

R.S.G.B.



BULLETIN

February 1953

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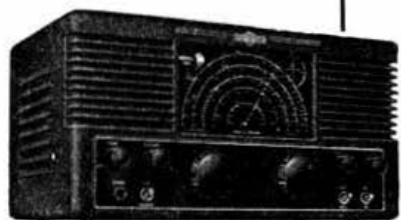
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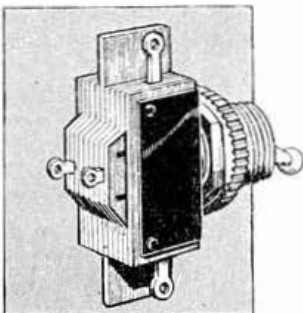
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R.S.G.B. BULLETIN

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FEBRUARY
1953



PUBLISHED ON OR ABOUT THE 15th OF EACH MONTH AS ITS OFFICIAL JOURNAL BY THE
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THE R.S.G.B. IS A MEMBER SOCIETY OF THE I.A.R.U. AND ACTS AS THE REGION 1 BUREAU OF THE I.A.R.U.

WHY IS 30/- ESSENTIAL?

● Last year's audited accounts show that it cost £12,795 to run the Society. Assuming a membership of 11,625—the actual figure as at June 30, 1952—the expenditure per head was 22/-, made up as follows:-

	s.	d.		s.	d.
BULLETIN (excluding Editorial costs)	8	6	MISCELLANEOUS (12 items) ...	2	0
SALARIES, PENSION PREMIUMS AND NATIONAL HEALTH INSURANCES	6	6	RENT AND RATES	1	0
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			QSL BUREAU		6
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THIS MEANS THAT:—

ASSOCIATES, WHO PAID A SUBSCRIPTION OF 10/-, WERE SUBSIDISED TO THE EXTENT OF 12/-. THERE WERE 1148 ASSOCIATES. OVERSEAS CORPORATE MEMBERS, WHO PAID A SUBSCRIPTION OF 12/6, WERE SUBSIDISED TO THE EXTENT OF 9/6. THERE WERE 775 OVERSEAS CORPORATE MEMBERS.

COUNTRY CORPORATE MEMBERS, WHO PAID A SUBSCRIPTION OF 15/-, WERE SUBSIDISED TO THE EXTENT OF 7/-. THERE WERE 7341 COUNTRY CORPORATE MEMBERS.

LONDON CORPORATE MEMBERS, WHO PAID A SUBSCRIPTION OF 21/-, WERE SUBSIDISED TO THE EXTENT OF 1/-. THERE WERE 2237 LONDON CORPORATE MEMBERS.

LIFE MEMBERS, WHO HAD PAID A LIFE COMPOSITION FEE OF £10 10/- ON A COMPUTED LIFE OF 21 YEARS CONTRIBUTED 10/- EACH. THERE WERE 116 LIFE MEMBERS.

FOR THE YEAR DUE TO END ON JUNE 30, 1953, IT IS ESTIMATED THAT, AS THE RESULT OF ECONOMIES, EXPENDITURE WILL BE APPROXIMATELY £1,300 LESS THAN LAST YEAR—NAMELY £11,500.

IN ADDITION TO PROVIDING FOR THE PRESENT ESTIMATED EXPENDITURE, PROVISION MUST BE MADE FOR:

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A LARGER BULLETIN	1/- PER HEAD, TO YIELD	£550
ADDITIONAL PROVINCIAL REPRESENTATION ON COUNCIL AND MORE PROVINCIAL MEETINGS	1/6 PER HEAD, TO YIELD	£825
GENERAL EXPANSION PROGRAMME (e.g. NEW PUBLICATIONS)	1/6 PER HEAD, TO YIELD	£825
PARTIAL RECOVERY OF PAST LOSSES	2/- PER HEAD, TO YIELD	£1100
PARTIAL SUBSIDISATION BY CORPORATE MEMBERS OF ASSOCIATES (ESTIMATION)	1/- PER HEAD, TO YIELD	£550
		<u>£4,400</u>

TOTAL (£11,500 plus £4,400) .. £15,900

IF THE MEMBERSHIP REMAINS UNCHANGED AT THE JUNE 30, 1952 FIGURE, THE REVENUE FROM SUBSCRIPTIONS BASED ON THE NEW RATES WILL AMOUNT TO £16,040.

THAT IS WHY A THIRTY SHILLING CORPORATE MEMBERSHIP SUBSCRIPTION IS ESSENTIAL

R·S·G·B· BULLETIN

Volume 28 No. 8

February, 1953

Current Comment . . .

Why It Must Be Thirty Shillings

IN less than a fortnight Members must decide (at a Special General Meeting to be held on February 27) whether the Home Corporate membership subscription is or is not to go up to 30/-. The fair and impartial working of our democratic organisation is such that a vital decision of this magnitude has received careful examination from all possible aspects. It has not, as many appear to think, been subjected to the arbitrary "Our rates are up" treatment, now so familiar from those bodies wishing to raise the price of their goods or services.

Members may be pardoned for thinking that the examination has gone on long enough and that we should get this job of increasing the subscription well behind us and forgotten. They may feel that after three Editorials on the subject and any amount of discussion the position is completely summed up once and for all by the remark from Scotland published in the Correspondence columns of our last issue on the folly of imagining that the R.S.G.B. alone is immune to the hard laws of economics.

Many Members will say, and rightly so, "Why must the subscription be raised to 30/-? Give us the facts." These facts, and they are indisputable, are tabulated in detail opposite.

These facts show that during the Society's last complete financial year (ended June 30, 1952) expenses amounted to 22/- per member. This figure was arrived at by dividing expenditure (£12,795) by the total membership as at June 30, 1952—which was 11,625. On the above figures it means that, roughly speaking, Associates were subsidised to the tune of 12/-, Overseas Corporate Members by 9/6, Country Corporate Members by 7/-, London Corporate Members by 1/-.

No doubt there are Members who will say, "All right then, make the subscription 22/-," and whilst theoretically and practically this rate would have covered last year's expenditure, such a policy would indeed be shortsighted. If only these Members would think for one moment, they would realise that such an argument cannot result in smooth running and solvency, whether it be the R.S.G.B. or any other organisation.

Already the Society's liabilities in the future have been increased by some £2,000—the deficit on last year's expenditure; and always the members are clamouring for more—a bigger BULLETIN—more provincial representation on the Council—representation at International Conferences.

If all these things are desirable, then they must be paid for, and no honest-thinking Member can really expect, nor has he the right, to go on

being subsidised from the Society's capital assets.

It is estimated that expenditure for the year to June 30, 1953, will be £11,500. This amount, together with the £4,400 required for additional items and partial recovery of past losses, will total approximately £15,900. This figure can be obtained only by fixing the Home Corporate subscription at 30/-, the Overseas Corporate subscription at 21/-, and the Associate subscription at 15/-. This assumes no loss of membership due to an increase of subscription rates. Even at the new rates it will not be possible wholly to recover past losses for several years.

Members must bear in mind that even if the new subscription rates apply immediately it will be more than a year before the full benefit is apparent in the Society's accounts.

These, then, are the facts—and they show clearly even to Members to whom Balance Sheets are things of mystery, that the proposed increases to the subscription rates are really necessary.

It is the duty of every Member who regards the Society with loyalty and affection—as every Member worth his salt should do—to vote on this vital issue. If he cannot attend the meeting in person, he should use his right to register his opinion by appointing a person to act as proxy. Remember that this resolution affects each and every Member and the right to vote either in person or by proxy should be exercised by all.

Leslie Cooper (President)

Arthur O. Milne (Acting Vice-President)

Jack Hum (Honorary Editor).

Proxy Votes

TO assist those who will be unable to attend the Special General Meeting on Friday, February 27th, 1953, a proxy form is included in all copies of this issue of the BULLETIN posted to Home Corporate Members. To be valid, completed proxy forms must reach the General Secretary by not later than 6.30 p.m., Wednesday, February 25th, 1953.

The President (Mr. Leslie Cooper, 3 Summer Avenue, East Molesey, Surrey), the Acting Vice-President (Mr. A. O. Milne, 29 Kechill Gardens, Hayes, Bromley, Kent), and the other Members of the Council have signified their willingness to act as proxies.

Corporate Members should understand that in nominating a proxy they give him the right to vote in accordance with his own discretion, unless a clear indication has been given as to whether the holder of the proxy is to vote "aye" or "nay."

THE AMATEUR CODE

By LESLIE COOPER (G5LC)

BEFORE commencing this, my Presidential Address, may I say how very conscious I am of the great honour which has been bestowed upon me and I promise you that I will, to the utmost of my power and ability, serve the Society dutifully and conscientiously. To this I would add a word of sincere appreciation to my colleagues on the Council for the confidence they have shown in me and to all other members who have promised me their support, not forgetting my friends in the affiliated societies.

My Address must, of necessity, have a title, and after considerable thought I have called it "The Amateur Code." Not the Morse Code, the Q Code or the RST Code but a Code of Ethics, which we would do well to apply to our lives as radio amateurs.

This may be rather a different Address to those that have gone before. It has been characteristic of our past Presidents that they should each make a particular point with some force of argument, whether it has been of a technical, general or of a philosophical nature. Nevertheless, I hope that my views will arouse interest.

I am sure that every one will agree when I suggest that this world of ours would be an easier place to live in, if we all, once every now and again, read and considered the Ten Commandments.

No, I am not going to preach to you, don't misunderstand me. My point is this: when we feel at cross-purposes with ourselves and our hobby and perhaps a little awkward, then let us remember the Amateur Code.

The Amateur Code

What is the Amateur Code?

Well, you will find it in all editions of the *Radio Amateurs' Handbook*, published by our sister society, the A.R.R.L., and I make no apology for repeating it because it is universal in its application.

It goes like this:—

1. *The Amateur is Gentlemanly.*
He never knowingly uses the air for his own amusement in such a way as to lessen the pleasure of others. He abides by the terms of his licence.
2. *The Amateur is Loyal to his Society.*
3. *The Amateur is Progressive.*
He keeps his station ahead of science. It is built well and efficiently. His operating practice is clean and regular.
4. *The Amateur is Friendly.*
Slow and patient sending when requested, friendly advice and counsel to the beginner.
5. *The Amateur is Balanced.*
Radio is his hobby. He never allows it to

interfere with any of the duties he owes to his home, his job, his school or his community.

6. *The Amateur is Patriotic.*

His knowledge and his station are always ready for the service of his country and if necessary his community.

It is not my intention to comment on each item, I give them to you to consider. However, there are two I must enlarge on.

No. 2. *The Amateur is Loyal to his Society.*

I give it to you in strong terms of recommendation to keep this in mind. We may have differences between ourselves from time to time—that can be a healthy sign—but remember our strength, our bargaining power and our prestige is in our unity and our loyalty to the R.S.G.B.

No. 6. *The Amateur is Patriotic.*

Our signals go to the furthestmost ends of the earth and we should always put before the world our love of our country and our pride in upholding the prestige of our Society. You know, we are very fortunate to enjoy the gracious patronage of H.R.H. The Duke of Edinburgh.

There are some to whom the joys and thrills of Amateur Radio have come easily and cheaply in these days of so much ready information and knowledge. For many, the traditions of Amateur Radio have been inherited without serving the long apprenticeship of years ago. Some have acquitted themselves well, others have run roughshod over our ethics.

We have a destiny, no other hobby allows such freedom of speech or thought as ours, and by our actions and by our radiations, so shall we become known.

The Old Timers

Think back to the greatness of the Old Timers, the pioneers of our hobby. Their tremendous keenness, energy, resourcefulness and patience, and above all their true "Ham Spirit" which they gave to this Society, and to other national bodies, a spirit of friendship which should inspire succeeding generations of enthusiasts. This greatness, this constant search for new fields to conquer, served our nation well during the last war. Yes, indeed, there is much to remember of the tremendous efforts in those days.

May "The Spirit of Amateur Radio," mutual aid and loyalty to the Society be our guiding purpose.

"The Spirit of Amateur Radio"

Let me digress for a moment and tell you a true story.

In a certain South London district one whose call had regularly been heard, disappeared from



Mr. Leslie Cooper, G5LC, President, 1953

* Delivered at a meeting of the Society held at the Institution of Electrical Engineers, London, W.C.2, on Friday, January 30, 1953.

all local activities. He gave no reason for his long absence. Many months later a new station came on to the air. The operator had been blind from birth. Slowly the story leaked out—he who had disappeared had discovered, by accident, that one of his listener friends who was blind wanted desperately to know more about Amateur Radio. In fact he wanted to take part in our hobby. Our amateur set about teaching him everything; theory, practice and Morse—imagine his task!

To demonstrate a valve, he broke one open, dissected the component parts and built up, by touch, a picture of how a valve "felt," and told the story of how it worked. This went on for most components. Concurrent with this went the teaching of theory, of the Morse Code and the building of equipment, oft-times with special problems, associated with operation by the blind. All this to an almost stranger—his only tie being a common interest.

After months of infinite patience our blind friend took the Radio Amateurs' Examination orally and sat for the Morse test. He passed both. That spoke of wonders performed.

I can vouch that he is now one of our best operators and his tutor one of the proudest and happiest of men.

One final word: our true amateur is just an ordinary sort of fellow who does an ordinary sort of job—but he possesses a virtue which we should all envy—a desire and determination to serve our fellow men.

Amateur Radio recognises no barriers—Colour, Religion or Political. All that we need know is

that the other fellow shares a common interest in our hobby and abides by its precepts.

Pride in our Hobby

Now, what am I driving at? Just this! We have a hobby of which we should be justly proud and I believe that our strength and future greatness can best come by our individual efforts, providing those efforts are within the compass of our principles. Your help, small though it may be, is wanted.

I can assure you that it is not good enough just to pay your subscription, sit back and leave things to find their own shape. Ask yourself the question, are you personally contributing any good to Amateur Radio? Don't leave it all to the Council. They are fully conscious of their responsibilities and will discharge them well and without fail.

The late Dr. Ralph Moore, Headmaster of Harrow School, said, "If only we can care enough, then by the Grace of God, no limit is set to what we might achieve." Take heart from those words. Always give of your best for the benefit of the hobby as a whole. From that we shall gain in unity, in strength and in prestige.

Speaking in terms of kilocycles, we have to live together in a congested area, therefore, be thoughtful of other users of our bands—be tolerant.

This wonderful hobby of ours allows an immense free interchange of ideas and speech and wide social contacts. Our transmissions, our words and our actions are there for the world to listen to, so that only the best personal efforts are good enough. In other words, I ask you to operate and act by the precepts of the Amateur Code and bring credit to British Amateur Radio.

It did happen here

TWO and a half years ago the Society offered to set-up a communications network to meet any national disaster on land, at sea, or in the air. That offer was declined. Why? Because the G.P.O. had advised the appropriate Ministry that it was quite capable of handling any emergency without the help of radio amateurs.

It is worth recording the reply the Society received at that time from the Ministry of Transport. It read:—

"The Minister much appreciates the interest shown by your Council and your members in the arrangements made for receiving distress messages from vessels at sea and is grateful for their offer of co-operation. After discussion with the Postmaster-General, however, he is satisfied that the normal listening watch maintained by the stations of the mobile service should be adequate in all ordinary cases to ensure that any distress message is picked up and acted on. He feels that the occasions on which it would be necessary to call on the services of amateurs, or other members of the public would be so exceptional and, therefore, so few and far between that it would be more satisfactory not to lay down any hard and fast procedure, but to make the necessary arrangements in the light of the requirements of each individual case."

During the last few hours of January, 1953, a disaster of immense magnitude struck the coasts of the British Isles. Post Office telephones, Govern-

ment wireless stations and the utility services were put out of action for days on end. Radio amateurs in these stricken areas, ignoring the terms of their licence, but feeling sure that Public Opinion would support them, immediately placed their stations and their experience at the disposal of the authorities. In Lincolnshire, for example, when Humber radio station was put out of action by the floods, local amateurs maintained a continuous watch on the shipping frequencies. How well they did their job no one will ever know unless an enterprising journalist has been able to drag out a story. Four times in a few hours Grimsby and Hull radio amateurs intercepted distress calls from ships at sea. Yet, only a few months ago they, and we, were told "that the Postmaster-General is satisfied that the normal listening watch maintained by the stations of the mobile service should be adequate in all ordinary cases to ensure that any distress message is picked up and acted upon." What, may we ask, is an ordinary case?

To the average British amateur it seems incomprehensible that the Post Office can be so short-sighted—so jealous of its rights—as to spurn genuine offers of help.

These words were penned at the height of the disaster and long before the Council of the Society had had a further opportunity to review the situation, but we should be failing in our duty if we omitted to place on record, once again, our serious concern that no provision has yet been made by the Government to establish a National Emergency Amateur Radio Communications Service.

Is there no one in the present Government sufficiently powerful to say that the co-operation offered by the radio amateurs of the United Kingdom MUST BE ACCEPTED?

J.C.

MIXER MASTER OSCILLATORS

Described by W. H. ALLEN, M.B.E. (G2UJ)*

Part II

IN Part I, the principles of Mixer Master Oscillators were discussed and information given on the design of the oscillator stages. While stability is primarily dependent on those stages, careful arrangement of the mixer and amplifier circuits makes the system a practical proposition.

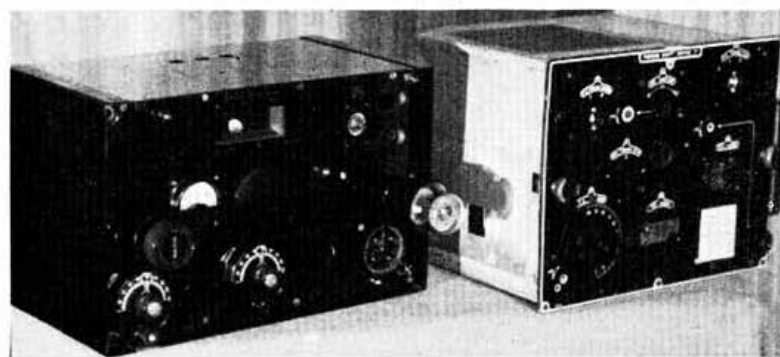
The Mixer Stage

Although several types of valve were tried in the balanced mixer featured in Fig. 1, Part I, the type which proved most satisfactory, from the standpoint of good efficiency, stability and lack of "pulling" on the oscillators, was the Mullard EL32 (VT52 or CV1052). This is a small output pentode with the signal grid brought out to a top cap, a feature which makes separation and screening of the circuits much simpler than would be the case with single-ended valves.

associated with this stage differ somewhat from those normally recommended, the figures quoted were found to function best in practice.

Keying

In both high and low-level units, keying is effected in the v.o. circuit, as this is found to produce the best note. The key is inserted directly (or *via* a relay if not of an enclosed type) in the h.t. line of the 6N7G in the former and in the screen grid feed to the 6SH7 in the latter circuit. The components R5, 6, 7 and C7 in Fig. 2 are fairly critical in value to prevent the screen voltage varying excessively during keying. While optimum for the 6SH7, they may have to be varied for best results if another type of valve is substituted. Key-click filters of normal design should be inserted where necessary.



General view of the two units with the push-pull version on the left. The 6N7G oscillator valve plugs into the front panel and below it, from left to right, are the c.o. tuning control (with crystal and meter above), the mixer anode tuning condenser immediately below the v.o. tuning control and the power socket on the right. The low-level unit has the output tuning condenser on the left, and the slow-motion dial for v.o. tuning on the right with the "netting" switch between them.

The screen voltage is quite critical; the arrangement shown allows the maximum r.f. output for minimum anode current. As mentioned before, the output from the mixer depends largely upon that from the c.o. and falls rapidly when this is less than optimum. Even so, the $75\mu\text{F}$ coupling condenser (C3) will only be partially meshed in practice. The input from the v.o. is far less critically connected with mixer output, and the coupling capacities—C8, C9—should be equal and of as small a value as possible consistent with satisfactory operation. The provision of an oscillator with a fair r.f. output is, therefore, an advantage in this respect.

An early design⁽¹⁾ used type 6F6 valves as a balanced mixer, but the EL32s proved much more suitable.

In low-level mixing the conditions of operation are more akin to those existing in a superhet. receiver with the v.o. taking the place of the incoming signal and the c.o. that of the local oscillator. It is desirable, therefore, for the v.o. input to be small relative to that from the crystal stage⁽²⁾ and weak coupling is in order, thereby ensuring the minimum of "pull" on the frequency of the v.o.

Following the conclusions reached by C. R. Hammond⁽³⁾ the 6SA7 was adopted as the mixer valve in this circuit and has proved very effective. Although the value of certain components

Buffer and Amplifier Stages

As the output of the circuit illustrated in Fig 1, (Part I), is ample to drive even a triode frequency doubler stage from 7 to 14 Mc/s, an internal amplifier is unnecessary. The output from the 6SA7 mixer (Fig. 2) is, however, much smaller and a fair degree of amplification is required to bring it up to that of the push-pull circuit.

The SP61 (VR65) was selected for the first amplifier stage (V4) owing to its high efficiency at the frequencies concerned and the fact that its top cap grid connection made the circuitry easier than would be the case with a single-ended valve. The SP61 operates almost in Class A but the drive provided by it to the following stage is sufficient to run the EL32 at good efficiency. When first setting up the circuit a low-reading milliammeter should be connected in series with the earthed end of R12 and, with the key up (v.o. not oscillating), the coupling condenser C13 should be reduced in capacity until a barely perceptible current of the order of 0.1mA flows due to drive from the c.o. As an example, this current was obtained when the output circuits were tuned to 3500 kc/s and the c.o. frequency was 3265 kc/s. C13 was approximately $6\mu\text{F}$. Careful tests were made for the presence of the crystal frequency in the output on the 3.5 Mc/s band but no trace could be found.

H.T. Voltage Supply

As no oscillator will operate to best advantage

* 32 Earls Road, Tunbridge Wells, Kent.

if the regulation of its power supply is poor, it is necessary to check this should any tendency be noticed for the frequency to shift while keying. The only really satisfactory test is to listen on the receiver to the note on, say, the 28 Mc/s band, with the oscillator and transmitter normally loaded, when even slight variations will become noticeable. Voltage stabilisers of the VR105 and VR150 type should be employed to regulate the voltages marked "stabilised" in the diagrams.

Construction

As previously mentioned the units described were constructed, for the most part, from surplus equipment available at the time. For that reason few readers will possess identical parts and/or chassis, but the basic requirements remain. For example, complete screening associated with a solidly constructed chassis is absolutely essential; furthermore the screening should be complete on the chassis and should not rely for its effectiveness on the metal cabinet. It is here that many constructors of precision apparatus go astray and find that stability is affected by pressure on the outer case.

The solidity of the panel is particularly important and attention to its adequate bracing will go far in producing a piece of equipment which holds its calibration and is generally a pleasure to use. The ideal would be for the panel to be of cast construction, but a near approach to this may be obtained by making it in the form of a shallow tray, the stiffening pieces round the edges being of metal angle, or even hard wood an inch or more in depth and perhaps a half inch in width with the panel screwed to them in a number of places.

A logical placement of the components in each section should result in reasonably short and direct wiring so arranged that any necessarily long leads cannot vibrate and cause an unstable note. Valves should be so placed that heat from them is not transferred to coils or tuning condensers and if necessary screening should be employed to this end, even if by so doing the length of some leads is increased. In both units the v.o. tuning coils were placed below the chassis and the v.o. and c.o. valves mounted outside the cabinet. Other valves were installed where adequate ventilation could be provided.

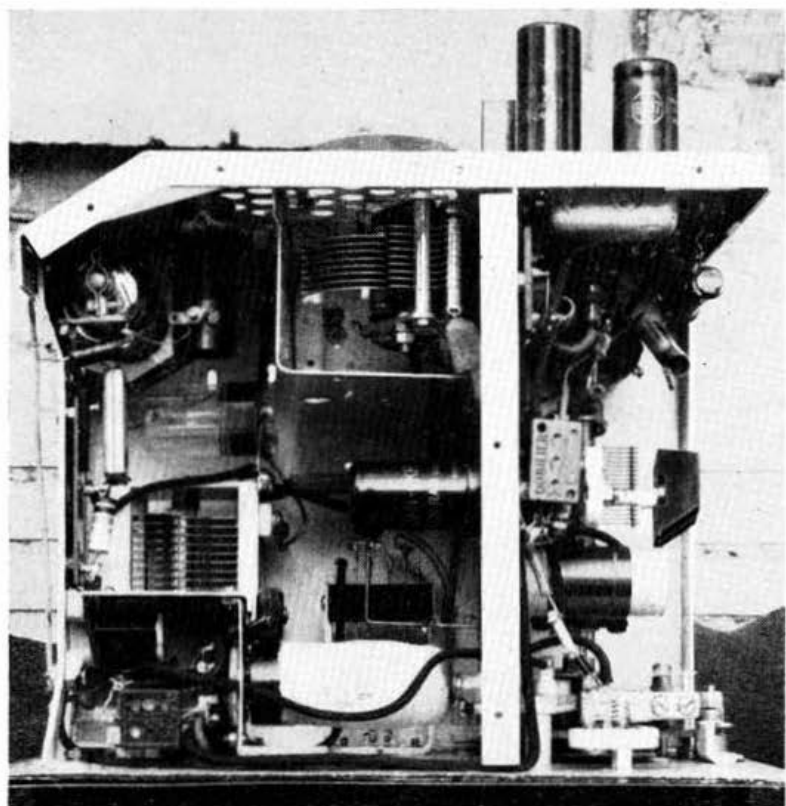
It has been stressed that coupling between the oscillators and the mixer and its output circuit should only be by way of the intended paths. If

interaction is experienced, even although the screening appears adequate, a cure may be effected by further by-passing of supply leads (both h.t. and l.t.), preferably with mica condensers, where the individual supplies pass through the screening partitions from one section of the apparatus to another. It was found essential to couple the mixer master oscillator to the remainder of the transmitter by means of co-axial cable. Provided it is of good quality a considerable length may be used without impairing the available output to any serious extent.

Operation

In both mixers the output circuit should be capable of tuning between 3.5 and 7.3 Mc/s so that by suitable choice of crystals, drive may be obtained on either band. The choice of crystal frequency will depend on several factors. The required sum or difference frequency should not approach so closely to that of the crystal as to render their separation difficult in the output circuit. It will be more marked in the single-ended than in the push-pull mixer where the crystal frequency is to a large extent cancelled out. This places a limit to the lowest frequency to which the v.o. may be tuned. In the single-ended mixer this will be around 250 kc/s when output is being taken on the 3.5 Mc/s band and around 500 kc/s on 7 Mc/s.

With the push-pull mixer it is possible to use a 7.5 Mc/s crystal and, by taking the difference beat, to cover the c.w. sections of the 7, 14, 21 and 28 Mc/s bands and on the sum beat, with the v.o. tuning between 500 and 611 kc/s, to obtain drive between 8,000 and 8,111 kc/s for coverage of 144 to 146 Mc/s. If this facility is required the mixer output circuit should be arranged to tune to 8.1 Mc/s. With a 6.5 Mc/s

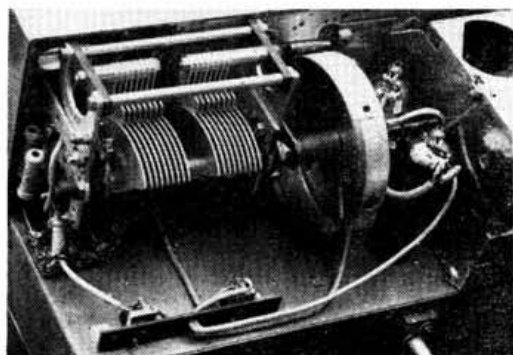


Plan view of the low-level unit. The two oscillator valves may be seen at the top right-hand corner with the EL32 output stage, the 6P61 buffer amplifier and 6SA7 mixer towards the left, bottom centre and centre respectively. The c.o. tuning condenser is in the screened compartment to the right of the EL32, and below it is the output tuned circuit.

crystal the v.o. requires to tune between 500 and 800 kc/s for 7 Mc/s output, 500 and 675 kc/s for 14 Mc/s, 500 and 650 kc/s for 21 Mc/s, and between 500 and 1,000 kc/s for 28 to 30 Mc/s. This is easily achieved.

Readers will be able to work out similar arrangements to suit such out-of-band crystals as they possess.

It will be seen that when the crystal is below the desired output frequency and the sum beat is therefore utilised, increasing the frequency of the v.o. results in an increase in frequency at the output. With a crystal above the output frequency the v.o. tunes backwards.



Interior view of the high-level mixer unit. The two coupling condensers (C8, 9 in Fig 1) are in front of the split-stator v.o. tuning condenser, with the two EL32 mixer valves between the drum dial and the screened compartment housing the c.o. stage.

Conclusion

It is hoped that the foregoing information will introduce those interested in really good quality transmissions to a form of drive which is unsurpassed by any normal v.f.o. and competes only with the very best of crystal oscillators where particular care has been taken to prevent slight frequency shifts when the transmitter is keyed or modulated. For break-in working on c.w. this form of drive is absolutely ideal as, with the key up, there can be no output anywhere in the transmitter at the operating frequency.

References

- (1) Bliss & Bailey. "A Heterodyne Exciter." *QST*, July, 1940.
- (2) Terman. "Radio Engineer's Handbook." Section 7, paras. 11 & 12.
- (3) Hammond. "Practical Design of Mixer or Converter Circuits." *QST*, February, 1941.

"Mixer Master Oscillators"

THE Editor of *The Radio Amateur* has drawn attention to the fact that a theoretical article on the principle of Mixer Master Oscillators was contributed by Dr. Stanley O'Hagan, G2CR, to the September 1947 issue of *Short Wave News*. A practical description of a v.f.o. unit entitled "A Crystal-Mixer Heterodyne V.F.O." written by E. Kaleveld, PAØXE, appeared in the October, 1948 issue of the same publication.

(Continued from next column)

aerials for the h.f. and v.h.f. bands, would provide some gain in signal strength, but where, as in the writer's case, aerial space is restricted, and optimum performance can to some extent be sacrificed for versatility, the crossed folded dipole seems to offer a useful compromise, and forms a basis for further experiments in aerial design.

Versatile Crossed Folded Dipole

By G. A. Richardson (B.R.S. 15615)*

THE aerial to be described was devised by the writer after many attempts to develop a suitable all-round receiving aerial which would give reasonable performance on the h.f. and v.h.f. bands.

It consists of two crossed folded dipoles, each 16 ft. 6 in. in length, mounted horizontally in the loft. The elements are of Telcon K35 ribbon feeder, shorted at the remote end of each dipole arm. One of the conductors in each dipole is broken at the centre, forming the feed point for the conventional folded dipole, and the two aerials are connected in parallel so that the incoming

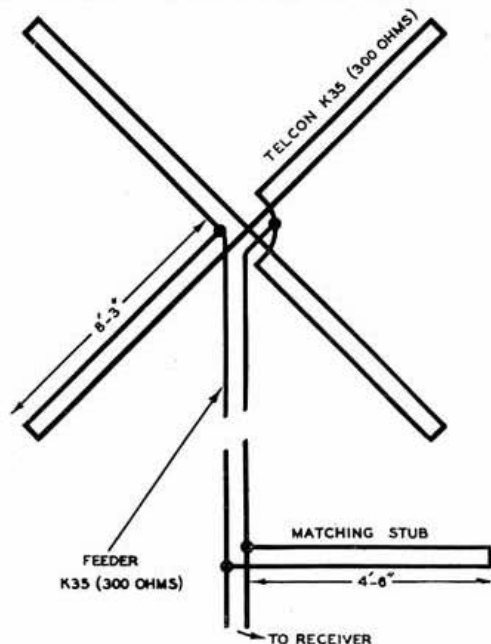


Diagram showing the method of construction of the crossed folded dipole used at B.R.S.15615. All joints should be soldered and polystyrene run over them with the hot iron to prevent corrosion.

feeder connects to both. The dipoles are mounted so that they cross at right-angles at the feed point, as shown in the diagram.

For a 90-degree angle between a pair of crossed dipoles, the centre impedance is exactly one half of that of a single dipole. Assuming an approximate value of 300 ohms for the impedance of a single folded dipole constructed from K35, then the centre impedance of a pair of such dipoles crossed at 90 degrees is about 150 ohms.

For matching purposes, using 300-ohm feeder, a single stub consisting of 4 ft. 6 in. of K25 short-circuited at the far end should be connected to the feeder at a distance of 11 ft. 9 in. from the aerial. Since K25 is unscreened, the stub should be kept clear of the main feeder; if convenient, it should be fixed at right-angles to the run of the feeder.

This aerial has given satisfactory results on all bands between 1.8 Mc/s and 144 Mc/s, and appears to be omnidirectional. No doubt the use of an individual aerial for each band, or separate

(Continued in previous column)

* 201 Abercain Road, Streatham, London, S.W.16.

T.V.I.-proof Transmitter for National Field Day

The rules for the 1953 N.F.D. permit a new combination of bands. Here's a neat, easily constructed transmitter, suitable for "A" station use during the contest, which also makes an effective T.V.I.-proof "home" station transmitter at inputs up to 60 watts.

THE predecessor of this transmitter was designed to satisfy the writer's contention that a two-stage circuit would effectively cover the 1.7, 3.5 and 7 Mc/s bands. It worked so well that it was decided to incorporate a number of refinements designed to make it T.V.I.-proof and easier to operate. The resultant piece of equipment is now illustrated. Incidentally, with an input of 5 watts, T9 reports have been consistently received.

The Circuit

Apart from the switching, the circuit (Fig. 1) is simple and straight-forward. No constructional difficulty should be experienced and, with the exception of a few good quality silver mica and ceramic condensers, most of the components can be obtained readily on the surplus market.

An ML6 valve is employed in a Clapp oscillator circuit. Using carefully selected values of silver mica condensers, adequate drive may be obtained,

* 10 Chepstow Crescent, Newbury Park, Ilford, Essex.

even on 7 Mc/s. All leads must be kept as short as possible, using 18 s.w.g. wire for rigidity. The coils are mounted above the chassis and the valve horizontally below. It was found necessary to switch each coil, separately, in and out of circuit, so that there is no common connection. The ceramic switch, with its associated coils and tuning condenser, is mounted in a metal box.

The coupling condenser to the p.a. grid is a 100 μ F ceramic air-spaced trimmer, a capacity setting of 10 to 20 μ F proving most satisfactory for maximum drive with purity of tone. With a 250 V h.t. supply, a current of 0.75 mA is available on 7 Mc/s, which is ample to drive the p.a. to 40 watts on c.w. and 25 watts on phone. A 500 ohm resistor in the cathode of V1 was found essential to maintain a T9 note under these conditions. By using a larger coupling capacity the drive could be increased, but as the note suffered the value suggested was adhered to.

An 807 valve was selected as the p.a. because of

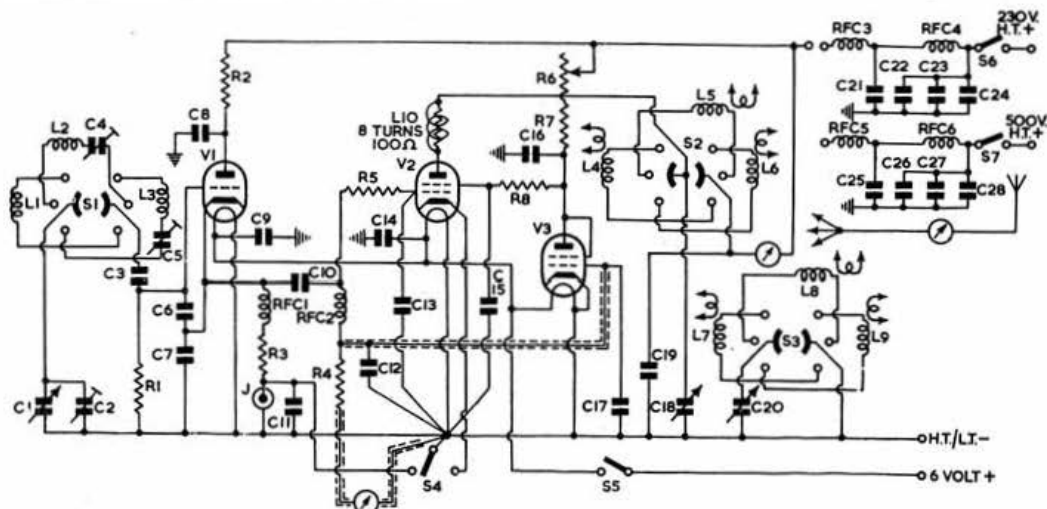


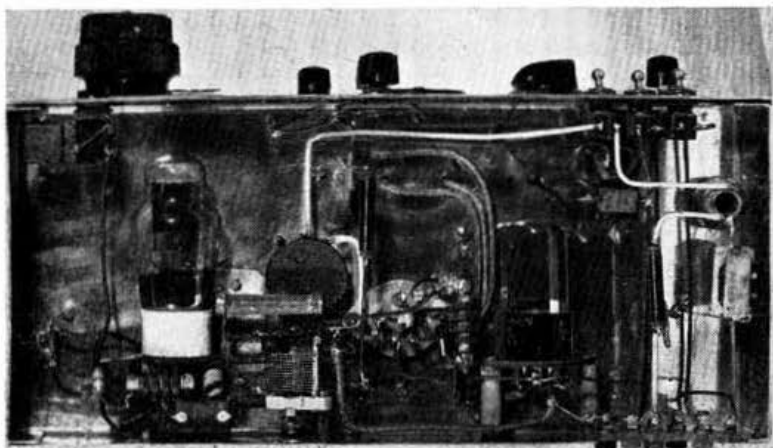
Fig. 1.—Circuit of a T.V.I.-proof Transmitter suitable for Field Day Work.

C1, 18	100 μ F ceramic variable
C2, 150	μ F ceramic variable
C3, 7, 8, 12,	100 μ F silver mica
16, 23, 27	100 μ F ceramic trimmer
C4, 5, 10	280 μ F silver mica
C6, 280	μ F silver mica
C9, 14, 22, 26	0.002 μ F
C11, 19	0.01 μ F
C13, 15	10 μ F silver mica
C17	50 μ F silver mica
C20	150 μ F ceramic trimmer
C21, 25	500 μ F mica
C24, 28	25 μ F silver mica
R1	100,000 ohms $\frac{1}{2}$ W
R2	1,000 ohms 1 W
R3	500 ohms 1 W
R4	20,000 ohms $\frac{1}{2}$ W
R5	50 ohms $\frac{1}{2}$ W
R6	50,000 ohms pot. 3 W
R7	10,000 ohms 3 W
R8	100 ohms $\frac{1}{2}$ W

R.F.C. 1, 2	Eddystone 1010
R.F.C. 4, 6	Eddystone 2 pile
R.F.C. 3, 5	100 turns 30 s.w.g. on $\frac{1}{2}$ in diam. former, close wound
S1, 2	2-pole 3-way ceramic switch
S3	3-pole 3-way ceramic switch
V1	ML6
V2	6V6
V3	807
L1	100 t. 26 s.w.g.
L2	42 t. 26 s.w.g.
L3	22 t. 20 s.w.g.
L4	4 t. 26 s.w.g.
L5	34 t. 20 s.w.g.
L6	18 t. 18 s.w.g.
L7	90 t. 26 s.w.g. tapped every 4 turns to centre
L8	30 t. 20 s.w.g. tapped every 4 turns to centre
L9	12 t. 18 s.w.g. spaced 1 turn, tapped every 3 turns
	All coils wound on $\frac{1}{2}$ in diam. formers.

its low drive requirements and because it can be driven to 75 watts on c.w. As it is necessary for all the electrodes of an 807 to have low impedance paths to earth at high frequencies, 10 μ F condensers are used in the control and screen grid circuits. Both condensers are connected to a common earth point, whilst 50 and 100 ohm grid stoppers respectively are also used. The low impedance path for the anode is provided by the tuning condenser.

Ceramic switches are used to switch the anode and aerial loading coils, and to provide "netting" facilities; the cathodes of both V1 and V2 are connected to a single pole change-over switch. A 6V6 is used as a "clammer" valve to reduce p.a. standing current during "key-up" periods.



Under chassis view. The oscillator is to the left.

Calibration

Before calibration is commenced, the lid of the oscillator box should be securely fixed in position.

By careful adjustment of C2, the 1.7 Mc/s band can be spread over 90° of the dial. The band edges should then be marked. The edges of the 3.5 and 7 Mc/s bands can then be similarly indicated, C4 being used to spread the former band

over about 80° and C5 to spread the 7 Mc/s band over approximately 45°. After this has been done, the dial can be calibrated every 10 kc/s on each range.

Aerial Loading Adjustment

With the transmitter set in the centre of each band in turn, the aerial should be tapped-down the aerial loading coil until maximum r.f. is indicated in the aerial current meter. While these adjustments are being made, the link should be frequently checked to maintain correct coupling.

The aerial used with the transmitter described was 136 ft. long and no trouble was experienced in loading up on any of the bands covered. Once the taps were correctly adjusted, it was only necessary to retune the p.a. and aerial loading condensers when changing frequency.

T.V.I. Suppression

Link coupling between the anode and aerial coils helps to prevent harmonics being radiated whilst the aluminium casing also aids T.V.I. reduction. Although it was not found necessary to use a 43 Mc/s trap in the p.a. anode circuit, a 100 ohm resistor with 8 turns of wire wound round it is used as a safety measure.

It is important that screened leads should be used where shown on the circuit diagram, and ceramic or mica condensers employed wherever indicated.

The transmitter was tested for T.V.I. by breaking the common h.t. feed to the oscillator and p.a. so that up to 750 V could be applied to the 807. Filters were installed in the h.t. lines. In the London area, with an input of 60 watts, no interference with the vision signal occurred when operating on either 3.5 or 7 Mc/s, although the aerial ran within 1 ft. of the television dipole. At Chelmsford, 25 miles from Alexandra Palace, no interference was caused with an input of 40 watts on 3.5 or 7 Mc/s and 10 watts on 1.8 Mc/s.

* * *

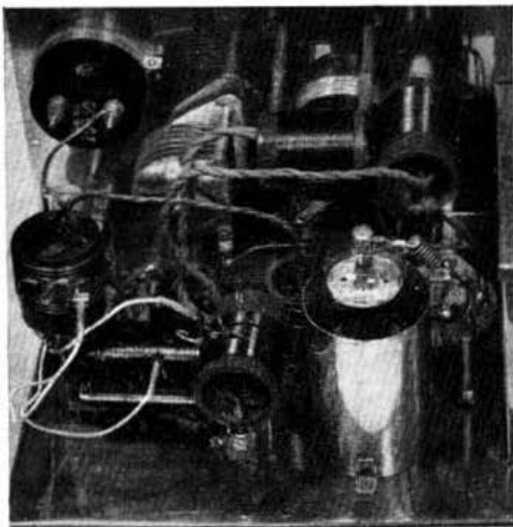
During the 1952 National Field Day, the transmitter was operated by G2QI/P using an input of 3 watts, with creditable results.

SINGLE SIDEBAND (Continued from page 339)

recorded my experiences so as to help spread the gospel." G3EWI (Kew), a keen 2-metre operator, proposes to become active on that band soon with s.s.b. Up to the present it would appear that no-one has attempted this type of transmission above 50 Mc/s. Perhaps the credit of a "first" may yet go to him. It will be necessary of course to receive 'EWI's signal on a receiver with a crystal controlled first oscillator.

Late News

During the recent spell of good conditions on 3-8 Mc/s, G3COJ contacted W1ATE, W1IIM and W4YCM/VO2. These contacts were made between 02.45 and 03.45 G.M.T. although the band had opened up as early as 01.30 G.M.T. 'COJ says that W2PAJ, who is associated with the V.O.A. Amateur Radio hour, has agreed to devote a whole programme to s.s.b. Suitable information may be sent via G3COJ or G3CU. The date of the broadcast will be announced shortly.



The p.a. stage and aerial coupling circuit. The edge of the oscillator box may be seen to the right of the picture.

A Hybrid Windom

By E. Johnson (G2HR)*

CIRCUMSTANCES often prevent an operator from erecting a mast at the station end of the aerial, and may also preclude attachment to the chimney-stack, so that an end-on arrangement must be used. Provided most of the wire is outside the station, such an aerial can give excellent results. Often, however, a substantial length of the radiating section is, of necessity, brought into the station, producing two undesirable effects—power loss due to proximity of walls and earthed objects, and receiver blocking caused by radiation from the aerial lead-in.



Fig. 1.—Layout diagram of the hybrid Windom aerial.

An arrangement which can give satisfactory results is illustrated in Fig. 1. At first glance it appears to be the usual type of end-on aerial, comprising lengths B and C, with stub A attached at a predetermined point. Closer inspection, however, with the aerial redrawn as in Fig. 2, reveals it is an adaptation of the familiar Windom, where A and B form the radiating section while C is the single-line feed.

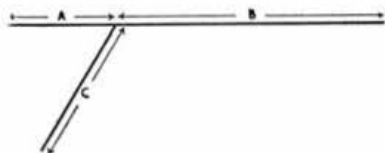


Fig. 2.—The aerial redrawn to illustrate method of adjustment.

The aerial is best adjusted by trial and error. The length of the radiator (A+B) should be chosen to resonate within the desired band; and while the usual formulae may be used in the first instance for calculating the required length, the final resonant frequency should be determined with the aid of a grid-dip meter. Calculation by formulae alone may be inaccurate, since the proximity of earthed objects tends to lower the resonant frequency, while the fact that the radiator is bent has the opposite effect.

Adjustment

Having cut the radiator (A+B) to resonance, the length of the stub A should be adjusted so that the impedance at the junction of A and B is equal to the impedance of the single-line feed C. Obviously, as the length of A is increased or decreased, so the length of B must be correspondingly adjusted, keeping the overall length of the radiator (A+B) constant.

Stub A is adjusted to give minimum standing-wave ratio on feed-line C (i.e. the line should be substantially "flat"). Initially, A can be made 0.36 of the total aerial length. Lamps may be temporarily inserted at intervals along C, the

respective lengths of A and B being altered until the lamps glow with approximately equal brilliance. Provided the resonant length is correct and the lengths of A and B are suitably proportioned, three lamps inserted in A, B and C, immediately adjacent to the common junction point, should glow with equal brilliance.

The polar diagram of this type of aerial, though rather unpredictable, will approximate to the dipole figure-of-eight. It should be remembered that, however well matched, there will always be some radiation from the feeder. Since, however, the impedance is comparatively low, there will be no high-voltage r.f. points within the station as occurs with conventional end-on aers. The feeder-current will therefore be adequate on low power to permit easy adjustment.

CQ Single Sideband

By H. F. Knott (G3CU)*

LETTERS received recently show that there is still a tendency to believe that s.s.b. has to be complex to get the most out of it, and that a complete rebuild of the existing transmitter is necessary. Something has already been said of the former, but it is apparently not realised that quite a fair proportion of an existing station, e.g. the exciter unit and the p.a., may be conveniently used in conjunction with a single sideband adaptor (phase-shift type), which replaces the modulator and its associated power supplies. While in the writer's view a complete fixed frequency sideband drive unit is desirable, it is by no means essential. An adaptor (see *Radio Amateurs' Handbook* 1952) would consist of a speech amplifier, a pair of balanced modulators, and the 90° audio and r.f. phase-shift networks. The r.f. networks would be required to tune to the band on which it was intended to work, and could be either conveniently switched or consist of plug-in units. The ability to change frequency with such a system and yet maintain the necessary phase and balance to retain a single sideband, would limit the shifts to about 100 kc/s. It would also be important to monitor the outgoing signal for possible misalignment. However, for a beginning, working in a limited frequency range in any one band, it is obviously a comparatively easy way of starting. The p.a. would, of course, need to be adjusted for linear operation.

Notes and News

Activity on 3.5 Mc/s. has been about the same as usual, the highlight being several DX contacts. G3CWC worked VO2B and two VEs while G3IMW raised VO2B and a CT1. G2CR (Scunthorpe), is back on the band again after a long absence, and judging by his signals, has improved matters at his end. G3FDG has almost completed his receiver adaptor which includes sideband selection and a Vectorscope. This latter device is for analysing a received signal and is capable of showing up even the slightest defect. So be sure your signals are clean!

G3CCZ, who has been doing a great deal of listening on 14 Mc/s recently, writes to say, "I think that you have only to hear a W6 on s.s.b. and compare him with a W6 a.m. station to be convinced of the advantages of the system, at least from the selective fading and attendant phase distortion point of view. I wish I could have

(Continued on page 338)

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Television Transmission for the Amateur

Part II - Scanning System and Video Amplifier

Part I of this series—published last November—described the fundamentals of a television system, and showed a block diagram of a transparency scanner operating on the Flying Spot principle. In this article more detailed consideration is given to the design of a simple telestill transmitter.

The Scanning System

THIS comprises a high-intensity, finely focussed cathode ray tube, some form of optical system, the transparency, and the photocell. The c.r.t. used must possess the following features: it must be of very short persistence screen trace, or the fine detail in the picture will be lost; it must be fairly flat-faced, or there will be difficulty in using an optical system; its screen must emit light of a colour to which the photocell is sensitive; its screen must be of a fine grain, to prevent the generation of spurious noise on the picture; the size of the raster must not be so large that there is difficulty in maintaining sufficient brilliance without over-running the tube, nor yet so small that the size of the spot becomes appreciable.

end of the c.r.t. In general, this is limited to large transparencies, such as $3\frac{1}{2}$ in. \times $2\frac{1}{2}$ in., or $\frac{1}{4}$ -plate. Glass slides cannot be used, as they will not bend to the shape of the tube face. There will always be a loss of focus by this means due to the finite thickness of the tube face glass. Provided the face is sufficiently flat, a lens system can be used to focus the raster on to the transparency. This gives better focus, but as there is a loss of light, it is necessary to use a condenser lens between transparency and photocell as well. Fig. 1 shows how the necessary focal lengths, etc., can be calculated. The relevant formulae are:

$$\frac{1}{a} + \frac{1}{b} = \frac{1}{f_1}; \quad \frac{1}{c} + \frac{1}{d} = \frac{1}{f_2};$$

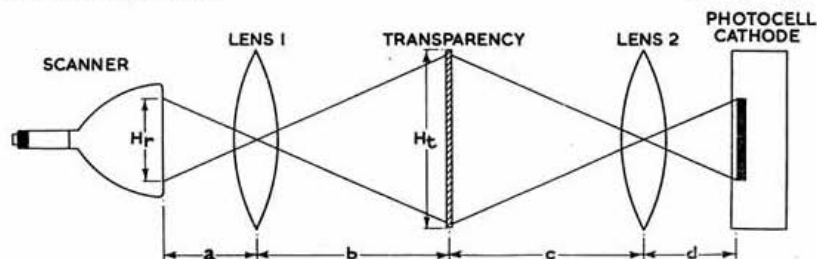


Fig. 1.
The optical system.

Apart from specially designed tubes such as the Mazda 30C2, or the American tubes with P15 traces, the nearest approach to a really short persistence tube is the photographic blue variety used in some oscilloscopes; a 3 in. blue trace tube can be bought new for about £3. These particular tubes are rarely offered on the surplus market, but fortunately many ex-radar tubes, which will give quite satisfactory results, can still be bought at reasonable prices. The appendix shows a list of tubes that are suitable. If the reader is starting from scratch, he is advised to look for an ACR1 or ACR2X (basically similar), an ACR8, or a 3FP7 in the electrostatic series, or a 5FP7 in the electromagnetic series. Some types of standard white trace TV tubes can be used. A projection type tube is not satisfactory, neither are tubes such as the VCR97, because their afterglow is so long as to limit the picture to about 80 lines. It should be noted that the tubes shown are mainly not blue trace; some, in fact, are apparently long persistent, such as the 5FP7 recommended. These tubes have a double layer screen, the first being a short persistence blue, followed by some other long persistent colour. The colour sensitivity of the photocell will select the correct trace without the addition of any colour filters.

The Optical System

An optical system need not be used; if the scanning raster is made the same size as the transparency, the latter can be stuck right on the

where f_1 and f_2 are the focal lengths of the first and second lenses respectively

Also: The height of the c.r.t. raster $\frac{a}{b} \frac{H_r}{H_t}$

The height of the transparency $\frac{a}{b} \frac{H_r}{H_t}$

Unless lenses of short focal length are used, the optical system will become inconveniently long. Spare camera and enlarger lenses are ideal.

The Transparency

The transparency may be of any size, and either positive or negative. For initial experiments, a black bar or cross of opaque cello tape can be stuck onto the scanning c.r.t. face; certain cellophane wrappers used for sweets make very good transparencies.

Once the whole unit is working, photographic negatives, or small hand drawn cartoons, can be used. There is no objection to the use of colour transparencies, but the colour balance may not be maintained as the photocell to be described has a predominantly blue response. The transparency can be fitted into a simple holder, or the reader may have an old lantern slide projector that could be suitably modified. A design for a 35 mm. film strip gate (after C. G. Dixon) using a surplus gun camera lens, is shown in Fig. 2.

The Photocell

As in general, the type of photocell employed in sound film projectors is not sufficiently sensitive, a multiplier type of cell—such as the RCA931A—which makes use of secondary emission, is used

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instead. Fortunately, these cells were used in large quantities during the war, and some can still be found on the surplus market. British equivalents to the 931A cost about £30!

at full gain. Furthermore, the sensitivity will be found to vary slightly over the area of the photo-cathode, so it is worthwhile trying several tubes, or varying the cathode position, in order

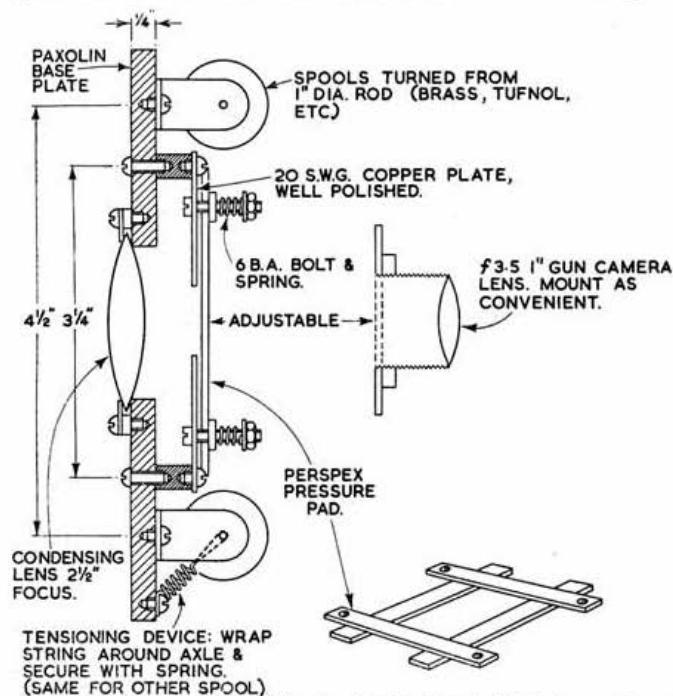


Fig. 2.—Constructional details for a 35 mm. film strip gate.

The 931A has a spectral response, corresponding exactly to the emission from a photographic blue c.r.t. trace. This means that it gives maximum output when used with a tube of this kind, but it will be found that any of the suggested c.r. tubes give satisfactory results with the 931A. Although the cell is very sensitive (its output is of the order of 20 amps/lumen), they are very noisy if run

to find a spot of maximum sensitivity. It is not necessary to focus the transparency to a fine spot on the cell cathode, in fact the greatest possible cathode area should be used.

The whole of the optical system (in its widest sense) should be enclosed in a light-tight box, painted matt black on the inside. With some tubes, it may be advisable, in order to reduce

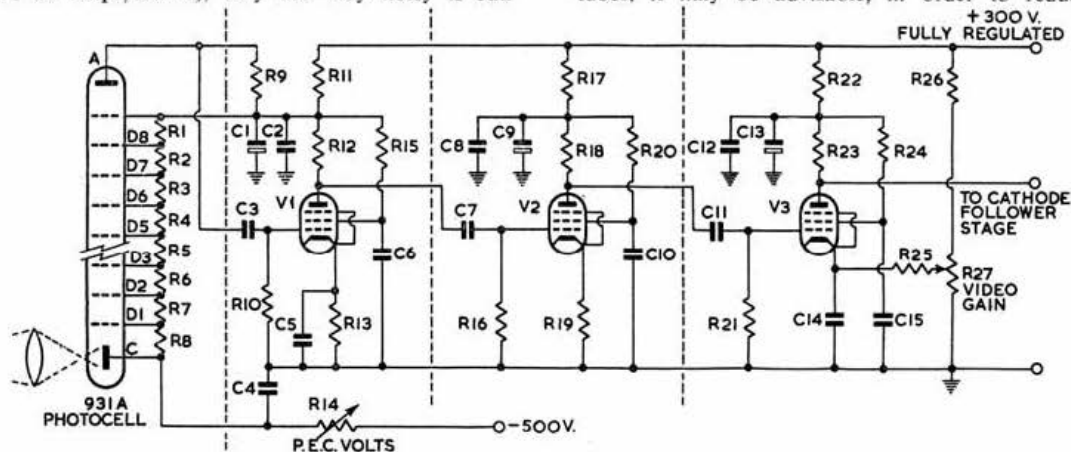


Fig. 3.—Circuit of the video amplifier.

R1, 2, 3, 4, 4a (not shown)	39,000 ohms $\frac{1}{2}$ W.
5, 6, 7, 8	
R9, 12	2,200 ohms 3 W.
R10	100,000 ohms.
R11, 22	4,700 ohms 2 W.
R13	180 ohms.
R14	2 megohm carbon pot.
R15, 20, 24	56,000 ohms.

R16	500,000 ohms.
R17	6,800 ohms 2 W.
R18	2,200 ohms 3 W.
R19	180 ohms.
R21	250,000 ohms.
R23	3,300 ohms.
R25	100 ohms.
R26	50,000 ohms 2 W [pot]
R27	20,000 ohms wirewound

C1, 8, 12	8 μ F (at least).
C2, 9, 13	0.001 μ F mica.
C3, 6, 10, 15	1 μ F paper
C4	2 μ F.
C5	0.01 μ F
C7, 14	0.1 μ F paper
C11	0.25 μ F.

A 39,000 ohm resistor, R1a has been omitted from the top of the photocell chain, i.e., between dynode 9 (not shown) and h.t.

spurious spillover of light, to paint-over the end of the c.r.t. where the actual raster does not appear. Lenses, where used, can be mounted on simple racking mechanisms to allow for manual focussing. An inspection hole should be left in a suitable place so that the scanning raster can be checked from time to time.

As described, the scanning unit is rather long. With an ACR1 scanner in use but no optical system (the photocell being some 6 in. from the face of the tube), the overall length is nearly three feet. There is no reason why mirrors or prisms should not be used to shorten the apparatus by doubling back the optical path.

The Video Amplifier

For those unfamiliar with video frequency techniques, some of the component values shown in Fig. 3 may seem rather strange. This is because it is necessary to pass a bandwidth of from 20 c/s or even lower to 2.5 Mc/s or higher; in addition, and only where this type of flying spot scanner is being used, the response over this range must not be flat, but rising in the h.f. region to compensate for the finite afterglow time of the scanning c.r.t. The circuit shown, therefore, will not do as a camera amplifier where a "live" camera tube is in use.

Base diagram for the 931A photocell (bottom view). Pins 1-9, Dynodes 1 to 9, Pin 10 Anode, Pin 11 Cathode.



There are many well-known methods for extending the h.f. response of amplifiers, but the circuit illustrated has the advantage that it needs no test gear to align the amplifier which should be built in the manner of a TV receiver r.f. strip; that is to say, all circuits should be fully screened, and very well decoupled. The whole amplifier should be screened to prevent broadcast break-through, whilst an electronically regulated power supply is essential to prevent "motor-boating" at very low frequencies. Further notes on the amplifier will appear in Part III, together with details of the common time-base unit.

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Appendix

Government Surplus CRTs Suitable for Flying Spot Scanning Army Tubes
 ACR1, 2X, 8, 11, 15, 19, 22.

R.A.F. Tubes

VCR84, 85, 87, 112, 140, 511, 518m, 524, 524A, 529, 530. Equivalents and Others
 CV255, 269, 274, 300, 307, 836, 954, 958, 959, 962, 1112, 1379, 1380, 1383, 1391, 1511, 1518, 1529, 2786, 3774, 3776; VCRX97, VCRX156, VCRX530; V1020, V1023, (32)26J; NC5, 9, 10, 14; W1071, 1851, 1921, 6601; ZC0123, 0697, 3081, 3595, 13369; ZA13075.

American Types

Any type with P2, 4, 7, 11 or 15 traces.

It's Topical

MORE than 250 commentators, speaking upwards of 40 languages, will describe the **Coronation of Her Majesty Queen Elizabeth** on June 2nd. If tests now being carried out prove successful, it is anticipated that, in addition to the U.K., television pictures will be broadcast simultaneously, with appropriate commentaries, to France, Holland, Denmark and Germany. The G.P.O. will provide 400 sound and television circuits and 800 extensions for microphones and cue-lights. Films of the Coronation will be seen on TV networks throughout Canada and the U.S.A. within a few hours of the actual crowning.

On May 1st, 1953, the European **maritime distress frequency**, now on 1,650 kc/s, will be moved to 2,182 kc/s which will become a **world-wide** radio-telephony distress and general calling frequency.

Regulations for the **control of ignition interference** under the Wireless Telegraphy Act, 1949, come into force on July 1st, 1953. After that date, all new cars must be fitted with suppressors. Although not compulsory on older models, the motoring public is being urged to fit suppressors to all cars. The efficiency of the ignition system is not in any way impaired.

At the recent wedding of Miss Jane McNeill and the Earl of Dalkeith, the proceedings were recorded by **John Blair, GM5FT**, a member of the Society for many years.

The **Second Electrical Engineers Exhibition**, organised by the Association of Superimposing Engineers, will be held at Earls Court from March 25th to 28th. Admission is by trade and association membership card or R.S.G.B. badge. Chief organiser is Phil Thorogood, G4KD.

Even those with DX calls are not to be free of TVI troubles for long. Latest countries to order television stations are **Venezuela and Thailand**, both of which are to have 625 line systems supplied by Marconi's Wireless Telegraph Co., Ltd. Two German TV networks are also to employ British equipment—Pye cameras and control gear.

The Postmaster-General recently announced that 25 applications for permission to establish **commercial TV stations** had been received by the G.P.O., three of which relate to the Channel Islands.

The General Electric Co., Ltd., has developed cathode ray tubes with **conical deflectors**. By using these tubes with circular time bases and applying the signal to the central conical deflector, no time is lost for the "fly-back" as in ordinary oscillograph tubes.

For his help in obtaining licences for German nationals in Western Germany, **Major Rowland Shears (G8KW)** has been elected the first Honorary Member of the German Amateur Radio Society.

Hugh McConnell

Members in all parts of the United Kingdom will learn with satisfaction that **Mr. Hugh McConnell, GM2ACQ**, of Allo-way, Ayrshire, Scotland, has, as the result of much pressure from members in all parts of the British Isles, withdrawn his letter of resignation from the 1953 Council. Mr. McConnell's colleagues on the Council fully appreciate the motives which led him to write his earlier letter and are glad to learn of his decision to continue his valuable services to the Society.

The Radio Amateurs' Examination

Model Questions and Answers

Part 7. Transmitters

As questions are probable on simple transmitting circuits the candidate should be able to draw diagrams neatly and rapidly. Attention should be paid to a balanced and symmetrical lay-out, corresponding components in successive stages being shown in the same relative positions. An example of satisfactory lay-out is given in Fig. 1, from which it will be seen that the voltage-dropping resistors R3, R4 and R7 are at the same level. Similarly, the by-pass condensers C1, C2, C6, C7 are in line, as are condensers C4, C9 and C11. By-pass condensers are best shown near the chassis line rather than adjoining valve electrodes. Appropriate values for the resistors and condensers should, normally, be given below the actual diagram. The values given in the captions beneath Fig. 1 and Fig. 2 are typical and may be memorised, but considerable latitude is often permissible.

By

B. W. F. MAINPRISE
B.Sc. (Eng.), A.M.I.E.E. (G5MP)*

State briefly the advantages of crystal control.

The frequency will be accurately known and the risk of out-of-band operation greatly reduced. Changes in voltage, tuning, or even circuit arrangements will result in a barely perceptible alteration to this frequency. Switched crystals allow rapid setting to pre-determined frequencies.

Power supply ripple or voltage fluctuations during keying will impair the note to a far lesser extent than if a master-oscillator were being used.

The circuit constants of a crystal controlled oscillator may be chosen for maximum output;

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with a master-oscillator they must be chosen to provide high stability of frequency with consequent reduction of output.

Note.—In an examination, each of the above advantages would be listed separately, numbered, say, from 1 to 6, and somewhat expanded by brief explanatory comments.

Give the circuit diagram of a 25-watt transmitter suitable for frequencies from 2 to 14 Mc/s. Explain briefly the function of the various parts.

A typical circuit is shown in Fig. 1. V1 is the oscillator valve, its frequency of oscillation being controlled by the crystal X in the grid circuit. L1C3 form the output circuit of this stage; the r.f. voltage developed across these two components is applied via the condenser C5 to the grid of the frequency-multiplying valve V2. The output of V2 appears across the circuit L2C8 which is tuned to the second, third or fourth harmonic, as required, of the crystal frequency. This frequency-multiplying stage drives the output valve, V3, which operates as an amplifier. L3C13 form the tank circuit of this amplifier and the output is transferred by inductive coupling to the dipole aerial via the coaxial feeder F, which should have a characteristic impedance of about 70 ohms. The length of the dipole aerial will depend on the output frequency.

Automatic grid bias is provided for the three valves by the flow of current through the grid resistors R1, R5 and R9. As such bias would disappear if V1 stopped oscillating, a small amount of protective bias is arranged for by the inclusion of the cathode resistors R2, R6 and R10. These serve to limit the anode currents to a reasonable figure in the circumstance mentioned.

A screen-grid or pentode valve is desirable in the oscillator stage to avoid excessive feed-back from the anode to the grid circuit. A type 6AG7 valve is suitable. A 6AG7 is also chosen for the frequency multiplier on account of its high gain.

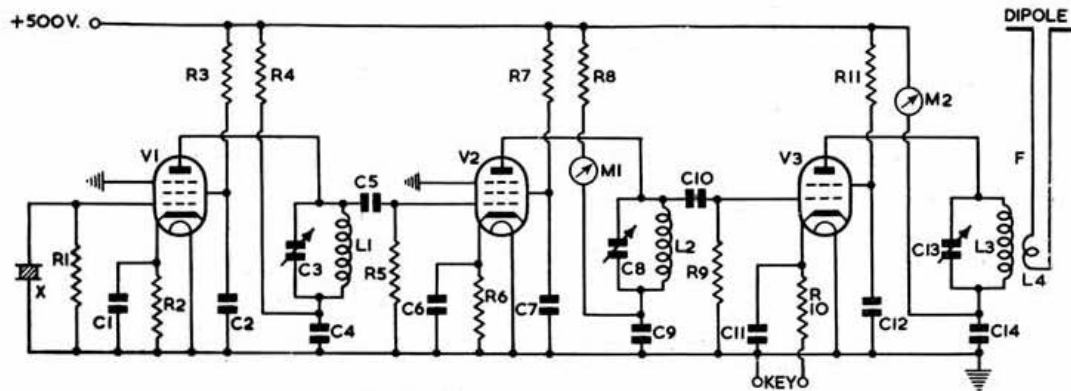


Fig. 1.—Simple three-stage transmitter.

C1, 2, 4, 6, 7, 9, 11, 12, 14
C3, 8, 13
C5, 10
0.005 μ F.
100 μ F variable.
100 μ F.

R1, 4
R2, 6, 10
R3, 7
R5, 9
R8
15,000 ohms.
250 ohms.
47,000 ohms.
30,000 ohms.
10,000 ohms.

R11
V1, 2
V3
F
25,000 ohms.
6AG7
807
70 ohms feeder.

Self-oscillation (other than parasitic oscillation) will not occur in this stage, since the anode is not tuned to the same frequency as the grid circuit.

As the circuit does not employ neutralisation, a screen-grid or pentode valve must be chosen for the amplifier stage in order to avoid feed-back from the anode to the grid circuit. A type 807 valve may be used where the lay-out incorporates good screening and by-passing, since this valve possesses a low anode-to-grid capacitance and an anode connection taken from the top of the glass envelope, well away from the grid lead at the base. Any tendency towards parasitic oscillations (which arise largely from resonances in anode or grid leads) may be checked by the inclusion of "stopper" resistors of about 20 ohms each in the control-grid and screen-grid leads where these leave the valve-holder.

For an input of 25 watts a voltage of 500 is applied to the amplifier anode. With all circuits tuned to resonance, the aerial coupling is increased until a reading of 50 mA is shown on the milliammeter M2. The voltage at the oscillator anode and at the frequency-multiplier anode is reduced to about 200 V and 250 V respectively by the resistors R4, R8. Screen voltages of about 150, 200 and 250 V are provided for the respective stages through resistors R3, R7, and R11.

Keying is effected by breaking the cathode circuit of the output valve. A voltage of 500 will exist across the contacts of the key when these are open, and a protective cover, or a keying relay, should be used for safety. To avoid key-clicks a choke of a few henrys inductance should be used in series with the key, and a condenser of about 0.01 μ F, with a series resistor of about 100 ohms, placed across the contacts to absorb the spark at "break." Some experiment with these values may be needed to achieve optimum key-click suppression.

Notes

1. To avoid risk of error in the examination, the simplest of crystal connections are shown. The reduced dimensions of some crystals may, in practice, make a more complicated arrangement of the grid-cathode circuit desirable.

2. The values of the voltage dropping resistors will depend on the valves chosen and may be calculated by dividing the excess voltage to be dropped by the current (expressed in amperes) drawn by the electrode to which they are connected.

3. If the question does not specify a three-

stage circuit the candidate can save time by omitting the frequency-multiplying stage and merely stating: "A frequency-multiplying stage may be provided between the crystal oscillator and the output stage. It could consist of a 6AG7 valve with connections as shown for the output stage, and operated at an anode voltage of about 300."

Give, and explain briefly, the circuit diagram of a master-oscillator suitable for driving an amateur transmitter. State the precautions taken to ensure good stability.

An *electron coupled oscillator* would be suitable and the circuit is given in Fig. 2. An indirectly heated pentode valve V is used, the grid and cathode forming the oscillatory electrodes. The frequency of oscillation is determined by the tuned circuits L1C2; C1 provides band-spread. These components must be of rigid and low-loss construction. The cathode is taken to a tap on L1. The screen-grid of the valve acts as anode of the oscillatory circuit and is maintained at earth potential to radio frequency currents by the by-pass condenser C4, while the suppressor grid of the valve is directly earthed. The electron flow from cathode to anode is varied by the oscillations as it passes through the grid and screen-grid, and the output is taken from the anode of the pentode by means of the tuned circuit L2C5. This should be tuned to a harmonic frequency to reduce undesirable feed-back. Anode components should be screened from those of the grid circuit. Variations in the tuning or loading of the anode circuit will have little effect on the frequency determined by L1C2, in view of the screening provided by the suppressor and screen-grid. Also, in a pentode valve, changes in anode voltage have only a slight effect on the anode current. The r.f. voltage developed across L2C5, is called the *excitation* or the *drive voltage* and is applied to the grid of the following stage by the coupling condenser C7.

High stability is achieved by the following design factors:

1. Rigid and low-loss construction of L1, C1, C2. 2. A large value of capacitance (500 μ F) for C2 to swamp small changes of capacitance arising through heating of the valve and tuning of the anode circuit. 3. Choice of a valve having good internal screening and consequent low anode-grid capacitance. 4. Careful screening between anode and grid circuits. 5. A fairly large capacitance (200 μ F) for the anode tuning condenser C5. 6. A low value for the coupling condenser C7. 7. Stabilisation of anode and screen voltages by means of voltage regulator valves. 8. Correct ratio of anode voltage to screen voltage. 9. Valve run at low input so that the heat produced by it and by components, such as voltage dropping resistors, is kept to a minimum. 10. Ample ventilation, or, in precision equipment, the temperature kept constant by a thermostat. 11. Rigid mounting of components, with protection from mechanical vibration.

Distinguish briefly between Class A, Class B and Class C amplifiers. In what applications may each be found in amateur stations?

In Class A amplifiers the grid bias is so chosen that the valve operates on the mid-point of the anode current/grid voltage curve. The input signal voltage is limited to such a value that grid current does not flow, nor is the point of anode current cut-off reached. The output is then a replica of the input voltage. This method of

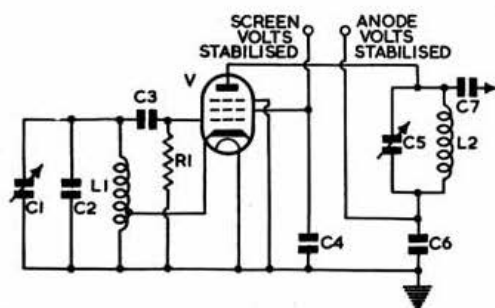


Fig. 2.—Basic Master Oscillator Circuit.

C1	50 μ F variable	C5	200 μ F
C2	500 μ F	C6	0.005 μ F
C3	100 μ F	C7	50 μ F
C4	0.005 μ F	R1	25,000 ohms

operation is found mainly in the early stages of audio amplifiers. Occasionally in r.f. applications a Class A amplifier is used to isolate a master-oscillator from keying fluctuations in subsequent stages. The efficiency is only about 25% but harmonic generation is a minimum.

In Class B amplifiers a greater amount of grid bias is applied so that the valve works almost on the point of anode current cut-off when no input signal is present. The output consists of positive half-waves, the negative half-waves of each cycle being almost entirely suppressed. Such operation is widely used in the output stages of audio amplifiers for powers in excess of 20 watts. For audio frequency work a single valve cannot be used, and a push-pull arrangement is essential. For radio frequency amplification a single valve may be used and an efficiency of around 50% is obtainable. Harmonic generation is greater than in Class A operation.

Class C amplifiers use a grid bias equal to at least twice that required to cut off anode current with no input signal. The negative half of each cycle is completely suppressed and the anode current flows only during part of each positive cycle. This type of operation cannot be used for audio frequency work, but allows the highest possible efficiency (around 70%) for telegraphy or for anode modulated output stages. Harmonic generation may be considerable and attention must be paid to the anode and aerial tuning arrangements to avoid harmonic radiation.

Note.—If time allows, the answer should include diagrams showing input and output voltage waveforms in the three cases. These diagrams may be found in pages 163-165 of *Electrical and Radio Notes for Wireless Operators*, to which reference has previously been made.

"Harmonic Radiation from External Non-Linear Systems"

AN article by Mack Seybold (W2RYI) of R.C.A. under the above title, in the January 1953 issue of *QST*, deals exhaustively with the problem of overcoming the last barrier to completely T.V.I.-proof operation in fringe areas. When all the usual precautions have failed to eliminate the final traces of T.V.I., the cause is likely to be due to external rectification by corroded joints in such items as pipes, gutters and roof drains, guy wires, receiving aerials (sound and TV), wiring, lightning arrestors, chains and light fixtures. Similar action may be produced by diode probes, hearing aids, radio and TV sets, neon bulbs, fluorescent lights and battery chargers. Methods of tracing offending articles (which may be almost anything, however unlikely, capable of acting as a rectifier) are described.

The Lazy Man's 59'er

MANY communication receivers are deficient in r.f. gain at 14 Mc/s, but a simple, ready-made solution is available in the ex-Government v.h.f. pre-amplifier, Ref. No. 10UB/6003—still available cheaply—which uses an EF54. Two screened cables, one for i.t. (6.3 V—brown and black wires) and the other for h.t. (250 V) are supplied for power input and Pye plugs for aerial input and output. When used in conjunction with an R208, and aligned at 14 Mc/s by means of the dust cores, a considerable increase in gain may be obtained. Due no doubt to the broad-band tuning, useful gain is also realised on

the other bands covered by this set. The unit is small enough to be installed inside many receiver cabinets B.R.S. 19252

The Late Ron Rogers (G6YR)

The T.R. for Southport, Mr. Peter Cawson, G2ART (113 Waterloo Road), will be glad to receive offers from members (not dealers) for any of the following items of equipment left by the late Ron Rogers, G6YR:

1 Indicator Unit type 96, complete but slightly soiled; 2 Westinghouse transformers, 115 V input—6.3 V 10 A, 6.3 V 0.6 A, 5 V c.t. 3 A and 850-0-850 V 142 mA, 65 V 142 mA; 1 TU9B, new; 1 R1355 with R.F. Unit type 24, complete; 1 Receiver P.38, soiled, less 2 r.f. valves; 1 Rectifier Power Unit PP-51/APQ-9, new; 1 Reel $\frac{1}{2}$ in co-axial cable, solid dielectric, approximately 20 yards; 1 Burgoyne solder gun, used; 1 Solon 65 watt soldering iron, 230 V, used; 1 Garrard Induction Motor Type 202A, used; 1 $\frac{1}{2}$ in Wolf Cub drill with lathe stand, etc., almost new; 1 Astro Compass Mk. II in box; 1 Crystal, 500 kc/s, $\frac{1}{2}$ in pin spacing; 1 Crystal, 3518 kc/s, $\frac{1}{2}$ in pin spacing; 1 Crystal, 500 kc/s, FT241A type holder; 1 Q.C.C. P5 crystal, 7010 kc/s; 1 Q.C.C. P5 crystal, 9690 kc/s; 1 Modulation Indicator Type 2. In addition, a large quantity of valves is for disposal.

Silent Keys

The death of Alfred Gibbon Burgess, G5RG, of Wembley, Middlesex, on December 26, 1952, removes from the ranks of Amateur Radio yet another Old Timer. Although young in years—he was only 42 at the time of his death—Alfred had been associated with the Society from about 1926.

His station was not particularly active in recent years, yet his interest in Amateur Radio remained as keen as when, as a young man, he co-operated in low-power and 5-metre experiments. He was a frequent visitor to Convention before the war and gave his support to local Society groups.

Mr. Burgess joined the G.P.O. at an early age and held executive office in the Engineering Department at the time of his death.

Our sympathies are extended to his widow and other relations.

The death last month of Henry ("Hank") B. Lockwood, W2HFS, of Hartsdale, New York, severs a link with R.S.G.B. Headquarters which was first forged during the time of the Atlantic City I.T.U. Conference in 1947. It was from W2HFS that the R.S.G.B. representatives to the Conference (Stanley Lewer, G6LJ, and John Clarricoats, G6CL) made their first contacts with England. In recognition of his outstanding services to the Society, the Council, later that year, presented to Mr. Lockwood a beautiful hand-made cigarette box.

Almost to the end of his life, in spite of grave illness, Hank's call was heard daily on the DX bands. When, a few weeks ago, Bill Parker, G6BY, was awarded the ROTAB Trophy for consistent work with W2HFS and other U.S. amateur stations, Harry Lockwood was among the first to offer him congratulations.

To Mrs. Katherine Lockwood and her family we offer our heartfelt sympathies. They may take comfort in the knowledge that the call W2HFS will always bring back in the minds of many hundreds of his friends the memory of a grand radio amateur. *Vale Hank.* J.C.

Those who work on the DX bands will be grieved to hear of the death of Roger Harrison, EL2R—one of a small group of enthusiasts who kept that rather out-of-the-way country on the air. Still a young man, he had travelled nearly all over the world and after serving at sea during the war was employed by Pan-American Airways. He had recently acquired a home in Liberia and was looking forward to being married in a few months' time.

Our sympathy is extended to his family, his fiancée, and to his uncle Mr. J. E. Catt, G5PS, who has brought the sad news to our notice. A.O.M.

A road accident in Wisconsin, U.S.A., was responsible for the recent death of Donald R. Small, G3ALI, of Wembley Park, Middlesex. Don served as Radio Officer with the Merchant Navy from 1940 to 1943, when he joined the Norwegian Merchant Service. Licensed in 1947 he was active on 14 and 28 Mc/s until leaving for the States in 1950. At the time of his death he was working as a telegraphist with a railroad company.

Our sympathies are offered to his relatives and close friends. D.R.W.

A Variable Delay Switching Unit

By T. R. SMITH (G3BMN)*

In certain circuits, particularly those concerned with mains rectification and power supply, a time delay is required in the switching sequence. The unit described in the following article is designed to provide this facility in a relatively foolproof manner.

THE usual methods employed to obtain a time delay in the switching of circuits involve either (i) a thermal-type switch using a bi-metallic bar to operate the contacts, or (ii) an electro-mechanical dashpot. Both systems have certain disadvantages, and the switch to be described was devised to overcome these. The facilities it offers may be summarised as follows:—

(a) The delay time may be varied between approximately five seconds and one minute;

(b) The power consumed while in use is low—about one watt;

(c) If the mains supply is interrupted, either accidentally or due to failure, the full delay period is available, however soon the supply is restored;

(d) The power requirements of the circuit to be switched can be catered for simply by the use of suitable contacts on the relay (contacts A3 in Fig. 1).

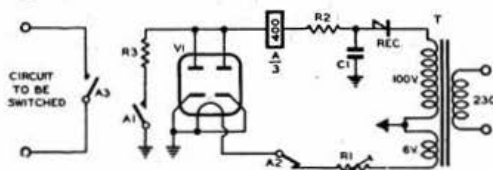


Fig. 1.—Circuit of the variable delay switching unit. R1, 30 ohms wire-wound variable; R2, 2,200 ohms $\frac{1}{2}$ W; R3, 6,800 ohms $\frac{1}{2}$ W; C1, 16 μ F electrolytic; V1, EB34 (VR54); REC, Rectifier RM1; T, see text.

Operation

Referring to Fig. 1, it will be seen that on applying 230 V a.c. to the primary of the transformer, current will be supplied to the diode heater and an h.t. supply of some 100 V will be available at the anode. The heater is fed via a variable resistor R1 and the contacts A2 of the relay. The anode is connected to the h.t. supply through the coil of the relay and a current limiting resistor R2.

After the required time delay, the diode cathode temperature reaches a value such that the current flow in the diode will cause the relay to operate; this in turn will actuate the three sets of contacts A1, A2 and A3, with the following results:—

(i) A1 connects resistor R3 to h.t., thus keeping the relay closed when the diode current ceases;

(ii) A2 disconnects the diode heater, allowing it to cool immediately and so ensuring a delay, however soon it may be required again;

(iii) A3 switches on the circuit for which the delay is required.

The unit is then in operation, the only power consumed being that required to operate the relay via resistors R2 and R3.

Components

The voltages required from the mains transformer may not be easily obtainable from the standard types. In the prototype, a medium-sized output transformer was converted with successful results; originally intended to be used with a 6V6

output stage, it was modified in the following manner:—

The primary was connected to a 230 V a.c. supply, and the open-circuit voltage across the secondary winding measured. Power was then disconnected. The iron core and the secondary winding were then removed, counting the number of turns. The turns per volt ratio were then determined. It is usually about 16 for this type of transformer.

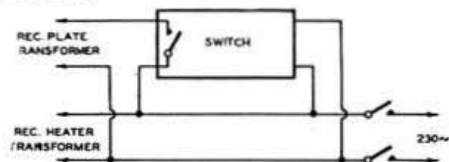


Fig. 2.—Schematic of typical delay switching circuit.

Since the power requirements for the two secondaries are quite small, sufficient space will be available to wind them on in place of the original secondary. The h.t. winding consists of 1500 turns of No. 40 s.w.g. enamelled wire, one strip of thin paper being inserted half way through the winding. The diode heater winding comprises 100 turns of No. 30 s.w.g. enamelled wire. Another layer of thin paper is placed between the two secondaries. The outer end of the h.t. winding and the beginning of the heater winding are joined and connected to chassis.

The relay used is of the "3000" type having a resistance of 400 ohms. Any suitable type may be used provided the operating current does not limit the diode current to less than that required to operate the relay. Resistor R2 should be adjusted to limit the diode current to a maximum of 16 mA. With the relay specified a resistance of 2200 ohms is correct.

Once operated it will be found that the current can be reduced and the relay will still "hold." Resistor R3 should therefore be of such a value that the current through the relay is sufficient to "hold" it with the diode inoperative, while keeping the current as low as possible to minimise power consumption. With a 400-ohm relay, R3 is 6800 ohms.

Resistor R1 controls the delay time of the unit. Where a fixed delay is required, it may be adjusted and left; if, however, different delay times are required, a pointer and dial can be fitted, the latter calibrated in seconds.⁽¹⁾

When used for switching mercury-vapour rectifiers, the supply to the transformer should be arranged to come on at the same time as the heater supply to the m.v. rectifiers. The main h.t. transformer is then switched by contacts A3. A typical schematic is shown in Fig. 2.

A final practical point: when mounting the relay, the contacts should be arranged so that dust will fall through and not settle on the contact points.

⁽¹⁾ The calibration of the dial should be checked periodically as the delay time will lengthen due to ageing of the valve.

Improved Stabilised Power Supply

By J. WOOD (G3VG)*

A STABILISED power supply has several important applications in Amateur Radio, especially in circuits where frequency stability is dependent to some extent upon h.t. stability, e.g. variable frequency oscillators. The power unit to be described has (i) a voltage stability of 200 (i.e. ratio of a.c. mains variation to d.c. voltage variation); (ii) a total ripple content of 6 mV peak-to-peak (or 2 mV r.m.s.); and (iii) a variation in d.c. voltage output of 0.5 V in 300 V for a change in load from zero to 80 mA.

a stabilising circuit and little smoothing is therefore required. The circuit of Fig. 1 is satisfactory for good stabilisation, giving a ripple comparable with that of a two-stage filter power supply.

Refinements

However, by slight circuit changes and additions it is possible to achieve greatly improved performance. The modified arrangement is illustrated in Fig. 2. A two-step filter is incorporated, the first being a parallel rejector circuit tuned to 100 c/s by a condenser (made up to 0.17 μ F by a selection of various capacities), and the second a normal choke-capacity filter.

The feed-back circuit from the grid of the amplifier valve via the 0.1 μ F condenser and the 1000-ohm and 100,000-ohm resistors reduces the output ripple by about half. The 1000-ohm potentiometer should be adjusted to give minimum ripple with the load in use; under these conditions the peak ripple is 2 mV r.m.s.

The maximum current that may be drawn is limited by the 807 stabilising valve, but two may be used in parallel, if desired, to obtain a current output of 160 mA. The voltage output of the rectifier should be about 400 V r.m.s., the required stabilised d.c. output voltage being adjusted by the potentiometer in the amplifier grid circuit.

In order to eliminate the slow drift of voltage output, the resistors in the chain R10, R11, R12, should be of close tolerance, one per cent., if possible.

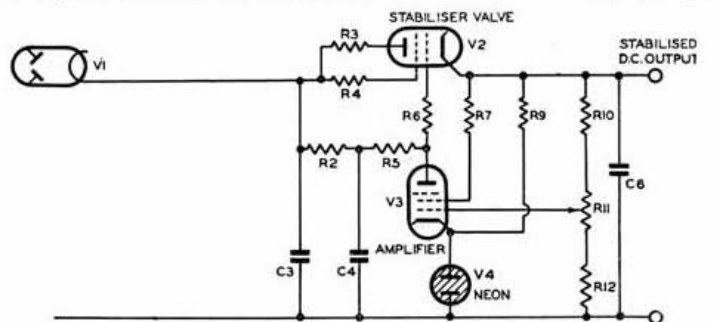


Fig. 1.—Circuit of conventional stabilised power supply, as in Fig. 2.

Circuit Details

The circuit most widely used is the series stabilising arrangement shown in Fig. 1, where the stabilising valve is in series with the d.c. source and the load. The action is as follows:

When the output voltage of the rectifier rises, the cathode voltage of the stabilising valve also rises, and this change is communicated to the grid of the amplifier valve whose cathode is held at

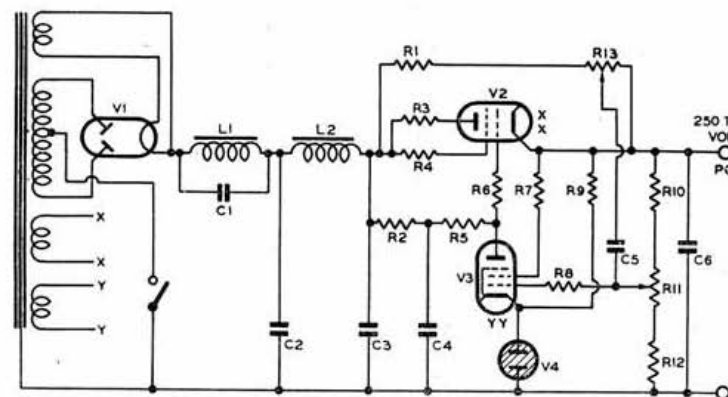


Fig. 2.
Circuit of the improved stabilised power supply.

C1	0.17 μ F (see text)
C2, 3	7 μ F
C4	2 μ F
C5	0.1 μ F
C6	8 μ F
R1, 2, 5	100,000 ohms
R3, 4	100 ohms
R6, 8	1,000 ohms
R7	10,000 ohms
R9	68,000 ohms
R10	200,000 ohms
R11	100,000 ohms potentiometer
R12	140,000 ohms
R13	1,000 ohms potentiometer
L1, 2	10 H
V1	5U4
V2	807
V3	SP61
V4	7475

constant potential by the voltage reference tube (a neon or similar valve). As the grid becomes more positive, a greater anode current is drawn through the anode load (two 100,000-ohm resistors in series) so that the anode becomes more negative; this decreasing voltage is then applied to the grid of the stabilising valve via a 1000-ohm resistor, resulting in a reduction of anode current and a decrease of cathode potential. For a drop in the rectifier output, the reverse action occurs.

Because of the stabilising action, a reduction in the output ripple voltage is an inherent feature of

* 5 Beechwood Avenue, Farnborough, Kent.

LONDON MEETINGS, 1953

All meetings are held at the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London, W.C.2. Buffet Tea from 5.30 p.m. Meetings commence at 6.30 p.m.

Friday, February 27, 1953: **Special General Meeting.**

Friday, March 20, 1953: **F. Charman, B.E.M., G6CJ.**

"V.H.F. AERIAL DEVELOPMENTS."

Bandsread on 21 Mc/s for the HRO

By A. H. MASON (GM6MS)*

ONE of the main reasons for the popularity of the National HRO receiver among amateurs is the excellent bandsread facilities on 3.5, 7, 14 and 28 Mc/s, each band covering the major portion of the tuning scale. Although the new 21 Mc/s band can be received by using the 14-30 Mc/s general-coverage coil set, the full frequency range of 21 to 21.45 Mc/s is contained within only twelve divisions of the tuning scale.

If, however, the reader is fortunate in having a 14-30 Mc/s general-coverage coil set in addition to the bandsread coils for 14 and 28 Mc/s, the following modification will enable him to obtain adequate bandsread operation on 21 Mc/s.

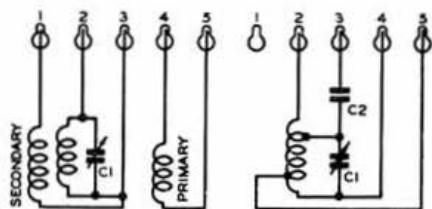


Fig. 1.—Connections for the 14-30 Mc/s g.c. coils before modification; (left) r.f. and mixer stages; (right) oscillator.

Materials Required.

No changes need be made to the receiver itself. The modifications are confined to the standard 14-30 Mc/s g.c. coil set, and the necessary series trimmers which have to be fitted can be taken from any of the following coil sets: 50-100 kc/s, 175-400 kc/s, 0.48-0.96 Mc/s and 0.9-2.05 Mc/s. Four 50 μ F silver-mica condensers of 5 per cent. tolerance are required to "set" the band.

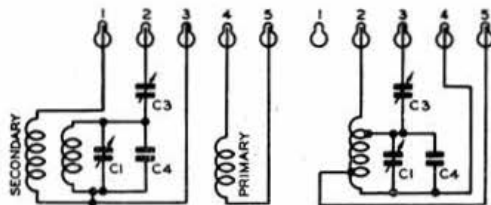


Fig. 2.—Coil connections after modification. The solder tag numbering corresponds to that used in the HRO

Circuit Arrangements

The original connections to the 14-30 Mc/s coils are illustrated in Fig. 1. Fig. 2 shows the modifications and additions. The condensers marked C1 are the original trimmers fitted to the coil set; those labelled C3 are taken from one of the i.f. coil sets and are used to adjust the amount of bandsread.

In order to obtain sufficient capacity across the coils to accommodate the 21 Mc/s band, the fixed 50 μ F condensers (C4) are connected in parallel with the band-setting trimmers (C1). The series tracking condenser C2 in the oscillator section may be discarded, as its place is taken by the variable trimmer C3.

The bandsreading trimmers should be removed from the i.f. coil set by melting the solder at the trimming slots and unscrewing the nuts while holding a screwdriver in the slot at the opposite

end of the condensers. Each should have five moving and not less than six fixed vanes; unwanted vanes can be removed by carefully bending them back and forward with a pair of long-nosed pliers until they break off.

After fitting the trimmers in the vacant spaces on the 14-30 Mc/s coil set, the nuts should be tightened so that the capacity can be adjusted with a trimming tool, leaving the movement fairly stiff. The slots in the nuts and screws should be in line. Finally, solder is run over the nuts and screw-heads to clear the trimming slots.

Aligning the High-Frequency Oscillator

After carrying out the modifications, plug-in the coil set and allow the receiver to warm up. Adjust trimmer C1 in the oscillator compartment so that 21.45 Mc/s peaks at 400 on the scale calibration. It is important that the oscillator should be on the h.f. side of the signal. Check the other end of the band at 21 Mc/s; if the scale reading is more than 20, decrease the value of C3 slightly and again tune-in 21.45 Mc/s at 400 on the scale by increasing the capacity of C1. By checking back and forward between the band-limit frequencies in this way, it will be possible to cover 380 scale divisions, provided C1 and C3 are correctly adjusted.

Signal Frequency Circuits

To align the r.f. circuits, set trimmers C1 and C3 in the r.f. and mixer compartments to approximately half-scale; then adjust each stage for maximum signal at 21 and 21.45 Mc/s in the following sequence: mixer, 2nd r.f., 1st r.f. Due to "pulling" between mixer and oscillator stages, it is advisable to tune by listening to background noise rather than to a signal. The r.f. stages should be aligned with the aid of a signal generator. In order to arrange for the bandsread to cover 380 scale divisions while keeping the response reasonably flat, it will be necessary to adjust both C1 and C3 in each stage as described for the oscillator section. Finally, the calibration at 20 and 400 on the HRO tuning scale should be checked; if it has altered, the h.f. oscillator trimmers need re-adjusting.

It should be noted that the coil set, after modification, is only suitable for the 21 Mc/s band, and will not cover the 14 and 28 Mc/s bands.

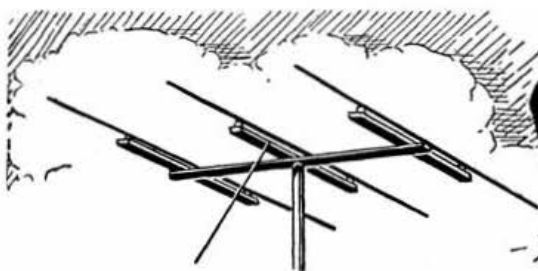
Appendix

Some difficulty may be experienced in removing the solder from the trimmers in the i.f. coil unit due to the old solder remaining in a thick plastic state. However, if it is heated with the usual 65-watt soldering iron, it will mix with new Multicore 60/40 solder to form a low melting point solder which may be shaken off the nut, then easily removable.

Low Gain in the HRO

LOW gain in a National HRO, using valves of the 6C6 type, was found to be due to the earthing tags throughout the receiver relying on the cutting action of the shake-proof washers to make contact with the chassis through the enamel. Removing the rivets and carefully scraping the chassis clean at these points materially improved performance.

* 390 Kingspark Avenue, Rutherglen, Glasgow.



AROUND THE V.H.F.'s

By W. H. ALLEN, M.B.E. (G2UJ)*

The Month on Two Metres

EARLY January is not a time of year when good conditions are expected on 2 m and it was all the more pleasant, therefore, when the band opened up before the middle of the month and a number of French and Belgian stations, as well as many in the Midlands and North of England, were heard at good strength at least in the London area and in the south-east of the country.

G6RH (Bexley, Kent) raised G3IOO (Oswestry, Salop) on the 10th at RS57 on 'phone and on the following evening heard G2PU, 3WW and 4MW, all in Cambridgeshire, at S9. On January 13 F8AA was contacted and ON4BZ (Brussels) heard. On the same evening G5NF (Farnham, Surrey) was getting S8/9 phone reports from France. G6RH followed up with G2FNW (Melton Mowbray, Leicester) on the 14th and G3IAL, 5RW, 5YV and 6YU on the succeeding evening. The 15th yielded some of the best results from France ever experienced by G3DIV (Eastbourne, Sussex) who regards at least those on the north coast as "locals"! He took part in what must have been one of the most extensive "round-table" QSOs ever to be held on the band with F3CA, 'JN, '8BY, 'GH, 'LO and 'NH all on 'phone and all reading one another for upwards of an hour. Two evenings later conditions still held good and a QSO was again effected with F3CA (50 miles east of Paris). ON4BZ was heard to say that he had received OZ2FR, OZ3IZ and SM7BE.

According to G8DV/A the band was open to the Midlands and as far north as the Mersey on the evening of January 19 when G3IOO (who by the way uses a v.f.o.) told him that there were a number of Cheshire stations active around 144.4 Mc/s.

Evidently the news of the band's sudden resurrection had spread and it was pleasant to hear and work a number of stations whose calls, once so familiar, had not been logged on 2 m for some months.

G2HIF (Wantage, Berks.)—active at the times he suggested in the December BULLETIN i.e. Sunday mornings and on Thursdays between 1900 and 2200 G.M.T.—found a small but satisfying increase in activity, particularly from the west and north-west. Whether this was due to improving conditions or more stations being active is not clear, but 100-mile contacts were certainly no rarity during December and January and included G3IOO, 5YV and 6CW. G3FAN (Ryde, I.O.W.) and 3GOP (Southampton), not so distant but shielded by 500 ft. hills, and G8SC (Malvern) on the other side of the Cotswolds, were also good signals.

G2HIF wishes to try other difficult paths and suggests that those interested should try and contact him on Thursday evenings between 2000 and 2200 G.M.T.

An example of sustained, and successful, activity hard to beat is G3WW's record of 1,019 contacts on 2 m during 1952 with 218 different stations. Recent QSOs included, among many others, G2ALL (Cambridge), 3FUL (Luton, Beds.), 3GJZ (Newmarket, Suffolk), 8MW—ex-DL2MW—(nr. Mansfield, Notts.), 8VR (Abbey Wood, London, S.E.) and 8WV (Hanslope, Bucks.). G3AVO/A, a doctor in the R.A.F., has moved from Royston, Herts. to Bassingbourne, Cambs.

G3BVU (Witney, Oxon.), having raised his beam to 28 ft. and improved his cascode converter, heard F8AA for about two hours on the evening of January 17 working London stations at the rate of one every ten minutes or so. His signal averaged RST 569 with some long-period fading. G4AP (Swindon, Wilts.) was a good signal on n.b.f.m.

Several French stations and ON4BZ were also heard by G2AHP (Perivale, Middx.) who, on turning his beam towards the west, found that conditions were also good in that direction and worked G3AUS (Torquay, Devon). G5ML (Coventry) was also worked by G2AHP who to date has a grand total on 2 m of no less than 335 stations. G3GJZ would appear to be the only Suffolk station at present active on the band and it is understood that he intends to improve his present aerial system as soon as the better weather arrives.

The V.H.F.s in Scotland

A daily sked between GM3EGW (Dunfermline, Fife) and G2FO (Stockton-on-Tees, Durham) has produced consistent, although often rather weak, signals over a difficult path. The time is normally 2300 hours, but depends upon when TV closes down. G3IOE and G4LX, both near Newcastle, have recently been worked: the frequency of the former is 144.55 Mc/s. GM3EGW agrees with the views expressed by G3WW in his letter in last month's BULLETIN regarding the *Short Wave Magazine* Two Metre Band-plan and finds it of assistance in reducing interference between local contacts and stations in more distant parts of the country.

V.h.f. activity in the east of Scotland is at present confined mainly to local contacts, several stations being located in Edinburgh. In the west the main interest seems to be 70 cm centred on Glasgow. Although so far free from causing TVI, GM3EGW suffers from it in reverse, the interference being in the form of T6 notes (at best) from harmonics of the local oscillators of nearby TV receivers and lies between 145 and 146 Mc/s.

Who Works on 70 cm?

G2RD (Wallington, Surrey) offers to try and answer that question for the London area by providing a monthly report on active calls compiled from those he hears and works and those heard and worked by his contacts. If a few mem-

* 32 Earls Road, Tunbridge Wells, Kent.

bers in other parts of the country would be good enough to do the same there would soon be available information which it is felt should be of interest to all 70 cm operators. In order that the list may record activity on the air please confine calls to those in actual operation. The list from G2RD covering January 1 to 19 is: G2DD, MV, QY, RD, WJ, 3ECA, FP, GDR, 4KD, RO, 5AA, CD, DT, RD, 6NF, YP, 8KZ.

A list from G2XV (Cambridge) reads as follows: Worked (between December 1 and January 24): G2FKZ, WJ, 3BKQ, 4MW. Heard: G3FUL, GDR and 5IG.

Until this month no one has sent in a score for the 70 cm Regional Ladder, but a bit of persuasion has now yielded one possible entrant, G2FKZ (London, S.E.), who has worked Regions 5, 6, 7 and 11. Is anyone else hiding his light under a bushel? With two or three entries we will put them in a "box" similar to the 2 m layout. Entries should include the number of Regions, stations and countries worked since July 1, 1952; four Regions are the minimum qualification.

Two-Metre Receivers

G6WU (Southgate, London, N.14) is running two stages of push-pull earthed grid triodes (Brimar 12AT7s) in his 2 m converter and finds that the signal-to-noise ratio is far better than he obtained from neutralised 6J6s. Even with the high gain available no difficulties have been encountered from instability once really good screening was put in and the 300 ohm input impedance of the first stage enables 300 ohm feeder to be connected directly to the cathodes without the need for any form of matching. On the subject of earthed cathode triodes which, of course, require neutralising, it does not seem to be generally appreciated that a neutralising adjustment, such that the stage does not actually oscillate, is not necessarily the position for optimum performance. A noise generator is almost essential if the lowest possible noise factor is to be achieved.

Some New American Valves

Now that TV channels have been assigned in the U.S.A. up to nearly 900 Mc/s, valve manufacturers have produced three new types suitable for use at these frequencies. These are the 6AF4 oscillator, 6AJ4 earthed grid triode amplifier and 6AM4 e.g.t. mixer. G5CD, who has been able to test samples of these valves, tried two of them in the 70 cm receiver which he described in the BULLETIN for July, 1951.

The 6AF4 proved a first rate oscillator up to 600 Mc/s where it produced 1 mA in a 10,000 ohm grid leak with only 50 volts on the anode. Above 750 Mc/s, however, the tuning circuit became very small and the indications were that at the upper limit of its frequency range the inductance would consist of little more than the tags on the valve holder. At 70 cm the 6AM4 as a mixer gave a gain of 9 db greater and as an r.f. amplifier about 1 db greater than the 6AJ4, while the noise factor of the receiver was improved by about 3 db by changing the two 6AJ4s for 6AM4s. An attractive feature of the latter is the fact that it requires only 1.25 volts peak from the oscillator for its maximum conversion conductance of approximately 2.3 mA/V. Unfortunately there is no indication at present of these types being manufactured in this country.

Reports for the March issue should arrive by February 21.

Regional V.H.F. Ladder

TWO-METRE BAND

To qualify for entry in the Two-Metre Regional V.H.F. Ladder, members must have worked stations in at least seven R.S.G.B. Regions since July 1, 1952. The rules, and a list of Regions and Counties or Areas forming them, were published on page 544 of the June, 1952, "Bulletin."

Psn.	Call & Location	Worked		
		Regions	Stations	Countries
1.	G3BW Whitehaven, Cumb.	15	63	5
2.	G3WW Wimbleton, Cambs.	14	227	9
3.	G5YV Leeds, Yorks.	13	212	9
4.	G2HIF Wantage, Berks.	13	109	7
5.	G5DS Surbiton, Surrey.	11	182	6
6.	G4RO St. Albans, Herts.	11	136	4
7.	G3FAN Ryde, I.O.W.	11	115	4
8.	G2FNW Melton Mowbray, Leics.	11	78	3
9.	G6LI Ludborough, Lincs.	11	59	6
10.	G2YB Caversham, Berks.	10	166	4
11.	G3FD London, N.14.	10	80	7
12.	G3HBW Wembley, Middx.	10	69	4
13.	G6XX Goole, Yorks.	10	63	3
14.	G6YU Coventry, Warks.	10	46	3
15.	G3CBO Denham, Bucks.	9	145	4
16.	G2AHP Perivale, Middx.	9	107	2
17.	G2FJR Sutton Bridge, Lincs.	9	83	3
18.	CW8UH Cardiff, Glam.	9	60	3
19.	G2DKH/P Stanley, Co. Durham.	9	45	4
20.	G3AGS Manchester 8.	9	36	3
21.	G3BHS Eastleigh, Hants.	9	35	2
22.	G5MR Hythe, Kent.	8	55	5
23.	G3FII Colchester, Essex.	8	42	6
24.	G3BVU Witney, Oxon.	8	42	1
25.	G3COP Southampton, Hants.	7	46	2

The Aberdeen Coronation Year Award

TO mark the Coronation of Her Majesty Queen Elizabeth, the Aberdeen Amateur Radio Society is to issue a certificate to any amateur who contacts four member stations of the Society between January 1st, 1953 and December 31st, 1953. To claim the certificate, the call-signs of the stations worked and the date and time of QSOs must be submitted.

In addition, licensed amateurs living in any other town named Aberdeen in the world will automatically be elected to Honorary Membership of the Society.

Claims should be sent, together with a remittance for 2/6 (50 cents Canada, U.S.A. and possessions) to Aberdeen Amateur Radio Society, 1-6 Blenheim Lane, Aberdeen, Scotland.

Sir Evan Nepean

CONGRATULATIONS are extended to Lt.-Col. Sir Evan Y. Nepean, R. Signals, G5YN, who recently succeeded to the family baronetcy. Sir Evan is due to sail on February 26 for Singapore, from where he hopes shortly to operate as VS1YN. Lt.-Col. Nepean was the first holder of the famous Tibet call-sign—AC4YN.

THE MONTH ON THE AIR

by A.O. Milne
G2MI

All-European Contest

It is a peculiar thing but this Contest does not seem to be very popular. Our Danish friends, who organised it last time, say that they have had a very poor response so far in the number of logs received. They have, in fact, prolonged the period for the reception of logs to February 15. Incidentally, the Contest Manager has forwarded to H.Q. a list of 168 British call signs that appear in the logs already received, but who have themselves not submitted a log. Even if you were not in the Contest as a participant, your log would be very useful for checking purposes.

U.S. phone

We are advised by the A.R.R.L. that as from February 20 A3 is authorised for U.S. stations between 7200 and 7300 kc/s. They are not yet authorised to use phone on the 21 Mc/s band.

Notes and News

G3IBN is being pestered by a pirate, who gives his call as G3IBN or G3IBN/A, and his QTH as either Bingley, Yorkshire (the home of the genuine G3IBN), or London, where the holder of the call has never operated.

Listen for "Ricky Barry's tea-time net"—Ricky being MP4HBK. One day recently the net included MP4HBK, HZ1MY, VS9AW, F9HE, VK2AGW, SU5EB, EQ3AL, VK3ZV, VK2ACV, W8GZ and T12TG.

G3ETQ thinks 14 hit an all-time low during early January. On 7, however, he managed to add SP, LX and 4X4 to his total.

G8PP recently raised FB8AD, who then worked a SM5; during this latter QSO the FB8 suddenly broke off and kept sending AS. After a long pause he came back and sent "Mail just received, official licence arrived. Call sign now FB8BE." He duly signed as FB8BE! G8PP is wondering if he will get a card and, if so, under which call!

YI3BZL (now G3BZL) c/o 27 Fountain Street, Leek, Staffs, complains of the very poor return for his own 100 per cent. QSL. He worked 110 countries whilst in Iraq, but has cards from only 64.

B.R.S. 7594 of Yeovil, commenting on the good conditions which have prevailed on 3.5, reports hearing KP4CP, FA8MV, VE1CN, JY1QW, W1, 2, 3, 4, 5 and 8, all between 2330 and 0100 G.M.T. He wants to know if G6YA/A, the Bristol Festival of Britain station, ever QSL'd. We don't remember O.M., but perhaps this will catch the eyes of the organisers.

Bob Pybus, who has temporarily forsaken the amateur bands to log the wealth of signals to be heard on the medium-wave broadcast band, says it is amusing to "dig out" a three or four layer frequency, i.e., an East Coast American goes off the air to reveal a Middle-Westerner on the same channel. He duly closes down and there underneath is a West Coast station.

* 29 Kechill Gardens, Hayes, Bromley, Kent.

G4FN contacted FR7ZA a few minutes before he left for a six months' visit to Paris.

G2DPY reports that W6DFY is a consistent signal on 7 Mc/s at 1600 G.M.T. daily. On one occasion he was 589. WJNE/VO6, also often heard, asks for cards to be sent to his home QTH. He will not be able to QSL until he returns as there is no mail service where he is at present.

KH6BB has been heard on 7 at 0100, calling CQ, but no one seemed to care, says G2DPY.

The licence position in Iraq has now been regularised mainly due to the efforts of Jerry Edwards, G3WH/Y13WH. The Iraqi P.M.G. now issues a licence which is easily obtainable by properly qualified persons for the equivalent of £5. Y13WH was the first licensee. Others in the same category are Y13BZL, Y12FD and Y12AM. Y13BZL still holds that call which remains current until September of this year.

B.R.S. 18017 (Warwick) questions the identity of KF3AA who worked an EA on 14 Mc/s. He stated that he was the operator of an American expedition at "Plateau Is., North Pole."

The unauthorised Chilean Antarctic stations now use CE9 calls. They, of course, should be ignored.

G3HTI and others have commented on our note last month about "Why 15?" They say "Why not 42?" Well, why—because we make one mistake—make another? If we all talked in frequency there would be no argument.

Top Band—

or should it be "Bottom Band"—has been the star turn this month. In fact, but for the old faithful, there would not have been much about which to write.

Starting with some of the really outstanding achievements, we record that G6AB, Holland-on-Sea, Essex, worked ZC4RX on 1867 kc/s at 2000 on January 22. ZC4RX was a solid 569 that evening and was later worked by G3HQQ. Answering our query of last month, G5PP says OH3NY has, in fact, worked 60 British counties on Top Band and already has 48 of them confirmed. G5PP will be working /P in Rutland on February 21 on approximately 1860 kc/s and hopes, later on, to be going to Radnor, Montgomery and Merioneth, possibly during the Easter holiday.

G6ZN (Wakefield) contacted K2ANR at 0645 on Sunday, January 11, getting 549 with only 3 watts input from dry batteries to a single-valve Hartley. He has also worked OK1, OK2, OK3, OH3NY, OH3PX, OH7OH and HA5BT (confirmed). G5MP has logged 25 transatlantic stations on 1.8 between 0600 and 0800 on Sundays, including VE1, W1, 2, 3, 4, 8 and 0. He has worked W0NWX, a distance of over 4,000 miles.

G3IRU (Sutton) has worked OH7OH (at 2104), GW3IHL, GM3JDR and G3IOS, all in the early evening, when most of the Eastern European DX seems to come in. He has been drawing a few rough graphs and finds that Eastern DX peaks up between 1930 and 2200, the British Isles DX

between 2300 and 2400 and 0100 and 0300. There is a deep trough between 0400 and 0530 when the Western DX shows up if conditions are right.

GM3JDR (Wick), pretty good DX for the U.K., has noted the best phones from England as G3GGN, G2DPZ, G4GA, G2AON, G2FTS, G4VZ, G3HYN and G3HRM. His bag on this band is OH2YV, 2NB, 3NY, 3PX, 3QR, 7OH, 7OC. His earliest QSO with OH3NY was at 1430. They are, of course, more or less locals to him!

A New Country

As a result of initial representations made by your scribe, the A.R.R.L. has advised us that they are prepared to add the Sultanate of Oman to the country list for DXCC. The announcement will appear in the March issue of *QST*. VS9AW has been very active there for some time, so quite a lot of people should be able to add one more to their score. The Sultanate of Oman is separate from Trucial Oman.

We are now trying to persuade the A.R.R.L. to consider the claims of Sicily (IT) and Ruanda-Urundi (OQ0) to be counted separately, but so far, despite support from *CQ* magazine, we have not been able to move them. Still, we live in hope.

W.A.Z.

We have suggested to *CQ* magazine that they might well adopt the idea which the Germans had for the W.A.E. Certificate and allow certain countries to count as substitutes for the Russian territories, which can no longer be worked. So far they are reluctant to do so. There are good arguments on both sides, and if we have any more news we will let you know.

Who's Who

Syd Lashley (VP6SD) will have left Barbados by now and will be active soon with a VE2 call. His new address will be c/o 351 Olivier Ave., Westmount, P.Q. He promised to QSL all VP6 contacts before he left.

Bob Tillett (G3HRT), who is a radio officer aboard *R.M.S. Ruahine*, recently called at Pitcairn Island. He says that VR6AC should be on 14 Mc/s phone and c.w. soon, and will be operated by Mr. McCoy, a descendant of one of the original settlers. Andrew Young, the original VR6AY, who operates ZBF, the Island's coast station, may also operate VR6AC from time to time.

Brian Levens (G3GUW) leaves shortly for Malaya. He is taking his equipment with him, so a new VS2 can be expected soon.

G3DPH (Ipswich) says that ST2AC is G3HEZ, also from Ipswich. He is active on 14 Mc/s phone and c.w. from 1300 to 1800 G.M.T. daily, using 40 watts. His QTH is A. E. Cullington, P. & T. Dept., Khartoum. According to G8KZ another new ST is ST2AR (ex-G4AR), whose address is A. E. Dowdeswell, Box 253, Khartoum. The QTH of AP2R (G3GJQ) is 583728, Cpl. Handley, P., R.A.F. Sqdn., Royal Pakistan Air Force, Drigh Road, Karachi.

Ken Ellis (HZ1KE/DL2KE) says that his logs have just caught up with him. Anyone still short of a card from any of his many aliases should re-QSL, giving full details.

G5VT says ZD4BK is ex-G2AHC. ZS5NF is portable in Zululand.

21 Mc/s

Nothing very startling has occurred this month. G3COJ, on phone, has worked CE3CZ, 1450; CR6AT, 'BX, both at 1500; OQ5HZ, 1235; TF3TP,

1345; 4X4CW, 1220; ZD9AA, 1100; and on c.w. CR7AF, 1125; FF8JC, 1445; OQ5BQ, 1045; TI2TG, 1340; VU2CQ, 1115; and ZS3K, 1140. He has heard 74 countries on this band and worked 41 of them. G2MI has worked 51.

DL2 QSL Cards

Cards for the undermentioned DL2 calls are held at G3IEZ and will be forwarded on receipt of suitable stamped, addressed envelopes. If not claimed within three months they will be destroyed.

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

HELP US...

- When writing to Headquarters do not include BULLETIN items, queries, changes of address and publication orders, etc., on the same sheet of paper. Only one envelope is necessary, but a separate sheet for each subject, please.
- Always print, or write clearly, your full name and address. Christian names, call-signs and illegible signatures cause much unnecessary checking.
- Notify Headquarters of impending changes of address several weeks before you move. Alterations to subscription reminders, etc., are not sufficient unless definite instructions are given. Include your B.R.S. number, and/or call sign, your present address and, if possible, the date your subscription falls due. Remember that BULLETIN wrappers are prepared up to a fortnight before the publication date.
- Please pay your subscriptions promptly when due. Failure to do so may result in the loss of valuable issues of the BULLETIN: high costs of production make it necessary to limit the number of extra copies printed each month.
- When forwarding your subscription renewal always return the reminder card sent to you from Headquarters, or, if this has been lost, indicate the month your subscription fell due.
- Please send all QSL cards to Mr. A. O. Milne, G2MI, 29 Kechill Gardens, Hayes, Bromley, Kent, and not to Headquarters.
- The Society is seldom able to supply information on ex-Government equipment except in the form of BULLETIN articles.

... TO HELP YOU!

The Ballycastle-Rathlin Experiments

An account of early experiments in wireless telegraphy during the closing years of the 19th century.

MUCH has been written about Rathlin Island, its treacherous waters, its rescues from storm-tossed ships, and, today, its famous Breeches Buoy Life-Saving Crew and R/T radio link with the mainland, which enables the island's population of 170 to give what help they can to distressed shipping. Before the days of Marconi, communication was confined to carrier pigeon; it was therefore appropriate that the Island, separated by eight miles of ocean from the town of Ballycastle on the mainland, should be selected as the site for a number of important experiments in the new science of radio communication.

The Pioneer Experiment

The very first experiment conducted on Rathlin, was not carried out by Marconi himself, but by his Chief Assistant, Mr. G. S. Kemp. The year was 1898.

Lloyds were in difficulties because their station at Torr Head was unable to report passing ships in conditions of bad visibility, although the vessels sailed close enough to Rathlin Island lighthouse to identify themselves by light or flag to the light-keepers. The Company therefore requested a demonstration of wireless telegraphy between Rathlin and Ballycastle to determine whether shipping reports could be passed back to the mainland during adverse conditions of visibility.

On July 6, 1898, the two stations were installed, and Mr. Kemp had instructed Signalman Donovan and his two sons at the lighthouse on Rathlin, and Mr. Byrne of Lloyds, on the operation of the equipment, when orders were received to dismantle everything for transport to Kingstown, where the apparatus was to be used for Marconi's famous reports to the *Dublin Express* on the Kingstown Regatta. On July 24, however, Mr. Kemp, accompanied by Mr. Glanville—a colleague who had been with Marconi at the regatta demonstration—returned to Ballycastle to continue the experiments. Glanville was put in charge of the station on the island.

The original Ballycastle station had been at the Coalyard, but during the next few days, Kemp used Glanville's signals to assist in selecting the best site for the Ballycastle aerial. This was finally erected between the spire of the Roman Catholic Church and a mast consisting of a crane jib borrowed from the coalyard. The operating cabin was a small room in a house on the cliff.

Radio Contact

Events moved swiftly. On August 22, Glanville fell down a cliff while investigating rock strata and was killed. Two days later, Kemp erected a new 104-ft. mast on the mainland, then went to Rathlin to finish work on the station, eventually returning to the mainland, but leaving Mr. Donovan to operate the island's station. Satisfactory communication was established and maintained throughout the day on August 26, ten ships being reported passing Rathlin in thick fog. Further successful tests were made during the following days.

The stations were finally dismantled on September 2.

* Carrowlavery, Arroy, County Antrim.

ber 2, after a long delay caused by rough weather which prevented boats from reaching the island.

Later Developments

A year later, further tests were carried out, based on the results of experiments made across the Bristol Channel. Parallel wires were erected at Ballycastle and Rathlin, the wire lengths being six miles and one and a half miles respectively. The experiments were conducted by Mr. Davis (an associate of Sir Oliver Lodge), Mr. J. E. Taylor of the Engineer-in-Chief's Office, G.P.O., and Mr. T. Patterson, a Post Office engineer.

On February 8, 1901, the G.P.O. handed over the stations for the establishment of a wireless telegraph service by Lloyds. Public telegrams were also handled, forty-six telegrams, in addition to press reports, were cleared on the opening day—an outstanding achievement in the early days of telegraphy. Mr. G. H. Scarlett, then Postmaster at Ballycastle, has the distinction of being the first Morse operator employed on a permanent wireless telegraph installation.

Equipment

During the experiments of 1898, the transmitters consisted of a plain spark-gap in series with the aerial-earth circuit, across which a condenser, charged by the output of an induction coil, was discharged to set up h.f. oscillations in the aerial-earth circuit. The installations were of a temporary character, and do not seem to have been photographed. The details of the tests described above are authenticated by Kemp's diary which he kept throughout his active life.

The equipment used in the permanent installations was designed by Sir William Preece, then Engineer-in-Chief, G.P.O. Preece's parallel inductance system was maintained in operation until 1905, when it was superseded by Marconi's apparatus. In 1935, radio telephony was introduced.

GW3BAZ Honoured

CONGRATULATIONS are due to Warrant Officer Jack Evans, GW3BAZ of Cardiff who was awarded the British Empire Medal in the New Year's Honours List for distinguished services to No. 3614 (County of Glamorgan) Fighter Control Unit, Royal Auxiliary Air Force. The citation refers to "the very high standard of his technical ability and his devotion to duty."

The Chief Technical Officer of No. 3614 F.C.U. is war-time Wing Commander Cyril Parsons, GW8NP.

The Army Wireless Reserve Squadron

THE training programme is now in operation and frequencies have been allocated for use throughout the year for practice procedure and traffic "nets." Other voluntary activities have also been arranged. There are still vacancies for operators and radio mechanics and excellent prospects of promotion exist for those who join now.

The Squadron's first annual camp will be held near Chester from June 13-27, 1953. Further information may be obtained from Major Haylock, G3ADZ, 230 Devonshire Avenue, Southsea, Hants.

Kingston Social

MORE than 100 members and their friends attended the Kingston and District Amateur Radio Society's first social on January 3, 1953. Among the guests were Leslie Cooper (G5LC)—performing his first official duty as President of the R.S.G.B.—and Mrs. Cooper, Council Member P. W. Winsford (G4DC) and Mrs. Winsford, and the South-West London D.R. Fred Lambeth (G2AIW) and Mrs. Lambeth. Due to a prior engagement, the General Secretary, who had been invited, could not attend.



Kingston Social

Left to right: R. S. Babbs, G3CVU (Hon. Secretary, K. and D.A.R.S.), P. W. Winsford, G4DC, V. L. Mayhead, G2ACA (Chairman, K. and D.A.R.S.), Leslie Cooper, G5LC, and Mrs. Cooper.

The visitors were warmly welcomed by the President (Mr. H. Falkner) and a bouquet was presented to Mrs. Cooper.

Mr. Cooper, in his reply, congratulated the organisers in providing a social function which the ladies could attend and expressed the hope that this practice would be widely extended. He also paid tribute to those who, so unsparingly, give their time to the organisation of the Amateur Radio movement. Mr. Cooper then presented the G2BN Cup to the 1952 winner, Graham King.

Entertainment was provided by Miss N. White (soprano), P. van Hoorn (bass) with Mrs. Wynne Canning (accompanist). A dancing display was presented by pupils of the Margaret Barnes School of Dancing after which Horace King and Betty mystified the audience with their magic. Music for dancing was played by Grace Spencer.

Irish Hamfest

THE V.H.F. Research Society of Ireland held its first Convention during the weekend of January 24, 1953, when events included a dinner in Dublin, followed by a meeting in Athlone on the Saturday. Both events were attended by some 50 amateurs from Eire and Northern Ireland, and by Messrs. F. Charman, G6CJ (Immediate Past President, R.S.G.B.) and W. H. Allen, G2UJ (V.H.F. Editor, R.S.G.B. BULLETIN) who, as guests of the V.H.F. Research Society, travelled over specially for the occasion.

The guests at the dinner included the Minister of Posts and Telegraphs (Mr. Childers), The Lord Mayor of Dublin (Senator A. Clarkin), Senator F. O'Donnell, Col. J. Devine (Director of Signals) and their wives. During the toasts, the Minister spoke highly of the amateurs, and also gave an interesting discourse on the future of broadcasting in Eire, including the possibilities of television and v.h.f. broadcasting. Replying to a toast to the R.S.G.B., proposed by Mr. H. Riley, EI2G, Mr. Charman spoke of the work of the R.S.G.B., the educational aspects of Amateur Radio, and of the need for international unity amongst amateurs. He also congratulated the Society on having united EI and GI, and on their successful co-operation with the National Society—the I.R.T.S. He concluded by offering them full encouragement and help from the R.S.G.B. in their v.h.f. work.

Events at the Athlone meeting included an hour's talk by Mr. Allen, G2UJ, on the practical aspects of v.h.f. work, followed by the famous "Aerial Circus" of G6CJ which arrived intact in spite of the efforts of the Customs! The proceedings lasted into the small hours, but the discussion which followed the lectures continued the whole of the following day on the 80-metre band!

With their hosts (EI2W and EI2G) the R.S.G.B. representatives were entertained to dinner by the Society; were received at the Mansion House by the Lord Mayor; at lunch at Curragh Camp by Captains Doyle, Alvey and McGoff (EI5C), and after a tour of the sights of Dublin, to lunch at the Senate by Senator O'Donnell, finally returning home somewhat overwhelmed by Irish hospitality, but full of vivid memories of their first four days in Eire. F.C.



V.H.F. Research Society of Ireland Convention [Photo courtesy "Irish Times"]
The Lord Mayor of Dublin (Senator A. Clarkin) making a presentation to Mr. F. Charman (G6CJ). Others in the group include Mr. H. L. Wilson (EI2W), Mr. W. H. Allen (G2UJ) and Mr. J. Reilly (EI2G).

London U.H.F. Group Dinner

THE first annual dinner of the London U.H.F. Group was held at the Bedford Corner Hotel, Tottenham Court Road, on January 15, 1953, when 35 members were present.

In his speech, the General Secretary (who was the guest of honour) stressed the importance of research work on the higher frequencies both for commercial as well as military use. Mr. Clarricoats instanced the difficulties experienced by the Services during the early days of the last war in finding men well trained in the fundamentals of radio science and with sufficient practical experience of electronics to undertake work on R.D.F. (later known as radar) and kindred projects. Those available were found, to a very large extent, among the ranks of the radio amateurs of this and other allied countries, who, due to their unique opportunities for building and operating various types of apparatus on the higher frequencies, were ideal material for training in the new wartime arts of scientific detection. By far their greatest asset was practical experience in the principles and practice of v.h.f. communication, then in its infancy so far as the majority of commercial firms were concerned.

Although everyone hoped that such a catastrophe would not again befall the world in our lifetime, not to prepare for it would put us, as a nation, in a similar position as we found ourselves before the last upheaval when we were still hoping for peace without being prepared for war. A future war would depend to an even greater extent upon radio and kindred techniques, and if such an emergency should arise it would require all the knowledge we could muster of v.h.f. and u.h.f. to cope with the design and operation of the apparatus rendered necessary in a world made smaller

by the development of the jet engine and faster-than-sound aircraft.

The chair was taken by Mr. Phil Thorogood (G4KD) who had the support of many prominent v.h.f. enthusiasts.

Following the dinner the company broke up into discussion groups.

The London U.H.F. Group meets at the Bedford Corner Hotel on the first Thursday evening of each month.
W. H. A.

LONDON MEMBERS' LUNCHEON CLUB

will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road.

At 12.30 p.m. on February 20, 1953.

Visiting amateurs especially welcome.
Telephone table reservations to HOL 7373 prior to day of luncheon.

The Television Society

THE following lecture meetings of the Television Society will be held at 164 Shaftesbury Avenue, London, W.C.2, commencing at 7 p.m. on the dates shown. February 27—"The Scanning Electron Microscope" (D. McMulian, Ph.D.). March 12—"Television Aerial Equipment" (N. M. Best). April 9—"Aspects of Programme Planning" (Cecil Madden, M.B.E.). May 7—"A delayed trigger oscilloscope" (R. Anderson and J. R. Smith). May 29—"A directly-driven line scan circuit" (E. Jones and K. Martin).

The Society's Annual Dinner will be held at the Dorchester Hotel on March 26 and the Fleming Memorial Lecture, details of which will be announced later, will be given on April 24. In June, the Society is to hold a meeting at which papers on "Fringe Reception" will be read.

Society News

Committees of the Council, 1953

THE following Members have been appointed to serve on the Committees of the Council for the current year:

Contests.—Messrs. E. S. Fish, G2HCZ; S. E. Fryer, G3ERO; C. J. Greenaway, G2LC; J. P. Hawker, G3VA; T. L. Herdman, G6HD; F. Hicks-Arnold, G6MB; W. H. Matthews, G2CD; A. W. Timme, G3CWW; R. Walker, G6QI; F. E. Woodhouse, G3DC.

Finance and Staff.—Messrs. C. H. L. Edwards, G8TL; D. A. Findlay, G3BZG; J. H. Hum, G5UM; A. O. Milne, G2MI; P. W. Winsford, G4DC.

G.P.O. Liaison.—Messrs. R. H. Hammans, G2IG and A. O. Milne, G2MI.

Membership and Representation.—Messrs. I. D. Auchterlonie, G6OM; H. A. Bartlett, G5QA; C. H. L. Edwards, G8TL; H. McConnell, GM2ACQ; and L. E. Newnham G6NZ.

Technical.—Messrs. W. H. Allen, G2UJ; F. Charman, G6CJ; H. A. M. Clark, G6OT; D. N. Corfield, G5CD; C. H. L. Edwards, G8TL; R. H. Hammans, G2IG; F. Hicks-Arnold, G6MB; J. H. Hum, G5UM; A. H. Koster, G3ECA; S. K. Lewer, G6LJ; and J. W. Mathews, G6LL.

The President is an ex-officio member of all Committees of the Council.

Region 1 Bureau Committee

THE Council has nominated Messrs. F. Charman, G6CJ; J. Clarricoats, G6CL; L. Cooper, G5LC; R. H. Hammans, G2IG; and A. O. Milne, G2MI, to serve on the I.A.R.U. Region 1 Bureau Committee for the current year.

London Lecture Meeting

FOLLOWING the Presidential Address at the Institution of Electrical Engineers on January 30, Mr. R. H. Hammans (G2IG) delivered a lecture on "Single Sideband Transmissions." Although the equipment demonstrated appeared to be somewhat complex, Mr. Hammans stressed that its manifold advantages could now be obtained from much simpler circuits, and he urged members to try the system which, he claimed, would replace ordinary amplitude modulation in the not far distant future.

Flood Disaster

THE Society records its thanks to the B.B.C. for including in News Bulletins throughout the morning of Wednesday, February 4, an appeal, made by Headquarters, to U.K. amateurs to keep off those frequencies in the 3.5-3.8 Mc/s band which were being used by the Dutch Amateur Radio Emergency Communications Service during the recent flood disaster.

The Society also records its thanks to the many public-spirited U.K. amateurs who co-operated with their local authorities and with Headquarters during the emergency.

National Field Day, 1953

Members are reminded that applications for N.F.D. permits may be made only by properly appointed T.R.s and A.R.s. Applications must reach Headquarters not later than April 2, 1953. N.F.D. Rules appear in the December, 1952, issue of the BULLETIN.

National Field Day, 1952

An error occurred in checking the entries for National Field Day, 1952, which resulted in the score for the Bury "A" station being shown incorrectly in the report published last September.

The correct score is 565 points, which gives Bury joint 66th place with Loughborough.

The Contests Committee regret this error and offer apologies to all concerned.

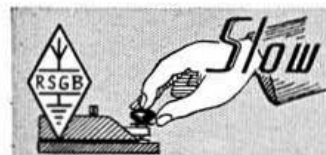
Helvetia 22 Contest

The annual Helvetia 22 Contest, organised by the U.S.K.A., will take place on March 14 and 15 (Telephony) and April 18 and 19 (Telegraphy). The usual certificates will be awarded to leading stations. A table listing the 22 Swiss cantons may be obtained from Dr. Bernard Plancherel (HB9FI), Medizinische Klinik, Inselspital, Berne, Switzerland.

Contests Diary

1953

March 28-29	B.E.R.U. (Telegraphy)
April 11-12	B.E.R.U. (Telephony)
May 3	D.F. Qualifying (Edgware)
May 9-10	144 Mc/s Open
May 31	D.F. Qualifying (Peterborough)
June 13-14	National Field Day
June 21	144 Mc/s Field Day (No. 1)
June 28	D.F. Qualifying (High Wycombe/Oxford)
August 16	D.F. Qualifying (Rugby/Slade)
August 30	144 Mc/s Field Day (No. 2)
September 6	Low Power Field Day
September 6	D.F. Qualifying (Romford/Southend)
September 13	420 Mc/s Tests
September 27	D.F. National Final
October 3-4	Low Power
November 7-8	"Top Band" (No. 2)



Slow Morse Practice Transmissions

The following slow Morse transmissions, sponsored by the Society, are intended to assist those who aspire to obtain an amateur transmitting licence. More volunteers are still required for parts of the British Isles not already covered, particularly in the London Area. Stations listed who find themselves unable to continue transmissions should immediately notify the organiser, Mr. C. H. L. Edwards, A.M.I.E.E (G8TL), 10 Chepstow Crescent, Newbury Park, Ilford, Essex.

* Each station will operate in turn.

G.M.T.	Call	kc/s.	Town	G.M.T.	Call	kc/s.	Town
Sundays				Wednesdays			
09.00	G3LP	1850	Cheltenham	14.00	G3ADZ	1910	Southsea
10.00	G6MH	1990	Southend-on-Sea	19.00	G3ADZ	1900	Southsea
	G3AAZ	1780	Welwyn	19.30	G3HBX	1870	Warwick
10.30	G3EPK				G6XA		
	G3EWG			21.30	G3HXC	1770	Birmingham
	G5UM			22.00	G3DLC	1800	Grays, Essex
10.30	G3GIO	1915	Guildford	22.00	G3HXX	1850	Cambridge, Glos.
	G3CYS	1990	Pontefract	22.00	G3GIO	1915	Guildford
	G3ESP			22.45	GM3GUS	1800	Dunfermline
10.30	G3HCX						
	G3HNC			Thursdays			
	G3IDT			19.00	G3NC	1825	Swindon
	G3US				G2DOF	1830	S. Birmingham
11.00	G2FXA	1900	Stockton-on-Tees		G3DTG		
12.00	G15UR	1860	Belfast	19.30	G3ENH		
14.00	G5AM	1900	Witnesham.		G6KI		
			Ipswich		G8JI		
21.00	G2FIX	1812	Nr. Salisbury	20.00	G3FVH	1920	Hull, Yorks
Mondays				20.30	GW3BKP	1745	Wrexham
19.00	G3NC	1825	Swindon	21.30	G6DL	1760	Birmingham
	G3BFP	1875	Croydon	21.30	G3ICX	1900	Sutton Coldfield
20.30	G3BLP			22.00	G2NK	1730	St. Mary Cray
	G6LX			22.00	G3GIO	1915	Guildford
21.00	G3BHS	1720	Eastleigh, Hants	22.00	G3IFX	1910	Derby
21.00	G3BLN	1900	Bournemouth	22.30	G3OB	1803	Manchester
22.00	G3GIO	1915	Guildford	23.00	G3LA	1915	Brentwood
22.15	G2BRH	1900	Ilford		G4AK		
22.30	G8TL	1896	Ilford				
Tuesdays				Fridays			
18.30	G2FXA	1900	Stockton-on-Tees	19.00	G3BLN	1900	Bournemouth
19.00	G3IBL	1883	Derby	20.00	G3CSG	1870	Wirral
	G3HGY	1815	Coventry	21.00	G3BHS	1720	Eastleigh, Hants
19.30	G5PP			22.00	G3GIO	1915	Guildford
	G5SK						
20.30	GW3BKP	1745	Wrexham	Saturdays			
21.00	G3EFA	1855	Southport	09.30	G3ICX	1800	Sutton Coldfield
22.00	G3ELG	1772	Rotherham	13.00	G2FXA	1900	Stockton-on-Tees
22.00	G2BND	1890	Daiston, E.	14.00	G3ADZ	1910	Southsea
22.00	G3GIO	1915	Guildford	22.00	G3GIO	1915	Guildford
23.00	G2XG	1735	Chingford				

MEMBERS USING THIS SERVICE ARE REQUESTED TO SEND LISTENER REPORTS TO THE STATIONS CONCERNED

COUNCIL PROCEEDINGS

Résumé of the Minutes of the Proceedings at the Meeting of the Council of the Incorporated Radio Society of Great Britain held at New Ruskin House, Little Russell Street, London, W.C.1, on Thursday, December 18, 1952, at 6 p.m.

Present.—The President (Mr. F. Charnin in the Chair), Messrs. H. A. Bartlett, L. Cooper, C. H. L. Edwards, D. A. Findlay, T. L. Herdman, J. H. Hum, F. G. Lambeth, H. McConnell, A. O. Milne, R. Walker and John Clarricoats (General Secretary).

Apologies.—Apologies for absence were submitted on behalf of Messrs. W. A. Scarr and P. W. Winsford (who was ill).

* * *

Membership.

Resolved:—

- (a) to elect 91 Corporate Members and 41 Associates;
- (b) to grant Corporate Membership to 5 Associates who had applied for transfer.

Affiliated Societies.

Resolved:—

- (a) that as from January 1, 1953, the annual subscriptions payable by Affiliated Societies shall be £1 1s.;
- (b) that every Affiliated Society shall be entitled to receive one free copy of the BULLETIN each month.

Empire DX Certificates.

Resolved:—

- (a) to accept an offer to produce Empire DX Certificates by hand, at a cost of £2 12s. 6d. per certificate;
- (b) to review the position when a grand total of 100 certificates has been produced.

It was reported that 72 certificates had been produced to date.

Annual and Special General Meetings.

Matters relating to the Annual and Special General Meetings to be held on December 19, 1952, were discussed and decisions reached.

Proxy Forms.

Resolved not to accept 38 proxy forms received less than 48 hours prior to the time of holding the Annual General Meeting.

London O.R.M.

The Secretary was instructed to thank the London R.R. (Mr. W. H. Matthews) on behalf of the Council, for submitting a Report on the recent London O.R.M. and to express regret that incorrect information was given, inadvertently, at the meeting, in answer to a question about affiliated societies.

C.C.I.R. 7th Reunion.

The Secretary reported that the 7th Reunion of the International Radio Consultative Committee (C.C.I.R.) is due to open at Lancaster House, London, on September 3, 1953, and is expected to last for about one month. At a recent meeting of the British General Purposes Committee, of which Committee he is a member, he (the Secretary) had expressed the opinion that the Council would, no doubt, be glad to make arrangements for a meeting with the Amateur Radio delegates to the Reunion.

Resolved to take steps at the appropriate time to arrange a meeting with the Amateur Radio delegates in attendance at the Reunion.

Society's 40th Anniversary.

The Secretary suggested that the Council may like to consider the question of arranging a social function—possibly a dinner—in London to commemorate the 40th Anniversary of the founding of the Society (as the London Wireless Club) on July 5, 1913.

Resolved to adopt the suggestion put forward by the Secretary that the 40th Anniversary of the foundation of the Society be celebrated by the holding of a formal dinner in London during July or September, 1953.

The Secretary was authorised to make such preliminary enquiries as he may consider to be desirable.

Coronation Relay.

The Secretary suggested that the Council may like to consider the question of organising a Coronation Relay to mark the occasion of Her Majesty's Coronation. Messages would emanate from Presidents of National Radio Societies and Chairmen of local Radio Groups, Branches and Societies, and would be sent to R.S.G.B. Headquarters via Amateur Radio channels. The Secretary indicated that the Coronation Relay (if arranged) would revive the tradition of the Loyal Relay which was an important feature of Society activities during the time H.R.H. The Prince of Wales, K.G. (now H.R.H. The Duke of Windsor, K.G.), was Patron of the Society.

Resolved:—

- (a) to adopt the suggestion put forward by the Secretary that a Coronation Relay be organised by the Society to mark the occasion of Her Majesty's Coronation;
- (b) that Mr. H. A. Bartlett be appointed to act as Coronation Relay Organiser.

Loyal Address.

The Secretary suggested and it was resolved unanimously, that a Loyal Address be presented to Her Majesty, Queen Elizabeth II, on the occasion of her Coronation.

Amateur Radio Exhibition.

The Secretary reported that a direct profit of approximately £75 was expected to accrue from the Exhibition. In addition an indirect profit would accrue from the sale of publications, sales items and subscriptions to foreign journals. Approximately 2,700 persons paid for admission to the Exhibition.

Resolved:—

- (a) as a token of appreciation, to offer to pay the subscriptions, when due, of seven members who had rendered special service to the Society at the Exhibition;
- (b) to thank the Exhibition Manager (Mr. H. Freeman) for his valued services to the Society.

Consideration was given to the following resolution passed at a meeting of members held in Mansfield on December 7, 1952:—

"That future Annual Amateur Radio Exhibitions be held at the same time as the National Radio Shows and, if space permits, in the same building."

Resolved to inform the Region 4 Representative (Dr. E. S. G. K. Vance) that the Council is of the opinion that it would be a serious mistake to change the existing arrangements for R.S.G.B. Amateur Radio Exhibitions.

The Secretary was instructed to explain to Mr. Vance that the Royal Hotel has become an established venue for the Exhibition which is now one of the chief social events in the Society year. The intimate atmosphere created at the Royal Hotel would be lost if the Exhibition became part of the National Radio Show.

V.H.F. Research Society of Ireland.

The Council noted with pleasure that the Council of the V.H.F. Research Society of Ireland had decided to accord Honorary Membership to the present and future Presidents of the R.S.G.B.

Subscriptions.

Consideration was given to the following resolution passed at a meeting of members held in Bristol:—

"That this meeting considers that from the point of view of efficient administration and economy it would be preferable if the subscriptions of all members became due on a fixed date annually, provided the date chosen was not at the end of the year."

Resolved to refer the resolution to the Membership and Representation Committee for its consideration.

Novice and Technician Licences.

It was reported that the Wireless Institute of Australia were anxious to learn the views of the R.S.G.B. on the question of Novice and Technician Licences.

The Secretary's reply, in which he explained, *inter alia*, that a previous Council had expressed itself as not being in favour of adding to the already congested state of the ether in Europe by asking the G.P.O. to issue Novice Licences, was approved.

Cash Account.

Resolved to accept and adopt the Cash Account for November, as submitted by the Hon. Treasurer.

Financial Position.

Mr. Findlay reviewed, briefly, the financial position of the Society as at November 30, 1952, and stated that the estimated deficit for the current year would probably be somewhat less than for the previous year. Expenditure had been reduced as the result of economies in certain directions. Mr. Findlay emphasised that his estimates were based on the assumption that the Special Resolution would be adopted at the Special General Meeting on December 19th, 1952, and that the fall in membership would not be appreciably greater than he had predicted. Mr. Findlay gave details of estimated income if subscription rates different from those set out in the Special Resolution were adopted.

The Secretary reported that, as from the December issue of the BULLETIN, approximately £25 per month would be saved as the result of a fall in paper prices.

QSL Bureau.

Resolved to award honoraria in the total sum of £70 7s. to 14 QSL Sub-Managers in appreciation of their voluntary services to the Society during 1952.

Call Book Editor.

Resolved to make a suitable presentation to Mr. John Tyndall and his wife in recognition of their valuable services to the Society in connection with the R.S.G.B. Amateur Radio Call Book.

Staff Christmas Boxes.

The Chairman of the Finance and Staff Committee (Mr. Cooper) reminded the Council that it had been the custom in past years at Christmas time to recognise the services of the established members of the staff by making them a gift in kind equivalent to a week's salary. This year

only four out of the seven members of the staff would qualify for such recognition. Mr. Findlay expressed the view that, because of the Society's financial position, no Christmas Boxes should be awarded for the current year.

Resolved to recognise the services of those members of the staff with more than 12 months' service by making them a gift in kind of National Savings Certificates or Tokens, to the value of one week's salary each, in lieu of a Christmas present.

Articles of Association.

Resolved to hold a Special Meeting of the Council on Monday, December 29, 1952, at 6 p.m., for the purpose of preparing a final draft of the revised Articles of Association for submission to the Board of Trade.

The meeting terminated at 10 p.m.

Resumé of the Proceedings at a Special Meeting of the Council of the Incorporated Radio Society of Great Britain held at New Ruskin House, Little Russell Street, London, W.C.1, on Monday, December 29, 1952, at 6 p.m.

Present.—The President (Mr. F. Charman in the Chair), Messrs. H. A. Bartlett, L. Cooper, C. H. L. Edwards, D. A. Findlay, T. L. Herdman, J. H. Hum, F. G. Lambeth, A. O. Milne, R. Walker, P. W. Winsford and John Clarricoats (General Secretary).

An apology for absence was submitted on behalf of Mr. W. A. Scarr.

* * *

Purpose of Meeting.

The President explained that the primary purpose of the meeting was to prepare a final draft of the revised Articles of Association for submission to the Board of Trade. In addition the meeting would be asked to consider certain matters arising from the recent Special General Meeting held on December 19, 1952.

Articles of Association.

The President submitted the Report of a Meeting of the *Ad Hoc* Committee which was appointed to examine correspondence received from members.

Arising from a consideration of the Report it was resolved to amend the printed draft of the Articles as follows:

Article 9 to read:

"Vice-Presidents shall be Corporate Members who have rendered outstanding service to the Society. Distinguished persons shall be eligible for election as Honorary Vice-Presidents."

Article 11. Add the words:

"On reaching the age of 21 years every Associate must apply for transfer to Corporate Membership. Persons holding a transmitting licence shall not be eligible for Non-Corporate Membership."

Article 16 to read:

"No entry, other than name, address and date, shall be made or kept in the records of the Society relating to any candidate whose application is rejected."

Article 19 to read:

"The Annual subscription shall be £1 10s. for Home Corporate Members, £1 1s. for Corporate Members residing outside the United Kingdom of Great Britain and Northern Ireland, the Channel Islands and the Isle of Man, and 15s. for Associates or such lesser sums as the Council may decide from time to time. Corporate Members shall pay an Entrance Fee of 10s. upon admission."

Article 27 to read:

"The affairs of the Society shall be managed by a Council consisting of

- The President,
- The Immediate Past-President,
- The Penultimate Past-President,
- The Executive Vice-President,
- The Honorary Treasurer,

seven ordinary elected Members and not exceeding six other Members each representing one of six zones comprising the United Kingdom of Great Britain and Northern Ireland. The zonal boundaries shall be determined by the Council and may be changed from time to time."

Article 28. Amend to read:

"All Council Members . . . Each year one third of the Council Members . . . The Council Members to retire . . . Council Members shall be eligible . . ."

Article 60. Amend first sentence to read:

"The Society shall, at each Annual General Meeting, confirm the appointment of properly qualified auditors . . . The President informed the meeting that the Members of the *Ad Hoc* Committee had, individually, read every letter received from members relating to the revised Articles of Association."

Resolved to receive, approve and adopt the Report of the Committee.

Special General Meeting.

Resolved to approve for publication the Minutes and Report of the Special General Meeting.

Letter of Resignation from Mr. McConnell.

The Secretary reported that, following the defeat of the

Special Resolution at the Meeting on December 19, 1952, Mr. Hugh McConnell, GM2ACQ, had, publicly, announced his intention to resign from the 1952 and 1953 Councils. Mr. McConnell had subsequently confirmed his decision to resign in writing. Mr. McConnell had also submitted for publication a "Letter to the Editor" setting out the reasons which had prompted him to resign from the Council.

Resolved to accept, with much regret, Mr. McConnell's resignation from the 1952 Council.

The Secretary was instructed to explain to Mr. McConnell that the question of his resignation from the 1953 Council would be a matter for the consideration of that body.

Resolved:—

(a) to place on record the thanks of the Council to Mr. McConnell for his valuable services to the Society during the year 1952;

(b) to authorise publication, in the Correspondence columns of the R.S.G.B. BULLETIN, of Mr. McConnell's "Letter to the Editor."

The Secretary submitted, for the consideration of the Council, an Editorial dealing with the financial position of the Society which had been prepared by the Hon. Editor.

Resolved to authorise publication of the Editorial in the January issue of the R.S.G.B. BULLETIN.

Further Special General Meeting.

After general discussion it was resolved:—

(a) to hold a Special General Meeting of the Society at the Institution of Electrical Engineers, Savoy Place, London, W.C.2, on Friday, February 27, 1953, at 6.30 p.m.;

(b) to submit to that meeting a Special Resolution relating to Articles 19 and 27;

(c) to recommend to the membership at the Special General Meeting that Article 19 be amended to read:

"The annual subscription shall be £1 10s. for Home Corporate Members, £1 1s. for Corporate Members residing outside the United Kingdom of Great Britain and Northern Ireland, the Channel Islands and the Isle of Man, and 15s. for Associates or such lesser sums as the Council may decide from time to time. Corporate Members shall pay an Entrance Fee of 10s. upon admission."

Retiring Members of Council.

Messrs. Herdman, Lambeth and Walker (retiring members of Council) expressed their pleasure at having been privileged to serve on the Governing Body of the Society and of the help they had received from the General Secretary and his staff. Mr. Cooper expressed his personal regrets that the Council would, during his year of office, be deprived of the assistance of Members who had rendered yeoman service to the Society. The President thanked the Members of Council for their loyal support and spoke of the unity which had existed during the year. He had endeavoured at all times to do his best for the Society.

Mr. Cooper, speaking on behalf of his colleagues, thanked Mr. Charman for his services during the year. Reference was also made to the mark which the President had left in the field of International Amateur Radio.

The meeting terminated at 10 p.m.

Side Slip

THE call-signs of the three sightless amateurs shown in the picture on page 292 of the January issue are, from left to right, G3ILU, G3ILT, G3IWC. The caption reversed the order of G3ILU and G3ILT.

Thought for Today

If you are a Home Corporate Member, your subscription to the Society will cost you

1d.

A DAY

if the rate of 30/- p.a. is accepted

Is this really too much?

Regional and Club News

BARNSELY & DISTRICT AMATEUR RADIO CLUB.—Nearly 60 amateurs with their wives and friends attended the Annual Dinner held on January 10. A draw for prizes donated by radio and electrical concerns was much appreciated. Meetings are held at the King George Hotel, Peel Street. *Hon. Secretary:* P. Carbutt (G2AFV), 33 Woodstock Road, Barnsley.

BRIGHTON & DISTRICT RADIO CLUB.—At the A.G.M. on January 6, the following members took office: *Chairman:* C. T. Fairchild; *Vice-Chairman:* R. T. Henley; *Hon. Secretary:* R. T. Parsons, 14 Carlyle Avenue, Brighton 7; *Hon. Treasurer:* W. Pitfield; *Committee Member:* F. R. Jupp. Forthcoming lectures include talks on "Tape and Disc Recording" (February 17) and "Radio Autobiography" (March 3).

BRISTOL.—At the January meeting a committee was elected to make plans for N.F.D. A lecture on wideband couplers by R. G. Lane (G2BYA) was well received. H. J. Gratton (G6GN) was the winner of the local c.w. contest, with D. V. Newport (G3CHW) second.

CAMBRIDGE & DISTRICT AMATEUR RADIO CLUB. Meetings continue to be well attended and visitors are always welcome. *Hon. Secretary:* T. A. T. Davies (G2ALL), Meadow Side, Comberton, Cambridge.

CHELTHAM.—Meetings are held at 128 Prestbury Road on the first Thursday in each month at 8 p.m. A comprehensive programme has been arranged and preparations for N.F.D. are under way.

COVENTRY.—A 70 c.m. transmitter using a CV6 valve aroused considerable interest at the January meeting. The Group's first annual dinner was held recently and proved very successful. Informal meetings are to be held at members' homes; local members are invited to visit the T.R. (G6TD) on March 13 at 7.30 p.m.

COVENTRY AMATEUR RADIO SOCIETY.—Meetings will be held at the Y.W.C.A., Queen's Road, on February 16 ("Test Equipment"), March 2 ("Application of Wave-meters") and March 16 (Lecture by J. Hanson, G6YU). The 21st Annual Dinner will take place on February 27 at the "Hare and Squirrel." Tickets from the *Hon. Secretary:* K. Lines, 142 Shorncliffe Road, Coventry.

DERBY & DISTRICT AMATEUR RADIO SOCIETY.—The Annual Dinner will take place at "The Irongates," Derby, on February 27. Meetings are held every Wednesday at 7.30 p.m. at the School of Arts and Crafts, Green Lane. *Hon. Secretary:* F. C. Ward (G2CVV), 5 Uplands Avenue, Littleover, Derby.

DULWICH & NEW CROSS.—Meetings are now held on the first Tuesday in the month at the "Walmer Castle," 102 Peckham Road, Peckham, S.E.15. A "Junk Sale" is arranged for March 3 at 7.45 p.m.

EDINBURGH AMATEUR RADIO CLUB.—The Club now has its own premises at 16 Bothwell Street (downstairs), off Easter Road. Meetings are held every Wednesday at 7.30 p.m. and full details may be obtained from the *Hon. Secretary:* D. Black (B.R.S. 3300), 16 Edina Place, Edinburgh.

GLOUCESTER RADIO CLUB.—Meetings are now held at "The Cedars," Hucclecote Road (near "Waggon and Horses") on Thursdays.

ISLE OF MAN AMATEUR RADIO SOCIETY.—Meetings are held on the first Wednesday in each month at Broadway House, Douglas, to which local members and visitors are welcome. *Hon. Secretary:* R. S. Trickey (GD3DRB), "Aigburth," Sunningdale Drive, Onchan.

PORTSMOUTH & DISTRICT RADIO SOCIETY.—At the recent A.G.M., L. B. Rooms (G8BU), 51 Locksway Road, Milton, Portsmouth, was elected *Hon. Secretary* for 1953. The Chairman and Life Vice-President (L. E. Newnham, G6NZ) was congratulated on being elected to the R.S.G.B. Council. Meetings take place on Tuesdays (7.30 p.m.) at the Signal School, R.M. Barracks, Eastney. New members will be welcomed.

PLYMOUTH.—The Annual Dinner Dance was held at the Connaught Rooms on January 16. The event was a great success, thanks to the efforts of Mr. and Mrs. C. Teale.

SALISBURY & DISTRICT SHORT WAVE CLUB.—A demonstration in connection with the proposed local Scout net was given recently by members of the club to the 10th Salisbury Rover Crew. Meetings are held every Tuesday at 7.30 p.m. *Hon. Secretary:* V. G. Page (G3IVP), 32 Feversham Road, Salisbury.

SLADE RADIO SOCIETY.—Meetings will be held at the Church House, Erdington, on February 20 (Film Show).

R.S.G.B. BULLETIN, February, 1953.

February 27 (Special D/F evening) and March 6 (Talk on Radio Fundamentals). Meetings commence at 7.45 p.m. and visitors are welcome. *Hon. Secretary:* C. N. Smart, 110 Woolmore Road, Erdington, Birmingham 23.

SOUTH WEST ESSEX RADIO SOCIETY.—At the A.G.M. on December 30, Field Day plans were discussed and arrangements made for starting a Morse class. Meetings are held on Tuesday evenings at 367 Rush Green Road, Romford. *Hon. Secretary:* B. W. Le Grys (G3GOT), 75 Shaftesbury Road, Romford.

SOUTHEAST & DISTRICT RADIO SOCIETY.—The A.G.M. was held on January 23 when the Committee members for 1953 were elected. Meetings are held in the London Road-Queen's Road Block of the Municipal College. *Hon. Secretary:* G. Chapman, 20 Leigh Hill, Leigh-on-Sea.

STOCKPORT RADIO SOCIETY.—The A.G.M. will be held on March 17. Society members hope to assist the R.S.G.B. Town Group in N.F.D. R.A.E. classes are well attended. *Hon. Secretary:* G. R. Phillips (G3FYE), 7 Germans Buildings, Buxton Road, Stockport.

SURREY RADIO CONTACT CLUB.—The Annual Dinner was held in Croydon on January 16. The Club net on 1875 kc/s is on Mondays at 2130 G.M.T. *Hon. Secretary:* S. A. Morley (G3FWR), 22 Old Farleigh Road, Selsdon, South Croydon.

WEST KENT RADIO SOCIETY.—Meetings will be held at Culverden House, Culverden Park Road, Tunbridge Wells, at 7.30 p.m. on February 25 ("Tape Recording") and on March 11 (Field Day Discussion).

WEST LANCs. RADIO SOCIETY.—Meetings are now held on Thursdays at the Scouts Hall, East Street, South Road, Waterloo, at 8 p.m. Recent activities have included visits to a telephone exchange and to Seaford Coast Radio Station. *Hon. Secretary:* B. J. Whitty (G3HWX), 46 Argo Road, Waterloo, Liverpool 22.

REPRESENTATION

THE following are additions to the list of Representatives published in the December, 1952, issue:—

County Representatives

Region 3

Shropshire

G. Myatt (G3FRN), 12 Swan Street, Broseley.

Warwickshire

R. Palmer (G5PP), 22 Sherlock Road, Coventry.

Region 5

Essex (outside London)

J. Ridley (G2AJF), Gablehays Lodge, Springfield, Chelmsford.

Region 9

Cornwall

D. J. Beattie (G2WW), Suffolk House, Lidden, Penzance.

Somerset

E. A. Hayward (G2UH), Bridge Cottage, Coker Hill, West Coker, Yeovil.

Region 13

East, Mid & West Lothians*

K. M. Senior (GM3AEI), 23 Marchmont Avenue, Edinburgh 9.

* Result of Ballot:

D. Samson (GM3EQY) 17 votes
K. M. Senior (GM3AEI) 32 votes (Elected.)

The following are additions and amendments to the list published in the February, 1952, issue:—

Town Representatives

Region 1—Westmorland.

Westmorland Area.—G. B. Moser (G3HMR), 6 Hodge How, Windermere.

Region 2—Yorkshire West

Sheffield.—P. A. Wilson (G3HTE), 7 Wostenholme Road.

Region 5—Cambridgeshire

Cambridge.—J. B. Foster (G3IIT), 145 Cambridge Road, Trumpington.

Region 7—London South-East

Dulwich & New Cross.—Mrs. M. Mills (G3ACC), 59 Upland Road, S.E.22.

Region 9—Devonshire

Exeter.—A. J. Scanes (B.R.S. 4948), 77 Woolsey Avenue, Whipton.

Vacancies

Messrs. F. N. F. Bewley (G8HX), E. J. King (G3DCC) and L. Rivers-Young (G3BTP) have resigned as Representatives for the towns of Mansfield, Eltham-Sidecup and Slough respectively. Mr. E. J. Cowles (G2AJU) has resigned as Suffolk County Representative. Nominations for their successors should be made in the prescribed form and sent to reach the General Secretary by March 31, 1953.

Forthcoming Events

REGION 1

Bury.—March 12, 7.30 p.m., Y.M.C.A., The Rock, Bury.
Chester (C. & D.A.R.S.).—Tuesdays, 7.30 p.m., Tarran Hut, Y.M.C.A., Chester.
Crosby.—Tuesdays, 8 p.m., Scout's Hall, East Street, Waterloo.
Liverpool.—February 28, March 14, 2.30 p.m., Larkhill Mansion House, West Derby.
Manchester (M. & D.R.S.).—March 2, 7.30 p.m., Brunswick Hotel, Piccadilly, Manchester.
Rochdale (R.R.T.S.).—Fridays, 7.45 p.m., 1 Law Street, Sudden.
South Manchester (S.M.R.C.).—Alternate Fridays, 7.30 p.m., Ladybarn House, Mauldeth Road, Manchester, 14.
Southport.—February 23 and March 9, 8 p.m., Y.M.C.A., off Eastbank Street, Southport.
Stockport (S.R.S.).—Alternate Tuesdays, 8 p.m., Blossoms Hotel, Buxton Road.
Warrington (W. & D.R.S.).—February 17, March 3, 7.30 p.m., King's Head Hotel, Warrington.
Wirral (W.A.R.S.).—February 25, March 11, 7.45 p.m., Y.M.C.A., Whetstone Lane, Birkenhead.

REGION 2

Barnsley.—February 27, 7.30 p.m., King George Hotel, Peel Street.
Bradford.—February 17, March 3, 7.30 p.m., Cambridge House, 66 Little Horton Lane.
Catterick.—Wednesdays, 7 p.m., Loos Lines, Catterick Camp.
Darlington.—Thursdays, 7.30 p.m., 129 Woodlands Road.
Doncaster.—March 11, 7.30 p.m., Black Bull, Market Place.
Gateshead.—Mondays, 7.30 p.m., Mechanics Institute, 7 Whitehall Road.
Middlesbrough.—Thursdays, 7.30 p.m., Joe Walton's Boys' Club, Feversham Street.
Newcastle-upon-Tyne.—March 16, 7.30 p.m., British Legion Rooms, 1 Jesmond Road.
Pontefract.—February 19, March 5, 8 p.m., Fox Inn, Knottingley Road.
Rotherham.—Wednesdays, 7 p.m., "Cutlers Arms," Westgate.
Scarborough.—Thursdays, 7.30 p.m., B.R. Rifle Club, West Parade Road.
Sheffield.—February 25, 8 p.m., "Dog & Partridge," Trippe Lane. March 11, 8 p.m., Albreda Works, Lydgate Lane.
Slithwaite.—Fridays, 7.30 p.m., 3 Dartmouth Street.
Spenborough.—February 25 (A.G.M.), March 11, 7.30 p.m., Temperance Hall, Cleckheaton.
York.—Thursdays, 7.30 p.m., Club Rooms, Y.A.R.S., Fetter Lane.

REGION 3

Birmingham (South).—March 6, 7.15 p.m., Stirchley Institute (Room 7).
Coventry.—February 27, 7.30 p.m., Priory High School, Wheatley Street.
Kenilworth, Warwick and Leamington.—March 19, 7.30 p.m., Dalehouse Lane.
Malvern.—March 2, 8 p.m., "Foley Arms."
Stourbridge (S. & D.R.S.).—March 3, 8 p.m., King Edward's School.
Worcester (W. & D.A.R.C.).—Thursdays, 7 p.m., City Library (basement), Foregate Street.
Wrekin (W.A.R.S.).—Mondays, 8 p.m., Wrekin Service Club, Roseway, Wellington.

REGION 4

Alvaston.—Tuesdays and Thursdays, 7.30 p.m.; Sundays 10.30 a.m., Nunsfield House, Boulton Lane, Alvaston, near Derby.
Chesterfield.—February 24, March 10, 7.30 p.m., Bradbury Hall, Chatsworth Road.
Derby (D. & D.A.R.S.).—Wednesdays, 7.30 p.m., Derby College Arts and Crafts, (sub-basement), Green Lane. February 27, Annual Dinner and Social, Irongates Grill Room, Irongate.
Leicester (L.R.S.).—February 16, March 2, 16, 7.30 p.m., Holly Bush Hotel, Belgrave Gate.
Lincoln (L.S.W.C.).—February 18, March 4, 7.30 p.m., Technical College, Cathedral Street.
Loughborough.—February 18, 7.30 p.m., Great Central Hotel.
Mansfield (M. & D.A.R.S.).—March 1, 3 p.m., Swan Hotel.
Newark.—March 1, 15, 7 p.m., Northgate House.
Northampton (N.S.W.C.).—Fridays, 6 p.m., March 6 7 p.m., Clubroom, 8 Duke Street.
Nottingham.—February 20, 7.30 p.m., Trent Bridge Hotel.
Peterborough.—March 4, 7.30 p.m., New Inn, New England, Peterborough.
Workshop.—March 2, 7 p.m., King Edward Hotel.

REGION 5

Chelmsford.—March 3, 7.30 p.m., Marconi College, Arbour Lane.
Ipswich.—February 25, March 11, 7.30 p.m., T.A. Drill Hall, Woodbridge Road.
Lowestoft (L. & B.A.R.C.).—February 25, March 11, 7.30 p.m., Y.M.C.A.

REGION 6

Cheltenham.—March 5, 8 p.m., 128 Prestbury Road.
Gloucester.—Alternate Thursdays, 7.30 p.m., Spreadeagle Hotel.
Portsmouth.—Tuesdays, 7.30 p.m., Signals Club Room, Royal Marine Barracks, Eastney.
Southampton.—March 7, 7.30 p.m., 1 Prospect Place.
Stroud.—Wednesdays, 7.30 p.m., Subscription Rooms.

REGION 7

Acton, Brentford, Chiswick.—Tuesdays, 7.30 p.m., A.E.U. Rooms, Chiswick High Street, W.4.
Balham.—February 19, 7.30 p.m., Alexandra Hotel, Clapham Common, South Side, S.W.4.
Barnes, Putney & Richmond.—March 10, 7.30 p.m., 337 Upper Richmond Road, East Sheen, S.W.14.
Barnet (B. & D.R.C.).—Wednesdays, 8 p.m., "Hopedene," The Avenue.
Bromley (N.W.K.A.R.S.).—March 6, 8 p.m., Shortlands Tavern, Station Road, Shortlands.
Chingford.—February 24, March 10, 8 p.m., "70 cm"—Dr. A. Koster (G3ECA), A.T.C. H.Q., Pretoria Road.
Croydon (S.R.C.C.).—March 10, 7.30 p.m., "Blacksmiths Arms," South End, Croydon.
Dulwich & New Cross.—March 3, 7.45 p.m., "The Walmer Castle," Peckham Road, S.E.15.
Ealing.—Sundays, 11 a.m., A.B.C. Restaurant, Ealing Broadway.
East Ham.—February 24, March 10, 8 p.m., 57 Leigh Road.
East London.—February 22, 3 p.m., "Line Transmission," Cant. P. P. Eckersley, A.M.I.E.E., Town Hall, Ilford.
East Molesey (T.V.A.R.T.S.).—March 5, 8 p.m., "History and Development of Amateur Radio," John Clarricoats (G6CL), "Carnarvon Castle," Hampton Court.
Eltham & Sidcup.—February 23, March 9, 7.30 p.m., "Junk Sale," "N.F.D. Discussion," Holy Trinity Hall, Hurst Road, Sidcup.
Enfield.—March 15, 3 p.m., George Spicer School, Southbury Road.
Finsbury Park.—February 17, March 17, 7.30 p.m., 164 Albion Road, N.16.
Guildford & Woking.—February 22, 3 p.m., "Royal Arms Hotel," Guildford.
Harlow (H. & D.R.S.).—February 17, March 3, 8 p.m., War Memorial Institute. February 24, March 10, 8 p.m., 6 High Street.
Hendon & Edgware (E. & D.R.S.).—Wednesdays, 8 p.m., 22 Goodwin Avenue, Mill Hill.
Ilford.—Thursdays, 8 p.m., G2BRH, 579 High Road.
Kensington & Shepherds Bush.—March 13, 8 p.m., 38 Royal Crescent, W.11.
Lewisham (R.A.R.C.).—Wednesdays, 8 p.m., Durham Hill School, Downham.
Norwood.—February 21, 7.30 p.m., Windermere House, Westow Street, Crystal Palace.
Reigate (E.S.R.C.).—February 26, 7.45 p.m., 19 London Road.
Slough.—February 19, 7.45 p.m., Labour Hall, Chandos Street.
Southgate & Finchley.—March 12, 7.30 p.m., Arnos School, Wilmer Way, N.11.
Sutton & Cheam.—February 17, "The Harrow," Cheam Village.
Uxbridge.—March 6, 7.30 p.m., "The Vine," Hillingdon.
Watford (W.A.R.S.).—February 17, March 3, 7.30 p.m., "Cookery Nook," The Parade.
Welwyn.—March 3, 8 p.m., "Are our operating standards good enough?" Discussion, Council Offices.

REGION 8

Brighton (B.D.R.C.).—Tuesdays, 7.30 p.m., Eagle Inn, Gloucester Road. (E.B.S.W.C.).—Thursdays, 7.30 p.m., 27 Warren Avenue, Woodingdean.
Chatham (M.A.R.T.S.).—Mondays, 7.30 p.m., Co-operative Hall, Luton Road.
Hastings (B. & H.A.R.C.).—February 24, March 10, 7.30 p.m., Saxons Cafe, Denmark Place.
Eastbourne.—February 19, March 5, 7.30 p.m., 333 Seaside.
Gillingham (G.T.S.).—Alternate Tuesdays, 7.30 p.m., Medway Technical Institute.
Isle of Thanet (I.O.T.R.S.).—Fridays, 7.30 p.m., George Hotel, Hawley Street, Margate.
Maidstone (M.K.A.R.S.).—Fridays, 8 p.m., Elms School, London Road.
Worthing (W. & D.A.R.S.).—March 9, 8 p.m., Adult Education Centre.

(Continued on page 363)

Letters to the Editor

The Society assumes no responsibility for the views expressed herein by correspondents.

Radio Astronomy and the Amateur

DEAR SIR,—I read with interest the letter from Mr. J. G. Ratcliffe in the December, 1952, issue of the BULLETIN and my colleagues and I appreciate his interest and proposals.

Unfortunately, the lunar echo equipment at Jodrell is at present struggling valiantly with a 30ft. aperture aerial, so that the echoes with the present power (around 1 kW) are enveloped in the noise level. As the new 250 ft. dish will not be complete for another three years, an independent amateur would require a large aerial to be able to receive useful, or even observable, echoes from the Jodrell equipment. There are also the formidable technical difficulties of synchronisation of local oscillators, so that the 120 Mc/s signal may be held to within 1 c/s and the provision of suitable monitoring equipment.

There are occasions, however, when the co-operation of radio amateurs would be of great assistance in Radio Astronomy research, such as the relaying of information from outstations, and general monitoring. There is, indeed, no fundamental reason why those who like a change from QSOs should not do many of their own observations and conduct their own research on this still barely-trodden path. The major difficulty in the case of noise experiments will be the provision of a suitable pen recorder and that is a costly item.

It will no doubt interest readers to learn that the man who designed and built the "Moon" equipment at Jodrell is a fellow amateur—"Sandy" Murray, G3CBG.

Yours faithfully,

ROGER C. JENNISON (G2AJV).

Jodrell Bank Experimental Station,
Holmes Chapel, Crewe, Cheshire.

Behaviour of 300 ohm feeders in wet weather

DEAR SIR,—In reply to the letter from R. J. Slaughter (January issue), I should like to make the following comments.

Whilst it is quite true to say that the percentage changes in V_R and Z_0 are equal it must be remembered that the quantity dealt with is a single amount in the case of Z_0 but a multiple quantity where the V_R is concerned.

Feeder lengths—the point under discussion—can be many half-waves long, especially on v.h.f. This, therefore, multiplies the change in V_R , yet Z_0 remains at the figure produced by the change.

The reader can easily work out for himself—taking the two extremes in my table of four examples—what the effect would be on the feeder length used at his station. On the other hand, assuming a perfect match at 300 ohms (giving unity s.w.r.) the approximate difference for the two extreme variations would be less than 0.1, that is a new s.w.r. of 1.1.

As the present-day tendency among amateurs seems to be a preference for so-called multi-band aerials, it is apparent that this small change would mean little to them, as matching is a compromise in all cases. But when the change takes place "before their very eyes"—that is, on the meters—they are aware of something wrong.

My findings only point to the reason for this change and do not suggest any loss in power propagated. In fact, very little loss is experienced in actual practice—only dislocation in tuning adjustments—if the s.w.r. is high. This point I still affirm, whatever type of feeder line is used; until the "inconstant K" becomes more stable this trouble will persist.

Yours faithfully,

F. TILLOTSON (G6XT)

Morley, Leeds.

Frequency Measurement

DEAR SIR,—With reference to the letter from W. Farrar (G3ESP) on the question of frequency measurement in the December issue of the BULLETIN, whilst I sympathise with him I deplore anything which would tend to reduce the standard of Amateur Radio.

In these days of cheap components—i.e. Government surplus—it is not a difficult task nor is it costly to produce a crystal standard for frequency checking—it is, of course, tedious making the actual measurements and quite frankly I do not believe that more than a small percentage of active stations really do comply with the regulations in this respect, especially under competition conditions. I recently had my first experience of a c.w. contest, and while I was trying to measure my frequency the other stations were collecting points by the dozen! Eventually, of course, I gave up the struggle and took the nearest check point and kept my fingers crossed.

However, as in most things, the G.P.O. are very lenient and I really do not think they could check up on, or for that matter expect, every frequency change to be logged to the limits set down and providing we do not stray outside the bands it is far better to let sleeping dogs lie.

There are many more important things to deal with in

conjunction with the G.P.O. and whilst they are happy over the question of frequency measurement, so am I.

Yours faithfully,

L. E. PROFAZE (G3FYA).

London, N.11.

Coronation Year Hospitality

DEAR SIR,—It occurs to me that there must be many overseas amateurs either on a visit to this country or serving with the Armed Forces who would welcome the opportunity of meeting British amateurs during their stay here.

Would it therefore be possible for the Society to compile a list of members who would be willing to extend hospitality to overseas amateurs and to publish same in the BULLETIN? This scheme could be arranged on the same lines as was "Ham Hospitality" during the late war.

Being Coronation Year this would be an ideal opportunity for us to get to know our friends from other countries and for them to meet us in our own homes. U.K. amateurs away from home could also be included.

Yours faithfully,

F. ALLAN HERRIDGE (G3IDG).

Balham, London, S.W.12.

EDITORIAL NOTE.—Headquarters will be pleased to compile a list of Members willing to extend hospitality. Offers should be made on a postcard giving Name, Address, Call-sign (or B.R.S.), Telephone No. (if any), most suitable times and days for visits, and whether or not prior notice is required. It would also help if an indication could be given as to whether hospitality would normally be confined to a visit or would include bed and breakfast.

Sightless Operators' Club

DEAR SIR,—I have undertaken to prepare a list of the names and addresses of sightless transmitting amateurs with a view to forming a club which would aim at facilitating the exchange of ideas. I should be grateful to any member who would care to advise me of any such amateurs known to him.

Yours faithfully,

W. N. CRAIG (G6JJ).

28 Chaldon Way, Coulsdon, Surrey.

Around the Trade

Mullard Ltd. have recently made available a new double-tetrode for use on frequencies up to 600 Mc/s. The valve, designated the QQV03-20, is of all-glass construction and has a B7A base. Technical data is available from the Communications and Industrial Valve Dept., Century House, Shaftesbury Avenue, W.C.2.

* * *

The use of horizontal polarization at the B.B.C.'s low-power TV stations has prompted Aerialite Ltd. to market new models of their television aerials designed for use in the areas to be served by those stations. The horizontal "Dublex" aerial costs £4 18s. 6d.

* * *

Multicore Solders Ltd., Maylands Avenue, Hemel Hempstead, have issued an interesting pamphlet entitled "Soldering Technique," copies of which are available on receipt of a stamped addressed envelope. Technical Summary M.52 is also available, and deals briefly with the many Multicore products.

* * *

The accent nowadays is definitely upon miniaturisation both in valves and components. An example of the latter is the range of potentiometers announced by John Bell & Croyden Ltd., 117 High Street, Oxford, and marketed under the name "Belclere." Measuring only $\frac{1}{8}$ in. diameter by $\frac{1}{4}$ in. deep and weighing one-ninth of an ounce, the potentiometer, together with an on/off switch, is housed inside the control knob and is intended for drum operation. Connections are brought out to 4 tags and a centre bolt.

Standard values are 3-6 megohms with logarithmic tracks and 1 megohm with a linear variation of resistance with rotation, but other values may be obtained to order. A 1 megohm model was employed as the gain control across the input of a two-stage audio amplifier and proved to be perfectly silent in operation. The resistance, although somewhat in excess of that marked, was remarkably linear and the switch quite silent even when carrying its maximum rating of 100 mA at 50 volts. Naturally, in such a tiny component, the rating for the resistance element is low and the makers do not recommend a loading in excess of 0.1 watt continuous signal with a maximum d.c. of 10 μ A.

**Mention the Bulletin when
writing to advertisers**

NEW MEMBERS

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

THE call-sign, name and address of every new Home Corporate Member who holds a G.P.O. Amateur Wireless Transmitting Licence will automatically appear in the next edition of the R.S.G.B. Call Book.

Changes of address and details of new calls issued should be sent direct to the Call Book Editor, Mr John Tyndall, G2QI, 174 The Drive, Ilford, Essex.

DUE to an editorial oversight a list of the names of persons elected to membership at the September, 1952, Council Meeting was not published. The list follows.

Corporate Members (Licensed)

- G2CVY W. H. J. YEO, Ebberly Dairy, Newport Road, Barnstaple, Devon.
 G2DJA †J. H. PALMER, 137 Randall Avenue, Cricklewood, N.W.2.
 G2DSW E. J. WATTS, Clavinia, Thornhill Park Road, Southampton, Hants.
 G3HDT E. CROUCH, 25 Alexandra Road, Winhill, Burton on Trent, Staffs.
 G3DAR †A. WALKER, 112 Gaisby Lane, Shipley, Yorkshire.
 G3DCK J. A. SMITH, 56 County Road North, Hull, Yorkshire.
 GW3DNX A. G. R. DIXON, Lower Flat, 118 Bryn Road, Brynmill, Swansea.
 GW3EHP J. WILMOT, Pantiles, Craig-yr-Eos Road, Ogmere by Sea, Bridgend, Glam., Wales.
 GM3GPN R. JARDINE, No. 2 House, Repeater Station, Gairloch, Ross-shire, Scotland.
 G3GTK E. W. BRYAN, Royal Signals School of Artillery, Larkhill, Wilts.
 G3HBW A. L. MYNETT, 29 Sunleigh Road, Alperton, Wembley, Middlesex.
 G3HCZ *B. EDMONDSON, 131 Hatfield Road, Bolton, Lancs.
 G3HDG R. PARRY, 46 St. Stephens Road, Leicester.
 G3HHD T. J. HAYWARD, 41 Shortheth Road, Erdington, Birmingham.
 G3HOF J. GALE, 8 James Street, Little Lever, Bolton, Lancs.
 G3HRD J. ELLIS, 9 Boscawell Terrace, Pendean, Near Penzance, Cornwall.
 G3HRR G. R. TAYLOR, 7 Hill Street, Hednesford, Staffs.
 G3HXN S. R. BOAKES, Cambridge Villa, Bristol Road, Cambridge, Glos.
 G3IAU H. G. ATTERWILL, 71 Berkeley Road, Hillingdon, Uxbridge, Middlesex.
 G3IDL R. O. JONES, 12 Broadatone Crescent, Brading, Isle of Wight.
 G3IEZ S. BATES, 64 Roseberry Road, Muswell Hill, N.10.
 G3IFR L. G. WOOD, R.R.F. East Wing, R.E.U., R.A.F. Henlow, Beds.
 G3IGU K. H. COATES, Hooton Pagnell, Doncaster, Yorkshire.
 G3IIX H. E. R. BURFIELD, 42 East Barnet Road, New Barnet, Herts.
 GW3IKK J. H. TAYLOR, 92 Erddig Road, Wrexham, Wales.
 GW3JLZ T. E. I. BROMHAM, 51 Bath Road, Morriston, Swansea, Wales.
 G3IMA E. F. COLLINS, 1 Lynton Grove, Copnor, Portsmouth, Hants.
 G3IND D. H. BOYLES, 45 Dunbar Road, Forest Gate, E.7.
 G3ISM *S. MANN, 15 Eastfields Road, North Acton, London, W.3.
 G3JGM G. MILLINGTON, 17 Tettenthall Road, Wolverhampton, Staffs.
 G3JRS J. R. SIMPSON, 240 Blagreaves Lane, Littleover, Derby.
 G4KV †R. LANSLEY, 41 Daws Avenue, Wallisdown, Bournemouth, Hants.
 G5UA R. W. WELDRICK, 30 Central Street, Holyland Common, Nr. Barnsley, Yorkshire.
 G6AX †A. L. CLARE, 59 Hamer Lane, Rochdale, Lancs.
 G8OO W. MOORE, Windyridge, Wireless Station, Bridport Road, Dorchester, Dorset.

Corporate Members (Overseas)

- DL4OR C. D. RITCHIE, 7706 A.F.N. Co., The Grand Hotel, Heidelberg Military Post, A.P.O. 403, c/o U.S. Army Zone of Germany.

- KP4CC J. B. CASTANERA, Calle Tapia 275, Santurce, Puerto Rico.
 MI3TM †M. W. J. OLIVER, c/o P.O. Box 4028, Nairobi, Kenya.
 PA0KC J. A. KLIFFEN, Damkade 6, Zaandam, Holland.
 SM5ARP C. J. G. AABOM, 13 Cirkelvaegen, Stockholm, Sweden.
 SU1GG †G. W. GLOVER, Billet 22, 1 EQ Wing, 107 MU, Kasfareet, M.E.A.F. 15.
 VE3LJ V. SHARP, 168 Castlefield Avenue, Toronto 12, Ontario, Canada.
 VQ3BM C. WATSON, Aeradio Station, Mbeya, Tanganyika Territory.
 VQ5DQ J. BRAKEFIELD, P.O. Box 391, Kampala, Uganda.
 W5SXZ W. H. MORTON, 6 West Concourse, Avon, New Jersey, U.S.A.
 W8CSI J. P. SINCOCK, 1314 Second Street, Marquette, Michigan, U.S.A.
 ZB1BT J. N. BURTON, 37 St. Georges Street, Gzira, Malta.
 ZD2WCR W. W. C. READ, Stroud Farm, Burtonhole Lane, Mill Hill, N.W.7.
 ZE2JE D. N. KAYE-EDDIE, P.O. Box 460, Salisbury, S. Rhodesia.
 ZL1AJE R. R. DUNN, Police Station, Kihikih, Waikato, New Zealand.
 5A2CA J. W. V. BULL, Technical Officer, 5 Forces Broadcasting Stn., Benghazi, M.E.L.F. 6.
 5A2CB E. ANGELL, c/o 5 Forces Broadcasting Station, Benghazi, M.E.L.F. 6.
 5A2CD C. DEWS, c/o I.A.L. Benina Airport, Benghazi, Libya.
 5A2CE K. A. H. BAKER, Cyrenaica Signals Sqdn., M.E.L.F. 6.
 5A2CF G. C. CURTIS, P.O. Box 201, c/o British Legation in Libya, Benghazi, Libya.
 5A2CH H. J. WARREN, Met. Officer, Radio Sonde, Benina Airport, M.E.L.F. 6.

Corporate Members (British Receiving Stations)

- 19724 H. J. MASON, Bathurst, Sturminster Newton, Dorset.
 19725 A. T. BARKER, 82 Northfield Road, Peterborough, Northants.
 19726 D. COLVIN, 24 Stopford Street, Liverpool 8, Lancs.
 19727 R. SHADLOCK, Top Flat, 99 Whiteladies Road, Clifton, Bristol.
 19728 C. J. TIMEWELL, Glendale, Carhampton, Minehead, Somerset.
 19729 W. E. GANDER, Keyes, Parkgate, Newdigate, Surrey.
 19730 I. C. MURRAY, 50 Primrosehill Drive, Aberdeen, Scotland.
 19731 T. F. GULVIN, 60 Neilsland Road, Fairhill, Hamilton, Lanarkshire.
 19732 F. J. SMITH, 4 Sandhurst Road, Polygon, Southampton, Hants.
 19733 D. BUTLER, 21 Inverleith Drive, Sydenham, Belfast.
 19734 A. S. G. RACHER, 7 Bower Street, Glasgow W.2, Scotland.
 19735 W. G. MAY, 111 Dale Jalley Road, Shirley, Southampton.
 19736 J. A. TURNER, 43 La Motte Street, St. Helier, Jersey, Channel Islands.
 19737 R. R. DUNCAN, 24 Meadow Road, Ear'ey, Reading, Berks.
 19738 R. F. ANGEL, 15 Torquay Avenue, Shirley, Southampton.
 19739 G. JOHNSTONE, 280 Duke Street, Glasgow, E.1, Scotland.
 19740 M. J. COOMBE, 27 Coronation Street, Barnstaple, Devon.
 19741 R. H. JONES, The Knoll, St. Georges Road, Hightown, Nr. Southport, Lancs.
 19742 A. L. BOOTH, 11 Aldwick Avenue, Didsbury, Manchester, Lancs.
 19743 R. A. SWAIN, 8 Clinton Road, Shirley, Birmingham, Warwickshire.
 19744 W. SMITH, 12 Restalrig Road South, Edinburgh 7, Scotland.
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Correction

In the list of New Members published in the December, 1952, issue of the BULLETIN, the name of the member holding the call-sign G3GNM should read A. C. WILLOUGHBY-BIDDELL.

* Denotes transfer from Associate grade.
 † Denotes re-elected.

FORTHCOMING EVENTS (Continued from page 360)

REGION 9

- Bath.**—February 23, 7.30 p.m., Y.M.C.A., Broad Street.
Exeter.—March 6, 7 p.m., Y.M.C.A., St. David's Hill.
North Devon.—March 5, 7.30 p.m., Rose of Torridge Cafe, The Quay, Bideford.
Penzance.—March 5, Railway Hotel.
Plymouth.—February 21, 7 p.m., Tothill Community Centre, Tothill Park, Knighton Road, St. Jude's.
Torquay.—February 21, 7.30 p.m., Y.M.C.A., Castle Road.
West Cornwall (W.C.R.C.).—February 19, March 5, "Fifteen Balls," Penryn, near Falmouth.
Weston-super-Mare.—March 3, 7.30 p.m., Y.M.C.A.
Yeovil.—Wednesdays, 7.30 p.m., Grove House, Preston Road.

REGION 10

- Cardiff.**—March 9, 7.30 p.m., "The British Volunteer," The Hayes.

REGION 11

- Holywell.**—March 22, 4 p.m., Congregational Schoolroom.

REGION 13

- Dunfermline.**—Mondays and Thursdays, 7.30 p.m., behind 34 Viewfield Terrace.
Edinburgh.—February 19, March 5, 19, 7.30 p.m., Edinburgh Chamber of Commerce, 25 Charlotte Square.

REGION 14

- Falkirk.**—February 27, March 13, 7.30 p.m., The Temperance Cafe.
Glasgow.—February 25, 7.15 p.m., 39 Elmbank Street.

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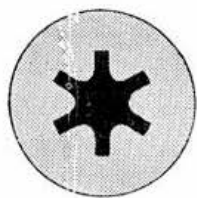
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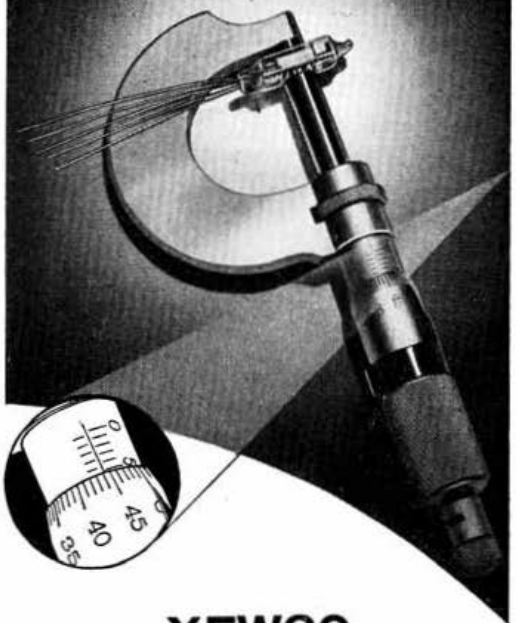
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3/8"	" "	1/7	3/8"	" "	1/7	3/8"	" "	1/-	3/8"	CH SC	1/-
1/2"	" "	1/9	1/2"	" "	1/9	1/2"	" "	1/2	1/2"	CH SC	1/2
5/8"	" "	1/10	5/8"	" "	1/11	5/8"	" "	1/1	5/8"	CH SC	1/1
3/4"	" "	1/11	3/4"	" "	2/-	3/4"	" "	1/2	3/4"	CH SC	1/2
7/8"	" "	2/-	7/8"	" "	SC 2/1	7/8"	" "	1/2	7/8"	CH SC	1/2
1"	" SC	1/11	1"	" NP	2/3	1"	" "	1/4	1"	CH SC	1/4
1 1/8"	" NP	2/1	1 1/8"	" CS	1/4	1 1/8"	" "	1/5	1 1/8"	CH SC	1/5
1 1/4"	" "	2/3	1 1/4"	" NP	1/6	1 1/4"	" "	1/5	1 1/4"	CH SC	1/5
1 1/2"	" "	2/6	1 1/2"	" "	1/7	1 1/2"	" "	1/7	1 1/2"	CH SC	1/7
1 3/4"	Inst/H	1/9	1 3/4"	" "	1/8	1 3/4"	" "	1/9	1 3/4"	CH SC	1/9
2"	NP	1/9	2"	" "	1/9	2"	" "	2/6	2"	CH SC	2/6
2 1/2"	CS	2/-	2 1/2"	" "	1/10	2 1/2"	" "	2/9	2 1/2"	CH SC	2/9

4BA				BRASS				STEEL			
1/8"	CHNP	2/-	1/8"	RHNP	1/10	1/8"	CHNP	1/2	1/8"	RHNP	1/2
1/4"	" "	2/1	1/4"	" "	2/3	1/4"	" "	1/3	1/4"	RHNP	1/3
3/8"	" "	2/1	3/8"	" "	2/9	3/8"	" "	1/4	3/8"	RHNP	1/4
1/2"	" "	2/2	1/2"	" "	3/-	1/2"	" "	1/2	1/2"	RHNP	1/2
5/8"	" "	2/6	5/8"	" "	1/8	5/8"	" "	1/4	5/8"	RHNP	1/4
3/4"	" "	3/3	3/4"	" "	2/-	3/4"	" "	1/4	3/4"	RHNP	1/4
7/8"	Hex/H	2/6	7/8"	" "	2/3	7/8"	" "	1/6	7/8"	RHNP	1/6
1"	" "	3/6	1"	" "	1/10	1"	" "	1/9	1"	RHNP	1/9

2BA				BRASS				STEEL			
1/8"	RHNP	2/10	1/8"	CHNP	4/6	1/8"	CHNP	1/9	1/8"	H/HSC	1/9
1/4"	" "	3/-	1/4"	" SC	3/-	1/4"	" "	2/-	1/4"	Lge RH	2/-
3/8"	" "	3/3	3/8"	" "	5/-	3/8"	" "	2/-	3/8"	RH SC	2/-
1/2"	" SC	3/3	1/2"	RH	4/9	1/2"	" "	2/6	1/2"	CH	2/6
5/8"	NP	4/3	5/8"	CS NP	4/-	5/8"	" "	2/9	5/8"	RH CP	2/9
3/4"	Hx/HSC	10/-	3/4"	" SC	4/9	3/4"	" "	2/-	3/4"	CS	2/-

8BA				BRASS				STEEL			
1/8"	CH NP	2/-	1/8"	CH SC	2/-	1/8"	CH NP	2/-	1/8"	CH NP	2/-
1/4"	" "	2/6	1/4"	RHNP	2/6	1/4"	" "	2/-	1/4"	CH NP	2/-
3/8"	CS	1/8	3/8"	" "	2/2	3/8"	" "	2/2	3/8"	CH NP	2/2
1/2"	CH	2/3	1/2"	" "	2/9	1/2"	" "	2/2	1/2"	CH NP	2/2
5/8"	CS	1/9	5/8"	Hex	2/9	5/8"	" "	2/3	5/8"	CH NP	2/3
3/4"	" "	2/6	3/4"	" "	2/10	3/4"	" "	2/3	3/4"	CH NP	2/3

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F OR SALE.—Home-built ham band superhet, H.R.O. type dial, 1.6 Mc/s i.f., valves, coils for 40, 20, 10. Almost completed 1,000 V power unit, Eddystone rack/panel assembly, Woden 5/25 H. Pair RGI-240A. Also S27, needing attention. Accept £30 lot, or offers separately please. All enquiries answered to CARY, 21 Lywood Road, Leighton Buzzard, Beds. (870)

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F OR SALE.—SX.16 and Hallicrafters speaker, first-class condition, £25. 19 set, Mk. III, complete, £11. Wanted: 12 V generators for Collins TCS.12; offers and details to L. GROUT, 68 The Drive, W. Worthing. (866)

F OR SALE.—Transmitter, Clapp v.f.o., Labgear wideband exciter, band-switched 3.5 through 28, p.a., p.p. 807s; complete, £40 or near offers. RME.69 receiver and DB20 preselector, £30.—G8GB, SALISBURY, Bleadon Hill, Weston-super-Mare. (872)

F OR SALE.—120 W 'phone and c.w. transmitter; Franklin E.C.O.; B.S. exciter, 80-40-20-15 and 10; push-pull 829B final; push-pull 807s modulator; speech clipper and modulation indicator; £60. Radiovision Commander receiver, excellent condition, £35. Also other gear. Going VE7, must sell out all gear. Buyer collects.—G3INB, P. A. NIBLOCK, "Silverwood Cottage," Byfleet Road, Cobham, Surrey. (845)

G IVEING UP Amateur Radio. The following must be sold: 750 with "S" meter and matching speaker, two months old, £50. BC.348 with Radiocraft two-stage band-switched pre-selector with built-in power pack, RF.24 unit and parts for power packs, £30. Radiocraft 1-v-1 mains, all coils and built-in power pack, £6. "S.W.L." vols. 3, 4, 5, bound, 10/- each. "S.W.M." vols. 4, 5, 6, 7, 8, bound, 15/- each. All the above are in perfect condition.—K. DALRY, 74 Queen Street, Louth, Lincs. (838)

G OOD valves, many unused: 8012, (2) 866 (with base), 10/-; (3) 6AK5, (2) 523, (7) GU1, VT75 (KT66), P26/500, 7/6; 6AG5, IC5GT/G, 6SK7, 5/-; (2) VT501 (TT11), (2) EF54, VT94, 6SH7GT, (2) 59 (with base), (2) CV1199, 41MP, 3/6; (4) VR65A, C6V, VT52, (2) VT61A, 2/6; all each. Also 16 "Short Wave Magazines," June, 1938-September, 1939, 5/-; 16 July, 1946, to December, 1947, 8/-; 12 "QST," November, 1935-November, 1936, 5/-; 7 "Radio News," 5 "Electronics," "Tele. Tech." 1943, R.S.G.B. Call Book 1951, 9 "Short Wave News" and "Listener," 10/- lot. Black brass box, 16 in. x 7 in. x 9 in., panel, with handles; 2 20 H chokes; various components; 10/-; 9 Beehive, SCR.522 coil condenser; sub-chassis, Muirhead SM, etc.; 10/- lot, 2 20 H 100 mA, 4/- each, 32 in. Premier rack, 3 chassis, 2 panels, only few holes, 15/-; Type 24, 3 new valves, no switch unit, 10/-; Postage please.—G6CB, 7 Caxton Road, Wimbledon. (862)

H .R.O. Senior with power pack, 9 coils, B.S.; matched speaker recently realigned by H.R.O. specialists; £40. Also R.1116 double superhet with fully metered power pack and 3 No. 27 units. Offers or exchange complete B.2.—MULCAHY, 36 Engel Park, Mill Hill, London, N.W.7. (850)

L ABGEAR D.S.L. base and 7, 14, 28 Mc/s coils. Two Labgear 50-50 split stator condensers.—Offers, 89 Staines Road, Feltham, Middlesex. (865)

M ETALWORK.—All types cabinets, chassis, racks, etc., to your own specifications.—PHILPOT'S METAL WORKS LTD. (G4BI), Chapman Street, Loughborough. (99)

N EW R.C.A. 552T Iconoscope (or similar tube) wanted.—G4GZ, 233 Welholme Road, Grimsby. (875)

P ATENTS and Trade Marks. Handbooks and advice free.—KINGS PATENT AGENCY LTD. (B. T. KING, G5TA, Mem. R.S.G.B., Reg. Pat. Agent), 146A Queen Victoria Street, London, E.C.4. Phone: City 6161. 50 years' refs. (98)

P YE PCR.2 receiver, modified, covers 15-20-40-80-160 plus L. and M.W., £10. Transmitter/receiver, 18 set, Mk. III, £4. 38 set, £1 10s. Power unit type 3, £3. Wavemeter 1310, £3 10s. Tannoy 60-80 W amplifier type 6, re-valved, £10. Wavemeter 1191, £4 10s. Indicator, type 198, £1 10s. 100 micro ammeter, 4-in. scale, £2 10s. Valves: 813, £2 5s.; 35T, £1 5s.; 715B, 830B, RK2CA, 211, 10/-; 872A, 836, G6G, 7/6; 6J5, 4/-; Mains p.p. d.c. outputs, 250 V at 80 mA and 12 V at 3 1/2 A, £2 5s.—Box 864, NATIONAL PUBLICITY CO. LTD., 36-37 Upper Thames Street, London, E.C.4. (864)

Q SLs and log book (P.M.G. approved). Samples free. State whether G or B.R.S.—ATKINSON BROS., Printers, Elland. (772)

R EQUIRED urgently: QRO table-top, all-band transmitter and Eddystone 740 or 750. Price reasonable.—Write or phone, BARNES, 4 Victoria Road, Hale, Cheshire. (Altrincham 4464.) (869)

R .1155 built-in output stage, power supply in matching crackle case, £8. I.F. crystals, 558 and 560 kc/s, suitable for 1155 filter, 25/-; Woden DT1 and DT2, mint, 25/- each; UMI, slightly used, 35/-; RF27, converted 21 Mc/s, 25/-; Adcola iron 15/-; Mic 6 insert, 10/-; Carriage extra.—Offers, G3EVU, 94 Locksley Park, Finaghy, Belfast. (880)

R .1155, modified, less speaker, £10. Crystals 7030, 7124, 7235, 10/- each. PT15 (2), 5/- each.—Uxbridge 5200 evenings. (873)

R .107, unmodified and complete, excellent condition, £9, or exchange set of 4 H.R.O. bandspread coils. Collect or carriage extra.—FELTON, G3IEF, 46 Prebendal Avenue, Aylesbury (Aylesbury 542.) (831)

S ALE.—R.1155N, internal p.p., 6V6 output, fitted in Eddystone cabinet, illuminated dial, needs slight attention. Eddystone 3 in. L.S., also 19 set Mk. II; R.1155 p.p. and 6P6 output; RF.24 unit, etc. Offers and s.a.e. please.—"The Elms," 126 Weston Road, Meir, Stoke on Trent. (863)

S ALE.—36 ft. steel mast, 9 sections. TUSB Clapp v.f.o. TUS crystal oscillator, 40 m. p.a. Modulator power units: 350 V 250 mA, 6.3 V 3 A, 250 V 100 mA, 6.3 V 2 A, 120 V bias pack, 7110 kc/s crystal, 100 kc/s crystal bar, 12 meters. Spares, £18 or offers.—SULLIVAN, 48 Shelton Avenue, Warrington, Surrey. (861)

(Continued on Page 372)

EXCHANGE & MART SECTION

(Continued from Page 371)

SALE.—Rack-mounting p.p. PT15 p.a., all brand, 30/-, Modulator AB2 807s, multimatch output, 40/-, Exciter 807s, 30/-. Power supplies: 1,000 V at 350 mA, 75/-; 500 V at 500 mA, 65/-; 500 V at 300 mA, 55/- Transformer, 500-0-500 at 300 mA, 2 x 4 V c.t., 25/-, "Principles and Practice of Radar," Penrose, 40/-, "Wireless D.F.," Keen, 30/-, "Radar Engineering," Fink, 30/-, "Radio Handbook," 15th edition, 12/6, "Ladner & Stoner," 20/-, Parmeko chokes, 10 H at 120 mA FB, 7/6.—Box 833, NATIONAL PUBLISHERY CO. LTD., 36-37 Upper Thames Street, London, E.C.4. (833)

SALE.—3-valve T.R.F. receiver, plug-in coils, 1 w./m.w./s.w. (10-160 m), no power pack, 45 (excluding carriage).—GUTTERIDGE, "Greendene," Blackwell Common, West Town, Nr. Bristol. (825)

TS.47 v.h.f. test oscillator, 40-500 Mc/s, in absolutely brand-new and mint condition, £60 o.n.o. Supreme U.S.A. 504-A valve tester, combined multi-range meter, in new condition and perfect order, £15. Both items plus carriage.—Box 835, NATIONAL PUBLISHERY CO. LTD., 36-37 Upper Thames Street, London, E.C.4. (835)

TYPE 210 signal generator, 20-88 Mc/s, modified 230 V a.c.; manual; no noise diode; £16.—"The Shack," Beddau Road, Caerphilly, Glam. (828)

VALVES.—At 1/6: KBC32, KF35, KL35, 25A7, RK34, VR503, BL62, X65. At 2/6: ILA6, ILN5, 1625, SU2150A, KT63, SP61, SP41, RL37, EL33, EB34, 12J5, 6SH7, IC5, 12SN7. At 5/-: EC52, EF39, EF50, 6AC7, 6L6, 6J5, 12SJ7, 6X5, 12C8, EF54, VT52, 8018, VT501, 6SK7. At 6/-: 1A7, 12SA7, 12SC7, 12K8, 6K7, 6F5GT. At 7/6: 6SJ7, 6SL7, 6SN7, 6SC7, 6N7, 807. At 10/-: 6AG7, 85A1, VR105, VR150, VR90, SZ4. Also CRT for Cossor DB oscilloscope, £3 10s., and TU5B (new), £2. Please include about 3d. per valve postage.—G3HIT, 145 Cambridge Road, Trumpington, Cambridge. (852)

VALVES, mostly unused: (6) 834, (7) 801, (2) 804, (2) RK28A, (2) PT15, (5) PVO6-25, all at 5/- each.—G2CZS, 392 Baddow Road, Chelmsford, Essex. (858)

VITAVOX (£6 10s.) B.50 microphone, used few times, new condition; offers. Want UM3.—G2IK, 42 Norton Road, Bristol 4. (837)

WANTED.—BC.610 Hallicrafters, ET.4336 transmitters, SX.28s, AR.88s, receivers and spare parts for above. Best prices.—P.C.A. RADIO, The Arches, Cambridge Grove, W.6. (842)

WANTED. buy or borrow: Data on the German naval transmitter, type 18705/1, manufactured by Lorenz.—G3IUV, 182 Oxford Road, West Hartlepool. (867)

WANTED.—Handbook or circuit, receiver RG.39 (1-24 Mc/s CR.100 type).—G3HWE, 9 Peverels Way, Northampton. (857)

WANTED.—H.R.O. coils, receivers, power packs, AR.88Ds, AR.88LFs, SX.28s, BC.348s, AR.77s, etc.—Details please to R.T. & I. SERVICE, 254 Grove Green Road, Leytonstone, E.11. (LEY 4986.) (101)

WANTED.—R.C.A. speech amplifiers type MI-11220 J or K and aerial tuning units BC.939A, coils and tuning units for BC.610 transmitters.—Offers, stating quantity and price to P.C.A. RADIO, The Arches, Cambridge Grove, W.6. (843)

WANTED.—R.C.A. 4331 transmitters.—P.C.A. RADIO Cambridge Grove, Hammersmith, W.6. (Telephone RIVERSIDE 3279.) (562)

WOLF electric drill, 1/2 in. heavy duty, type NW3cE, 230-250 V, 750 r.p.m., complete with stand; as new; £13 10s. plus carriage.—G2BVM, Ixworth, Suffolk. (851)

I 130 A v.h.f. signal generator, 100-156 Mc/s. Taylor 45B valve tester wanted: state condition and price. TS.47 and BC.639A handbooks wanted, buy or loan.—Box 836, NATIONAL PUBLISHERY CO. LTD., 36-37 Upper Thames Street, London, E.C.4. (836)

W c.w./30 W 'phone band-switched American transmitter, break in, netting, T9X v.f.o. and crystals, direct freq. calibration, 1.5-12 Mc/s, doubles to 14 Mc/s. All-cast construction, superb job, £10.—G3ARI, 73 Deepdene, Potters Bar. (Phone 4592.) (834)

150 W T.V.I.-proofed, full-metered c.w./'phone table-top transmitter, 813 p.a.; separate enclosed 1,250 and 450 V supply; £42. R.F. unit No. 24, brand new, £1. 600 V 200 mA metal-cased supply, £3. 250 V 25 mA and 18 V metal-cased supply with dropper, leads, switches, etc.; perfect for Wilcox Gay v.f.o.; £2 10s. Prefer buyer collects or carriage extra. Worcester area. —Box 826, NATIONAL PUBLISHERY CO. LTD., 36-37 Upper Thames Street, London, E.C.4. (826)

188 "Wireless Worlds" and "ABACS," 30/-. 33 "Short Wave Magazines," A/R handbook and valve manual, 5/-. 29 technical journals, 15/-. Servicing manual and laboratory handbook, 7/6; or the lot, 35/-. The Electrical Encyclopedia, comp. 4 vols., Fb condition, 65/-. The Business Encyclopedia and Legal Adviser, comp., 6 vols., 30/-; or both sets £4.—G3ERR, 1 Braemar Gardens, Colindale, London, N.W.9. (871)

45/- paid for new boxed 813s; 20/- for new boxed TZ40s. Details to Box 874, NATIONAL PUBLISHERY CO. LTD., 36-37 Upper Thames Street, London, E.C.4. (874)

3/2 EACH: 9002, 9003, 6AJ5, 6AR6, 7193, 5/- each: 1X2A, 6CB6, 9001, 6AK5, 6C4, 6AG5, 6X5, 6C5, 6L6, 6AQ7, TT11, U22, P61, 12A6, VR56, VR57, RK74, 705A, 7/6 each: 6X4, 6BE6, U12/14, PT15, 10/- each: 807, CV90, 15/- each: 446A, 2C40, 2C44, 40/- each: 813, Please add 3d. each post and packing.—JEAPES, 129 Cambridge Road, Trumpington, Cambridge.

APPOINTMENTS SECTION

Appointments vacant

HATFIELD Instruments Ltd., who are now expanding their laboratories, require senior and junior electronic engineers with experience in the repair and recalibration of high-grade radio and industrial laboratory equipment.—Apply in writing in the first instance, stating age, experience and salary required, to HATFIELD INSTRUMENTS LTD., 175 Uxbridge Road, Hanwell, W.7. (840)

MINISTRY OF CIVIL AVIATION.—Radio mechanics required at aerodromes and radio stations in various parts of United Kingdom. Special training courses for keen mechanics with basic qualifications. Interesting work in progress providing electronic aids to navigation. Prospect of permanent pensionable posts. Rates of pay (London) from £290 per annum at age 19 to £385 at 25, rising, subject to qualifying test to £475, plus pay addition of 10%. The rates are slightly lower for the Provinces. Candidates aged 19 or over with practical experience in maintenance of radio or radar equipment should apply to Ministry of Labour and National Service, Barnsbury Road, London, N.1, quoting Order No. Kings Cross 576 (860)

SKILLED RADAR MECHANICS urgently required by the Ministry of Supply for duties in connection with experimental electronic work at the Telecommunications Research Establishment, Malvern, and the Radar Research and Development Establishment, Malvern. Applicants should have completed an apprenticeship (or equivalent) in the radio or electronics industry, or have served an equivalent period in an appropriate trade category of H.M. Forces. Wages on entry at 16s/4 for a 5-day, 44-hour week, with prospects of advancement up to 18s/4 per week for those fully qualified. Single hostel accommodation is available.—Apply giving full details of apprenticeship, training (including Forces training), qualifications and experience, etc., to Chief Superintendent, I.R.E., Great Malvern, Worcestershire. Applications from Instrument Makers, Moulders, Turners, Millers and Aircraft Engine and Airframe Fitters will also be welcomed. (877)

WANTED.—Good operators to fill the Army Wireless Reserve Squadron. If you value your time on the air, help to preserve it. Fifteen days' paid training plus interesting voluntary activities throughout the year. Dig out that application form you collected from the Amateur Radio Exhibition, or write now to G3ADZ at 230 Devonshire Avenue, Southsea, Hants, for details. (846)

CROWN AGENTS FOR THE COLONIES

WIRELESS AND TELEGRAPH SUPERVISOR required by the Nigeria Government Railway Department for one tour of 18 to 24 months in first instance. Option of appointment either (a) on agreement with a prospect of permanent and pensionable employment on salary £750 rising to £1,175 a year (including expatriation pay) or (b) on a temporary basis at salary £807 rising to £1,269 a year (including contract addition and expatriation pay) with a gratuity on satisfactory completion of final service of £25 or £37 10s. according to salary, for each completed period of three months' service. Outfit allowance £60. Free passages for officer and wife and assistance towards cost of children's passages or their maintenance in this country. Liberal leave on full salary. Candidates must have a sound knowledge of International wireless operating, of telegraph working, and of the general running and supervision of a Telegraph and Wireless office. They should have experience of the working and handling of traffic over wireless and telegraph networks together with technical knowledge of modern H.F. radio transmitters and receivers and of telegraph circuits. Candidates employed by the General Post Office should apply through departmental channels. Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience, and mentioning this paper, to the Crown Agents for the Colonies, 4 Millbank, London, S.W.1, quoting on letter M.29579.G. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (881)

Appointments wanted

EXPERIENCED radio engineer, City & Guilds and other certificates, fully equipped with test gear and facilities at home, being now disabled, desires experimental or development work in radio and allied fields. Intricate assembly work undertaken. Open to suggestions.—JIM SLATER (G3EKF), 79 Newhouse Road, Blackpool. (Tel. Marton 794.) (829)