WIRELESS WEEKLY

3D

THE 100% AUSTRALIAN RADIO JOURNAL

Vol. 4
No 16

REGISTERED AT THE G.P.O., SYDNEY, FOR TRANSMISSION BY POST AS A NEWSPAPER

FRIDAY, AUGUST 1, 1924

This Week's Feature: Construction of Single Slide Tuner

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DOUBLE SLIDE TUNER CRYSTAL SETS.—With detector and 'phone condenser, on Bakelite panel, Prices 29/6, 35/-, 38/6

LOOSE COUPLER SETS.—Complete with detector and 'phone condenser on Bakelite panel; very highly finished; wave length range 150 to 1,500 metres. Price £3/5/-

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VALVE MAGNIFIERS.—For magnifying the music on crystal or valve sets), cabinet type, Bakelite panel, efficient transformer; arranged for either English or American valves.
One Stage. Prices .... £5, £7, and £10 each.
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AERIAL EQUIPMENT.

AERIAL WIRE.—Per 100 feet. Price .. 2/9

LEAD IN WIRE.—7/20, insulated. Price, per yard ..... 2d.

Some sets are made to catch the people, Ours are made to catch the music!

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Nickel case. Prices .... 4/6, 5/6 and 6/6
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Practice. Prices 8/6, 12/6
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Tubes (primary and secondary), 6d. each; primary ends (maple), 1/-; Secondary ends (maple) 6d. each; base boards (maple) .. 3/3

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"Jefferson," 3½ to 1 ratio, No. 41. Price, 30/-
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Nickel (with nuts). Price, per doz. .. 1/-
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Brass. Prices, per doz. 3/-, 4/6, 7/-
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Bakelite Binding Posts. Price .. 5/-, 7/-
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Sliders and Rods, nickel plated, 6½in. long, Each 2/6
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Variable, "Bretwood" 4/3
Fixed "Volmax," ¼ to 5 megohms. Price, each 1/6
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"Erla," nickel plated or black. Price .. 1/6

METERS.—Pocket, Voltmeter. Price .. 8/6
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"Pignolet (2 scales), 0 to 7 volts and 0 to 150. Price 75/-
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"Gilfillan" .0003, excellent on Radio frequency circuits. Price 18/6
"Tuneup," .001 m.f. 20/-
"Ansrad," .001 m.f. 18/6
Signal .001 m.f. Vernier 30/-
Use a variable condenser and make your set efficient.

SHOULD THIS LIST NOT INCLUDE WHATYOU REQUIRE, WE HAVE IT NEVERTHELESS

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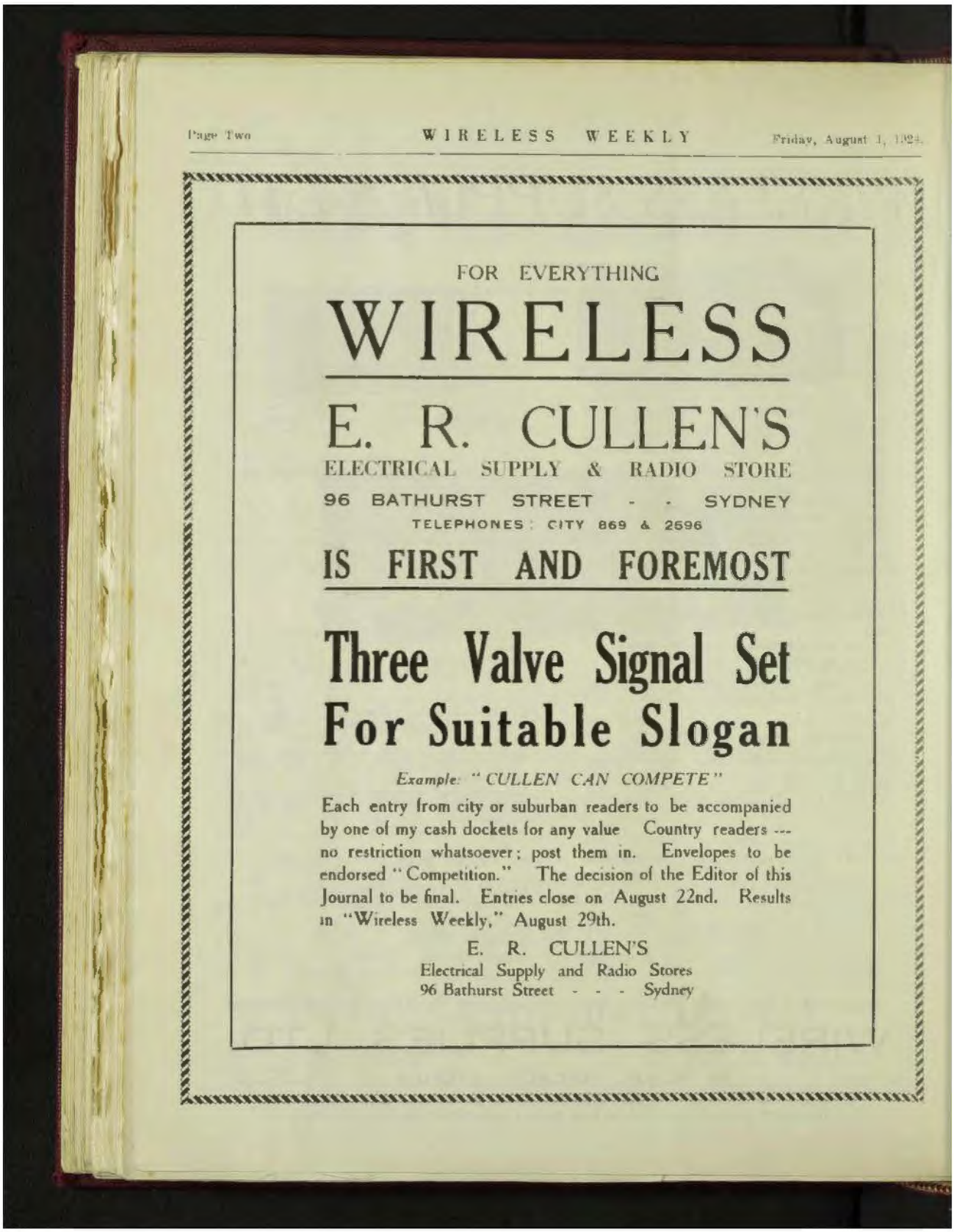
Phone M 3378 — 21 ROYAL ARCADE, SYDNEY — We pay freight on all goods except Batteries

All enquiries and orders have the direct supervision of our Mr. Ray Evans (late in charge Radio Test Laboratory, Garden Island), who has been engaged professionally on Radio Work since 1912



FAMOUS FROST PARTS

FROST-RADIO

No. 618. Bakelite Sponge Shock Absorber Socket, Standard base, panel or table mounting ... 6/3

For 199 Tube ... 6/3

For those who wish a compact gang of three Shock Absorber Sockets. The construction is identical with our separate sockets, except for base. For panel or table mounting.

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No. 600.—Frost-Radio Metal Frame Rheostat or Potentiometer.

Equal in operation to the best moulded type with precision operation of all moving parts and guaranteed resistance wire. Frame is made of heavy sheet brass, nickel plated and formed so as to give a rigid construction both to the windings and the contact arm. Central mounting thimble with locating tip prevents turning when mounted on panel. Washers provided to fit panels of varying thickness. Fluted moulded knob and nickel plated pointer.

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No. 602. Metal Frame Rheostat, 35 ohms ... 5/6

Same with Vernier ... 7/6

No. 605. Metal Frame Potentiometer, 400 ohms ... 5/6

No. 606. Metal Frame Potentiometer, 200 ohms ... 5/6

EACH OF THE ABOVE WITH VERNIER, 7/6.

THE MOST COMPLETE LINE RADIO PARTS EVER ONE PRICE

FROST SOCKETS

618	**SINGLE SHOCK ABSORBER SOCKET**, for Standard Valves	6/3
617	**SINGLE SHOCK ABSORBER SOCKET**, for UV199 and C299	6/3
	(All above sockets are made of Bakelite and have sponge rubber cushions.)	
612	**BAKELITE SOCKET**, for C299 and UV199 Valves	5/-
100	**BAKELITE SOCKET**, for Standard Valves	5/-
619	**3 GANG SHOCK ABSORBER SOCKET**, for Standard Valves	24/6
616	**3 GANG SHOCK ABSORBER SOCKET**, for UV199 C299	24/6

FROST RHEOSTATS & POTENTIOMETERS

COMPLETE WITH TAPERED BLACK BAKELITE KNOBS, METAL PARTS HIGHLY NICKELLED, KNURLED TERMINALS, TECHNICALLY PERFECT.

650	**RHEOSTAT**, 6 ohm (Maroon Bakelite)	7/3
651	**RHEOSTAT**, 6 ohm Vernier (Maroon Bakelite)	9/6
652	**RHEOSTAT**, 35 ohm (Maroon Bakelite)	7/3
653	**RHEOSTAT**, 35 ohm Vernier (Maroon Bakelite)	9/6
600	**RHEOSTAT**, 6 ohm Metal Frame	5/6
601	**RHEOSTAT**, 6 ohm Vernier, Metal Frame	7/6
602	**RHEOSTAT**, 35 ohm, Metal Frame	5/6
604	**RHEOSTAT**, 35 ohm Vernier, Metal Frame	7/6
654	**POTENTIOMETER**, 400 ohm (Maroon Bakelite)	9/6
605	**POTENTIOMETER**, 200 ohm, Metal Frame	5/6
606	**POTENTIOMETER**, 100 ohm Metal Frame	5/6

FROST MISCELLANEOUS

701	**EXTENSION CORD**, complete with Adaptor and Plug, 20ft.	32/6
400	**LOOSE COUPLER** or Receiving Transformers	75/-
410	**CRYSTAL TUNING COIL SLIDER** (1100 metre range)	27/6
501	**RADIO JACK BOX** (for 4 plugs)	28/-
611	**ADAPTER**, for C299 or UV199	5/6

FROST

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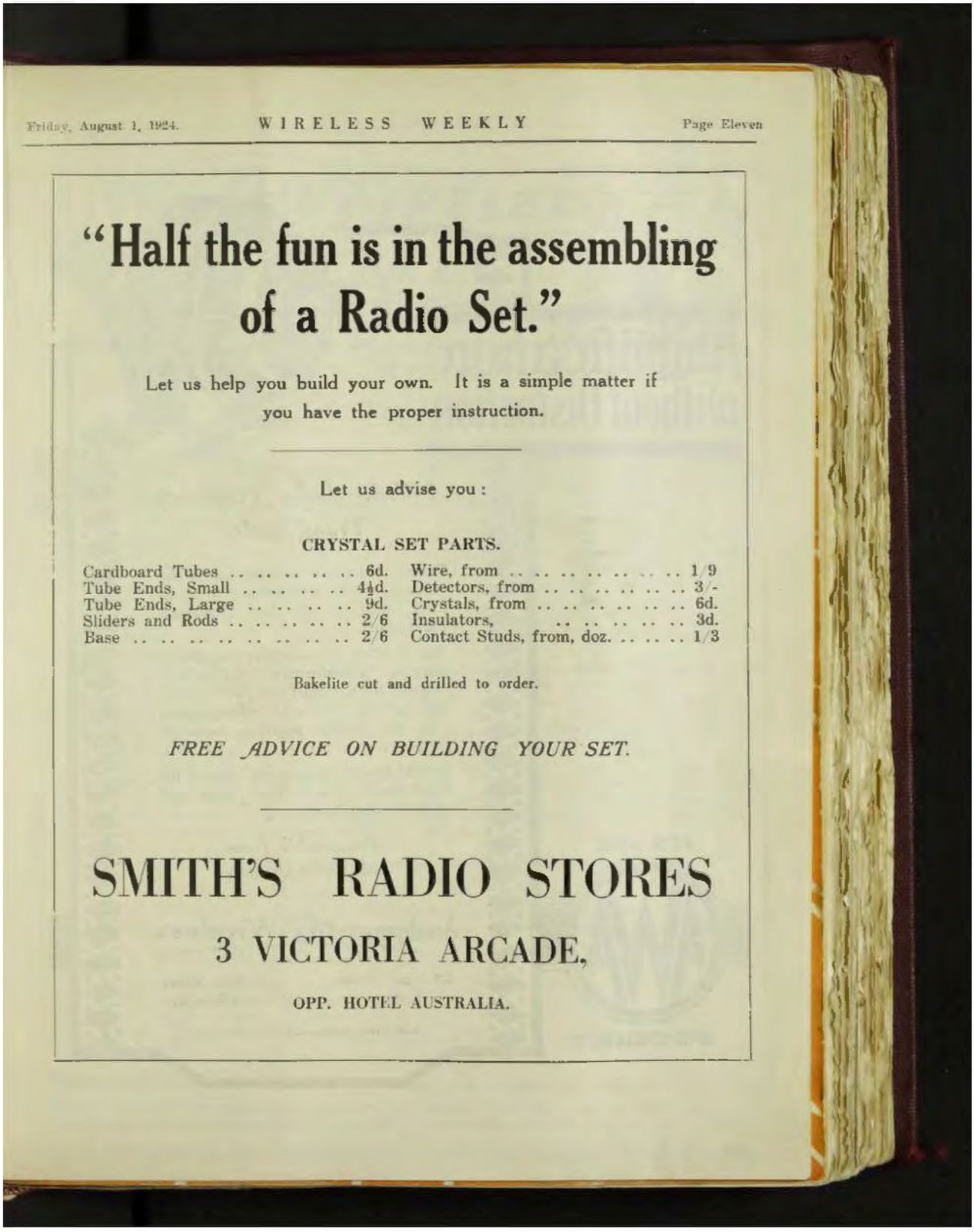


THE WIRELESS WEEKLY
A Journal Devoted to the Interests of Wireless Enthusiasts both Amateur and Professional

Vol. 4. Friday, August 1, 1924. No. 16.

The Ten Watters' Club

NOT everybody knows of the existence of the Ten Watters' Club. Composed of a number of Sydney transmitters, it was formed some months ago, ostensibly for the purpose of promoting harmonious working between them and to further the interests of its members generally. To-day it has practically faded out of existence.

The reasons for its failure are many, and not far to seek. Primarily it had practically no organisation, and that fact alone was sufficient to cause its undoing. Its objects, which were probably very worthy ones, do not appear to have ever been carried out, and, due to the fact that extremely scanty particulars were available concerning the Club's activities, it has never been regarded seriously by experimenters.

Had its members thrown their weight into the Australasian Radio Relay League, thus giving their support to a body whose operations were not confined to a small circle of transmitters, but rather to an amalgamation of the interests of ALL transmitters, they might have been a vital factor in the accomplishment of something worth while.

It is not too late, however, for the members of the Ten Watters' Club to play their part in the linking up of experimental transmitting stations. They can do it by concentrating their efforts upon the advancement of the Radio Relay League, which is destined eventually to be the organisation to which all EXPERIMENTAL transmitters will belong.

No general progress can be made by small scattered groups acting without co-operation between each other; but a great deal can be done by an organised body supported by, and representing all transmitters. The Radio Relay League is already well equipped; but it needs support, and encouragement. It is to be hoped that before long the League will include in its membership every experimenter holding a transmitting license.

Roster for Week ending 6th August, 1924

	7.30 to 8.0	8.0 to 8.30	8.30 to 9.0	9 to 9.30	9.30 to 10	10 to 10.30
Thur, July 31	2 RA 2 GR	2 IJ 2 JM	2 YI	2UW ZN	2 YG 2VM 2 ZZ	2 ZG
Friday, Aug. 1	2 IJ 2 GR	"	"	"	" "	"
Saturday, 2	2 RA 2 GR	2 IJ "	"	" "	" "	"
Sunday, 3	2 RA 2 GR	"	"	" "	" "	"
Mon., 4	2 RA 2 GR	2 IJ "	"	" "	" "	"
Tues., " 5	2 IJ "	"	"	" "	" "	"
Wednes., 6	2 RA 2 GR	2 IJ "	"	" "	" "	"

From 6.55 p.m. until 7 p.m. every Saturday and Sunday, time Signals are sent by 2MU on a wave-length of 200 metres

A NEW COVER WILL BE A FEATURE OF "WIRELESS WEEKLY" NEXT WEEK.

THE BOON OF THE BROADCAST BIRD.

A NEW ASPECT TO AN OLD ARGUMENT.

By Alan Burrows.

THERE are times when the "genuine experimenter" feels inclined to curse the invention of wireless telegraphy, which made broadcasting and all its after-effects possible. And the maligned broadcast-listener may occasionally have justification to register a moan about the airs and condescension exhibited by some of the genuine experimenters. This has led to much argument and dispute, which, like all argument and dispute, seldom gets anywhere but back to where it started, and sometimes beyond that. The truth is found in the adage, alleged to have been first promulgated by Uncle George: "It takes all sorts to make a world," and, however reluctant experimenters may be to admit it, the same applies in a radio world. It takes broadcasters and experimenters to make the scheme complete. And here is an instance of it.

Whatever is to be said—and quite a lot is said—concerning the rights (which often turn out to be the wrongs) of experimenters and broadcast addicts, there is this to be advanced for the broadcast listener: He has been responsible, unconsciously, it is true, for the cheapening of much of the gear which the experimenter uses. In other words, there are so many of him that manufacturers have been able to market their goods in sufficient quantities to lighten the price to the consumer. Which doesn't mean to say that any valve (except, of course, a transmitter) should cost more than 10/- to leave its native shores, nor have a large-sized duty shoved on to it, if only one was made per year. It means, simply, that the broadcaster has created a huge demand for gear that must inevitably have its effect upon its composite price. And if that effect is rather microscopic so far, it is due to overseas combines and rings, and exorbitant import duties—not by any means to the local dealer, who, more often than not, has to receive the blame.

The point, therefore, is that the demand created by the garden type of listener-in must sooner or later have its effect upon the gear which the hothouse type, the experimenter, uses—for both types do occasionally use the same sort of instruments, although many of the hothouse variety would be loathe to admit it. In fact, Morse keys are almost the only item whose sales have not soared since broadcasters first began to broadcast.

The result, therefore, is that the experimenter finds to his hand a large assortment of condensers, rheostats, coils, inductances, and so on, *ad fin.*, all moderately priced and ready for use. It is true, of course, that this would have happened, to a certain extent, if broadcasting was still among the joys to come; but the demand made by experimenters could never have come near that created by the broadcast fans.

THE OLD DAYS.

It is the pioneers who can really realise the truth of this; and in America and England, where accessories are so much cheaper than here, the fact must be doubly evident. Condensers haven't now to be home-made (whoever saw a really efficient home-made variable condenser?); rheostats and potentiometers no longer can be used for circular letter-racks, and in these days nobody knows the pride of a hand-made knob-and-dial.

Now, this isn't to say that the present-day sets are any handsomer than those made ten or twelve years ago; to compare them is next to impossible, just as it would be to compare a modern motor car with a stage coach from the point of view of workmanship, although in this case the stage coach would probably win. And the same could often be said of the earliest and latest wireless sets, for seldom does the modern enthusiast put the work into his outfit that his fathers in radio did. It simply isn't necessary.

Therefore, the modern experimenter, according to this, is deteriorating. His ability is fast becoming a thing of the past, and the time is gone when he can say proudly, "I made it myself." He says instead, if he is truthful (as one or two wireless fans are), "I assembled it myself." And he is just as proud and complacent about it as if he'd made everything himself, from the vacuum in his valve to the bakelite panel which supports it.

On the other hand, the set, when it is assembled, works several times as efficiently as some of the former ones (with the usual exception of those owned by a certain number, who, for the purposes of this narrative, shall remain anonymous), and is more prepossessing in appearance—as it should be, considering it was actually "made" by American or English experts. And that introduces the question: Are the added efficiency, the increased convenience, and the gain in the quality of the finished article worth the sacrifice of the truthful and accurate boast that "I made it myself"?

Already, I know, everyone has answered strongly in the affirmative. Not many would care to go back to the days when every part had to be made by hand; to the numerous soul-destroying jobs which made the end of the work a relief and not a regret. Many will say, too, that now it would be impossible to make most of the requirements of a valve set, when even a so-called "home-made" transformer is nearly always a part of the intestines of some decrepit Ford. And there is a lot of truth in this, although to some the word impossible—except, perhaps, in relation to valves and one or two other items—has no meaning; this was the spirit bred in the early days of wireless.

A BROADER FIELD.

And if that spirit doesn't exist any longer; if experimenters nowadays are reaching a condition of "cushiness" when they will scarcely be able to wind a loose-coupler, then broadcasting is to blame to a great extent. It is a fact, of course, that he who has tendencies this way is not worthy of the name of experimenter. But the fact remains that the modern amateur, with, once more, the exception of some old-timers, does lean that way; he wants to be pampered, and, with broadcast-listeners' materials handy, he is pampered.

Like everything else, however, this question has two sides to it, and, as it happens, in this case the other side happens to be the bigger. For the fact that now the experimenter can get his parts already made, and that he is freed from the petty annoyances of making terminals and contact-studs, has opened avenues of research and experimentation which otherwise would be closed. His hands are loosed, and he can set his face towards a broader field than circumstances have allowed him in the past.

And, if not yet, very soon the full benefit of the broadcast fans' huge call for goods will make itself felt amongst the amateurs. So let the experimenter, using a set whose parts were perhaps made for his neighbour, the broadcast-listener, before raising his voice and cursing the chap next door whom he nightly hears "receiving," remember that, after all, he has some-

thing for which to thank him. There are some who think that the experimental fan owes little to the other variety, and to some extent they are right, although the issue is nearly always exaggerated.

The dividing line, indeed, is gradually altering its position; and soon, it appears, the factions will consist of an alliance of broadcast-listeners and contented experimenters in opposition to the DX fiends. Eventually, however, even the long-distance men will be brought to a realisation that the casual experimenter who is trying to find something beyond a DX murmur, and the libelled broadcaster, play their part in the scheme of things that are wireless.

THIS BEATS DUBBO.

"Airlie," Balnarring,
Westernport, Victoria.

To Editor, "Wireless Weekly."

Dear Sir,—I have observed with much interest recent reports concerning crystal reception of broadcasting, but I think this beats all, don't you?

I am a 15-year-old experimenter, and my set is a home-made single slide crystal set. Am situated 40 miles air-line distance from Melbourne, three miles from the shore of Westernport Bay, which is easily found on a map of Victoria. My air-line distance from Sydney is about 500 miles.

I have received 3 A.R.'s programmes clearly and distinctly with good volume, day-time and night-time, ever since they started.

I also hear 3ZL, New System Telephones and 3 M.E. Amalgamated Wireless day-time and night-time. 3 M.E.'s announcer is rather "raspy," but their programmes are excellent, and they roar in.

I had been receiving another station for about a month, sending theatrical displays, splendid orchestral selections and vocal items, but had not identified it.

But on the night of Thursday, July 4th, between the hours of 8 and 9 p.m., I heard an announcer say, "This is 2 F.C. Farmers Broadcasting. Our next item is a soprano solo by Madam Mary Anne McDonald, entitled 'A Weary Heart.'" I heard another soprano solo, then a male quartette. (It was now after 9 p.m.) There were two more soprano solos, and then another song by Miss Thompson. The next item was a tenor solo, and then another item by Madam McDonald, "an old Scotch song," remarked the announcer.

The next item was a male quartette, "Comrades in Arms," by Mort's Dock Male Choir. The station closed down at 10 p.m.

On the following night I heard a baritone solo; then Mort's Dock Male Choir sang "Excelsior." Next a soprano solo by Miss Bryant; a male duet, baritone and tenor; solo, with the chorus whistled. The "Song of West" by Mr. —— (X's), a double quartette by the choir, a solo by Mr. J. Elliott, "A Picaninnies' Lullaby" by the choir, and then a soprano and tenor duet. Then the announcement, "This is 2 F.C. Farmer's Broadcasting; that concludes our programme for to-night. Good-night! Good-night!" National Anthem.

I wish to congratulate the announcer on his splendid radio voice, which was always audible. If any doubt arises I will forward names and addresses of witnesses, and I invite anybody to come and hear it for themselves.

My aerial is a twin-inverted L, each wire 65 ft. long (16 gauge copper wire), and both are spaced 6 ft. at each end. It is supported by two trees, each 50 ft. high. Lead in is 90 ft. long, taken from north end, and the earth connection is a sheet of galvanised iron buried 3 ft. in moist clayey soil.

I am using N.H.M. Galena in a home-made crystal detector.

Trusting you will find space for this.—I remain, yours truly,

D. N. FORBES.

NO MORE FIRES THIS WINTER.

630 Willoughby Road,
Willoughby, July 18, '24.

The Editor, "Wireless Weekly."

Dear Sir,—I have read in your valuable paper of a country experimenter receiving 2F.C. on a crystal. Well, I have a new one here. On Thursday night, July 17th, I lost my only crystal, which, needless to say, put me in a bad temper. But being an experimenter, and trying to prove worthy of the name, I started to look around for a substitute, and failed to find anything for quite a while, when I saw a box of coke waiting to be put into the fire. Selecting a small piece, I put it into my crystal cup. Imagine my surprise when a voice announced "2F.C. here." I also picked up 2B.L., and later in the evening got 2B.F. I tried several other pieces of coke, all with the same success. I don't know if this experiment is new to others, but it is new to me. Trust you will be able to let me know if I have discovered anything worth while. If, as I have just said, this idea is new, would you pass it on to others through the columns of your valuable journal? I have ordered a ton of coke, and the moral is, "Never tell your friends to eat coke, it may be useful."—Sincerely yours,

C. A. PIGGOTT,
Experimenter No. 4362.

SOME GOOD DX.

Box 38, G.P.O.,
Rockhampton, Qld.,
19th July, 1924.

The Editor, "Wireless Weekly,"
33 Regent Street, Sydney.

Dear Sir,—Herewith is my DX report since the 2/7/24. I have only been able to get down under 300 metres since then. Nearly all the stations (experimental) mentioned have confirmed my reports. The results up to the 9th were obtained on 5 valves (2HF, det., 2LF), but since then all others were obtained on 4 valves, one stage of radio being omitted.

2/7/24—1YA (N.Z. 2000 miles, 3 ft. from phones), 2BL, 4CK, 2GQ, 4NAI.
3/7/24—2BL in daylight 20 ft. from loud speaker, 2HF. (I closed down at 6.45 p.m.)
4th & 5th—Had no accumulator.
6/7/24—KGO (3 ft. from phones, using 4 valves, held for 10 mins.), 2CM, 2HM, 2CR, 2ZZ, 5WJ.
7/7/24—2BL. (I closed down at 7.45 p.m.)
8/7/24—2GR (phone 12 ft. from phones), 2BL, 2AY, 2GY, 2YG, 2GQ, 5LO, 2BK, 4GE, 2GQ, 2CR, 2ZK, 2HM, 5WJ, and 2HH. (Not too certain about the last.)
9/7/24—2BL on 1 valve in daylight 800 miles, KGO best on 4 valves, 2GR, 2HM. (Battery flat at 8 p.m.)
10th & 11th—No accumulator.
12/7/24—Maximum — 4 valves—2GQ, 3BM, 2LO, 2YI, 2BK, 2ZZ.
13/7/24—KGO, 2BL, 2GQ, 2YI, 2HM.
14/7/24—2BK, 2YI, 2HM.
15/7/24—2HF, 2BL, 2DS, 2ZZ, 2BK, 2GQ.

Continued on page 44

The Tuned Anode Unit of the Progressive Unit Panel Receiver.

(By "Insulator.")

This is the last unit I have to describe, and, like last week's, more than one can be made and added to the set. The particular purpose of this unit is to bring in the long distance signals. Actually this is accomplished in this fashion: The distant signal, when it arrives at your aerial, is generally very weak, worn out really, and lacking sufficient strength to actuate the detecting valve. What is wanted is something to boost the poor weak signal to give it sufficient strength to go along to the detecting valve and carry out its duty. So the Tuned Anode Unit is required to give it a spoonful of tonic, and the once weak signal gaily hops along to the detector and simply insists on being detected, as it is now strong enough to fight for its rights. After being detected it can be heard on the phones quite comfortably. But, again, should you desire to have a louder signal, the Note Magnifier is pressed into commission, which will enlarge the volume, and consequently a louder signal results.

Theoretically, the Tuned Anode Unit amplifies the signal at radio or high frequency (too high to be audible) the detector rectifies, whereas the Note Magnifier amplifies the already detected signal at audio frequency or at a frequency to which the telephones, and in turn the human ear, can respond.

There are two well-known methods of radio frequency amplification. One is accomplished by the use of radio frequency transformers, and the other is brought about by tuning the plate of the valve. This latter method is the one I prefer, hence I am recommending it here.

For this unit obtain the following materials:—

1—Piece of Bakelite, 9 in. x 8 in.
1—Marco 600 ohms Potentiometer.
1—Marco 6 ohms Rheostat.
1—77a23 Condenser.
1—Panel Mounting Coil Plug (United).
1—Set Ericsson Fuse Clips.
11—Bakelite Top Terminals.
1—3 in. Dial.

The construction is not going to present any great difficulties. Figure 9 will assist you in marking out and drilling your panel. You will note I have not included any distances for terminals, as I am sure you are all quite familiar with these now. Once again let me remind you of a centre punch for marking out, and let me advise caution when drilling the holes for the coil plug. Perhaps you had better take the measurements of your own plug before drilling, as a variation may take place in the manufacture. My own is as marked, 9/16ths apart.

After all holes are drilled, polish with good old Brasso and assemble your components. Fix your valve clips first; next, your rheostat, noting that the rheostat terminals don't short the bottom filament clip. Now attach your potentiometer. Say, how do you like this potentiometer? Splendid job, isn't it? Will take a lot of beating. Don't you think so? Good! I thought you would say that! Now add your coil plug and then your condenser. Finally, assemble your terminals. Quite easy, thanks to single hole fixing.

Now turn the panel round, and it should resemble Figure 10, minus the wiring, of course. Well, by following out Figure 10 you will soon have completed the wiring. I don't think I have ever told you how to get the connecting wire nice and straight. I myself unwind, say, 12 feet of the 16-gauge tinned copper wire and twist the end round a door knob. Holding the reel in my hand, I pull it tightly; pull it until I feel it give. Then it is quite straight. I then cut off the necessary lengths required for wiring. And, say, do you know I don't like the right-angled bends which are invariably seen in sets. I prefer to bend my wire in a nice curve, an effect I obtain by curling the wire around a

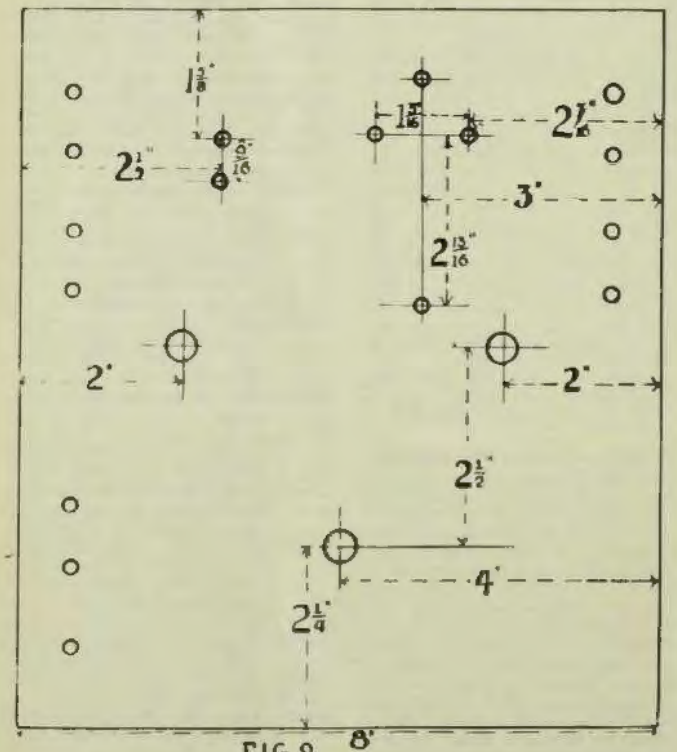


FIG 9

READ PARTICULARS OF THE NEW FROST LINES ON PAGES 4 & 5.

small empty cotton reel. It looks much better; and, personally, I think it will yield greater efficiency. Of course, that is a matter of opinion. Oh! don't be worried by the terminal to which no wire is connected. That is placed there to balance up the appearance. It may be left out, if desired.

Everything O.K.? Right! The valve again is a V24, as can be seen, and is certainly ideal for radio frequency amplification on account of the distances between the legs. Some people may think I am quite mad in recommending such expensive valves. I am not, because I don't think it is possible to better these valves for the purpose in which I have chosen them. It may be information to some when I say that almost all British ships employ either V24 or QX valves entirely (Isn't that right, Brasso?), and there is no question of that good results are obtained. Again, I have been asked why I have placed the valves in front of the panel. Well, I think the reason is obvious, and, apart from that, I don't see any reason why a valve should not be placed in front of the panel. To me it looks good.

However, insert the valve and the coil. This coil should be of the same value as the secondary coil employed. And, oh, say! I have discovered a splendid honeycomb coil at a very reasonable price. I think it is known as the Stokes coil, and I obtained it from E. R. Cullen. (I want to win his Slogan Competition.) I have compared them with several other makes, and I must say they give wonderful results, comparable even to the Atlas, and certainly superior to many another brand which is sold. To those who haven't purchased coils my advice is to ask and insist on the Stokes. I am sure you will not regret it.

Well, back to our set. This Tuned Anode Unit is inserted between the Tuning Unit and the Detector Unit, and linked across. No difficulty should be experienced in linking, but, lest someone doesn't quite understand, I have shown it in the last figure. Connect everything up as shown, attach aerial and earth and coils, valves, etc., and listen-in. Bear in mind that now you are using Tuned Anode it will be necessary to reverse the Tickler Coil in the Tuning Panel. This little wrinkle will save you quite considerable trouble. However, are you listening-in? Righto! Tune your secondary by using condenser E. Got something? Yes! Well, turn to D, next F, and then G. Bring your tickler closer retune. Ah! That alright? Play about with your dial a little more; watch your filaments, don't have them too bright; and look to your grid leak. In a little while you will be

(Continued on Page 21.)

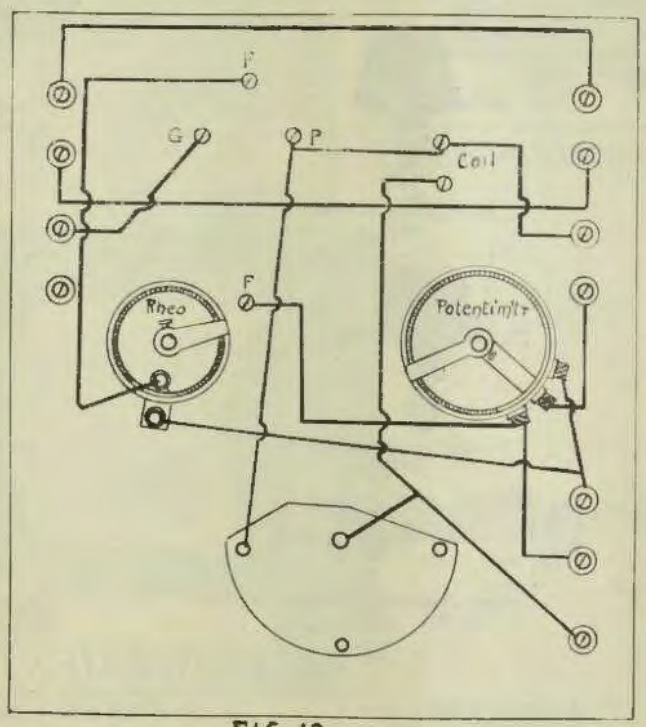
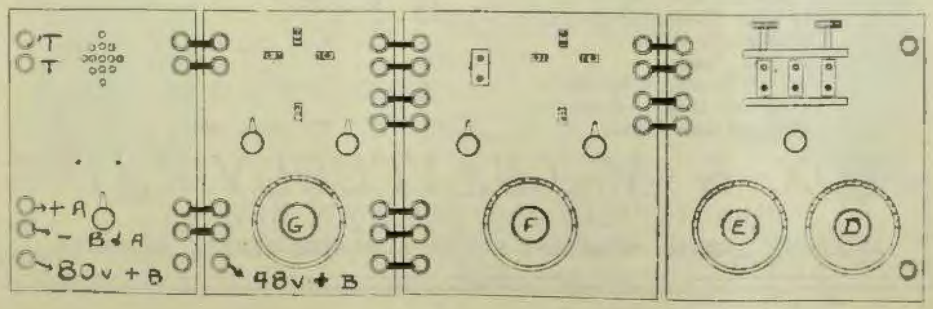


FIG 10



PARTICULARS OF FROST LINES ON PAGE 4 AND 5

Framingham Potentiometer.

DeVeau Gold Seal Radio Head Set Cat. No. 843.

Framingham Inductance Switch.

Framingham Vernier Rheostats.

Framingham Series Parallel Switch.

DeVeau Two-Circuit Radio Jack Cat. No. 25.

Framingham "All Tube" Universal Rheostats.

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SUPER-HETRODYNE.

By F. Basil Cooke, F.R.A.S.

Before commencing a discussion on the Super-Hetrodyne, it would be advisable to consider what exactly is meant by the term Hetrodyne. An analogy commonly experienced is to be found with musical instruments. Take two violin strings not quite in tune, but nearly so, and set both in vibration. The result is a series of rhythmic loud and silent periods, usually called beats. The number of beats occurring per second is determined by the difference between the number of vibrations per second of each violin string. In other words, if one string vibrates at the rate of 250 per second (middle C) and the other at 255, then there will be 5 beats per second when both strings are vibrating together.

In wireless the number of vibrations per second is determined by dividing the velocity (186,000 miles per second) by the wavelength. Mathematically this is expressed by the equation—

$$v = \lambda \cdot n,$$

where v is the velocity,
λ the wavelength,
n the number of vibrations per second.

This is called the frequency, and for a 300 meter wavelength is just one million.

If, now, two stations are transmitting together and their frequencies (or wavelengths) are only slightly different to each other, then the receiver will hear a note the pitch of which is determined by the beat frequency. In this case one station is said to be hetrodyning the other.

A very practical example of this is nightly experienced when listening-in. With several hundred amateurs all listening round about the same wavelength, and many of these fans having receiving sets which are actually very low-power transmitting stations, it happens that every now and then two of these sets oscillate at very nearly the same wavelength, with the result that the listener-in hears what is commonly called a howling or whistling. As one of the culprits moves his condenser, thereby altering his wavelength, it alters the beat frequency with whomever he was hetrodyning, and the very familiar "chirp" is heard.

This phenomenon is taken advantage of in receiving continuous wave telegraphy. The transmitting station sends out on a certain wavelength, say, 300 meters, meaning that the frequency of electrical impulses at the receiving station is one million per second. Of course, no telephone receiver is capable of detecting such a tremendous frequency, so another local low-power transmitter is put in operation at a frequency of, say, 1,000,500 per second. The result is that there are 500 beats per second produced, which, when detected, gives a nice, clear, musical note in the phones (one octave above middle C). In this case the local station is the hetrodyne.

Since the advent of the valve, circuits have been devised whereby the one valve acts as the hetrodyne as well as the detector. When this occurs the set is said to be oscillating, and unless special precautions are taken the set in this condition might become a source of annoyance to nearby receivers in that the hetrodyne is re-radiating some of its aerial, so becoming a low-power transmitting station.

In the super-hetrodyne receiver advantage is taken of this hetrodyne action in such a manner that before amplifying the incoming signals at radio frequency, the incoming wave, after one stage of amplification, is hetrodyned to a frequency (beat) corresponding with some pre-determined wavelength, usually 3000 meters, after which it is further amplified at the new radio frequency, then detected; after which it is amplified at audio frequency.

This action is accomplished by using a valve as a separate hetrodyne as the

F. Basil Cooke F.R.A.S. Director of Radio Services, David Jones Ltd.

READ PARTICULARS OF THE NEW FROST LINES ON PAGES 4 & 5.

second valve, and the new frequency passes along for further amplification until finally it is detected at 3000 meters instead of, as originally, in the aerial as 300 meters.

The advocates for this circuit claim that it is extremely difficult to amplify at radio frequency more than with one, or at the most two, stages on low wavelength, but, by changing the wavelength, amplification becomes much easier.

The reason that it is difficult to amplify at low wavelength is, that due to the capacity of the valve the extremely high frequency of the low wavelength sets up harmful oscillations, which prevent clear reception, and the only way of preventing this, other than with the Super-Hetrodyne, is to damp down these oscillations by neutralising the capacity effects, as in the case of the Neutrodyne, or by adding resistance to the circuit. With respect to the Neutrodyne effect, we will discuss this in a later paper.

CONCLUSIONS.

From the above, then, we see that the Super-Hetrodyne has been designed with the object of being able to amplify at radio frequency low wavelengths by changing the wavelength to a higher order, thereby minimising the evil effects of the tube capacity. In order to do this, two perfectly good valves at 35/- each, together with a lot of attendant expensive apparatus, is serving no useful purpose whatever with respect to actual amplification.

Further, the Super-Hetrodyne has no cause for existence except for low wave reception. Again, this circuit, although very stable when once made correctly and understood, is extremely difficult to adjust, so adding enormously to its cost. Special precautions must be taken to ensure proper shielding, even to the extent of wrapping metal foil round the phone cords and earthing same.

For broadcasting reception, the set when eventually made is not one whit better than a good Standard Tuned Anode circuit. Especially is this true for 2F.C. (Farmers' Broadcasting Station), as this station is using a wavelength of 1100 meters, where the Super-Hetrodyne ceases to possess any special virtue.

Summing up, then, the Super-Hetrodyne possesses no special advantage for broadcasting; it is extremely difficult to make, and even more so to adjust. It is very critical and very costly, employing two more tubes than would otherwise be required for the same work; consequently current consumption is increased.

Very few experimenters in Australia could get the most out of this set, and those few, although spending many interesting hours of high-grade work and possibly receiving very long distances, could very possibly have done just as good work with other less costly circuits.

The Super, then, is really only efficiently useful for very few, and is not a suitable circuit for broadcasting reception.

Western Australian Notes.

From our Special Correspondent

AN interesting half hour is provided by the Westralian Farmer's broadcasting station, 6WF, every Friday night Any experimenter may come along to the station and read some matter of interest to the wireless amateurs in general. Recently experimenters had the pleasure of hearing Mr. B. Holt, President of the Committee of Affiliated Radio Societies of W. A., discourse on topical matters. It is safe to say that his audience numbered several thousands.

A matter which is engaging the conversation of many in W.A. at the present time is the proposal of a certain section in the Eastern States to form one broadcasting company which is intended to control all other institutions in the divers States. 6WF strongly disapproves of such a scheme after having expended so much capital, and intends to fight its hardest in preventing the absorption of their company by any Eastern concern.

Our single transmitting amateur, who has for the past two years been carrying on transmission from his station, 6BN, on Wednesday nights, will henceforth be confining his operations to Sunday evenings, beginning at 7.30. Mr. Stevens has a splendid announcing voce, and although his transmissions, as stated before, are on 1 watt, they contain excellent volume.

The Westralian Farmer's broadcasting department received a humorous request from a gentleman recently. It took the form of a letter asking the announcer to broadcast as soon as possible a message to his wife in the country to the effect that he would not be home on such and such a night. The announcer did not broadcast the message.

In the course of a lecture by a Mr. G. W. Wickens, "Seasonable Work in the Orchard", broadcasted from 6WF recently, a telephone message was received at the station. The caller stated that he was receiving the transmissions perfectly. This was at Merridden, about 200 miles distant from Perth. At the conclusion of the lecture Mr. Wickens broadcasted his thanks to the subscriber at Merridden.

Since the last notes appeared some creditable "DX" work has been done by a W.A. amateur. Mr. S. Chambers, of 7 Joseph St., Leederville. He has for some considerable time been receiving Sydney. Farmers Ltd. 2FC with considerable strength too, the music being easily audible behind the transmissions of our own broadcasting station. His set incorporates three valves arranged as a straight out detector, H.F. and L.F. He informs us that the music is readable on even 2 valves. This set has provision for plugging in an extra H.F. and an extra L.F. but he prefers to accomplish long range reception on as few valves as possible.

"It may be of interest to readers to learn that the announcer at 6WF, is Mr. Benjamin Wells, grandson of the famous Benjamin Wells, flautist, who received Royal commands and appeared before the late King Edward VII. This announcer has an exceedingly well modulated voice and "comes-over" splendidly.

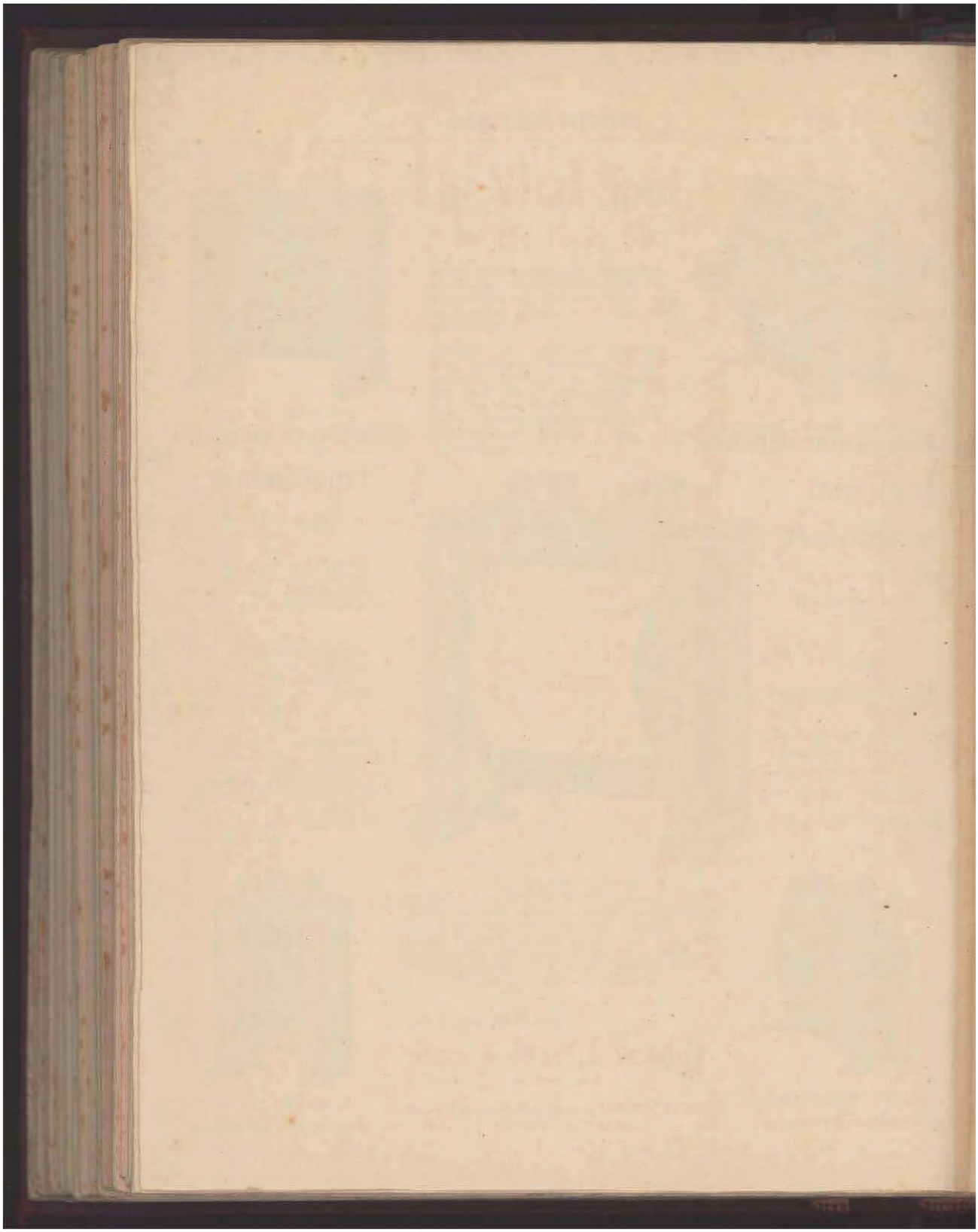
(Continued from Page 17.)

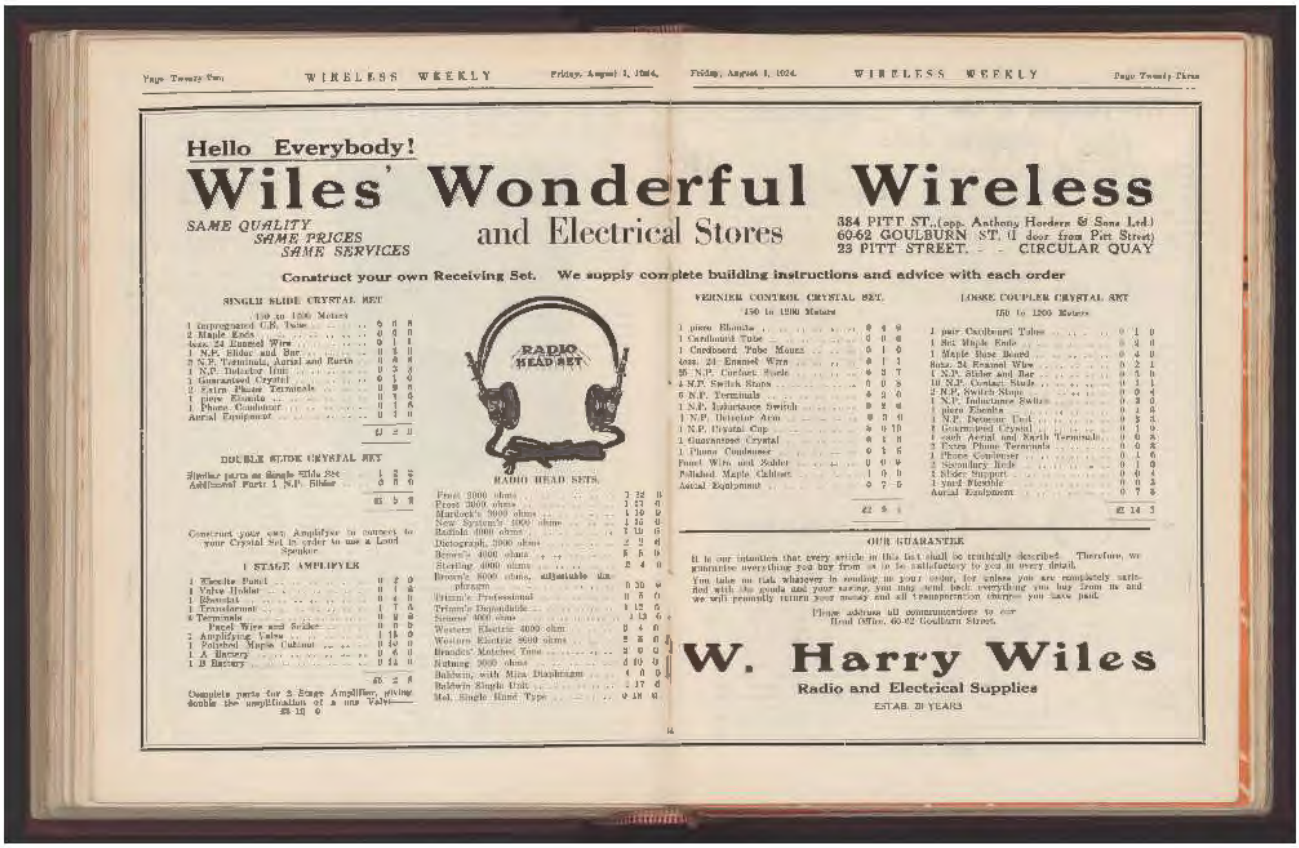
quite familiar with your set, and you will be able to work wonders. A loud speaker will go well. While I am writing a loud speaker is barking out sound. It is a Grodan horn and a Radiocceive Unit, which gives me sufficient volume for all the household.

Anyhow, I am sure you are sick of me and this receiver, so with some coil values I will close down. Use the following:—

	Prim.	Sec.	Tickler.	Anode.
Amateurs	25	35	50	35
2B.I..	35	50	50	50
Commercial	50	75	75	75
2F.C.	100	200	150	200

SEE THE FROST LINES ON PAGE 4 AND 5.





The Relation of the "C" Battery to the Amplifier Tube.

Newcomers in the field of wireless are frequently guided in their choice of apparatus by results which they observe on other people's receivers. The average amateur who builds his own set and uses a stage or more of amplification is for a time troubled with the question of tuning, and this takes a little while to overcome. A little touch of the condenser or the coil-holder, and a medley of squawks and howls is heard, or the music becomes distorted. First impressions are everything to the newcomer, and reception marred by the harsh factors of distortion tends to drive him away, rather than attract him to wireless.

This article, therefore, is designed to show why the use of a "C" battery will eliminate distortion in the vacuum tube as an amplifier, and just how it affects the tube.

Distortion is seldom present in a one-stage amplifier, but with two or more stages of radio-frequency amplification it is only too noticeable. Why is that so?

Figure 1 shows the layout of a two-stage amplifier. Look it over. What point or points could distortion occur in? If you are familiar with the functioning of this apparatus you would answer that the probable parts are the transformers and the bulbs. Quite true. If a transformer, to take the instruments in their order of sequence, is improperly designed distortion will certainly manifest itself therein. But in this age we have transformers that will operate efficiently over a given band of frequencies. Those instruments being eliminated, we have only the tubes to suspect.

To understand how distortion occurs in the vacuum tube, as an amplifier, a brief resume of the characteristics of the vacuum tube had best be dealt with.

To start at the beginning, a vacuum tube is composed of three elements: a filament, a plate, and a grid, supported in a vacuum container. When the filament is made incandescent by means of the "A" battery, electrons (the smallest indivisible particles of matter known to science) will be emitted by it. If the plate of the tube is given a positive charge with the "B" battery, these tiny electrons will be attracted to it in very large numbers. When the positive charge is increased, the number of electrons flowing from the filament to the plate will increase. If the charge is further increased, still more electrons will speed to the plate. But there is a point where any further increase of positive potential will not result in augmented electronic flow. This state is known as the *saturation point*. Around it are built the reasons for distortion in the vacuum tube as an amplifier.

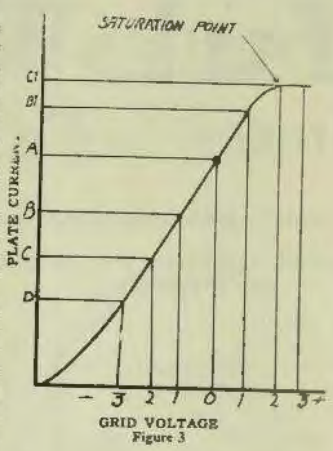


Figure 3

Over this electronic flow the positive current impressed on the plate by the "B" battery will pass. When the plate voltage and the filament current are maintained constant, a definite number of electrons will pass and a fixed number of milliamperes will flow in the plate circuit.

Now for the grid element. This may be regarded as the key to the action of the tube. When a negative charge is placed upon the grid, the electron current is susceptible to more or less obstruction, depending on the grid voltage. And, when the grid carries this charge into the electronic region, the plate current is varied, because it depends on the electron flow for its progress to the filament. When the charge on the grid is positive, the result is just the opposite. Therefore, the electrical presssure on the grid regulates the passage of current in the plate circuit. Consequently, the current in the plate circuit, supplied by the "B" battery, is a dupli-

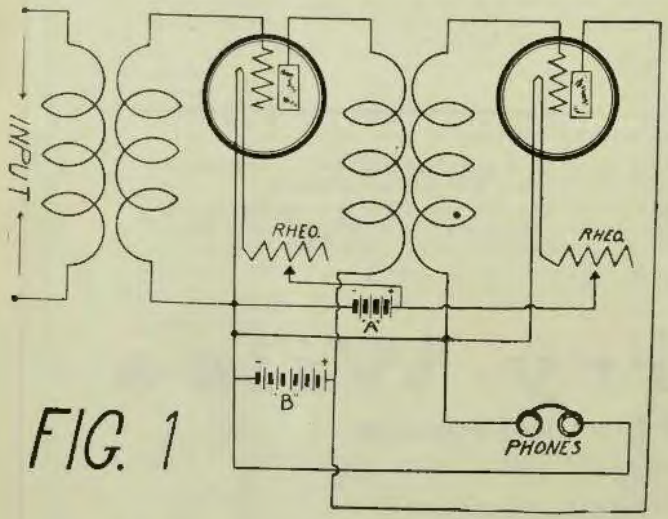


FIG. 1

HAVE YOU READ PARTICULARS OF FROST LINES ON PAGE 4 AND 5?

cate in greatly increased amplitude of the current impressed on the grid. The pressure on the grid is that of the incoming radio signal. That is how it is "amplified." The current that actuates the diaphragms of your receiver really doesn't come from Pittsburg or Schenectady (or anywhere else) at all. It comes from your "B" battery. But the flow of the "B" battery is regulated (by means of the grid) by the incoming signal.

Consider the diagram at Figure 2. The point "O" on the heavy, lower horizontal line, represents a pressure of nothing on the grid. Trace this line upwards till it meets the dot on the curve, thence left to the point "A" on the heavy vertical line marked Plate Current. "A" represents a certain value of current flowing in the plate circuit. Now follow the line "1" positive—to the right of "O"—on the grid voltage bottom line, upwards, then left to the point "B1" on the plate current line. It will be noted that an *increase* of current has resulted in the plate circuit, occasioned by a change of the grid voltage. The line "1" negative, when traced upwards to the curve and across to the plate current line "B," shows a corresponding *decrease* of current flow in the plate circuit. The grid voltage points "2" positive and "2" negative show the increase and decrease of the plate circuit current in the *same proportion*, but in greater amplitude. Therefore, the *plate current is uniform*. This curve (Fig. 2) serves to illustrate the plate current in respect to the grid voltage in the first amplifier. It will be seen that it is working properly; the grid voltage is reproduced in the plate circuit without distortion.

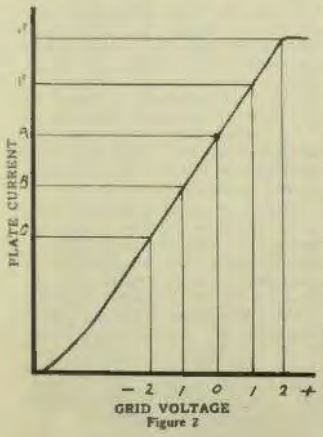


Figure 2

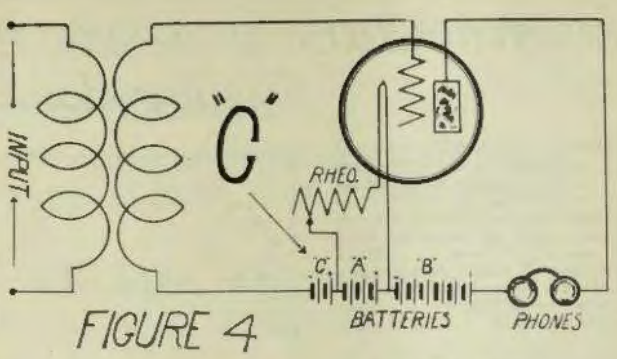


FIGURE 4

Now glance at Figure 3 with the explanation about the saturation point in mind. Again, as in Figure 2, the point "O" on the grid voltage results in a definite current flow in the plate circuit. The points "1" and "2" positive, and "1" and "2" negative, have the same plate current increase and decrease significance. But, in this case, we have a higher amplitude point impressed upon the grid, because the input is amplified by the first tube. At the negative side of the "zero-line" on the grid voltage we have the point "13." This is reproduced faithfully in the plate current at the "D." But what about the positive increase? Look at the diagram. Because the saturation point is reached at the grid voltage positive point "2" no more electrons are attracted to the plate, therefore no more current can flow in the plate circuit.

What is the result? It is simply a lop-sided plate current, as it were. Its amplitude is greater with the negative impression "3" than it is with the positive impression "3."

Now, what we must do, of course, is even up these positive and negative amplitudes, so they will give an even current in our phones or loud speakers. It is obvious that the plate current must be lowered. This can be done with an outside resource. The most economical source is the "C" battery. Its purpose is to simply lower the rate of electronic flow so that the plate current passing over it will be uniform at all times.

This transformation converts the plate current to the well-regulated state illustrated in Figure 2.

Figure 4 shows the relation of the "C" battery to the other parts of the second stage audio-frequency amplifier. It should not be used if no distortion of signals is experienced. If utilised, the "C" battery greatly conserves the life of the "B" batteries and will pay for itself in that way. High "C" voltage should not be used with U.V. 199 and C. 299 tubes. The following gives directions for the "C" battery voltage to be employed:—

"C" Batt'y Voltage.	"B" Batt'y Voltage.
.25 to .05	22.5
.05 to .09	45.
1. to 2.5	60.
3.0 to 4.5	90.
4.5 to 8.	110.

QUESTIONS AND ANSWERS.

A.R.B. (Croydon): Practically any two-valve set may be added to with further valves, and there would be no necessity to scrap any part of it. Can we help you out with the circuit?

Experimenter (Bondi): We recommend the U.V.199. The Freshman is a good variable leak. Yes, you may obtain copies of the valve pamphlet from Amalgamated Wireless (A/sia) Ltd., 97 Clarence Street, Sydney.

PROOF POSITIVE.

"Is your wife a good cook?"

"You bet! She's the best little can-opener in America!"—Atlanta Constitution.

Cop—"You're pinched for speeding."

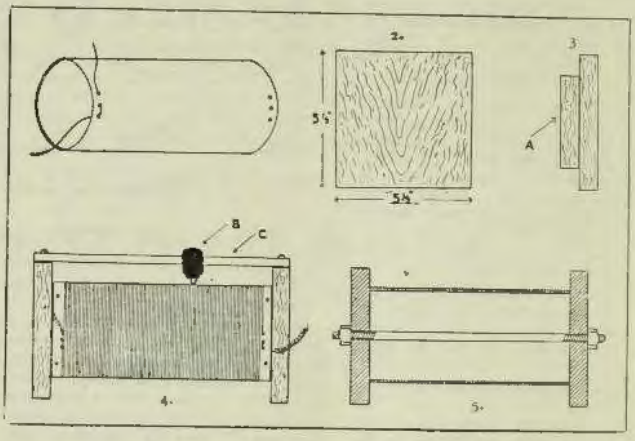
Copped—"What's the big idea? Doesn't that sign say 'Fine for speeding'?"—Sun Dial.

FROST LINES ARE FEATURED ON PAGE 4 AND 5.

CONSTRUCTION OF A SINGLE SLIDE TUNER.

THERE is a tendency amongst beginners to hurry through a job, paying more attention to "getting it over" than anything else, but this is a great mistake which is inevitably realised sooner or later. "Make haste slowly" should be the radio mechanic's slogan, the usual alternative being "Take it to pieces and do it again."

The cylindrical or solenoid inductance is undoubtedly the most popular type amongst beginners. The construction presents very few difficulties, it is very efficient, and even in its most simple form can be made continuously variable. An example of this is shown in Fig. 4, where B. represents the slider with spring plunger, and C. the rod. It will be obvious that if one end of the coil is connected to the aerial, and the slider, or one end of the rod to earth, then only the amount of winding between the end of coil and slider is actually in use. Thus by moving the slider in either direction the inductance can be varied to any desired amount and "tuned in" to the wave-length required. The "former" on which the wire is wound is usually a cardboard cylinder

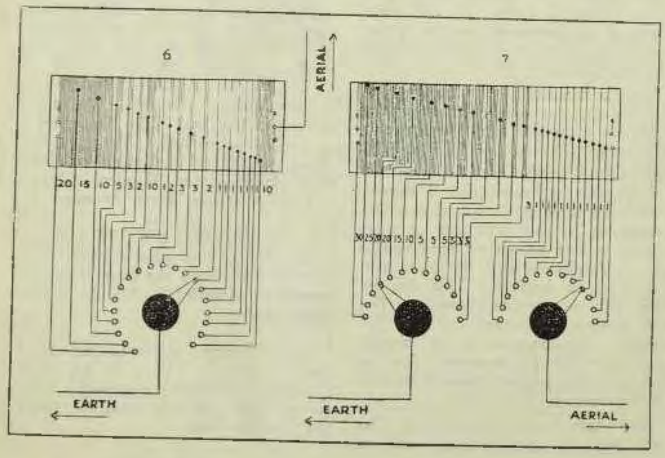


12 in. long and 3½ in. or 4 in. in diameter, previously dried in the oven and given at least 4 coats of shellac varnish inside and out. Each coat should be allowed to dry out thoroughly before applying the next. Ebonite is always preferable, but the cardboard cylinder properly prepared makes an excellent substitute.

Pierce three holes in each end of the cylinder about half an inch from the extreme edge and "anchor" the wire as shown in Fig. 1. leaving a free end of about 12 in. for connecting up purposes. The wire, which is enamelled may be of any suitable guage, No. 22 being the size most generally used for the slide inductance. Apply more shellac to the former then while this is still "tacky," commence the winding. A single layer of wire wound on evenly is all that is required. Finish off the wire in the same manner as it was started, apply a light coat of shellac varnish over the whole winding and put the now completed coil aside to dry.

From a piece of good dry wood about ½ in. in thickness, cut out two squares as shown in Fig. 2. finish them off smoothly with glass-paper and apply two or three coats of shellac varnish. Cut out two wooden discs of same thickness, see that they fit tightly in the ends of the coil and secure them firmly to one side of each of the squares in the position indicated in Fig. 3, where "A" represents the disc.

(Continued on Page 30.)



South Australian Notes.

(From Our Special Correspondent.)

So far as wireless is concerned, South Australia is at a great disadvantage, both for the dealer and the listener-in, they having to practically depend on the experimenter for introducing wireless to the public and providing the entertainments. Several attempts at broadcasting have been made, but they have been failures.

The South Australian experimenters have been equal to the task, however, and the amount of radio gear sold by the various dealers is no doubt due to their splendid performances. They are equal to any experimenters the world over, as can be seen by the meritorious records created by them in both transmission and reception.

Foremost amongst these are Mr. L. C. Jones, 5BQ, whose fine radiophone concerts on Sunday evenings have been enjoyed in every State of the Commonwealth and in New Zealand.

Mr. F. L. Williamson, 5AH, whose CW signals have been received in U.S.A., and Mr. Ray Snoswell, 5AG, who has quite a number of fine DX records, including his recent successful transmission to Perth, W.A.

In times past Mr. Harry Kauper, 5BG, and Mr. W. J. Bland, 5AG, have put up some fine performances in both transmission and reception.

S.A. experimenters living west of the Mount Lofty ranges are badly handicapped, as those on the eastern side can get signals through from the Eastern State transmitters exceedingly strongly on a single valve set, while those on the western side need to use amplification for the same signals, although 2FC and 2BL come in well on one valve, as also do quite a number of the interstate transmitters.

One S.A. experimenter, Mr. J. Williams, of King's Park, states that 2FC is just audible on his crystal set, but with the addition of a 2-stage LF amplifier the speech and music are quite clear.

A NEW CIRCUIT.

What with Neutrodynes, Ultradynes, Monodynes, and a host of other dynes, experimenters just entering the radio field are likely to become somewhat mixed.

At least one S.A. beginner has informed me that he is going to try the Super-Iodine circuit. Before taking up wireless he was an amateur quack, so perhaps he intends to combine wireless with surgery.

THE MARCONI BALL.

A Marconi Ball in aid of the Children's Hospital appeal was held in the Liberal Club Hall on Wednesday evening.

The hall presented a gay appearance, being tastefully decorated with palms, orange trees and olive branches. Balloons and flags in the Italian colors completed the decorations, and Italian costumes were worn by those taking part.

Hundreds of imitation oranges filled with confetti were tied on to the trees, and caused great excitement in the battle of fruit at the conclusion of the supper, which was served in the Piccadilly Cafe downstairs.

A wireless receiving set was installed in the hall, and musical items were transmitted from the studio of the South Australian Radio Co. Special items were rendered by the whistling violiniste, Miss Elsa Lewis, and Mr. Jack Fewster's orchestra played the latest dance music.

Showers of confetti were blown all over the hall like a snowstorm by a powerful electric blower.

The committee responsible for the arrangements were Misses S. MacMillan, L. Larsson, R. Blewett, H. Howard, F. Creasy, K. Martin, H. Olsen, and Messrs. H. Walsh, O. Ziegler, W. Runge, L. Frayne, M. Skinner, C. Bowman, R. Leak, H. Martin, V. Treloar, F. Doolette, and the joint secretaries, Miss Phyllis Everett and Mr. W. B. Morrison.

TO BEGINNERS IN WIRELESS.

HALF the fascination of Wireless lies in the making of your own set at home. The problem of what to make and HOW to make it is often a difficult one. Here are a few back numbers containing articles which will interest you. As we have only a limited number of each one, it is advisable to get in early.

Single copies, 4d.; Two copies, 9d.; Three copies, 10d.; Four copies, 1/-; Five copies, 1/3; Six copies, 1/6, post free. Just drop a line to "Wireless Weekly," 33/37 Regent Street, Sydney, enclosing stamps, and we will mail them immediately to your address.

"The S.T. 100 Receiver," by W. L. Hamilton ("Wireless Weekly," March 7th), showing all the details for the construction and operation of the famous ST 100 2-valve receiver. This set is acknowledged to be one of the most efficient for Broadcast reception. It is easily built, and reproduces music and speech with wonderful volume and clarity. The construction of this receiver, including cost of all parts, will not involve an expenditure of more than £15.

"A Highly Efficient Loose Coupler," by "Insulator" ("Wireless Weekly," March 21st). This article shows step by step the building of a loose coupler that will give splendid results on Broadcasting and Spark Signals. The method of winding the primary and secondary, number of turns, how to make tappings, etc., is very clearly shown. The construction of this loose coupler will not cost more than 35/-.

"Crystal Detector Unit," by "Insulator" ("Wireless Weekly," March 28th), illustrating clearly the construction of a home-made crystal detector (costing about 5/-) to use in conjunction with the loose coupler described above.

"A Valve Panel," by "Insulator" (Wireless Weekly," April 11th), showing how to make an efficient one-valve receiver. Clearly illustrated and easy to follow.

"A Crystal Set for 5/-," by "Insulator" (Wireless Weekly," April 17th). This article explains the construction of a crystal set for Broadcast reception, at a total cost of 5/-.

"Honeycomb Coils," by "Insulator" (Wireless Weekly," April 25th). A splendid description of the winding of home-made Honeycomb Coils. Every detail clearly explained. The article contains a table showing the number of turns required for primary, secondary and tickler coils for all wavelengths from 120 to 25,000 metres.

READ PARTICULARS OF THE NEW FROST LINES ON PAGES 4 & 5.

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(Continued from Page 26)

The two coil supports are now complete, and the coil may now be mounted to the discs by means of small screws. Fig. 4, shows the mounted coil complete with slider and rod. The left side of the winding, which is a "dead end" should be attached to the support with a screw and the other end on the right connected to the aerial terminal. Along the line where the slider plunger makes contact with the winding the enamel insulation must be scraped away.

An alternative method of mounting the coil is shown in the sectional diagram Fig. 5. The two wooden discs are dispensed with, and through the centre of each square support a hole is drilled to take a length of threaded brass rod. The ends are then clamped to the coil by means of two nuts secured to the protruding ends of the rod.

A simple tapped inductance for the short wave receiver is shown in Fig. 6. Here the sliding contact is dispensed with and the tappings taken off the winding to a multiple switch. This method ensures a more efficient electrical contact, and is perhaps easier to manipulate than the slider, but where it is possible to "tune in" to a single turn of wire anywhere along the coil wtih the slider, this will not be possible with tappings unless of course a tapping is taken off at every single turn, in which case the arrangement of the contact studs would present an insurmountable difficulty. For every tapping one contact stud will be required, and a switch arm of 1½in. radius will usually take about twenty contact studs. We will asume that the ebonite panel has been marked off, drilled and fitted with the switch arm and twenty contact studs, and that the cabinet is large enough to accommodate the coil. Obtain a cardboard cylinder 3in. or 3½ in. in diameter, and about 6 in. long and prepare it as explained above. The tappings commencing from the left of coil (Fig. 6.) are arranged as follows:—

The end of the winding is counted as one tapping. Wind on 20 turns of wire (No. 22 or 24) and preferably double cotton covered, and take off the first tapping. The wire is held firmly against the tube with one hand while a loop about 1in. long is twisted with the other. See that the loop stands out at right angles with the tube, and that it shows no signs of untwisting. Proceed as before, and when another 15 turns have been wound on, take off the second tapping. The tapping should not run in a straight line along the coil, but should be staggered' as shown, each one being slightly out of line with the other.

The remainder of the tappings are arranged as shown in the diagram. The number of turns between the last tapping and the end of winding on the right will be best determined by carefully noting the number of turns employed on a single slide inductance of the same diameter when say 2BL is accurately tuned in.

This station will transmit on low wave lengths; we will assume that the aerial is permanently fixed and that when signals are loudest the slider plunger is resting on the fifteenth turn from the end of the coil. To eliminate risks reckon the fifteenth as ten and allow ten turns between the last tapping and the aerial terminal.

The insulation is now carefully removed from the loops and a length of fairly stiff copper wire soldered to each. Insulating sleeving is now placed on these connecting wires and the end attached to the contact studs. An alternative method of connecting is to make the loops long enough to reach the contact studs and employ a larger size sleeving to cover double wire. Another method of arranging the tappings is shown in Fig. 7, where two multiple point switches are employed, the one on the let for coarse tuning, and the other on the right for fine tuning. In this case both ends of the winding are connected to contact studs. It will be seen that a much finer tuning can be obtained by this arrangement.

THE B. B. C.

2LO COSTS £12,000 ANNUALLY

THAT all things considered, the quality of Australian broadcasting is superior to that of the B.B.C.; is the opinion of Mr. F. C. McDonald, late of the B.B.C. station 2LO, London. Mr. McDonald, who has an intimate and first hand knowledge of wireless activities in Great Britain, has just arrived from London to take up permanent residence in Australia.

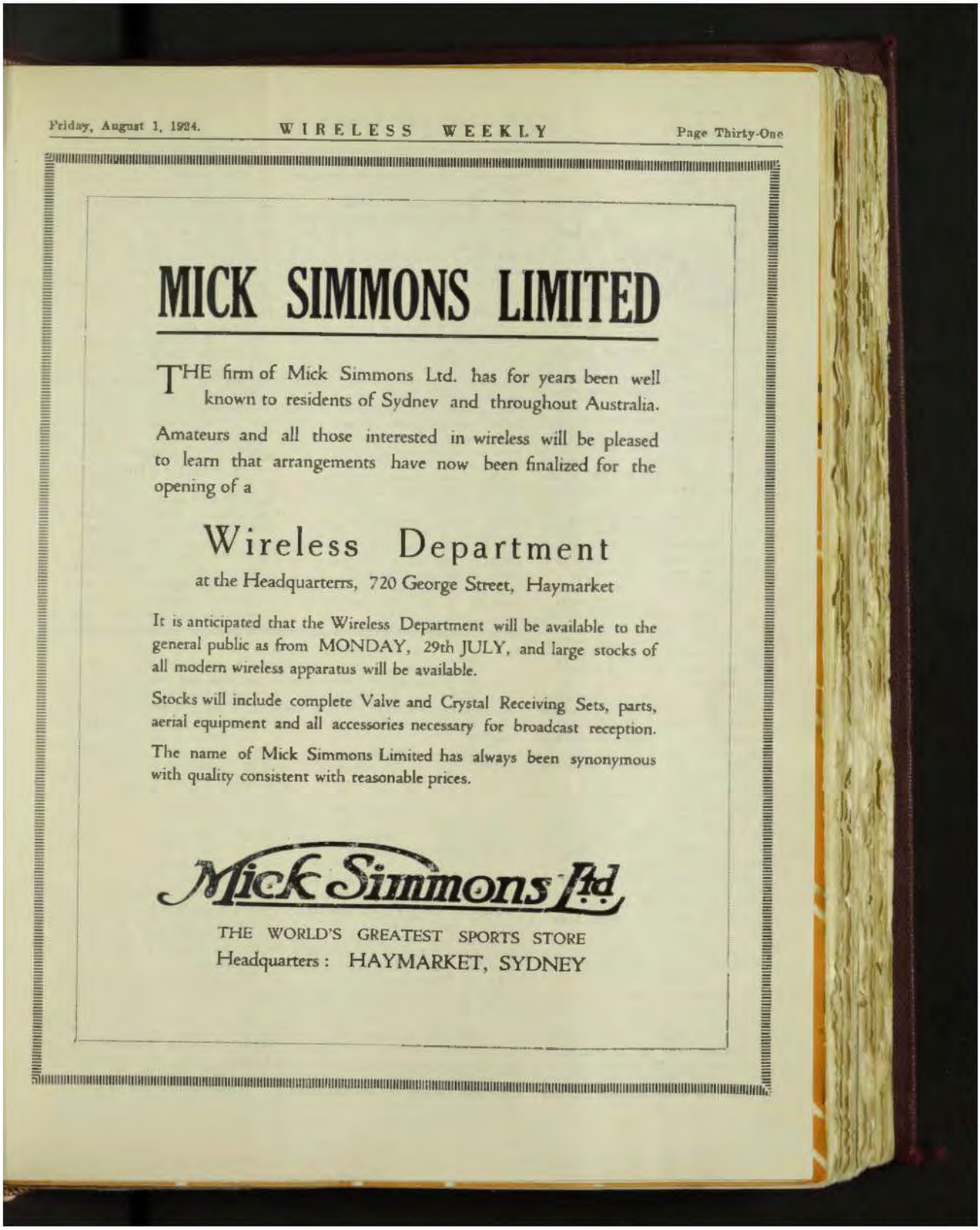
Some interesting details of the operation of 2LO, were given us by Mr. McDonald, and among them was the fact that the yearly cost of the upkeep of this station, including all payments to artists, is in the near vicinity of £12,000 The permanent staff comprises the station manager, announcer, operator, assistant operator, electrician, orchestra, restaurant staff, studio caretaker, and doorkeeper. All the above are paid.

According to Mr. McDonald, the programme that is to be put over during the evening session is carefully rehearsed in the afternoon, and in order not to put the performers to expense and so that they may not be late, they are given dinner at the restaurant, adjacent to the studio. In the palm court they sit and chat until their particular turn comes.

Up to the end of 1922, all artists broadcasted by 2 LO gave their services entirely free, but this was put an end to by the Theatrical Employees' Association which prohibited members from singing, etc., unless they were paid. Local unpaid talent was then made use of, but with very unsatisfactory results. Arrangements were then completed between the B.B.C. and several theatres for broadcasting of theatrical entertainments, at the same time, the B.B.C. announced that all artists broadcasting from the studio would be paid.

The fees, however, are not such as to awaken avaricious desires in the breasts of ambitious entertainers, and in the case of bands, for instance, Mr. McDonald states that the payment per head for an evening's performance works out at something like 5/-. The highest fee paid by 2LO is to the Lavana Jazz Band, which is broadcasted occasionally from the Savoy Hotel. Artists such as George Robey, Gertie Gitana, etc., receive only a nominal sum and it is commonly believed that they donate these payments to the hospitals.

Theatres which are regularly put "on the air" are the Alhambra, Palladium, Shaftesbury, Coliseum, Hippodrome, and Drury Lane. Negotiations are proceeding for the linking up of the Houses of Parliament and it is anticipated that at an early date speeches in the House will be broadcasted from 2 LO.



THE LEICHHARDT AND DISTRICT RADIO SOCIETY.

Members of the Leichhardt and District Radio Society held their 90th general meeting at the club room, 176 Johnston Street, Annandale, on Tuesdya, July 22nd.

The attendance was excellent, and a very interesting and instructive lecture on "Tuning" was delivered by Mr R. C. Caldwell. The lecturer dealt principally with the use of the ordinary earthing system, counterpoise "earth," and the use of no earthing system at all, each method being explained and elaborated upon, and its various advantages and disadvantages discussed at length. The usual crop of questions were answered by Mr. Caldwell, after which a vote of thanks was carried.

Next Tuesday night the society will holds its 22nd monthly business meeting, when a number of new applications for membership will be dealt with, and other formal business on hand disposed of.

The syllabus of lectures arranged at the beginning of this year having been successfully carried through with, a new and more comprehensive one has been compiled, and details will be published in the society's report in these columns in next issue.

Mr. E. J. Fox, a member of the society, has been successful in copying C.W. Morse transmitted from station 6.01 (Western Australia), a two-valve set—detector and one stage of audio amplification—being used.

Inquiries regarding the activities of the society are welcome, and should be addressed to the hon. secretary, Mr. W. J. Zech, 145 Booth Street, Annandale.

THE STRATHFIELD DISTRICT RADIO CLUB.

The eighteenth general meeting of the club was held at the club rooms on Thursday, 24th July, Mr. Jacob being in the chair. Upon declaring the meeting open, the President, in commenting upon the death of Mr. B. Rourke, moved that a letter of sympathy be sent to the relatives, and this was carried unanimously, the members standing for two minutes in respect to the memory of Mr. Rourke.

The minutes of the previous meeting were read and confirmed, and general business was brought forward. Preliminary arrangements were made for a grand concert to be held at an early date in the Burwood School of Arts.

The Artarmon Glee Club has kindly promised to assist, and several of the artists have offered their co-operation.

The secretary of the club would be glad to welcome suggestions from any experimenter in the direction of making this concert a huge success.

A receiving set consisting of five valves, made up of five separate units, is now being built by the club members, and the tuning and detector units are in course of construction.

After lengthy discussions, the circuit decided upon by the committee is the P.1.

Any person interested in wireless research work is invited to come along any Thursday night to the club room, which is situated at the corner of Albert Road and Duke Street, Strathfield, or communicate with the secretary, Mr. M. Wraxall, "Almor," Long Street, South Strathfield.

in other countries. An arresting example used by the lecturer was "that at the present rate of progress we shall shortly have world-wide radio. What will the DX artist do when he wishes to communicate with an amateur in a country whose tongue is other than English? Get an interpreter or try him with Esperanto." The meeting closed with a vote of thanks to Mr. Taylor.

The club meets every Wednesday in future. Would members and intending members kindly note?

A syllabus of lectures is being drawn up, the first to be delivered on Wednesday, 6th August next.

Experimenters and others interested are invited to communicate with Hon. Secretary A. Cameron, "Ogilvie," Clanwilliam Street, Chatswood.

WAVERLEY RADIO CLUB.

Mr. E. Bowman presided at the meeting held on July 22nd. The correspondence included a letter from "Wireless Weekly" in reference to details of the club's transmission. These would be furnished, although it was mentioned that no regular schedule of transmitting times could be given yet.

Further reference was made to the competition for the best crystal set,

AUSTRALIA–ENGLAND TESTS.

Arrangements have been made by the N.S.W. Division of the Wireless Institute of Australia for tests between Australian and British experimenters.

The schedule is outlined below, and experimenters are requested to send particulars of results to the Hon. Secretary, Wireless Institute of Australia, Box 3120, G.P.O., Sydney, so that they may be officially forwarded to London.

Station.	*Wavelength.*	*Time GMT.*	*Dates.*	*Call Up.*
6 *XX*	115 *metres*	11.00 *to* 11.30	29/7 *to* 2/8 *and* 10/8 *to* 25/8/24.	*VH 1 VH de G 6 XX*
2 *SH*, 2 *OD*				*AG or ZG de G 2SH-etc.*
2 *JW*, 2 *VF*	85 *to* 110 *metres*	8.30 *to* 10.30	28/7/24 *for* 14 *days.*	
5 *FS* and 5 *KO*				

In both tests a code word will also be transmitted.

THE NORTHBRIDGE RADIO CLUB.

The ninth general meeting of the above club was held at the club room, "Hoylake," Sailor Bay Road, Northbridge, on Wednesday, 23rd inst.

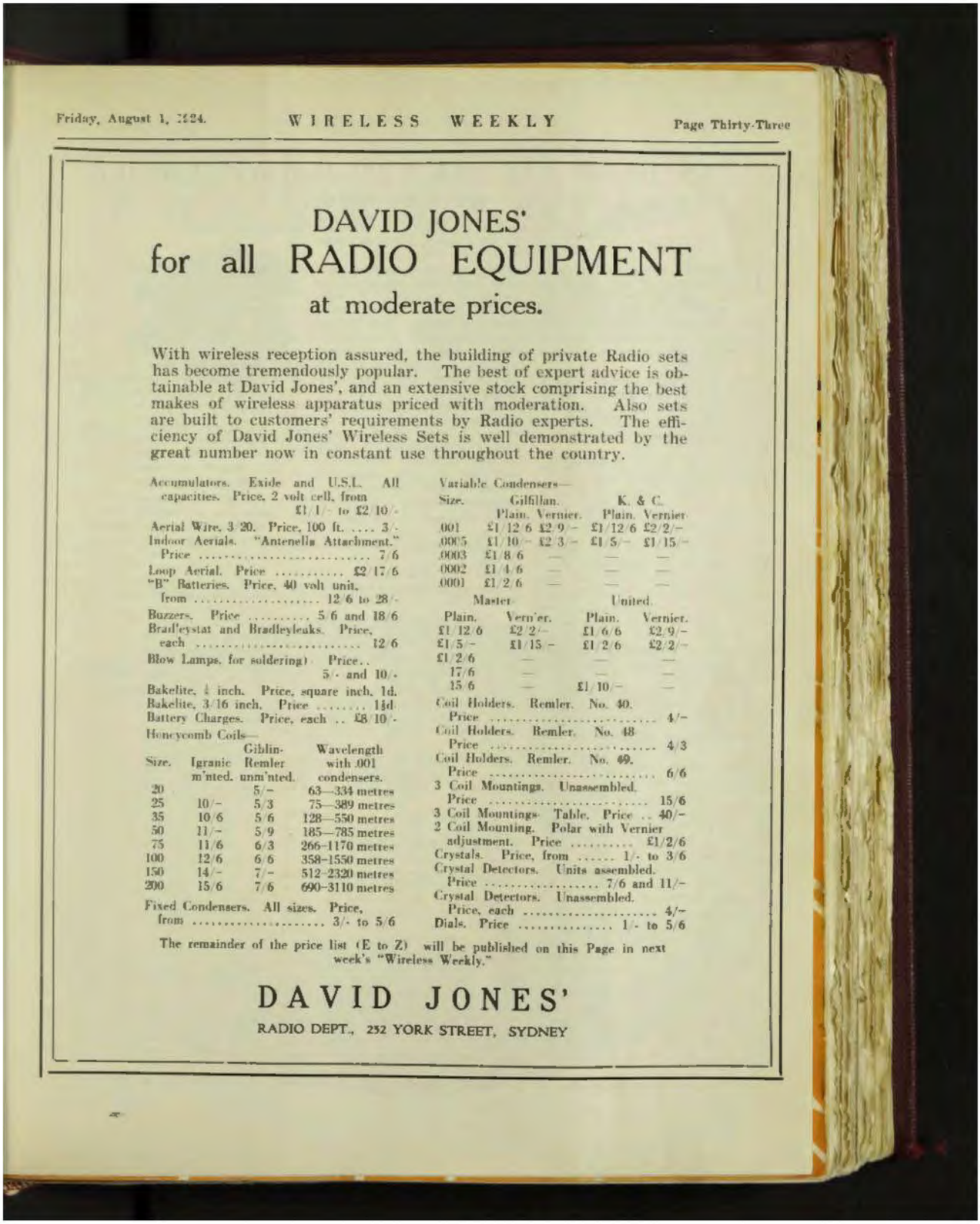
Those present spent a most interesting evening listening to Mr. Frank Taylor, president of the Sydney Esperanto Society, who gave a lecture on "Esperanto—its Relation to Radio." Mr. Taylor explained the necessity for an auxiliary international language, and briefly outlined the progress made

points to be awarded on the basis of appearance, efficiency and cost, with 10/- as the maximum expense. Marks would be forfeited for any outlay over this amount.

Two new members, Messrs. Scott and Wilcock, were admitted into the club.

Mr. W. Anderson suggested that Thursday night lectures and buzzer practice be held. Discussion on this, however, was postponed till there should be a larger meeting.

(Continued on Page 43 Col. 3)



INSTRUMENTS USED IN RADIO SERVICE.

By H. A. Stowe, M.W.I.A.

Paper read before the N.S.W. Division of the Wireless Institute of Australia on Tuesday, 15th July, 1924.

TO operate a transmitting set without measuring instruments is like trying to steer a boat without a compass on a dark night. It is sure to lead to trouble sooner or later. They have a very important place in the circuit of a transmitter, or receiver for that matter.

There are so many different types of instruments offering that an experimenter who is not familiar with them may be put to some trouble wondering which instrument will suit his requirements.

The correct choice of instruments, then, is also important, and may affect, to a large extent in some cases, the efficiency of the set; in fact, rather than being an asset they may be a source of trouble.

It is the purpose of this paper to briefly describe the construction of the various types of instruments and their application.

In order to know what a set is doing it is necessary to know certain values, which values can only be determined by suitable instruments. We may then classify our requirements under three heads—

A. Power input to set.
B. Power output, or radiation.
C. Current values in various parts of the circuit.

Each of these heads require its own special type of instrument, and their proper selection is important. The type of instrument for each section will be indicated, and later a detailed description of each will be given.

Power Input:

The power input to a set is equal to the product of the plate voltage and the plate current.

These values must, then, be measured by some type of instrument. Both these values may be measured at the valve, and so use Direct Current values. So that instruments suitable for D.C. must be used. In this direction we have two choices—1, Moving Coil type; 2, Moving Iron type.

The first is a direct current instrument only, while the second is suitable for either direct or alternating current.

Of these two types the moving coil is by far the most sensitive, and takes less energy from the circuit for its operation. Its scale is uniformly divided, thereby allowing greater accuracy in reading. The Moving Iron Instruments, while being universal in their application, are not nearly so sensitive, and take more energy to operate them. Their scales tend toward crowding at the ends, thereby making close reading difficult. Compared to the moving coil type they are cheaper in price. The power consumption of the instrument is important, for when the power to be measured is very small the power consumed in the instrument may represent a fair percentage of the total power being used.

As the actual plate current is usually very small, below 100 M/A, accuracy is necessary in reading this value. In this direction the moving coil instrument should be used, as up to the present no moving iron instrument has been constructed on commercial lines to read accurately as low as this. Such instruments reading as low or anywhere near as low as this have large losses; the reason for this will be explained later.

The moving coil instruments can be made to read as low as desired, even to a fraction of a M/A. They also have low losses, and are very accurate.

In the case of the plate voltage, it may either be measured on the A.C. side of the rectifier or on the D.C. side.

If measured on the A.C. side allowance must be made for the drop of volts in the rectifier, and in this case an A.C. instrument must be used. In this case a moving iron type of instrument can be used satisfactorily, as at voltages such as are used on transmitters such instruments can be constructed to read very accurately with very low loss—that is, when connected across the supply will take very little current. In this case it must be noted that such instruments take more current the lower the voltage for which they are designed.

If the plate voltage is measured at the D.C. side or at the valve, a moving coil instrument can be employed with advantage on account of their features as before mentioned—that is, accuracy and low power consumption.

It should be noted in this direction that the current taken by the instrument can easily be much more than the current taken by the valve if a cheap class of instrument is used.

From this it will be seen that if any true indication of the input is desired, some consideration should be given to the instruments which are to be used to measure the values.

The same remarks as above stated apply almost in every case where values of the current in any part of the circuit is required, with the exception of the aerial current.

In the measurement of the valve filament current values, either the voltmeter method or the ammeter method may be used. The voltmeter method is generally the most satisfactory, for it shows the actual voltage being applied to the valves. The ammeter method has a point or two in its favor, as the actual current consumed by the valves is indicated, but where a large number of valves are in use, say, in a receiving circuit, allowance must be made for the current taken by individual valves. The ammeter can be used for determining the lowest current value at which the valves can be worked satisfactorily. In both these cases accuracy is required, and some notice should be taken of the instrument used. In the case of the voltmeter method the voltage used is generally fairly low. This means that relatively low resistance instruments must be used to measure it.

In the case of the moving iron type a fairly large current may be taken by the voltmeter if of medium or cheap quality, and even if of good quality the current is high compared to moving coil instruments of the same value, and as this instrument is to be permanently across the battery its current consumption is of some importance where accumulators have to be used. Somewhat the same thing applies in regard to the ammeters also. Ammeters of moving iron type of low reading have a relatively large drop across them owing to the employment of a relatively large operating coil, while the losses in a moving coil ammeter are very low, indeed.

(Continued on Page 38.)

BRINY REMINISCENCES.

By Brasso.

(Continued from Last Week.)

And what merry hours we spent there, with the "old man" sitting at the head reeling off his dry Scotch yarns. Old timers on the Australian coast may remember Captain Buchanan as the man who sneaked the damaged steamer "Papanui" out of Melbourne without a pilot and in the face of instructions to the contrary from the Navigation Dept. A cruiser was sent after him, but when she hove up alongside, the "Papanui" was gaily fluttering the "Nicaraguan" flag from the stern. The "old man" was never tired of telling us of that momentous voyage from Melbourne to Kobe, with a skeleton crew and two great holes in the bottom roughly chocked up with planks and cement.

We passed Malta close to the northward about three days out, and next morning had a little mild excitement when three French cruisers hailed us up and circled slowly round while they gave us the once over. The "Bakara" was so obviously German that she invited suspicious and close scrutiny. The sight of those guns levelled at us sent a chill feeling up and down my spine and I was more than pleased when we were officially passed, and proceeded on our way with the snow clad mountains of the North African coast a mile or so on the port beam.

Listening-in during my hours on watch the ether seemed filled with a very babel of sound, and the Mediterranean seemed full of warships of every nationality. I soon learned to distinguish the British ships by the booming crashing note; the Italian by the "Da" used instead of the usual "De" between calls; and the French note which sounded almost similar to the old fixed gap discharger. The messages were of course in code, all of which I painstakingly logged and passed along to the "old man" who, I subsequently learned used to just as painstakingly pass them into the galley fire. All Merchant vessel traffic was, of course, stopped, except in the case of neutrals, who must have enjoyed the unrestricted freedom of the air. Being on the main sea lane we passed many steamers bound East, from deep laden colliers to the stately Bibby liners bound for India. Although several Q.R.A's. were shot at me from Dutchmen and Swedes I never so much as warbled a solitary dot back although I was often inclined to pull off some joke such as "Here S.S. "Edina" bound from Melbourne to Geelong.

Gibraltar.

In due course the grim heights of the Rock of Gibraltar rose out of the mist ahead, and sliding gently around the headland on which were the tall masts of B.Y.W. (Windmill Hill) we came to anchor in the middle of a bunch of assorted steamers. In a few moments a torpedo boat came alongside and a neatly clad R.N. Lieutenant bawled questions at us through a megaphone. Our stay in Gib was exactly 45 minutes, the whole of which I spent studying though a German telescope the terraced heights of Gibraltar, and the Spanish looking houses with their red roofs and green shuttered windows. From various points up the side of the Rock the wicked snouts of guns stared grimly at possible enemies, and sticking over the very edge of the summit were others that seemed perilously close to overbalancing and crashing down upon the narrow streets of the town of Gibraltar.

Across the Straits a dull grey patrol boat steamed ceaselessly up and down, and out from the dock entrance sped a fleet of mosquito craft, bent upon some mission or other. Being confronted with the Rock itself, and the vision of those big guns dominating the entrance to the most important waters in the world, the claptrap that has been written about the passing over to Spain of Gibraltar paled into insignificance beside the fact that nothing visible could pass that barrier.

However my musings were abruptly terminated by the last fond words of the Naval Lieutenant, who blithely got the following off his chest: "You may bump submarines, but you can easily get away from them." So, all hands filled with a new sense of the joy of living we up anchor and steamed away along the Spanish Coast, bound for Blighty. As the dusk crept down, an ice cold wind blew up from the broad Atlantic, and astern the blinding beam of a searchlight on the heights followed our course for a few moments, and then swept away over the Straits, moving slowly up and down and covering every yard of water.

That night, between 7 and 8, I logged four S.O.S. calls from torpedoed vessels around the English coast. And listening in there in the silent cabin, the only sounds being the measured tread of the officer on watch on the bridge above and the steady thump of the screw, it seemed that I was in another world. The fun was over and ahead of us was the Bay of Biscay, and the possibility of being earmarked by a prowling "unterzee" boat.

(To be continued)

(Continued from Page 34.)

Aerial Current:

Somewhat different conditions exist here compared to the other parts of the circuit. The frequency of the current in this part is infinitely higher than the rest of the circuit where instruments are used, thus preventing the use of ordinary type instruments, either moving coil or moving iron, so that a different type has to be employed and may be mentioned under two heads, "hot wire" and "thermo-couple" instruments. The cost of these instruments differ very considerably; thus the experimenter, if of the usual type, "poor," may lean towards the cheaper, the "hot wire" instrument, while the man that possesses a thermo ammeter is thought very fortunate.

It is intended to describe the construction of these two instruments, along with their suitability for the work. Those who are "transmitters" know how important it is to keep the aerial system resistance as low as possible, as the current flowing or radiation is directly dependent on that factor. In most aerials the D.C. resistance of the aerial is from about 1 to 3 ohms., and in some cases may be lower than 1 ohm., and as any increase in this value may considerably reduce the radiation current, we should consider carefully what we intend to connect in series with it to measure the current flowing. Let us take the first-mentioned instrument, the "hot wire" type. Its construction is as follows:—A piece of fine wire which carries the current to be measured is fixed at each end to a rigid support. From the centre of this wire a thread is taken round a very fine spindle, which is carried in jewels, and to which the pointer is attached. Fixed to the spindle also is a coiled hair-spring, which tends to turn the pointer from zero towards the other end of the scale against the restraining action of the thread, which is wound round the spindle so as to oppose the spring. When the current to be measured passes through the wire, which may consist usually of platinum-iridium or platinoid, or any metal of high melting point, the heat generated therein causes the wire to expand, so allowing the thread to slack out, thus permitting the spring to turn the spindle through an amount equal to the amount of the expansion of the wire, and as the amount of expansion is proportional to the temperature of the wire, which in turn is proportional to the current flowing, it follows that the movement of the pointer is a measure of the current flowing, such movement being actually proportional to the square of the current flowing in the wire. In order to get sufficient movement of the pointer to be of use, the "hot wire" has to be made fairly long, between 2 and 4 inches, depending on the construction of the instrument. Further, in order that the best factor may be effective for the relatively small current used in the aerial, the wire has to be of very small cross section, and the finer the wire the higher its resistance. Now, as any alloy has a higher specific resistance than copper, it is found that the resistance of the hot wires are comparatively high. The smaller the current to be measured the higher will be its resistance, which for meters generally used on experimental low power stations is between 2 and 4 ohms. It will be seen, then, at once that the resistance of the ammeters may be twice that of the aerial, or more, thereby cutting down the radiation, as the hot wire is usually connected directly in series with the aerial. This feature or fault decreases with the size of the instrument, as with larger capacity meter several hot wires or shunts are used, thereby decreasing the resistance of the meter.

A somewhat different principal is employed in the thermo instruments. When two different metals are brought together at one point and that junction heated, a small direct current is set up in the metals, and it is found that there are certain metals when used together give a larger current when heated—for instance, iron and constantan. The current flowing in the metals is proportional to the temperature of the hot junction. If, then, a sensitive direct current instrument such as a moving coil instrument is connected across the cold ends of the metals, the instrument can be made to indicate the temperature of the metals. If then we use, say, a small piece of wire carrying a current to heat the thermo junction, the moving coil instrument will in reality measure the current flowing in the heating wire. This, then, is the principle of the thermo instrument. The hot junction of the thermo couple is welded to a very short piece of wire, which is to carry the current to be measured. This heating wire being very short has a very low resistance, and as the thermo couple is welded to it the instrument responds to very small changes of temperature, hence to changes of current flowing. These instruments are very accurate and not affected by the temperature of the surrounding air, as is the case with the hot wire instruments.

It is evident from this which is the most efficient type of instrument for accurate work. Both these types of instrument are unaffected by change of frequency, and respond with equal accuracy on either high or low frequency.

Continued in next issue

A LONELY WIRELESS POST.

Willis Island, which is about half-way between Brisbane and the region of Papua and the Solomon Islands, has been equipped by the Australian Government with a wireless station and meteorological lookout post.

Situated in the centre of a hurricane area, Willis Island is merely a strip of rough grass land 468 yards long, fringed with a coral beach. Coral mixed with cement served to make the mortar in which the two 87-foot tubular masts are set, and for the foundations of the wireless hut and living quarters.

Two operators are in charge, and in spite of their apparent isolation, are in wireless touch with the Australian station at Rabaul, in New Guinea.

During the hurricane season the station reports its observations to the mainland every three hours, and the new service should prove of immense service to shipping in this treacherous region.

The station is operated by the Coastal Radio Division of Amalgamated Wireless (A/sia) Ltd.

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OF COURSE the set you build is to be better than any owned by friends---and it can be. Avoid their mistakes, profit by experience, and build a set to be proud of. The difference in cost between a makeshift assembly and a good one is nominal---but the difference in reception results obtained is tremendous. For best results—

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	Detector Amplifier Units	

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Limited

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Ferry travellers pass our doors. To accommodate our customers, we will in future open at 8.30 a.m. to receive orders for Bakelite to be cut and drilled. Wire, Slider Bars, Tubes wound, etc.

These orders will be ready for delivery at 5 p.m. same day

We are also open Friday Nights until 9 o'clock

RADIO CO., LIMITED

15 LOFTUS STREET, CIRCULAR QUAY, SYDNEY

Personalities in the Australian Wireless World

MR. J. G. REED.

Radio Engineer, Amalgamated Wireless (A/sia) Ltd.

ABOUT 1910 an experimenter gave a wireless demonstration at the Newcastle School of Arts, the apparatus consisting of a large spark coil connected to two long brass rods for a transmitter, while across the room was a similar system connected to a coherer and bell for the receiver. The operation of this apparatus made a vivid impression upon the audience, one of whom was no other than Mr. Reed, who thereupon decided that wireless had more than a passing interest for him—and he commenced a new hobby.

A year later, with the aid of a one inch spark coil and single circuit crystal receiver, the subject of our sketch succeeded in working over a distance of 1½ miles.

In 1914 Mr. Reed was carrying out radio experiments in conjunction with Lieut. Bracegirdle, SDNO, and the Signal Staff of the Newcastle Naval Depot, and in 1915 he joined the Naval Shipping Examination Service, later taking up duties as telegraphist and electrical artificer at Sydney Radio and Garden Island, finishing up in 1918 as assistant to Radio Inspectors Weston and Crawford. Subsequently he was for some time engaged as Engineer in the Telephone and Telegraph Department of the Sydney G.P.O.

In Melbourne, in 1922, Mr. Reed carried out the first long distance amateur experiments with Mr. Chas. Maclurcan at Sydney. Using only two valves, signals were picked up in the southern capital from the old 1350 metre 9 watt station at Strathfield.

Many experimenters are, no doubt, familiar with Mr. Reed's voice as announcer at 2 M.B., from which station he used to broadcast weekly gramophone concerts.

Mr. Reed joined the Commonwealth Government Radio Staff in 1921, from which service he was transferred to Amalgamated Wireless (A/sia) Ltd. in 1923. In collaboration with the Company's engineers he has done excellent work in connection with the equipping of Farmers' Broadcasting Station "2.F.C.," being responsible for most of the detailed work in connection with the design of the apparatus.

Mr. Reed has lately been engaged in the conversion of the spark transmitter at Sydney Radio into a modern high-power tonic train valve transmitter, and more recently engaged on testing work in connection with the new Melbourne Broadcasting Station.

Mr. Reed has a distinct liking for ferreting out cause and effect—the essence of research work—and brings to bear upon his work an extensive wireless knowledge acquired partly by practice and partly by studying the latest literature dealing with developments in every phase of wireless.

It may be said that Mr. Reed's main hobby, apart from his work, consists of wireless experimenting, lecturing to amateurs, and writing radio articles on how to construct wireless sets from the most miscellaneous gear.

NORTHERN SUBURBS RADIO SOCIETY

Continued from page 32

The last general meeting of this society was held at the clubroom, Gordon Public School, Gordon, at 8 p.m. on Tuesday, 22nd.

It was decided that the club should give a demonstration of wireless receiving to the students of the Gordon Public School on Saturday, August 9, and the secretary very kindly offered his set for use on this occasion.

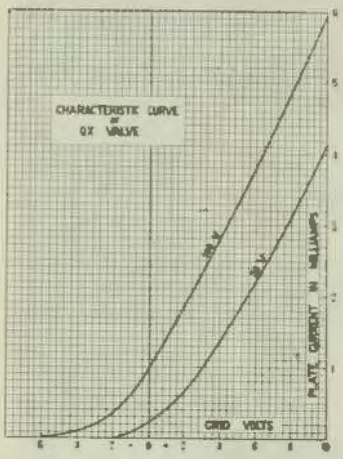
A lecture on aerials and earths was delivered by Mr. Primmer, and proved very interesting to those present.

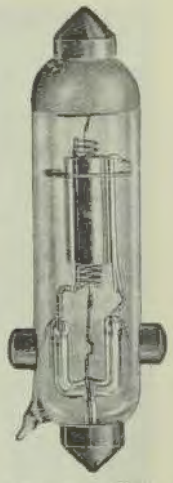
The club's new aerial which had just been erected was also tested out on a two-valve set loaned for the evening by one of the members, and during the evening some very good signals were received on it.

A further discussion then took place on the club's four-valve set which is in course of construction. This set is to consist of a step of radio frequency, detector, and two steps of audio frequency; and members are asked to bring along any parts which they are willing to donate towards the completion of this set.

The next meeting will take place on Tuesday, August 5, at 8 p.m. Anybody interested in wireless will be very welcome, and a lecture is to be delivered on "Tuning Apparatus." Further particulars may be obtained from the hon. secretary, Mr. R. Primmer, Gordon Road, Gordon.

Q. X. Valve





The Marconi QX Valve is of the tubular type. This is a highly efficient modern valve, and is the result of much research and experience in valve manufacture.

The plate and grid leads are brought directly out through the sides of the glass tube, thus ensuring that the capacity effects in the valve are at a minimum.

The QX is a particularly sensitive detector, and is equally effective when used as an amplifier.

Reference to the characteristic curve will show that the QX may be used to give unusually good rectification, and that with suitable potentials applied high amplification may be availed of.

Type	Fil. Bat.	Fil. Term.	Filament	Holder clips Type V24.		
QX	Voltage 6	Volts	Amps	Anode Volts	Approx. Dia. of Bulb	Approx. Length
		5	0.75	25-100	18 m.m.	73 m.m

Continued from page 15.

Every night since some of these experimenters have come in well, and most of them are audible up to a foot from the phones. KGO is heard every night; he broadcasts, and his carrier is QSA on 2 valves, no audio being employed. The distance to Sydney by air from here is 800 miles. 2BL and 2FC can be heard every night on 1 valve, and 2BL has been heard very faintly in daylight on the same number. I soon hope to have a five-watt transmitter going, and to work with some of the above stations.

With best wishes for the advancement of your great little paper.—Yours faithfully,

H. L. HOBLER.
Experimental Station 4DO

[And very nice going, too.—Ed.]

STERLING HEADPHONES

We regret that through an error in our last issue, "Sterling" Lightweight Headphones were listed at £4/4/-, instead of 44/-, in advt. of The Lawrence and Hanson Electrical Co., Ltd.

This make of headphone is becoming increasingly popular with wireless fans, and judging by remarks, few would begrudge paying £4/4/- for them. Still, the correct list price is 44/-.

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