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6D

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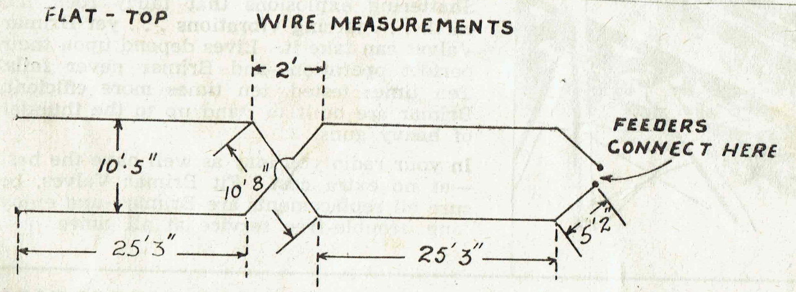
A DIRECTIONAL ANTENNA FOR THE 20 METRE BAND

When the average radio experimenter decides that he would like to "drag" in a few more stations he either expends a considerable sum of money in buying a much advertised "super-gain" receiver that he has had in his mind for some time or else he adds more stages of R.F. amplification to his present job. Little does he realise that an inexpensive, educational and very interesting means of increasing the range of his receiver is to construct a beam antenna. The following article deals with a very excellent type of antenna array which was first employed in England for long distance reception.

The antenna consists of a horizontal flat-top which picks up the signal and a pair of feeder wires for connection to the receiver. Because the feeders connect to one end of the flat-top this system is called an "end-fed" antenna.

The flat-top consists of a pair of horizontal wires spaced 10 feet 5 inches. These wires cross over at the centre, dividing the antenna into two sections, each approximately one-half wavelength long. The overall length is about 53 feet. If the spacing of 10 feet 5 inches is inconveniently long a spacing of 8 feet 8 inches may be used. All the other dimensions remain the same except that the sections are made 26 feet 4 inches long.



None of these dimensions are critical, since a coupling unit is employed, which will allow for any variance from these figures within a few inches.

The general construction of the antenna is shown in Fig. 1. Three spreaders of 1 inch by 1 inch light wood are used to give the 10 feet 5 inches spacing. 1-inch dowel could be

(Continued on Page 5)

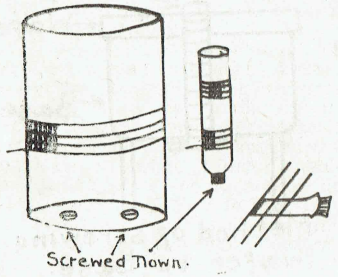
IMPROVISATION IN BUILDING AND REPAIRS

(By RAHOB 7552).

In this article it is intended to pass through the successive stages of a receiver and suggest methods of substituting or improvising components. It should be remembered, however, that there is a limit to this method and no one can improvise for a valve or an I.F. coil for example.

We will begin with coils. Builders of small sets can try using small round bottles as coil formers, and crystal set builders can use glass jars. The corks or lids are nailed down and the bottle or jar is then screwed or "corked" on to same. It should be remembered that this method is scientifically sound as glass is a good insulator and some experimenters prefer these formers to the usual cardboard type. The wire is fastened down by tapes.

Dia. 1.

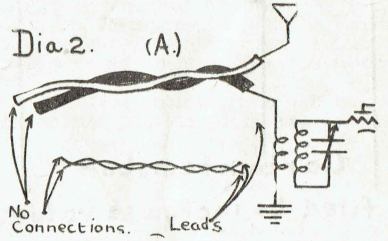


Now a word about repairing commercial coils. If a winding has a break in it, it is often possible to carefully unwind same, resolder the break, insulate with a piece of spaghetti, and rewind the coil by hand. If this operation has been carefully performed, it should be possible to re-align the coil by means of the trimming condenser. Primary windings are not critical to a couple of turns, but secondaries must be more accurate. With I.F. coils using Litz stranded wire, it is necessary to see that the full number of strands are present and all cleaned of enamel. Naturally, it is better where possible to replace the unit, but the author has repaired coils by the above method several times.

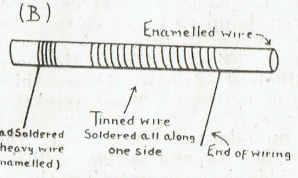
Our next item is condensers. There are two possible ways of improvising condensers of small capacity which will prove very satisfactory. One is by twisting two insulated leads together and using one end of each lead for the connections. This type can be used for example to cut down aerial signal strength. The thicker the wire and the thinner the insulation (spaghetti preferred) the greater will be the capacity. Another method is made by winding a number of turns of bare tinned wire round a piece of heavy gauge enamelled wire. The turns of tinned wire are soldered together and one end of each of the wires is used for connecting to the circuit. This condenser can be given a coating of dope. The above methods are useful for capacities around .0001-.00001 mfd. For larger capacities the experimenter will have to make them the same way as they are made in the factories, that is by rolling up two sheets of tinfoil with a sheet of waxed paper in between. It is sometimes possible to repair broken condensers of the paper type by unrolling carefully, till you come to the place where the paper (dielectric) has been punctured and burnt through, then paste a piece of paper over the hole, using as little paste as possible, and then rolling the condenser up tightly and immersing in candle grease (melted). You can also make up smaller capacity condensers out of old ones in the same manner.

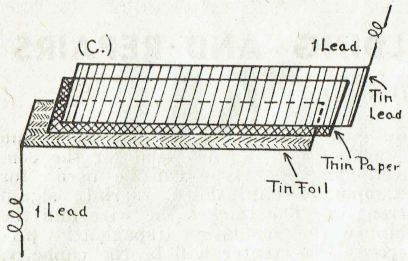
Resistors do not give much scope for the experimenter, but there are two possible ways of improvising. If you need

Dia 2. (A.)



(B)

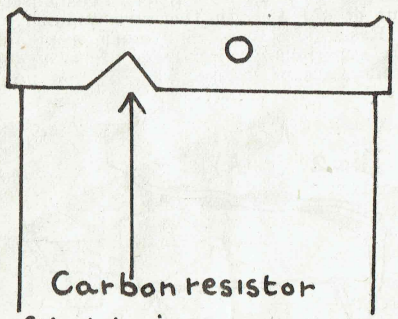




a resistor of unobtainable value, and you have some old copper wire or element wire, you can wind this round a former to give the correct value. If you use copper wire you will only be able to make small values, say up to 200 ohm and you must be sure that the wire is heavy enough for the required current.

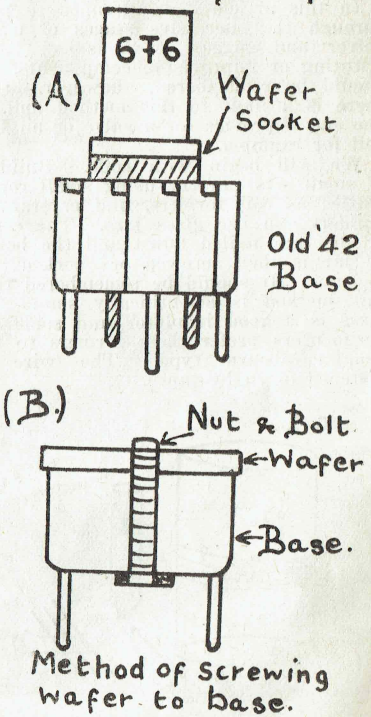
The other method is by filing carbon resistors so as to increase their resistance. For example, if you require a 1 Meg. resistor for a grid leak, and you only have a quarter Meg. you can file the resistor till the value is brought up to 1 Meg. Of course if you are going to use these resistors to carry large currents, you must make sure that the resistor will carry them without overheating.

Dia. 3



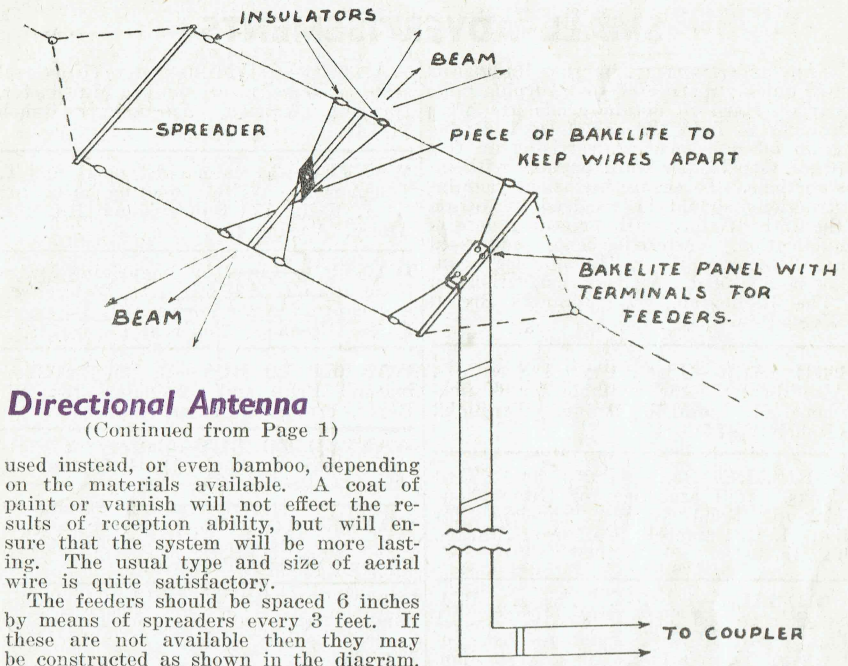
Now we come to valves themselves. It often happens nowadays that you require say a 42 tube and you can only obtain a 6F6 say. (Same characteristics but different base). Does this mean that you must put a new socket in the set? No, the proper thing to do is make an adaptor. You break the base off the old 42 and screw a 6F6 socket on to this base, connecting the lugs to the correct pins in the old base. Then you insert the new tube in the adaptor and the adaptor in the set.

Dia. 4



A very common problem is that connected with ganged variable condensers. In the first case the experimenter may have a gang with a capacity which is much too large for the required purpose. One method of solving the problem is to remove some of the plates, either from the fixed or moving sections. (It is not necessary to remove both lots). Or pieces of insulating material such as mica, ebonite or varnished paper can be glued to one side of each plate. These sheets of material have the effect of decreasing the capacity. Other methods of altering the capacity are by placing condensers of either the fixed or trimmer type in series with the gang to reduce maximum capacity, or in parallel to increase maximum capacity. It should be remembered, however, that when this method is adopted, the range of the gang is shifted either up or down the scale as the case may be. However,

(Continued on page 22).



Directional Antenna

(Continued from Page 1)

used instead, or even bamboo, depending on the materials available. A coat of paint or varnish will not effect the results of reception ability, but will ensure that the system will be more lasting. The usual type and size of aerial wire is quite satisfactory.

The feeders should be spaced 6 inches by means of spreaders every 3 feet. If these are not available then they may be constructed as shown in the diagram. If it is desired to reduce pick-up by the feeders a transposed feeder system could be employed using 2-inch spacing. Twisted pair feeders should not be used with this antenna. The feeder length should be 35 feet or 70 feet, depending on the constructor's choice. Feeders of this type, known as Zepp, should not be more than 100 feet long.

The coupler should be mounted preferably outside the building so that the feeders will not have to be twisted by bringing them through windows, etc. However, feed-through insulators could be employed on the wall of a house. Connection from the coupler to the receiver can be made by winding two or three turns of "hook-up" wire round the centre of the coupling coil. This link connects to the "doublet" terminals on the receiver.

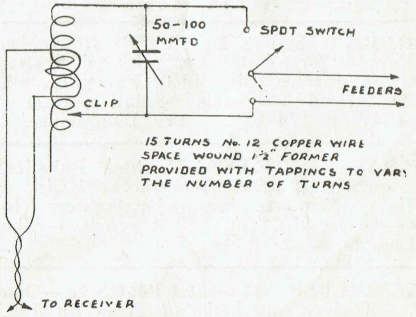
A single-pole double throw (S.P.D.T.) switch may be connected as shown. Thus, the antenna may be made non-directional by simply connecting the two feeders together. The flat-top and the feeders now perform as a single wire for general reception.

This antenna, similar to all half-wave antennae, is mainly directional at right angles to the plane of the flat-top. Hence, the antenna should be situated at right angles to the line joining the two stations, i.e., the receiver and the transmitter. If the antenna is placed so that it is mainly directional to signals coming from Europe then it should cover an area at least from England to Eastern Europe. Or similarly it could be situated to receive from North America.

For long distance reception, as mentioned, on 20 metres, a flat-top height above ground of 40 or 50 feet is helpful but less height such as 25 or 30 feet is satisfactory.

To tune the antenna it is only necessary to vary the tappings on the coil

(Continued on page 15).



SMALL ADVERTISEMENTS

An advertisement in the Radiogram will quickly dispose of your surplus radio parts. Hard to obtain goods are often brought to light through a small Radiogram advertisement. Advertising on this page costs 2d. per word payable with instructions. To ensure inclusion, your instructions should be received by us on the 15th of the month preceding date of publication. Advertisements addressed c/o "Radiogram" or "Lamphouse" can not be accepted. Address instructions to "The Radiogram," 11 Manners Street, Wellington, C.1.

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UNUSUAL ITEMS

(From "Ohmite News.")

It has long been recognized that the ancient Egyptians knew many things that modern civilisation is just discovering. For instance, night blindness was recognised as a disease in ancient papyri and the treatment was the eating of liver. Today liver, which supplies vitamin A. is still recommended.

☆ ☆ ☆

Although some objects have been set in faster rotation in laboratory experiments, the speed of rotation of a newly developed motor is truly amazing. Its operating speed is 120,000 R.P.M. or 2,000 revolutions per second. The motor is used for the grinding and drilling of airplane parts.

☆ ☆ ☆

To raise wrecked aircraft for removal and salvage, rubberised fabric air bags are being used. These bags comprise a seven-foot cube built in three horizontal chambers. The range of lift is from ten inches to seven feet. At 3½lbs. per square inch pressure the lift is about 11 tons!

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Cat. No.		Each
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RC362	Hikers One Coils	3/9
RC530	Oxford T.R.F. Aerial Coils ..	3/3
RC531	Oxford T.R.F. R.F. Coils	3/3
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RE517	Wireless Jug Elements	9/6
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RG210	Bayonet Cap Light Adaptors ..	1/3
RJ8	Twin Tip Jacks	8d.
RM1	Test Prods	7/- pair
C564	8Mfd. Ducon Dry Electrolytic Condensers	4/3 ea.
RS1	1 Mill. Spaghetti Tubing ..	4½d. yd.
RS2	2 Mill. Spaghetti Tubing ..	5d. yd.
RS3	3 Mill. Spaghetti Tubing ..	6d. yd.
RS4	4 Mill. Spaghetti Tubing ..	8d. yd.
RS5	6 Mill. Spaghetti Tubing ..	1/- yd.
RS17	Surprise Packets	5/- ea.
RU6	Mottled "Kittyhawk" R.N.Z.A.F. Fighters	3/6 ea.
RU7	Cream "Kittyhawk" R.N.Z.A.F. Fighters	6/- ea.
RU11	Mottled "Mitsu" Japanese Fighters	2/- ea.

THE LAMPHOUSE

RADIO WITTIQUIZ

H. VERNON WHEATLEY.

(Answers on page 19).

Take 10 points for each question answered correctly. 100 per cent.—very good; 75 per cent.—good; 50 per cent.—very fair; 25 per cent.—not so fair.

1. There are windings and windings but bifilor windings are (A) non-inductive; (B) capable of producing more volts per turn; (C) inductive; (D) those which require more turns per volt; (E) more efficient as regards service; (F) free from hysteresis.

2. Ten seconds for this one! As a mathematician, you would say without hesitation that 9/64 inches equals (decimal equivalent) A, .15625; B, .109375; C, .140625; D, 0.9375; E, .10564.

3. If you had a perikon detector in your crystal receiver, you would know that it consisted of (A) bornite in contact with galena; (B) carborundum ditto with silicon; (C) ghane ditto with tellurium; (D) zincite ditto with copper pyrites; (E) silicon ditto with iron pyrites; (F) hessite ditto with cassiterite.

4. If you came across a node you would immediately know it was (A) the grid cap on a radio tube; (B) the plate of a tube; (C) a point of zero current or potential in an oscillatory circuit; (D) a maximum point of current or potential in the same circuit; (E) any point of current or potential in a low frequency circuit.

5. If we were fortunate enough to be peering raptly at the screen of a television receiver and suddenly the objects became interlaced, we would know that the name for this effect is (A) non-synchronous; (B) intercalation; (C) interference; (D) polyphasing; (E) synchronous; (F) syntony.

6. The rating of a power tube covers many aspects. For instance, a rated 10 watt output tube will, without any alarming temperature increases, dissipate (A) 10 joules of energy per second; (B) 100 joules in the same period; (C) 10 joules of energy in one tenth of a second; (D) one joule in ten seconds; (E) none. The term joule being not applicable in this case.

7. In a transformer, a high turns ratio is necessary for high voltage amplification. This gives us a larger distributed self-capacity and also automatically increases the leakage inductance, thus lowering the resonant frequency. Bearing these points in mind when selecting an audio transformer for general use, we would sort out one with a ratio of (A) 1 :5; (B) 1 :7; (C) 1 :3; (D) 1 :1; (E) 1 :10; (F) 1 : 8.

8. If you designed an amplifier and wished to make use of a large signal voltage in the output stage, your choice for the final power tube would be (A) an output pentode; (B) a triode; (C) a beam power pentode; (D) push-pull pentodes; (E) two paralleled pentodes.

9. Quite a few things are fundamental. Shaving is fundamental slavery, but fundamental, when applied to the wavelength of a broadcasting means that the fundamental wavelength of a station on 400 metres is (A) 400 metres; (B) 200; (C) 800; (D) 1,600; (E) 1,200; (F) 2,000; (G) or any multiple of 400.

10. Even electrons get lonely and the term used to describe the manner in which electrons bunch together as they leave the cathode of a cathode ray tube is (A) beam; (B) unilateral; (C) undamped; (D) enticulation; (E) fasciculation; (F) stroboscopic; (G) stereophonic; (H) supersonic.

CHEAP CHEMICAL EARTHS

If you are too tired to take the cells from worn out "B" batteries there is still no point in throwing them away. After removing the Fahn stock clips—whose uses are obvious—solder the blocks together. And this is the one time when you don't have to bother which is positive and which negative. Having removed the cardboard covers, you dig a hole at an appropriate spot in the yard—avoiding spots where the dog buries its bones, because dogs always chose dry ground! A nice big hole too; down as far as you have energy to dig.

When a suitable wire for the earth connection, as stout as possible and preferably insulated where it comes in contact with the sides of the building, etc., has been soldered on, the old batteries are buried with a pipe leading down to them so that they may be dampened occasionally. Especially where the soil is poor and sandy the improvement may be vast since the absorption of the chemicals renders the conductive area much greater.—Rahob 7040.

Girdling The Globe

DX observations of the month by Arthur T. Cushen, 105 Princes Street, Invercargill, DX advisor to the Radio Hobbies Club, and Short Wave Editor of the New Zealand DX Club's bulletin, "New Zealand DX-TRA." All communications to the above address will receive prompt attention.

BROADCAST.

Australia.—The special broadcast from 5KA Adelaide on the morning of December 3rd was well received in this country. Many reports to hand show that reception was good throughout the Dominion and many listeners state that it is the best special programme they have heard. DXers in all parts of Australasia and the North American continent were called.

United States, Canada.—Here is a list of the best stations being received and should be a good guide for January reception. Many of these are audible any night at a good location.

Denotes opens at this time (o).

8.30 p.m.—1170kcs., WWVA (o).

9.00 p.m.—1100kcs., WTAM (o); 1110, WBT (o); 1160, WJJD (o).

9.15 p.m.—1530kcs., WCKY (o); 1020, KDKA.

10.00 p.m.—700kcs., WLW; 750, WSB (o); 890, WLS (o); 920, WMMN; 990, WNOX; 1010, KLRA; 1030, WBZ; 1080, KRLD; 1120, KMOX; 1130, KWKH (o); 1180, WHAM; 1320, KXYZ (o); 1360, WSAI (o); 1370, WSPD (o); 1380, WMBG; 1480, KCMO; 1500, KSTP (o); 1510, WLAC (o).

10.30 p.m.—590kcs., WOW (o); — CMCY (o); 600, WMT; 690, CMQ (o); 740, KTRH (o); 760, WJR; 870, WWL; 950, WSPA; 960, KMA (o); 1040, WHO (o); 1200, WOAI; 1360, WKAT (o); 1540, KXEL (o).

10.45 p.m.—920kcs., KARK (o); 970, WFLA (o); 1250, WCAE (o); 1480, WRDW (o).

11.00 p.m.—570kcs., KMTR (o); 600, WREC (o); 620, KGW (o); 650, WSM; 660, WEAF; 670, WMAQ; 750, KMMJ; 780, WBBM; 820, WBAP; 830, WCCO; 910, KRRV (o); 980, KMBC; — WSIX; 1140, KSOO; 1170, KVOO (o); 1210, WCAU; 1250, KPAC (o); — WREN (o); 1280, WTCN (o); 1290, KRGV; — KOIL (o); 1330, KFH; 1350, KRNT (o); 1360, KSCJ (o); 1520, KOMA (o); 1560, WQXR (o); 1590, WAKR.

11.15 p.m.—570kcs., WNAX; 1140, WRVA; 1150, WJBO; 1250, WDAE.

11.30 p.m.—560kcs., KWTO; 570, KGKO; 590, KTBC; 630, KVOD; 720, WGN; 790, WMC; 940, CBM; 1230, KFDA; 1420, WOC; — KILO; 1460, WHP.

Midnight.—620kcs., KTAR (o); 790, KGHL (o); 900, XEW; 950, KPRC; 1140, KGDM (o); 1160, KSL; 1280, KFOX; 1440, KGNC.

12.30 a.m.—630kcs., KVOD; 790, KECA (o); 860, XEMO; 900, CKBI; 990, CKY; 1010, CECN; 1060, CJOC (o); 1110, WMBI; 1320, KDYL; 1420, WOC; 1430, KLO.

1 a.m.—CBK, KHQ, KFSD, CJOR, KMPC, KXL, CHAB, KTRB, KLX, KFPY, KTKC, KJR, KFWB, KOMO, KFVD, KWJJ, KJBS, KEX, KVCV, KOVO, KYA, KTFI, KHSL, KOL, KLS, KFBB, KALE, KFRE, KGB, KMO, KGIR, KIDO, KGER, KSLM, KRE, KERN, KARM, KPRO, KYOS, KGA, KPMC.

A fuller list can be had on application to 105 Princes St., Invercargill.

SHORT WAVE.

United States.—Here are the latest changes: Boston.—WBOS operates on 9.895mcs. at 7 a.m. at very good strength, broadcasting programmes for the Armed Forces Radio Service.

WRUL-WRUW-WRUS are the calls used when closing at 6 p.m. WRUW is the poorer signal; WRUS on 9.70 and WRUL on 11.73mcs. are well received.

New York.—WNRA, using 9.85mcs., is heard at good strength at 8 a.m. WNRI, on 13.05mcs., closes at 7.30 a.m.

Cincinnati.—WLWR uses 9.75mcs. in the mornings in "Voice of America" programmes. WLWL, on 15.23 and 13.03 mcs., sign at 7.15 a.m., reopening on 7.832 and 13.03mcs. at 7.30 a.m. WLWK, on 11.71mcs., operates 7.30-9 a.m.

India.—Delhi has opened yet another frequency in the 19 metre band; this one on 15.16mcs. is well received with news at 3.15 p.m.

(Continued on page 20).

SHORT WAVE—New Stations of the month

Megacycles	CALL	LOCATION	ITEMS OF INTEREST
21.675	GVR	London	Opens at 9 p.m., news 11 p.m.
15.275	ZOJ	SEAC, Kandy.	Call in English at 4.30, signs 5.25 p.m.
15.160	VUD	Delhi	News at 3.15 p.m.
12.280	JANS	Batavia	Closes at 8 p.m.
10.010	WJQ	New York	Testing at 7 a.m.
9.895	WBOS	Boston, Mass.	Musical programmes 7 a.m.
9.855	WNRA	New York	"Voice of America" 7 a.m.
9.750	WLWR	Cincinnati	Foreign programmes 7 a.m.
9.680	VLC2	Shepparton	To Britain 4.15 a.m.
7.865	SUX	Cairo	News at 6 a.m.
7.470		Guam	Calls San Francisco 11 p.m.
6.030		Rome	Home programmes, closes 7 p.m.

Slips at The Mike

3ZB, 15-11-44, shoppers' session: "Prices to fit everybody's figure."

1YA, November 19, 1944, 3.10 p.m.: "We will now present an expert from this Oratoria."

2YC, 20-11-44, 10 p.m., boxing announcer: "The crowd are on their toes and they're swinging lefts and rights."

2ZB, November 24, 1944, 9.7 a.m., describing American meals: "They sometimes have their salad plain and then eat the dish."

Batteries in Enclosed Receivers

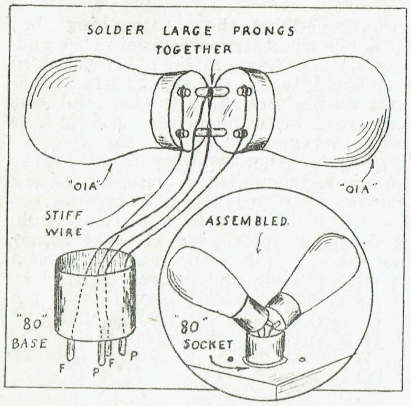
Nowadays batteries are often enclosed in the cabinet containing the receiver. When this is done, the batteries—which, it should be remembered, are large masses of earthed conducting material—should not be placed close to components or directly underneath them.

This applies particularly to tuned circuits, as the proximity of a large earthed object will have much the same effect as is experienced if, for instance, the hand is placed close to a coil or condenser.

HINTS AND KINKS

The following Hints and Kinks have been sent in by Readers. Rahobs, help your Club by contributing to this column.

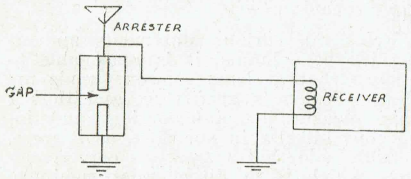
In an emergency two ordinary radio valves may be connected together to serve as a full-wave rectifier in place of a type "80." Mount in a 4-prong



valve base two old 5-volt valves such as the "O1A" which still have good filaments. Solder the prongs together as in the enclosed diagram.

THE LIGHTNING ARRESTER.

An essential of any outdoor antenna installation is the lightning arrester. It consists simply of two metal electrodes which are spaced a few thousands of an inch apart so that the ordinary low voltage radio signals cannot jump across the gap, but an easy path is provided



direct to ground for any high potentials induced in the aerial by discharges of lightning, which would jump across the small air gap instead of flowing through the opposition offered by the inductive action of the antenna coupling transformer in the receiver. The lightning arrester is connected directly from the antenna lead-in wire to the ground as shown.—Rahob 10279.

I have made up quite a number of sets with the IN5GTs 1D8GTs, etc. In one I needed a close shield, and as shields for those are unobtainable I made a perfectly fitting screen from the metal containers used by the "Selo" Film Company in the same way as the foil on Kodak films.

Two small pieces are cut out of the bottom piece to fit over the screws of the socket. The top and bottom of the tin are cut out, right to the edge in the top part, and about 1/16in of an edge left on the bottom section. The bottom is placed on the valve socket, then the valve is plugged in. The top sleeve is then placed over the valve, and a perfect shield is the result.—Rahob 8734.

CHROMIUM POLISH

So much chromium is now used in radio sets and on panels that it is well to know that this finish may be polished. The only materials required are absorbent cotton or soft cloth, alcohol, and ordinary lampblack.

A wad of cotton or the cloth is moistened in the alcohol and pressed into the lampblack. The chromium is then polished by rubbing the lampblack adhering to the cotton briskly over its surface. The mixture dries almost instantly and may be wiped off with another wad of cotton.

The alcohol serves merely to moisten the lampblack to a paste and make it stick to the cotton. The mixture cleans and polishes very quickly and cannot scratch the chromium surface. It polishes nickel-work just as effectively as it does chromium. Care should be taken to see that the lampblack does not contain any hard, gritty particles which might produce scratches during the polishing.—"Radio Handbook."

Old or broken gramophone records melted with a soldering iron make good filling for holes in bakelite panels or for sealing and insulating screws, reinforce large holes with wire.—Rahob 12020.

LIGHTNING ARRESTOR.

Using a spark plug with a ½in. thread, screw it into the end of a water pipe. The lead-in is connected to the top of the spark plug and connected to the aerial of the set. The above makes an excellent lightning arrestor.—Rahob 11362.

For my part, I am fully satisfied with the Radiogram and each monthly copy is looked forward to. From a radio expert's point of view, improvements could possibly be made and no doubt such improvements will form part of the Radiogram's post-war policy.

Would it be possible to do away with the "Modern Radio Dictionary" and in its place have a list of radio terms and their correct meanings. After all the Modern Dictionary is only put in for amusement.

I will stop now, wishing the Club every success.—Rahob 11978, Waimate North.

With regard to Rahob 10450's letter in the November Radiogram, I agree thoroughly with his remarks about 2 valve sets. I have done quite a bit of DX-ing during the past year and have never used anything bigger than a 2 valve set. With this I have managed to log stations from all over the world, on short wave and broadcast.

There has also been a lot to say lately about the standard of the Radiogram. Well, I reckon that it has vastly improved over the 1941 issues and those about that time. I do not think that there is too much repetition in it, but could you not print some different types of circuits. I also see that you ask for our opinion on Postman's Knock, well I say, "Keep it," as long as it does not take up too much room.—Rahob 7323, Auckland.

I think what I owe the Club can never be repaid in money or words. Let me explain.

The dream since I first took interest in radio as a hobby was to some day enter into it for a living but in my local town there seemed very little hope of this. A while back the chance came. A position was advertised and I applied. I think that my Rahob badge was no small factor in getting me the position in a well-known local radio firm.

Well, best of luck to the Club and my thanks for an enjoyable year.—"W.," Ashburton.

On reading the November Radiogram Postman's Knock I think that Rahobs No. 11048 and 11328 should not be allowed to make such statements and get away with it. It might be a bit different if their statemens and remarks were correct, but they are nothing but falsehoods right from beginning to end. They do not seem to be a bit thankful for what is done for them. If I were you I would not waste paper in the Radiogram or a moment's thought or time on them—just ignore them.

Surely we should all realise that the Radiogram is published under very hard conditions. It would not have survived at all if it had not been run and published under some very clever management and people who have devoted a lot of their time and interest toward it.

In conclusion I will say that I am very satisfied with the little paper and am quite confident that after the war is over it will be better than ever.—Rahob 10688, Pukekohe West.

In answer to your request for comments upon the "Postman's Knock" pages, I would like to say that this feature is both valuable and desirable.

I gain certain interesting information —not wholly statistical—which is of value to me, and I would like to express my thanks to the many Club members who have written in appreciation of my efforts.

To the minority—those jolly Ph. D's of mayhem who wish to see me shot and so forth, and those who find me indescribably boring and monotonous, etc.—I shall express my thanks for supplying a slight measure of comic relief.

From the various statements appearing in the columns, it is reasonable to assume that at least someone reads my efforts, which is gratifying, and thus I gain pleasurable information and innocuous hilarity in one dose, as it were. I might add that I treat all correspondence which is in direct relationship to myself, ad valorem.

This has the effect of leaving me in a genial frame of mind and looking forward to the next month's issue of Postman's Knock.—H. Vernon Wheatley, Christchurch.

I have been away in the jungles fighting Japs and have found out what a good thing this little book is. My dad always used to post it on to me and boy was it a treat to think that when this war is all over our Club may rise to a new and higher standard than ever.—A soldier member of your Club, Rahob 5725.

Here is my opinion of the Club's literary effort, "The Radiogram." I consider this neat little booklet to be one of the most interesting and educational radio magazines that I have ever had the pleasure to own. I also think that Mr. H. Vernon Wheatley's articles are very well constructed and contain some notable ideas in their length. Rahobs (if I can call them this) who criticise the Club's magazine and also Mr. Wheatley's work should try to do as good themselves and see what a sorry plight in which they would end up.—Rahob A302, Australia.

Having been closely associated with a Radio Hobbies Club for about 12 months, in which time the membership has increased from about 12 to 120, the writer may claim some slight knowledge of the radio activities of the average club member.

In reply to Rahobs 9843 and 11328, it may be stated that my impression is that over 90 per cent. of the club members are not interested in conventional super-heterodyne receivers, and very rightly so, by reason of the fact that club members are not radio manufacturers but amateur experimenters who are continually changing their circuits and their tube line-ups. It is further submitted that experimental work of this type is infinitely more interesting and instructive and far less expensive than the construction of orthodox household receivers. As for the super-heterodyne circuit, it is not so "modern" as some Rahobs may imagine, but dates back to 1917 and depends entirely on the continued oscillations of the same old regenerative circuit employing a plate tickler-coil, grid-leak, and condenser.

With regard to criticisms of the contents of the Radiogram it is suggested that the gentlemen above referred to have the remedy in their own hands. It only remains for them to construct their super-hets, write a description, furnish circuit and wiring diagrams, and send the complete article to Rahob 1 who would probably be glad to receive the matter and pay for it at standard rates, if it is up to standard.

Further to the matter of the yearly subscription, it is suggested that 12 copies of the Radiogram, one copy of the Annual and 10 per cent. off most purchases is very good value for six shillings. It is further suggested that the continuance of the Radiogram and the Annual depends upon the lamented six shillings and the advertising fees. As to the subject matter, that probably largely depends upon contributions by Rahobs who make time and have the energy to endeavour to help their fellow hobbyists.

The writer is in no way associated with the Lamphouse, but has been a radio hobbyist for the last 10 years. For the love of Mike, Rahob 1, give these moaners back their valued six shillings.—Rahob 4613.

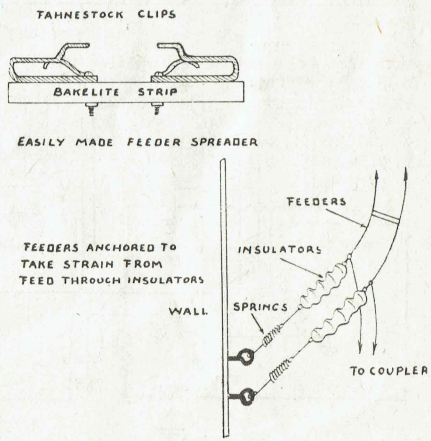
AUSTRALIA.—Conditions have been very bad here lately owing to a serious drought which has given cause to some terrific dust storms which drown all signals when they are at their height. You probably have some of Mildura over there in New Zealand after our last effort, when the dust blew for three days without a stop. I intended having an evening at the set tonight, but a dust storm has spoilt everything, but there will come a day.

Do you hear many of our stations over your way? Some of them verify with very attractive cards. 3BA Ballarat has an excellent veri, while 2NZ and 2GZ have a very nice card. The National Stations nearly all verify with a plain black and white PMG card, although I have received rather attractive ones from 3GI and 2CO.—Rahob A169.

Directional Antenna

(Continued from page 5)

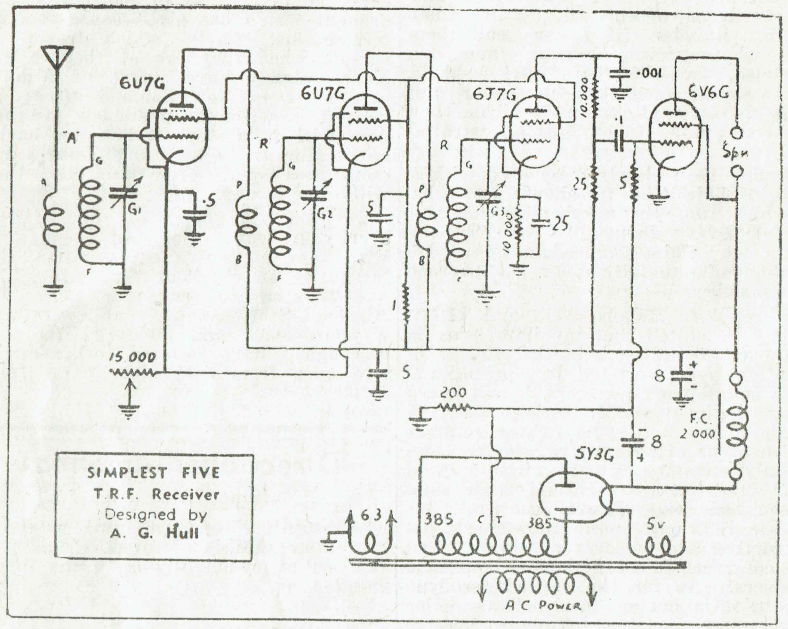
and rotate the condenser until maximum signal strength is obtained. This position will vary slightly according to the frequency.

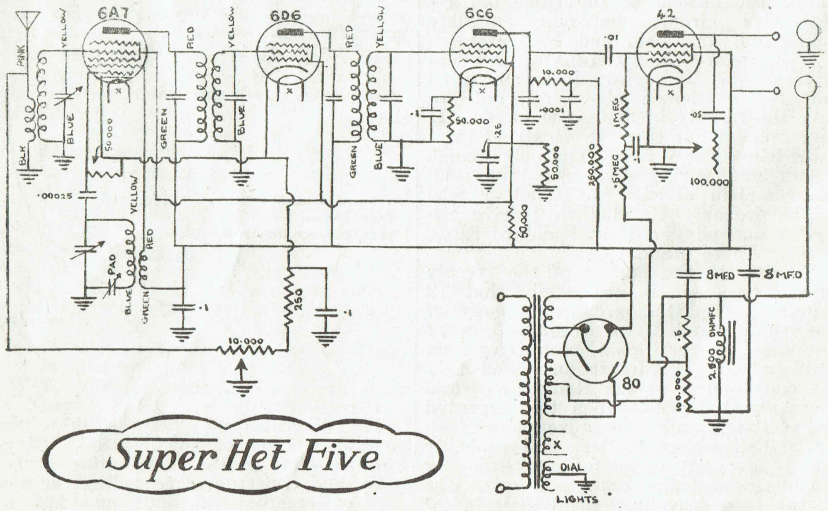


The diagrams will help to show the general method of construction. Much has been left to the imagination of the individual constructor regarding the system of erecting the antenna but no doubt many ideas on this matter are already known by most radio experimenters.

CIRCUIT REVIEW

SIMPLEST FIVE T.R.F. RECEIVER





STRAIGHT SUPERHET FIVE.

GENERATORS

H. VERNON WHEATLEY.

This article will deal principally with the upkeep of generators for the benefit of those possessing wind-chargers, etc., and car owners.

The cut-out is an essential unit with a generator, so I'll deal briefly with that.

When the generator starts, a magnetic field caused by current flowing in coil A, pulls down the contact arm, and the battery receives the charging current. When the generator stops or is not revolving at a speed sufficient to produce the charging current, the low resistance coil B produces a magnetic field which cancels the magnetic field of coil A. This opposition releases contact arm, thus breaking the circuit. The points should be kept clean.

Should your generator spark excessively at the commutator, look for any of the following:—

Brushes incorrectly set as regards neutral axis; excessive currents; pitted or grooved commutator; proud mica; a flat on the commutator; dirty brushes or commutator; brushes incorrectly held; incorrect pressure on brushes; brushes not properly bedded, or broken, or even inserted wrong way round; partial breakdown of insulator between commutator segments.

These faults, with a few obvious omissions, are fairly easily corrected. If the armature, when rotated, produces an evenly blackened commutator to your view, clean in the normal way, but if it is blackened locally, the cause is a "flat" or "shoulder" at the spot where it is blackened. The only cure for this is to turn it up on a lathe.

Should your generator fail to excite, the cause may be that the commutator is dirty, or due to a high resistance deposit forming on the brushes due to the generator running for a long period and not producing current. A high resistance in the field circuit or a break, and turning the generator in the reverse direction causing a loss of residual magnetism, will cause a generator not to excite.

Again, the remedies are obvious. To re-excite, set the generator running normally, after removing the original fault, apply 1½ volts or more in correct polarity across the generator output. Merely "flash" the wires from the exciting battery across the output. The exciting voltage should never exceed the rated voltage of the generator. 1½ volts (dry cell) is generally sufficient.

Your generator works on a very simple electrical law: When relative motion takes place between a conductor and a magnetic field, so that the conductor is "cut" by the field, an E.M.F. is produced. The rate of "cutting" determines the magnitude of this E.M.F.

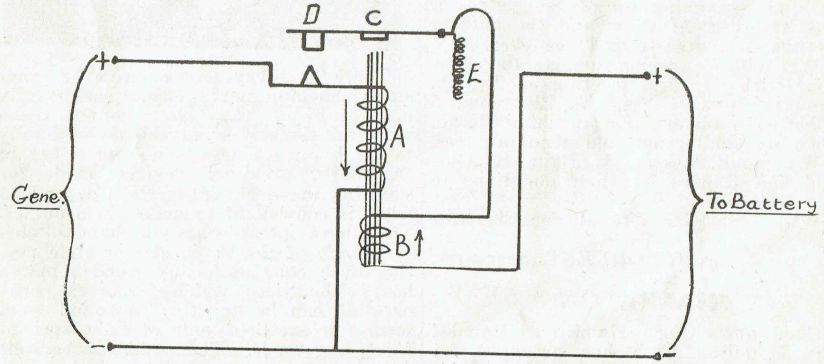
As Faraday's laws of Electro-magnetic Induction have it:—

1. An induced E.M.F. is established whenever a change occurs in the magnetic flux linking with an electric circuit.

2. This E.M.F. is proportionate to the rate of change of flux.

N.B.—The neutral axis mentioned previously indicates the point at which the brushes should make their change-over on the commutator.

It is the exact point at which the armature coils are cutting no lines of force, or at right angles with the field. The axis varies with the load, because the lines of force become distorted in the direction in which the generator is turning.



Cut-out.

A. High resistance parallel coil.
B. Low resistance series coil.
C. Contact arm.
D. Points.
E. Tension spring release.

AUCKLAND

A. WALKER, President.

The outstanding event of the year was the judging of the entries in the junior and senior competitions on November 25 at Mr. Norman Christie's home.

The construction was of an excellent standard and the judges expressed their appreciation of the efforts taken by members in their work.

In the junior section all entries were battery operated and judging was very difficult due to the general performance in each case being so high. In the final summing up Mr. Wood was very fortunate to win both sections by a half-point in each instance.

In the senior section with the 3-tube Superhets some keen rivalry was expected and this proved so when the entries were brought in. The construction and layout were exceptional in their class, although with the exception of Mr. Forrest (who went in for the Ham type receiver with home wound coils) the other entrants had a decided trend to the Commercial Dual Wave Receiver design. Despite this tendency the performances were really outstanding and the combined entry of Messrs. Garrett and Beere won the first section prize as well as the Bain Cup. Our worthy president carried off the other prize with his entry.

In the summing up of the judges it was an excellent show and the bumper attendance quite enjoyed the evening.

We will be commencing the New Year with our first meeting on Friday, January 19, 1945, at the Clubroom, 5 Abbotts Chambers, Karangahape Road, when we shall renew old acquaintances.

We thank Messrs. A. Bain, R. Gatfield and Rhodes for their donations to the Club.

With best wishes to all for the New Year.

—J. FORREST, Secretary.

HAMILTON

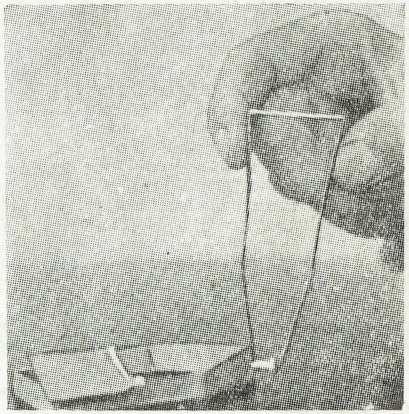
Good news for Hamilton Rahobs! The Hamilton Club has arranged for the use of the Hamilton Welding Club's Rooms for their meetings, which in future will be held each fortnight. There is both a lecture room and a workshop.

Our Club recently co-operated with the welding club in a display of home made models and radio gear and much interest was created.

Watch G. S. Anchor and Co.'s window for notices about future meetings.

Particulars about our Club can be obtained from the Secretary, Rahob 6792, A. D. Nelson, 12 Ulster Street, Hamilton.

Handy Tool made from an Ordinary Match Box



There is always some screw or other small machine part getting accidentally down into a place you cannot reach with the fingers or anything else handy to get it out. There is no end either to the clever practical devices made for such instances, but all of them depend on what is convenient to make them out of. The above photo shows a handy "pick up" made of the tray sides or slide portion of a common penny wooden match box. The piece which forms the tray or slide can be quickly "unwound" and forms an excellent pair of light springy forceps or tongs. The wood can be split with a knife to any desired width. You will be surprised at how easily they can be handled and at the grip or pinch you can get out of them at the business ends.

PEN FRIENDS WANTED

Sig. R. Burgess, NX151841, Signals 6 Aust. Div., c/o 3 Aust. Base, Sub Area, Australia, would like to correspond with any Rahobs interested in Radio Controlled Model Aeroplanes.

Rahob A302, Keith Howard, 4 Edith Street, West Cessnock, N.S.W., would like to correspond with Rahob A390, of Sydney, if he is willing.

Rahob 11608, T. E. Wildbore, Apiti, North Island, N.Z., requires pen friends in Australia, interested in stamps, about 11-12 years of age.

PHOTOGRAPHIC RECORD

ACKNOWLEDGMENTS.

A photograph of the home of Rahob A146, of Melbourne, Australia.

A photograph of Rahob A433, of South Broken Hill, Australia.

A photograph of Rahob 12792, of Waiuta.

WITTIQUIZ ANSWERS.

(See page 8).

1.—A.
2.—C.
3.—D.
4.—C.
5.—B.
6.—A.
7.—C.
8.—B.
8.—A.
10.—E.

LIBRARY DONATIONS

Rahob No.	Donation £ s. d.
12817	10 0
11572	6
10092	2 5
10852	4 0
12084	6
10787	4 0
2988	18 6
6716	4 0
7726	10 0
11371	9
4866	4 0
	2 18 8
Lamphouse Donation	2 18 8
	5 17 4
Previously acknowledged	106 0 2
Total	111 17 6

Books purchased: £19/3/1.

STAMPS

Thanks to the following Rahobs who have donated used stamps to the Radio Hobbies Club's Collection: 10936, 12386, 12610.

Rough-Riding Radios

The toughest of all pieces of radio equipment now engaged in fighting the war to a successful finish is the tank receiver. This brain of the tank, through which it receives the instructions which enable it to take its part in complex actions, is a rugged brother of the automobile radio. Like it, compactness is the greatest virtue, but unlike it, that compactness must be joined with an ability to resist rough handling which was practically inconceivable to manufacturers of auto sets.

Just converted to tank radio production, experts from one of these organisations protested at what appeared to be fantastic specifications. The demands were nonsensical, they insisted. Tank radios were in principle very little different from those used by the police in their scout cars.

A demonstration was necessary to convince them. A police radio was installed in a tank and given a ride over rough terrain for just one mile. Then the remains were returned to the factory experts. After one glance at the wreck, they agreed that the Signal Corps' specifications were conservative. Not only were tubes broken, but a large number of the apparently solid soldered joints had come apart, and even the coils were partly unwound.

Rough handling is only one of the troubles of tank radio. Another is interference. To combat this, all tank radios use the principle of frequency modulation, which permits static-free and fairly clear conversation among the crew and from one tank to another. The problem of mechanical interference is not so easy to solve, and such things as the grinding of gears, clanking of heavy tracks, and the deafening blasts of the gun are now the greatest obstacle to easy communication.—"Radio Craft."

Recentring Speech Coils

A useful way of recentring loudspeaker speech coils is to pass 50 C/S mains current through the primary of the speaker transformer, which causes the speech coil to vibrate at a 50 C/S frequency. Slacken off the clamping screws of the centring device, when the speech coil, by vibrating, should centre itself. While it is still vibrating, tighten up the clamping screws of the spider.

If the coil or the diaphragm are distorted it may be necessary to apply a sideways force to the spider in a certain direction to allow the coil to clear the magnet before tightening the screws. When the coil is touching, the note emitted will be harsh and rattling; when it is centred properly, the characteristic clear 50 C/S hum will be produced.

The best way of providing a suitable mains current through the primary of the speaker transformer is to connect it to the mains via a low wattage electric lamp of the correct voltage for the mains. A 15 W lamp will probably be sufficient; if the wattage is too high the current flowing will reach a value which may overheat the primary of the transformer or, by causing violent vibration, may damage the speech coil and diaphragm of the speaker.

An energised speaker unit must have its field coil live, and it may be advisable to energise this separately.—S.T.A., Cardiff. (From "Electrical Trader.")

GIRDLING THE GLOBE.

(Continued from page 9).

Britain.—Here is the latest schedule of the B.B.C.'s Pacific service, which was altered recently:

GVZ (9.64), GRV (12.04), GSN (11.82) broadcast throughout the service from 5.45 to 10 p.m. GRX (9.69) is heard till 9 p.m., while GRM (7.12) signs at 8.30 p.m. GWD (15.42) operates from 8.45 to 10 p.m.

A new transmitter, GVR on 21.675mcs, is received well from 9 a.m. This transmitter is carrying the General Overseas Service to India.

Central Pacific.—At 11 p.m. two more Pacific bases can be heard sending dispatches to San Francisco. They are Guam on 7.47 mcs. and Saipan on 7.35mcs.

Europe.—A verification just received from ABSIE, the new American Broadcasting Station in Europe, shows that they operate from 4.30 a.m. till 1 p.m. and use B.B.C. transmitters. News at 8.30 a.m in English is being well received on GWH, 11.80mcs.

Australia Calling.—All VLI, Sydney, stations have been withdrawn, and the service is now carried on Shepparton and Melbourne stations. Melbourne stations are: VLG, 9.58mcs.; VLG2, 9.54; VLG3, 11.71; VLG4, 11.84; VLG6, 15.23; VLG9, 11.90. Shepparton, VLC2, 9.68; VLC4, 15.315; VLC5, 9.54; VLC6, 9.615; VLC7, 11.84.

Services below are in English unless otherwise stated:

10.30-11 a.m., VLC4, Japanese to Asia; 12.00-12.15 p.m., VLC4, to Philippines; 1.45-2.45 p.m., VLG3, VLC4, North America; 3-3.45 p.m., VLG6, VLC4, to South West Pacific; 5.10-5.45 p.m., VLG3, VLC7, to North America; 6.00-6.40 p.m., VLG3, VLC7, French to Tahiti; 6.55-7.25 p.m., VLG3 to Britain; 7.30-7.55 p.m., VLC2, VLG3, to Asia in Japanese; 7.55-8.30 p.m., VLC2, to Northern Asia in Japanese; 8.10-9.00 p.m., VLG4, to New Caledonia in French; 9.00-10.00 p.m., VLC6, to Philippines; 9.30-10.00 p.m., VLG4, to S.W. Pacific; 10.15-11.45 p.m., VLG4, VLC6, to Asia, 10.15 p.m., Chinese; 10.30 p.m., English; 10.50 p.m., Malay; 11.15 p.m., Dutch; midnight-1 a.m., VLG2, midnight, Malay; 12.30 a.m., English; 1.01 a.m., French; 1.35 a.m., Thai; 2-2.15 a.m., VLC6: 2.15-2.30 a.m. VLG, VLC6: 2.35-2.45 a.m., VLG, VLC6; for India: 3-3.45 a.m., VLC6, VLG3, to N. America; 4.15-4.45 a.m., VLC2, to Britain; midnight-12.45 a.m., to North America, VLC6.

THE "FALCON-4"

(From "Radio Craft," with acknowledgments to "Australasian Radio World").

The attractive little receiver is a real war product, representing the experience of people faced with four years of shortages, struggle and threats of invasion. Its design and construction embody several feature particularly interesting to American constructors.

The American experimenter can learn much from his European and Australasian colleagues who have been at war for four years. From Australia comes this four-tube dual-wave receiver, a set designed with the sole aim of reducing battery drain.

We imagine that we are facing a scarcity, but the average Aussie thinks of us as sitting in clover. Batteries have been off sale for years in that country, and the radio magazines carry articles on "rolling your own." Tubes cannot be obtained by the expedient of turning in old ones. They just don't exist. If one is needed to complete a layout, the would-be constructor advertises for it in the radio press, sometimes offering to swap some "unobtainable" component of his own for the desired type.

Thus an Australian set will be found to have the minimum in hard-to-get parts and fancy frills. Design is as simple as it could be made, and components used are the fewest possible. The result is an attractive, easy-to-build receiver, the result of the experience of men who can still "put 'em together" after four years of war.—Editor.

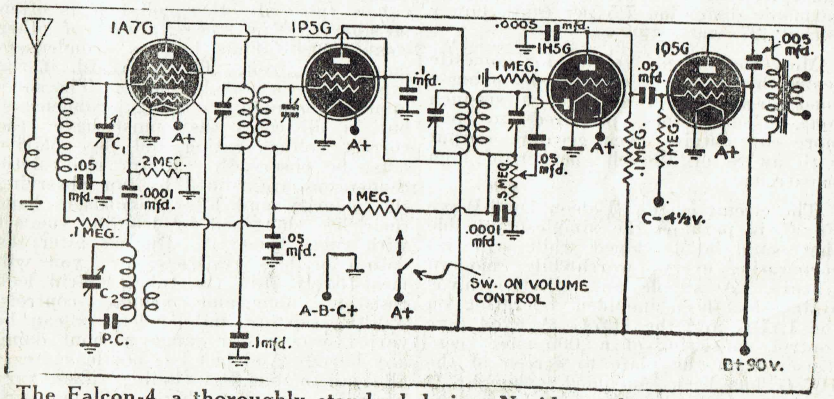
Most notable advance in battery tube technique during the past few years, the new 1.4-volt tubes represent an important step forward towards the ideal in battery receiver design. Years ago 6 and 4-volt filaments gave way to 2-volt, and now designers have available a highly successful series of tubes requiring only 1.4 volts across the filaments.

More important still, filament current has decreased in proportion, so that it is now possible to design a 4-tube receiver drawing a total filament current equal to that taken by a single tube several years ago, and with a total filament wattage only a fraction of that used in radios manufactured a few years ago.

"B" CONSUMPTION IMPROVED.

An equivalent advance has also been made on the "B" supply side. Receivers drawing up to 20 or 24 mils. "B" current at 135 volts were the order of the day a few years ago. Today, corresponding performance can be obtained from a set drawing only 10 to 12 mils. at 90 volts.

While this remarkable improvement in economy is largely due to advances made in tube design, part of the credit must also go to the new type permanent magnet speakers. Sensitivity has been increased considerably, or in other words using a latest type permanent magnet dynamic speaker, considerably more volume is obtainable with a given output than from an equivalent type speaker of several years ago.



The Falcon-4, a thoroughly standard design. No ideas which would call for extra parts are presented. Economy of battery consumption is the keynote.

The "Falcon Dual-Wave Four" is an example of what can be achieved with the new 1.4-volt tubes, high-gain coils and latest high-sensitivity speaker. A four-tube dual-wave receiver drawing .25 ampere "A" current at 1.4 volts, and approximately 10 mils. "B" current at 90 volts, it gives a performance comparable with that of earlier receivers with approximately double the "A" and "B" wattage.

USES READY-WOUND COIL UNIT.

The receiver uses a recent dual-wave coil unit and a pair of high-gain I.F. transformers (either air or iron-core types may be used). A 1A7G is used as mixer-oscillator, and while this tube was designed primarily for broadcast operation, it works splendidly on the short waves as well.

Next follows one of the 1P5-GT multi-mu pentodes as I.F. amplifier, followed by a 1H5-G as diode detector and triode audio amplifier driving a 1Q5-G beam output pentode. This tube has characteristics broadly resembling those of the 1C5-G, but it operates with considerably less grid bias, and is therefore more sensitive. For those particularly interested in "B" economy, the 1Q5-G has a further important advantage, in that it may be operated satisfactorily under over-biased conditions, giving an appreciable reduction in "B" battery drain without serious increase in distortion.

The 1Q5-G has a 1.4-volt filament drawing .1 ampere. With 90 volts on both plate and screen, and a bias voltage of —4.5, the plate and screen currents are 9.15 and 1.6 mils., respectively. Load resistance is 8 000 ohms, total harmonic distortion 7.5 per cent., power output .27 watt.

More than ample volume for domestic requirements can be obtained by using a good speaker with at least a six-inch cone. Constructors prepared to pay more can obtain even greater output with an 8- or 10-inch speaker of high sensitivity.

The circuit of the "Falcon Dual-Wave Four" is perhaps the simplest possible that could be developed while still incorporating every worthwhile modern feature. A simple and effective a.v.c. system has been included, operating on the 1A7-G and the 1P5-G. A fixed tone control, consisting of a .005 mfd. condenser from the plate to screen of the 1Q5-G has been included, though it would be a simple matter to incorporate a variable control if desired. However, as reproduction is very well balanced, the fixed control is actually all that is necessary.

The circuit is straightforward and with the constructional details given in the text, the average set constructor should have no difficulty in building this receiver.

Improvisation

(Continued from page 4).

this does not matter for such purposes as reaction condensers, bandspread condensers, etc.

As a guide, the following table may help to give some idea of the average values of gangs.

Midget Condensers.

5 plates—.000005 μfd.
7 plates—.000025 μfd.
13 plates—.00005 μfd.
17 plates—.000075 μfd.
23 plates—.0001 μfd.

Standard size condensers.

43 plates—.001 μfd.
23 plates—.0005 μfd.
13 plates—.00025 μfd.
5 plates—.0001 μfd.

Figures given are the total number of moving and fixed plates.

The following few hints should also be studied carefully, as they can be applied by nearly every experimenter. The values of many components are not critical. While it is necessary to use gangs and tuning coils of the correct values (also all other coils) it is often possible to vary the values of other components. Thus by-pass condensers may vary from .05 to .5 μfd. if the exact value is not obtainable. The same applies to audio coupling condensers, but in all cases they must have the correct voltage rating and the polarity must be observed. Many electrolytic condensers are ruined by not observing the polarity and filter condensers have their life shortened by running the set with tubes removed. Do not alter the values of bias resistors or you will most likely ruin the tubes. Grid leak resistors, tone and volume controls, A.V.C. resistors and condensers can be varied over a fair range without doing any harm. And last but not least, treat all your material, including tubes, very carefully, so that there will be sufficient for every Rahob to obtain his requirements.