

The

6^p

SHORT-WAVE MAGAZINE



No. 8

OCTOBER,
1937

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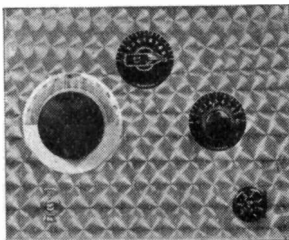
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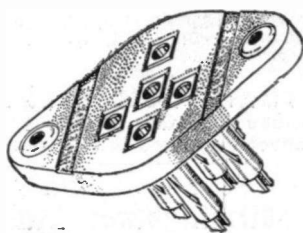
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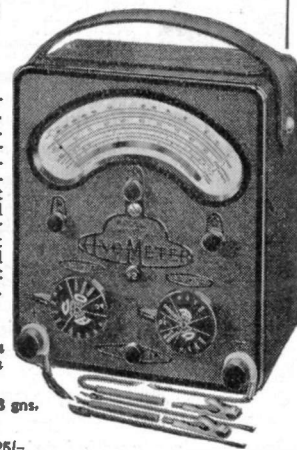
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THE SHORT-WAVE MAGAZINE

Vol. 1

OCTOBER 1937

No. 8

Editor: BASIL WARDMAN (G5GQ)

Editorial Asst.: S. W. CLARK

Advertisement Manager: C. T. MILDENHALL

WE HAVE received a large number of letters from readers singing the praises of THE SHORT-WAVE MAGAZINE, in fact we may safely say that not a day passes without at least half a dozen complimentary letters arrive. Why don't we publish them? Because, Mr. Reader, we think you would grudge a page devoted to our own self-advertisement.

As we have said before, we on this magazine are not only interested in short-waves as journalists, but as enthusiasts in yours and our hobby. Radio has progressed in the last ten years, the apparatus we used then is as antiquated as yesterday's news. But has radio journalism progressed?

In a progressive age the technical paper must progress with the technique: what was good enough ten years ago is not good enough to-day. Science demands the discarding of obsolete ideas: surely we should, in a scientific magazine, use scientific principles?

And so in THE SHORT-WAVE MAGAZINE we have tried to be as modern as the hobby we write about. Examine it. You will see that the cover is different to any other, the titles and subtitles are "livelier" than the general run of technical papers, the presentation has a style that is unique.

We mentioned the word "livelier" just now, and that is the keynote of this paper. We want to get the impression of life running through it, so that you feel you are actually taking part in events, not merely reading about them.

It has been suggested that we are American. To some people anything "new" is American. Let us say once and for all that we are not American, but progressive. Short-wave radio is inter-continental as opposed to international. Our duty is to inform you of the latest developments, and if the larger proportion of them originate in America, must we ignore them just because they do take place there?

Another idea of ours is that only by giving full value for money can a journal succeed. We claim that space in THE SHORT-WAVE MAGAZINE is more valuable than any other radio journal. Figures are invariably boring so we won't quote any, but we do ask you to compare the number of articles we publish each month with those of any other radio journal. We average about twenty separate features each month, and every one of these is entirely short wave. Count up the number in any other and see how many articles you get for each penny spent. THE SHORT-WAVE MAGAZINE gives better value. It means that words cannot be wasted, each feature must be "pithy," otherwise we could not maintain the number.

Our contributors are composed of the leading short-wave writers in the country: men who are themselves interested in short waves, and who therefore understand and will supply the needs of other short-wave enthusiasts.

Glance through this issue. You will find RAY CORTON writing simply on radio perplexities, a S.-W.M. exclusive writer; CHARLES WHEELER, another S.-W.M. "exclusive," tackles elementary transmission from an entirely new angle; F. A. BEANE, leading short-wave broadcast expert, brings the latest short-wave station news; "CENTRE TAP" supplies the lighter vein; while "THE DX SCRIBE" caters for the dx enthusiast.

On the technical side AUSTIN FORSYTH (G6FO) and the EDITOR (G5GQ), both active amateur transmitters, arrange the technical and constructional articles, while S. W. CLARK, Assistant Editor, takes responsibility for circuit drawing, constructing, and testing.

Such is the policy of THE SHORT-WAVE MAGAZINE, progressive presentation of a progressive hobby.

VALUE!

Contributions for publication in our editorial pages will be given consideration and payment will be made for matter used. Only manuscript accompanied by a stamped, addressed envelope will be returned. Whilst we are willing to advise on suggested articles no guarantee of acceptance can be given.

The publisher does not necessarily agree with the views expressed by all correspondents and contributors, the aim being to open the columns to every phase of opinion.

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AN AMATEUR VISITS RADIOLYMPIA

RADIOLYMPIA, a mass of lights, music from loud speakers, a blurred mass of people, miles of exhibits, that "tired feet" feeling, and finally the welcome breath of fresh air on emerging.

Those were my first impressions of the show, and probably of many who visited it. And so, having recovered from my bewilderment, I am going to try and tell you something of the people and exhibits I saw.

On entering I made a bee line for the Eddystone stand, and there was greeted by G5BJ and G6XK, both well-known to most of you who listen around 20 metres. G6XK, by the way, is doing a lot of flying now, so is able to test equipment under really rough conditions.

● New Condensers and Dials

They have certainly beaten the Americans with their new range of transmitting condensers, not only in price but also in quality. Two types are made, the low voltage (3,500 volts) using DL9 insulation, and the high voltage types Frequentite. The construction embodies rounded and polished aluminium plates with cast end plates. The attention to detail is shown by the use of small angle brackets cast integral with the end plates so that the condensers can be mounted on stand-off insulators from the chassis. Both straight and split-stator types are available and so it looks as if they will monopolise the transmitting condenser market this year. A beautiful low voltage type is also made in solid brass throughout, even the vanes being soldered together.

Most of us have seen with envy those wonderful looking dials on American equipment, and so the new Eddystone dials of similar construction will be welcome, especially as the price is well within reach.

Altogether it was a very enjoyable visit to this stand. We had an interesting talk on various topics, and 5BJ was telling me something of the effect of chokes in the mains leads for suppressing interference from transmitters. He told me that in his experience 90% of the trouble was in mains borne.

● Switches and Transformers

Next, to Bulgins, where I ran into H. T. Stott, technical chief. He told me some interesting facts about switches. One of the troubles they had come across was "earthing," and they had traced this to quite a simple thing. It was not insulation, but to the fact that when the switch was "opened" a spark occurred, and the area this spark covered sometimes was so large that the moving part of the switch travelled with it. To overcome this they have used what amounts to an insulated extension handle, inside the switch, between the moving part and the toggle. This travels through the area of the spark but being an insulator cannot earth anything. It struck me as very ingenious, and shows the tiny things which are so inconspicuous and yet so important.

A remarkable product he showed me was the new range of midget transformers, actually the size of a postage stamp. Seeing my look of surprise he remarked that I evidently thought them inefficient, but that although so small in size they were 85% as efficient as the very largest type made. He suggested their use for portable receivers and transmitters, but to me they also seemed ideal for microphone circuits, especially as line transformers can be wound to order. I intend to try a pair between a condenser microphone and the main amplifier.

For portable use they are making a complete line of vibrators, so that h.t. can be taken off a car battery. These little gadgets are just the thing for use when the receiver or transmitter is taken into the country, far easier than carting high tension batteries around!

● Seven and Ten Metres.

I thought it was time to look at some receivers so I went across to Pye's stand, where G5HI greeted me. Their most impressive set (to me) is the QAC5, which not only covers the television sound channel, but also the ten-metre amateur band, a very useful feature. The output has been increased to 7 watts, variable selectivity has been fitted and also "fly-wheel tuning." This tuning is very nice, as a sort of heavy flywheel is fitted internally. Owing to its weight the finest slow tuning can be done with absolutely no trace of backlash, while if one wants to tune from one end of a band to the other quickly, all that is necessary is to flip the dial and the heavy flywheel carries the tuning right across without further effort. With complete coverage without a break from 6.5 to 66.7 metres (in three bands). Last year's model had more sensitivity than is required by most, so this improved model should be very "hot."

Another new model which will find a ready market is the QPB, a battery portable all-waver. I suppose "self contained" is the real description, because it is of the table type, not the suitcase, and so is not meant to be carried about under the arm but from room to room or in the car. One short-wave range is used, 18.3 to 52 metres.

● Testing Instruments and Soldering Irons

Calling at the Avo stand I was surprised to find the number of products they manufacture. Everybody knows the Avometers, from the big 46-range Model 7 at 16 guineas to the smaller Avominors. The pick, from the amateur point of view is the Universal Avominor. It gives d.c. readings from 75 millivolts to 500 volts, 2.5 milliamps to $\frac{1}{2}$ -amp, a.c. volts from 5 to 500, and resistances from 20,000 ohms to 10 megohms. The full-scale readings allow much smaller readings to be taken. The meter is, of course, moving coil and apart from the more obvious direct measurements is useful for measuring the output voltage of receivers for "lining up."

Priced at £5 10s., it is a cheap proposition compared with using a number of meters for these different measurements.

Soldering irons are always a nuisance to amateurs. They never seem designed for the job, and there is nothing more infuriating than trying to solder an out of the way joint with the average bit. I didn't know until now that Avo's made them, but their "Zeva" irons are a distinct improvement over the ordinary pattern. The bit itself is detachable, fixed with a taper pin, so that it can be changed in a matter of seconds, and also the length of bit protruding from the iron can be varied.

Other test instruments displayed were the valve tester, working on the mutual conductance principle, and providing for British and foreign valves, and a very neat modulated oscillator giving from 100 kc. to 30 mc. without external coils. Non-radio products which interested me were the exposure meters. I used one of the cine models last year and found it absolutely fool-proof, as it had to be because I was using a strange camera, but not a single film was wrongly exposed. Over in America I left the exposure meter in a taxi in Washington, but some kind soul traced me and I found it waiting for me on the liner at Quebec.

● Cathode-ray Tubes and Valves

Valves were my next interest, and I was lucky to run into L. Grinstead, transmitting head of Mullards. We had a long chat on modulation, especially anode with class B modulators. It's a thing which looks nice on paper, but when the r.f. valve load is dynamic, and the class B ultra-dynamic, quality is anything but. He, like me, prefers low level modulation, especially with pentodes. There is no bother with modulation chokes, or high output modulators, and with reasonable care linear modulation is easily obtained. It can be got with the other system, provided a few cathode-ray oscilloscopes and signal frequency generators are available, but what amateur has? I was glad to hear that they are after the amateur market at last, and are reducing prices and introducing new types of transmitting valves which will make the use of American transmitting valves uneconomical.

In the receiving line, their new TH4A triode-hexode, and the TSP4 r.f. pentode, designed for television receivers struck me as useful for 10- and 5-metre receivers.

To those with American receivers the Tungram range of American "tubes" is interesting. They are guaranteed equivalent to R.C.A. standard, and the 6C6, 6DT, and 42 types I have used were quite up to the R.C.A. I have. They also make a triode-hexode in the American range, a thing the Yanks have not done yet. Tungrams can supply specially matched sets of valves for most American receivers, an important item with some of the multi-valve communication type. Transmitters will be interested to hear that they are making an equivalent to the RK20.

Hivac's chief item was the all-purpose valve, a multi-element valve for use in any position in a set.

Unlike most receiving valves they can be driven into positive grid current so can be used for class AB audio. They are the originators of the "critical anode" principle, pirated by the Americans in the 6L6 types, but I hear that they, the Americans, are going to make them under licence. The Hivac 6L6 gives more output in class AB than do the Yank types in class B.

The special short-wave types were also on show, an interesting feature being that either the grid or anode can be brought out to top cap.

At Ediswan's stand I saw Geoffrey Parr, of cathode-ray tube fame. He showed me the new Mazda D1 diode for u.h.f. work. This is a low-capacity valve with special base and the diode brought out to a top cap. Two new power valves are the PA20, giving 4.2 watts, and the PA40, designed for class AB in which a pair give 43 watts.

● Converters, Microphones and Speakers

I often hear of people with d.c. receivers moving to localities where a.c. is used. At the Regentone stand they were showing various types of rectifiers expressly designed for operating d.c. sets off a.c., and at a price of £3 10s. average they should prove extremely useful. Regentones were not only showing their usual fine range of eliminators, but also two new short-wave products, the first a converter with integral power supply selling at £4 19s. 6d. and covering from 6.5 to 80 metres without a break. This should be good for the ten-metre amateurs and the nine-metre American police bands, both of which are so good now. The other is a universal mains transportable all-waver, selling at £9 17s. 6d. and covering from 16-2,000 metres. This is really transportable, being small in size, and equipped with a carrying handle. It is small enough to go into an attache case, so is just the thing to take away when travelling.

At Dubiliers Messrs. Higginson and Bennett showed me the new ceramic dielectric condensers. These resemble a button with a wire on each side, and are especially suitable for short-wave receivers as they are exceptionally constant. Instead of foil, metal is sprayed directly on to the ceramic insulation, so there can be no movement. These types (CD and CC) are about one quarter the size of the usual mica type. For h.t. smoothing the oil-filled types are remarkably cheap, a 2 mfd. 1,000 volt type costing 8s. 3d., and having infinite life. A new type, the 680, moulded mica, 2,000 volts working, listing between two and three shillings is a useful line for p.a. people or transmitters. Incidentally, Mr. Bennett told me that if those requiring condensers for p.a. or transmitting work would write to him he would be pleased to advise them of the types to use. It's a good tip, because he has saved me quite a bit of money in advising a cheaper condenser where I should have thought a far more expensive one was necessary.

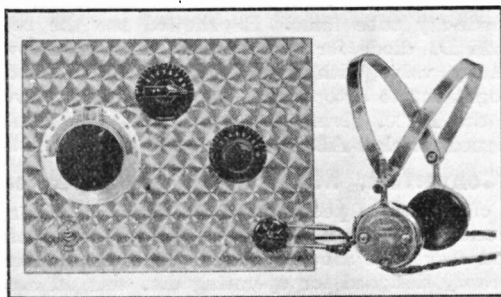
Fitting a two-pin plug into a three-point socket! At Clix stand I was shown this with their new type mains plug, designed to fit even the worst type of

(Continued on page 14.)

DETAILED WIRING INSTRUCTIONS FOR "THE S.-W. M." ONE-VALVER

First described in March and
now successfully in extensive use

By S. W. CLARK



The featherweight 'phones show compactness of a commercial model.

EIGHT MONTHS ago we published the circuit of a receiver designed by our Editor and built round a Class B valve, the first triode as detector and using the second as low-frequency amplifier. We make no apology for presenting again this simple but effective receiver, believing that it is impossible to obtain more from one valve; it has now been in constant use long enough for us to assure readers that it has come to stay.

We do not propose to take up space in this issue with relating its many hours' use, instead various radio societies have had the receiver on loan and their reports will appear later.

No circuit alteration is indicated. Mains working has yielded little success as also have additional amplifiers. It has been found that the original features are negated or lost in any alterations tried, but there are minor modifications, for a few components are now obsolete: the valve and coil holders (7- and 4-pin respectively) are replaced by the new Eddystone type 1073/5; use is made of a Bulgin battery cord and plug in conjunction with a Clix 5-pin valve holder in place of terminals, as some difficulty has been experienced in insulating terminals in the earlier models. Individual choice will decide the method used, the under chassis wiring drawing (presented with the "Ideal" receiver plans on a separate sheet with this issue) illustrate connections used with valve-holder battery connections.

The circuit is reproduced opposite; space does not permit again giving the list of parts and coil data which appeared in the March issue. Copies are still obtainable.

Advertised kits of parts are obtainable either ready wired or, for the constructor desiring to make

his own, chassis and/or kits of parts are available for building with the aid of the wiring diagram. The earlier photograph makes it unnecessary to reproduce a drawing of the above-chassis wiring as only four wires require connection from below to the controls.

● Mounting the Components

Underneath wiring should be tackled first, then there will be less possibility of damage to the condensers in the process of connecting up all but four wires. Commence by mounting the switch, 'phone jack and terminals (if a 5-pin valve holder is used for battery connection then only earth and aerial terminals will be necessary). Position the battery connector with the plate pin at the lower edge.

All terminals except "earth" must be well insulated from the chassis. The switch requires no insulation, but make certain that no portion of the jack contacts the cabinet, *this is most important*.

Fix the valve and coil holders in the positions apparent from drawing; use one $\frac{1}{4}$ -inch screw only in each for the time being, longer screws are necessary in the two remaining positions for later attachment of a .001 condenser to each. The drawing does not fully illustrate this point as the two condensers in question are shown removed from final position for clarity.

Grid leak (5 megohms) and condenser (.0001 mfd.) wire ends are twisted together and covered with a short length of sleeving. Do not rely on a twisted connection between these components but make certain that both wires protrude sufficiently from the covering to receive solder. Bend the leads to shape but do not solder at this stage. It is assumed that most joints will be soldered, but those not able to make a satisfactory job may of course use the terminals provided on components for fastening the wires.

Next fix a .001 condenser to the valve holder. Take the nearest wire end round the holding screw and under the nut, continue to filament pin indicated, this connects pin 4 to l.t. + via chassis. The wire ends on resistors and condensers should not be cut.

Join one end of the .5 condenser to terminal marked "con" on transformer, the other end must be connected to the high frequency choke and 20,000 ohms resistor. Free end of the h.f.c. is joined to a .001 condenser. These five components are then placed in position and retained there temporarily by fixing the transformer and condenser near pin 2

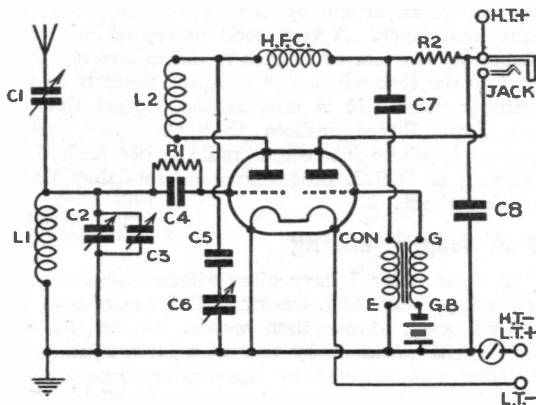
of coil holder. The .5 condenser may be pushed into the choke for about one-eighth of an inch if the earlier type choke is used (HF 14).

● Connecting

While fixing this latter group of parts it will be time for heating the soldering iron. Connect coil pin 4 to h.f.c. where it is already joined to the .001; valve pin 1 to "G"; "E" to chassis and then on to earth terminal. The latter connection is necessary if chassis is in two parts, future corrosion between panel and chassis may cause bad contact.

Coil pin 2, after being earthed to chassis, is taken to one side of the switch, remaining side to h.t.— and l.t. +; pin 3 of the coil goes to 3 of valve; pin 5 to l.t.—; pin 7 to tube of jack. Vacant pins now are: coil, 1; valve, 2 and 6. No. 6 requires no later connection.

Tip of jack is joined to h.t. + and .001 condenser previously mounted with valve holder. Solder this wire at the jack end first and cover about half the



wire with sleeving, here join the free end of the 20,000 ohms resistor and slide on remainder of wire covering.

It is now necessary to place the variable condensers, no insulation is necessary but if aluminium be used for chassis construction spacing washers will be required. Four holes are needed for taking wires to these condensers from underneath. Reaction condenser (957) has one wire only (fixed plates) and this is taken to the .001 fixed condenser mounted on coil holder.

The tank and bandspread (1042 and 1043) fixed plates are joined above and taken through to pin 1 of coil where is soldered also one end of grid leak/condenser and the moving vanes of the aerial pre-set. The fixed plates of aerial condenser are connected to terminal marked "aerial."

Battery cord wiring is colour coded: Red, h.t. +; black, h.t.— (a lead is taken from the battery end of this wire to grid bias +); yellow, l.t. +; white, l.t.—; blue, g.b.—. In the original version the bias battery had no external leads as it was clipped under the chassis.

Coil data, and list of parts, except for modifications above, remain as appearing in the March issue.



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Secretary: **RADIO SOCIETY OF G.T. BRITAIN,**
53 VICTORIA ST., LONDON, S.W.1

Reflected Waves and Side-splash

in other words—All Sorts of Things

THE TWELFTH Radiolympia has come and gone. A few years ago this event set the amateur radio world agog with excitement but now, apart from the stands of the valve makers, short-wave component specialists, speaker and meter manufacturers, etc., our interest annually diminishes and it rouses only the casual interest of even the most enthusiastic fans. I asked a provincial visitor what interested him most there and he replied "Metropolis Garages Car Park." This is undoubtedly a wonderful place—ten parking floors 100 yards long, served by internal spiral roadways for entrance and exit. You merely park, jump into the lift to the ground floor and enter the Exhibition under cover the whole way.

While he may have been exaggerating I must admit that I could find nothing startling there, not that one could very well expect to, in short-wave lines at least. Components follow very practical lines—amateurs know what they want so "stunting" in that direction would come as a bit of a shock. All the usual gear was well represented although somewhat overshadowed by the broadcast sets which were very well displayed, but despite the rival attractions of television, the all-wave aspect was the star turn of the Show.

● The Deciding Factor

I travelled to Olympia with an uneasy feeling, being somewhat prejudiced by newspaper bally-hoo, that I was either going to see a B.B.C. super vaudeville show or a giant shop-window of "one-knob-for-everything" sets specially designed for extreme cases of senile dementia, so I felt little of the disappointment cynically expressed by my provincial friend. Indeed, I quite enjoyed it—there was plenty of good stuff to be found—but it had to be looked for. The television side was good, for those so interested that is, but most amateurs have already seen demonstrations, and manufacturers furthering their hush-hush policy were silent when it came to handing out any real dope. I came away with the firm impression that the best brains in the industry had been applied to designing bigger, more colourful and more easily operated dials—undoubtedly selling point No. 1.

● Unkind

To add to the pleasure of my visit I looked up many old friends and acquaintances, some of whom I had not seen since last Radiolympia. One incident is worth relating—the laugh is on Mr. Cholot (Lissen, Ltd.). This firm was giving away a puzzle, and for the benefit of those who could not do it the solution was shown every hour. This duty fell to Mr. Cholot—he's got a flair for that sort of thing, as many readers who have heard him address their local radio club can well testify.

Incidentally, he must share with Mr. W. G. J. Nixon of the G.E.C. (Osram Valves) the record number of radio club addresses. However, to get back to the story, while giving the solution, Mr. Cholot served up a neat little conjuring trick done with a packet of cigarettes (and a Lissen receiver, of course), so a certain wag drew out a notice which read E. CHOLOT, CONJUROR AND ENTERTAINER and stood it behind him. The cigarette trick was mystifying, it had me guessing until he showed how it was done and then it was just too simple.

● A Hopeful Sign?

"King's English is the language of the air" was the title of an article by Lord Forbes in a leading daily newspaper. A very good survey of ham conditions it was too, coming as it did in striking contrast to the tosh which has appeared recently in the ordinary press. It is encouraging to feel that at last Fleet Street realises that there are many thousands whose interest in radio is not limited to listening to B.B.C. programmes on sets they know nothing about.

● A Happy Ending

In these notes I have often referred to the good fellowship prevailing among radio amateurs. As actions speak louder than words, let me relate a simple little incident by way of a further example. A letter was received by the Editor from a keen bedridden short-wave listener in Sheffield. The Editor got into contact with Mr. D. H. Tomlin, the hon. sec. of the Sheffield Short-Wave Club, and acquainted him of the invalid's plight, resulting in his being accepted as a member of that club (he has already been accepted as a honorary member of the N.R.S.) and a visiting rota being arranged to enable him to meet and exchange views with his fellow members. Further comment unnecessary.

● Pleasant Shopping

Most districts, I suppose, are served by a shop of the type I call, for the want of a better name, the "handy" shop—you know the sort of place I mean, where sheet metal, rodding, angle pieces, wire of all gauges, nuts and bolts of all sizes, etc., are sold. They are invariably "friendly" places tucked away in a side street—one-man affairs, with the stock all higgledy-piggledy. A place where you can go in to buy two-pennyworth of something without feeling the slightest embarrassment and the proprietor (no high pressure salesmanship about him) leisurely attends to your needs however large or small, chatting affably while he counts out the dozen soldering tags or whatever else you may require.

In the district where I live there is a delightful example of this type of shop and I often find myself popping in for oddments. Every time I go there, rarely spending more than a shilling or so, I feel I ought to have to pay an extra copper or two for the convenience of having such a place to readily supply the little sundries needed for constructional and experimental work.

During the school holidays I noticed quite a number of schoolboys making purchases: obviously real constructors who spurn ready-made stuff, buying lengths of ebonite former, transformer stampings, eureka and litz wire, etc., going the whole hog and making their own components.

● No Credit Given

Discriminating purchasers they are too! One lad I noticed was choosing a pair of headphones from the secondhand stock. He wanted a pair not weighing more than so much, large ear-pieces and wide head-bands, and finally, not costing more than two shillings! Nor was he taking any chances: the pair he finally selected were submitted to almost every known test and concluded by his taking a coin from his pocket, spitting on it and touching the leads on the moistened part while he listened intently. Yes, that pair would suit. What, the proprietor wanted half-a-crown for them! Well, the buyer only had two shillings and a penny. No chance of a reduction? Very well, he would pay sixpence on them and have them reserved until he got his pocket-money at the end of the week. So the 'phones went in to the "reserved" box with an assortment of other items evidently standing by for the same reason.

After the lad's departure I commented on schoolboy interest to the proprietor and he assured me that nearly a quarter of his customers were schoolboys and on a Saturday morning when they were free of homework and replete with pocket-money there was almost a continual procession of them in and out of his shop. He was indeed grateful to the science masters of local schools for covering radio in their lessons. Anyway, there will be no shortage of technicians and hams in future years.

● A Man of Promise

It would be interesting to mingle with these schoolboy enthusiasts and really get the "low down" on their ideas and ambitions. Their opinions, too, of the "handy" shop proprietor would no doubt be highly illuminating. In my schooldays there was a funny little shop where all sorts of interesting things were to be bought, ranging from working models of stationary engines to discarded cinema projectors all littered in hopeless disorder in an extremely limited space. I cannot recall ever having seen anything new there, but how we loved to go over that stock.

I well remember the eccentric proprietor too: we called him the "Inventor" because he used to regale us with stories of the amazing inventions he was working on, which, when completed, would alter the whole course of the war. In fact, once two or three

of them were finished a dramatic victory would be ours in a few hours. We waited very patiently for a long time expecting the "Inventor" to become a national hero and felt proud that he took us into his confidence, but he disappointed us and we gradually lost faith in him, even to the point of questioning the accuracy of his statements about the things he had to sell. Whereupon he would fly into a rage and chase us out of his shop regardless of whether we were about to buy anything or not. Later we called him the "blue-nosed old robber"—his nose was a bluish tint and anyway to our youthful minds he did seem to ask a lot for the things we most wanted. The shop finally closed down overnight and the stock was taken away. Rumour had it that the "Inventor" had been put away in a mental hospital. Whatever his fate he passed beyond my ken and his shop became a receiving depot for a laundry or something equally prosaic.

● Ex-W.D.

Alas, the "Inventor" had gone out of business too soon! A year or two later, with the end of the War, a new era was born. The era of the junk shop. The world was full of army boots, barbed wire and field telephones, and shops sprang up like mushrooms with more ex-W.D. stuff than the civilian knew what to do with at knock-out prices. Many, like myself, acquired quantities of crude wireless apparatus and began our even cruder experiments. I have always considered that time was the birth of popular amateur radio and not some couple of years later when broadcasting of a sort commenced. The ex-W.D. shops were very different from the "Inventor's." They had hundreds of every line, not just one of each item which had seen better days and had a history. Anyhow, I can still console myself by thinking they were run by mere money-makers and had none of the romance which simply exuded from the almost unreal "Inventor's" store.

● Live and Learn

At a friend's house the other day I saw his 13-year-old son (a chip off the old block) adapting an old .0005 variable condenser for a simple short-wave receiver, by removing half the vanes and double spacing the rest. Yes, everybody has been bitten by the short-wave bug nowadays, and it is not the result of all-wave Radiolympia, although one might easily be led to believe so after reading the daily papers during the Radio Show. When the laddie re-assembled the condenser (.00015 plus or minus umpteen per cent.) the rotor section was found to move stiffly, whereupon he "lubricated" the ends of the spindle by rubbing them with a lead pencil. Result—an effective cure. A non-greasy "lubricant" dear readers, containing graphite as the U.C.L. people say. How many of you would have thought of that? I shouldn't, and I have certainly never heard of it being done before.

Genere Zap.

"RADIOQUEST"

Armchair Understanding of Radio Riddles

Conducted by RAY CORTON

IT IS APPARENT from letters received that many desire a general radio knowledge without delving into profound technicalities. The majority of those who have asked that this need might be met are broadcast listeners who have now become the owners of all-wave sets and those who have not the time nor the inclination for deeper study. They may be likened to the car owner-driver who wants to know just what the engine, gears and clutch actually do, without becoming an amateur mechanic. Those with more ambitious ideas who have in the past become discouraged by the tortuous approach of conventional "beginners' courses" will find this series a useful starting point. To the latter class, let me first say that I am certain the vast majority of amateurs did not gain their knowledge from books or theorists; they gradually absorbed it by general reading and actual experience.

● To be both Pleasant and Interesting

You will now appreciate that this series of articles is to be a guide, and not a course of lessons. I am convinced that all the essentials can be learned in a pleasant manner without attempting to cram half-digested theory into a mind seeking interest rather than intense study. This is to be accomplished by explaining the meaning of terms already familiar by name, to show their relationship to one another and to outline in easily understood terms the whys and wherefores.

Having, I hope, both explained and justified this novel method of imparting elementary knowledge, I will get down to brass tacks by first tackling problems which, taken from readers' letters, seem to perplex most and deal with them progressively.

● Aerial design

Perhaps the question that has most worried these beginners is aerial design. Recently in this magazine there have been a number of articles on aerials which have delighted the more experienced amateurs out for dx (long distance) reception, but a distinct impression seems to have been left among beginners that it is impossible to listen to short waves without a special aerial. That is, of course, entirely wrong. A specially-designed aerial will work wonders with your reception but *any* aerial can be used for short-wave listening, so we can leave its design alone for a while yet. The usual single wire as used for normal broadcast reception will give quite satisfactory results—indeed much better than a special aerial wrongly employed.

Now that is clear we will consider the function of a receiving aerial. Wireless waves transmitted in

the normal manner travel through ether in *every* direction—it is too early yet to consider the effect of "beaming," which is simply to concentrate the energy radiated in a particular direction. Just at this stage we will not complicate matters by considering the manner in which sound is converted into electrical energy and transmitted through the ether in the form of waves. The carrier wave, as its name implies, carries the modulation or sound frequencies. This wave is controlled from the transmitting end and as it remains constant throughout its travel it thus can be, and is, referred to by the length of a single complete wave to describe the transmission. Refer for a moment to *fig. 1* and you will see that the distance from the crest of one wave (or cycle) to the crest of the next is the wavelength, the distance always being referred to in metres.

Wireless waves travel in a series of perfectly regular undulations. You must imagine them flying off from the transmitting aerial in every direction, north, south, east, west and every intermediate point of the compass, upwards and downwards, and

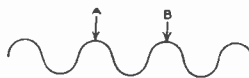


Fig. 1.

The distance between A and B measured in metres, is the wavelength.

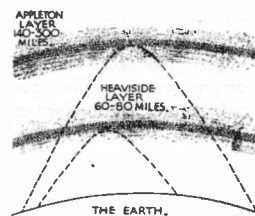


Fig. 2.

The dotted lines indicate the course of the wave.

not just as a single line at any particular level as many beginners seem to imagine after seeing a wave-form illustrated in the usual manner. These waves travel at the same rate as light, that is at the enormous speed of 186,000 miles per second—a distance equal to more than seven times the circumference of the earth—covering the whole area and not just a single point. If, for a moment, we compare them to a current of air such as the wind, passing the receiving aerial, we realise that only the minute part of the wave actually impinged on the wire will affect it, the rest travelling onwards, weakening, but not diminishing in speed or changing its form or length.

We have now considered the ground wave, that is the part of the radiated energy which travels along the earth's surface direct from transmitting

aerial to receiving aerial. It is the ground wave your aerial picks up when you listen to the local broadcast station, and, as you know by everyday experience, the further away you are from the local station the weaker become the signals. The reason for this diminution of strength is because the wave, travelling along the ground, is absorbed by objects with which it comes in contact, such as trees, buildings, hills, etc. Short waves are absorbed by these obstacles far more than ordinary broadcast waves, and so to cover any real distance with them by this means would need enormous power. I have assumed you already realise that to a certain extent wireless waves penetrate obstacles they encounter, otherwise, of course, an indoor aerial would be an impossibility. Now if we could receive short waves from a distant station without letting them come into contact with these absorbing obstacles we could use very low power and still get the same strength as if the station were quite local. Now this is exactly what does occur and accounts for you hearing distant stations so much louder than continentals on the long or medium waves.

The waves you receive from distant short-wave stations do not travel along the ground but up into the air until they reach heights varying between 60 to 300 miles, where, owing to the action of the sun on gases which exist there, they are reflected back to earth. The regions where these gases exist are known as the Heaviside and Appleton layers—see *fig. 2*. The approximate heights are given but you must not imagine they are sharply defined. They vary in intensity but are most highly ionised at those heights. These reflected waves reach earth again at a distance perhaps of some thousands of miles away, the angle of radiation (and consequently reflection) being controlled by the transmitting aerial design, but the great point is that none of the energy has been lost by absorption of obstacles at ground level. The gap between the point they leave and that to which they return is known as “skip-distance.” That is why short-wave stations are as strong at two thousand miles as your local broadcaster at a hundred!

Judging by those same letters, it is apparent that many beginners do not realise that the signals “caught” by their aerials are there the whole time whether the receiver is operating or not. They seem to think the receiver “feels out” or attracts them—this is a fallacy. A tiny fraction of every transmission passing the aerial is caught, many hundreds of signals being there at the same time, audible only when the set is adjusted to “tune-out,” rectify and re-convert them into a reproduction of the original sound, the number which you can hear in your phones or speaker being entirely dependent upon the efficiency of the receiver.

● The meaning of “Frequency”

Having digested the nature of waves we come to the question of frequency. Beginners are often puzzled when they find a station is quoted in one list as using a certain wavelength and in another

list only the frequency is shown. The frequency is simply the number of cycles (a cycle, you have learned, is an individual wave) completed in one second’s travel. Now you will see their relationship and how simple it is to calculate one from the other. Having already learned that radio waves travel at the same speed as light, we merely convert that distance, 186,000 miles, to metres, as that is the measurement in which wavelengths are always quoted. We find that it is approximately 300,000,000 metres—although that figure is not exact it is near enough to be accepted for practical purposes. It is then only necessary to divide the length of a wave into that figure to ascertain the frequency, the answer being in cycles. We will take an example—a station broadcasting on a wavelength of 300 metres. 300 divided into 300,000,000 gives us one million cycles, a figure too cumbersome for reference so we refer to it in kilocycles (kc.). A kilocycle is a thousand cycles, and thus the frequency of a 300-metre station is 1,000 kc. Obviously, the shorter the length of the wave the greater will be the number of cycles completed, i.e., the frequency. Another simple example will explain megacycles (mc.), the figure used to describe short waves as in the case of the list of stations on the back cover of *THE SHORT-WAVE MAGAZINE*. A megacycle is one million cycles, so working out in a similar manner the frequency of a 30-metre transmission, we find the answer to be ten million cycles or ten thousand kilocycles, the figure quoted for practical purposes being megacycles—10 mc.

Simple, isn’t it? Conversely, of course, the wavelength can be found by dividing the frequency into 300,000,000.

Perhaps you have seen claims by manufacturers of broadcast sets that their receivers have a 10 kc. separation; that means, the set is able to separate two stations with that difference in their frequency.

● Short-Wave Possibilities

To help you to realise the immense possibilities of short-wave work so far as cramming a large number of stations into a narrow wave-band is concerned, we will compare the kc. difference between 300 and 320 metres and then 10 and 30 metres, a difference of 20 metres in each case. Working it out in the manner I have just shown we find that the difference between the former is 62 kc. but between 10 and 30 metres the difference is ~~5,000~~ 20,000 kc.—over 320 times as great! As we go lower in wavelength the difference increases proportionately in leaps and bounds. That comparison will also serve to illustrate, for short-wave work especially, that the frequency figure conveys far more than the wavelength measurement. You, who have sampled and know what has already been achieved by short-wave radio, will now begin to realise the almost unlimited possibilities of what can be done when this field has been fully explored. I can safely leave that to your imaginations now that you have some foundation of knowledge to work upon.

(Continued on page 14.)

TIME

Leslie W. Orton gives you some idea of the varying times in this article

TIME is as important to the long-distance enthusiast as it is worrying to a convict! Exactly what time is it in New York at mid-day in England? How many hours ahead is India? Those and many more queries begin to tantalise the dx enthusiast as soon as he picks up a distant station.

● American Zones

New York and a number of other eastern states of North America are, as you probably know, five hours back from our time. That is, say, that when it is midnight in England it is 7 p.m. in New York.

America is split up into various time zones. Taking the United States we find Eastern Standard Time; Central Standard Time; Mountain Time and Pacific Time. You will find it extremely useful to know the states employing the different times and so here they are:—

Eastern Standard Time is used by Maine, Vermont, New Hampshire, Massachusetts, Connecticut, New York, Pennsylvania, Rhode Island, Delaware, Maryland, New Jersey, Virginia, Georgia, North and South Carolina and Florida.

Central Standard Time—six hours behind our time—is used in parts of a few of the above states as well as Alabama, Tennessee, Kentucky, Indiana, Ohio, Michigan, Mississippi, Louisiana, Texas, Arkansas, Oklahoma, Kansas, Missouri, Illinois, Iowa, Nebraska (half), South and North Dakota (half) and Minnesota.

Mountain Standard Time is seven hours behind British time and the states of New Mexico, Arizona (except for a corner of the state), Colorado, Wyoming, and parts of Idaho, Utah, Kansas, Nebraska, and North and South Dakota.

Pacific Standard Time is eight hours behind our time. The following states employ it: Washington, Oregon, California, Nevada and parts of Arizona, Utah and Idaho.

Turning south we find that the chief South American stations (in Colombia, Venezuela, Ecuador, Peru, Bolivia and Chile) are five hours back. Argentina is between 4 and 5 hours back—depending what part of the country you are in.

● Advance Time

Now let us swing in another direction—eastwards. Time now advances. South Africa is two hours ahead of us. But in Bombay, and India generally it is 5 to 6 hours ahead. The Dutch East Indies, Borneo, etc. are 7 to 8 hours ahead whilst Australia is 8 to 10 hours ahead, depending upon the locality. Western Australia is 8 hours ahead (as in Japan, Manchuria, etc.); South Australia, Northern Territory and parts of New Guinea 9 hours; most of Victoria; New South Wales and Queensland 10 hours. New Zealand and Fiji Islands are between 11 and 12 hours ahead—a day. And so, as we go from station to station we change from hour to hour, from day to tomorrow, from tomorrow to yesterday—what a world!

S.-W.M. APPARATUS ON LOAN

SOME TIME AGO we offered to send the S.-W.M. class B receiver to radio societies on a week's loan for test. So great has been the demand for this that seven months after publication of this receiver we have had to order up more to cope with the demand.

The idea of trying out apparatus described in the S.-W.M. under their own conditions and without the restriction which the presence of one of our staff would cause, is proving so popular with clubs that we have decided to extend it to other S.-W.M. apparatus.

We have accordingly decided to extend this service to as many of our constructional items as possible, and so it will be possible for clubs to try out such things as new transmitters using new type valves, cathode ray equipment, receivers, frequency meters, etc., and enable their members to actually handle and form their own opinion before constructing their own models.

All apparatus except transmitters will be sent out complete with power supply. In the case of transmitters where mains operated, filament supply will be included, but owing to the cost of transport on heavy mains equipment, clubs will be expected to supply h.t.

As transmitters are released for this service, the necessary voltages will be specified, and secretaries are requested when writing to state that the club is licenced for the full power of the transmitter and also to supply details of the proposed h.t. supply.

The "Ideal" receiver will shortly be available, and also we have planned a full programme of transmitters from 5 to 50 watts, on from 1.7 to 56 mc, so there will be some very interesting equipment on loan.

There is only one stipulation—an honest report on the results of the test, and long notice must be given.

THE PUBLIC AND 160 METRES

By N. P. SPOONER (G2NS)

LET US LISTEN to the story of a certain amateur. He was a nice ham until the greed for gold undermined his amateur status. He worked far into the night constructing one-valve, fixed-tuned receivers set to his 1.7 mc. crystal frequency. These sold like the proverbial hot cakes and he then pumped out regular hours of gramophone entertainment. The listeners' veins tingled with erotic fires as the jungle rhythm roared through the district. But one evil day the skipper of a passing coastal boat attempted to call the operator of a ship-shore service station to ask that a berth be arranged for him at a certain port. All the shore operator could unscramble—and it was not the first time this had happened—was 'an apoplectic seafarers' blasphemies riding through and on a mighty cataract of sound in which a half-caste gurgled to his honey that he "lurved her so." The story ends sadly with the unexpected visit of the little green van and the official sealing up of the offending gear for many weary months.

In the September issue of this magazine G8GG, supported by G5GQ, suggested that greater use be made of the 1.7 mc. band, but up pops our old boy—BCL QRM.

● Varying Local Conditions

My own personal experience has been that the QRM question actually fluctuates with the atmosphere of the surrounding neighbourhood. The better the tone of the district the worse the selectivity of its receivers, or, to present it in another way, the working bloke runs a superhet but the employer still makes the best of a flapping-coil contraction of unknown vintage.

Bournemouth is reputed to be the most "wireless-minded" town in England. This only means that for its population it pays for the most number of licences. There are no factories or industries and before moving to the present QRA I operated in a district where the average rateable value of the houses was £25 p.a. For no less than eighteen months I carried out regular daily tests on 1.7 mc. with G5PB, using telephony only, at any time of the night or day that we chose, without BCL complaint. However, within exactly thirty-five minutes of removing and starting up at a new QRA in a district where the rateable values averaged £40 p.a. complaints were posted off to the B.B.C. in London, to the G.P.O., London, and a third to the local Post Office. 7 mc. telephony also produced some complaints.

We will confine ourselves to the question of telephony, as with loose-coupling and a good key-thump filter c.w. should never cause any trouble. I would suggest that traps seem to be the most acceptable

and lasting cures and after all, it is well worth the price of even three dozen simple pre-set condensers and a few turns of wire to be able to test on any band at any time, happy in the knowledge that one is not interfering with a neighbour's enjoyment of the programmes for which he has contributed.

● Show BCL's How

To avoid being confined to one crystal frequency it is advisable to show BCL's how to re-tune the trap for themselves. If a second operator is not available a noisy kitchen clock left ticking in front of the mike will, providing the BCL's house is not far distant, leave the operator free to go round and carry out the initial tuning. In most cases the Post Office engineers act as go-between, no names or addresses being disclosed and the opportunity of thus making personal contact with the complainant is lost. This personal contact is of great importance because a few minutes' patient explanation gives an obvious proof that the amateur is just as interested as the listener that broadcast reception should be trouble-free.

Favourable public opinion should always be courted and in furtherance of this I recently asked the P.M.G. for a definite ruling upon the subject of supplying traps for unselective receivers. His courteous and friendly reply brings the following points to light: (1) There is no liability whatever upon the part of an amateur to supply traps. (2) Anonymous complaints should be ignored and if it is impossible to effect a personal contact the complainant should be referred to the local P.O. where an Interference form can be obtained. (3) The case will be investigated and in the event of a cure being found this will be demonstrated to the complainant who will then have the opportunity of paying for the material used or getting similar material made up and installed. (4) The question of the receiver being unselective will be pointed out by the Enquiry officer, if such proves the case. (5) Should the complaints prove very numerous it may be necessary to observe "quiet hours." For one's own peace of mind this "quiet hour" penalty should be avoided and it will usually be possible to do so if personal contact can be made instead of the Post Office engineers having to make numberless journeys.

By foregoing the collection of the cost of the trap, by following up all complaints one hears through neighbours, the radio shop, the barber's or any other source of local gossip, one can usually manage this personal contact. Those who are missed are often found by making announcements before, during and after tests, with a newly-licensed station or removal to a new district. Give out clearly that "this is G—, licensed by the Postmaster-General.

If any listeners in the — district of — find that this transmission can be heard at the same time as the B.B.C. programmes will they kindly call, write or leave their address with G— at such and such an address, when personal attention will be given to the matter." Follow this with a personal visit, demonstrate a trap and present it to the BCL with your blessing. Of course, if you cannot be bothered or want the price of the trap tell the person to go to the Post Office and fill up a form. The engineers will do the rest . . . but look out for "numerous complaints" and the "quiet hours" penalty!

● Listener-interest

For non-transmitting readers also there is plenty of interest in and around the 1.7 mc. band. If amateur signals are scarce one can usually find a trawler or two luridly cursing about elusive kippers or the police coldly describing a brassiere found in the bushes!

As a final hint of the unexpected on 1.7 mc. I close with the story of the amateur who took a party of enquiring YL's up to his shack. Upon switching on his receiver he was amazed at the adjectival fluency of a trawler skipper who suddenly belched at him. Cutting the visit as reasonably short as possible he got back to the shack to find the air still quivering with sea expressions. He switched on his rig and, when an opportunity came, called the trawler which had given its name and announced the fact that it was looking round "for that b— Bill who it hadn't heard yet that evening." Imagine therefore our ham's greater amazement when the trawler actually came back to him. Said the amateur in an authoritative a voice as possible: "This is a Government checking-station. We are reporting you to your owners for grossly foul and indecent language. Close down at once." Back came a hesitant and obviously subdued answer: "I regret this. I shall close down at once." And not another squeak was heard for the rest of the evening, which supports my contention that every band available should be thoroughly and regularly explored because of the refreshing and unassailable truth that "anything can happen in Amateur Radio."

VALVES AT TWO-THIRDS LIST PRICE.—We have still in hand a considerable number of valves of de-controlled types which are available at two-thirds of the list prices while stocks last. These include a practically full range of battery valves, AC types:—ACSG 4, ACFA 4, ACHL 4, ACPX 4 and ACME 4. For example:—HL 2, list price 3s. 6d., de-controlled price 2s. 4d. SG 2, list price 7s. 6d., de-controlled price 5s. 0d. ACPX 4, list price 9s. 0d., de-controlled price 6s. 0d.—The 362 RADIO VALVE CO., LTD., 324/6, Liverpool Road, Highbury, N.7.

"AN AMATEUR VISITS OLYMPIA"—*continued from page 5.*

socket. No screwdriver is needed with this plug, the wire is inserted in the holes inside which close up as the cover is screwed on. Every conceivable type of valve socket was there, even a low-loss type of octal. All the short-wave type now have brass rings in the mounting holes so that it is impossible to fracture them by bolting down too hard.

Looking round the gallery I was pleased to find a range of transformers at reasonable prices, 2,000 volts at 200 mils. priced at £4 15s. All-Power Transformers were showing a complete range from the smallest filament types to the largest transmitting.

Finally I finished up at Shaftesbury Microphones. There Mr. Gourriet, a real enthusiast, explained the new velocity mike. This has four separate ribbons, and two permanent magnets, which help to give the high output of —42 db. The impedance is .8 ohms, and so there is no danger of hum pick-up in the leads. Velocity mikes are highly directional and so can be placed near loudspeakers without feed back.

Talking of amplifiers I was informed that their standard type gave 105 db. gain with no trace of hum, while in the lab. they had had up to 120 db.! One source of hum they discovered was the electron beam in a valve getting in the field of a transformer!

And so out of the show, across the road, to see P.G.A.H. Voigt demonstrating his high fidelity speakers. Listening to them made me realise the deficiencies of the B.B.C. transmissions, particularly on top response. I suggested that he used his own condenser microphones to show real quality, but he said people would get fed up with hearing his voice!

These speakers are of the exponential horn type, folded up so that they fit into a corner of the room, and looking more like articles of furniture than radio. However their efficiency is about 35% compared with the 3% of standard types, so that half a watt goes as far as the normal five!

And so good-bye to Radiolympia until next year.

"RADIOQUEST"—*continued from page 11.*

In conclusion, I would suggest that you work out a few frequency to wavelength, and vice versa, problems of stations where you know the two figures just to make sure you understand their relationship. By doing so, I think you will feel that you have not read the first of this series in vain, having grasped at least a few of the essentials in general radio knowledge. It may be a less interesting preliminary to the fascinating subject of transmitter and receiver design but it will give you a better understanding of the more technical articles you read. Next month I propose to deal with the cycle of operations which take place in the various types of receivers in an equally simple manner.

ERRATA—Page 11, col. 2, 13th line up. Read "20,000" for "5,000."

BROADCAST PROGRAMMES FOR OCTOBER

(a) W2XE (Wayne) 21,520 kc, 13.9 m.	(h) 2RO (Rome) 11,810 kc, 25.40 m.
(b) " 15,270 kc, 19.6 m.	(i) W2XE (Wayne) 11,830 kc, 31.13 m.
(c) W2XAD (Schenectady) 15,330 kc, 19.5 m.	(j) TPA2 (Paris) 15,243 kc, 19.68 m.
(d) W3XAU (Philadelphia) 9,530 kc, 31.2 m.	(k) TPA3 11,885 kc, 25.27 m.
(e) " 6,060 kc, 49.5 m.	(l) TPA4 11,720 kc, 25.60 m.
(f) W3XAL (Boundbrook) 17,780 kc, 16.8 m.	(m) W1XAL (Boston) 11,790 kc, 25.45 m.
(g) W2XAF (Schenectady) 9,530 kc, 31.5 m.	(n) " 6,040 kc, 49.67 m.
	(o) OLRA (Praha) 11,840 kc, 25.34 m.

All times G.M.T.

SUNDAY

- a.m.
 9.15 News in French, English and Italian (daily) (k)
 11.00 Concert—relayed (daily) (j)
 p.m.
 12.00 News in English (daily) (j)
 12.15 Concert—relayed (daily) (j)
 12.43 Various Programmes from Italian Stations (daily) (h)
 1.00 Organ Reveille (a)
 1.30 Lyric Serenade (a)
 1.45 Radio Spotlight—The Week in Preview and News of the Stars (a)
 2.00 "Coast to Coast on a Bus"—programme for Children with Milton Cross (f)
 2.00 "Sunday at Aunt Susan's"—Children's Programme (a)
 2.20 Mediterranean Hour (daily) (h)
 2.20 Gramophone Records (daily) (j)
 2.30 Concert—relayed (daily) (j)
 2.55 Press Radio News (a)
 3.00 Russian Melodies, directed by Alexander Kiriloff (f)
 3.30 Walburg Brown, String Ensemble (f)
 4.00 Press Radio News (f)
 4.05 Ward and Muzey—Piano duo (c)
 4.20 Varied Programme for Italian East Africa (h)
 5.00 The Hour Glass (c)
 5.00 Concert—relayed (daily) (k)
 5.30 Salt Lake City Tabernacle Choir and Organ (d)
 5.30 Radio City Music Hall (f)
 6.00 Church of the Air (b)
 6.00 Dorothy Dreslin—Soprano (c)
 6.20 Varied Programme from Italian Stations (h)
 6.30 Dreams of Long Ago (f)
 6.45 Poch's Gold—David Ross and Orchestra (d)
 7.00 Magic Key Symphony Orchestra, directed by Frank Black (f)
 7.30 Thatcher Colt Mysteries (c)
 7.30 Call Letters (daily) (o)
 7.40 Dance Music or Gramophone Records (daily) (o)
 8.00 Tapestry of Melodies (c)
 8.00 Everybody's Music—Howard Barlow and Columbia Symphony Orchestra (b)
 8.00 News in German and French (daily) (o)
 8.25 Variety Programme (o)
 8.30 The Widow's Son (c)
 9.00 News in English (daily) (o)
 9.05 Military Band (o)
 9.30 Variety Show with Jerry Sears (f)
 9.30 The World Is Yours (c and g)
 10.00 Marion Talley—Soprano (c and g)
 10.30 The Time of Your Life (c and g)
 11.00 Catholic Hour (c and g)
 11.15 Concert from Radio Paris (l)
 11.30 A Tale of To-day (c and g)
 a.m.
 12.00 Jello Summer Show (from Hollywood) (c and g)
 12.45 Morin sisters and Ranch boys (c and g)

- 1.00 "1937 Edition of Twin Stars," Victor Moore & Helen Broderick (c)
 1.00 Variety Programme with Don Ameche (c and g)

MONDAY

- p.m.
 12.30 Organ Reveille (daily except Sunday) (a)
 1.00 Morning Almanack with Phil Cook (a)
 1.30 Jack Shannon—Songs (a)
 1.45 Leon Goldman—Violinist (a)
 2.00 Near and Far East—News in English and Italian, and Concert of Music (daily, except Sunday) (h)
 2.00 Breakfast Club Orchestra (f)
 2.00 Metropolitan Parade (a)
 2.10 French Women's Chronicle—by Mrs. Decaris (j)
 2.30 Jack Berch and his Boys (a)
 2.45 Bachelors' Children (daily, except Sunday) (a)
 2.45 Press Radio News (daily, except Saturday and Sunday) (f)
 3.00 Sweethearts of the air (f)
 3.15 "Ma Perkins"—dramatic sketch (daily, except Saturday and Sunday) (f)
 3.30 Dramatic sketch—Old Man of the Mountain (daily, except Sunday) (f)
 4.00 Honeymooners—Songs (daily except Sunday and Wednesday) (f)
 4.00 David Harem (c)
 4.15 Three Majors—Vocal Trio (daily, except Saturday and Sunday) (f)
 4.20 Italian East Africa—News in Italian; Orchestral and Vocal Concert (daily, except Sunday) (h)
 4.30 Herman and Banta—Piano duo (f)
 4.45 Manhattans Dance Band (f)
 5.00 Happy Jack—Songs (c)
 5.00 Swinging the Blues (h)
 5.15 Your News Parade (daily, except Saturday and Sunday) (d)
 5.30 WGY Farm Programme (daily except Sunday) (c)
 5.30 "Romance of Helen Trent"—Dramatic Sketch (daily, except Saturday and Sunday) (d)
 5.30 Arabian Hour—News in Arabic; Concert of Arabic Music (daily, except Sunday) (h)
 5.45 "Our Gal Sunday"—Dramatic Sketch (daily, except Sunday) (d)
 6.00 Joe White—Tenor (c and g)
 6.00 Gold Medal Hour—"Betty and Bob"—Dramatic Sketch, and Hollywood in Person (daily, except Saturday and Sunday) (d)
 6.15 Dan Harding's Wife (daily, except Saturday and Sunday) (c)
 6.15 Words and Music (c)
 6.40 News in German (daily, except Sunday) (h)
 6.45 Aunt Jenny's Real Life Stories (daily, except Sunday) (d)

- 6.55 News in French (daily, except Sunday) (h)
 7.00 Big Sister (d)
 7.10 Varied Programme from Italian Stations (daily, except Sunday) (i)
 7.15 Jack and Loretta—Songs and Patter (daily, except Sunday) (d)
 7.30 Montana Slim—Yodelling Cowboy (d)
 8.00 Colonel Jack Major's Variety Show (b and d)
 8.00 Pepper Young's Family (daily, except Saturday and Sunday) (c)
 8.15 Ma Perkins (daily, except Saturday and Sunday) (c)
 8.30 Vic and Sade (daily, except Saturday and Sunday) (c)
 8.30 Relay (k)
 8.30 "Pop" Concert, directed by Howard Barlow (b and d)
 8.30 The O'Neils (daily, except Saturday and Sunday) (c)
 9.00 Lorenzo Jones (daily, except Saturday and Sunday) (c)
 9.00 Bob Byron—"Swing" Whistler, Piano and Patter (b and d)
 9.05 Popular Concert of Light Music (daily, except Sunday) (o)
 9.15 The Dictators (b and d)
 9.15 Club Matinee—Variety (f)
 10.00 Press Radio News (f)
 10.00 Clyde Barrie—Baritone (b and d)
 10.15 Eton Boys—Male Quartet (b and d)
 10.30 Doris Kerr—Songs (b and d)
 10.45 Little Orphan Annie (c and g)
 10.45 Funny Things—Nora Stirling (b and d)
 11.00 News Reporter (daily, except Sunday) (f)
 11.00 American Hour—News in Italian and English; Opera; 2KO Mail Bag (h)
 11.00 Howard Phillips—Baritone (d)
 11.15 News in English (daily, except Sunday) (h)
 11.15 Gramophone Records (l)
 11.30 Press Radio News (daily, except Sunday) (c and g)
 11.30 Press Radio News (daily, except Sunday) (f)
 11.35 Three X Sisters (f)
 11.35 Sports Resume—Paul Douglas (daily, except Sunday) (d)
 11.45 George Hall's Orchestra (d)
 a.m.
 12.00 Amos 'n' Andy (c and g)
 12.00 Poetic Melodies (daily, except Sunday) (d)
 12.15 Song Time—Hollace Shaw and Ray Heatherton (d)
 12.30 Voice of Fireside Concert (c and g)
 12.30 Jay Freeman and his Orchestra (d)
 12.45 Boake Carter (d)
 2.00 Columbia's Shakespeare Cycle—Shakespearean Play, with Victor Bay's Symphony Orchestra (e)

(Continued on p. 18.)

GUIDE TO THE WORLD'S SHORT-WAVE BROADCASTERS

(listed by Continent)

Compiled for "The Short-Wave Magazine" by F. A. BEANE (2CUB)

All times are given in G.M.T. for convenience.

MODIFICATIONS (September)

COJK—Employs slogan "Radio Zenith"; relays CMJK "La Voz de El Camagueyano"; address "Radioemisoras CMJK y COJK, Finlay 3, Altos, Camaguey, Cuba." Verifies reception with beautiful folder-type card

COBZ—Correct wave-length 33.32 m.; slogan "Radio Salas"; verifies by QSL card; postal address: P.O. Box 866, Havana, Cuba.

LATIN AMERICA

COBC, HAVANA (Cuba)

Metres: 32.1 approx.; Kilocycles: 9,438 approx.
Power: unknown.

Operating schedule: 11.55—05.30 daily.

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

Distance from London: approximately 4,200 miles.

Postal address: "Radioemisora COBC, Apartado 132, Havana, Cuba."

Identification characteristics: Relays CMBC and refers to the slogan "El Progreso Cubano" frequently. A bugle call may be heard practically every 15 minutes, also chimes and cuckoo calls at times. Broadcasts General Electric programmes simultaneously with COCH (31.8 m.).

Verification of reception reports: Confirms by letter.

TIGPH, SAN JOSE (Costa Rica)

Metres: 51.45; Kilocycles: 5,830. Power: 1,000 w.

Operating schedule: 00.00—04.00 daily.

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

Distance from London: approximately 5,440 miles.

Postal address: "Radiodifusora TIGPH, Apartado 800, San Jose, Costa Rica."

Identification characteristics: uses the slogan "Alma Tica" often; relays TIX, "La Reina del Aire"; concludes broadcasts with the Ted Lewis "Good Night Song".

Verification of reception reports: confirms reception with card bearing the national colours.

TIPG, SAN JOSE (Costa Rica)

Metres: 46.80; Kilocycles: 6,410 Power: 1,000 w.

Operating schedule: 23.00—04.00 daily.

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

Distance from London: approximately 5,440 miles.

Postal address: "Estaciones La Voz de la Victor, Apartado 225, San Jose, Costa Rica."

Identification characteristics: uses slogan "La Voz de la Victor" (The Voice of the Victor); bugle call and/or chimes. Broadcasts National Tourist Bureau "Travel Talks" in English every Sunday and Thursday from 02.00. Call in English is given as:—"This is station TIPG, The Voice of the Victor, in San Jose." (phon: San Ho-say). Occasionally relays TIX (650 kcs.). Closes with tune "Parade of the Wooden Soldiers."

Verification of reception reports: Very obstinate in replying although it has been known to request reports "over the air". Sends an attractive QSL card to those who are lucky.

TIEP, SAN JOSE (Costa Rica)

Metres: 44.8; Kilocycles: 6,696. Power: 500 w.

Operating schedule: 00.00—04.00 daily.

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

Distance from London: approximately 5,440 miles.

Postal address: "Radiodifusora TIEP, Apartado 257, San Jose, Costa Rica."

Identification characteristics: announces as "The Voice of the Isthmus in San Jose," or "La Voz del Tropico." English is used occasionally and a studio clock chimes the hours.

Verification of reception reports: difficult to obtain, but sometimes sends a nice card.

TIRCC, SAN JOSE (Costa Rica)

Metres: 45.81; Kilocycles: 6,550. Power: 500 w.

Operating schedule: 00.00—04.00 daily.

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

Distance from London: approximately 5,440 miles.

Postal address: "Radioemisora Catolica Costarricense, Apartado 1064, San Jose, Costa Rica."

Identification characteristics: English used occasionally and the title "Radioemisora Catolica Costarricense", or "Accion Catolica"; 4 chimes, and when signing off the call is usually given in English two or three times.

Verification of reception reports: verifies with attractive card.

TI4WX, HEREDIA (Costa Rica)

Metres: 37.50; Kilocycles: 8,000. Power 50 w.

Operating schedule: 13.30—16.00 and 19.30—03.00 daily (possibly discontinued).

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

Distance from London: approximately 5,430 miles.

Postal address: "Radiodifusora TI4WX y TIWX, G. E. Gonzalez, Heredia, Costa Rica".

Identification characteristics: relays TIWX, "La Voz de la Patria"; slogan "Emisora Costa Rica".

Verification of reception reports: card confirmation.

TI4NRH, HEREDIA (Costa Rica)

Metres: 31.02; Kilocycles: 9,670. Power: 150 w.

Operating schedule: 02.00—03.00 and 04.15—05.00 daily.

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

Distance from London: approximately 5,430 miles.

Postal address: "Radioemisora TI4NRH, Apartado 40, Heredia, Costa Rica.

Identification characteristics: announces frequently in English; radiates striking of studio clock; bugle call; slogan "La Voz de Costa Rica"; usually closes with the words "Buenas Noches; Au Revoir, Goodbye", and Costa Rican National Anthem.

Verification of reception reports: these are welcomed and if correct confirmed by a handsome certificate, measuring 13" by 7". Postage, preferably in the form of an American dime, or American stamps should accompany all reports.

HJ1ABB, BARRANQUILLA (Colombia)

Metres: 49.10 or 31.36; Kilocycles: 6,110 or 9,565. Power: 1,000 w.

Operating schedule: 21.30—03.00 daily.

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

Distance from London: approximately 5,400 miles.

Postal address: "Estacion HJ1ABB, Apartado 715, Barranquilla, Colombia".

Identification characteristics: relays HJ1ABI; announces in English and Spanish every fifteen minutes; uses 4-chime signal, all announcements being interspersed by a single chime; in Spanish the call is usually given as (phon.):—"Radio-emisoras ah-tchay-hota-uno-ah-bay-ah y ah-tchay-hota-uno-ah-bay-bay, la Voz de Barranquilla, en Colombia Sur America". Closes with the tune "La Golondrina".

Verification of reception reports: confirms with attractive card bearing National colours and large call-sign, very difficult to obtain however.

TI8WS, PUNTARENAS (Costa Rica)

Metres: 39.74; Kilocycles: 7,550. Power: 120 w.

Operating schedule: weekdays 22.00—24.00 and 01.30—03.00; Sundays 21.00—22.00.

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

Distance from London: approximately 5,450 miles.

Postal address: "Radioemisora TI8WS, Apartado 75, Puntarenas, Costa Rica".

Identification characteristics: refers to the slogan "Ecos del Pacifico" and occasionally tests with amateur stations and other b.c. stations in Latin America.

Verification of reception reports: confirms reception with beautiful card depicting the Bay of Puntarenas.

HJ1ABE, CARTAGENA (Colombia)

Metres: 31.58; Kilocycles: 9,500. Power: 1,000 w.

Operating schedule: 15.30—17.00 and 22.00—03.30 daily.

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

Distance from London: approximately 4,550 miles.

Postal address: "Radiodifusora HJ1ABE, Apartado 31, Cartagena, Colombia".

Identification characteristics: relay HJ1ABE, "El Progreso Cartagenero"; announces in English occasionally and in Spanish as "Radiodifusora Colombiana HJ1ABE (phon. ah-tchay-hota-uno-ah-bay-bay), La Voz de los Laboratories Fuentes, en Cartagena (phon. Cartaheyyna), Colombia, Sur America". A bugle call is used and a recording of "Big Ben" strikes the hours.

Verification of reception reports: owners claim "We always QSL". Their card is a most attractive one.

TUESDAY

- p.m.
- 1.45 Maurice Brown—'Cellist (a)
- 2.00 "Dear Columbia"—Fan Mail Dramatization (a)
- 2.10 Social Topics, by Mr. Rives (j)
- 2.25 Press Radio News (a)
- 2.30 Richard Maxwell—Tenor Philosopher (a)
- 2.45 Press Radio News (f)
- 5.00 The Rythmaires (d)
- 5.15 Your News Parade (d)
- 6.00 Cleo Brown—Songs (c)
- 6.30 It's a Women's World (c)
- 7.00 Molly Steinberg—Stage Relief Speaker (d)
- 7.30 N.B.C. Music Guild (f)
- 7.30 Dalton Brothers—Vocal Trio (d)
- 8.00 Theatre Matinee (b and d)
- 8.30 Columbia Concert (b and d)
- 8.45 Have You Heard?—Dramatization of Interesting Facts (f)
- 9.00 Bob Byron—"Swing" Whistler, Piano and Patter (b and d)
- 9.15 The Novelteers (b and d)
- 9.30 Club Matinee—Variety Show (f)
- 10.15 Science Service Series (b and d)
- 10.15 Choir Symphonette (c and g)
- 10.30 St. Louis Syncopators (b and d)
- 10.45 Children's Hour (d)
- 11.00 News in English (h)
- 11.15 Three X Sisters (c and g)
- 11.20 Latin American Hour (i)
- 11.35 Short Wave Mail Bag (c and g)
- 11.45 George Hall's Orchestra (b and d)
- 12.00 Amos 'n' Andy (c and g)
- a.m.
- 12.15 Song Time with Ruth Carhart and Bill Perry (d)
- 1.00 Blue Velvet Music (d)
- 1.30 Al Tolson Show with Martha Raye (d)
- 2.00 "Watch the Fun Go By," presenting Al Pearce and His Gang; Nick Lucas, Singing Guitarist; Arline Harris, "Human Chatter-box," with Carl Hoff's Orchestra (e)
- 2.30 Benny Goodman's Swing School—Pat O'Malley and Guest (e)

WEDNESDAY

- p.m.
- 1.00 Morning Almanack with Phil Cook (a)
- 1.30 Dalton Brothers—Vocal Trio (a)
- 1.45 Sydney Raphael—Pianist (a)
- 2.00 As You Like it (a)
- 2.30 Richard Maxwell—Songs of Comfort and Cheer (a)
- 3.00 Sweethearts of the air (f)
- 3.45 Viennese Ensemble (f)
- 5.00 Cheri and the Three Notes (d)
- 6.00 Three Rancheros (c)
- 6.00 Make Believe—Ruth Carhart, contralto; Bill Perry, tenor; Novelty Orchestra (d)
- 6.45 Hollywood in person (d)
- 7.00 News Through a Woman's Eyes (d)
- 7.30 Montana Slim—Yodelling Cowboy (b and d)
- 8.00 Manhattan Matinee—Variety Programme (b and d)
- 8.15 Continental Varieties with Celia Branz (Contralto) (f)
- 8.30 Current Questions Before the House (b and d)
- 8.45 Columbia Concert Hall (b and d)
- 9.00 Club Matinee (f)
- 9.30 Russell Dorr—Baritone (b and d)
- 9.45 Academy of Medicine (b and d)
- 10.00 Ann Leaf at the Organ (b and d)
- 10.15 Song Stylists (b and d)
- 10.30 Jack Armstrong (c and g)
- 10.45 Funny Things—Nora Stirling (b and d)

- 11.00 North American Hour—News in English (h)
- 11.00 Del Casino—Songs (d)
- 11.05 Harry Kogen and His Orchestra (f)
- 11.15 Four Stars—Rhythm Quartet (d)
- 11.15 Eton Boys—Male Quartet (d)
- 11.45 The Singing Waiters (i and d)
- 12.00 Amos 'n' Andy (c and g)
- a.m.
- 12.30 George Hall and His Orchestra (d)
- 12.45 Boake Carter (d)
- 1.30 Texalo Town with Eddie Cantor and Deanna Durbin (e)

THURSDAY

- p.m.
- 2.00 Music in the Air—Variety Programme (a)
- 2.10 Life in Paris, by Mr. Henri Bellamy (j)
- 2.30 Richard Maxwell—Tenor Philosopher (a)
- 2.40 Press Radio News (a)
- 5.00 The Merry Makers (a)
- 6.15 Words and Music (c)
- 7.00 Ramble; in Rhythm (d)
- 7.30 Dalton Brothers—Vocal Trio (d)
- 8.00 N.R.C. Light Opera Company; Harold Sanford, Conductor (f)
- 8.00 Theatre Matinee (b and d)
- 8.15 Musical Programme (f)
- 8.30 C.B.S. - B.B.C.—Dance Exchange (b and d)
- 9.00 Howells and Wright—Piano Team (b and d)
- 9.15 Personal Column of the Air (c)
- 9.30 U.S. Army Band (b and d)
- 10.00 Current Questions Before the Senate (b and d)
- 10.15 Elsie Thompson at the Organ (b and d)
- 11.00 North American Hour—News in English (h)
- 11.05 Harry Kogen and His Orchestra (f)
- 11.15 Norsemen Quartet (c and g)
- 11.20 Latin American Hour—News in Italian, Spanish and Portuguese (i)
- 11.35 Tony Russell—Tenor (f)
- 11.45 George Hall and His Orchestra (b and d)

- a.m.
- 12.00 Amos 'n' Andy (c and g)
- 12.00 Poetic Melodies—Jack Fulton (Tenor), Franklyn MacCormack (Reader), and Carlton Kelsey's Orchestra (d)
- 12.15 Song Time—with Doris Kerr and Russell Dorr (d)
- 12.45 Patti Chapin—Songs (b)
- 1.00 Rudy Vallee's Variety Hour (c and g)
- 2.00 Major's Bowes' Amateur Hour (e)

FRIDAY

- p.m.
- 2.00 Metropolitan Parade (a)
- 2.10 Events of the Moment (j)
- 2.25 Press Radio News (a)
- 6.00 Alexander Brothers (c)
- 6.15 Words and Music (c)
- 7.00 News Through a Woman's Eyes (d)
- 7.15 Showtime Matinee (f)
- 7.30 Montana Slim—Yodelling Cowboy (d)

- 8.00 Columbia Concert Hall (b and d)
- 8.30 Three Consoles (b and d)
- 9.15 Among our Souvenirs (b and d)
- 9.30 Bon Voyage (b and d)
- 10.00 Marion Carley—Pianist (b and d)
- 10.15 Eton Boys—Male Quartet (b and d)
- 10.15 While the City Sleeps (c and g)
- 10.30 Doris Kerr—Songs (b and d)
- 11.05 Harry Kogen and His Orchestra (f)
- 11.05 North American Hour—News in English and Italian; Concert of Request Numbers (h)
- 11.15 Hobart Bosworth—Dean of Hollywood (d)
- 11.15 Barry McKinley—Songs (c and g)
- 11.45 Frank Dailey's Orchestra (d and e)

- a.m.
- 12.00 "Poetic Memories"—Jack Fulton (Tenor), Franklyn MacCormack (Reader), and Carlton Kelsey's Orchestra (d)
- 12.00 Amos 'n' Andy (c and g)
- 12.15 Song Time (d)
- 12.30 Jay Freeman and his Orchestra (d)
- 12.45 Boake Carter—News Commentator (d)
- 1.00 "Hammerstein Music Hall"—Ted Hammerstein M.C.; Jerry Mann, Comedian; Guest Star and Music Hall Orchestra (e)
- 1.30 WGY Farm Forum (c and g)
- 1.30 Hal Kemp's Dance Band, with Alice Faye and Don Forbes (e)

SATURDAY

- p.m.
- 1.00 Poetic Strings (a)
- 1.30 Four Stars—Girls' Vocal Quartet (a)
- 2.00 Breakfast Club (f)
- 2.00 Ray Block at the Piano (a)
- 2.10 Judicial Talk by Mr. Henri Delmont (j)
- 2.15 Dalton Brothers—Male trio (a)
- 2.30 Fiddlers' Fancy (a)
- 2.45 Mellow Moment (a)
- 2.55 Press Radio News (a)
- 3.00 Ruth Cross—Your Garden and Mine (a)
- 5.00 Continentals (c)
- 5.15 Orientale (d)
- 5.30 WGY Farm Programme (c)
- 5.30 George Hall and His Orchestra (d)
- 6.00 Happy Jack (c)
- 6.15 Jimmy Shields—Tenor (d)
- 7.00 Your Host is Buffalo (c)
- 7.15 Ann Leaf at the Organ (d)
- 7.45 Tours in Tone (d)
- 8.00 "Down by Herman's" (b and d)
- 8.00 Chick Webb and His Orchestra (f)
- 8.45 The Dictators (b and d)
- 9.30 The Dancers (b and d)
- 10.00 Frank Dailey's Orchestra (b and d)
- 10.00 Press Radio News (f)
- 10.30 Kaltenmeyer's Kindergarten (c and g)
- 11.00 North American Hour—News in English (k)
- 11.00 Ben Feld and His Orchestra (d)
- 11.20 Latin American Hour (h)
- a.m.
- 12.15 Song Time (d)
- 1.00 Saturday Night Swing Club (e)
- 1.30 Johnny Presents—Russ Morgan's Orchestra; Charles Martin's Circumstantial Evidence Thrills. "It Might Have Happened to You" (e)

AROUND THE HAM SHACKS

2—G5VU

By D. J. LEGGE

AMATEUR STATION G5VU is located at Wollaton, near Nottingham, and is owned and operated by Mr. S. W. Henton. The full QRA is 8, Eton Grove, Wollaton Park, Notts. The shack is a wooden hut at the side of the house, and although small, it holds the apparatus quite comfortably and leaves a fair amount of space available to move around in. The transmitter with its accompanying receiver and separate speech amplifier is at one end, while at the other is a small table on which, at the time of my visit was a portable five-metre transceiver, which he was testing in preparation for a field day event.

On the walls are a number of QSL cards which testify to 5VU's ability as a worker of dx stations. The rest of the wall space is devoted to a number of shelves which are filled with a great many books and boxes of spare parts. These take up so much room that he has had to revert to the ceiling in order to stick his map somewhere.

The transmitter used here is capable of operation on the 7, 14, and 28 mc. bands; it is built up in the conventional rack and panel style with four tiers. The rack is of all-steel construction, and each stage is completely detachable, the panels are of ebonite.

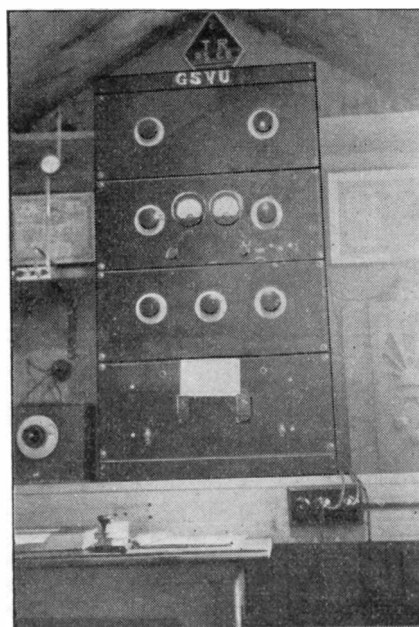
The first tier contains the power supply which delivers 500 volts at 150 ma., the second the crystal oscillator and doubler stages, the third the final amplifier and the fourth is a Collins coupler unit. The valve line up is as follows: 59 tritet crystal oscillator link coupled in a 6L6 doubler into an RK25 in the final, the power input is 25 watts c.w. and 15 watts on fone.

Operating from this station is mostly on c.w. but occasionally fone is used. When on fone the RK25 is suppressor grid modulated by a Pye two-valve a.c. broadcast set which has been remodelled into a first-class speech amplifier. It uses an AC/HL and an AC/Pen and has an output of about 3 watts. A home-made transversed current mike is used here, it hangs from the ceiling by the way; it is a very nice-looking job but 5VU is not satisfied with it, as it is not sensitive enough for his requirements.

● "Straight" Receiver Preferred

Many "hams" would almost give their right arms to own a single signal super receiver, but not 5VU. He has a straight regenerative two-valver and is quite satisfied with its performance. It is the well-known Eddystone All-World Two and it sure rolls in those dx signals.

There is only one aerial in use here, it is a half-wave 14 mc. Windom. It is about 30 feet high and slopes down towards the house, he intends to raise the lower end in order to make it level, but is a little apprehensive of the result, as it will alter its angle of radiation and so may affect its dx properties, for it certainly has them as it is. When used for 28 mc. the aerial is end fed and he finds it quite O.K.



Most of the work at this station is done on 28 mc. but just lately this band has fallen off and he is now doing some on 14 mc. until conditions pick up.

● 28 mc. Pioneer

G5VU was one of the first British stations to operate on 28 mc.; at that time the only stations on the band were a few Continentals and Yanks, and all he had to do was send out a test call and half the band would come back, that is providing conditions were favourable, conditions on ten having a notorious mercurial tendency to alter without warning. He has an excellent log of QSO's on this band, and during an American ten-metre contest a short while ago he worked 21 W's in two hours on fone. He is waiting for one QSL from VK in order to claim W.B.E. on 28 mc.; he has already W.A.C. and W.B.E. on 14 mc.

He informs me that it is very rarely he gets reports from SWL's in England, but he seems to be the target for American QSL collectors, most of whom send only the vaguest reports and very rarely any postage.

G5VU started on the air about five years ago with a single-valve rig with an input of two watts on c.w. He says it was weeks before he made his first contact, then months before he got out of Europe. This transmitter was battery operated on 7 mc., later he used supply mains and pushed his input up to 10 watts, then up to the 25 watts he now uses.

There are a great many visitors to this station, so many in fact that he is thinking of having a visitors' book. All are welcome, so if you happen to be in the district just drop round for a chat—you'll enjoy it.

CONSTRUCTIONAL DETAILS

OF THE S.-W.M.

“Ideal” Straight Receiver

Engineered by AUSTIN FORSYTH (G6FO), “S.-W.M.” Technician,
in collaboration with BASIL WARDMAN (G5GQ), Editor.

II.

THIS MONTH the construction and wiring of the “Ideal” Receiver is to be dealt with, and readers will find in these pages and the supplement inserted in this issue all photographs and diagrams they require. All this material should be carefully studied and thoroughly understood before any constructional work is attempted, as it is obviously essential to copy the model exactly in order to ensure success. In this connection, we should say here that no responsibility can be accepted in the case of those who may use the circuit and some of the components and apply them to a form of construction or a chassis design of their own. While readers with the necessary knowledge and experience of amateur-band receiver design may be able to deviate from the original with success—and will therefore need no advice from us—this set is presented as one which has been carefully thought out in every detail, from circuit to components and chassis lay-out, and it is assumed that all constructors will follow the model exactly.

Now we come to what we consider to be a step forward in the interests of the home-constructor who, while he may be able to build simpler types of set with a fair measure of success, has yet failed to get the expected results in the case of more complicated receivers. The reasons for this are a combination of several factors—incomplete and hazy descriptions of *actual construction* on the part of the designer, who is never absolutely certain that he has made everything quite clear, and an inability on the part of constructors to fill up these gaps from their own experience. The chief blame, however, lies at the door of the designer, because it should be well known that of the large number of home-constructors who take an ever-deepening interest in short-wave radio, all cannot be expected to have a high degree of technical knowledge and experience, since their interest is largely in the getting of results. Hence there has too often been in the past a wailing and gnashing of teeth, followed by a long and acrimonious correspondence with the wretched designer concerned before something like

the expected capabilities of the receiver have been approached.

With all this very much in mind, we have applied ourselves to the problem of making things as easy as possible for the average home-constructor, who relies entirely on what he sees in print when he builds a set. The result of these cogitations is what we might call the Numbered Wiring System, and this title is almost self-explanatory because that is just what it all amounts to. The terminations and joints of each lead carry a distinctive number, these being shown on the wiring diagram. A check may be made easily between the work and diagram. It is difficult to know how this can be simplified or improved upon, since in addition to diagrams there are the photographs which will locate the actual position of each component on the chassis. The most inexperienced reader can, we think, embark with complete confidence on the construction of this receiver and should be able to produce a set looking exactly like the photographs, both above and below the chassis.

Here a few words of explanation are needed. The shell which will be supplied by Messrs. Evrizonne or E. Paroussi differs very slightly from that shown in the photographs. These alterations, which were decided upon after the model was built and result in improved appearance and lay-out—nobody can expect to get everything just right the first time, particularly as it must all be put on the drawing-board beforehand—are so slight that had they not been mentioned here, they would probably not have been noticed, so that these remarks are really for the benefit of the eagle-eyed!

Experienced constructors will have no difficulty in building the set from the circuit diagram alone; for them, it is simply a matter of throwing an eye over this and the chassis and parts, and getting on with the job, and no doubt in some such cases the receiver is already in operation. But for those who feel they must rely on the detailed description—the majority of readers, in fact—we would once again counsel a thorough reading of this article,

WIRING DIAGRAMS

of "The Short-Wave Magazine"

"Ideal" Straight Receiver

(Described August and September, 1937)

and

"Class B" One-Valver

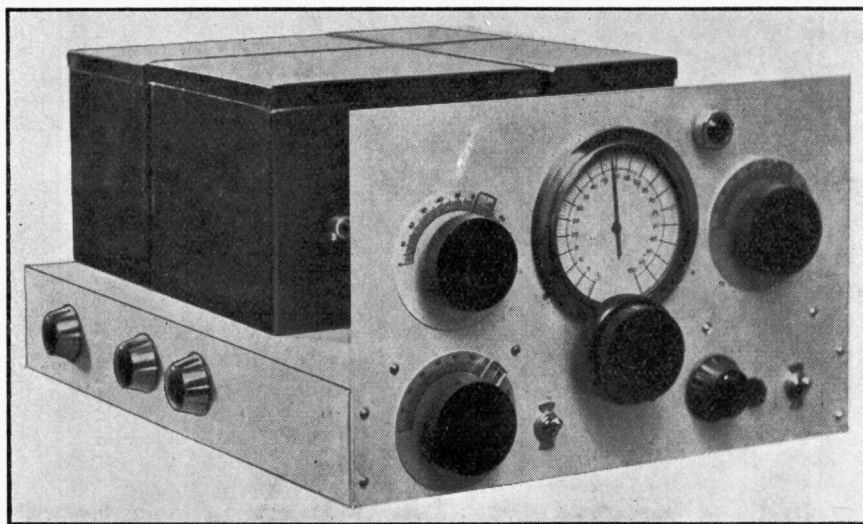
(March and October, 1937)

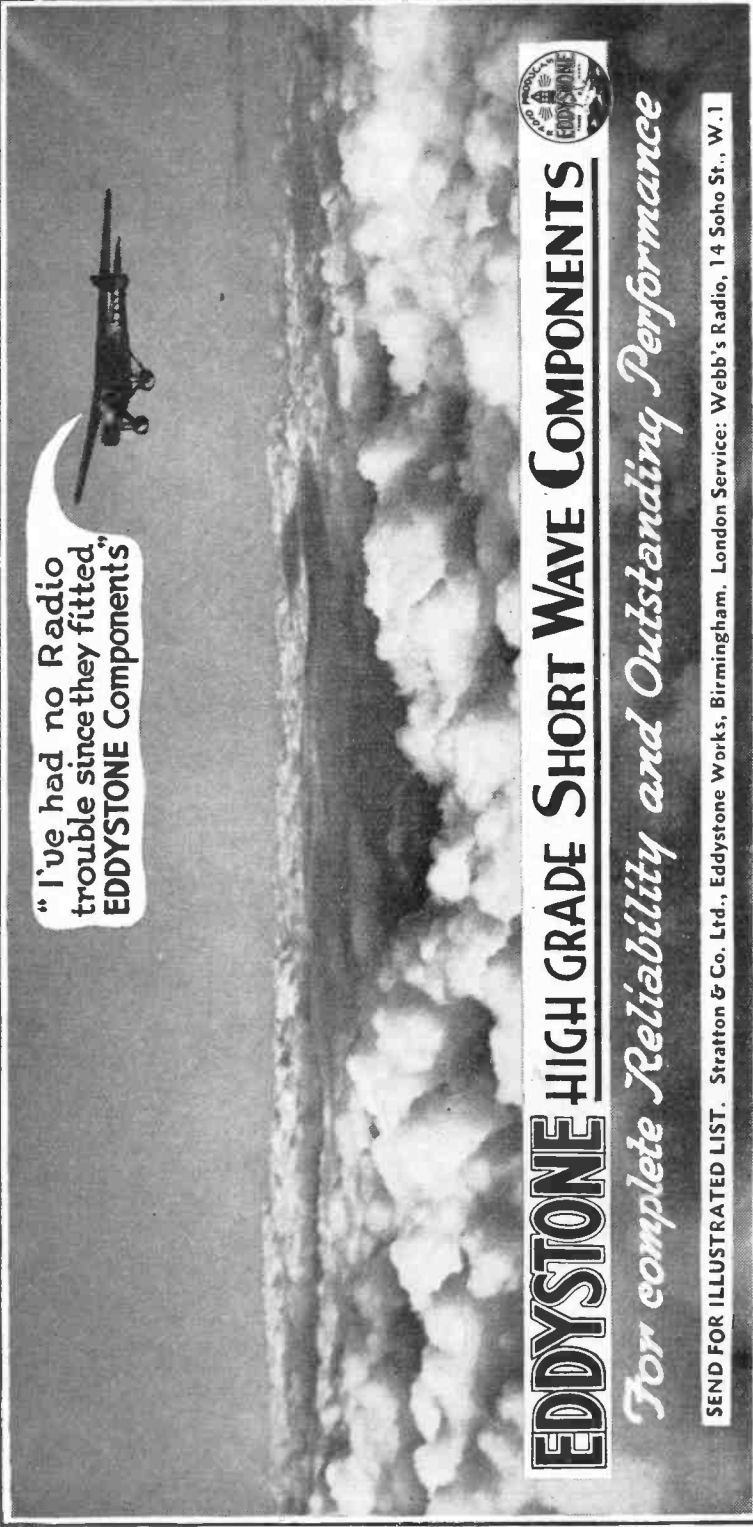
Price

6_{D.}

In presenting this six-page supplement giving wiring plans and photographs of the "Ideal" and "Class B" Receivers, we do so with the knowledge that our readers will appreciate simplicity of reference.

With the aid of the text-matter published in the issues noted above, these diagrams and photographs will form a valuable link for the constructor, thereby avoiding the necessity for Blue Prints.





"I've had no Radio
trouble since they fitted
EDDYSTONE Components"

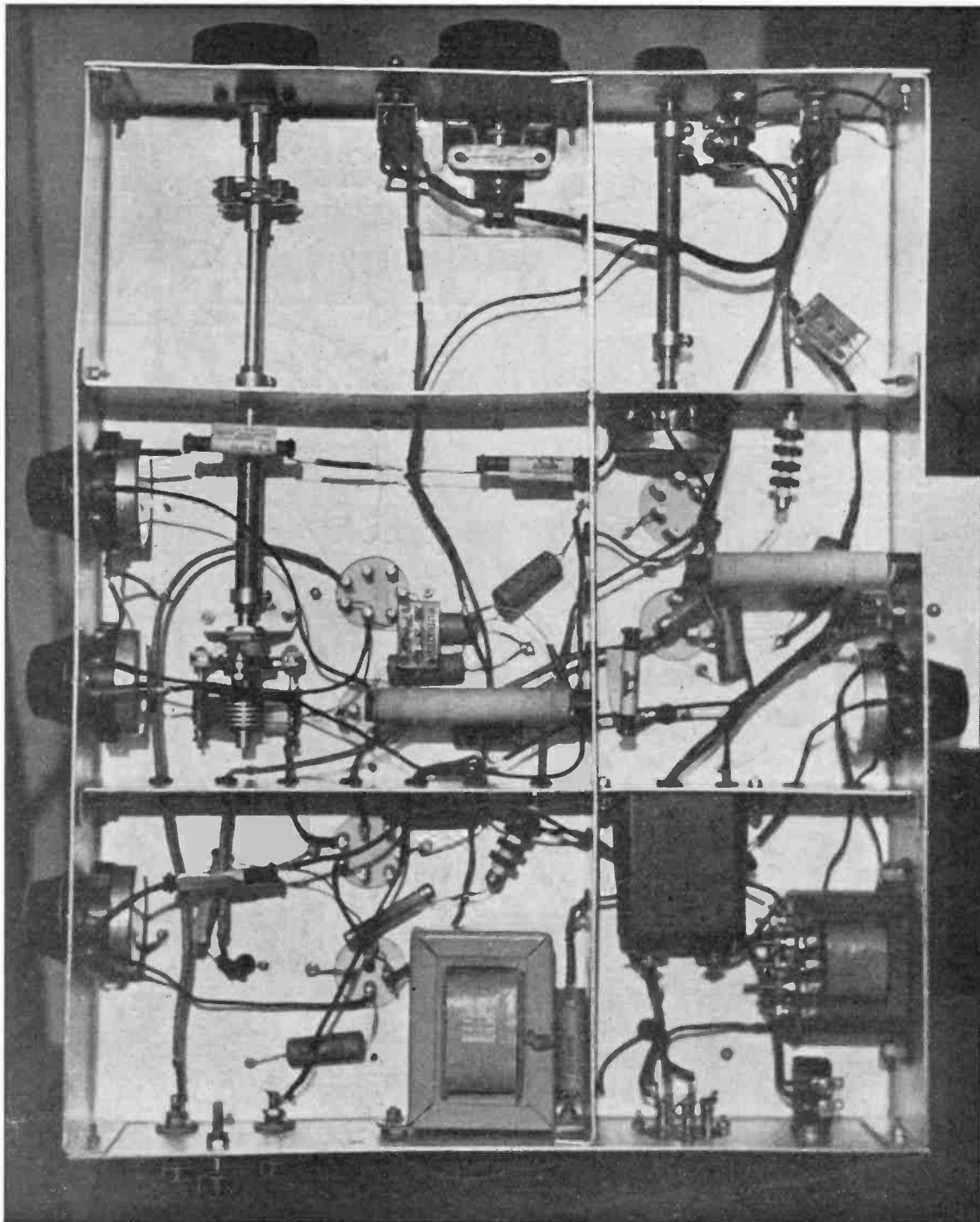
EDDYSTONE HIGH GRADE SHORT WAVE COMPONENTS



For complete Reliability and Outstanding Performance

SEND FOR ILLUSTRATED LIST. Stratton & Co. Ltd., Eddystone Works, Birmingham. London Service: Webb's Radio, 14 Soho St., W.1

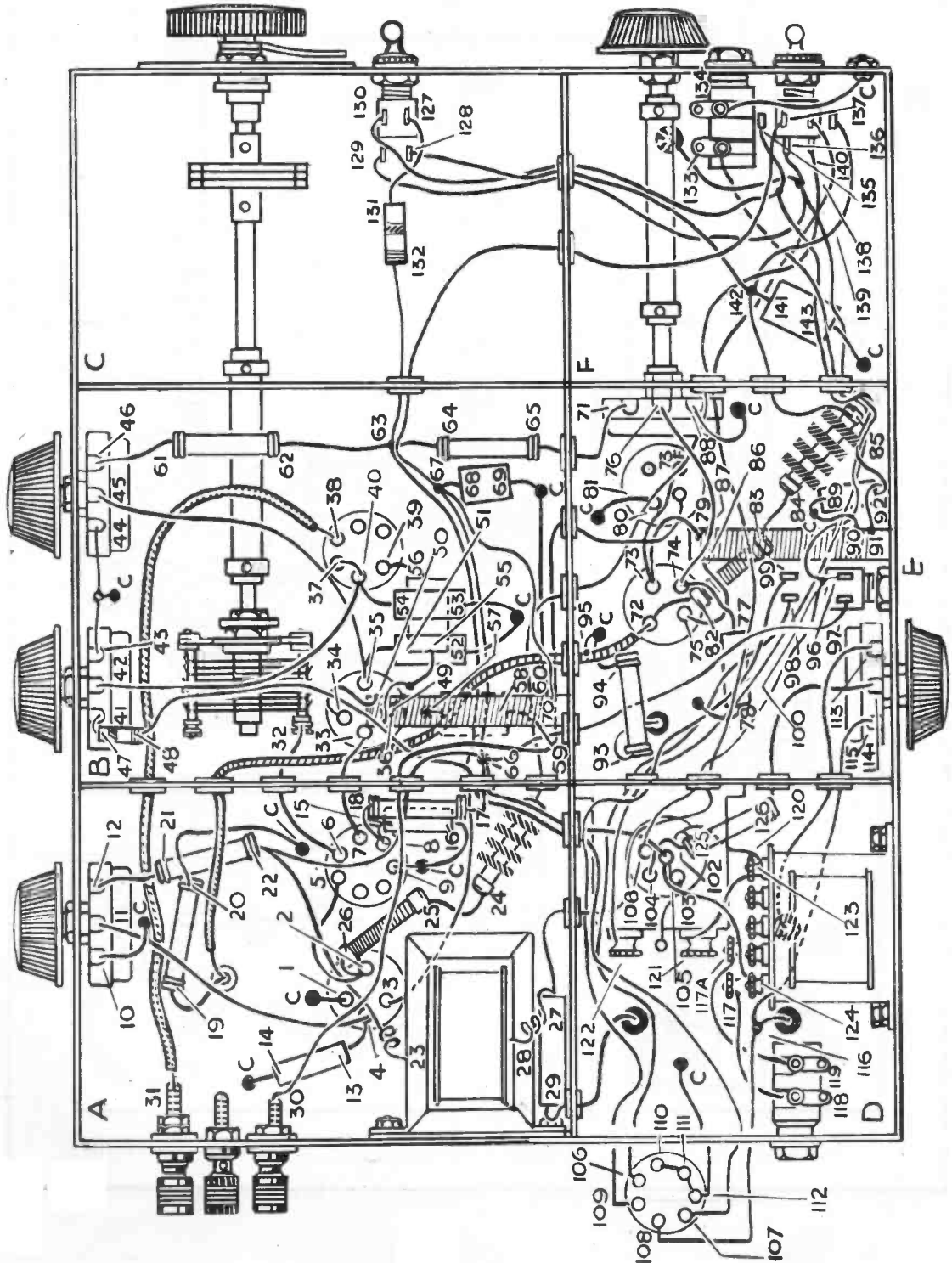
The photograph below shows positioning of the various components — also the general appearance on completion. **“ IDEAL ”** RE
The wiring diagram on the next page is of course identical to this photograph. It will be seen that at each junction a number has been placed with a view to



RECEIVER

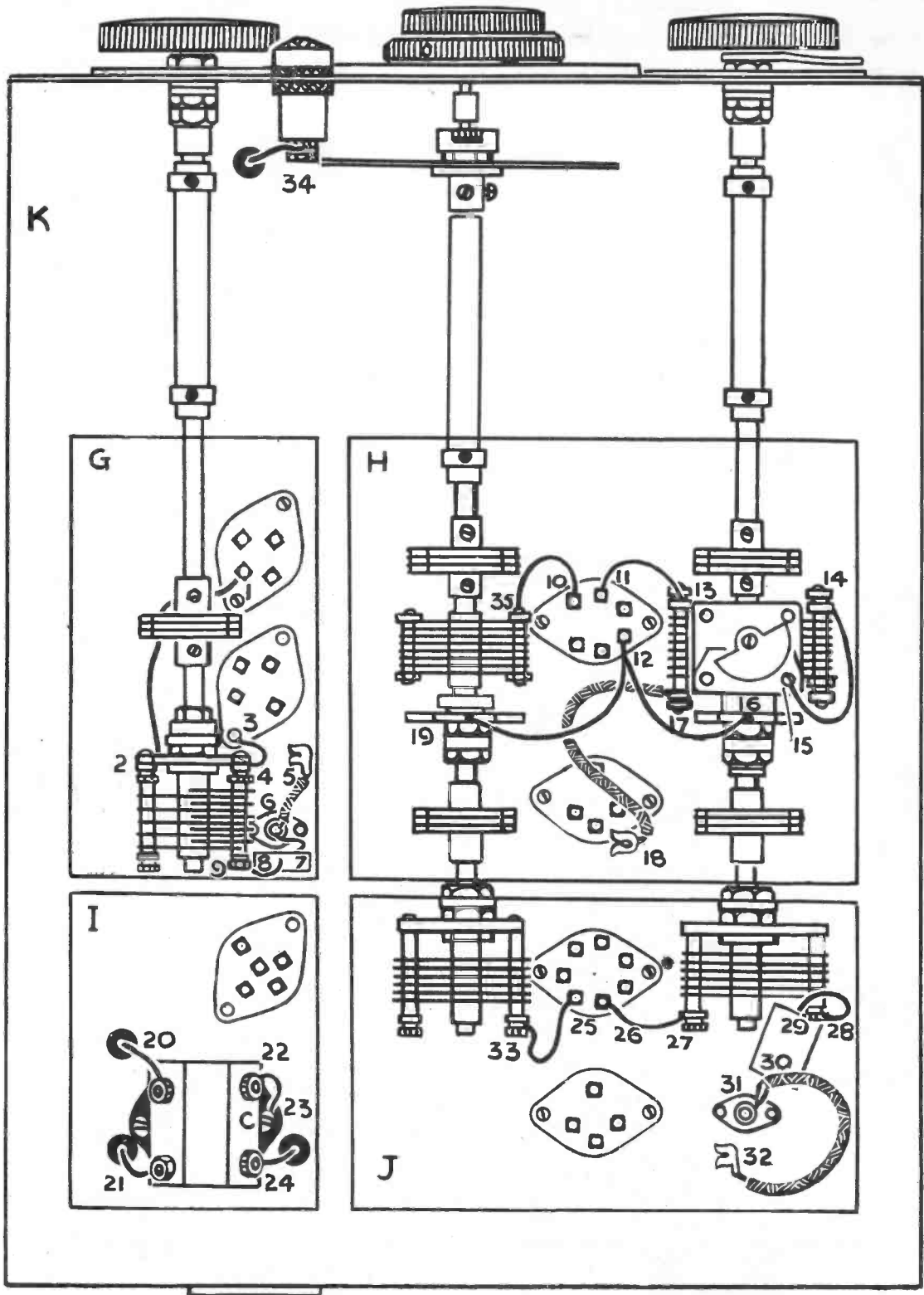
making for simple reference from point to point. In future references to this Receiver the numbers will be quoted.

It will be found that the diagrams of the wiring have been printed one on the other to show the actual position where wiring connects through chassis platform.



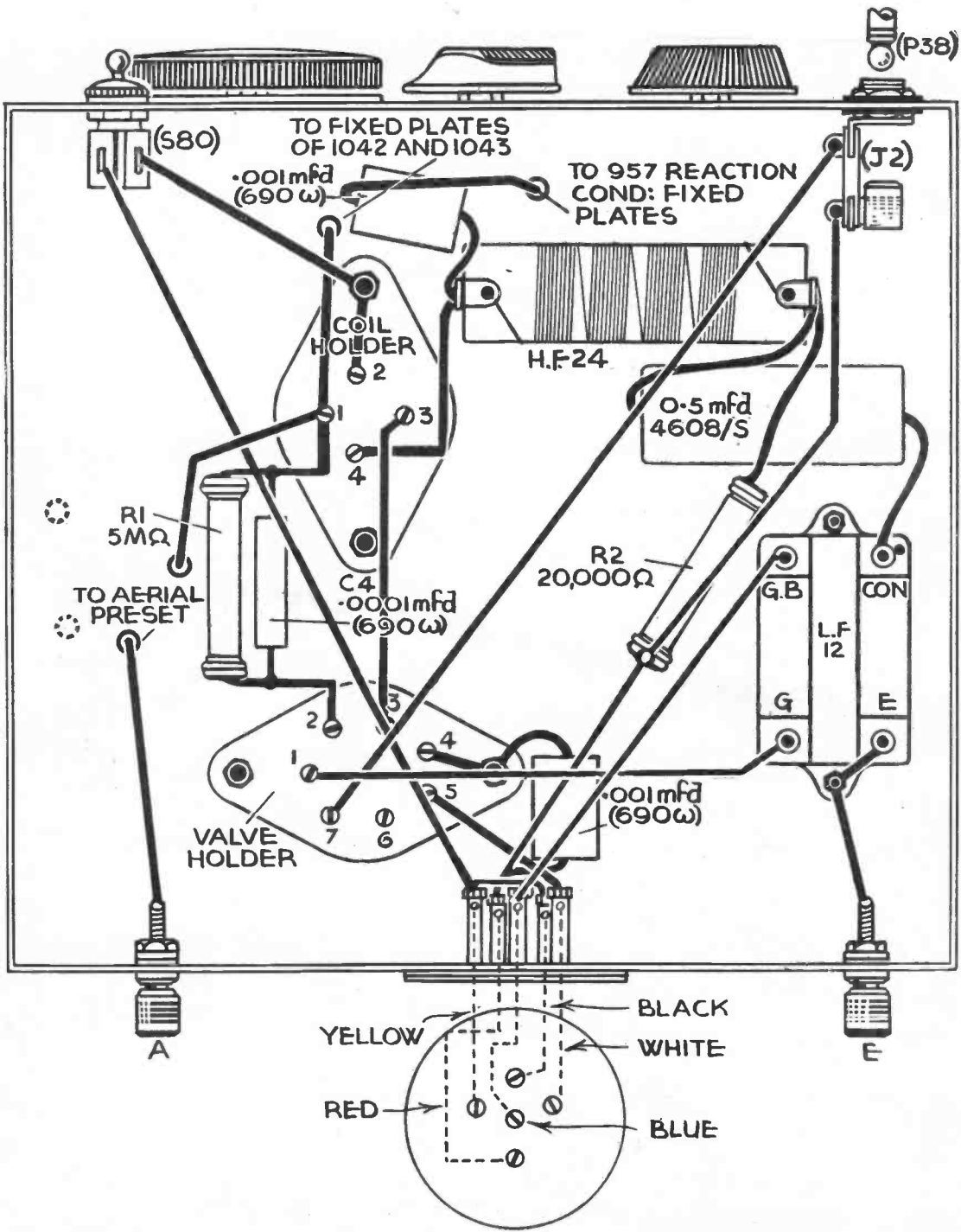
"IDEAL" RECEIVER

above-chassis wiring



THE "CLASS B" RECEIVER

Full details concerning this wiring plan will be found on pages 6 and 7 of the October issue of "The Short-Wave Magazine."



together with a careful examination of the chassis, parts, circuit diagram and wiring plan, before the work is commenced, as by absorbing these details a mental picture can be built up which is of the greatest assistance during building.

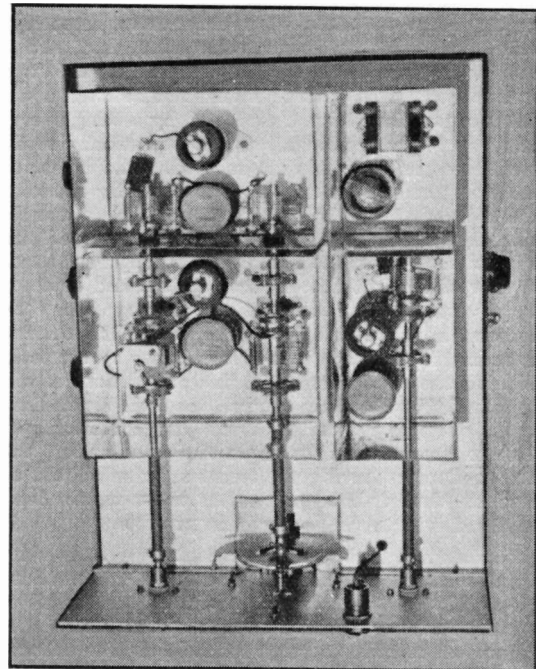
● Preliminary Constructional Work

The chassis is completely drilled except for certain small holes for fixing screws, and the only equipment required for the work are a pair of side-cutting pliers, screw-driver, brace with a selection of drills up to $\frac{1}{4}$ -inch, soldering-iron, hacksaw, scriber, pen-knife, patience and common-sense.

As mentioned last month, the boxes, viewed from the front of the set, are as follows: Left-front, r.f. stage; left-rear, detector stage; right-front, monitor and right-rear, l.f. stage. The extension controls above the chassis level comprise band-set, band-spread and monitor tuning, and their centres are at a height of $2\frac{3}{4}$ -inches from the chassis. The first thing to do is to get the main parts mounted and the ganged condensers lined up. Remove the panel by taking out the fixing screws, and mount the dials and switches in the positions shown in the photographs. The reaction control is immediately beneath the band-set dial, and the switches from left to right are the d.p.s.t., h.o. and the d.p.d.t. send-receive. The 'phone jack is close alongside the latter, the other small knob on the right-hand side being the monitor (b.o.) regeneration control. In order to bring the cursors of the three slow-motion assemblies as close as possible to their respective dials, the slow-motion driving heads should be packed up behind the panel with two insulated bushing washers each. The dials can be held with 6 B.A. screws through the holes provided, if desired, but it will be found that the lock-nut securing the 'driving-head to the panel will be sufficient. The main tuning control, the Eddystone Full Vision dial driving the band-spread condensers, should next be mounted. As in the case of the other dials, it is necessary to pack up behind the panel in order to bring the pointer flush with the graduated card. The depth of packing required is $\frac{1}{4}$ -inch, and can be obtained by means of nuts, washers, metal collars or anything else that may be convenient so long as a good bearing surface is provided. We used a couple of square $\frac{3}{16}$ th inch nuts which happened to be handy, these being fitted on the two fixing screws of the dial, between the flange and the panel. The pointer spindle will also need to have about $\frac{1}{8}$ -inch sawn off so that it can be adjusted nicely.

Next, place the valve- and coil-mounts and mark the positions of the fixing screws, as holes to clear 6 B.A. must be drilled for securing them. Make sure these holders are put in their correct places, and be careful when tightening up not to go too far, otherwise the frequentite will fracture or the brass collars in the holes will pull through. The holders

should, of course, be centred so that the pins are clear and equi-distant from the chassis edge, otherwise shorting will occur. Note the way the coil- and valve-bases in the monitor box are set—on the skew. Their positions are easily fixed by leaving the screening box in place and getting one edge of the two holders parallel with the flange of the box, with the pins "looking" in the right direction, as indicated.



To mount the variable condensers, remove the r.f. stage and monitor screening boxes—the two front ones. Condensers C8 and C9 are fixed directly to the detector stage screening box, the holes of which should be towards the front of the set when the chassis is received. There is enough room between the detector and r.f. stage boxes to accommodate the lock-nuts of C8 and C9, and the shafts of these two condensers will then be found to protrude into the front box, which should now be placed in position but not fixed. Condensers C1 and C2 are then secured to their respective brackets, which are adjusted such that the apertures in the screening boxes are accurately centred with the holes in the brackets. The condensers are tightened in with the rotor connection—the odd one at the top—vertical. Now slip a flexible coupler on to each of the two shafts coming into the r.f. box and insert the shafts of C1 and C2 into the other sides of the two couplers such that the stator terminals on C1 and C2 are towards the panel, i.e., the two

sets of condensers will then be ganged so that their two longest shafts are connected together. Another flexible coupler is put on the front end of C1 and C2, and the extension controls taken out to the dials on the panel. Adjust both sets of condensers so that they are equally meshed—this is important—and set them to maximum capacity. Fix the slow-motion controls on the panel to correspond—band-set dial reading 100 degrees and band-spread reading zero—and then swing each in turn through the whole tuning range to make sure they drive smoothly. Unless the lining up is accurately done, they won't, and it is here that the adjustment of the two brackets comes in. These should not be fixed down till their positions have been found by setting everything up loose, when they will automatically settle themselves as the dials are rotated. The holes for the fixing screws should then be carefully marked, and if this is properly done, there will be no trouble with slip or refusal of the drive to take up all the way round. Even though flexible couplers are used, in view of the fact that each of the r.f. and detector stage slow-motion controls are driving two condensers, all of which are rather stiff, the driving mechanisms must be given every chance by correctly aligning the condensers. In this connection, it will be found that the main control, the Full Vision dial, drives quite easily under almost any conditions, so that to ensure smoothness in the band-setter, the two condensers having the freest spindles should be used on the left-hand side, thus reducing the load on the driving head as much as possible.

Coming now to the monitor control, a little close work is required, since the clearances are small to keep this compartment as compact as possible. With a hacksaw, remove enough of the foot of the adjustable bracket to bring the holes in the bracket and box in line, with the bracket opposite the valveholder. The condenser is mounted so that its stator terminals are towards, and close to, the back of the box, and the flexible coupler must be arranged so that it is about half-way between the coil- and valve-holders. The best way to arrive at all this is plug in a valve and a coil former, and then juggle with the condenser mount till it is right. In doing this, it will be found that the flange of the insulated part of the bracket will have to be cut off so as not to foul the valve. When finally treated, the bracket as a whole will look something like the sketch in *fig. 2*.

A small point to notice is that when putting on the main extension control, that driving the band-spread condensers, the collar and set screw will have to be taken off the rod to get it through the hole in the box, and with the panel in position, the bottom part of the Full Vision dial will fit into the shaped cut in the front edge of the chassis.

The remaining parts mounted on the upper side of the chassis are two midget stand-off insulators

and the l.f. transformer, which goes in the right-rear box, and is symmetrically placed in relation to the valveholder in that compartment. The stand-off insulators are to carry the grid connections to the top caps of the detector and monitor valves, at the same time getting the grid-leak leads through to the sub-space. These insulators are located as shown in the photograph—their positions to a decimal of an inch are not important, so long as the grid condenser leads are as short as possible—and between the two fixing screws for the insulators, a $\frac{1}{4}$ -inch diameter hole must be drilled to take a rubber

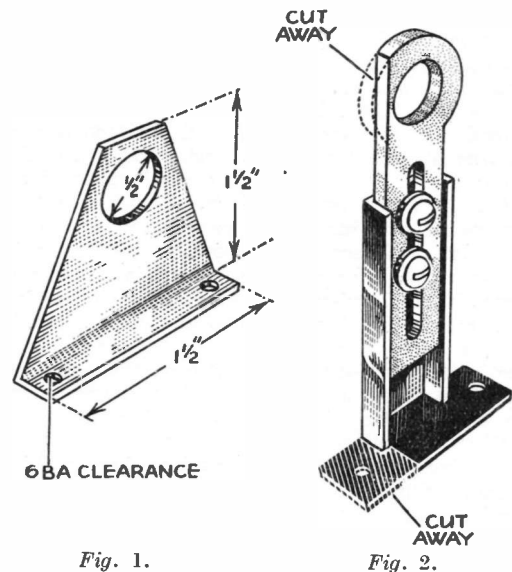


Fig. 1.

Fig. 2.

Reaction condenser mounting bracket. To be made of aluminium or anything similar available.

Monitor Condenser mounting bracket to be cut away as shown. See text.

grommet; since the wire ends of the leaks are not long enough to reach the insulator terminal, a short lead is taken from the terminal screw inside and through the grommet, the grid leak being soldered to the other end of this wire. The stand-off insulator then fits in position over the grommet, hiding it from view. Make sure there is enough insulated wire projecting in the sub-space to prevent the grid end of the leak earthing.

Both small insulators are fixed in this way, completing the top of the chassis and the panel. It will be found necessary to use a little patience—and persuasion—when using these rubber grommets for the first time, but they are easily squeezed in with the aid of a screw-driver and are excellent for leading wires through metal. In fact, they should

be used whenever it is necessary to take a connection through either the chassis or the ribs in the sub-space.

● Underneath the Chassis

Coming now to the sub-space, there are several points to be noted. First, the reaction condenser mounting. Its extension control, when opened out as far as possible, will locate C11 at the far end of the r.f. compartment, such that a short lead through the shielding rib is all that is necessary to connect its stator to the coil-holder of L3-L4-L5. As the height is limited, a bracket must be made to hold the condenser—this is easily contrived out of a piece of aluminium cut and bent as sketched in *fig. 1*—and, as in the case of the other variable condensers above the chassis, this bracket should be allowed to place itself by rotating the control of C11 before marking and drilling the screw holes 6 B.A.

Second, the filament chokes FC1 and FC2. These are wound on $\frac{1}{4}$ -inch formers, using either No. 26 d.c.c. or No. 24 enamelled wire. The formers, $3\frac{1}{2}$ -inches long, can either be wooden dowels or ebonite rod, and the winding length is 3 inches. The sleeve of a lead-in tube is quite satisfactory for the purpose, and fixing is by plugging the end of the tube with wood and, after drilling the appropriate ribs, securing them with wood-screws and a smear of "Durofix," which is a liquid cement obtainable in 6d. tubes of any ironmonger. As shown in the under-chassis view, these chokes—the long white things—are fixed so that they project into the r.f. and monitor compartments respectively, with their ends over the valve-holders. If wooden dowels are used, the mounting is easier, as no wood plug is needed.

FC1 and FC2 have to be double-wound, and the simplest way to do it is to measure off 16 feet of wire for each and then, doubling these lengths in half, put on the two windings side-by-side. This will give at the finish two open ends and one looped end, which should be cut at that point, leaving the single former with two windings on it. When connecting up these chokes, be careful to get FC2, the monitor filament choke, the right way round, as a little consideration will show that if this is not done, the l.t. will be shorted when switching on at S2. This is because a fixed condenser is unnecessary in series with the cathode tap of V3.

Now the placing of the other components: The coupling choke, Ch., is mounted in the detector compartment by means of two holes drilled in the rear sub-panel, and Ch. is located as near the rib as possible. This will be found to leave just enough room between the side of the choke and the screening rib to allow the 0.1 mfd. tubular condenser C14 to lie beside it. The output transformer T2 goes in the l.f. compartment with its low-impedance winding—that carrying two terminals only—towards the

chassis. The telephone coupling condenser C16 is also fixed in this compartment, but should not actually be put on till the l.f. wiring has been done, as it covers the valve-holder and its connections when in position.

The various potentiometers will be found easy to mount, but note that R12 is on an extension control and is located on a rib so that it projects into the monitor compartment to keep the leads short. Looking at the photograph in the last issue, potentiometers from *right to left* are R2, the r.f. regeneration control, R1 the r.f. bias control, and R6, the detector screen-grid potentiometer. On the other side of the chassis—not visible in the photograph in the September issue,—is the volume control R8, with the d.p.s.t. on-off switch S3-S4 alongside it.

Note that in order to get the knobs of potentiometers R1, R2, R6 and R8 close to the panel, half an inch must be sawn off each of the shafts—this is quite permissible and is suggested by the manufacturers.

On the rear sub-panel are mounted the aerial terminals, one for the receiver itself, and the other for the monitor. Both these must be insulated from the chassis, and the drilling will be found to allow of two insulated bushes being used, one on each side of the panel. The earth terminal, in the third hole symmetrically beneath the two aerial connections, does not of course require any insulation. The 7-pin valveholder for the battery connector goes in the large hole provided, with the speaker jack alongside.

The drilling required in the ribs and sub-panels is only for the coupling choke Ch., the output transformer T2, the coupling condenser C16, the choke mountings FC1 and FC2 and the fixing of battery-connector valve-holder.

● Wiring

The whole of the wiring can be easily followed from the circuit diagram, photographs and Numbered Wiring System. The various by-pass condensers are mounted as close as possible to their respective coil- and valve-holders and chokes, supported by their own wiring, with the earthy end taken to the nearest convenient screw in the chassis and soldered to it—firmly. It will be found that though in some cases two or three leads are taken through one grommet, they are either h.t. or l.t. connections or wires for switches, which are all at low-potential from the r.f. point of view. R.F. wiring is well spaced out, and where an r.f. lead has to go through a rib, it has the appropriate rubber grommet entirely to itself; this is important.

It should be mentioned here that it requires a little knack to get three wires through one of these comparatively small holes in the grommets, and unless each side of the insulator is held between finger and thumb while the lead is being worked

through by the other hand, they tend to pull out of the holes. Wherever h.t., l.t. or switching leads come together, they are bound with the braiding from odd pieces of flex—that is, the outside “silk” covering—which not only makes a neater job but also ensures rigidity. The various resistors are all supported in the run of the wiring and are clearly visible in the photographs. Their ratings have been chosen “over-plus” purposely in order to ensure the ample reserve necessary for long and consistent service.

Note that screened wire is used for the connection between the aerial terminal and r.f. coil holder, and also from the plate of the monitor valve to the grid of the detector. In the case of the aerial lead, the outer metallic covering is *not* earthed, but is simply cleaned back about half-an-inch from the ends to make sure it does not touch at these points. The lead should be stretched so that it cannot sag on to the chassis or any other part of the wiring. As explained previously, the screened connection between V2 and V3 does not actually touch either the plate of the monitor valve or the grid of V2, but is simply held against these two points such that the rubber insulation provides a condenser effect to couple the b.o. output to the detector. This is all that is required, and closer coupling only increases the beat-note to such an extent that the detector is blocked. The sheathing should, as before, be removed for about half-an-inch from each end so that it cannot touch, and the run should be arranged so that it only passes near low-potential wiring. The ends are secured by binding them to the plate pin of V3 and the grid side of the grid-leak R5 at the point where it connects to the stand-off insulator, a healthy dab of “Durofix” holding it firmly in place.

● Over-Chassis Wiring

This comprises the connections to the variable condensers, the air-dielectric trimmer across C1, the grids of V1, V2 and V3, and the grid condensers. Taking the latter first, they are simply wired in between the stand-off insulators and the nearest stator terminal of C9 and C18. A screened lead—with the sheathing unearthed—then goes from the stand-off insulator to the top cap of the valve.

The rotors of C8 and C9 earth to the chassis by virtue of the fact that they are mounted directly on the detector screening box, but in the case of C1 and C2, an earthing lead must be provided, since the flexible couplers and insulated brackets isolate these condensers from the chassis. This connection is made by soldering a wire to the appropriate pin in the valve-socket, i.e., the wire is not taken underneath but is attached to the edge of this pin above the chassis. This looks rather a complicated operation, but is really perfectly simple if the hole is plugged with a match stick to keep the solder from running down and to prevent too much being put on, which would not allow the coil-former to go in easily. A close-up sketch of it all is given in *fig. 3*, which also shows where the other similar connections are put on to wire in the stators of C1, C2 and C18. The grid lead for the r.f. valve V1 is taken straight from the stator of C1 to the top cap, the lead being soldered to the nearest nut at the back end.

In the case of C18, the rotor of which is similarly insulated by its holding bracket and flexible coupler, a wire is run from the rotor terminal to the nearest screw in the chassis, which happens to be that holding down one side of the valve-holder. The stator connection is from the appropriate pin in the coil-holder to the nearest stator nut of the condenser.

The J.B. air-dielectric trimmer—previously shown as C20 on p. 30 of the September issue—is mounted across C1 by soldering its rotor lug to the rotor of arm of C1, the two stators being connected together by a lead which will lie on the right-hand side when looking down into the r.f. compartment. There is a convenient stator nut on the front end of C1 and two possible points on the trimmer for this connection to be made.

There are two or three slight deviations from the original circuit which should be mentioned here. Condenser C20 is dispensed with—it is used as the trimmer across C1, as just described—while a 10,000-ohm ½-watt resistor is put in series with the lead marked “G.B. -3v.” This can be seen in the photograph just above R1, and its purpose is to limit the bias battery current to earth to a figure

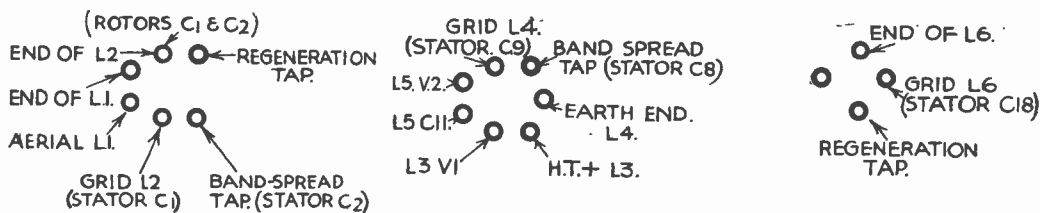


Fig. 3.

Coil Connections, looking down formers when plugged into holders.

commensurate with the drain on the h.t. supply. Condenser C15 should be .0001 mfd., while another condenser of the same value should appear, marked C10, between the h.t. end of the r.f. chokes in the detector plate circuit and earth. Both these condensers will be readily recognised as r.f. by-pass capacities. Another small point to notice is that though the photographs show 7-pin coils in the r.f. stage, a six-pin holder and former are actually used, and similarly, in the monitor compartment a 7-pin valveholder is visible where a 4-pin only is required.

● Coil Data

As explained last month, the question of coils has required particular care in order to get the best out of the receiver and to ensure the fullest advantage being obtained from the sharply tuned r.f. stage. In order to allow readers to familiarise themselves with the performance and capabilities of the receiver on the most popular band—7 mc.—winding data for these two coils only is being given this month, and final information for the full set of coils with the operating notes in the November issue.

For the 7 mc. coils, threaded formers are used, and the necessary details are given in the table. In order to get the close-winding required for L1, L3 and L5, the formers must be filed below the windings L2 and L4 to provide a flat surface on the ribs. This is very easily done by determining where the grid windings will end, and then with a sharp file rubbing over each rib two or three times to get the threads out. The very small reduction in diameter does not matter and in any case is taken care of by the turns values.

The holes for taking the wire through the walls of the former are made with a No. 6 drill—which will be about the smallest in the box and is 1/16th-inch in diameter—the positions of the holes being first marked with the point of the scriber so that the drill does not wander. The simplest way to carry out the operation is to hold the former in the left hand and, with the drill as far into the chuck as it will go, press the brace against the chest and operate the handle with the right hand in ratchet fashion; that is, not all the way round, but backwards and forwards. The drill can then be felt as it goes through the wall, and accidents are avoided.

It is important to reproduce the coils exactly as described, otherwise they will not track up properly and much manipulation of the trimmer will be required.

With regard to the monitor-b.o. coil L6, the data for this is also given in the table—note that it actually tunes 3.5 and not 7 mc. as this happens to be a convenient band on which to start using the monitor—and the winding procedure is exactly the same as for the other coils, only simpler, as there is only one inductance and three connections to be made. In case it may be thought that having the monitor on 3.5 mc. will preclude its use as a b.o. on 7 mc., remember that in the description of this stage in last month's article, it was explained that the b.o. will operate on the harmonic principle just as effectively as when the fundamental is used, the sole exception to this being in regard to 'phone monitoring. In other words, an effective 'phone check will only be possible on 3.5 mc. with that

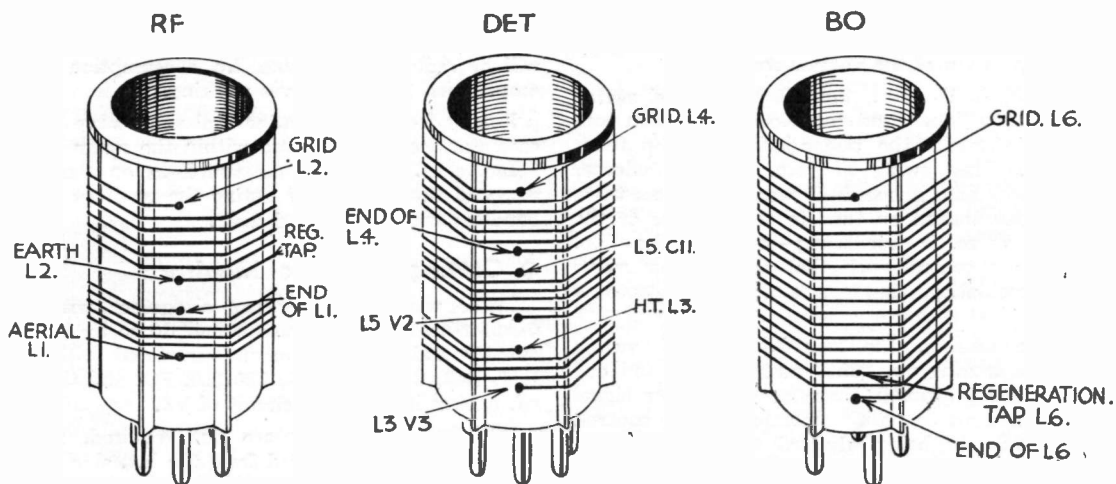


Fig. 4.

Arrangement of windings and terminations on the three coils. L1, L3 and L5 are all close wound. All windings to be in the same direction.

particular coil at L6, but *c.w.* monitoring will be possible with the transmitter on any band, and similarly a beat-note into the detector when V3 is operated as a beat-oscillator.

● Preliminary Operating Points

The foregoing should bring the reader to the stage when he can plug in the 'phones, connect up the batteries, switch on, and expect to hear a signal. Don't forget to put the bulb in the dial-light, by the way, as this may cause some consternation at first.

With the reaction control at zero, the band-set dial at 63 degrees and the main tuning control at zero, set the right-hand panel switch looking downwards, "on," and the left-hand one upwards. With the battery switch in the "on" position, tune round on the main control till a signal is heard. This will probably be 'phone in the 7 mc. amateur band. Then turn up R6 till smooth oscillation is obtained on C11; this should occur at about 30 degrees or thereabouts on its scale. Now, set R1 at half-way and turn up R2, the r.f. regeneration control. The signal on tune will get louder, but don't go too far with R2 till the trimmer has been adjusted, as far less r.f. regeneration is required when the two circuits are dead in tune. An insulated screw-driver inserted in the slot of the trimmer enables it to be correctly operated, and the adjustment consists in making small movements of the trimmer, one way or the other, till the signal is at its best. A further increase in strength should result, and the r.f. regeneration control can now be set at its best position, which is just *below* oscillation point. The final touch is to bring up the reaction control C11. The signal should now be at greatly increased strength, and can be controlled on the audio side by manipulation of the volume control.

To bring in the b.o., the left hand panel switch is depressed, "on," and the b.o. regeneration control knob alongside the 'phone jack turned up about half-way. Then swing the b.o. tuning condenser till the beat note is heard—it won't be unless there is a 'phone station on tune in the receiver or the detector valve is oscillating—and set the b.o. regeneration control such that the monitor valve is just oscillating, unless a stronger beat-note is required.

For monitoring, the right-hand panel switch should be looking up, "off," and the left-hand one in the same position. Then the transmitter signal can be brought in on the monitor tuning control, the regeneration being adjusted as before. If the monitor is switched to b.o. with the right-hand switch set for monitoring, upwards, nothing much will be heard from the transmitter and no damage will be done, as inspection of the circuit will show that V3 is then receiving its h.t. through two different paths, one of which—that through S2 and

R10—simply by-passing the audio output to earth, via the h.t. battery.

With about 50 watts input to the transmitter, and above, there will probably be no pick-up lead required at the monitor aerial terminal, but with lower power working, a short aerial will be necessary, which should be varied as regards length and position till a comfortable signal is heard.

As regards the receiver tuning, the setting of 63 degrees on the band-set condenser will find the 7 mc. band, but in order to get the l.f. end of this frequency range with the main dial at zero—which in the case of the *Eddystone Full Vision Dial* means that the condensers C2 and C8 are all in—a little variation may be necessary if the coils are not exactly the same. The band-spreading is so arranged that 7 mc. covers about 80 degrees of the dial, there being ten degrees over-lap at each end to bring in marker stations. Moving the main dial from 0 towards 100 tunes from the l.f. to the h.f. end of the band. This is apt to be a little confusing for those who think in terms of wavelength, or are accustomed to see increase in frequency with decreased condenser readings, but one soon gets used to it. As Messrs. Eddystone rightly point out in their accompanying leaflet, increase in frequency with increased dial readings conforms with modern practice.

All values have been calculated assuming 150 volts h.t., and at this voltage, the consumption of the receiver with all four stages in operation is between 25 and 30 ma. This figure can be reduced by biasing the output valve back or by using a smaller one, such as the Hivac Y.220, in which case the total plate current will be about 15-18 ma., though the power handling capacity of the receiver will be reduced. The total l.t. consumption is 0.8 amps. with the four valves working.

Finally for this month, several short-wave broadcast stations will be found within the range of the 7 mc. coils. They can be tuned in on the band set, and then logged by noting the readings of the band-set and band-spread dials.

● Cutting Out The Monitor

Those wishing to dispense altogether with the monitor-beat oscillator circuit can do so by leaving out V3 and the components associated with it—R11, R12, C17, C18, C19, C20, L6, FC2 and the two r.f. chokes in the plate circuit of V3.

Switches S1 and S2 are not required, nor is resistor R10, and the lead from the h.t. side of the r.f. chokes in the plate circuit of V2 is taken straight to the coupling choke Ch.

The receiver then becomes a "straight three" with all other features as regards band-spread, etc., remaining as previously described. The panel

appearance will be altered in that there will be no control on the right-hand side of the main tuning dial, and no switches along the bottom edge. The on-off switch S3-S4 could be mounted in one of these positions instead of S1 or S2.

COIL DATA FOR THE 7 MEGACYCLE BAND.

R.F. Stage.

L1—5 turns, close wound.

L2—10 turns total. Regeneration tap $\frac{1}{4}$ turn from earth end. Band-spread tap 3 turns and 5 ribs from earth end. This winding to follow threads.

$\frac{3}{8}$ -inch between L1 and L2.

Detector Stage.

L3—8 turns, close wound.

L4—12 turns total to follow threads, band-spread tap 3 turns and 5 ribs from earth end.

L5—4 turns, close wound.

$\frac{5}{16}$ -inch between L3, L4 and L5.

B.O. Stage. (3.5 mc.)

L6—Former wound full to follow threads, regeneration tap 4 turns from earth end.

impossible to mistake 14,300 for 14,200 as with the normal bar.

● 1.7 mc

Now for its other use. Using the 1,775 kc. axis it will control a valve giving up to 15 watts on this frequency, so that not only can it be used for measuring frequency but also for controlling the transmitter.

It will be realised that being of the "bar" type the power it will handle is greater than that of normal crystals, and with doublers it can be used through the amateur bands.

The second frequency of 1,775 kc. need not be adhered to—we selected this particular frequency to give markers on 7,100, etc., but any other frequency in the 1.7 mc. band may be chosen to suit individual requirements.

The provisional price of this "duplex" crystal has been fixed at 27s. 6d. complete with holder.

We are still testing out various circuit arrangements to find the most economical method of using this for frequency measurement, and a constructional article on its use for this purpose and for 1.7 mc. work will appear next month.

Meanwhile it will be used for 1.7 mc. work during the month on 1,775 kc. in a simple battery one-valve transmitter so that amateurs can hear it on the air.

TWO CRYSTALS FOR ONE!

FOR SOME time past we have had two problems on our mind, the design of an accurate frequency meter, and the design of a simple 1.7 mc. transmitter.

An accurate frequency meter can be designed, but not at a cost reasonable to amateurs. The main essential of such a meter is that it should retain its original accuracy, which means that a high grade laboratory variable condenser, and a temperature corrected inductance must be used.

"My frequency meter uses a half-crown variable and a home-made coil" you will probably say, and you find it quite good enough for your needs. But on 14 mc. do you honestly think it is accurate to within 15 or 20 kc., especially when it has not been checked against a standard for some time?

To get maximum use of the bands means that the more accurate our meter the more of the band we can use. If we can measure accurately, to within 500 or 1,000 cycles it means that we can use 40 kc. more than if our accuracy were only within 20 kc. To e.c.o users an accurate frequency meter allows them to put their transmitter anywhere within the bands accurately and without the fear of being off frequency.

The usual solution to this is to use a 100 kc. bar, which is recognised by the G.P.O. as a frequency standard. Here we run into snags: the cost of a bar purely for frequency meter use, and the inability to use it for any other purpose. Another trouble is that using the harmonics of the bar you are trying to measure, say, on the 14 mc. band, and there will be harmonics on 14,000, 14,100, 14,200, 14,300, and 14,400 kc., and any one is liable to mistake 14,100 for 14,200 kc.

Discussing various schemes with Mr. C. Brookes, of the Brookes Measuring Tool Company, he suggested a new type of crystal which overcame all these difficulties and could also be used for transmitter control. After considerable research he produced an entirely new type of crystal having quite original features.

● 1.7 mc and 100 kc

This new crystal is cut so that it will oscillate in one direction at 100 kc. and in the other at 1,775 kc. Now if it is made to oscillate on 1,775 kc. harmonics will be found on 3,550, 7,100, 14,200, etc., so all that is necessary is to take say 14,200, and then 14,000, 14,100, 14,300, etc. can be obtained on the 100 kc. axis. Thus it is absolutely

(Continued at foot of preceding column.)

HAVE YOU HEARD...?

An abstract of the past month's conditions, as compiled and presented by

F. A. BEANE (2CUB)

MANILA, capital of the Philippine Islands, makes news! Until recently the listener relied on 20-metre amateurs to provide reception of KA, but now Manila has raised its voice on 31.34 m., or about 9,575 kcs., presenting musical programmes and news in Spanish every night from 21.30 to 22.30 G.M.T., with the exception of Saturday (early Sunday morning in the Philippines). At 21.30 KZRM, for that is its call, "signs-on" with chimes and, generally, the announcement "KZRM, Radio Manila, owned by Erlanger and Galinger, brings you breakfast-time music and news. The correct time, brought to you by R.C.A., is exactly five-thirty."

This announcement was heard at 21.30 G.M.T. and, provided the Philippines do not change to a different time, the announcement and time given should hold good. Reception of KZRM, however, can hardly be termed consistent since much depends on W1XK for good or bad results. One night KZRM holds the upper hand, then for the next half dozen nights it wrestles vainly with W1XK in an effort to make itself heard, and the result is just a turmoil of the "Singing Lady" and Spanish news! Now is the time to search for "Radio Manila" and to send for its verification—tomorrow may be too late! The address is "Radio Station KZRM, Erlanger and Galinger, Importers, Manila, Philippine Islands."

"Radio Manila" does not command all the limelight, for the neighbouring "Voice of Tokio," JZJ (19.79), which needs little introduction, brings to Europe nightly news of the Sino-Japanese conflict between 19.00 and 20.00 G.M.T. at colossal strength, while its compatriot JZJ (25.42 m.), overshadowed by the mighty 2RO, occasionally conquers the surrounding noise. China, to whom Japan maintains she brings friendship, does not appear to have an outlet for anti-Nipponese vociferations, which is quite a pity really as etheric warfare seems *the* thing these days!

● Latin America Again

From the maelstrom of the East our interest is captivated by the pacific West, and Cuba "Pearl of the Antilles." COCQ (30.77 m.) of Havana, former "star" of the West Indies, has been eclipsed by the supremacy of the neighbouring COCM (or COCN) operating on about 30.5 m. From 22.00, or so, COCM may be heard with programmes of characteristic rumba and bolero, interspersed, in the orthodox Cuban manner, by miscellaneous advertisements and the frequent call "Transradio Columbia Sociedad Anonima, CMCM, onda larga y COCM,

onda corta, Apartado 33, en Habana, Cuba" or in English "Transradio Columbia, CMCM, long wave and COCM, short wave, Box 33, Hayana, Cuba." Its compatriots COCO, COCH, COCQ, COBZ, COCX, COJK, and COCD, are still being heard and need little introduction.

HIN of Trujillo City, Dominican Republic, is still providing a remarkable signal on 48.05 m., but has now changed its slogan to "Broadcasting Nacional" and occasionally it is audible in the region of 24 metres—apparently a harmonic.

The evasive HH3W, on an announced frequency of 9,645 kcs., too, presents a good signal after midnight, but it should be searched for sooner than 01.30 when it leaves the air with a good-night greeting in French (the official language of Haiti), Spanish and English. Difficult enough to log, it is much more evasive as a verifier of reception reports, in fact it is notorious for habitually ignoring listeners' reports, reply coupons and everything else, although a Polish friend tells me that a nicely worded letter in French did the trick!

Writing of QSL cards reminds me of two outstanding ones which I have received recently. One is from XEWW depicting what is presumed to be a Mexican elopement in the more picturesque horseback manner and the other from CR7BH showing the African continent and radiations emanating from Lourenço Marques, where the station is situated. The wavelength of XEWW is given as 31.58 m. and the power 10,000 watts, but on a recent occasion it was observed on 19.79 m. until 02.00, the only Spanish speaking station to be found between GSO and GSF. For identity reference is made to the title "La Voz de la America Latina" and four chimes are used. The address is Apartado 2516, Ajuntamiento, Mexico D.F.

The card of CR7BH, like XEWW, fails to give notice of the operating schedule, but gives its power as 250 watts and address: Caixa Postal 954, Lourenço Marques, Mozambique. To log this comparatively rare "catch" one must listen between about 17.30 and 19.30, but so far I have generally found it at its best around 17.30, although it rarely exceeds R4 in strength. A sister station, CR7AA, is said to operate simultaneously on 48.88 m., but I do not know of an authentic report from this country on its transmissions.

● An Anglo-American Hour

Numerous stations, employing English in a minor portion of their programmes only, have announcers who are either American or have acquired that

accent (just like some of our amateurs affect!), but when I tuned to a new Chile station and discovered a semi-Oxford accent advertising cameras and proclaiming the transmission to be an Anglo-American Hour, I was more than astonished! The station from which this programme originates is CB89 of Santiago, Chile, relayed by CB1170 on 25.5 metres, and the English programme is heard from 23.00 G.M.T. to 24.00. Reports are requested and should be sent to Casilla 706, Santiago, Chile. The wavelength is given as 25.64 m., but is sadly incorrect since HP5A occupies the latter, while the Chilean is heard between DJD and GSD.

Panama, apparently, has no intention of being left behind in the race for the greatest number of stations, since she has blossomed forth with the HP5A mentioned above. To the more ardent dx'er this transmitter is likened to a local, although employing comparatively low power. "Radio Teatro Estrella de Panama"—that is the title HP5A glories in—may be heard nightly from about 23.00 G.M.T., when one usually hears a news commentary presented in American style by Lieut. G. Williams of treasure-hunt fame, manager of the station. Reception reports are requested to be addressed to Apartado 954, Panama City.

Seldom heard Nicaragua in the North now offers YNPR on 34.92 m. as its most prominent representative at the time of writing. On a recent occasion it was quite strong in the region of 02.00 and was identified by its reference to Managua (its situation) and the slogan "Radio Pilot" indicating that the owner is the local stockist of receivers of that name. If reception verification is sought one must apply to A. Majewsky, Radiodifusora YNPR, "La Vos del Radio Pilot," Managua. The power is 500 watts, which suffices to make YNPR audible practically over the whole world.

● The Ultra High Frequencies

Ultra short-wave reception is the current vogue; if your receiver doesn't tune down to 5 metres, or lower, you are not only out of date, but missing many thrills of the b.c. bands. On 9.454 m., or 31,600 kcs., several stations may be heard, but as quite twelve are licensed to operate on this channel one generally finds this frequency a weird low frequency hum from which an occasional voice or call disengages itself for a few minutes at a time, but only to be usurped by a co-frequenter of the band. The strongest "usurpers" at the time of writing are W3XEY and W9XPD, with the addition of an occasional intelligible signal from a C.B.S. relay, presumably W2XDV. The former is often at its strongest around 19.00 with the N.B.C. Red Network programmes, the announcement being, generally, "This is the Ultra High Frequency Station W3XEY in Baltimore relaying the programme of WFBR," reports being requested. The address is "The Baltimore Radio Show Inc., Baltimore"; power 100 watts and correct reports are confirmed by a rather uninteresting QSL card. W9XPD, with similar power, of St. Louis, may be heard at the

same time relaying KSD with the N.B.C. programme. Again reports are welcomed and should be sent to "St. Louis Post Despatch, 12th and Olive Street, St. Louis, Miss."

Other interesting signals are W2XEM of the Newark Police on 30,100 kcs., W6XKG, Los Angeles, 25,950 kcs., and the second harmonics of W2XAD on 9.78 m. and a German station, presumably one of the 19 m. Zeesen group, on roughly 9.81 m. Another station, which usually commands attention, but which I have heard little of so far this autumn, is W9XAZ of Milwaukee, Wisconsin, operating on 26,400 kcs. with 500 watts power.

● Further News from North America

Many regular listeners to the news commentaries of the 25.45 m. WIXAL have been puzzled by its apparent absence from the ether lately. Normally these broadcasts commenced at 23.00 B.S.T., but more recently they have been heard about 30 minutes later, still at colossal strength. Apart from the ever popular W2XAD, W2XE on 13.94 h. has proved the most powerful North American transmission during the past month. From 11.30 to 14.00 it peaks at R9, but at 14.00 an aerial directed on South America is brought into use resulting in an amazing drop in signal strength, well illustrating the effectiveness of such arrays.

The Hicksville station W2XGB on 17.33 m. is still well heard in the evenings and, on one occasion, provided a surprisingly powerful and thrilling commentary on the Gold Cup Hydroplane Race.

● More News from South America

Reverting once again to the Southern Continent we gain more news of the ceaseless activity amongst Colombia's and Peru's broadcasters. In Colombia HJ1ABP of Cartagena (31.23 m.) operates from 22.00 and is one of the most powerful signals found in the 31 m. band, while its compatriot HJ5ABD, "La Voz del Valle," has put in a welcome reappearance on 49.3 m. The former is a prompt verifier but "La Voz del Valle" is most irregular and unreliable.

Little is heard of OAX4J (32.15 m.) of Lima, although it occasionally puts in an appearance in the early mornings before 05.00, when it may be heard relaying the programme of OAX4I. Opera lovers may hear a "complete opera" from this station on a Sunday morning from about 03.00. Accurate reception reports, which should be addressed to Casilla 1166, Lima, Peru, are confirmed with an attractive folder type card well worth possessing. OAX4Z which made a sensational debut on 49.33 m. a few months ago, appears to have ceased operating as it is not heard now, while little is heard of OAX5B on 25.43 m., possibly due to the fact that the powerful Cuban COGF employs an adjacent frequency.

CB615, originally alleged to be CEB, appears to have deserted its 12,300 kcs. frequency, and to have vanished into thin air, although there is a possibility that it may have moved to its assigned 6,150 kcs. channel.

CORRESPONDENCE

"SHIPS THAT PASS"

Beyond the fact, in one's own opinion, the "man the other end" is either a good or a poor operator it is remarkable how little the average QSO reveals of his actual personality.

The sending and accent may change but, to both operators, a contact is often nothing more than a distant fist or voice reciting a sacred RST formula with an afterthought in the shape of gear description.

May I therefore, through your excellent columns, suggest that amateurs take full advantage of the terms of their licence and spice their contacts with some of the brotherly ragchew ingredient and less of the QRN CUAGN recipe.

We are not commercial traffic-pushers and the "personality touch" might well be included not only in our QSO's but in our QSL cards, of which I enclose a sample.—Yours faithfully, with 73, N. P. SPOONER, G2NS, R.S.G.B.

[A portion of the card referred to reads: Operator, Norman P. Spooner. Born London 1897. Married 14 years. Ex-Telegraphist in Spain and Portugal. Soldier in France, Belgium and Italy. Signwriter in U.S.A. and Canada. Cowpuncher, Goldminer, Eucalyptus Distiller in Brazil. Hobby: Amateur Radio. What's yours? Hi!]

C. A. RIGBY REPLIES

As the writer of the article, "A Quick Way of Learning Morse," I am pleased to reply to "Ex-op" (spelt *dit-dah* way). I quite agree that Morse is the language of telegraphists, the point being made clear in the final part of the article dealing with the "tune" of signals. On the other hand, "Ex-op" should remember that the article was intended for "Short-Wave Magazine" readers and not for those attending a Marine Wireless School where repetition of "*dit dah, dit dah, etc.*" would probably annoy no one. I daresay that only a very small portion of "S.-W.M." readers could satisfactorily attempt the "Sound Method" of learning the Morse letters, without annoyance to someone in the home.

After instruction at a wireless school, practical experience in the services, and acquaintance with short-wave listeners of all types since the early days, I am convinced that the majority of learners combine both sight and sound methods. Of necessity, the method of teaching depends on the instructor; and there is much to be said for the learning of Morse by both eye and ear.

Regarding the resultant errors and confusion "Ex-op." points out, I know from experience that even such is the case with the "*dit dah*" method. Nine out of ten would-be operators who start with the sound method will eventually end with the grouping of the letters as suggested, in order to memorise them quickly.

In conclusion, I hope "Ex-op" will pity me, since I am bothered by a neighbour learning Morse who persistently starts pounding on a Morse key with the door wide open. What an infernal nuisance he would be if he started repeating: "*dit dah dah dit—etc!*"—C. A. RIGBY, Newcastle-on-Tyne (another Ex-op).

A PROBLEM FROM SOUTH AFRICA

I was greatly interested in reading your summary of the "Ideal Receiver" correspondence and particularly in noting the requests made for the inclusion of "R" meters. This has induced me to submit a request for the inclusion in an early issue of an authoritative article dealing with "R" or signal strength meters. I think such an article would be welcomed by many of your readers.

In the past various publications have dealt with tuning meters but these do not meet the requirements of serious short-wave listeners who require information on methods of measuring signal strength, which methods should provide reliable comparisons of signal strength from day to day.

An article, therefore, describing the best arrangements available, together with sufficient data to enable us to choose the method best suited to our own receivers, construct and calibrate it would, I am sure, be most welcome.

I am particularly interested in observing the influence of the moon, etc., on reception conditions from various parts of the world, and my greatest difficulty to date is in recording signal strength sufficiently accurately to enable me to collect satisfactory data.

At the moment my signal strength meter consists of a 0-1 milliammeter in the plate circuit of the I.f. valve, a variable shunt resistance being used for adjustment purposes.

Its movement, however, on all but the more powerful s.w. b.c. stations such as Davenry is insufficient for my purpose.—Yours faithfully, J. WILSON, 89, River Street, Pretoria, South Africa.

AMERICAN VALVES

I wish to take advantage of your query service, but before so doing, feel that a few words of appreciation on the "Short-Wave Magazine" would not be out of place. . . .

Now to business. I made up the 2-valve ultra short receiver and received the television programmes, by judicious fiddling at good volume on a moving coil speaker, but because of said judicious fiddling, quality was not so hot. I therefore constructed a mains version using a Mazda HL and transformer coupled to AC/PEN. I get a beautiful regenerative rush but no signals. Now are you going to get down to it and give us a mains version of this fine little set. I expect the extra capacity in a mains valve and holder upsets valves somewhat, anyway I am still trying to get rid of the "bugs."

One last word, don't be frightened to use American valves in your TX or Receiver circuits, they are cheap and as most of us have a Yank transformer on hand which incidentally are also cheap, you will go a long way to being more popular by lightening the drain on our pockets caused by the ridiculous price of British valves.—Yours, etc., F. H. OSBORN, 2CVO.

[Will other readers comment on these points, please. At the same time we point out the policy that it is cheaper to use two efficient British valves rather than three cheaper American.—Ed., "S.-W.M."]

CRACKLE-FINISH PANELS

Several enquiries have reached us recently concerning the crackle-finish obtained commercially. Is there any method by which the amateur may produce this effect? We know of no worth-while method, but perhaps one of our readers can oblige.

LOST FLIERS AND D.F.

I was interested in your article, "The Earhart Flight," in the September issue as I have always been of the opinion that the majority of such disasters could have been prevented if adequate direction-finding equipment had been carried and the personnel had a knowledge of Morse. None of the various accounts of the Earhart flight seem to have taken into consideration this lack of Morse knowledge and equipment for operation on 600 metres.

It does not appear to be generally realised that d.f. on short waves at sea, especially when speech is used, is apt to be very unreliable, whereas on 600 metres using Morse it has been a complete success for many years.

I have had bearings on 600 metres myself at sea on several occasions when it has been impossible for the ship's officers to take sights by the sextant for several days, owing to the sun and stars being obscured by fog and heavy cloud, and these bearings have proved the ship's position by log (dead reckoning) to be as much as 15 miles out, at times. This, of course, is not unusual when celestial observations cannot be obtained. This being the case, an aeroplane flying over the sea, where visibility is bad and winds strong, must drift off its course many miles more than would a steamer, which is prevented to a large extent from being blown off its course by a strong wind due to the resistance of the water. (The chief factor affecting the course of a ship being the various currents.)

There is no doubt that fliers who undertake flights over vast oceans without reliable equipment and Morse knowledge have an immense amount of courage, especially in view of the fact that the chances of being sighted by a passing ship, in the event of being forced down, are remote indeed.

The slight chances of sighting a relatively small object such as an aeroplane (probably half submerged) can be imagined when it is remembered that a life-boat holding 35 persons cannot be seen at a greater distance than 6 miles from the bridge of a ship 50 feet above sea-level.—Yours faithfully, "Sparks," Westcliff-on-Sea.

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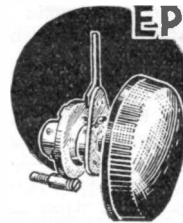
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There are other headphones on the market to-day which sell because they are low in price. That does not mean they are cheap. On the contrary a "Brown" Headphone which may cost treble in price will be giving good service long after two or three of these low-priced ones have gone—and gives better reception right from the beginning to the end.

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MULLARDS TO WREST TRANSMITTING VALVE MARKET FROM AMERICA

Prices Cut by Half

AMERICAN imports of transmitting valves will suffer a severe setback owing to the new programme of the Mullard Valve Company.

Prices of certain existing types are to be reduced by over 50%, and a complete new series of small transmitting valves is to be marketed, competitive with the Americans in price, but possessing added advantages.

Four r.f. pentodes are in course of production, two directly heated, and two indirectly heated types. All these are fully screened; r.f. transmitting types, for operation on frequencies up to 60 mc. without neutralisation.

The first two are rated at 15 watts anode dissipation, the directly heated type being termed the "PZ05-15", and the indirectly heated type "PV05-15." The PZ05-15 has a filament rating of 4 volts at 1 amp, and the PV05-15 a cathode rating of 12 volts at 0.4 amps. This high voltage, low current rating on the indirectly heated types is a big advance, as it reduces enormously the heavy voltage drop in the filament leads common to other types.

Typical operating conditions at 15 metres, anode volts 500, current 70 mls., screen grid 300 volts at 11 mls. give an output of 20 watts in class C.

● Five Metres

At five metres their output is amazing, a pair in push-pull giving 41.5 watts of r.f. at an anode input of 500 volts at 138 mls., an efficiency of 60%! Even at this frequency the driving power required is only 1.6 watts.

The valves are designed either for suppressor, anode, or screen modulation, and are priced at £1 12s. 6d. for the PZ05-15, and £1 17s. 6d. for the PV05-15.

● 50-watt Pentodes

The other two pentodes are directly and indirectly heated improvements on the American RK20. Type PZ1-35 has a filament rating of 4 volts at 0.8 amps, and type PV1-35 an indirectly heated cathode rating of 12 volts, 0.9 amps. Anode dissipation rating 35 watts. On 15 metres typical conditions are: anode 1,000 volts at 80 mls., screen 250 volts at 27 mls., output at 65% efficiency: 52 watts, the driving power needed being only $\frac{1}{4}$ -watt.

The PV1-35 should be particularly useful as a high power regenerative crystal oscillator, and with

suppressor modulation would make an ideal single valve 'phone outfit. Prices are: PZ1-35, £5; PV1-35, £8 10s.

● U.H.F. Triodes

The other two releases are u.h.f. triodes for use down to 2.5 metres. The first, a "ten watter" (type TZ04-10) has the following ratings.

Filament volts	4.0
Filament amps.	1.1
Impedance	11,400 ohms
Mutual conductance	2.2 ma/v
Amplification factor	25
Anode dissipation	10 watts
Max. Anode volts.	
20 metres	500 volts
2.5 metres	300 volts

On 15 metres the valve will give an output (class C) of 10 watts with an input of 400 volts at 43 mls.

Anode and grid are brought out to separate "top-caps" in the bulb, the anode being made of metal. The price of this valve is £1 14s.

● 75 watts on 56 mc.

Similar in looks, but having a carbon anode is the TY1-50, a fifty-watt big brother of the TZ04-10.

This valve is going to be very popular in five-metre transmitters for with 1,250 volts at 95 mls. an output of 75 watts is given. Yes, 75 watts at 60 mc.! Operating details are:

Filament volts	7.5
Filament amps.	3.25
Max. anode volts at	
5 metres	1,250
Impedance	5,250 ohms
Amplification factor	10.5
Mutual conductance	2.0 ma/v

The price has been fixed at £3 10s.

Some of these types will be under test during the month and simple transmitters employing them will be described in next month's issue of THE SHORT-WAVE MAGAZINE.

EASTBOURNE AND DISTRICT

Radio Society, one of the oldest in the country, will after a slump period shortly open its winter session with a programme of general interest. Beginners are specially invited, although numbered in the enthusiastic group are members interested in transmitting and u.h.f. research.—Hon. Secretary, S. M. THORPE, A.M.I.R.E., 74, Brodrick Road, Hampden Park, Eastbourne.

On the Amateur Bands

"Ham" News by G5GQ

GOING out to dinner is one of the major curses of civilisation, and so it is a real pleasure to attend the R.S.G.B. Convention Dinner without having to bother with the formalities usually associated with this sort of affair. Hams go there to meet old friends and make new ones, and as all are out for a good time, it is good.

Vic Desmond (G5VM) and Bert Dyson (G6NJ) were two of my dinner companions, both of whom I had not seen for two years. The talk turned to the vast change in amateur radio during the last two years. When we started most of us had perforce to build our own gear, because we couldn't buy it, but nowadays most newly-licensed hams buy ready-made American transmitters and receivers "Kathleen Mavourneen" wise, and get their W.A.C. within a few days of starting up. Or maybe the prevailing easy dx on 14 mc. makes us think so.

The crush was so great that it was impossible to get to all the people you wanted to meet, but I did manage to grab Freddy Miles (G5ML). He showed me some photos of his new station, entirely home constructed yet bettering many commercially-built outfits. He had a lot of trouble getting new masts, his suppliers having to order a quantity of wood from abroad as they could not get shipment of the masts separately.

The story of his station is interesting. Wanting a new house, he cruised round in his car with a portable receiver until he found the ideal radio location, and there built his new place.

● Olympia

"Heat, Light and Sound," or the R.S.G.B. stand at Olympia. More hams per square inch than Spaniards on 7 mc! "TEST DE G2MI" audible throughout the exhibition. Relays of voices to shout for the handbook. Harrassed "Clarry" trying to talk to half a dozen of us at once. Best card G5BJ's, but it wasn't on the wall!

● 1.7 mc.

Smashing success of the 1.7 mc. campaign. At the present rate we shall have ten stations on the band by 1947! So far G6FO, G2NS, G8GG, and G6ZR are coming on so we are a crowd. G6ZR has been keen on this band for years, and has been on almost nightly around 11 p.m. since about 1927.

No definite schedules fixed yet, but I shall be on 1,775 kc. on Sunday, October 3, at 11 a.m., and Sunday, October 10, again at the same time. Frequency will be 1,775 kc., and power about 5 watts, so perhaps some of you will join me for a yarn.

2CCS of Wellington, Salop, has written me about 1.7, which he considers better than 3.5 for local work. He is prepared to listen for any station on

this band if they will drop him a line. Address: Post Office, Donnington Wood, Wellington, Salop. Thanks, 2CCS.

● Low Power

Had a long QSO with G8TV, low power exponent. Using not more than 3 watts on 7 mc. he is putting out a fine signal. The transmitter consists of a Hivac AC/Y as crystal oscillator feeding a 66 ft. zepp aerial. His aerial was only 15 ft. high when we worked, but even so he was R6 at my place, cutting through the racket very well. He told me that he had worked a Russian during the afternoon and had got R5. So 7 mc. can be useful for working beyond our shores during daylight.

Another interesting one was with G6ZR. He has been off the air for some time but says that once a ham you always come back, and so is rebuilding for all-band operation. I have been feeling rather lonely on 7 mc., as I know so few of the new stations, so welcome ZR back to the band.

GW6YQ, dead on my own frequency (7,015), told me that the local crowd were taking some 56 mc. gear up Snowdon. Just as I asked for definite times to listen one of the Spaniards lighted on us and ended things for the time being. Perhaps some of you heard this Snowdon test, I heard nothing in London.

● "Believe it or not"

Other old timers on 7 mc. include G6FO, our designer, G2PL and G6WY. Ham, 6WY, has been doing a lot of 'phone on 14 mc. recently, but BCL complaints worry him, so perhaps that is the reason for his return to 7 mc. He was heard R9 plus in W7 on 'phone—when he broadcast via B.B.C. and Daventry Empire! His BCL trouble reminds me of visiting a prominent station where 'phone was demonstrated (using some hundreds of watts) during B.B.C. hours. I asked whether he ever got complaints and the reply was, "No, never. I used to but everybody round here has sold their sets so I don't now."

Judging from the way conditions are going, 7 mc. should be a good dx band this winter. Yes, I know all about the Spaniards, but when dx starts to come in they will fade out. I have heard stacks of W's, VE's, and VO's this month, starting to come through about 11 p.m., but haven't raised any yet. When winter time begins this will mean 10 p.m., not such a late hour to wait for dx.

Signals always seem so much stronger on 7 mc. than they do on 14 mc. Fading is supposed to be less on 14 mc. but I have always found the reverse, and would far rather work W's on 7 than on 14. One thing I have noticed is that you can call them

for hours on 7 mc. with no luck and then one will come back giving R7, and even after that you still won't raise another for hours.

● Visitors

G5OH from Bournemouth dropped in to see me and have a yarn. He rather likes the new rack outfit under construction and since he has sold his old transmitter is rebuilding on this system. Leaving my place around 11 p.m. he had to drive home through the night, a 100 mile journey which I didn't envy him!

Before going down to Bournemouth recently the last station I worked was G6PY, who was the first I worked on reaching G5OH. On my return the first contact was with G5OH, double coincidence!

Two ex-India hams, G5HI and G6HB came in one night. Conversation was deer and alligator shooting out east. That's one of the things I like about ham radio, most hams can talk on almost any subject, and usually forget radio when they get together.

Local G5XH also visited me, blowing his famous flashlamp bulb on my c.o., and getting vast entertainment from my bug. An idea for clubs is to have a sweep for those who have never used one, and give the "kitty" to the best performer!

● Readers

J. McIntosh Davie (G2XG), ex FOA8H (S. Africa, 1926), corrects me over the number of readers of

this column, which has now increased to four! Coming from one of the old crowd his remarks are exceptionally interesting. Spending most of his time with 40 kilowatts or so on commercial gear, he is all for low power in his own rig. Quite rightly he complains of the amount of power used by many stations doing local work. I agree with his remarks concerning a station using about 400 watts on 7 mc. each time he modulated the aerial circuit blowing over. 2XG says, "makes me feel little boys shouldn't play with what they can't control."

There is a lot of sound reason in this, for much more power is used on some of the bands than should be. C.W. is not so important because it doesn't spread, but 'phone is a different proposition. With 3 watts fully modulated I can put R8-9 signals round Europe on 'phone, and this with any junk hook-up. I run my main transmitter with as small an input as possible, normally ten watts, because I get longer life from the valves. Not so George, 50 miles away. He is a big noise and so in goes 250 watts, 400% modulated. The rest of us, getting on quite well with reasonable power suddenly find George jamming everything, so up goes our power to get through. Are we any stronger? No, not on your life, because background noise has come up. And so the mad circus goes on, and more of our money is wasted just to overcome interference.

BOOKS AND CATALOGUES REVIEWED

"RADIO SERVICING SIMPLIFIED"

First published in 1934 this book has now reached a sixth edition in which the whole work has been rewritten and, in the process of making it up-to-date, enlarged. The sixteen chapters deal fully with the subject, as the title suggests, by the use of graphs, tables and circuits; these latter, besides assisting the service man, make a splendid reference for the amateur. There are 37 in all depicting fundamental theory and covering a multiplicity of arrangements ranging from valve and metal rectifier practice to the more complex a.v.c. and signal rectification. For instance, how often are we apt to forget the appropriate biasing wiring possible when applying same to output valves? The same problem may arise when fitting decoupling, volume control, scratch filters, etc.

The service man who invests 2s. 6d. will find he has a text book that will serve him well. The reading is easy, and chapter and sub headings permit quick reference to the particular problem requiring solution. By this we do not infer that the book should be used for reference only when in doubt: it should be read from cover to cover,—the style invites one to do so.

Although naturally the short waves do not utilise many pages standard receiver practice is explained,

use being made of a t.r.f. circuit for illustration purposes. Short-wave superhet and converter design are also dealt with.

Messrs. Automatic Coil Winder and Electrical Equipment Co., Ltd., are to be complimented on the publication of this handy, convenient size manual, which will find extensive use.

WEBB'S RADIO

Those contemplating purchase of a receiver for amateur use or a transmitter complete are advised to write, enclosing 2d. for postage to Messrs. Webb's Radio, Soho Street, London, W.1, for their new list giving specification of such famous receivers as the "Super Skyrider," tuning from 5 to 550 m.; the R.M.E.69, 9 to 550 m. in six bands; "Sky Buddy," 18 to 550 m.

Transmitter specifications are also given. The UHX35, with its 40 watts r.f. output and 120 mc. operation is illustrated.

PETO SCOTT

The Peto Scott Co., Ltd., of 77, City Road, London, E.C.1, have produced a booklet containing eight specifications of short-wave sets that may be built from reasonably-priced kits. A range of components are also illustrated; of particular interest are the 4- and 6-pin coils covering from 9-2,000 metres and priced from 2s. to 4s. "The Pilot Short-Wave Experimenter" is the title.

From S.W.L. to Full Licence—2.

By CHARLES WHEELER

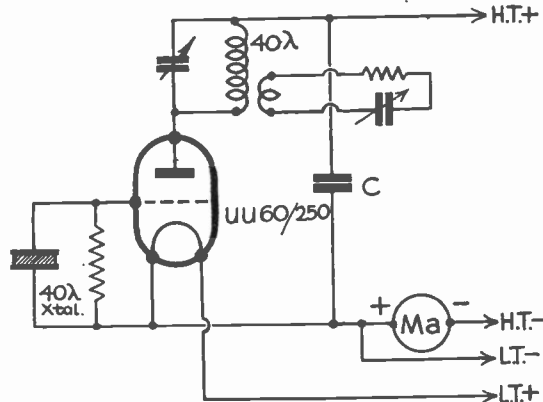
I LEFT YOU last month hoping to receive my artificial aerial licence—it arrived about three weeks after I sent in the application, and is beside me now. I will tell you some of the rules.

Firstly, it allows reception only for experimental purposes, an ordinary broadcast licence being required for the broadcast set.

Then, as this concerns an A.A. station, the definition of an artificial aerial circuit as defined by the Post Office authorities will not come amiss here. "An artificial aerial" means "a closed, non-earthed, oscillatory circuit, possessing inductance, capacity, and resistance, and functioning in place of the usual aerial-earth system." In plain language it is a coil, tuned by a condenser, with a resistance in the circuit, the whole thing not earthed.

● Steady !

Of course I was frightfully pleased to own a call at last, and went round to the Editor full of plans for a marvellous transmitter. It was to be a mains outfit, with crystal oscillator, doublers, power amplifier, and modulator.



After a talk with him I soon changed my mind. He pointed out that I had never played with transmitters, and probably had never even handled a crystal. If I built up the transmitter I had in mind the chances were that I should be thoroughly fed up with it by the time I had got my full licence. "You've got six months minimum before you can get your full ticket—use that time to get an understanding of your gear, get a simple crystal oscillator and find out all you can about it. Rig up doublers, power amplifiers, modulators, etc., but do it with the battery gear you have in your junk box, and then when you are ready for your full licence you will know exactly what you want, and you won't have wasted money on useless stuff."

It seemed common sense so I looked through my gear and found a Hivac PX230, a 100-volt h.t. battery, an Eddystone condenser and coil, and then borrowed a Weston 0-300 milliammeter and a 7 mc. crystal. The crystal looked very fragile, but he told me they were very strong if reasonable care was used. To clean it I put some ordinary washing soda in warm water, held the crystal in the palm of my hand and rubbed the solution on it with the fingers of the other. Then I put it under a running tap and dried it with first a towel, and last with some filter paper. It didn't break!

Then I rigged up the circuit shown in *fig. 1*. Directly I switched on the meter went over to 280 mils., rather high for a battery valve! After a moment's thought I spotted the trouble, I had got the meter in the combined —h.t., —l.t. lead, so it was reading the combined h.t. and filament current! So I connected it in the —h.t. lead before it joined the —l.t. and the mils. dropped to 43. An important thing about milliammeters is that if they are placed in the plus h.t. the plus of the meter goes to the plus of the h.t., and the minus of the meter to the plus of the set. If they are in the minus h.t. lead, the minus of the meter goes to the minus h.t. and the plus to minus of the set. I put mine in the minus h.t. so that if I touched it I shouldn't get a shock—if they are in the plus they sometimes leak and if you happen to touch them you feel it!

● Tuning

Well, I had got 18 turns on the 1½-inch diam. former, and a .0001 condenser across it but when I turned the condenser there was no difference in the meter, still 43 mils. I got a flashlamp bulb, connected it across a loop of wire and held this near the coil, but nothing happened.

I had not put in a bypass condenser, so I connected a .0001 (C) in, and tried again. As I turned the condenser the mils. suddenly dropped to 10, and the bulb lit up brightly. The crystal started oscillating with the vanes nearly all out, and stopped with them about half way in. This tuning is not at all critical, as I had previously thought. As the vanes are moved further in when the crystal has once started, the light gets brighter, reaching full brilliancy just before the vanes were in far enough to stop oscillation. Instead of the bulb a small neon lamp was tried, and this lit well as the coil was touched at the anode end, but not at the h.t. end. Once lit it could be moved an inch or so away still glowing, but when it was moved too far away and went out it had to be touched on the coil again before it would glow.

(Continued on page 38.)

Listeners' DX Corner

By "The DX Scribe"

LAST MONTH I had my tail cut off by the Editor because I was going to tell you about the new idea for this corner when I was stopped almost in the middle of a word. That's the worst of Radio-lympia, the only worthwhile feature in THE S.-W.M. shortened to make room for it!

Well, this is the idea. We listeners like to compare our reception with others in different parts of the country, while transmitters abroad are interested to see if they are being heard over here. I have placed all the logs at the end of this column so that transmitters can spot their calls at a glance and we can compare each other's logs without having to read through the rest of the feature. Nothing new in that, but the idea is that the write-up should consist of comments as in the past, with notes on the best times to listen, new station frequencies, and any unusual experiences or conditions noticed. If we can put all our experiences together we may be able to accurately summarise conditions during the month and possibly predict conditions for the next month.

One point about logs, space is limited, so for 20 metres with Americans only W5, W6, and W7 district calls will be printed, but on the other bands all districts will be used.

An example of the type of experience which is useful is contained in my remarks last month regarding Pacific Coast conditions.

● "Two Great Minds . . ."

W. E. DAVEY, Belfast, writes that after reading them he looked up his log which bears out my own experiences almost completely. On August 12, from 06.20-06.45 B.S.T. he heard: W5DUM, K6KMB, VE4LX, VE4KZ, XE2FY, W8HXQ, W6YP, K6BMC, W6HTQ, W6HQY, VE5HA, VE4OF and W8CMW. Conditions then changed and about 08.15 he heard: K6NZQ, W6GCT, W6CQI, etc., but no other districts. Has any one else noticed this "group" effect? Let's hear from you.

He says that FB8AH (Madagascar) has been coming through on 14,250 kc. four days out of six, his 'phone varying between R2 and R5. Other points in his letter are "The reception of W7FQK at R9 on the l.s. one morning. Somehow puts me in mind of water-cooled tubes, about 10 kw., and beam antennæ!" "W3BSY was over here for a couple of days and he spoke of 'hunnors' of watts to our ten watts. He had some yarns to tell of water-cooled tubes." "Does Bob Everard go to bed at night? By the look of his logs he sleeps by day and burns the midnight oil. He has, I hear, verified reception of all States of the U.S.A.—a really fine list of work."

Thanks very much for your letter, W. E. Davey, and do please keep it up for I am sure we all like to hear from you.

● Ten Metres

Now, to BOB EVERARD. His ten-metre log is definitely the star of the month. He writes that the band opened up on September 3, and for twelve days' listening his log is super. The amazing part is the reception of so many continents, all barring Oceania. I know there are stacks of VK's on ten but they are just not peaking through yet. The Asiatic, VU2CQ, is the most outstanding, while the number of W5's is interesting as they were comparatively rare when the band was open last year. Bob's logs are unique in that he is so consistent in all directions, most of us have "blind spots" but he doesn't have that trouble. Notice the number of Philippines he logged. He uses an R.I. converter, four years old, for ten!

HAROLD TAYLOR, Bridgend, is another of the omni-directional brigade, and has also been very successful with the Philippines (or should I say Filipinos). He gets W7VA working portable at Nome, Alaska, but cannot hear any "full blooded" Alaskans. He says "I heard him at Nome at 11.00 B.S.T. on July 4, but at 08.25 B.S.T. on August 12 he was at a fort in the most northern part of Alaska, so he is truly portable. I held him for an hour and he finished up at 09.35 B.S.T. with J2NF."

Speaking of conditions he remarks that "The most noticeable feature of this month has been the marvellous consistency of VK2XU and VK3PE, coming over QSA5 every morning."

By the way, both he and Bob Everard use the same type of set, British, so who says we can't make short-wave receivers?

● Saved !

DONALD H. TOMLIN, Sheffield, comes to my rescue over the "VV" prefix. "The call has been used quite a lot recently. VV1CX and VV1BA were logged on July 4 and August 3 respectively, and VV calls have been referred to by the Yank stations quite frequently, but the location has not been heard by me."

A very small alteration to his aerial has made all the difference to reception. It was an inverted "L," 33 feet top, pointing 12 W. of N., 30 feet high at the house end, and 35 feet high at the pole end. With this W6, VK, etc., were always received well. Dropping the pole height to 30 feet, i.e., making the top level, has increased the strength of European stations, North Africans and East Coast Americans, but Pacific Coast Americans and Canadians have been conspicuous by their absence.

● An Aerial Tip

This is a point which few people realise. The higher the better is usually the case with aeriels, but height is a peculiar thing. I knew a prominent amateur who had a wonderful aerial system, fully 70 feet high, with which he could hear everywhere except S. America. To receive this he had to use an aerial only six feet high! It sounds absurd but it's perfectly true.

A half-wave aerial dead level is assumed to receive best at right angles, but raising or lowering

one end will "swing" this direction of reception appreciably, and is well worth trying for "blind spot" countries. As the length is increased the more universal the direction becomes, but we haven't all got room to do this. I use a horizontal doublet (66 feet) for 40 metres, 40 feet high, and insulated from it, suspended from the centre is a 33 feet vertical doublet for 20. Sometimes they work better as "T" aeriels, with the two leads twisted together, but if reception is poor one usually proves better than the other. It depends on conditions, but the horizontal aerial, pointing due N. and S. is hopeless for S. Africa, average strength being R3, to R6 on the vertical. The vertical brings in "man-made" static far more than the other. But it is a system which does not require much space, so some of you may care to try it.

I have had a lot of queries about XG3BY. No, the XG is not Chinese, but stands for "ex G," and indicates that it is an English transmitter operating outside England. I don't think this station is officially licensed, but it belongs to a private English yacht, cruising around the Mediterranean. There are several of these, using "X"OH, "X"ON, "X"OZ, Finnish, Belgian, and Danish ships respectively.

Unusual reception time is reported by 2COD, Sunderland. On the 18th, at 23.45 B.S.T. he heard, right in the middle of the mob of East Coast Americans, PK1MX, who was working G5JO. As peak time for this country is 18.00 B.S.T. this reception is remarkable. HS1BJ confirmed this peak time at the other end, so the same applies both ways. 2COD hopes to be on the air with a full licence during the autumn so perhaps we shall hear something of him.

WALTER MORRIS, Caernarvon, thought he was going to be left out with the Colorado stations as he had only heard W9BTO on 20 at 7.50 a.m., June 15. The sudden return of ten brought in a wad of them, including the elusive W2UEL. This was on Sept. 9 at 15.10. After tea he found a dozen or so 5's and 6's, and in the middle of them W9IGM, "The 'ole man of the mountains," working portable at Breckenridge, Colorado. W9FHX, Denver, was heard using 50 watts. Receiver is a detector with two step, pretty good going.

● Summary

Taking the logs in general, the most interesting feature this month is ten metres. No need to sit up late, or get up early, any time during the afternoon or early evening real dx is heard. It's well worth trying, and if you can't get down there on your big sets, try THE S.-W.M. one-valver. It's honestly good. I've been trying to borrow one myself, but although there are two of them going round the clubs, after six months the demand is so great for them that I still can't get hold of one!

On twenty metres W5, 6, and 7 are to be expected this time of year and conditions are up to standard. The prominent feature therefore is the number of Mexicans and Philipines, both extremely rare. The outlook now is for fade out of W6 in the

mornings, but for their appearance around midnight. Mornings should alternate between J's and VK/ZL's. 40 metres will soon be coming up in the mornings, while a most neglected band, 80 metres, is also worth using. Last year when down with 'flu I had a Pye T10 by my bedside, aerial 6 feet strung across the room, and was surprised to find W's coming through on the speaker between 7.30 and 8.30 a.m. Don't forget they are not allowed 'phone on 40, but on all the rest of the bands.

Once more I've used up all my allotted space (and more) so let me know how you like the new arrangement of this section.

Thank you one and all for your letters. 73.

JOHN A. EDWARDS, 10, Oak Road, Sale, Manchester.
6-valve super., loudspeaker only. August.
20-metre 'phone.

VK2 ABG, VV, XU, AP, UY, NO, ABE, AZ, XS, VB, UC, RJ, IQ, UU, 3QR, HG, ZL, PE, LA, KX, MR, KJ, WL, BW, 4KO, UL, WU, JU, IF, 5AW, GF, KAI MM, HS, YL, ME, JR, DT, PK1 ZZ, MX, VM, GL, 3VD, 3AA, 4DG, VR, V51 AF, AI, 2AK, AO, AR, VU2 LL, CQ, YZBA, FB8AH, OQ5AA, ZT2B, ZE1JA, JY, ZS6 AJ, Q. ZU6P.

W6 JDR, EJC, YU, LCL, MR, FKK, SJ, JKR, GUJ, LFD, JT, JGS, AMG, FGU, BKY, GSM, LYM, ISH, AI, OCH, HOW, CFJ, AH, GD, CNW, EX, NNR, JPW, ASI, BJB, W7 DNP, APD, FQK, VA (operating portable at Barrow, Alaska.) VE4 LX, OK, JJ, 5EF, OT, XE1 AE, Y, 2FC, 8AP, VP 5PZ, 3BG, W10XDA, HH2B, T2KP. OA4 A, C, AL, LUT BK, AG, 8AB, PY 1FR, 2BA, 5AQ, HC1JB, CX 1AA, 2AK, 3BL.

BOB EVERARD. August 15-September 15.

10-metre 'phone.

VU2CQ, LUTAG, K4EDO, SUIRO, ZU6J, ZS6AJ, W5 GGN, CCU, DUK, ALK, DSU, PNH, GHW, CQJ, YJ, W6 OZH, OTS, CHR, FZL, ERT, NLS, NTR, GCX, MWK, HUM, NDC, MBD, JJU, AM, EBH, NLP, ITH, OZC, OSH, W7 EMP, ESK, W8 AHC, KYY, EUK, IFC, NK, AVB, QUL, CLS, QK1, W9 KZN, UEL, DDF, DRQ, WTN, WIG, WED, SJV, ARK, YOC, YJH, TPU, CVN, DXP, PQH, TTB, YRX, UXP, ABX, SYG, CNE, BBN, JBO, WLD, RH, LLC, GHY, ELL, VTG, FIG, PDJ, ZJN, VE3TY.

20-metre 'phone.

W5 AKZ, GAR, DEW, GIB, ZA, YJ, DQ, ZS, BIN, BJO, FDI, AHK, DAN, DVM, DNV, CYC, BCU, BEK, HYV, BEE, AWE, EHM, AMK, ERL, VJ, W6 EJC, ITH, CUU, ISH, OAJ, JT, CFJ, FKK, JKR, GCT, AL, CNE, MWO, NTX, NNR, LVS, ATQ, NMI, LYP, KQJ, NLP, BJB, AOK, QD, YU, IXJ, JPW, FWU, LLQ, DDA, NBG, FDN, MWD, OSH, MLG, AMG, LYM, IDV, LFU, GCX, NFP, CNA, BAW, HOW, OCH, W7 ESK, FQK, ALZ, AIC, APD.

K6 NZQ, KMB, KFW, MXM, BAZ, CMC, K7FBE, VS1AI, PK1 MX, QU, ZZ, MF, VK2 AP, XU, TI, NY, VV, VB, XS, IQ, AK, RJ, CE, AZ, BW, HF, QI, QR, ADH, ABG, VK3 PE, TL, UL, KX, MR, XJ, ZL, GK, GO, LL, KE, ZJ, VK4 KO, WU, VE4 HU, LZ, TJ, MO, OK, AC, FI, BD, WJ, UM, AW, KX, OF, CW, JJ, VE5 PE, AM, OT, VO, NY, JK, HI, OO, BF, EF, UW.

LU 7AG, 8AB, 9BV, 1HI, 1JC, 4BL, 4BH, 5CZ, 6KE, ZS6 AJ, Q. CX1AA, CELAH, YV5 AM, AN, AK, AG, YV1AA, HPIA, VP5 PZ, AG, 3BG, 4TH, K4 SA, DDH, CO8 EC, YB, 7VP, HC1 JB, FG, OA4 N, C, AL, AG, KAI ME, JR, YL, HS.

MICHAEL MADDEN, 1, Main Street, Roscrea, I.F.S.
Superhet. (Desires correspondence with an English reader.)

IU 9KA, 4BI, PY 2ER, 1FR, 2IU, CE3 DW, DN, CX2AK, CO7 VP, HF, 2LY, OA4N, HH5PA, NY2AE, HC1JB, W 6BFE, 7CAM, XELLM.

W. E. DAVEY, 2, Fingal Street, Woodvale, Belfast.
20-metre 'phone.

VE4 LX, KZ, OF, 5HA. VP2CO. ZEJJA. ZUIP. XE2FY.
VS 1AI, 7RA. PK 2VD, 4AY, 4VR, 4WL. K6 KMY, BMC,
NZQ, OQE, JLV, MTV. W6 BIC, CQI, HTQ, HOY, MOU,
NNR, JKR. W7FQK. W5 DVM, BYP, ZS, BJO, YJ, JSY.
CE 1AH, 3DG. LU 1EX, 9BV, T12KP. HClJE. CX1AA.
PY2 ET, AC, GC, FF, IFR, 5AQ. K4ENY. NY2AE. FB8AH.

HAROLD TAYLOR, Eardisley, Cefn Glas, Penyfael,
Bridgend, Glam.

W5 AKZ, BEE, BEK, BJO, CYC, DAN, DUK, DVM, DVN,
ECL, ECT, ELW, SFJ, FNA, FPO, FTI, CIV, OKG, YJ,
ZS, ZK. W6 AC, AH, AKY, AL, AM, BFC, EJC, FPF, GCT,
JKR, LLU, MLG, NNR, NR, OAJ, PN, RX, W7 FEZ, FQK,
VA. K6 OQE, NZQ, 4ENY, 4SA. XE 1Y, 2FC, 3AR. CO2 LY,
RH, 7VP. T12 KP, RT. HI 5X, 7G, 7I, VP5PZ. YV1 AA,
AD, 5AB. OA4 AI, N, Q. HCl FG, JW. CE 1AH, 3DG.
CX2AK. PY1 AW, BC, FR, GO, UJ, 2BN, CK, CN, ET, EW,
FF, KX, LM, LU, 3BX, 4BI, CT, 5AF, AN, AQ, AG. LU 1QA,
3HK, 4AW, BL, KA, 6DT, KE, 7AG, 9BV. VK2 BG, HF,
2NO, UE, XU, 3PE, GO, LA, QI, WA, ZL, 5AW, GF, JC.
V52 AK, AL. KAI ME, MM. PK 1MX, 3WI. OQ5AA. VU2BG.

WALTER MORRIS, Cae Rhos, Llanfaglan, Caernarvon,
N. Wales. June 1-September 16.

20-metre 'phone.

W5 JC, CO, AMX, ASG, BKS, YW, DNV, ECR, AKZ,
FNA, ZA, FTO, CYC, BMM, FPO, ZS, DUK, BB, DQ, ECL,
FBI, BEK, BEE, EBJ, YJ, Fiy, COK, COE, FDI, BLW,
AHJ, EYV, EDW, OWE, DRB, DWE, CJB. W6 NMI, BYB,
BJC, CQI, BCH, TT, AL, AM, YU, EJC. GCX, LLN, NNR,
AH, GCT, BPM, LYP, BKV, FTU, IFH, BAY, AN, LLQ,
EIP, BKO, NKS, NRO, HOW, ISH, FJ, LAG, MLG, FK,
IXZ, LCI, BKR, COQ, MWD, KQQ, LYM, NTX, CNE, CRI,
MGB, CFA, CKR. W7 APD, CEO, FQK, BL, CA, EAE, ESK,
BEL, EGV, ETO.

K6 NTV, OQE, NZQ. VE4 EA, IF, BD, 5OT, EF, JK, TV.
VK2 XU, TI, CI, YW, HF, HP, VV, RJ, XF, AZ, ADE, TR,
JAL, HL, HK, KX, LA, ABD, PE, PW, ZL, PL, WA, VV,
XJ, 4JX, 5AW, AI, BJ. K4 SA. ENY, DDH, UG. CO2 NY,
RH, AY, WW, WZ, 7CX, 8EC. XE1 LK, DC, 2FC, AH, AR,
3HI, FC. PY 1DS, 2EW, EA, 5AQ. OA4 AL, AI, AK, AB, N,
R. T12 KP, FC. CE1 AO, AH, 3CO. LUIHI. HK3JA. HCl FG.
JB. HPICE. HI 5X, 7G. HH2B. VP 5PZ, 6YB. CX2AK.
NY2AE. YV 1AA, 5AE, AD.

10-metre 'phone.

W2 JCY, FWJ, TP, 3GSB, CPT, EMA, 4RDD, CYC, CYU,
DRZ, AP, FT, PP, 5ALK, FCR, DUK, EJO, GCX, 6NLP,
NLS, PN, MKW, MDN, 8NXP, EUL, EUK, QUL, 9IGM,
UEL, KNZ, UIA, FIG, ZFF, YGH, DLU, OMG, GBO, WSE,
FPB, TTB, FRU, DRO, TTV, UPX, FHX. VU2CQ.

DONALD H. TOMLIN, 32, Moorsyde Avenue, Sheffield,
10.

PY2 ADF, ER, EJ. K4SA. HK4AV. HI5X. VU2CQ. LU 4GI,
7AG, 1UA.

C. GIBBINS, 59, South Road, Herne Bay. 0-v-1.
August, 1937. 20 metres.

W6 EIP, SJ, AL, MLG, BCH, JKR, NNR, EJC, NPX,
BFC, PG, MWD, AMG, ZJG, JXI. W7 ESK, DNB, FQK.
K6 OQE, NZQ. VE4 LX, OK, 500, UW. VK2 PU, XU, VV,
AL. VS 2AK. VP 3BG, 5PZ. HClJB. HH2B. OA4AL, C. PY1 DP,
DS, 2DU. LU 7AG, 5CZ, 4BI. TI 1AF, 2MPH. YV5AE.
CO7 HF, VP, 2WW.

L. LEVITT, Well Lane, Kippax, Leeds. "S.-W.M."
Class B 1 valve.

VK2 XU, VV, 5AW, 3AL, VE, MX, PE, 2WA, QI,
W5 CEN, ZS, DEW, FHJ, 6FGU, KMY, MYO, BOY, OOX,
LLQ, ISH, SUA, 7FQK, CPY. K 4ENY, 6KMB. PY2 FS,
CK, ES, LM, ET, CO, CW, 1DK, FR, MK, 5AQ.

LU 7AG, 1PA, QA, 6KE, 4BL, 7BK, 4FG, 8AB, 5CZ, 4KA,
T13 AV, LE, 2RE. VP 4CH, 9R. OA4 AL, N, BG. CE1 AH,
AO, 3CO, BW, DW, YV 1AA, 5AE, 5ACC. HCl JW, JB.
HK4AJ. CX2AK. XE2FC. KALME. CO 8YB, 2JJ. VE 4OZ,
9AL, 4BD, ZEJJA. W10XDA.

"FROM S.W.L. TO FULL LICENCE"—continued
from page 35.

Next I tried reducing the h.t. voltage, and was surprised to find that I could get it to oscillate with only 9 volts. A funny thing about varying the h.t. is that as it is reduced the further in must be the vanes of the condenser before oscillation starts. Varying the value of the fixed bypass condenser was also tried, but no difference was noticed between .0005 and .05 mfd., so this is not critical.

On the receiver the note of this little transmitter (it really is one although it is low power) sounded good, so keying was tried. The key was put in the negative h.t. lead, but the note "chirped" when I tried to key it. This proved to be due to the position of the variable condenser, and only occurred when it was tuned for maximum output. Reducing the capacity slightly (and so the output) made the note perfectly steady, but key clicks sounded very bad. A .1 mfd. condenser, in series with a 100 ohm. resistance cured this and the note sounded really commercial.

It has been quite interesting playing round with this simple gear, and I feel that I have got the hang of this sort of crystal oscillator, so next I am going to try a doubler, and I will tell you all about it in November.

CLUB ACTIVITIES

R.N.S.I.'s Leonard Trophy Contest Result

Winner of trophy and replica: 1st, E. A. Donovan (EI2M), Dublin; 2nd, F. A. Robb (GI6TK), Belfast; 3rd, A. R. Irwin (GI5TK), Ballygowan. The winner of gold medal for highest scorer outside Ireland was: 1st, K. Karkauskas (LY1KK), of Kaunas, Lithuania; 2nd (winner of silver medal), J. P. Jessup (W2GVZ), Ridgewood, N.J., U.S.A.

Over 200 amateurs entered for this contest and the scores were: EI2M, 113 contacts with 27 countries, 3,672 points; GI6TK, 61 contacts with 41 countries, 3,256 points; GI5TK, 107 contacts with 18 countries, 1,926 points.

The R.S.N.I. wish to thank all who entered, and hope that these and many more amateurs will enter for the next Leonard Trophy contest.

BELFAST

Mr. FRANK A. ROBB (GI6TK), 60, Victoria Avenue, Sydenham, Belfast, N.I., is hon. secretary of the City of Belfast Y.M.C.A. Radio Club.

Details, please Mr. Robb. This note applies to other secretaries, whether officiating in England or abroad.

BINGLEY

The Milnes Radio and Television Society has now a full transmitting licence, and is operating at present on the 7 mc. band, call sign G8UP, frequency 7,160 kc. using an all-British tx, input 10 watts. Reports of reception would be appreciated.

Operating times are irregular but fairly frequent. The tx is suitable for portable use.

A recent lecture was: "Modern storage batteries and their applications," by R. Grey (Messrs. Exide). On October 4 a lecture entitled "Forms of electrical interference and methods of suppression" will be given by Mr. Perkins (Belling-Lee). Prospective members should apply to hon. secretary, F. RIDLER, Victoria Works, Church Street, Bingley, Yorks.

BLACKPOOL

The winter programme has commenced and Morse classes and other activities started with enthusiasm. A new feature in a "Listeners' dx Corner" has been started to enable listening members to gain some idea of the unusual and otherwise interesting stations being heard and to give information on how and when and where to listen for them.

A series of talks on detector circuits is to be followed by an 0-v-0 reception contest and an exhibition of the receivers used, the winner to be judged on the set as well as stations heard—special points will be given for home-built and adapted parts and general ingenuity in construction.

The direction-finding field day was held on September 26 on 14 mc. and 56 mc. Most of the members are active. G5MS on 14 mc.; G5SO on 3.5, 7 and 14 mc.; G6VQ on 7 and 14 mc. and waiting for his WAC and WBE cards; G8AK on 7 and 14 mc.; G8GG on 1.7 and 14 mc.; G8NU on 7 mc. AA's: 2CKD is testing a new phased aerial system with quite good results; 2CMC, 2CLR, 2CUI are busy, while 2CWW and 2CQQ are contemplating gear. The receiving members are dusting the cobwebs off the receivers and getting ready for serious listening and, we hope, swotting of the code. Secretary: H. FENTON, 25, Abbey Road, Blackpool.

BRADFORD

The Short-wave Club here are now busy with the winter programme, and all who are interested are invited to attend the demonstrations. A few forthcoming events: On Friday, October 22, Messrs. Stratton and Co. have arranged a demonstration of "Eddystone" short-wave components. The following Friday, 29th, Radio G6AZ has kindly consented to lecture on "aerials," and he will cover both transmitting and receiving types. Good attendances are naturally desired, and any member of the public is welcome. Per pro Secretary: S. FISHER (2BMO), 10, Highfield Avenue, Idle, Bradford, Yorks.

BRITISH SHORT WAVE LEAGUE

On August 28 about 35 members of the above society met at "Radiolympia" where they were introduced to G6AQ (hon. sec. W.F.S.R.A., British Section) and the secretary of the B.S.W.L., and also to their fellow members. Despite last-minute arrangements members enjoyed each others' company in visiting the various stands, and at about 16.30 quite a number partook of tea, but many were eventually lost in the maze of stands!

Great things have been planned for the coming dx season; a grand membership drive has been inaugurated and many members have secured their a.a. licences as a result of the League's articles on

transmitting. Details of the annual "Stephen Gingell" Cup contest will be announced shortly. The QSL Bureau has handled scores of cards, while the secretary has granted well over 60 "Heard All Continents" certificate applications.

W.F.S.R.A. notes, published in the League's SHORT-WAVE REVIEW, are proving popular, the hon. sec. of the British section of that organisation having a busy time enrolling new members. On October 16 the League of Nations broadcasters HBP (38.47 m.) and HBL (31.27 m.) will radiate a special programme for members of the B.S.W.L. at 22.30 G.M.T., and a special QSL card will be sent out to verify reports on this transmission.

Further particulars of the B.S.W.L. may be had from F. A. BEANE, 2CUB (secretary), of Ridgewell, Halstead, Essex, and a specimen REVIEW will be sent in return for 2d. in stamps.

EXETER

The Exeter and District Wireless Society held their first meeting for the season on September 20. The balance sheet for the year was presented by the treasurer showing the society to be on a sound financial footing. Mr. A. T. Batten gave a talk on Radiolympia, and also demonstrated a Murphy all-wave set.

A varied programme is arranged for this month as follows: 4th, Demonstration of short-wave sets and apparatus by Mr. E. Cholot (by courtesy of Messrs Lissen, Ltd.); 11th, Visit to High Frequency Department of the Royal Devon and Exeter Hospital, conducted by Dr. C. Wroth; 18th, Demonstration of the season's new sets, by Mr. F. J. Thorn; 25th, "Direction Finding" by Mr. R. C. Lawes (G5ZV), who has practical experience in this work.

Meetings are held on Mondays at 8 at the Y.W.C.A., Dix's Field, Southernhay, where new members will be welcomed. Hon. secretary, W. J. CHING, offers to post full programmes for the next three months to interested local enthusiasts; address correspondence to 9, Sivell Place, Heavitree, Exeter.

NATIONAL RADIO SOCIETY

Over 50 representatives are appointed. Write to me if you wish to get in touch with your nearest rep. Three new services are in operation: translation bureau (French and Spanish) run by Mr. Gershon (N.R.S. 43), 32, Park Road, Chelmsford, Essex; a b.c. station QRA address service; and a commercial QRA bureau by Mr. Gershon.

The Lancs. and Essex branches issue News Sheets to county members. They include the county news, station lists, members' reports, articles of general interest and so on.

Now lads, a query. How many of you would like to have a badge? Upon your answer depends whether we issue them or not.

Mr. Charles Biggs of 86, Lordship Lane, Tottenham, N.17, North London Rep. N.R.S. will be pleased to hear from any blind, bed-ridden or unemployed members in the London area. He will endeavour to visit, and announces the formation of a bureau (the N.R.S. London Unemployment Bureau) for the benefit of the unemployed.

With this end in mind a percentage of the membership fee of 1s. will be put aside to our unemployment benefit fund.

Owing to the fact that rather a smaller number than have been expected have joined the short-wave contest does not conclude until the end of December. Members should verify reception and send their cards to HQ, enclosing a stamp-addressed envelope for reply. The cards will be returned by return post. Don't wait until the end of the contest before sending your cards along. Send them in batches and we will know how the competitors stand and the excitement of the chase for the prize will be greater.—LESLIE W. ORTON, 11, Hawthorn Drive, Uxbridge, Mddx.

NORTHERN IRELAND

The Radio Society of Northern Ireland held its annual meeting on September 1. After members had enjoyed tea the following trophies were presented: Leonard Trophy, E. A. Donovan (EI2M); Stevenson Trophy, J. Cowan (GI5OY); Robinson Trophy, S. H. Pattison (2AQU).

The following officers were elected for the year 1937-8: president, V. Leonard; vice-president, L. Stevenson; committee, J. M. Lowden (GI8MI), J. Cowan (GI5OY), R. Watson (GI8GK), F. A. Robb (GI6TK) and R. Holden (GI5HU); hon. secretary, C. Taylor (2AOB); hon. treasurer, J. N. Smith (GI5QX); an awards and social committee were also elected.

The society now has a badge for members in the form of a black diamond with red hand of Ulster in centre and letters "R.S.N.I." in gilt.

It was decided to communicate with the I.R.T.S. in Dublin with a view to having a joint meeting of the two societies at an early date. It is also proposed to pay visits to places of interest during the coming season.

Full particulars of the society may be had by writing to the hon. secretary, 2, York Crescent, Shore Road, Belfast, N.I.

SOUTHEND

A further direction-finding contest in the successful series organised by this Society was held on September 12 when 36 members and friends took part in a search for a transmitter concealed near Nobles Green, Eastwood, Essex. Three parties succeeded in finding the transmitter within the prescribed time, the winners being Messrs. L. Pugh and J. Leggett, who took a short cut through a narrow lane which had previously been considered impassable by cars. This exploit and the accuracy of their bearings enabled them to win in the record time of 1 hour, 6 minutes.

The last open-air event of the 1937 series will be a night direction-finding contest, commencing at midnight on October 9. The hon. secretary, Mr. F. S. ADAMS, of 27, Eastern Avenue, Southend-on-Sea, will be pleased to send copies of the rules to any members of other societies who are interested. Visiting teams will be cordially welcomed. Reports on the transmissions are also invited and will be acknowledged. The wavelength used is 155.8 metres.

QUERY COUPON

S.-W.M. 10/37

SURREY RADIO CONTACT CLUB

Editor Opens Winter Session

The first meeting of the new session of the above club was held on Tuesday, September 7, when 38 members and friends welcomed a visit of the editor of this paper. Mr. Wardman, G5GQ, with only a few hours' notice, delivered a most interesting and particularly instructive lecture on "Amateur receiver requirements for present conditions," and dealt with his subject fully from the most elementary types, progressing to the "Ideal" receiver described in the September issue and concluded with a talk and demonstration of the latest Comet Super Pro.

As the editor of this paper is very well known to the writer and many members of the club he was induced to prolong his visit and give a further talk and demonstrate a cathode-ray tube in action, modulated from a small transmitter which was available, together with other apparatus.

The club wish to thank THE SHORT-WAVE MAGAZINE for the opportunity of hearing so much of interest via its editor and all readers living in the Croydon area are most cordially invited to attend the next meeting of the club at The Alhambra, Wellesley Road, West Croydon, at 8 p.m. on October 5 or to write to the hon. sec., E. C. TAYLOR (G5XW), 45, Grant Road, Addiscombe, for details of club activities.

THORNTON HEATH

It must not be taken as a sign of inactivity because no report of the Short-Wave, Radio and Television Society of Thornton Heath has appeared in THE SHORT-WAVE MAGAZINE recently. The Society has, during the summer months (apart from August), carried out a full programme and has now commenced a busy winter session. It is expected that our tx (G8GY) will be on the air on 40 m. in future at least once a month—a S.-W.M. "Ideal" straight is being made for the rx. Readers, whether beginners or hams, are always welcomed to our meetings either as visitors or potential members.

We should like to record gratitude to the editor for the loan of apparatus described in this magazine for test purposes and also for his personal visit and lecture. A film made by our chairman of our recent 5 m. field day, together with previous films, will be shown at our H.Q. on October 5. Further thanks are due to the editor for the promised loan of a private film record of his recent visit to the States, for the same programme. Hon. sec., J. T. WEBBER, 368, Brigstock Road, Thornton Heath, Surrey.

TOTTENHAM

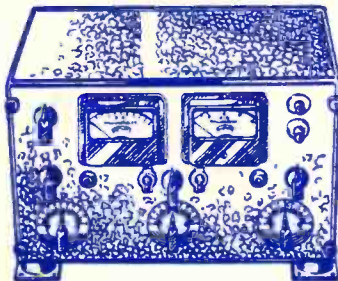
The Tottenham Short-Wave Club shack will be nearly complete in its extension by the end of October and will hold a much larger number of members. With extra facilities its experiments will be enlarged. Further applications from those interested in short-wave work are invited, write the hon. sec. at 60, Walmer Terrace, Palmers Green, N.13.

BROADCAST STATIONS

Station	Call	Wave	Freq.	Station	Call	Wave	Freq.
PITTSBURGH	W8XK	13.93	21.54	EINDHOVEN	PCJ	31.28	9.50
DAVENTRY	GSJ	13.93	21.53	LYNDHURST	VK3LR	31.32	9.58
WAYNE	W2XE	13.94	21.52	MILLIS	W1XK	31.35	9.57
DAVENTRY	GSH	13.97	21.47	BOMBAY	VUB	31.38	9.56
BANGKOK	HS8PJ	15.77	19.02	ZEESEN	DJA	31.38	9.56
BANDOENG	PLE	15.93	18.83	PODEBRADY	OLR3A	31.41	9.55
DAVENTRY	GSG	16.86	17.79	ZEESEN	DJN	31.45	9.54
BOUNDBROOK	W3XAL	16.87	17.78	JELOY	LKJ1	31.48	9.53
HUIZEN	PHI	16.88	17.77	TOKIO	JZI	31.48	9.53
ZEESEN	DJE	16.89	17.76	SCHENECTADY	W2XAF	31.48	9.53
WAYNE	W2XE	16.89	17.76	HONG KONG	ZBW3	31.49	9.52
BUDAPEST	HAS3	19.52	15.37	MELBOURNE	VK3ME	31.55	9.51
ZEESEN	DJT	19.53	15.36	DAVENTRY	GSB	31.55	9.51
ZEESEN	DJR	19.56	15.34	CARTAGENA	HJ1ABE	31.58	9.50
SCHENECTADY	W2XAD	19.57	15.33	RIO DE JANEIRO	PRF5	31.58	9.50
DAVENTRY	GSP	19.60	15.31	MEXICO CITY	XEWW	31.58	9.50
BUENOS AIRES	LRU	19.62	15.29	MADRID	EAR	31.62	9.49
ZEESEN	DJQ	19.63	15.28	HAVANA	COCH	31.82	9.43
WAYNE	W2XE	19.65	15.27	BANGKOK	HS8PJ	31.85	9.35
DAVENTRY	GSJ	19.66	15.26	LIMA	OAX4I	32.12	9.34
RADIO COLONIAL (Paris)	TPA2	19.68	15.24	BUDAPEST	HAT4	32.88	9.12
PODEBRADY	OLR5A	19.71	15.23	RADIO NATIONS	HBP	38.48	7.80
EINDHOVEN	PCJ	19.71	15.22	TOKIO	JVP	39.95	7.51
PITTSBURGH	W8XK	19.72	15.21	SAN DOMINGO	HIT	45.25	6.63
ZEESEN	DJB	19.74	15.20	NANKING	XGOX	43.99	6.82
HONG KONG	ZBW4	19.75	15.19	VALENCIA	YV4RB	46.01	6.52
DAVENTRY	GSO	19.76	15.18	MARACAIBO	YV1RH	47.12	6.36
TOKIO	JZK	19.80	15.16	MARACAIBO	YV5RP	47.84	6.27
SOURABAYA	YDC	19.80	15.15	HAVANA	COKG	48.39	6.20
DAVENTRY	GSF	19.82	15.14	MARACAIBO	YV5RD	48.78	6.16
VATICAN CITY	HVJ	19.84	15.12	WINNIPEG	CJRO	48.78	6.15
ZEESEN	DJL	19.85	15.11	PITTSBURGH	W8XK	48.86	6.14
SOFIA	LZA	20.24	14.88	JELOY	LKJ1	48.94	6.13
WARSAW	SPW	22.00	13.83	HAVANA (CUBA)	COCD	48.94	6.13
SANTIAGO (Chile)	CB615	24.39	12.30	GEORGETOWN	VP3BG	48.94	6.13
REYKJAVIK	TFJ	24.52	12.23	BOGOTA	HJ3ABX	48.96	6.13
MOSCOW	RV59	25.00	12.00	MEXICO CITY	XEUZ	49.02	6.12
RADIO COLONIAL (Paris)	TPA3	25.23	11.88	WAYNE	W2XE	49.02	6.12
PITTSBURGH	W8XK	25.27	11.87	CHICAGO	W9XF	49.18	6.10
PODEBRADY	OLR4A	25.34	11.84	BOUNDBROOK	W3XAL	49.18	6.10
WAYNE	W2XE	25.36	11.83	BELGRADE	YUA	49.18	6.10
LISBON	CT1AA	25.36	11.83	TORONTO	CRCX	49.26	6.09
ROME	2RO	25.40	11.81	LIMA	OAX4Z	49.24	6.09
TOKIO	JZJ	25.42	11.80	HONG KONG	ZBW2	49.26	6.09
VIENNA	OER2	25.42	11.80	NAIROBI	VQ7LO	49.32	6.08
BOSTON	W1XAL	25.45	11.79	CHICAGO	W9XAA	49.34	6.08
ZEESEN	DJD	25.49	11.77	MARACAIBO	YV1RD	49.42	6.07
PODEBRADY	OLR4B	25.51	11.76	PHILADELPHIA	W3XAU	49.50	6.06
DAVENTRY	GSD	25.53	11.75	CINCINNATI	W8XAL	49.50	6.06
WINNIPEG	CJRJ	25.60	11.72	COPENHAGEN	OXY	49.50	6.06
RADIO COLONIAL (Paris)	TPA4	25.60	11.72	MOTALA	SBG	49.50	6.06
HAVANA	COCX	26.24	11.43	BOGOTA	HJ3ABD	49.59	6.05
TOKIO	JVM	27.93	10.74	BOSTON	W1XAL	49.67	6.04
BUENOS AIRES	LSX	28.99	10.35	PANAMA CITY	HP5B	49.75	6.03
RUYSSELEDE	ORK	29.04	10.33	ZEESEN	DJC	49.83	6.02
MADRID	EAQ	30.43	9.86	BOGOTA	HJ3ABH	49.85	6.01
HAVANA	COCQ	30.77	9.75	HAVANA	COCO	49.85	6.01
LISBON	CT1CT	31.00	9.68	PODEBRADY	OLR2A	49.92	6.01
BUENOS AIRES	LRX	31.06	9.66	GEORGETOWN	VP3MR	49.92	6.01
LISBON	CT1AA	31.09	9.65	MONTREAL	CFCX	49.96	6.00
ROME	2RO	31.13	9.63	MEXICO CITY	XEBT	50.00	6.00
CARTAGENA	HJ1ABP	31.25	9.62	MOSCOW	RW59	50.00	6.00
MOSCOW	RV96	31.25	9.60	VATICAN CITY	HVJ	50.26	5.97
RADIO NATIONS	HBL	31.27	9.59	MARACAIBO	YV1RB	51.28	5.85
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