator Crete has ever had, has now left for home . . . OY7ML has had trouble with his beam and has reverted to a dipole; active daily on 14030 kc, from 1300 to 1330 GMT.

From *G4MJ*: VR3O hopes to be active from VR1 (Gilbert & Ellice Is.) late May or early June . . . YJ1JB was on 14348 kc at 2045 on April 8, working W's but very weak in the U.K.

Around the Bands

There is no lack of reports for all bands from One-Sixty to Fifteen, although, as usual, Twenty comes in for more attention than the others. One difficulty this month is that some of



A quartet of real DX call signs. Standing, left, VQ8BI, with VQ8BT; seated, left, W4BPD, the DX traveller who has been operating under so many exotic call signs, with VQ8AI on the right. This photograph was taken during the visit of W4BPD to Mauritius, at the QTH of VQ8BT, who is ex-G3GZN and on an Admiralty appointment out there.

the lists of DX worked on that band are long enough to fill a whole page, and those of the top-scorers more or less duplicate one another. So we have had to cut them down to the really exotic ones through sheer pressure of space.

In future we would like to see all lists made a little more selective, but with more information about the times at which the DX is worked. Pruning lists is always a problem, since a W6 or VK may be DX to one person but just a routine QSO to another. Thus if we extract just the best pieces of DX from each list, readers will have a good cross-section of what is going on, even if they are not shown just how

much good stuff some of the old hands have been amassing.

Top Band Activity

No outstanding DX this month, but an addition to the select list of those who have worked ZL. G3FGT managed it on March 20 at 0630, thus realising one of his life ambitions — WAC on Top Band. In fact he has worked all continents since last December, with 29 different W's booked in; 39 countries, 38 of them confirmed!

G3IGW remarks that ZB1BX and 1BY provided some end-of-season excitement and stirred up incredible QRM around 1827 kc. G3IGW himself worked ZB1BX and heard UA9ACD; and he adds that G3AEF will be in Alderney during the second week in June.

G3PPE heard ZC4TJ (1850 kc) at 2245 GMT on April 6, but he was so strong that he was marked as "doubtful." G13RCB is now looking for the "rare" Scottish and Welsh counties, and reports hearing quite a lot of GDX on Sunday mornings.

G3PVK thought the event-of-the-month was the appearance of ZB1BX and 1BY; he found that 'BX had the better signal but 'BY was the more active. OH2NB, OH3NY and 5A3CJ were all worked, and new PAØ's show up each day. The appearance of GC3RFS on Sark pleased a lot of 'chasers.

G3RRU pushed his score along with GC3RFS, EI and the ZB1's, as well as quite a few new counties... G3PEK had a contact with DL1FF, notable because of the 589 report and the fact that the whole of his long wire was lying on the ground!

G3REA reports hearing and working UA3NB (last year this call was used by a phoney, so he wonders!). On March 16 he heard an OK working 4X4MC. And between April 6 and 13 he worked the ZB1's, GC3RFS/3RPB (Sark), DL7IM, PAØCD, OH2YV, GM3KLA (Shetland) and GM3BST/A (near Cape Wrath).

G2DC says that VQ4AQ and VQ4IN are now both active on Top Band, looking for G's around 2330 GMT. G3IDG notes that if CT1CO is accepted as a "good

one," then the possible total for this band from the U.K. is now up to 80.

Eighty Metres

The usual sad story of commercial QRM continues, but a few good ones have been worked in the cracks. G2DC found nothing new on the band, but raised KP400, KV4AA, ZL2GS and many VE's and W's, the latter as early as 2200 GMT. G3NFV on SSB worked PJ2AA, HI8XAA.

G3PEK winkled out W5HCZ/VO2 and UA9CM... GW3PSM found the same VO2, VE1ZZ, ZB1's and 5B4's... G3DO (on SSB) raised UA2AW and HI8XAA... and G3BHI got his new Commando II SSB rig on the band, working OH2TH/Ø, HB9, OZ and VO1DH.

Other reports are to hand from SWL's, the best coming from D. Hayes (London, W.3). He heard SB from VP2AB (0025), KZ5GI, XE11L, FY7YI, ZL4OD and others, VP7CW, PZ1AK, YV4CA, VE8RG and KP4AXU (all 0500-0600). Plenty of good DX was also logged at other times during the CQ SSB Contest.

Forty Metres

G3NOF has joined the 7 mc SSB party, and worked VK2AVA. Several other VK's including mobiles were heard around 7098 kc at 0700... G3DO, on SSB, improved his score with OA4DI and VPØRT, the latter an all-time new one.

G2DC, on CW, collected EP2AN, KZ5FP, M1VU, PY's, UAØEB, VK4YP, VU2EN, XE10K, ZL2GS and a load of W's and VE's. G2YS, also on CW, worked VP5XG, VP8GQ and AL9PK (giving QTH as Tunis).

SWL Hayes covered this band and heard many VK's and ZL's on SSB, as well as CX7BY, HK3LX and YV5AWS; he adds that G3A00 worked a YJ1 at 0700 on April 14.

Twenty Metres

Extremely good conditions have made Twenty a real hot-bed of DX, especially for the SSB types, whom we will deal with first.

TOP BAND COUNTIES LADDER

Station	Confirmed	Worked
<i>CW and Phone</i>		
G2NJ	98	98
GM3OM	98	98
GM3COV	98	98
G3OIT	93	96
G3LWQ	93	93
G3NPB	90	92
GM3KLA	87	88
GM3PBA	85	86
G3PLQ	83	89
G3JFO	82	84
G3LHJ	79	84
G3OWR	77	80
G3OXI	76	82
G3REA	68	71
GM3IKD	54	61
G2BP	51	54
G3OLU	50	54
G3IDG	50	52
G3HZL	25	52
<i>Phone only</i>		
GM3OM	89	89
G3FS	86	86
G3NPB	83	83
G2NJ	44	44
G3OWR	41	54
G3LHJ	27	31

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

The best from GW3AHN's list were DU1EH, FH8CE, FR7ZC/T, FR7ZI, HL9KH, KC6BK, KG6SZ (Saipan), WA4LTX/KJ6, K6CVQ/KS6, KX6AY, PJ5CG, TG9SC, VR2BJ and 2EK, VR30, VS9ADV/W1, YA1AW, YS2SA, ZL1ABZ (Kermadecs), W4EIL/KS6, KB6CP and DU1IK.

GM3JDR's log shows DU1AA and 1EH, FR7ZC/T, FR7ZI, HI8XAA, HL9KH, KC6BK and 6BO, KG6's, KX6AE and 6BF, LA8SE/P and 9RG/P, PJ5CG, TG9SC, VP8GQ, XW8AL, YA1AK and 1AW, ZD8DW and ZP5OG. (CW added FH8CE, M1VU, ZD3A and 5R8CM).

G3DO's SSB connected with FH8CE, FR7ZC/T, FR7ZI, FY7YI, HI3MSP, HI8XAA, KB6CB, 6CP and 6CQ, K6CQV/KS6, PJ3AO, VP2GAC, VR2DS and 2EK, XW8AL, YN1BE and 7GJ, YS1MS and 2SA.

G4MJ (SSB again) worked VK9LA and 9ZS, KC6BO and 6BK, BV1US, KX6BQ, ZD8DW, YA1AW, FR7ZC/J and /T, VR30, VR2BJ, 2EK and 2EO, FH8CE, CR8AA and HL9KH. CW fetched in FB8ZZ, FB8XX and FR7ZC/T.

Still with the SSB mode — G3NOF made it with FY7YI, HH2J, HI8XAA, LA8SE/P and 9RG/P, PZ1AX, ST2AR, VP8GQ, YS1MS, 9G1EO, 9Q5RK. G3NFW



In the July 1962 issue of "Short Wave Magazine" we pictured Neil Summers as probably the youngest candidate ever to qualify for a U.K. amateur licence — he passed the R.A.E. and the Morse Test before he was 14, and had to wait till then before his callsign could be issued. He is now G3RJK, at 31 Chatham Road, Walthamstow, London, E.17. A keen CW operator, he can hold his own with the QRO types, and uses both straight and bug keys with equal dexterity. The rig, in his bedroom, is all-band, running about 40w. to an 807 on 10-80m., his Rx is an IIRO with an HF-band converter, and the aeriels are various. On 160m. nine countries have been worked since September, and on the HF bands G3RJK is an enthusiastic participant in CW contests. And jolly good luck to him!

raised HL9KH, TG9SC, VC9MB, ST2AR, HI8XAA, ZP5OG and BV1USF.

G3GDC again comes up as the sole representative of AM, on which mode his best were HI8MMN, VP2SM, 4VP and 6JC, HH2PW, FM7WS, 9M2FK and 2BS, VS1GC and 1LV, 6W8DM, XW8AL and VK's, ZL's and so on. And now he is building in readiness for SSB!

G3BHI swapped SSB with HL9KH, KX6AE, LA8SE/P, OH2TJ/Ø, PZ1AX, ST2AR, SVØWY and VE3FFW/SU.

And so to the comparatively rare CW mode, headed by G2DC with FH8CE, FR7ZI, FR7ZC/T, HL9KP, KH6's, KM6CI, M1VU, VR2EM and 2EO, VR3L, VP5BL, VS1LJ, VS4RS, VQ8BT, 6O1MT, 9M2UF, W6ZDF/KM6 and WA4LTX/KS6.

G3RDC lists FR7ZC/T in pride of place, with 6O1, 9Q5, VK, ZL, M1VU, KH6, 4S7, KV4 and many other nice ones — with relative QRP and only a few weeks on the band.

G3RFE raised EP2RH, HK3AMA, KP4BBN, M1VU, VU2GG and ZL1AH. G2BP reports working LA8CE, who gave his QTH as "North of Polar Circle." G3PEK went "QRO" (45 watts) and raised HI8MMN, KZ5FP, ZS4PB/ZS9, YV's, KP4's, VP9's, VP8GQ, KG4AM, KH6IJ, VK's and ZL's.

GW3PSM, not very active owing to postings, worked CW with EP2AM, FR7ZC/J, M1VU, VP8GQ, VQ4IN, 5H3HZ, VS9MB and VK's. And finally back to the SSB mode for G3JOC, who worked (mostly .0630-0730 and 1230-1315) DU1AA, FG7XT, FM7WQ, FR7ZC/J and /T, HH2J and 2PW, HL9KH, KB6CP, KC6BO, KG6's, WA4LTX/KJ6, KM6CX, W4EIL/KS6, KX6AL, PJ5CG, TG9SC, VR2BJ, 2DK, 2DS and 2EK, YS2SA, 9L1RO and 9M2RI.

Fifteen Metres

By comparison with Twenty, Fifteen has made a pretty poor showing, but even so there has

TOP BAND LADDER

(G3P-- and G3R-- stations only)

(Starting date July 1st, 1962)

Station	Counties	Countries
G3PLQ	80	14
G3RBP	77	20
GM3PBA	75	18
G3REA	71	15
G3PVK	68	14
G3RRU	65	14
G13RCB	54	9
GW3PPF	53	10
G3PPE	49	10
G3RJI	45	5
G3RDQ	42	8
G3RJH	39	9
G3PMR	36	7

(NOTE: This ladder will continue until the end of 1963. New entries will be accepted up to July 1st.)

been some worth-while DX around. GW3PSM worked CW with FR7ZC/J, M1VU, VP8GQ, VS9AAA and VU2GG. G3RFE, same mode, raised EP2RH, VS1LV, VS9AJA, 5H3HZ, 9M2FK, 4X, 5A and 5B.

G2DC, on CW as always, collected FR7ZC/T and FH8CE, CE1BD, OA4AU KZ5MD, M1VU, VP2VL, 5R8BX, 6O2EU, 9Q5AB and a load of W's and VE's. G3BHI worked SSB with ZS6JK and 6DK; G3NOF swapped AM with 5A4TM, 9G1EE and a PY, SSB with ZE2KL.

G3RJX "slung a dipole off the roof" and worked LU4DGY and 8FBH, followed by 5B4OS and ZS2QG. But he sat through FB8XX "working practically everyone else" and is now getting down to a do-it-yourself beam.

G3NWT used his AM on VP8GQ, 5R8AA/P, VS1GC, 9M2AE, 5H3IW, ELØJ/MM, DU6RG, 9G1, VQ2 and the like. He heard JZØPM, 6O2EV, VK6QL, XE, 5R8 and other nice ones. G3MBL, also on AM, worked CR7GJ, 6W8DM, 9M2RI and ET3AZ.

GW3AHN raised 9Q5AB, FR7ZC/T, EP2RH and VS1LL on CW; FY7YI on SSB.

Ten Metres

You will note under "Mail from Overseas" that ZE2JA is still working G's on this band. A fair amount of ground-wave activity is now reported, and doubtless some European short-skip will liven things up during the summer. This is, of course, being written before the Ten-Metre Activity Sunday, but as mentioned we hope to squeeze in a note about that under "Stop Press" on p.149.

General Chatter

We are always hearing people bemoaning their bad QTH's, but it is seldom that anyone suggests that he has a good one! G4MJ (Birmingham) says that there are so many "300-plus" stations in the Midlands that one must sus-

pect geographical advantages. He adds that when Gus, FR7ZC/T, started up from Tromelin, within the first three hours he had worked G3AAM, 3FKM, 4CP, 2LB, 3DO, 5IW and 4MJ—all within screaming distance of Birmingham. And, of course, G3AAM and G4CP are the two top Europeans in the DXCC Roll of Honour. G4MJ has also noticed that the bands open for DX to London and the Southern counties at least 20-30 minutes before the DX is audible in the Midlands—a surprising time-lag for the 150-mile distance. A very interesting line of thought, anyway.

G3PPU was at his local club station, G3POW, when a discussion started on how long (or short) a DX call on Twenty CW should be. Put to a practical test, it whittled down to "CQ de G3POW" to get a call back, and then to "de G3POW" and finally to "G3POW K." He suggests that a single "K" on a clear frequency might produce a "QRZ?"

Concerning these wonderful conditions, so much better than the predictions, G3NWT writes "If the U.S. rainbow bomb caused such a rain of electrons as to paralyse solar cells and transistors, this and less spectacular bangs may also have accounted for an outlook on the HF's less bleak than expected." He also refers to the primary cosmic ray that was tracked in the U.S.A. It had a QRK of 10^{20} electron volts—enough to knock a 2in. nail half-way into a block of teak. "Work out what would happen if a thimbleful of them hit the earth all at once!"

G3NWT also puts up a serious thought concerning rare DX. "The most difficult thing is to estimate the amount of QRM audible at his end but not yours . . . perhaps the seasoned DX-er gets a sixth sense for this and hollers to the required extent but no more."

G3IDG followed up his recent researches into El-Bugs by the following interesting quotations:

"This, this is he; softly awhile. Let us not break in upon him." (John Milton); "And breakers roar beneath" (William Falconer); and, the most apposite of all, "Break, break, break . . . and I would that my tongue could utter the thoughts that arise in me" (Tennyson).

Late Flashes

G3RBP adds his call to the select list of those who have worked ZL3RB on Top Band (March 22 and 26). And on April 13 he worked W1ME, W3GQF and VE2UQ . . . HC8CA (Galapagos) may still be there after publication date . . . KB6CB is an XYL, 14285 kc SSB, 0900 . . . WA4LTX/KJ6, 14295 kc SSB, 0615-0900 . . . W4EIL/KS6, 14295 kc SSB, 0650.

LA8SE/P (Jan Mayen) leaves in July; LA9RG/P (Spitzbergen) active on 14275 kc SSB . . . TY2AB reported on 21 mc AM, 1440 . . . VR6TC (Pitcairn)—for skeeds at 0500 Tuesdays, contact W5OLG, who is also QSL manager . . . YJ1JB is VK2QJ on vacation—14289 SSB at 0630 and 2000.

ZD3A is on 14 and 21 mc CW, various times from 1900 onwards . . . VE7ZM has a licence to operate from 5W3 (Western Samoa) in about two months . . . 5T5AD is on 14 mc SSB, early evenings . . . 5U7AH likewise (14110 and 14135) . . . 9N1ME is a Mount Everest expedition.

Sign-Off

So that's it for another month, and what an exciting one it has been! May we have some more like it. Deadline for the June issue is **first post on Monday, May 20**—and that really is the limit, so don't miss it. The portcullis definitely comes down on that Monday morning. Address everything, as always, to "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. Until that date, Good Hunting, very 73 and—BCNU!

Miscellany

INCIDENTAL INFORMATION, AND ITEMS OF TOPICAL INTEREST

Proposal for harmless amusement during bad conditions:—"Copy the list of amateurs' names and addresses on this QSL card on to six of your own QSL cards. Delete the name at the top and add yours at the bottom. Take one card personally to each of the amateurs listed. In three months, if the chain is unbroken, you will receive visits from 43,562 radio amateurs, with QSL cards."

(Letter from G3NWT)

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Definition of Junk:—"Something you keep for ten years, and then need a couple of weeks after you have thrown it away." ("Radial," RAIBC Journal)

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The "Hetrociter," described in the April issue of *CQ*, is a rather rare piece of equipment—a transmitter for CW only. The conventional idea of a CW transmitter as a VFO followed by doublers and driving a PA has been thrown out in favour of the technique brought about by SSB; a 5 mc VFO is mixed with sundry crystal frequencies, and the output of the mixer is fed to a 6CL6, which drives a 6I46. Well worth studying, as the present-day pattern for a CW transmitter with a reasonable chance of TVI-proofing. It incorporates a valve keyer, too.

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"Everyone is founding certificates with the most fantastic requirements, mostly very easy—no QSL's required, just the very essential dollar. . . Just a question—do you Americans really think there is some sense in it?"

(Letter from OH2YV in "The DX'er," NCDXC)

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A further search among American two-letter calls heard on the 14 mc band has revealed the following Old Timers, still very active and still using the key in preference to the microphone: K4CT, 1912; W2ADQ, 1912; W1VB, 1914; W4MS and W4ZM, 1915; W3QT, 1922; W3SO and W5II, 1923.

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Pirates and phonies seem to have started a new line in "weirdie" callsigns. Recent appearances, mostly on 14 mc, have been CLØWN, OZØNE and CH3CL, the latter giving his QTH as "Chloro." (CH₃CL is the chemical formula for chloroform . . . which suggests one good way of doing away with the lot of them!)

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A newly-developed method of exploring radio sources in space is to observe them when they are being occulted by the moon. Investigators recently

used a 210-ft. radio telescope locked on to the radio star 3C-273 under these circumstances, and found that it was two separate objects, about 1 sec. of arc apart. They used frequencies of 136, 410 and 1420 mc, and treated the edge of the moon as a diffraction grating. The said radio signals have been on their way to us for about 500 million years, and the star is now receding at 20,000 miles per second.

(Letter from G2TA)

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Heard on the Air (I):—"I was waiting on his frequency, ready to call, and then the Red Army Choir started up on top of him."

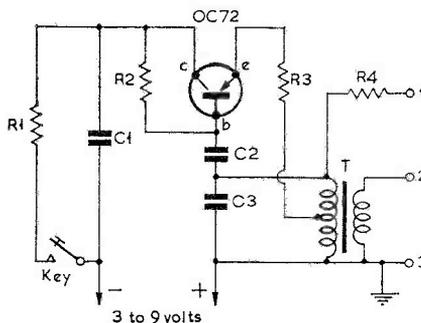
(5B4, on 14 mc SSB)

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April 1 seems to be turning into quite a day in the world of Amateur Radio; what with "spooF" articles in many of the periodicals (some of which are liable to misfire) and the appearance of calls like AP1RIL, who claimed to be in East Pakistan and had the W's on 14 mc going mad, we all have to be careful. We should not like to see the month of April becoming a time when it is necessary to scrutinise every single article with extra care, to decide if it is "loaded," or to suspect every exotic callsign of being a possible phoney. Perhaps the real April Fools are those who perpetrate these things?

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Among the serious technical articles in *QST* for April are an engrossing account of Trans-Equatorial (TE) VHF Propagation on the 6-metre band between Cyprus and Southern Rhodesia; a useful VFO with



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Transistorised audio oscillator for that which many of us need—Morse practice. Values are: C1, C2, 2 μF; C3, .05 μF, varied to give required pitch; R1, 50 ohms; R2, 30,000 ohms; R3, 300 ohms; R4, 50,000 ohms; transistor, OC72 or anything similar. For headphone output, connect across points 1,3; for low-impedance output, across 2,3. The transformer is a transistor output type with centre-tapped primary, such as the Radiospares T/T4. The output can be considerably boosted through an audio amplifier or the LF side of a BG receiver. (After ZS2AZ, in "Radio ZS," Jan. 63)



"... Yes, CW is dying out and I never use the key myself..."

the tuned circuit at a remote point; Nuvistor converters for VHF; an audio meter-reader for sightless amateurs; and a summary of the Oscar II project. There is also the very interesting (and violent) first reaction to the ARRL's suggestion that the way to clean up the bands is by restricting ordinary licences to certain bands and modes, and introducing an advanced licence which alone will make full privileges available.

Heard on the Air (2):—A Caribbean station telling a K9 who called him in response to a "CQ Europe" exactly what he thought of him. In effect, "I can work K9's any time I want to—if I want to—but some of these boys have stayed up all night to work me, so kindly keep off the frequency." (A little more firmness of this kind would do a power of good, especially if directed to unwanted "breakers.")

Heard on the Air (3):—W7-- to VE1--: "I've now got 303 confirmed." Reply: "So what—I've got more than that on One-Sixty!"

"How much longer have we to solder and unsolder transistors during our own constructional efforts? Is it not time we had them on 4-pin bases, say of B9G size? This would enable circuitry to be set up with holders soldered in, without having to take care of heat transference, and to change transistors readily when required." (Letter from G4LC)

"I hate the bother of learning Morse, but Civil Defence depends far too much on 'phone... duplex break-in is easy on CW; cumbersome modulators and delicate microphones are unnecessary... in this district we encounter tongue-twisting names and some of our operators have extremely broad accents. Telegraphy is the most lucid method of reporting

fallout QRK of 683 milli-rontgens at Llanfair-P.G. ... If Morse is vital for amateur activities, how about its more serious uses?"

(Letter from E. Sabin, Shrewsbury)

"I note with concern the growing use of electronic bugs by people who have obviously had little or no practice with them. What has happened to the old practice oscillator? Some of the stuff these people pump out is pretty frustrating, with innumerable erasures, making a normal length 'over' into something almost insufferable. Why can't the culprits do some closed-circuit practice before inflicting their tortures on others?" (Letter from G3IDG)

Another horrid game with el-bugs, of course, is to use them for sending a string of dots or dashes, either while tuning up or for the purpose of deliberate jamming. This has made them a menace—the type of people who did this with mechanical bugs soon got tired, but now they can just screw up the thing and leave it running. Investigation has shown that one or two stations thought to be commercials have, in fact, been amateurs with an el-bug doing its perpetual-motion trick... for what reason we know not.

PYE TRANSISTORISED RADIOPHONE

The new Pye R/T equipment for the commercial mobile bands between 25 and 174 mc consists of a transistorised transceiver made to fit under the dashboard of a vehicle, both microphone and loudspeaker being designed to produce clear speech through a high ambient noise level. The operating mode is AM, and an interesting point about this equipment, known as the Pye "Cambridge," is that it can be rented for 17s. 6d. a week.

SPECIAL-ACTIVITY STATIONS

This space is available for the publication of details in respect of stations to be established in connection with some local public event, such as fêtes, festivals, exhibitions and the like, at which Amateur Radio is to be demonstrated in action. For such purposes, the Post Office will usually issue a special for-duration call sign, held in the name of one particular local amateur, with the names and call signs of those permitted to operate.

G3REI/A-G3PIJ/A, May 10-11: To be operated by Reigate Amateur Transmitting Society in connection with the Exhibition of Leisure Activities, at Albury Manor County School, South Merstham, Surrey, with G3REI/A on 160m. and G3PIJ/A on 2 metres. Special QSL cards are being printed, and the QSL address is: F. D. Thom, G3NKT, 12 Willow Road, Redhill, Surrey.

GB3MYA, June 28-30: Organised by the World Association of Methodist Radio Amateurs and Clubs (WAMRAC) in connection with the Methodist Exhibition at Peterborough, Northants. Details from Rev. A. W. Shepherd, G3NGF, 121 Main Street, Asfordby, Melton Mowbray, Leics.

For The Beginner

VARIABLE FREQUENCY OSCILLATORS

The subject of VFO's is such a large one that it must be dealt with in two parts, one covering the theoretical considerations and the other the purely practical aspects. Only the more sophisticated circuits will be discussed, since any VFO without a high order of stability is quite useless under present-day conditions.

In the days when there was still room for a few more signals on the bands, the building of a VFO was a very simple job. Almost any well-known oscillator circuit was regarded as good enough for use . . . and, indeed, in some parts of the world this attitude still prevails, as can be heard from the lamentable quality of the signals emanating therefrom.

Take a Hartley, or a Colpitts, or a TP-TG oscillator, they think, couple it to a PA, and let the thing loose! A barbarous doctrine for these days of crowded bands, variable conditions, and, in particular, the necessity for sharply-tuned and stable signals.

Even thirty years ago the more discerning amateurs realised that one could not safely couple a VFO directly to a PA, especially if the latter stage were to be keyed or modulated; some form of isolating stage was essential. Hence the universal acceptance (among the enlightened types) of the VFO-BA-PA pattern. But most signals put out by the pre-war rigs of this type were hardly T9, and nowadays nothing but a really honest T9 should ever be regarded as good enough—with a definite T9x as the goal.

A good VFO is an essential in any receiver, too; the circuit can be identical, since it is an advantage to use low voltages even in a transmitter VFO. The enormous popularity of SSB has given rise to a new concept of stability, both in receivers and transmitters, and from henceforth "all creeping things" are definitely out.

We will therefore consider, in this part, some oscillator circuits capable of giving really high

stability. These can be developed from whichever of the basic oscillator circuits you most like the look of—but we must accept the fact that these same basic circuits, in simple form, are no longer good enough for present-day requirements.

Fig. 1 shows the three that are most likely to be of interest. They are merely sketches of the basic circuitry, so no definite component values are shown . . . the "shape" of the circuit is the important thing. At (a) is the electron-coupled Hartley oscillator, with the grid, cathode and screen of the valve forming the oscillatory section and the output taken from the anode.

At (b) we have the Colpitts variant on this, wherein the tap on the oscillatory circuit is achieved by connecting two condensers across it and using their common point instead of a physical tapping on the coil. Finally (c) shows the series-tuned Colpitts, also known as the Clapp. Two condensers are still used to provide the tapping, but the tuning condenser is in series with the coil instead of in parallel.

There is little to choose between them for efficiency, but in the simple form shown the Clapp is probably the most stable, since the two fixed condensers, which can be quite large, are directly across the electrodes of the valve and virtually swamp out the inter-electrode capacities.

All three circuits when in common use have this feature in common, and use large parallel capacitances. And this means that the main mechanical cause of instability will be the coil itself, which must therefore be of very high quality. It must be wound

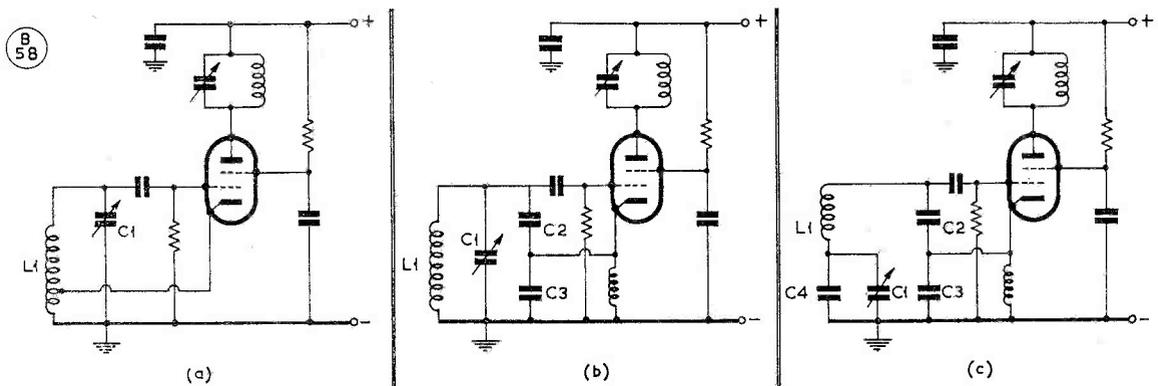


Fig. 1. Three basic circuits for a VFO, either for receiver or transmitter. In practice, most VFO's are elaborations or derivations of one of these. At (a) is the Electron-Coupled Hartley, at (b) the Colpitts, and at (c) the Series Colpitts, or Clapp. In each case, C1, L1, is the actual oscillatory circuit; in (b) and (c) the condensers C2 and C3 are relatively large, and serve as swamp capacities; and in (c) the condenser C4 is large compared with C1, and must be of good quality.

very rigidly on a former of good dielectric qualities, and preferably one which is grooved or ribbed, so that the turns are held rigidly.

Causes of Instability

When we talk about "instability" we are really mixing up three separate faults. The first is sheer mechanical inadequacy, which means that a bang on the table will cause a shift in frequency; or perhaps the mere fact of rotating the tuning condenser will cause jumps and wobbles. The remedy for this kind lies with the mechanical construction of the unit. Rigidity of the coil has already been mentioned; the wiring should be no less sound. Components must not be hung on the wiring if they are liable to move because of that. Short wires of heavy (but not *too* heavy) gauge should be used throughout, and the box itself, in which the VFO is mounted, must be rigid. A die-cast type has obvious advantages. The condenser and tuning dial are of the greatest importance, and economy in that direction can wreck the whole project. A good-quality condenser with *two* rigid end-plates and good bearings is essential. When your VFO is completed, if you can't drop it on the bench from a height of two inches or so without any shift in frequency, then it is a failure from the point of view of *mechanical* stability.

The second type of instability is the *short-term* variety. How much does the frequency shift immediately after switching on? Too many people take a frequency-creep during warm-up for granted, but it need not happen. One well-known receiver (not in the highest-priced luxury class) claims—and substantiates by performance—a total movement of 400 cycles during warm-up, and less than 100 cycles thereafter. The secret? Correct choice of circuitry and components . . . and this one does not even use a stabiliser tube and still achieves less than 100 cycles shift with a 10 per cent voltage fluctuation.

The third type, *long-term* stability, is tied up with the former, since mains voltage variations and temperature variations are the factors which mostly control it. There is no reason why you should not leave an oscillator tuned to a known frequency (WWV on 15 mc, for instance), switch it off and go away for three weeks' holiday, and then, on your return, switch it on and find the signal dead on tune. This is—or should be—everyone's aim. Again, mechanical construction and choice of components are the key points. Under the former we include the design of a unit in such a way that it does not readily become heated up; the valve can be remote from, or at least outside the box containing the oscillatory circuit. The latter includes the correct choice of condenser types, including all the fixed condensers, and the use of the right size of temperature-compensating condenser in parallel with the others.

Normally the effect of heat on a condenser and the other components of a tuned circuit is to cause a lowering of the resonant frequency. Special condensers with a negative temperature coefficient are available, and if used on their own would cause a *rise* in the resonant frequency as things warmed up. Obviously the two types can be "mixed" in the

right proportions so as to balance out these opposing effects. But this matter comes under the more practical heading and will be dealt with in the second part of this article.

Coupling to the Oscillator

One sure way to spoil a really good oscillator, when you have built it at considerable trouble, is to couple it tightly to another stage whose characteristics are varying all the time because of keying or applied modulation. So don't! A very sound method of protecting a good VFO against such treatment is to follow it with both a cathode-follower and a buffer amplifier. A double triode can be made to serve as oscillator and cathode follower, and a tetrode or pentode buffer used between this and the PA. Better still, though, instead of trying to drive straight through, is the scheme of running the VFO on some frequency that is not in the amateur bands at all, and beating it with a crystal oscillator, using various crystals to cover the required bands.

For instance, a VFO tuning from 5.0 to 5.5 mc could be made to beat with a 9.0 mc crystal oscillator. With the frequencies *added*, the coverage would be 14.0-14.5 mc, and with them *subtracted*, 3.5-4.0 mc—two bands covered at once with one crystal. However, at this juncture we are concerned only with the VFO itself and not with other possible stages in the receiver and transmitter.

Note, though, that with the favoured technique nowadays—both for receiver and transmitter—there is no need for a physical "take-off" of the oscillator RF output at all. The oscillator may be a triode section of a multi-grid valve, into another electrode of which the mixing frequency is injected. And the

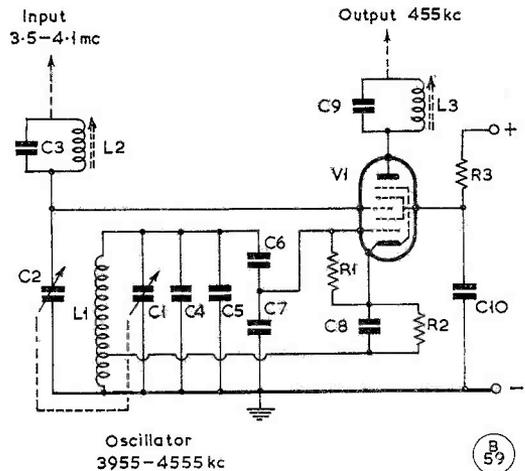


Fig. 2. A Hartley oscillator "elaborated" for use in a very stable receiver. C1, L1 is the tuned circuit; C1 is 35 μF , with C2 (105 μF) in gang. C4, C5 are chosen values, one having a positive temperature co-efficient, and the other negative. C6, C7 are 20 and 60 μF respectively. R1 is 150,000 ohms; R2, 300 ohms; R3, 6,800 ohms; C8, C10 are .01 μF . L2, C3 is the band-pass secondary of the previous stage, and L3, C9 the primary of the mixer stage. Note that all mixing is in the electron stream. See text for discussion.

final desired frequency, attained by this mixing, is taken from the anode of the valve, so that true mixing is obtained in the electron stream only—to the immense benefit of the oscillator characteristics.

Refinements

The circuit in Fig. 2 shows the kind of elaborations that the ordinary Hartley oscillator of Fig. 1 (a) undergoes when it is served up in practical form. In this case the actual tuned circuit, L1, C1 appears to be swamped by a mass of other components. C4 and C5 are condensers with a much higher capacitance than the tuning condenser C1; one of them has a negative temperature co-efficient, and the other a positive. The values are carefully chosen to give compensation over the normal working range of temperatures.

C6 and C7 may be looked upon as a capacitive potential divider, so that the grid is, in effect, tapped down the coil. The three electrodes coupled to the oscillatory circuit in this case are grid, cathode (through a tap low down on the coil) and screen (at earth potential).

This actual case comes from a receiver, not a

transmitter; so the injected frequency comes from a previous stage, with a band-pass transformer output of which C3, L2 form the secondary; and that secondary is tuned by C2, ganged to the oscillator tuning condenser C1. Likewise the mixed output, from the anode, goes through C9, L3, the primary of a further band-pass transformer.

In actual fact this oscillator tunes from 3955 to 4555 kc; the heterodyning frequency coming in varies between 3500 and 4100 kc; so what comes out, via the anode, is in this case the second IF, of 455 kc.

This oscillator is the basic arrangement of the circuit used in the Drake 2B receiver, the phenomenal stability figures for which have already been quoted. No stabiliser tube is used, but all voltages are very low. But this same circuit could equally well be used for an excellent transmitting VFO, beating with various crystal frequencies to give outputs in the amateur bands . . . it's the VFO and its stability that really counts.

In the next part of this article we shall be dealing with the practical points to watch in the construction of a really good oscillator, whether for receiving or transmitting purposes.

EVERYONE HIS OWN SATIRIST—OR, HOW FATUOUS CAN YOU GET

It was observed with some regret—which meant for us no amusement at all—that most of our contemporaries in the field of Amateur Radio indulged in the ponderous inanity of printing a “weird” article in their April issue—by way, of course, of a “satire” appropriate to the month, and usually with a coy reference somewhere that it *was* for the April issue. This sort of thing is all right occasionally, and can be very funny when it is well done—but becomes quite ridiculous when it is indulged in by the compilers of duplicated periodicals and club news sheets. We must remember to warn readers, next March, to be on the look-out for the *ha-ha* stuff in the April 1964 issues.

GOOD LUCK TO YOUR EFFORT

To those who may be taking the R.A.E. this month—Our best wishes for a successful result. It will be a fair paper, and if you have covered the ground properly, you should have no difficulty. Good luck, anyway!

G.P.O. PERSONALITY RETIRES

Captain Charles F. Booth, C.B.E., M.I.E.E., Deputy Engineer-in-Chief of the Post Office, who has been in charge of the Post Office's work on communications satellites and the British Ground Station at Goonhilly Downs, has recently retired. Captain Booth, who throughout his period of 40 years with the Post Office has been concerned with radio, became a well-known public figure at the time of the launching of Telstar, when television viewers saw him at Goonhilly Downs on the first night and the next night exchanging the first messages *via* the satellite. After joining the Post Office he was for 25 years in the Radio Branch Laboratories of

the Post Office Research Station at Dollis Hill. He became an international expert on quartz-crystal and primary frequency standards, and is part author of a comprehensive text book on the subject, *Quartz Vibrators and their Applications*. Captain Booth has represented the Post Office for many years at international conferences, at many of which he has led the United Kingdom delegation.

INTERESTING UHF TRANSISTOR

The new Raytheon silicon planar epitaxial transistor, type 2N2808, has an AC current gain of 5 at 200 mc; it can be used as an RF amplifier at 500 mc and as an oscillator on 1,600 mc. Power gain at 200 mc is 20 dB, with a collector-to-emitter voltage of 6v. and a collector current of 2 mA.

SOME ZL FINANCIAL STATISTICS

Though the ZL's licensed for AT station operation are comparatively small in numbers, they not only show the highest ratio of amateur activity to population density of any country in the world but, as this would imply, they are extremely enthusiastic about it. For the N.Z.A.R.T. two-day annual convention held in Dunedin last June, more than 200 members travelled long distances to be present, and the count for the convention dinner was no less than 282, most of whom had to be accommodated in and around Dunedin. The total cost of the convention was £830, and the actuarial work was done so accurately that the accounts showed a small credit balance of £3. The nett gain on operations for the last financial year was £558, which also shows that the N.Z.A.R.T. is in a strong position, with investments valued at nearly £4,000 and accumulated funds totalling £2,780, together with considerable fixed assets. And all this on a total membership of just over 2,000 of whom only 1,459 are fully licensed!

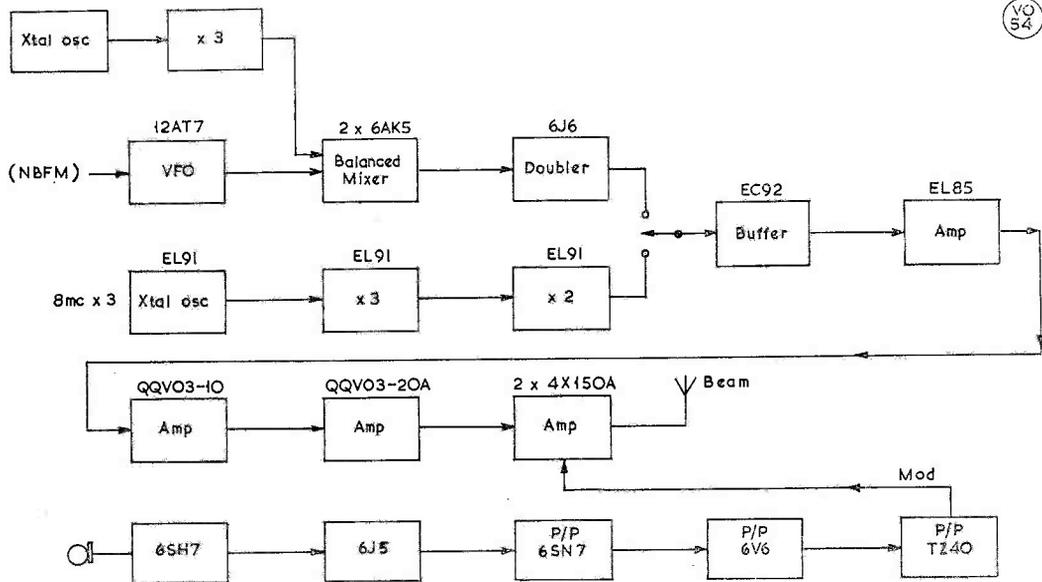


Fig. 1. Block schematic of the full-power AM two-metre layout in use at G3NPF (Southend-on-Sea), using a pair of 4X150A's in the PA, modulated by TZ40's. The frequency generating sections give choice of either crystal or VFO drive, the latter being of the crystal-mixer type, with the variable element on a relatively low frequency. Both frequency generators give output at 144 mc. The EL85 is a low-level amplifier and the QQV03-20A ensures ample drive for the high-power PA.

SOME VHF TRANSMITTING LAYOUTS

FULL-POWER AM ARRANGEMENT —SIDEBAND APPROACH FOR TWO METRES

THE diagrams herewith, while being for suggestion only, are yet of considerable practical interest. At Fig. 1 is the set-up now in operation at G3NPF (Southend-on-Sea), who has "gone big" on two metres, with a PA running full power and the choice of either CO or VFO control. His method of getting variable-frequency drive is interesting and, though G3NPF himself is using high-level AM, it would be possible to apply NBFM under VFO control conditions. As the block diagram at Fig. 1 indicates, the balanced mixer gives output at 72 mc, and there would be various frequency combinations possible for the crystal oscillator and the VFO, with the plate sides of the 6AK5's either in push-pull or parallel, to get the mixer out on 72 mc. In any event, the variable oscillator section could be kept tunable over a relatively low frequency range, giving the stability and ease of control so essential for VHF work.

Sideband Derivations

At Fig. 2 is the block diagram of the present transmitter layout at G3BA (Sutton Coldfield), who is putting out such excellent Sideband phone on two metres. The 131 mc CO drive is applied to the

cathode of the QQV03-10, and the 14 mc input to its grids in push-pull; the 145 mc resultant enables a balanced drive to be applied to the QQV06-40A, as a linear PA in Class-AB1. The screen of the QQV03-10 is stabilised at 150v. With about 10 volts r.m.s. of SSB drive, derived from the K.W. "Viceroy" exciter section, there is ample excitation for the RF output stage.

The layout at Fig. 3 suggests a way in which the ubiquitous SCR-522 (BC-624 Tx) could be modified to give an SSB drive, again in conjunction with a "Viceroy" on 14 mc. The first two stages of the SCR-522 Tx do not need to be touched, except that a crystal of about the frequency shown must be found for the CO—the actual xtal freq. will depend, of course, upon the final output frequency required. The first modification is to the plate side of V3, which in the original is the 832 driver stage, tripling. The tripler loop anode line and coupling condensers are removed, and C1/L1

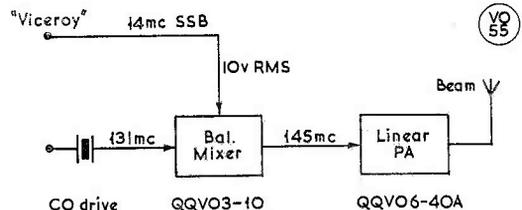


Fig. 2. Block diagram of the two-metre Sideband system now in use at G3BA (Sutton Coldfield), whereby the 14 mc SSB output from a K.W. "Viceroy" is mixed with a 131 mc CO drive. It is giving exceptionally good results and is an easy way of getting going with Sideband on VHF for anyone already in possession of an HF-band SSB Tx.

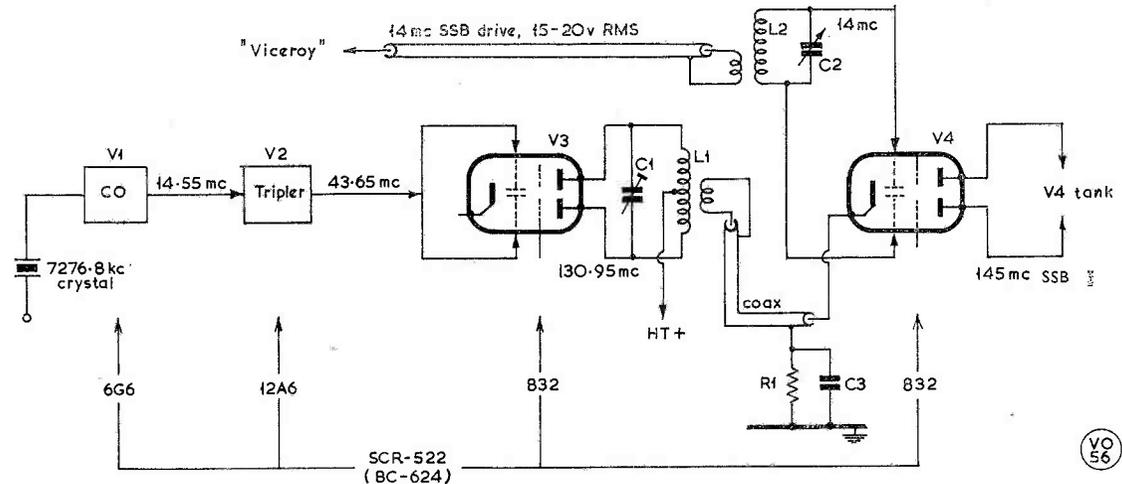


Fig. 2. Circuit arrangement suggested by G3BA for the conversion of an SCR-522 (BC-624 Tx) for Sideband operation on two metres. Apart from the modification, the essential requirement is an existing SSB exciter (such as the K.W. "Viceroy") capable of giving Sideband output on 14 mc, for mixing in the output stage V4. Various points about this arrangement are discussed in the text and only the necessary circuit modifications to the BC-624 are shown here.

put in to tune to 131 mc, and for this purpose C1 can be pre-set. The C2/L2 combination is made up to tune 14 mc, and is connected across the existing V4 grid assembly, this second 832 being the PA in the original. Since V4 has a bias connection, C2/L2 must be put across the original grid coupling condensers to ensure DC isolation (this is not indicated in Fig. 3, which is drawn to show only the basic modifications). However, because the RF chokes on the grids of V4 are VHF type, a better approach might be to discard them altogether, and return the centre tap of L2 to the bias point, through a 10K series resistor by-passed to chassis through a .001 μ F condenser.

To get the 131 mc drive into V4, a 2-turn link is coupled over the centre of L1 and taken *via* coax into the cathode of V4 in the manner shown; R1 is made 220 ohms, and C3 should be .001 μ F ceramic; the direct ground connection at the cathode of V4 must, of course, be removed, or else nothing much will happen. To complete the modification, take a coax feed from the "Viceroy," or other SSB transmitter, set up on the 14 mc band, and link couple it to L2.

Provided the 131 mc drive component is adequate, and there is something like 15-20v. r.m.s. of SSB drive available, the result should be 145 mc SSB output on the tank side of V4, this part of the circuit not requiring to be touched. The final output should be sufficient to drive a QQQV06-40A as a linear PA, using link coupling from the tank of V4 into the grids of the PA.

It should be emphasised that the circuit of Fig. 3 is a suggestion which has not actually been tried practically—however, it is offered as being of interest to those who would like to experiment with a BC-624, and though the SCR-522 is an obsolete surplus item, it has plenty of potential as modifiable equipment. And the particular method of

coupling between V3/V4 shown here (into the cathode of V4) has the merit of helping to balance out the frequencies most likely to cause the spurious emissions often met with in single-ended circuits.

"STOP PRESS"

Trentham Rally, April 21: In spite of threatening weather, this was again great success with very large attendance, estimated around 2,500 with some 450 cars in official parks. Exhibits included a modulated-light communication link and closed-circuit mobile ATV demonstration. Talk-in stations very busy on both bands, about 8% of /M's being on two metres. Extended report will appear in June issue.

Ten-Metre Test, April 21: Went off well in southern part of country, some 70 different stations being identified active on CW and phone in London/Home Counties area. Distances worked did not exceed about 100 miles, but many contacts made at 50-60m. ranges. Test results will be covered in "DX Comentary," June issue.

DX News: FR7ZC/G (Glorieuses Is.) there for April 18-20 only. KH6FBJ to be on Chichi-Jima (separate credit) during first week May. PX1OX will be on 15-80m., CW/SSB, June 25-July 6, DL2OX in charge, with good gear and aerial system.

April 25: Announced that K.W. Electronics, Ltd., now hold exclusive agency covering U.K., most of Commonwealth and many EU countries for American Hammarlund amateur-band equipment.

VHF BANDS

A. J. DEVON

THE barometric trace for the last few weeks has shown some violent fluctuations, and it was only as this piece went to press that there was any sign of an improvement in VHF propagation. Whether this developed into anything in the way of GDX conditions remains to be seen—and the last time we made a forecast in the same sense, nothing happened!

An account of the GB3CUW effort from the summit of Mt. Snaefell, Isle of Man, appears elsewhere in this issue. Suffice it to say here that the C.U.W.S. boys worked hard and did their best to give contacts on four metres and, two, and they hold the distinction of breaking new ground on the former band—it is the first time there has been any 70 mc activity from GD, and thereby they made a number of "Firsts," with G, GI, GM and GW. No very startling GDX was heard or worked on either band, but enough was achieved on both to make the effort well worth while.

On the theme of Forthcoming Events, do not forget about the London UHF/VHF Convention on May 18, of which details were given in this space last time; tickets, to include the dinner in

the evening (which is the high-light) are 27s. 6d. and obtainable through G3GMY (QTHR).

Then on June 15, at the Carlton Hotel, North Bridge, Edinburgh, the GM's are holding their annual VHF tea-and-dinner meeting, with a good programme of lectures and discussions. The Carlton can provide lunch, and also overnight accommodation if bookings are made in good time. The convention ticket is 22s. 6d. inclusive, and may be obtained from: W. B. Miller, GM3PMB, 14 Clamps Wood, East Kilbride, Glasgow—he will also be glad to arrange with the hotel for anyone wishing to stay the night. The GM's hope for contingents from outside Scotland, they put on a good show, and Edinburgh is a lovely city.

Since the last listing appeared, in the February issue, some further VHF Century Club Certificate issues have been made, as follows: No. 346 to Erwin Sommer, DJ5HN, Sodel/Oberhessen, whose cards are all DJ/DL except for HB1RG and OK2OJP. VHFCC No. 347 goes to W. G. Johnson, G2BJY, Walsall, Staffs., who shows a good variety of cards, from 10 countries; he runs a 40-watt PA, with a 5-ele Yagi. F. G. Maynard, G4OU, Sheerness, Kent, gains VHFCC certificate No. 348, his claim being based almost entirely on G contacts.

Then we have another clump of DJ/DL's: Herbert Matuschek, DJ3MY, of Holzkirchen, with No. 349, showing mainly locals, with a few OE/OK's; Ludvig Wagner, DL9JU, Munich, gets VHFCC No. 350, his lot including three Italians and four OE's, all the rest being from the G.F.R.; and No. 351 for Gunter Hoffschilt, DL9FX, also of Munich, with only four cards from outside the German Federal Republic, none of them for the U.K.

It looks as if in future we ought to ask that for these EU claims for VHFCC, at least 50% of the contacts should be with U.K. stations. It was never the intention that VHFCC awards should be made *ad. lib.* to foreign operators working only their locals to obtain

the required 100 confirmations. Some years ago, we disallowed

TWO METRES COUNTIES WORKED SINCE SEPTEMBER 1, 1962

Starting Figure, 14
From Home QTH Only

Worked	Station
64	G3BA
57	G3EDD
54	G3BOC
53	EI2A
51	EI2W
50	G3CO
49	G3OXD/A
48	G3BNL
45	G4LU
44	G2BJY
43	G3HRH
40	G3JYP, G3PBV
39	G3JXN
37	G2AXI
36	G3NUE
35	G2BHN, G3FIJ
34	G3OJY, G3PSL
33	G3JWQ
32	G3DVA
29	G5QA
27	G2DHV/P
26	G3NOH, G5UM
25	G3CKQ, G3GSO
24	G8VN
23	G3PTM
22	G3LQR, G3PTO
20	G3CCA, G3GWL, G3NPF, G3PKT, G3JHM/A
18	G3GVV, G3ONF
14	G2CDX, GW3ATM

This annual Counties Worked Table will close on August 31, 1963. All operators who work 14 or more Counties on Two Metres are eligible for entry in the Table. QSL cards or other proofs are not required when making claims. The first claim should be a list of counties with the stations worked for them. Thereafter, counties may be claimed as they accrue. Note: While new claims can be made at any time in the period from now to end-June 1963, all operators are asked to send in amended scores as often as possible, in order to keep the Table running up-to-date. After June 30, 1963, only amended scores from those already standing in the Table at that date will be accepted.

VHFCC claims from a large number of Japanese stations whose only VHF contacts had been with other JA's on the 50 mc (6-metre) band, in most cases apparently using SEO gear and super-regen. receivers! They had the 100 cards all right, in accordance with the letter of the rules, but hardly in the spirit. The refusal to issue caused hard feelings, needless to say, and ended in some rather acrimonious correspondence with the Japanese Embassy—but we held to the point (and have never heard from Japan since!—*Editor*).

Conversely, it now being so much easier for a G to work 100 U.K. stations, it would undoubtedly raise the status of the VHFCC award if it were made a condition for G claims that a certain percentage of the cards held should prove contacts outside the claimant's own country—say, 50% in the case of G's in the London/Home Counties area, tapering to 10% for GI's, and intermediate valuations for the other G-prefixes. While this would restore the intention originally behind VHFCC (and what the intention was is well known to the writer of this piece, because he invented the VHFCC idea in the first place) it would hardly be fair to change the rules for G's without due notice.

So we will say here and now, that we will look into the matter of changing the rules for claims with the issue of VHFCC No. 360. But for EU's, the rule about 50% of their cards having to be from U.K. stations comes into force immediately.

For your Contest diary: The R.S.G.B. have a two-metre portable event on May 5; this usually produces a large number of very strong signals through the band, from stations well sited on high ground round the country. And on May 26, there is a 70 cm. contest, the success of which is absolutely dependent on fair-to-good conditions.

There is quite a clip of 4-metre reports this time: The "firsts"

made by GB3CUW from Snaefell have duly been credited to G3PJK, GI3HXV, GM3FYB and GW3MDY, the first 70 mc QSO ever made from GD being with GI3HXV on March 26. An interesting contact for the GB3CUW boys was with G3AYT—he was working /M phone on 4m., and was raised immediately after their CW contact with G3PJK.

Among the other 4-metre news items, we notice G3NUE (Worcester) up to 20 counties now worked on that band; he shares the 20C rung with G3OHH and G3PJK. Louis of G3EHY (Banwell, Som.) is still well in the lead, with 29C worked on 70 mc. Some new stations come into the table this time. G3PMJ (Gorton, M'cr.) is now up to 30 stations worked, two of them, GW3MDY and GW3RBM, in new counties for him; incidentally, he corrects us on the point made here last month about having worked "27 stations in three days"—that was his total to that date. G3AYT (Hyde, Ches.) is very fully equipped for 4 metres—not only can he work /M on that band, but SSB as well. G2OI (Eccles, M'cr.) one of the most experienced operators in the VHF field up North, is now on 4m. and, like all the chaps in that area, is looking for GDX. At the moment, one of their best targets in that respect is GI3HXV (Finaghy, Belfast) who is regularly active.

G3PJK (Middleton Junc., M'cr.) also reports, and naturally was very pleased to make the 4-metre "first" with GD; another good QSO for him was phone with GI3HXV, worked several times during the GB3CUW sessions. G3PJK says that a good time for 4-metre operation is 1800-1900 GMT, when conditions seem to be better for long-haul stuff. GI3HXV also writes in, remarking that with him the GB3CUW 4-metre signals were 9+ on CW and phone. The active N.I. stations are, in addition to GI3HXV himself, GI3ALT, GI3HJA, GI3NFM and GI3ONF when he's home (he is a sea-going operator). The GI's are on the hunt for the GW's, apparently not yet worked on 70 mc from Northern Ireland.

FOUR METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 8

From Home QTH Only

Worked	Station
29	G3EHY
26	G3JHM/A
22	G5FK
20	G3NUE, G3OHH, G3PJK
19	G3BNL
18	G5JU
17	G3LZN
14	G3OKJ
12	G2OI, G3AYT, G3LQR, G5DS
10	G3OWA, GI3HXV
9	EI2W, G3IUD
8	G3PMJ

This Table records Counties Worked on Four Metres, on an all-time basis. Claims can be made as for the other Tables, e.g. a list of counties with the stations worked for them, added to from time to time as more counties accrue. QSL cards or other confirmations are not required.

An interesting letter from G3EHY records a solid sked QSO with GB3CUW on four metres—Louis says they had a nice, steady signal down in Banwell, and were worked on CW and phone. He finds 4-metre activity high at week-ends, with more stations coming on all the time; and he mentions G3PXB out /P in Glos. during the Easter week-end.

The note last time on G8VN's results with an indoor beam on two metres brings reports from G3KGU (Theydon Bois, Essex) and G3PTM (Solihull, Warks.) who are similarly placed. G3KGU says that he has been active on the band for three years, using a pair of 4-ele wide-spaced Yagis, stacked half-wave, installed in the loft, and rotatable; his Tx is a 12AT7-5763-5763-832 layout, running 12-20 watts; and his Rx an E88CC in cascade into E180F mixer, with a CR-100 for main tuning. With this equipment, he has worked, in the three years, 315 different stations in 26 counties and 6 countries, 41 of the stations

being EU's—nice going with an indoor beam!

G3PTM only started up in January of this year, but in that time has worked 103 different stations in 23 counties; his beam was at first a 5-ele flat-top, but that has now been replaced by an indoor slot-fed 4/4, which is giving improved reception of the GB3VHF beacon signal. His method of rotation is interesting: A 45 r.p.m. gram. motor drives on the rim of a 24-inch cycle wheel, on which the beam is mounted, giving "a very smooth 2 r.p.m. turning rate." As G3PTM says, an arrangement of this sort could not be used for a heavy outdoor erection, but works very well indoors. His transmitter takes 35w. input to the QQV03-20A PA, plate-and-screen modulated by a pair of 6L6's, and the Rx set-up is a CC converter with a 6CW4 RF pre-amp. stage, into an AR88D tuning 2-4 mc. Actually, G3PTM is thinking of deserting the indoor-beam fold and going in for an outside array—he says he'll let us know if there is any improvement!

EI2A (Nauan, Co. Meath) reports EI2AH (Longford), EI7AF (Offaly) and EI2AG (Louth) worked, and all for new counties, putting him up to 53C in the Annual, as GB3CUW was also raised for a new one.

From Cambridge, G3EDD reports an odd experience—having worked GB3CUW on two metres, he was called immediately afterwards by G13RMD (Co. Antrim), also a new county, the point being that the G1 was about 1½ S-pips stronger than the GD signal; indeed, with G3EDD, the latter never was better than S5. He mentions some interesting contacts, during the period, with G3KXA, who was out /P in five counties at week-ends. And G3EDD now has a new beam for 70 centimetres—two 9-ele Yagis stacked. He finds GB3GEC, the 430 mc beacon, a very useful signal, and always audible in Cambridge.

G3EKP (Belthorn, Lancs.) is on 70 cm., though not at present transmitting; he keeps a cross-band 144/430 mc schedule with G3LJO/T. G2DHV (Sidcup) has

been disporting himself under the call signs ON5ZQ and PA9DHV/M on two metres.

In Caernarvonshire as GW3OHC/P during Easter, to try out gear for /M and /P operation, G3OHC (Birmingham) struck a period of poor conditions and low activity, and in the wind and rain had battery trouble, to complete a rather disappointing experience; however, G3BA and GW3CRH/M were worked, and G3BNL was getting the signal.

Bill James, DL2XM, well known to many of us as G6XM, is being posted home and will be on from the Christchurch, Hants. neighbourhood as soon as he gets settled. During his spell at München-Gladbach, a regular thrice-weekly sked was maintained with G2JF (Ashford, Kent) and in a period of two years it hardly ever failed, with G2JF often getting through on phone. With that interesting experience behind him, Bill's immediate pre-occupation is finding suitable accommodation for his family in the Bournemouth area.

We are asked to bring to readers' notice that the non-partisan body known as the London UHF Group meets on the first Thursday of every month at the Whitehall Court Hotel, Bloomsbury Square, London, W.C.1. Their meetings are well-attended and always interesting, and the Group has been responsible for much in the way of VHF progress and indoctrination in the London area—for instance, the April meeting was devoted to talks and demonstrations from the point of view of beginners on the VHF bands. The hon. secretary is S. H. Chapple, G6SC, 7 Rutherford Close, Ewell, Surrey, who would be glad to hear from anyone who may think of joining or attending the meetings.

And talking of such activities reminds us that a somewhat similar body—the Coventry VHF/UHF Group—had an attendance of 30 VHF types at their March meeting, when gear of all kinds was shown, from 23 cm. parametric amplifiers to complex aerial change-over systems. And Mid-

70 CENTIMETRES COUNTIES WORKED SINCE SEPTEMBER 1, 1962

Starting Figure 4
From Home QTH Only

Worked	Station
29	G2CIW, G3KPT
25	G3LQR
20	G3AYC, G3EDD
17	G3LHA
14	G3BNL
12	G5QA
9	G3NOH, G5UM
6	G3BIK
4	G3EKP

This Annual Counties Worked Table is reckoned from September 1st, 1962 and will close on August 31st, 1963. All operators who work four or more Counties on the 70-centimetre (430 mc) band are eligible for entry. Counties should be claimed as they accrue, and otherwise the rules are as for the Two-Metre Annual Table.

lands stations now on two-metre RTTY are G3GGR, G3LAY and G6CW, while one of those copied from the Birmingham area on radio T/P is G3NES (Canterbury).

Finally, an apt comment from G3BA (Sutton Coldfield), talking of people who are considering a start on VHF: "If you intend to go VHF, do it correctly, and none of this 'dipole in the roof-space' stuff and calling CQ at 2.0 p.m. on a Tuesday afternoon, and then going back on 80 metres to tell everyone the two-metre band is dead." He's quite right—that's exactly what has happened, in numerous instances.

Dead-Line—

For the June issue is **Friday, May 24**, which gives your A.J.D. a little breathing-space—no, it's not a mistake, that is the final date, and we look forward to a heavy mail, addressed: A. J. Devon, "VHF Bands," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. With you again on June 7, and have a good Whitsun—all being well, for A.J.D. it will be a few days' sailing to Alderney and a glass or two of vino in Cherbourg on the passage back to the Hamble.

TT21 LINEAR AMPLIFIER

FOR SSB, AM OR CW
OPERATION

THE circuit shown here is based on the Earnshaw Linear—the original circuit by ZL1AAX, first published in the February 1959 issue of *SHORT WAVE MAGAZINE*, was for an 813, and here it is adapted (by ZL2ACE, in *Break-In* for January, 1963) to a TT21.

As in the Earnshaw Linear, bias for the TT21 is developed across R1 under drive conditions, and the stage is neutralised for clean and stable operation. The general design as shown here is laid out for working on 20 and 80 metres, at present the most popular SSB bands. C1/L1 is pre-set tuned to 20m. and C2/L2 to 80m., selected by the switch S according to drive input. The neutralising capacity C4 can

be a piece of metal strip about 3 ins. by 1½ ins. wide, shaped to fit to the TT21 envelope and spaced to ensure proper neutralising (that is to say, C4 works against the valve anode "through the glass," as in VHF practice).

On the PA tank side, L3 is made up for 80 metres (22 turns of 14g. spaced to 6 t.p.i., on a 2-in. diameter former of ceramic or other good low-loss material), with a tap for the 20-metre band at about 4 turns from the plate end of the coil.

Operating Points

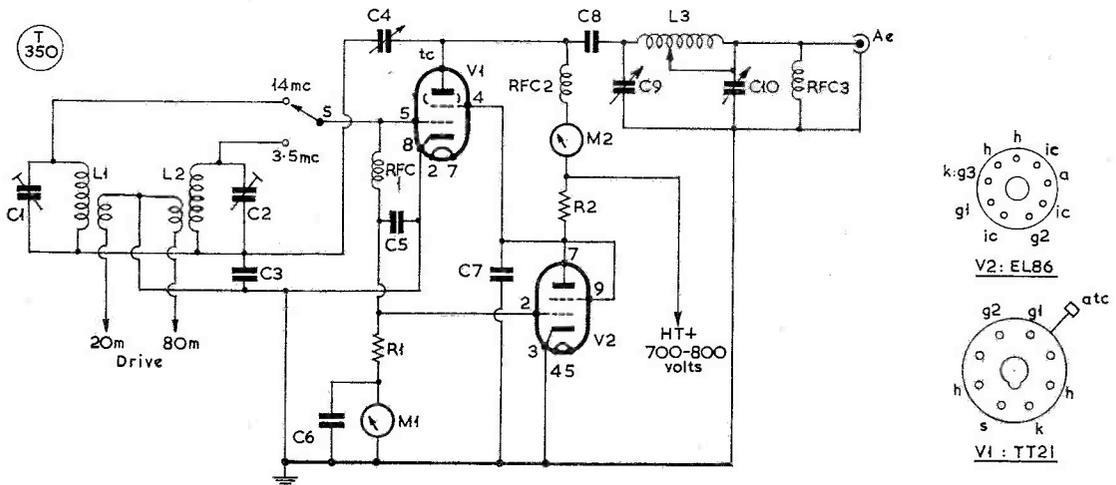
With the values given, the drive adjustment, as read on M1 and assuming 800v. HT, should be (1) for SSB, 2.0 mA; (2) for AM phone, 3.5 mA; and (3) for CW, 6 mA. In other words, in the AM/CW modes, the stage is driven towards the Class-C condition, and right into it on CW; the essential operating point is to avoid this when running the PA on Sideband phone.

The TT21 is a robust valve, capable of giving a very good RF output, but like all high-efficiency tetrodes, needs to be handled gently in the electrical sense. Under AM conditions, the maximum input should not exceed 90 watts and on SSB the talk-up should be not more than 125 mA with 750-800v. on the plate. Resonance and tuning adjustments must be carried out quickly to avoid high unloaded plate dissipations, and the valve should never be run without output loading. On SSB, it is best to keep the standing DC input to about 40 watts, though the TT21 is rated a bit over this. Maximum ratings are 1,250v. plate HT, 300v. screen, and 45w. anode dissipation for 100w. RF output. It is a standard G.E.C. small transmitting type.

Table of Values

Circuit of the TT21 Linear

C1 = 33 μF, pre-set	RFC2 = Pie-wound Tx type
C2 = 100 μF, var.	QRO RF choke,
C3 = 270 μF	So-Rad B124
C4 = Neut., see text	RFC3 = 2.5 mH RF choke,
C5 = .005 μF	So-Rad B123A
C6 = .001 μF	L1 = To tune 20m. with
C7 = .005 μF, 3 kV	C1
C8 = .001 μF, 4 kV	L2 = To tune 80m. with
C9 = 250 μF, t.xm.	C2
C10 = .001 μF, var.	L3 = see text
R1 = 33,000 ohms, 1w.	M1 = 0-10 mA, m/c
R2 = 25,000 ohms, 25w.	M2 = 0-200 mA, m/c
RFC1 = 1.5 mH RF choke,	V1 = TT21
So-Rad B123	V2 = EL86, or similar



The TT21 RF amplifier discussed in the text. It is based on the linear PA originated by ZL1AAX to use an 813 and, as in his circuit, the bias is developed across R1. When operated on CW, drive and therefore bias can be increased to about 6 mA, to approach the Class-C condition. Neutralising is by a small metal plate presented to the valve anode — see text. Higher HT voltages, up to 1000v, or more, can be used provided the maximum dissipation rating (45w.) of the TT21 is not exceeded in the SSB mode. For proper setting-up on AM or SSB, a CRO monitor should be used. On CW, an RF output of 100w. could be expected on both bands under correct drive and load conditions. For 20m., L3 is tapped at the 4th turn, and this must be made a generous low-loss connection — say, copper braid with a screw connector fitting an L-shaped lug soldered to the tapped turn. The 20-metre tuning will be high-C, for stable SSB operation, and the output will match into 50-75 ohms.

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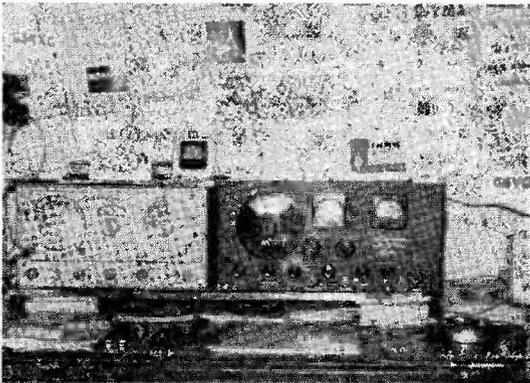
OPINION, COMMENT AND NEWS ON TOPICS OF LISTENER INTEREST

EACH instalment of "SWL" sees a greater volume of mail arriving, and this month the number of letters really has outstripped the space available for dealing with them. As some are of more than usual interest, we will quote them at length; from others we will take the more interesting snippets; but for those that merely dealt with what the writer had heard during the month, there is unfortunately not room. Therefore some of our readers are asked to take their new score in the HPX table as indicating that we *did* receive their letter, but that we just haven't the room for the contents. The HPX Ladder itself is longer than ever before, and the new additions by far outweigh the fallers-out.

Attitude to SWL's

H. G. Shaw (Heswall), who still heads the Ladder by a handsome margin, was recently invited to talk to the Wirral Amateur Radio Society on the subject of the DX bands from the SWL point of view. We are very pleased to note his remarks that here, at any rate, was one club with a really sympathetic regard for the SWL by its licensed members, from whom it was obvious that the aspiring listener got every assistance towards getting his own licence.

And on this very subject, we have quite a crop of successful and aspiring R.A.E. candidates writing in. *P. H. Moncaster (Goole)* is taking it this month, having survived the O-Level QRM last year and having a little time before the A-Levels next year. *M. I. Vincent (Cheltenham)* is a 14-year-old who is already up to the mark with his Morse, and will be taking an R.A.E. course this year. And *R. Ashby (Hinckley)*, who has been writing in to this feature



From the distant Isle of Arran, Bute, J. C. Black of Pier House, Brodick, sends this picture of his layout. His receivers are National NC-57 (left) and an SX-24. One of his major interests is sending tape-recorded reports to amateur stations.

for some time, tells us he is now G3RVW—so *some* of his troubles are over, and we wish him luck on the air.

ATU's

A surprising number of comments on ATU's have arrived, and so many people are so emphatic about their usefulness that we quote: "I built the ATU described in your recent article, the net result being a vast improvement" (*M. Healey, Horsham*) . . . "Thought you would like to know how useful I found your article on ATU's in the January issue" (*E. Lloyd, Beeston*) . . . "I have improved my Rx greatly with an ATU, crystal-controlled converter and a product detector, all from *Magazine designs*" (*D. J. Aldridge, Southend-on-Sea*). These are not quoted in any mood of self-congratulation, but to convince still more readers that a good ATU is one of the simplest ways of improving their results.

Overseas SWL

G. G. Bulley Mead writes from *Singapore*, where they apparently hear some strange things, since he asks if any U.K. listeners during February logged JA1BS/Ø, K2JAJ/CE, FO9IW or UB5ARTEK! He uses a CR-100 with a new front-end, and a 14 mc dipole, and concentrates mainly on CW. (And he thinks Singapore is ideally situated for DX!)

Incidentally we must have several more overseas SWL readers and would always be pleased to hear from them regarding receiving conditions in other parts of the world.

Home-Brew ?

Very sensible remarks from *D. Gray (Easington)*, who thinks that very few SWL's have the money to buy receiver and transmitter as soon as their licence arrives. But on the other hand he says "It is not necessary to wear one's fingers to the bone over the kitchen table to produce an Rx or Tx which has the *sole* merit of being home-brew, but probably gives results that are put to shame by commercial jobs." His outlook is that one can gradually build up a certain amount of equipment that is useful for SWL'ing and also for the day when the ticket comes through. And while listening, he is always noting the comments passed on various types of gear and finds them a great help in future planning.

The summing-up of the "Home-brew *versus* Commercial" question, as seen by SWL Gray, is "If you have the time and ability to construct gear that compares favourably with commercial gear, then do so, but I see no point in using inferior apparatus simply because it is home-built."

Quotes from Letters

"As soon as arrangements were made for my fortnight in Paris on a vacation course, I looked up the call-book and wrote to an amateur living near where I would stay. The result is that F8QT will pick me up in his car and take me back to see his rig, if I telephone him when I get to Paris . . . it will all help my learning French, and is just another

example of the friendly spirit existing in Amateur Radio" (*R. K. Western, Torquay*).

"CW listening accounted for my first W on Top Band (W2FYT) since when I have logged about 25 more, and 10 countries" (*B. Curnow, Plymouth*) . . . "When the Russians have an SSB Contest, Forty suddenly comes to life in the evenings . . . there are always a few reasonably clear kilocycles between the BC QRM and the CW portion of the band" (*C. H. Miller, Tayport*) . . . "Anyone interested in hearing South America on SSB should look around 14100 kc after 1800 GMT" (*R. J. C. Coats, Cowie*).

"I have noticed the growing use of the low end of Twenty for SSB, and one evening, within an hour I logged FY7, ZP5, CN8, TI2, VP2, VP9, VE4, OX3, all around 14100-14130 kc" (*S. Foster, Lincoln*) . . . "With my two-valve, home-built regenerative receiver I heard ZL's on Eighty-metre SSB nearly every morning in February—on a 15-ft. indoor aerial" (*J. Doggett, Abbots Langley*).

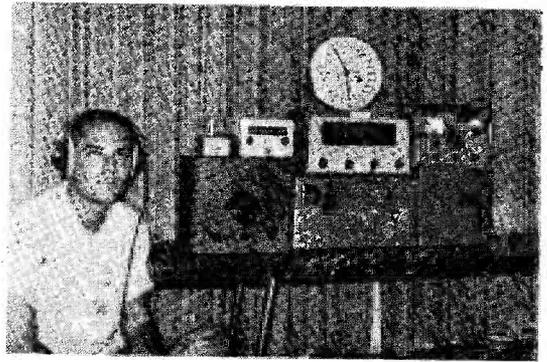
"Since leaving the R.A.F. as a wireless operator (1946), up to 1962, I took no interest in Amateur Radio; but since listening to CW then I have become very interested and have joined the local club, where I can pick up much-needed information" (*G. Thomas, Salford*) . . . "Could you possibly advise me if it would be possible to insert an advert. to see if some kind amateur would allow me to pay him visits to watch him at work?" (*A. W. Woodland, Clevedon*) . . . Don't worry about an advert.—write or phone a reasonably local amateur and see whether you can visit him—or join a local club and meet some of them. They *are* human—and even friendly!

DX/TV

Still very much a minority interest, DX/TV reception is strongly represented by *C. N. Rafarel (Poole)*, who has now acquired a 60-ft. tower, bristling with aerials. He will be covering Bands I, III, IV and V and looks forward to the coming "open season," between May and October. *Jacques Herreman*, the well-known Belgian exponent of DX/TV, is forming a European club, which will be circulating its own news in four languages. If any of our SWL readers are seriously interested in DX of this specialised nature, drop a line to *C. N. Rafarel* at 10, Netley Close, Parkstone, Poole, Dorset.

R. R. Loe (Colchester) is one who has aspirations in this direction, and in fact he hopes to get fixed up over Easter. Meanwhile he finds ordinary DX listening pretty interesting; has fitted up the complete station in his car, with a dynamotor; and hopes to get up a ground-plane for the three HF bands very shortly.

Correspondence for the next appearance of this feature, in the July issue, should reach us not later than May 31, addressed: "SWL," c/o The Editor, Short Wave Magazine, 55 Victoria Street, London, S.W.1. Good photographs are always wanted for illustration, and are paid for on appearance.



One of our overseas SWL readers — Ken Greenberg, 1613 West Albion, Chicago, 26, Illinois, U.S.A., whose main Rx is a National NC-125 (centre) with a matching speaker at right and on the left an RME DB-23 pre-selector covering 550 kc-40 mc. Other items include a crystal calibrator giving 100/1000 kc markers up to 30 mc; a Gonset VHF band Rx; and an FM receiver. SWL Greenberg, who is a high-school teacher in Chicago, has VHF and long-wire aerials for general reception.

HPX Queries

The most frequently encountered query in this month's mail is "How do I join the HPX Ladder and what are the rules?" The first part is easy—simply send, in the first instance, a list of the prefixes you have heard up to date . . . and keep it "topped up" each month you write. Don't repeat the whole thing; it gets too much like hard work.

Regarding the "rules," one can hardly say that there are any. Every prefix counts, the term "prefix" meaning the national prefix letters and also the initial figure of the callsign. So LA2, LA4, LF1, LJ2, and so on, although they are all Norway, count as separate prefixes. Among those crazy mixed-up ones with letters and figures, 5A1, 5A2 and 5A3 would all count as different. Where there is a *suffix* to a callsign it is treated as if it were a *prefix* . . . e.g. W5JDX/VP9 counts as a VP9. But a suffix such as /M or /A does not count, except in the special case of /MM's, which do. Finally, areas which have two completely different prefixes (UB5 and UW5; UA9 and UW9; and so on) . . . count them both. You can get roughly forty prefixes out of the U.S.A. these days if you listen to the novices with their KN's and WV's and so on!

Notes on the Bands

R. K. Western (Torquay) remarks that there cannot now be any grumbles about "early closing" on Twenty—it's open until nearly midnight! He has still been logging good DX on Eighty, although it's deteriorating. *D. Gray (Easington)* noted the tremendous signal that UA1KBW had on Twenty SSB, during the ARRL Contest; he "took a ride" and looked for every W or K station that the Russian worked, and as a result collected some of the rarer States—and also found that W6 and W7 were readable over here as early as 1430 GMT.

A. W. Nielson (Glasgow) has the impression that DX could be better on Fifteen than on Twenty, but

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continued

inactivity and weakish signals have made it difficult. For Twenty, he quotes a "phenomenal opening" on February 9, with the band still DX-active as late as 0200. On Eighty, the chief item of interest was "the flood of W's (1-4) almost nightly after 2300"—around 3800 kc, SSB. But identification was difficult because of hurried signing in local net working.

P. L. Stevens (Donnington) wonders whether Shropshire is a "rare" county for Top Band—because he hopes to be operating himself after taking the Morse test in June. (He is already building the "Mini-Topper" described in our issue of August 1962.)

M. Stapleton (London, W.13) queries the prefixes AT1, AL9 and VU1, which all sound fishy. R. Hunter (Kenton) heard XU7A and assumes that he is a pirate. Algerians did use AL unofficially for a time, but they have just come up with the proper one—7X2!

The many readers who complain that ten metres is "dead" may have found something to interest them during the Ten-Metre Activity Period on April 21—we hope they saw the advance notice of it in last month's issue. A little time spent on this band, particularly at week-ends, might reveal that it is not so dead after all—but don't expect any rare DX.

S. Howell (Hove), who is 13 years old, joins the HPX Ladder with 198, and says that Forty has been very good in the mornings, with VK audible nearly every day.

Stray Comments

C. F. Pocock (Watford) finds Eighty now divided into three main sections—CW, AM and SSB. "And what a nasty bunch of old men some of the chaps are," he adds. "The lack of callsigns is all too evident, and the habit of 'putting it back for the final' is deplorable, as the other chap often doesn't want to sign." (From what we have heard of it, we



"... Sorry, OM, getting QRM from the Junior op. ..."

HPX LADDER

(Starting January 1, 1960)

Qualifying Score—150

SWL	PREFIXES	SWL	PREFIXES
PHONE ONLY		PHONE ONLY	
H. G. Shaw (Heswall)	651	K. A. Randall (Fareham)	249
A. W. Nielson (Glasgow)	579	R. G. Evans (Swansea)	243
R. J. C. Coats (Cowie)	573	M. D. Stapleton	
R. Hunter (Kenton)	467	(London, W.13)	236
C. N. Rafarel (Poole)	448	M. Vincent (Cheltenham)	233
L. S. Margolis (Ilford)	426	D. Barker (Brownhills)	229
R. R. Loc (Colchester)	412	D. Hayes (London, W.3)	227
D. Smith (Stanmore)	410	D. J. Warburton (Dollor)	224
B. Curnow (Plymouth)	406	B. J. Tarry (Warrington)	206
F. C. Anyon (Wirral)	402	S. Howell (Hove)	198
D. A. Whittaker		M. V. Collins (Crayford)	195
(Waddington)	395	A. J. Birch (Lichfield)	194
R. K. Western (Torquay)	376	D. A. Williams	
D. Gray (Easington)	361	(Budleigh Salterton)	182
P. J. Lennard (Wartling)	360	J. T. Eden (Solihull)	166
F. Bourne (Plymouth)	348	R. Harsant (Ware)	158
S. Foster (Lincoln)	335	T. K. Evans (Aberystwyth)	158
M. Warrington (Burnley)	335	A. F. Roberts	
M. Healey (Horsham)	334	(Kidderminster)	157
K. C. Staddon (Stroud)	328	P. H. Moncaster (Goole)	156
D. J. Aldridge (Southend)	307	K. M. Duggan (York)	153
C. H. Miller (Tayport)	303	J. R. Daws (Leeds)	151
R. Adams (Shoreham)	303		
J. E. Pither (London, E.5)	302		
D. Douglas (Edinburgh)	300		
J. F. Hobson (Emsworth)	292		
W. J. Atherfold (Southwick)	272		
A. Huggett (Lamberhurst)	264		
G. C. Steedman			
(Huddersfield)	261		
R. J. Howgego			
(London, E.11)	260		
C. M. Palmer (Birmingham)	252		
R. V. Coupe (London, W.3)	251		

(NOTE: Listings include only recent claims. Failure to report for two consecutive issues of "SWL" entails removal from the Table. Next list, July 1963 issue, deadline May 31.)

should say that in many cases it's just about time he did!)

R. P. Tollerfield (Bristol) has got his Radio Amateur Certificate but has to wait a while for his licence (you may have guessed the reason!). He advises any SWL who is "over-enthusiastic" to get a grip on himself and not jump the gun. Meanwhile he is listening hard and changes his aerial system practically every week-end.

P. J. Lennard (Wartling) doesn't like the CW stations that operate in the SSB section of Twenty. This makes a change from complaints about phone stations operating down in the CW end!

The deadline for the next instalment of "SWL" (in the July issue) will be Friday, May 31. The coming month or two should be better for DX than the winter has been, and as we conclude this session we wish you all Good Listening.

T. W. BENNINGTON, BBC RESEARCH DEPT.

The death is announced, at the age of 63, of T. W. Bennington, who, though he joined the BBC in 1934 on the engineering side, soon branched off to the study of propagation. He was soon an international authority on the subject; his book *Short Waves and The Ionosphere* became the standard reference on HF/VHF propagation and ran into several editions. He remained with the BBC until his death, having served at the Moorside Edge transmitting station and in the Engineering Information Dept. before joining the Research Dept.

NEW QTH'S

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

G3RIC, F. A. Stanier, 9 Tudor Close, Penkhull, Stoke-on-Trent, Staffs.

G3ROK, L. A. J. Hull, 35 Oakmere Lane, Potters Bar, Middlesex.

G3RQM, C. Bradley, 2 Tesla Street, Philadelphia, Houghton-le-Spring, Co. Durham.

G3RRE, E. Brain, New Ground, Green Lane, Radnage, nr. High Wycombe, Bucks.

G3RRU, G. M. Gooch, 77 Halsbury Road East, Northolt Park, Greenford, Middlesex.

G3RRW, J. Francis (*ex-ZBIJF*), 19 Abercorn Road, Londonderry.

G3RTJ, G. R. Henderson, 76 Austen Paths, Stevenage, Herts.

G3RUA, Mrs. Barbara Jones, 28 Vicarage Road, Yardley, Birmingham, 33.

G3RUJ, R. Powell, 19 Radley Road, Fishponds, Bristol.

G3RVW, R. Ashby, 15 Teign Bank Close, Hinckley, Leics.

G3RWF, P. N. Henwood, 45 Weetwood Lane, Leeds 16, Yorkshire. (*Tel.: Leeds 51904*).

G3RWF/A, P. N. Henwood, Royal Grammar School, Newcastle-upon-Tyne, 2.

G3RWI, P. H. Cross, Lynden, Rowton Lane, Chester. (*Tel.: Chester 35661*).

G3RWK, T. M. Smith, 19 Osborne Terrace, Luddenden Foot, nr. Halifax, Yorkshire.

G3RWL, R. W. L. Limebear, 190 Winchmore Hill Road, London, N.21.

G3RWV, M. A. Sanders, 2 Mortimer Rise, Tring, Herts.

GW3RWX, D. M. Thomas, 39 Gron Ffordd, Rhiwbina, Cardiff, Glam. (*Tel.: Cardiff 60939*).

G3RXF, W. J. C. Storeton-West, 4 Old Nelson Street, Lowestoft, Suffolk.

G3RXH, H. A. Aspinall, Adare, Raikeswood Crescent, Skipton, Yorkshire.

G3RXN, C. W. Jacob, 21 Coquet Grove, Throckley, Newcastle-on-Tyne 5, Northumberland.

G3RXS, W. G. Scarlett, 12 Otley Road, Eldwick, Bingley, Yorkshire.

G13RXV, N. M. Graham, Shanagarra, Castledawson, Co. Londonderry.

G3RYI, A. J. Simmonds, 41 Sylvan Avenue, Hornchurch, Essex.

CHANGE OF ADDRESS

G3FQJ/A, J. W. Barton, Tapton Secondary School, Sheffield, 10.

G3HEK, J. B. MacRae Smith, 4 Hampton Close, Oswestry, Salop. (*Tel.: Oswestry 2845*).

G3HOX, Manchester and District Amateur Radio Society, c/o A. B. Langfield, 2 Rowland Street, Moston, Manchester, 10.

G3HPJ, T. Shepherd, 22 Danes Croft, Bridlington, E. Yorkshire.

G3HRX, J. C. Hilling, 6 York Road, Kings Lynn, Norfolk.

G3JBC, J. W. Cox, 28 Midland Avenue, Lenton, Nottingham.

G3KZY, J. Rathbone, 56 High Meadows, Romiley, Stockport, Cheshire.

G3LCW, L. A. Hood, 229 Middle Deal Road, Deal, Kent.

G3LEQ, G. L. Adams, Mandeville Bungalow, Howard Avenue, West Mersea, nr. Colchester, Essex.

G3LRH, G. A. Frampton, Dane End, Hollywood Lane, West Kingsdown, nr. Sevenoaks, Kent.

G3NGD, J. T. Beaumont, 12 Grosvenor Street, Stretford, Manchester.

G3NGD/M, J. T. Beaumont, 76 The Esplanade, Fleetwood, Lancs.

G3NOB, Mrs. Rita G. Shepherd, 22 Danes Croft, Bridlington, E. Yorkshire.

G3OST, D. E. J. Wilson, 15 Elmhurst Court, St. Peter's Road, South Croydon, Surrey.

GM3PGX, D. E. Murgatroyd, 25 Tedder Road, Kinloss, Forres, Morayshire.

GM3PMK, J. C. Buick, (*ex-G3PMK*), Ewan Cottages, Barry, Angus.

GM3PSP, A. J. Masson, 20 Merchiston Park, Edinburgh, 10. (*Tel.: FOU 5617*).

G3QF, Rev. E. Geddes, The Vicarage, Mossley, Manchester.

G4LS, L. W. Skipper, 67 Stanley Avenue, Portslade, Sussex.

G8PL, L. A. Kippin, 73 King Henry's Road, Hampstead, London, N.W.3.

AMENDMENT

GM3BXL, R. P. Liddell, 36 Hollandbush Crescent, Bankier, Banknock, Stirlingshire.

IF IN ANY DIFFICULTY

About getting SHORT WAVE MAGAZINE regularly and on time, we can accept single-copy post orders from readers individually. Send a P.O. for 3s., asking for a copy of the issue required, and post it on the Tuesday before the Friday of publication, e.g. on June 4 for next month's issue, due out on June 7. Many readers in remote parts already avail them-

selves of this facility. For a full year of 12 issues, the direct subscription rate is 36s., post free; all subscriber copies are mailed for delivery (in the U.K.) on publication day, the first Friday in the month. Orders, with remittance, to: Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. (We pay postage on single-order copies.)

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for June Issue: May 17)

(Address all reports for this feature to "Club Secretary")

WHAT is the hallmark of a "successful" Club? Cash in the bank, a large membership, a high percentage of licensed amateurs, or a consistently good turn-out at meetings? We should be inclined to say that the proportion of the membership regularly attending meetings is the real measure of success.

It is not achieved without (a) a well-organised series of talks or lectures to keep people interested; (b) a reasonably salubrious meeting-place; and (c) a keen and lively set of members. Given these three, how could any club fail? And yet some of them have the most unaccountable ups and downs, despite the best efforts of a hard-working team of officials.

From the Activity Reports received during the next few months we shall be trying to find the "missing ingredient" that makes for certain success . . . and we rather fancy that it has something to do with the constant indoctrinating of new, young members, without whom any club will eventually stagnate and become merely a gaggle of old-timers getting together for a pint and a moan about how things are going from bad to worse.

Accent on Training

One club whose activities have impressed us is **Chesham**, where the accent has always been on lessons and lectures for newcomers. The secretary writes that "shortage of funds and spare time are a continual handicap to be overcome by this training society, but despite an annual financial load of nearly £90 to cover our premises and fixed commitments the society continues to hold its own." This month they are hoping for five R.A.E. and about six Morse passes, but plan to step up the programme still further. Incidentally, they are taking part in the **Amersham Festival**, to be held on **Whit Monday**.

A worth-while effort by **Derby** starts on May 8, in the form of three consecutive (weekly) lectures on "Safety in the Shack and Home." These will cover First Aid, Electrical Safety, Fire Prevention and so on, all in conjunction with recognised authorities on the subjects. Congratulations, **Derby**!

Morse practice has a distinct bearing on the training angle, naturally, and one of the few clubs to feature it at every meeting is **Flintshire**. On May 27 (Railway Hotel, Prestatyn) they will be running slow Morse at 7.30 p.m., Hints and Kinks by **GW3PCZ/T** at 8 p.m., and a talk on Using Relays by **GW3PKH/T** at 8.30 p.m.

New ground is being broken at **Hastings** on May 21, when a visiting lecturer, **G2UJ**, will be talking on Nucleonics. May 7 is the date for a debate on the well-worn subject of *CW versus Phone*, with **G6QB** taking the key and **G3MQT** the mike.

Newcomers

We are always glad to see new names in the post, although some of the old ones who return after a long absence are just as welcome. This month we hear that things have started up in **Mansfield**, where the nucleus of a club has been formed. They meet every Friday at the Hope and Anchor Inn, Union Street, and anyone interested is invited to turn up. (See panel for secretary's QTH.)

Pontypool, though not a new club, has been absent from these columns for some time. They now meet on Tuesdays, 7 p.m. at the Educational Settlement, with Morse and R.A.E. tuition available to all who may be interested. VHF and HF portable expeditions will be a feature of their summer session, and they have a member with a /T licence who has a Vidicon closed-circuit TV layout in operation and would welcome co-operation on 420 mc.

Closed-circuit TV is also the subject for the **Melton Mowbray** meeting on May 18 (St. John Ambulance Hall, Asfordby Hill), when Mr. L. Root will be the speaker.

Inter-Club Events

It often seems to us that much more could be made of informal contests, Quiz events and so on, run on a competitive basis between nearby clubs. Some parts of the country have a really tight concentration of clubs—the area round Birmingham, for instance, also South London and the Home Counties. From time to time we hear of such things, but not as often as one would expect.

On this theme, **Portsmouth**, **Gosport** and **Isle of Wight** ran a local Top-Band contest on March 11 and 18 (two hours each evening). The Isle of Wight won the transmitting event, Portsmouth the receiving.

As far as ordinary visits go, these, too, are none too frequent, but we do note that **Northern Heights** are visiting **Manchester** on May 8. On the 22nd they have one of their Ragchew nights.

Sutton Coldfield and **South Birmingham** are another pair of clubs who organised an inter-club contest in March. We got this from *QSP*, the South Birmingham news letter, but the results have not yet been given.

Wolverhampton and **Slade** are a pair who get together with Quiz contests, and this they were due to do on April 22, at the Wolverhampton Hq. We hope the best team won. **Wolverhampton** break new ground, also, on May 6, with talks on "How I started Amateur Radio" delivered by senior members in the spirit of advice to the juniors. On May 20 they have a home-built gear competition and also a ballot for the Best Lecture (another good idea). Their April *Newsletter* gives the current programme, as usual, and also details of the Annual Dinner on May 27.

At **Slade** they will be hearing from G3LGI/T and G3JZF about Amateur TV (May 3), running a D/F Test on the 17th, and listening to G3BA on his "Welsh Safari with Radio" on the 31st. In contrast to the Wolverhampton idea (how Old Timers started up) they will invite their *newly-licensed* members to describe how they got on the air, at their meeting on June 14.

Yet another partnership, for Quiz contests and the like, exists between **Clifton** and **Crystal Palace**. Their third annual event resulted in a win for Crystal Palace, by 279 points to 258, each club winning on its home ground. **Clifton** have a Junk Sale on May 17; on the 12th they are running a 3.5 mc D/F Field Day, starting from Badgers Mount, Knockholt, at 11 a.m.

General Activities

Torbay held their AGM on April 6, when they elected G5SY president, G3ABU chairman and G3NQD secretary. G2CWR was elected vice-president in appreciation of his services to the club over the years.

Lack of heating in the club-room restricted activities at **Loughborough** during the first part of the year, but if membership continues to grow they hope to be better placed by next winter. In mid-March they took part in a local Hobbies Exhibition, and in April they ran a Film Show including "Field Day in Cyprus."

At **Barnet** they have had a Survey of VHF during the past Decade, by G3HRH, and a lecture on Home-Built SSB Gear, by G3DZW. The meeting for May 28 had not been finalised when they wrote, but it should be a Junk Sale and a "very special film show."

Back to our columns after a long absence—**Farnborough Technical College** Radio Society, where they are building an all-band transmitter and erecting a shack in the College grounds. New members interested in Amateur Radio, Audio or Radio Model Control are invited to get in touch (see panel for QTH).

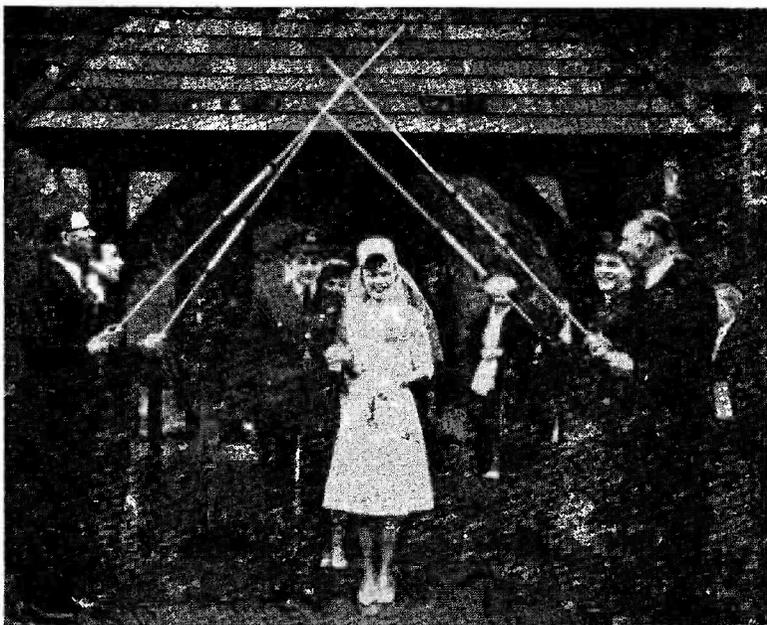
The April meeting at **Stourbridge** was well attended, and members heard a talk by G3BMY on Common Transmitter Faults. For the May 7 meeting they are promised a recorded lecture, with slides, on Semi-Conductors; on the 28th they will be discussing NFD arrangements.

Another club from which we have not heard for some time is **Basingstoke**, where they now meet on the second Saturday at the Immanuel Hall, Wote Street. On May 11 G3HGE will be talking about the Withers range of products.

UHF is a fairly rare subject on club programmes, so all honour to **Crawley**, who will have a lecture and demonstration of 23-cm. gear by G8RW on May 22. A new call-sign has appeared in their ranks (G3RXJ) and others are expected soon.

Details of the AGM at **Cray Valley** appear in their *Newsletter*, in which we also read of a *shack* for disposal—free to any club member. Take it away, but you supply the transport and the plot! Next meeting is on June 6, when the T.W. line will be demonstrated by G3HGE.

The new headquarters address for **Liverpool** is St. David's Mission Hall, Queens Drive, Childwall, Liverpool. They will be meeting there every Tuesday in May; Two-Metre converters on the 7th, Open Meeting on the 21st and Radio Control (G3ERB) on the 28th. We should most like to be there on the 14th, when they will debate the proposition that "The Ham is a Menace to Society." [over



When P/O E. W. Gent, R.A.F. (G3ODG), married Miss Sandra Wegg (only daughter of G3ANM) at Moulton Parish Church, Spalding, Lincs., they left the church under an archway of crossed 20-metre beam elements, borne by members of Peterborough Radio Society. G3ODG is an air electronics officer, at present based at R.A.F. Topcliffe, whose home QTH is King's Lynn, Norfolk. His best man was P/O J. G. MacTaggart, R.A.F., who is a keen SWL.

(A G3KPO print)

The Social Side

All sorts of goings-on are reported from **Medway**, who held their "Tramps' Night" social on April 1. A Bingo session, a Raffle and a "pass the drum of pennies" effort kept things going, with some of the members dressed as tramps and others in their normal attire "which they considered suitable for such a gathering." Clubs whose outlook is perhaps too deadly serious might care to note . . .

From the **North Kent Newsletter**, too, we read of a social outing at which 82 members and friends visited a show in London and voted it a most successful trip. Outings to Mobile Rallies are another useful form of social outlet, and **North Notts** are going to at least four of them during the coming season. Incidentally they hope to have four "new tickets" in their midst by the time this appears. On May 9 they expect a visit from the **Newark** club and also "some of the Grantham boys."

Bucket-and-Spade Parties are becoming traditional with quite a few clubs. This year **Pembroke** have organised one for June 30. It will be held at the Regency Parish Hall, Saundersfoot, and GW2OP/M and GW3LXI/M will operate the talk-in on 1876 kc. Applications, not later than June 25, to GW2OP (see panel for QTH).

Reading are holding a Mobile Picnic on June 2 at the Childe Beale Memorial Trust, Lower Basildon,

near Pangbourne. This will be an informal get-together, and visitors are expected to bring their own refreshments. This event will be repeated on August 25.

Six members from **Reigate**, including three mobiles, visited the **Hastings** club for a special lecture on Mobile Working on April 7. On May 10-11 they are running an Exhibition Station at Albury Manor Secondary School, Merstham, and their next regular meeting will be on the 18th.

Sutton Coldfield will be having a talk on Amateur TV, by G3KBA/T, on May 9; on the 23rd they will visit the BBC "shack" at Daventry; and on the 25th they are handling an Amateur Radio Demonstration at Fairfax School.

Yet another visit—this time by **Yeovil** to the Somerton Radio Station on May 19. And in June they are going farther afield, to the RAF-ARS station at R.A.F. Locking—date to be announced later. Several members have mobile licences and will of course be visiting Longleat.

Last month we expressed surprise at the fact that the **Roding Boys'** Radio Society reported cessation of activities because of an electricity failure. It now appears that they meet in a shack behind Wanstead House, and the link wiring between the two broke down in the cold weather. Repairs have been carried out and meetings are under way again. They intend

Names and Addresses of Club Secretaries reporting in this issue :

- ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, W.3.
 BARNET: F. Green, G3GMY, 48 Borough Way, Potters Bar.
 BASINGSTOKE: P. Jackson, G3ADV, 11 Oaklands Way, Winklebury, Basingstoke.
 CHESHAM: Capt. G. C. Stephenson, G3CLJ, 21 Lynton Road, Chesham.
 CHILTERN: H. D. Coltman, G3PVJ, 301 Micklefield Road, High Wycombe.
 CIVIL SERVICE: G. Lloyd-Dalton, 2 Honister Heights, Purye.
 CLIFTON: E. Godsmark, G3IWL, 211 Manwood Road, London, S.E.4.
 CRAWLEY: R. G. B. Vaughan, G3FRV, 9 Hawkins Road, Tilgate, Crawley.
 CRAY VALLEY: S. W. Coursey, G3JJC, 49 Dulverton Road, London, S.E.9.
 DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.
 ENFIELD: R. Langston, 54 Poynter Road, Bush Hill Park, Enfield.
 FARNBOROUGH TECHNICAL COLLEGE: Dr. D. M. Manley, G3OWF, Farnborough Technical College, Farnborough, Hants.
 FLINTSHIRE: A. Antley, Fairfield, Fairfield Avenue, Rhyl.
 HALIFAX: J. Ingham, G3RMQ, Lambert House, Greetland, Halifax.
 HARROW: A. C. W. Biddell, G3GNM, 114 Kingshill Avenue, Kenton.
 HASTINGS: W. E. Thompson, G3MQT, 8 Coventry Road, St. Leonards-on-Sea.
 HOUNSLOW: R. T. Heywood, G3NHH, 383 Whitton Drive, Isleworth.
 LIVERPOOL: H. James, G3MCN, 448 East Prescot Road, Liverpool 14.
 LOTHIAN: W. T. Sutherland, GM3JWS, 47 Great King Street, Edinburgh 3.
 LOUGHBOROUGH: J. S. Davis, 12 Avondale Road, Loughborough.
 MANCHESTER: A. B. Langfield, G3IOA, 2 Rowland Street, Manchester 10.
 MANSFIELD: M. Dawson, 35 Elkesley Road, Welbeck Colliery Village, Mansfield.
 MEDWAY: P. J. Pickering, G3ORP, 101 Chatham Road, Maidstone.
 MELTON MOWBRAY: D. W. Lilley, G3DFD, 23 Melton Road, Asfordby Hill, Melton Mowbray.
 MIDLAND: C. J. Haycock, G3IDJ, 360 Portland Road, Birmingham 17.
 MITCHAM: B. Blandford, 1 Biggin Avenue, Mitcham.
 NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogdon, Halifax.
 NORTH KENT: B. J. Reynolds, G3ONR, 49 Station Road, Crayford.
 NORTH NOTTS: E. W. Badger, G3OZN, 20 Tennyson Drive, Workop.
 PEMBROKE: G. C. Price, GW2OP, Hillcourt, Freshwater East, Pembroke.
 PONTYPOOL: J. S. Hammond, GW3JBH, 23 Park End, Langstone, Newport, Mon.
 PORTSMOUTH: H. Woodman, G3ORR, 71 Gladstone Street, Mile End, Portsmouth.
 RADIO CLUB OF SCOTLAND: A. Barnes, GM3LTB, 7 Southpark Terrace, Glasgow, W.2.
 READING: R. G. Nash, G3EJA, 9 Holybrook Road, Reading.
 REIGATE: F. D. Thom, G3NKT, 12 Willow Road, Redhill.
 RODING BOYS: S. Wright, 10 Newton Road, London, E.15.
 SHEFFIELD: D. A. Justice, G3PYL, 9 Leslie Road, Sheffield 6.
 SLADE: D. D. S. Williams, 117 The Boulevard, Wyld Green, Sutton Coldfield.
 SOUTH BIRMINGHAM: J. Ashton, G3PPA, 103 Monica Road, Birmingham 10.
 SOUTH LONDON MOBILE: B. Negri, G3LXN, 17 Voltaire Road, Clapham, London, S.W.4.
 SOUTHGATE: K. Spicer, G3RPB, 22 Clifton Road, London, N.3.
 SOUTH HANTS: P. A. L. Shoosmith, G3MDH, 7 Fairfield Close, Hythe, Southampton.
 SPEN VALLEY: L. A. Metcalfe, la Moorlands Road, Birkenshaw (acting).
 STOURBRIDGE: R. A. G. Macintosh, 50 Field Lane, Oldswinford, Stourbridge.
 SURREY (CROYDON): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.
 SUTTON COLDFIELD: K. H. Varney, G3DMV, 149 Whitehouse Common Road, Sutton Coldfield.
 THAMES VALLEY: A. Mears, G8SM, 4 Broadfields, East Molesey.
 TORBAY: Mrs. G. Western, G3NQD, 118 Salisbury Avenue, Barton, Torquay.
 WIRRAL: A. Seed, G3FOO, 31 Withert Avenue, Bebington, Wirral.
 WOLVERHAMPTON: J. Rickwood, 738 Stafford Road, Fordhouses, Wolverhampton.
 YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil.

to hold a field day and a week's camp in August.

With another interesting issue of their *GM Magazine*, the Radio Club of Scotland draws attention to the fact that they meet every Friday at the Woodside Halls, Clarendon Street, St. George's Cross, Glasgow, C.3. Young prospective members and SWL's are especially welcome, and refreshments are provided in the interval. The subjects covered, on a regular monthly syllabus, are: 1st Friday, Beginners; 2nd Friday, LF/HF/SSB/Mobile; 3rd Friday, VHF; 4th Friday, Ragchew and Gaelic Instruction (!); 5th Friday, RTTY/Tape Recording/Hi-Fi—which is about as comprehensive a programme as any club could hope to offer.



At the 16th annual dinner and dance of the Thanet Radio Society — the best attended in the club's history — the guests included F2XO and his xyl (left) and ON4TJ with Madame Thys, from Nieuwpoort.

CLUB NEWS IN BRIEF

Acton, Brentford & Chiswick: May 21, at the AEU club, 66 High Road, Chiswick—Field Day Briefing.

Civil Service: May 7, 6 p.m. at the Science Museum—Lecture and Demonstration, 625-line TV Receivers and Techniques. May 21 to August 20—Informal Meetings only.

Enfield: May 21—Junk Sale and Field Day plans.

Halifax: May 7, at Beehive and Crosskeys—Working Mobile (G3LHQ).

Lothians: May 9, at YMCA, 14 South St. Andrew Street, Edinburgh—Railway Communications (GM3LNE). May 23—Field Day Briefing.

Manchester: May 8—Hot Pot Supper with Northern Heights Club as guests. May 15—G3QV on Construction. May 29—G3PJK on VHF Converters.

Wirral: May 15—Radio Maths. Lecture, Part II, by G3EGX. May 22—NFD. June 5—Open Night.

Spen Valley: May 16, at Grammar School, Heckmondwike—Guided Missiles, by M. A. Browne, F.R.A.S. May 28—Visit to Baird Television.

Mitcham: May 24—The award-winning film, "This is the BBC." Book the date and arrive early.

South Hants: May 11—Meeting of Southampton Area Group at the University, 7 p.m. June 22—G3JLS on Power Supplies and "potted talk" by G3GOP.

Chiltern: May 30, at the British Legion, St. Mary's Street, High Wycombe—The National Grid (Mr. Shelley, C.E.G.B.).

Harrow: Fridays, 8 p.m. at Roxeth Manor County School, Eastcote Lane, South Harrow.

Hounslow: May 6, at Isleworth Town School, Twickenham Road, Isleworth—Building a Top Band Transmitter (G3PJG/T).

Surrey (Croydon): May 14, at Blacksmith's Arms, South End, Croydon—Constructional Contest judging.

Thames Valley: May 8—Radio Frequency Measurements (Mr. K. A. Fletcher of Wayne Kerr Ltd.).

South London Mobile Club: May 11—Ragchew Meeting. Visit to BBC, Tatsfield, during May. May 25/26—Week-end Camp. Rallies to be visited include Wethersfield, Barford, West Wycombe and Woburn.

Southgate: May 9 at the new QTH, Atlasta Lodge, Tottenham Road, London, N.13.

Sheffield: May 10, at 8 Sandbeck Place, Sheffield 11—"Hints and Kinks," a discussion on useful practical dodges.

Reading: June 29, at Palmers Hall, West Street—G8KW talking on the K.W. Electronics line of apparatus for the amateur.

FROM THE 5B4 QSL BUREAU

Those who hold, or ever held, the call signs ZC4BE, ZC4CH, ZC4CP, ZC4KV, ZC4FL, ZC4LL, ZC4PR and ZC4SG are asked to get in touch right away with the 5B4 QSL Bureau, P.O. Box 216, Famagusta, Cyprus, regarding the disposal of quantities of cards held for them. Present addresses for these operators are unknown. If disposal instructions are not received by September 1st, it will be assumed that the cards are not wanted, and accordingly they will be destroyed. Incidentally, this will explain why some readers have never had a return-QSL from these particular ZC4 stations! The 5B4 QSL Bureau is run by the Cyprus Amateur Radio Society for the convenience of all past ZC4's, as well as present and future 5B4's. Service personnel anticipating a posting to Cyprus, and intending to operate under a 5B4 call, are asked to get in touch with the Hon. Secretary, C.A.R.S., P.O. Box 219, Limassol, Cyprus.

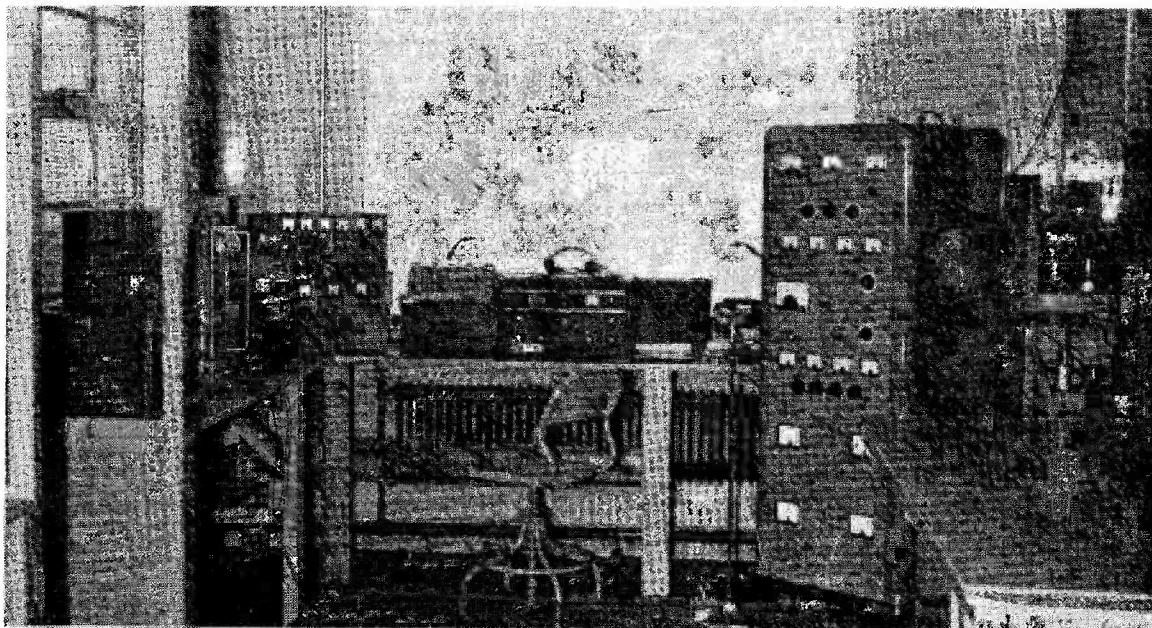
U.K. AMATEURS ON THE CONTINENT

If, during the fortnight to May 5, you heard or worked stations with ON5 or PA9 prefixes, they were G's holding temporary local licences in Belgium and Holland, mainly in connection with the Verviers Rally on April 28. One of them was G2DHV (Sidcup), whose call signs were ON5ZQ and PA9DHV/M.

In the same context, G3OHC (Birmingham) was licensed as ON5ZT and PA9OHC/M.

DX REPORTS ON THE LF BANDS

SWL A. M. Tearle, ME-L147, is serving on the communications staff of H.M.S. *Anzio*, to be operating between Gibraltar and the Persian Gulf during the next 18 months. He offers listening schedules on 80-160m. for any U.K. amateur stations who would like SWL reports from the area mentioned. Those interested should write to: Marine A. M. Tearle, ME-L147, Royal Marine Detachment, H.M.S. *Anzio*, c/o G.P.O., London.



Station of G4NT, High Wycombe, Bucks., which is an all-band layout. It was on display at a Hamfest on March 24, when G4NT was the host to about 100 amateurs from the surrounding district. Owned and operated by Norman Turner, who has been licensed since pre-war days, his equipment has a very professional appearance. This is hardly to be wondered at, as G4NT is chairman and managing director of the well-known and old-established firm of Ernest Turner Electrical Instruments, Ltd., Chiltern Works, High Wycombe, Bucks., who are manufacturers of high-grade panel instruments. This may also explain the fine display of meters on his own gear!

INTERESTING PANORAMIC DISPLAY UNITS

At the forthcoming Radio & Electronic Component Show (Olympia, London, May 21-24) Stratton & Co., Ltd., manufacturers of the Eddystone range of receivers, will be exhibiting two new panoramic display units. One is for VHF/UHF operation, with a 1-megacycle coverage, and the other is for HF and has a somewhat narrower scan. These panoramic units "illustrate," by CRT presentation, the signals available on either side of the frequency to which the receiver is tuned. The signal on tune is shown as a peak at the centre of the display and, as the receiver tuning is changed, the array of signals moves correspondingly. Apart from monitoring, the applications of a panoramic display unit include the frequency-checking of fixed-tune communication receivers and the accurate assessment of frequency drift. On communication networks, it enables the operator to call a wanted station and see immediately when that station replies, giving him the facility of tuning the signal accurately without searching.

MICROMINIATURE TECHNIQUES IN QUANTITY PRODUCTION

Having arrived at miniaturisation, by which much in radio and electronics seemed to have been made about as small as reasonably possible, we are now at the stage of micro-miniaturisation—meaning component assemblies that can be handled only under a magnifying glass. A good example is an integrator developed for R.A.E., Farnborough by Mullard, Ltd., to be shown at the Radio and Electronic Component

Exhibition (Olympia, London, May 21-24). This is for a rocket-guidance system, and consists of 164 layers of thin-film micro-circuits, stacked and hermetically sealed in four blocks, and containing no less than 3,438 components in a single unit less than 4in. in the greatest dimension; this represents a component-density of about 350,000 parts per cubic foot! The important thing about this Mullard development is that, in production quantities this form of "condensed electronics" would not only cost less than a conventional miniaturised unit, but would occupy barely 100th of the space. The Mullard integrators for Farnborough in the micro-miniature assembly actually contain 389 transistors, 832 diodes and 2,217 items like resistors and condensers—all in a pack about the size of a $\frac{1}{4}$ lb. box of chocolates.

NEW SOLDER INTRODUCED

For the Radio and Electronic Component Exhibition at Olympia, London, during May 21-24, Multicore Solders, Ltd. will be showing a new type of Ersin Multicore Solder, incorporating Ersin flux 362P. It contains less than half the percentage of flux usually provided in cored solder and is thus particularly suitable for the soldering of miniature components. To promote the extra rapid spread of the smaller quantity of flux and to deodorise the resin base, an exclusive agent called Pentacol has been combined with the flux. The result is that soldering efficiency is not in any way impaired, with the advantages that less flux residue is left at the soldering point, and fume emanation is reduced.

SMALL ADVERTISEMENTS

("SITUATIONS" AND "TRADE")

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

TRADE

STABILISED TRANSISTOR power supply unit, 12v. 0.5 amps., fully protected; size 4 in. cube, price £12 10s.—Box No. 2794, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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

WEBB'S LOG BOOK for recording signals heard and worked; 112 pages 9½ in. x 8 in., approved format, semi-stiff covers. Excellent value; 6s. 0d. post free, or callers, 5s. 4d.—Webb's Radio, 14 Soho Street, London, W.1.

QSL CARDS: Buff, blue, pink, green. 100, 14s. 6d.; 250, 23s.; 500, 40s.; 1,000, 75s.—Samples (s.a.e.): Reilly, Panxworth, Norwich, 56.Z.

CATALOGUE NO. 15. Government Surplus Electrical and Radio equipment. Hundreds of items at bargain prices for the experimenter and research engineer, 2s. 6d. post free; catalogue cost refunded on purchase of 50s.—Arthur Sallis Radio Control Ltd., 93 North Road, Brighton.

140 FT. AERIAL INSTALLATION. First Govt. release of these brand-new Marconi coil aerial tuning systems, enabling operators to work their Receivers or Transmitters to their best efficiency. Containing a drum of 140 ft. copper aerial wire with insulators, etc., feeding into the matching unit size 13 ins. x 8½ ins. x 9½ ins., with slow motion tuning using No's. 0-999. Originally intended for the 52 Tx/Rx. A "must" for any poor-reception area and serious operators. 300 only, 35s., post 5s.; two post free.—Dept. G, J. T. Supply, 309 Meanwood Road, Leeds, 7.

SILICON DIODES, 250v. AC in, 500 mA out, p.i.v. 1350v., 12s. 3d. 50-ohm high quality co-ax, 1s. 5d. yard. Post paid.—Glasgow Electronic Services, 21 Old Dumbarton Road, Glasgow, C.3.

HALLICRAFTERS UHF Communications Receiver, 124-225 mc. AM/FM, S-meter, 115/230v., mint condition. Transformers CR-100, S-20RU, 115/230v., 30s. HRO dial.—Wright, 4A Nepal Avenue, Atherton, Manchester. (Atherton 991.)

KW TESTED Eddystone S840, £30; 680, £55; 680X, £80; 750, £40; 888A, £75. Geloso G207DR, £35; G209R, £60. Hallicrafters SX-140 (as new), £40. Hammarlund HQ-170, £125. HRO's, £18-£23; AR88's, £30-£40.—K.W. Electronics Ltd., Vanguard Works, Dartford, Kent.

CASES, chassis, panels. ANYTHING in metal; send your drawings for quote. Stove enamelled, hammertone, or plain, in any colour.—Moss Watson, 40 Mount Pleasant Street, Oldham, Lancs. (Main 9400.)

TECHNICAL CIVIL SERVICE

HOME OFFICE COMMUNICATIONS BRANCH invites applications for WIRELESS TECHNICIAN posts at Regional Wireless Depots in England and Wales for installation and maintenance work on v.h.f. and u.h.f. communications systems for Police, Fire and Civil Defence services.

SALARY : £747 at age 21, rising to £876 at age 25 (this being the highest rate payable on entry), increasing to a maximum of £1,006 by annual increments.

QUALIFICATIONS AND EXPERIENCE : Applicants, who must be natural born British subjects between 21 and 40, should have a sound knowledge of basic radio communications theory, with workshop or factory experience in the maintenance of v.h.f. or u.h.f. equipment. Possession of the appropriate City and Guilds or Ordinary National Certificates will be an advantage.

PROSPECTS : All appointments will be in an unestablished capacity in the first place but there are reasonable prospects of establishment and promotion to Senior Wireless Technician (£1,028 - £1,212) and Chief Wireless Technician (£1,173 - £1,450).

Further particulars and application forms are obtainable up to 7th June, 1963, from Communications Branch, Home Office, Whitehall, London, S.W.1. Interviews will be in London.

READERS' ADVERTISEMENTS

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

MOHICAN COMMUNICATIONS Rx with manual, £35 o.n.o.? Also RF-24 and RF-26, with power pack, mains and vibrator units for R.109. Offers?—Box No. 2784, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

R. 1155N, 6V6 output, power pack and speaker, R. continuous coverage 200 kc-18 mc, £10.—Potter, Ashley, King's Somborne, Stockbridge, Hants.
KW VALIANT 160/10 metres, offers? Minimitter ATU 80/10 metres, £2. R.109 with 6v. acc., 75s.—Meaden, 38 Oak Hill, Surbiton, Surrey. (Elmbridge 7583.)

SALE: HALLICRAFTERS HT-11A, 1.5-3 mc, S Tx/Rx, 12v. DC p/pack, make nice mobile rig, £35. 2 x 38 Sets headphone/mike ass., £5.—Box No. 2786, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—continued

WANTED: G3BDQ Receiver, price and particulars to—Box No. 2783, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Eddystone 840C, 5 months' old, about 12 hours' use, as new, £45.—Bradshaw, 99 Every Street, Nelson, Lancs.

FOR SALE: CR-100, realigned, guaranteed, £18 10s. Hallicrafters SX-86, 500 kc-40 mc, £15. RA1B Bendix, 150 kc-15 mc, AC, BFO, good B/Spread, 250/6-3v. required, £15. R.1155N, includes 1-5-3 mc, modified o/p, 230/6-3v. required, £10. Command Rx 1-5-3 mc, complete 24v. dyno., £4. Booster motors, new, 12/24v., 10s. LR meters, 100 μ A, new, 17s. 6d. Transistors: OC35, 15s.; matched XC131, 12s.; XA102 (OC44), 5s.; transistor diodes, 1s.; silicon rects., 400v. 350 mA, 4s. 6d. Twin-gang variables, 500 + 150 μ F, 3s. 6d. Standard o/p trans., 5s. RF-27B, 30s.—Addison, G3BAY, 168 Westcotes Drive, Leicester.

EDDYSTONE S.659, 250 metres-30 mc, £10. Transmitter 36, complete, £6. CR-100, less case, needs attention, £2. 50 copies of *Short Wave Magazine* and *Bulletin*, 10s. Xtal microphone, 10s. Acos 22, £1. Siemens BFO, less p/pack, £1. Transformers 500-0-500v., etc., at 150 mA + heaters, 15s.; 500-0-500v. at 200 mA; 2000-0-2000v., 1000-0-1000v. at 2 kVA, £1; Chokes, 5s.; Multi-ratio 300w. mod. transformer, £1. 500v. p/pack, £2. 350v. stabilized variable p/pack, £3. 1/15th h.p. Selsyns, £1. Meters: 2 and 2½ in. 5-200 mA, 1s. 6d.; 1 mA, 2s. 6d.; 200 μ A, 5s.; 4½ in. 20 μ A, £1. New 813's, 30s.; pair 809's, 10s. Other valves 1s. 12 in. speaker, £3. Headphones, 2s. Aerial spreaders, Perspex, 1d.; Pyrex, 3d. 3 in. beehives, 3d. 230v. relay, 5s. Postage extra.—G3NKV. (Tel: Waxlow 5142 after 7 p.m.)

SALE: R.208, £6. TR.1986, complete, £2 10s. TR.1985, no valves, £1. 24v. dynamotor, 250v. out, 10s. Carriage extra, or buyer collects.—G3PPR, 129 All Saints Road, Birmingham, 14.

FOR SALE: 150w. commercial built table-top Tx, AM/CW, band-switched 10-160m., fully suppressed, attractive styling, with power supplies, £50 o.n.o.? Also many components, tuners, chokes, VFO covering 2-5-13 mc; state requirements. (Midlands)—Box No. 2785, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: EDDYSTONE S.750, good condition, overhauled by Webbs, £40.—Hampson, 50 Weymouth Street, W.1. (Welbeck 1588.)

SALE: R.208 Receiver, £8. B.28 (CR-100) Receiver, with spares and manual, tuning drive needs new cord, otherwise in good condition, £10. R.1132A Receiver, £2 10s. Type 3 power unit, £2 10s. Mini-mitter 5-band amateur converter, £9. RF-26B Unit, 10s. Power Pack with o/p stage, suitable for R.1155 Receiver, £2 10s. Buyers collect.—Burgess, 15 Old Mill Road, Plumstead Common, London, S.E.18. (Phone first before calling. Tel: Woolwich 7440 after 7 p.m.)

OFFERS for new K.W. Converter and Heathkit GDIU, as new; precision synchronous timer 230v. 0-8 seconds. **WANTED:** Commercial 1-8 mc Tx.—Taylor, 156 Clarendon Road, Broadstone, Dorset.

SURPLUS GEAR BC-221, BC-342, TA-12C, oscilloscope, meters, etc., send s.a.e. for list.—Dugdale, Boscombe, Carterton, Oxford.

WANTED: SSB EXCITER SB-10U, home-brew or W.H.Y.? State condition and price.—Box No. 2787, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

ERSKINE LABORATORIES double beam (5 in.) Oscilloscope with accessories, excellent con., £24. Xtal Cal. No. 10, 500 kc to 30 mc (special pulsing modulation neon), batt. working, new, 80s. *Short Wave Magazine* Oct. '59 to Feb. '63 inclusive. 69 copies *Wireless World*. 53 *Practical Wireless*. 75 *Flight* 26 March 1954 to 19 August 1955 inclusive. Offers?—A. Hardwick, 44 Station Road, Woodville, Burton-on-Trent, Staffs.

SALE: K.W.160 Transmitter, as new, perfect, £19. (Lancs.)—Box No. 2787, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

MOHICAN COMMUNICATION RECEIVER for sale, with batteries and manual, mint condition, factory aligned and tested, £32.—H. Gardner, Havenwood, Hambrook, Nr. Chichester, Sussex. (Tel: West Ashling 422.)

QST, CQ, RADIO 400 copies, 1929-1959, excellent condition, offers?—Box No. 2788, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: MOHICAN RECEIVER, with handbook, £29. Marconi Aircraft Transmitter AD97, with Modulator Unit and handbook, £5 or exchange, W.H.Y.? Braun battery/mains portable Radio-Gram, £7 10s. RF-26 Unit, £1.—GW3GIN, 50 Romilly Road, Cardiff.

FOR SALE: Steel tower with fittings for attachment to house, height 35 ft., with tubular extension of 7 ft., £20. Also Hallicrafters SX-24, £15. CT-53 signal generator, £16.—Frost, 64 Lucas Avenue, Harrow, Middx.

FOR DISPOSAL: G.E.C. Communications Rx, BRT-400E; Marconi CR-100; Mullard Ms 407/15. £100 or near offer; will separate. Technical handbooks available.—(Ring SYD 6452.)

FALCON 2-METRE Tx (as new) £34 o.n.o.? 2-metre J-Beam 4/4 and 40 ft. coax, £3 10s. Erskine M11W Scope, £8 o.n.o.? TE.149 Wavemeter (2), £5 each. Geloso Tape Recorder G.256, with 6 tapes, £12 o.n.o.?—J. Morgan, 1 Shrapnell Road, Well Hall, London, S.E.9.

R.1475 Rx 2-20 mc, complete with AC mains power pack, mint, £12. 2-metre converter built into spare guard unit to plug into above Rx, £4. Withers 4-metre converter, £7. R.107 Rx, excellent, £9. APR 4 Converter, 300 to 1000 mc, 30 mc IF output, AC mains stabilized power pack, £10. *QST* and *CQ* magazines, 1943 to 1957, 1s. 6d. each, '57 to '63 2s. *ARRL Antenna Handbook* 10s. *ARRL Radio Amateur's Handbook*, 1960, 17s. 6d.; 1962, 22s. 6d. *VHF Handbook* by W6SAI, 15s. *Beam Handbook*, 'SAI, 15s. *VHF Handbook, CQ*, 17s. 6d.; others. List s.a.e., write or *Phone Trevelyan 8141*.—Briscoe, 311 Eton Road, Ilford, Essex.

REQUIRED: *Short Wave Magazine* June 1962.—Box No. 2789, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

COMPLETE Amateur Radio transmitting station, sell complete, or exchange W.H.Y.?—(Finchley 4468.)

RF UNIT No. 2, 100-156 mc and RF Unit No. 3 190-240 mc, identical with RF Unit No. 1, described September 1959 issue *Short Wave Magazine*, offered in new condition at £3 10s. each, p/p 5s. SCR-522, 100-156 mc, complete with mains PU RA62C mounted on rack, with cables and instruction books, nearest £12 10s. Buyer collects.—R. Jay, 69 Church Road, Moseley, Birmingham, 13. (appointment only Tel: South 2285.)

SWL requires R.1155B in good condition, will pay about £5.—Reply, A. Stone, 1 Little Hayes, Wolverley, Kidderminster, Worcs., England.

SMALL ADVERTISEMENTS, READERS—continued

WANTED: Good-class Communication Receiver such as Collins 75A1/2/3/4, R.390A/388/309, S-line, AR88D mint, Rascal RA.17. Also transmitter such as Panda Cub, K.W. Viceroy, Collins 32V2/3. Cash transaction, will personally collect.—Clappison, 291 Beverley Road, Hull, Yorks.

CHESHIRE AMATEUR, now occupying small shack, has much good gear for sale. Gonset G66B, Master Mobile aerial and Master Matcher; Eddystone 740; audio amplifiers, power packs, etc. Large s.a.e. for lists.—Box No. 2770, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

U19 High Vacuum Rectifiers, 2500v. at 250 mA, checked on a Taylor Valve Tester and guaranteed 100 per cent O.K., four available at £2 each, p. and p. paid.—R. Bennett, c/o 70 Park Lane, Chippenham, Wilts.

FOR SALE: Bendix TA-12C Tx, excellent condition, complete with mod. and PSU except for dynamotor, £7 o.n.o.—J. G. Watt, GM3PFY, 101 Lanark Road West, Currie, Midlothian, Scotland.

PANDA CUB, £20; Eddystone S.640, £20; B2 Rx and PSU, £7. Xtal osc. C46, 10 mc, 1 mc, 100 kc markers, £3 10s. Command Rx, 1.5-3 mc, £4 10s.; 3-6 mc, £3; 6-9 mc, £2 10s. Command Tx, 160m. with internal modulator, £3 10s.; 80, 40m., £2 10s. Power Unit No. 3 (mains), £1 10s. 1196 12v. rotary converter, 12s. 6d. AR88 6v. vibrator PSU, 17s. 6d. Collins TCS-12 Tx, no modulator, £5. Williamson Amp., no PSU, £1 10s. *Radio & Television Servicing*, Newnes, 13 vols. up to 1963, £18 o.n.o.? *Short Wave Magazine* bound volumes, 10-18, 1952-1961, 25s. each vol.; also Vols. 19-20, not bound, 15s.; Vols. 5-9 7s. 6d. *Bulletins*, bound Vols., 26-36, 1950-1961, £1; also Vol. 37, not bound, 12s. 6d. Please add postage.—Knights, 16 Clyde Street, Grimsby, Lincs.

LG.50 50w. Tx, immaculate condition, nearest £30. **WANTED:** 150w. good cndx. Tx, LG.300, etc. London area.—Box No. 2790, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

LICENSED AMATEUR (Student) requires lodgings in *CHELMSFORD*, Essex, preferably with another licensed amateur, from June 23 to August 24, 1963. Terms please to—Box No. 2791, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: CR-100 Receiver, good condition, with manuals, £18. Eddystone S.640 Receiver, £14. 60w. CW rack transmitter, 10-80 metres, built-in power pack, suitable for beginner, £10. 75w. CW transmitter, 10-80 metres, with Gelooso 4/102 VFO and dial, unfinished cabinet, £8. PSU with 620-0-620v. 200 mA transformer, LT winding, £3; assorted valves, s.a.e. for list. Prefer buyer collects.—G3KMA, 9 Warwick Close, Hampton, Middx. (*Molesey 2347*.)

FOR SALE: Two 32 ft. dural masts (into four pieces for transit) 100 ft. thick nylon halyards, nylon pulleys, stays, strainers, on site, £14 o.n.o. or W.H.Y.? 100 ferrite beads, wire, feeder for 4ZU beam array, £2; s.a.e. for gen. please to—Constance Hall, 68LY, Restawhile, Clanwilliam Road, Lee-on-the-Solent (*Tel: 79547*), Hants.

FOR SALE: AR88D in excellent condition, £35.—Box No. 2792, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. (Surrey.)

AR88D, excellent condition, speaker, RCA S-meter, A tools, photostat manual, £35. Buyer collects.—Firth, 48 East Street, Lightcliffe, Nr. Halifax, Yorks.

680X, £65. 840C, £32 (buyer to collect Sunday afternoon). CR-100 manual, 30s.—R. Grain, 15 Waverley Gardens, Grays, Essex.

FOR SALE: Complete issues of *Short Wave Magazine* and *RSGB Bulletin* from 1957 onwards, your offers? SX-28 in excellent condition, £30; carriage extra, or exchange Heathkit Mohican. Power pack 600v. 200 mA, 400v. 250 mA, 6.3v. 8A, 12v. DC for relays, offers? Selling for lack of space.—Box No. 2793, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Command Rx, BC-454, "no mods," state condition and price.—G6GG, 28 Doggett's Close, Rochford, Essex.

AR88LF, as new condition, PVC wiring throughout, original RCA S-meter, complete with trimming tools and manual, £35. Hallicrafters S40B, 0.55-40 mc, bandspread throughout, brand-new and complete with manual, £22. BC-348 brand-new and unused, complete with dynamotor and manual, £16. ARB Receiver, same condition, £8. 2-metre cascade Nuvistor Converter, Tiger, new, £9 10s. Genuine bargains, space required. AR88 mains trans., 30s.; AR88 complete w/c switch assy., 20s.; both brand new and in sealed cartons, QQV03-10's, new, 18s. 6d. Speaker trans. 500 ohm to 3 ohm, new, 3s. 6d. Command Rx o/p trans., 3s. 6d. All items plus carriage.—Box No. 2795, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

CR-100, working, clean, N/L, meter. Crystal calibrators; G.E.C. mains; No. 10 mint; Class-D unused. **WANTED:** R.206, HRO.—Box No. 2796, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: AR88D, in exchange FUJITA 66 SLR Camera, ERC, normal and tele-lenses, extension tubes, filters, all in gadget bag, new value, £85.—Shaw, 6 Vincent Court, 199 New Park Road, London, S.W.2.

SALE: Space required. BC-348, mains PSU, re-valved, realigned, £8. BC-453, excellent condition, £2. AVO valve tester, with manual, gift £4; or lot, £12. May be seen working; prefer buyer collects. **WANTED:** Vibroplex bug key or similar.—Frew, 9 Hollybank Place, Bloxwich, Walsall, Staffs.

WANTED: Bendix Loop Aerial (MN20), also Azimuth Control/Indicator, other loops considered. Also **WANTED:** Hallicrafters HT-11, or BC-669 Transmitter-Receiver.—Box No. 2797, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Eddystone 888A, late model with flip switches preferred; please state price, condition and date purchased. Also LM7 or 14 frequency meter with charts.—G3NPY, 13 Talbot Road, Skegness, Lincolnshire.

EXCHANGE: Minimeter Top Band transistor mobile receiver for S.640, HRO or similar. **SELL:** Mains PCR Receiver, £4.—Box No. 2798, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

R. 109A, new, with spares, £4. Self energized handsets (2), £1. 12 in. BBC TV chassis, working, £1. 6-valve (octals) all-dry battery radio, 30s.; 3/12 in. TV Tubes, 10s. o.n.o.? Buyer collects evenings, weekends.—Richard, 66 Manor Avenue, London, S.E.4.

WANTED: BC-453 Command Receiver in good working order, give details of any modifications.—C. E. Whitmore, 7 Belgrave Place, Bath. (*Phone: 60363*.)

WANTED: Command Rx parts: 85 kc, 239 kc BFO coils, 1.5-3 mc coil pack, 3-6 mc dial; manuals AN/ARC5, R.11A, BC-348, TR.2002. Sale: S-27, no case, £12 o.n.o.? BC-348N unmodified, £14. BC-453, £3. Buyer collects.—Davies, 25 Pembroke Road, Walthamstow, London, E.17.

G4GZ's BARGAINS

VALVES: EA50, EF50, 1/6 each, 9/- doz. 6H6M, 6AC7M, 6K7G, 12S17M, 12SC7M, 2X2, 6B8G, EF50(S), 6C4, 2/- each, 18/- doz. 6AL5, 6AM6, 6J6GT, 6J6, 12A6, ARP12, AR8, EB91, EF91, EL32, TT11, VP23, Z77, 3/- each, 24/- doz. 6SN7GT, 12626, DC70, DF73, DL70, 3/6 each, 36/- doz. 6AK5, 6J7G, 6ST7, 12K7G, 12Q7G, 35Z4G, 3Q4, 12AT6, 959, 4/6 each, 48/- doz. 6SL7GT, 6S17M, 6X4, 6F6M, 80, 12C8M, 12AU6, 42, PCF82, PCC85, PY83, VRI50/30, 2A3, 5/- each, 54/- doz. 12AU7, 12AT7, 12SQ7M, 446A, EC80, 836, PL82, EZ80, EZ40, 6B16, 6BH6, 6BF80, EAF42, 6/- each, 66/- doz. 6L6G, 6L7M, 50L6GT, EZ81, 7/- each, 78/- doz. ECC85, ECC84, EM80, 3A5, 6K8M, 6L6M, 8/- each, 90/- doz. 7B7, 757, 7C5, 5R4GY, UCH81, VLS631, 9/- each, 102/- doz. EL84, 5763, ECH42, 9/6 each, 108/- doz. 805, 3E29, 25/- each. 4E27 (HK257B), 40/- each. P/P 6d. per valve 2/6 doz. lots if under £5.

AR88 tub. trimmers ceramic, 4 for 6/- AR88 smoothing chokes (10H 100m/a), 3 for 21/-, 65/- doz. ET4336 transformers. 190-250v. input, 10v. CT 10A 2x1/2. 10A. CT, twice, 35/- each, £16 per doz. Potted USA xfmrs. 230v. input, 32, 34, 36v. 2A. output, 17/6.

MC METERS. 3 1/2" rd. fl. (2 1/2" dial) 0-500 m/a, 12/6, £6 per doz. 0-15v. AC (MI cal at 50 cps.), 12/6 each £6 per doz. 2 1/2" rd. fl. (2" dial) 0-1 m/a, 22/6. 2" rd. fl. 0-500µ amps, 17/6. 0-30 m/a, 10/6. 2 1/2" rd. plug-in electrostatic 0-1500v. 16/6 each, £8 per doz.

B9A moulded valveholders and cans, 11/6 doz., 75/- gross. Micalex ditto, 13/6 doz., 90/- gross.

GEC PYRANOL. 10mfd. 2Kv condensers, oil filled, 27/6 each. 25pfd. ceramic air spaced trimmers, 4 for 5/-, 14/- doz.

GUNFIRE TIME SWITCHES. 200-250v. 50 cps. 20 amp. contacts, 1 make 1 break every 24 hours, 65/- each (P/P 2/6). £30 per doz.

ONE ONLY AR88D. Excellent condition £37/10/- Callers only.

EDDYSTONE RECEIVERS. FERROGRAPH TAPE RECORDERS — LEAK — QUAD — GOODMAN'S — WHARFEDALE, Etc. HI-FI EQUIPMENT.

JOHN ANGLIN

385, CLEETHORPE ROAD, GRIMSBY, Lincs. Tel. 56315

SMALL ADVERTISEMENTS, READERS—continued

FB S.640, with manual and matching S-meter, £20. **R.A.E. Correspondence Course**, £3. **Hallcrafters (1 mA) S-meter**, £1.—Box No. 2799, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

PANDA PR-120V Transmitter, perfect condition, £43. Details.—David Morgan, G3MEM, Jevington, Hilltop Road, Earley, Reading, Berks.

GPO Standard 19 in heavy duty equipment rack, 6 ft. channel uprights with angle base, £3. Buyer collects.—Dale, 30 Almond Road, Peterborough, Northants. (Phone: 68422.)

FOR SALE: 9R59 Communications Receiver, specs. as in Lasky's adv. *Short Wave Magazine*, Feb., £40, c.i.f.—Write H. Spoorenberg, PA0BW, Tollenslaan 9, Eindhoven, Holland.

COLLINS MECHANICAL FILTER Type F455R-05, brand new, unused, £10 o.n.o.? (Cost £15.) Buyer Collects to avoid damage in transit (London).—Box No. 2800, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

COLLINS VFO, 1.5-12 mc, mounted black crackle panel, superb stability. First £5 to clear.—GW3LSB, Holcombe, Vicarage Avenue, Llandudno, Caerns.

BARGAINS: Tiger Tiglet, 80/160m. Phone/CW, xtal mike, matching Tiger PSU, FB transmitter, £15. AR88D, less case, working, ideal spares, £7 10s. BC-454B complete, ideal spares, £1. Weller unused 100-watt instant solder gun, pre-focused spotlight, 50s.—Akehurst, Stevens Cottage, Ipplepen, S. Devon.

DX-40U as new, £23. Hallcrafters S.20R, £20. Pye 12v. car radio LF/MF/40/80/160m. bands, £16. PE-103 dynamotor, 12/500v., £6; 12/250v., £1. Walter battery/mains Tape Recorder, £20. Add carriage.—Wiggins, Midland Road, Hugglescote, Leics.

RF-26 converted 4-metres, internal supply, 30s. **Geloso pi-tank coil**, new, 15s. **Geloso 2-metre VFO** with dial ass., valves, £4 5s. **Pye R/T 12-volt**, old type, but useful for valves, etc., £2 10s. All items carriage paid.—Box No. 2801, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: CR-100, 60 kc-30 mc, plus manual and S spares, good working order, £20 o.n.o.?—Box No. 2802, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: HRO-MX, PU, nine coils, manual, with S Minimitter Converter five band, £25. R.107, £3; carriage extra.—Box No. 2803, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Hallcrafters S.20R, internal PSU and LS. S with new mains transformer and rect. valve, £18 o.n.o.?—Box No. 2804, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: 10-metre Tx/Rx, or other 10-metre gear. Exchange Marconi CNY/2, or cash.—G3NPB, Springfield, Haydon Bridge, Hexham, Northumberland.

WANTED: Type A-Mark 3, suit-case Transceiver; must be complete and good working order. Details and offers to—Strong, 12 Spring Lane, Ightham, Sevenoaks, Kent.

LINEAR 10-80m., 300w. p.e.p., also AM Class-C, LS modulation with CC, 400w. peak (equiv. 100w. P-and-S mod.) built-in CRT mod. monitor, modulator, power supply. Cabinet 24 x 10 x 12ins. Drive required 1/2w. SSB, 3w. SSB, 3w. AM., £30.—G3PTN, 3 Toronto Place, Leeds 7, Yorks.

SALE: HRO Rx, 9 coils, PSU, £20. **WANTED:** S.R.107 manual, your price.—Fraser, 189 Market Street, Tottington, Nr. Bury, Lancs.

G. W. M. RADIO LTD.

V.H.F. RECEIVERS approx. 80 mc/s. 230v. A.C. power pack, 6" speaker. Valves: 4 KT66, 3 Z90 (EF50), D63, DH63, KT63, 5U4G. Suitable for modification for 4 metres, etc. In good used condition, £3, carriage paid. Matching part stripped Transmitter chassis complete with 230v. A.C. Power pack, £2, carriage paid. Both units are 19" x B3" rack mounting. Less Crystals. **NO DETAILS AVAILABLE.** 19" rack, 21" panel space, 15/-, carriage paid. Rx, Tx and rack together £5, carriage paid.

CANADIAN MARCONI 52 RECEIVERS available as per previous adverts. Receiver alone tested and in good working order, £5/10/-, carriage £1, or complete set in case with installation kit ready to operate from 230 volts A.C. or 12 volts D.C., £9/10/-, carriage £1. Send S.A.E. for detailed leaflet.

METERS. 500 Microamp calibrated 0-15, 0-600 volts, ex 19 and 22 set, 8/6, post 1/6; 0-4 amps, hot wire type 2 1/2", 7/-, post 1/6. All meters tested before despatch.

TRANSMITTER components, ex 52 set. 813 valve bases, 3/6, post 9d. Tuning condenser, 200 + 200 pf., rated at 1200 volts D.C. for 100 watts input, 7/6, post 2/6. Cooling fans, 12 volts D.C. 1 amp., will operate on A.C., 5/-, post 2/6.

TELEPHONE WIRE. 500 yard drums twin plastic covered, 6 steel, 1 copper strands, 25/-, carriage 10/-.

SILICON RECTIFIERS. 420 peak A.C. at 200 m/a. two of these will suffice for 250 volts 200 m/a D.C. supply, guaranteed 2/-, post 6d.

WHIP AERIALS. Superior flexible base, eight 4ft. sections will make any length up to 24ft. These will handle 100 watts, 35/-, carriage 10/-.

SPEAKERS. 5", 3 ohm in neat black crackle case, used, good order, 15/-, post 2/6.

AMERICAN CARBON MICROPHONES, type T17. Ideal for mobile use, with side button switch, lead and jack, 7/6, post 2/6.

19" RACK MOUNTING POWER UNIT, type 3. 230v. A.C. Outputs, 250 volts D.C., 100 ma. 6.3v. at 3 amps. A.C., 39/6, carriage 10/-.

MOTORS. Dayton 37 r.p.m. 230v. A.C., ideal for aerial rotating, 20/-, post 2/6.

CLOCKS. Admiralty, brass cased 8-day quality movement, overhauled and guaranteed 12 months, £5/10/-, post paid.

40-42 PORTLAND RD., WORTHING, SUSSEX

SMALL ADVERTISEMENTS, READERS—continued

DX-100U TRANSMITTER, £65. Minimitter 120 Transmitter, £42. LG.300 Transmitter (RF Section) with 1200v., 350v., PSU's, £48. 813 Heater Transformer, 45s.—G3HID, Armadale, Manor Road, Burnham-on-Sea, Som. (Tel. 2511.)

FOR SALE: Part-built 120w. Tx (1000v. and 750v. PSU) both relay op.; Class-B modulator, 615, 2/KT88's, 2/KT66's, Woden UM3, all 19-in. chassis, £18. Labgear W/B Multiplier E.5026, 50s. Labgear Turret Tuner E.5023B, 30s. 2/813's with heater transformer, £3 10s. Labgear 5 way co-ax SW unit with mains c/o relay, £4. Saja Tape Recorder, £10. Tiger Ac. Coupler, 150w. 3.5-30 mc, £2 10s. BC-221 freq. meter with PSU, £15. Heathkit Balun Unit, £2. Del. reasonable distance. Inspection invited, but appointment first please; various other items.—Butland (FIN 7262 evenings).

FOR SALE: BC-453, new and unmodified, £5. **M**ANUALS: For WS-17, 5s.; Crystal Calibrator No. 10, 10s.; WS Burndept CN.348, 12s. 6d.; WS-38 AFV, WS-48, WS-62, 15s. each; Wavemeter Class-D No. 1, Wavemeter Class-D No. 2, WS-18 Amplifier, C.19, R.206, R.208, 17s. 6d. each; WS-9, WS-11, WS-46, Eddystone 504, 640, 659, 20s. each; WS-19, WS-31 AFV, CR.91A, 25s. each; R.107, 30s.; SX-28A, MN.26, 35s. each. Operating Instructions for WS-22, 7s. 6d.; WS-29, WS-19, WS-58, 10s. each. *Surplus Conversion Manual*, Vol. 2, 17s. 6d. Spares for AR88D and AR88LF, send s.a.e. for list.—A. J. Reynolds, 139 Waller Road, New Cross, London, S.E.14. (Tel. New Cross 1443 after 7.30 p.m.)

SALE: AR77 Rx FB cndx, £20. All-band compact Tx. 50-watt, designed for Mobile but FB as stn. Tx. AM/CW, £12 o.n.o.?—Jones, 28 Miltons Way, Wootton Bassett, Wilts.

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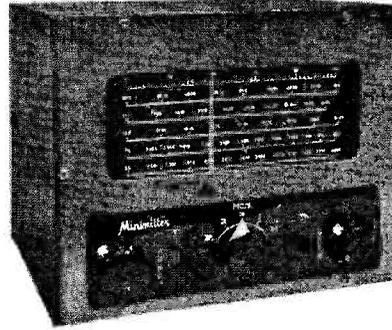
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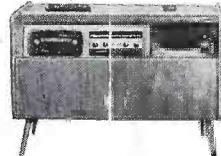
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