

WIRELESS WEEKLY

Registered at the G.P.O., Sydney, for

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VOL. 5. No. 15.

FRIDAY, FEBRUARY 6, 1925.



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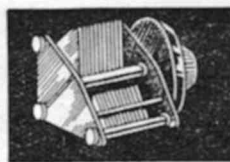
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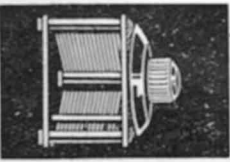
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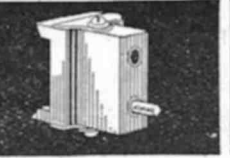
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Official Organ of the New South Wales Division of the Wireless Institute of Australia, with which is incorporated the Affiliated Radio Societies and the Australian Radio Relay League.

VOL. 5. No. 15

FRIDAY, FEBRUARY 6, 1925.

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EDITOR: The Editor will be glad to consider Technical and Topical Articles of interest to Australian Experimenters. All Manuscripts and Illustrations are sent at the Author's risk, and although the greatest care will be taken to return unsuitable matter (if accompanied by stamps), the Editor cannot accept responsibility for its safe return. Contributions should be addressed to the Editor, "Wireless Weekly," 12/16 Regent Street, Sydney, N.S.W.

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EDITORIAL

SHORT WAVE TRANSMISSION

The most important event of the last week has of course been the reception of broadcasting from K.D.K.A., the General Electric Company's station at Pittsburg U.S.A., both a novelty and an achievement for American Broadcasters and Australian listeners-in alike. According to reports the station was successfully received in many parts of Australia and considering that K.D.K.A. was using something like 3,000 watts and was on a wavelength of only 63 metres, this is not to be wondered at. Over and over again the efficiency of short waves has been demonstrated and the mere fact that large commercial companies the world over are adapting short waves to ordinary traffic shows that the age of enormous high power long wave stations is passing rapidly. The problem in the past with regard to broadcasting on short waves has been the limitation of the power that could conveniently be handled but this factor is being dealt with satisfactorily by American engineers, who have so far been considerably in advance of those of other countries in their practical application of short waves both in broadcasting and in radio telegraphy. The proof of this lies in the fact that only recently British periodicals have taken to publishing articles dealing with apparatus for the reception of American short wave stations, and not for British. Granted that it is the English way to conduct experiments secretly, while Americans believe in publicity methods, published reports indicate that America is a long way ahead and that whatever fresh developments occur may be expected from there.

Mr. H. Gernsback, Editor of Radio News, has so much confidence in the future of short waves that in a recent issue he predicts that within 10 years all broadcasting will be conducted on wavelengths below ten metres, and it goes without saying that on such low wavelengths it would be impossible for hundreds of stations to operate within a very narrow band without interference one with the other. Even on such comparatively high waves as 80 to 90 metres, the band used exten-

sively by American amateurs, Australian experimenters every night observe that, using receiving circuits of low resistance, or in popular language, low loss, these American stations may be quite easily separated.

The fact is of course of the greatest importance commercially, because while at present it is necessary to separate the wavelengths used by trans-ocean stations by thousands of metres to cut out interference, this interference was not noticed at the same stations, during tests on short waves when the wavelengths were separated by a comparatively few metres.

The trial transmission from England to Australia some months ago was carried out on short wave and this again is the principle underlying the beam system of communication.

As was recently announced in this paper, KGO next winter will, very probably, experiment with the rebroadcasting of British programmes to Australia and in view of the success attending the tests with KDKA it seems likely that short waves will be used.

In any case our prediction of some months ago that before long overseas broadcasting stations would be audible in Australia, is already justified, and with the rapid advance in the improvement of methods of reception and transmission, it will not be long before the tuning in of an American or British station will be quite an ordinary every day affair.

FOR N.Y. POLICE.

MAYOR HYLAN, of New York, has announced that all the police stations in New York will be equipped with wireless receiving sets early next year, to allow the police to keep in direct touch with the city's own broadcasting station, WNYC, and to obtain entertainment as well as departmental information.

Transmission of Standard Wavelength

WIRELESS INSTITUTE OF AUSTRALIA, N.S.W. DIVISION.

THE transmissions will be commenced from Radio 2CX on Tuesday, 10th Feb., commencing at 10 p.m., and will be continued on Tuesday, 17th Feb., and Thursday, 26th Feb.

Schedules will be as follow:—

10th: 130 to 200 meters.

17th: 60 to 130 meters.

26th: 200 to 250 meters.

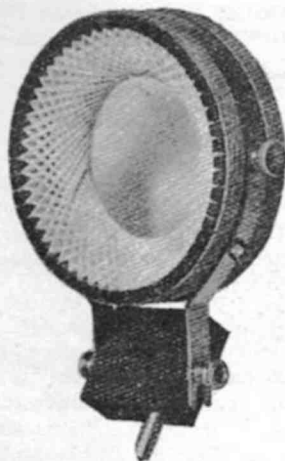
The signals will commence at 10 p.m. with an announcement by radio phone on 180 meters. The wavelength will be announced by phone, and then the code signal transmitted for a period of 2 min. by buzzer and then for a period of 2 min. by CW. The CW signal will be accurate, but the tonic train sigs will be approximate owing to difficulty of holding wavelength constant when modulating.

This procedure will be followed each night on which they are announced to take place; any alterations will be announced by radio phone. Below is

given the code for each of the wavelengths, and the experimenters are asked to keep them in a prominent place, as it is not intended to repeat this code key over the radio phone.

Wavelength.	Code Letter.
250	— — — —
220	— — —
200	— —
170	— . . —
150	— . —
130	. — .
100	. — — .
80	. . — — .
60	. — — . .

Reports as to the reception of these signals and their usefulness would be much appreciated by Mr. H. A. Stowe, Radio 2CX, "Rawene," Royal Street, Chatswood, N.S.W.



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Phil. Renshaw, Hon. Sec.
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Phone B2235
A.H. Ferrell P. Publicity Officer.

Practical Work in Experimental Wireless.

The scope for practical work in experimental wireless is a very wide one, and it does not seem to be realised how very much good can be accomplished, by practical co-operation between various stations. One hears from time to time very bitter complaints as to the treatment meted out to operators while trying to test new circuits.

Attention has already been drawn in these notes to the futility of mere DX hunting without adequate reason from an experimental point of view. Take the case of a man who is trying to adjust his transmitter. He gives a CQ call, and he is heard by probably 50 per cent. of the local amateurs. Of these 50 per cent. he may, if he is lucky, succeed in getting one to answer him. The others, recognising from the power of his call that he is not far away, totally ignore his signals. The one who answers, possibly through a bad adjustment of his set, thinks he is getting on to some long distance station and replies. Finding out what station he is working with, his enthusiasm immediately wanes, and he closes down, sometimes without even a civil "good night."

This sort of thing is very bad form, to say the least of it, and the very one who is perpetrating this class of work would be the first to complain bitterly if by some mischance his own transmitter were totally destroyed, and he had to start afresh to build a new one. Such an operator cannot conscientiously call himself an experimenter. If he is truly an experimenter he will be altering his circuits from time to time and will undoubtedly sooner or later have cause to utilise the services of the local hams. Moreover the experimenter should realise that to intelligently and successfully carry out new experiments two stations must be employed, and it is only by co-operation that successful work can be done.

Take another view of the case. Suppose an experimenter after having successfully installed and adjusted his transmitter starts to experiment along certain lines. He wishes to get reliable re-

ports from some station as to the effect of certain experiments he has in view, and static or other interferences makes it impossible to work long distance stations. Cannot the work be done more effectively, by short range communication? How is this work to be carried on if every experimenter consistently ignores any station within his own State.

Moreover there is a fascination quite apart from the scientific interest in recording the results of various alterations, and where two stations co-operate in the true sense of the work, the work becomes extremely interesting and absorbing.

Let experimenters take this to heart, and within reasonable limits answer all calls that come their way. This will assist the experimental movement very materially. It will also maintain interest in experiments in wireless work. It will create a spirit of comradeship, and good fellowship which unfortunately is conspicuous by its absence. No matter how familiar, aetherially, you may be with an experimenter in another State, there cannot be that same feeling of close friendship which will exist with your next door neighbour. It is quite recognised that certain classes of experiments require co-operation between stations a fair distance apart, and it is not intended in anyway to close down on DX work, but rather to open up the wider field of co-operation between local experimenters.

Delegates' Council Meeting.

The next meeting of the Delegates' Council will be held on Friday, February 13, 1925. Important business is on the agenda, and it is essential that every affiliated club should be represented. If your delegate cannot attend, see to it that a deputy is appointed.

Monthly General Meeting.

The next monthly general meeting of the New South Wales Division of the Wireless Institute, will be held on Thursday, February 19, when Mr. P. L. Sewell will lecture on "Rectifiers." No doubt he will rectify many of the erroneous impressions existing among experimenters on this important

subject. Members should make a special note of this.

Q.R.M.

Have you tried the new radio game? 2JT and 2CX have been trying hide and seek over the ether. 85 metres provides plenty of cover in this respect. 2GM also had a finger in the pie.

W. L. Carter has returned from his holidays. He does not appear to be any the worse for the change.

2CM is disporting himself by the sad sea waves. It is reported that instead of hitting signals over the ether, he is hitting golf balls over the green.

2DJ is expected to produce good results. Everybody is eagerly awaiting the opening transmission.

2ED is still lying low. When is he going to start up again?

The Publicity Officer is now taking a well earned rest. During his absence 2GM is running the QRM column and the Institute notes.

2GM should moderate his language when erecting his mast. It was so hot that it caused a pre-ignition in the Publicity Officer's car. The consequence was that he had had his arm in a sling for several days. Considering the air line distance was at least six miles the near by effect must have been tremendous.

A. H. PERRETT,
Publicity Officer.

SOUTH AUSTRALIAN DIVISION.

THE monthly general meeting of the South Australian Division of the Wireless Institute of Australia was held in the Prince of Wales Lecture Theatre at Adelaide University on Wednesday, January 14. A large gathering of members and friends was present and the chair was occupied by Mr. R. B. Caldwell (President). A letter was received from the radio inspector (Mr. H. Harrington) stating that the matter of interference caused by Adelaide Radio Station VIA was being considered by the department and would shortly be dealt with.

An invitation was received from the Blackwood Radio Club asking the Institute to send two delegates to the second annual dinner to be given by the Club. The appointment of the delegates was left in the hands of the Council who at a meeting held last week appointed Mr. T. S. Bagshaw (Vice President) and Mr. C. E. Ames (Hon. Secretary) to represent the Institute at this function. The Secretary read an article from the South Australian wireless paper regarding the disposal of the license fees already collected in this

State, on account of there being no broadcasting station entitled to remuneration. The article suggested that the Institute should take some action with regard to the matter. Mr. Bagshaw moved that the matter should be left to the Council to decide as to what should be done. The motion was seconded by Mr. Hunter.

At the conclusion of the business a single valve set was put together by Mr. C. E. Ames. The parts were assembled on a panel and wired up and when completed was connected up to a power amplifier, and a loud speaker enabled all present to hear the latter part of the evening's programme from 5CL. During the construction of the set Mr. F. E. Earle explained the circuit used, together with the uses of the various pieces of apparatus used in the construction of the set. At the close of the meeting a vote of thanks was accorded Messrs. Ames and Earle, and also to the Adelaide Radio Company who kindly supplied the power amplifier and the loud speaker and to the Electrical Supplies Depot for the loan of parts.

BRIGHTON SECTION OF THE WIRELESS INSTITUTE OF AUSTRALIA (Vic.).

At the last meeting of the above club held on Thursday, January 22nd, a very interesting lecture was given by Mr. Fry. The subject of the lecture was Crystals and their Properties. At the conclusion of the lecture a very hearty vote of thanks was passed to the lecturer.

For future lectures the Hon. Secretary has offered the use of a radiotelegraph for illustrating lectures; the principles of this machine are very simple. Diagrams and photos of the subject are prepared on plain pieces of paper and placed in the back of the machine and by the aid of mirrors are projected on to a screen placed at the far end of the lecture room. This method is an excellent one for illustrating lectures, and no doubt will be appreciated by members of the section. The Technical Committee are now preparing a roster of lectures for the coming year, and are also making arrangements for constructing a three valve set. Interested persons should communicate with the Hon. Secretary, Mr. W. Kerr, at the Club Office, 241 Bay St., North Brighton. Phone X4861.

R. Surridge, Publicity Officer.

Telephone City 4429

CHARLES D. MACLURCAN
Consulting Radio Engineer

Pratten Building,
26 Jamieson Street,
SYDNEY



WITH OUR READERS

AN APPRECIATION.

(To the Editor)

Sir,—Many thanks for your letter containing the required information re transmitting licenses, etc. It is kind of you to go to so much trouble for the benefit of your subscribers, all of whom I am sure are treated with like promptitude and courtesy. We, in the country, are not so favourably situated as our city enthusiasts who are able to, at a moment's notice, go to the fountain head for information, and it is pleasing indeed to know that on request Wireless Weekly will at all times send forward the very best information available. Again thanking you. Yours etc.,

P. BOULTON.

"Tenarby,"

Griffith St., Albury,
30/1/1925.

(To the Editor)

Sir,—No doubt you would like to hear of the following results as far as I have tested your circuit of Tuned Anode Receiver, published in Wireless Weekly, November 21st. I have just completed it, but before doing anything permanent I naturally tried it out with my experimental set, viz., on the bench, and was astonished to receive 6WF and 3LO with as much ease as I would 2FC or 2BL. Loud speaker strength on local stations both amateur and broadcasting came in excellently. The tuning is very critical. I thank you for publishing same and will forward you further results later. This circuit was used during our week of bad weather, and one night when things were bad, my aerial came down with a thump during 2BL's transmission. I went to see what could be done, but rain prevented me from erecting it until morning, as it was flat on the ground. Moved by curiosity I put the phone on my ears, and to my astonishment heard 2BL announcing an item—not loud speaker strength, though quite loud enough to hear everything on phones. Well this set me thinking, and Sunday, 25th inst., while broadcasters were going, I hitched my aerial lead from set to gas pipe leaving the earth still on water pipe. I was able to hear quite good strength in phone and very weak loud speaker strength on 2BL's transmission. I intend to follow this experiment up and will notify you of further tests. Kindly notify your many readers of the above experiment and I would like to hear of

their results in your valuable paper. I do not suggest a gas pipe to be used necessarily in this experiment, but, owing to time being short, and being anxious to try my pet theme, it was used by me in this test. Further tests will be carried out with buried aerial wire.—Yours, etc.,

R. W. J. GUTHRIE.

281 Bridge St., Drummoyne.

(To the Editor)

Sir,—KDKA, the station of the Westinghouse Electric & Manufacturing Co., E. Pittsburgh, Pa., was heard by me on Saturday, Sunday and Monday nights between 8 and 9 p.m. On Monday night the reception was remarkably clear, except for a few atmospherics now and then.

Messages were sent from: Mr. J. M. Elder, Australian Commissioner to the United States, The President of the Associated Press, The Editor of the New York World, Executive Officer New York American, J. K. Munsey, Proprietor New York Sun, Superintendent, Westinghouse Electrical and Mfg. Co., Pittsburg.

The announcer in reading these messages said he hoped that there was a shorthand writer listening. Unfortunately I could not write the whole text of these messages in long hand. Several musical items were rendered and then the following message was transmitted to Mr. Summet, 90 Henry Street, Melbourne: "Greetings from your American relatives via the first Radio Telephone Communication between our continents, your nephew, T. W. Horne."

At the end of the transmission KDKA signed off in telegraphy. The telephony was received on two valves using an indoor frame aerial and while KDKA was signing off in C.W., the frame aerial was disconnected and the signals were still heard quite strongly. The earth was then disconnected and the signals could be read with ease. Mr. C. L. Jaggard, of Alexander Avenue, was a witness of Monday night's reception, and Mr. W. J. Stevens, of same address on Sunday night. Yours, etc.,

A. A. M. McCULLAGH.

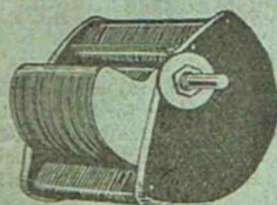
Alexander Av., Willoughby.

January 26th, 1925.

(Note: We are also advised that KDKA received O.K. on January 26th, by Mr. J. Rawe, of "Bronte," Dudley St., Punchbowl, N.S.W. He

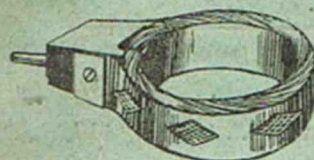
(Continued on Page 28, Column 2)

This Week's Specials



Al Quality Condenser.

77a-43 Plate, .001 ..	15/-
77a-23 Plate, .0005 ..	12/-
77a-11 Plate, .0003 ..	10/-
55-43 Plate Vernier complete with knob and dial ..	25/-
55-23 Plate Vernier, complete with knob and dial ..	22/6



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Coils.	Mtd.	Unmtd.
19	4/-	2/-
25	4/2	2/2
35	4/2	2/2
40	4/3	2/3
50	4/4	2/4
75	4/6	2/6
100	4/9	2/9
135	5/-	3/-
150	5/-	3/-
200	5/6	3/6
225	5/9	3/9
250	5/9	3/9

VALVES

Name.	Type.	Fil. Amp.	Fil. Vol.	Plate Vol.	Price.	Socket.
Phillips D1	Soft	.5	3.5	25-30	15/-	English
" D11	Hard	.5	3.5	30-70	15/-	"
" E	Hard	.7	4	60-100	15/-	"
" B11	Hard	.15	1.8	30-75	22/6	"
" D1V	Soft	.5	3.5	25-30	15/-	American
" DV	Hard	.5	3.5	30-70	15/-	"
" DV1	Hard	.5	3.5	2-10	22/6	English
Cossar	Hard	.6	3.5	30-70	20/-	"
Radiotron 200	Soft	.8	5	22-34	30/-	American
" 201A	Hard	.25	5	30-70	30/-	"
" 202	Hard	2.5	7.5	100-300	50/-	"
" WD12	Hard	.25	1.2	30-70	30/-	"
" 199	Hard	.06	3	30-70	30/-	199 Special
De Forest DV3	Hard	.06	3	30-70	30/-	American
" DV2	Hard	.25	5	30-70	30/-	"
Mullard Det.	Hard	.6	4	30-70	17/6	English
" H. Freq.	Hard	.6	4	30-70	17/6	"
" L. Freq.	Hard	.6	4	30-70	17/6	"
Marconi DE3	Hard	.06	3	30-60	32/6	"
" DEV	Hard	.25	4	30-70	47/6	V24 Type Special
" DEQ	Hard	.25	4	30-70	47/6	" "
" QX	Hard	.7	4	30-70	42/6	" "
Osram R5V	Hard	.7	5	30-70	19/-	" "
Marconi R	Hard	.6	4	30-70	19/-	" "

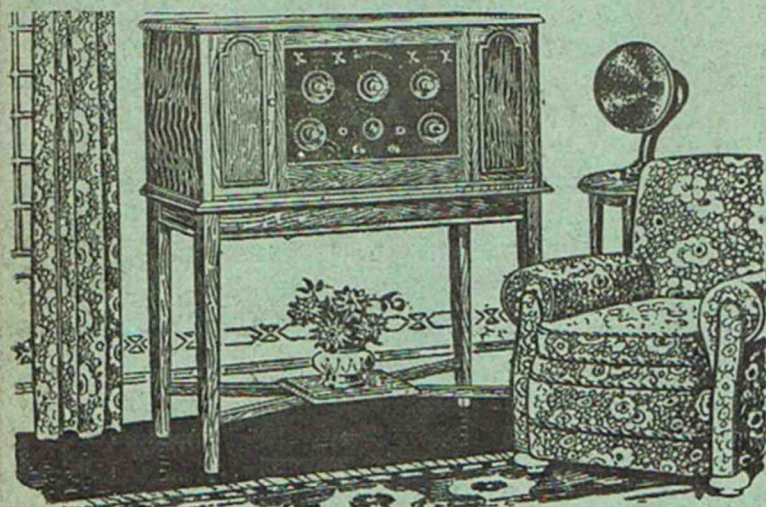


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By "BRASSO."

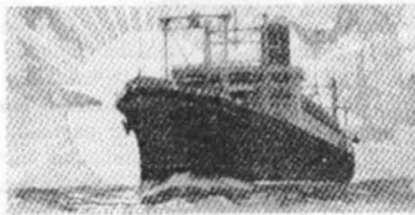
THE comparative scenic merits of Rio, Naples and Sydney Harbour have frequently been commented upon by various learned writers with somewhat different opinions, but as the three are entirely different types and as each has particular features it seems to me that fair comparison is almost impossible. Certain places affect certain persons in certain ways and one's own individual temperament must be taken into account when judging a place. Personally I incline toward the tropical stuff; the palm fringed shores of Levuka or the white surf booming up the beach to the foot of the palms on Cocos-Keeling, with the picturesque buildings of the cable station in the back ground, convey more to me than the world's most famous harbors. Rio at night with the blaze of fairy lights climbing far up the heights and the loom of the mountains in the back ground is wonderful—but Naples, like Sydney, is entirely subject to the state of the weather, and in the beautiful Mediterranean summer, is full of a fascination all its own, not to be spoilt by the narrow streets and cobbled roadways of the principal thoroughfares. Pompeii itself is but a sordid collection of dilapidated dumps unless one is gifted with a sense of the romantic and an appreciation and knowledge of the famous events of the ancient history of the world. The Canals of Venice are but stagnant waterways when looked at through the eyes of a student of hygiene, but to those who have revelled in the history of that once famous independent Empire they are crystal clear. And anyway, to come nearer home, wireless itself is apt to lose all its romance and to become somewhat commonplace to one who has kept six hour watches on lime juice freighters where one is thrown into more or less intimate contact with Geordies and the citizens of the place where they specialise in whisky and the world's biggest ships.

In the summer of 1916 I was shanghaied into the International Hospital at Naples, with a dog's disease known as dysentery, and for six weeks, while the "Anglo-Calithumpian," minus a senior op., browsed further East I became a citizen of Italy, steeped in its history and converted to everything save a black ziff. There is no romance in a hospital, especially an International one, where you are possibly the only Britisher, and your next

bed neighbour is probably a Dutchman or a Dago. For two weeks I surveyed the white walls of the ward and at intervals the dark eyes of the Swiss Italian nurse, who used to come and shake the pillows and in pidgeon English, read me the extracts from the daily Continental edition of the "London Daily Mail." Most of her lingo was all Greek to me, but I got a general smattering of what was doing in the way of stoush over in France and learned how many ships were sunk yesterday. I lent her a copy of "The Sentimental Bloke" and often used to grin when I thought of her trying to decipher the rabbit-oh language of Denis, and striving to understand such expressions as "Strike me pink," and "She turned me down." The doctor in charge was a little rotund, cheery Swiss, a bit pro German, but not worrying much about it. My visitors were the wife of the manager of the White Star Line at Naples, the boss of the local Seamen's Mission, and a couple of swell Italian dames who couldn't speak a word of English, but who would sit for ten minutes or so smiling amiably and warbling to me a la Italiano. One of them, I gathered from Mrs. White Star, was a Marchesa with a lot of cash and marriageable daughters, but despite the fact that I used to spruce myself up before she arrived, I never met the daughters, which was distinctly bad luck for Italian society. After two weeks the nurse handed me a Roman bathrobe affair in which I wrapped myself and was consigned to a chair on the wide verandah, where I studied the passers by and waved cheerily to the housemaids of a big mansion opposite, who studied me carefully through opera glasses for a couple of days and then sent me over a basket of those luscious Italian figs which unfortunately the quack wouldn't allow me to eat. He probably attended to them himself.

The International Hospital was situated a little way up the heights behind San Martino and on the road out to Cap Possillipo. From the verandah I got a gorgeous view of the Bay of Naples and could study each little hamlet along the southern shores as far as Villa Maria. Every village had its lines of drying spaghetti and behind them the vine clad slopes ascended steadily to the base of Vesuvius, whose smoking dome dominated every-thing.

A week of the verandah and my little romance with the housemaids opposite came to an end. Having been kissed affectionately by the matron and being "dooked" by patients of various nationalities, I bade good bye to my friends of the International and removed myself and my effects to the Hotel Londra, which was my home for the next three weeks. And some hotel, too, where courtesy and service were treated as a religion hardly more pious than that of extracting the nimble coin of the realm from the pockets of the residents, by way of tips. Fortunately my expenses were being footed by the White Star Line, and if, later the bill was presented to the Australian Government, well, we should worry. By day, despite the loss of about three stone in my normal weight and a baggy feeling about the vest, I wandered all over Naples, flitting like the humble bee, from flower to flower and dipping deeply into the scenic effects provided by that wonderful city. At that time King Vittore Emmanuolo was up in the Trentino putting some pep into his army, so by a process of moral persuasion and putting the hoodoo upon the British Vice Consul, a charming young man with an engaging personality and beautifully cut clothes I succeeded in inviting myself to the Royal Palace. This entailed a visit first of all to the Detective Office, where I was photographed and examined with minute care, and to the Office of the Commandante Della Porto, or boss of the burg, who wrote me out a permit bearing my name and other particulars inscribed a la Italiano. I managed to keep a stranglehold upon that permit, and afterwards sent it home. Under the impression that it was some sort of naturalisation paper, my folk were very concerned until I subsequently wrote from England explaining the joke. The palace was, I suppose, much the same as other palaces, full of splendid tapestries and entirely devoid of those little knick knacks such as a parrot or a canary which make a place home-like. The royal bath, however, intrigued me and I was half inclined to buy it. It was situated in the centre of a large tiled room, the roof of which was entirely taken up by a painting representing nymphs disporting themselves at the babbling brook. The bath itself was let into the floor and measured perhaps 20 feet by 10 feet, being reached by a flight of steps and heated by a system of steam pipes concealed by artistic decorations. I could easily picture King Vittore spending some hours there blow-



ing soap bubbles at the fairies above until his Prime Minister came in to remind him that his Navy was waiting for him to review it. Vittore incidentally is, or was, extremely popular, until the Socialists in Parliament became strong and insolent. On one occasion, at the opening of Parliament, King Vittore stalked solemnly up the aisle while the Socialist members took off their coats, remained seated and lit cigarettes, thus showing their opinion of the monarchy. For a time Vittore's crown looked shaky, but Mussolini and his bunch of Fascists have pretty well cleared things up. Always dramatic, these people are nothing if not original, the formation and the operations of the Fascisti under Mussolini and D'Annunzio's little comic opera party up at Trieste were but typical of the kind of stuff the Italians love.

However, the Palace having been inspected and the usual tips handed round, I took to conducting a series of personally conducted one-man tours of places of note and for a couple of days browsed peacefully amid the faded glories of Pompeii, that melancholy relic of a once considerably advanced civilisation. Just a few weeks before I had waded through Bulwer Lytton's "Last Days of Pompeii," so was in a very good position to grasp the meaning of things without being bored stiff by the usual guides, whose fond approaches I waved haughtily away.

Quite by accident, I discovered the Bagna Possillipo, or municipal baths, where daily from 9 a.m. to noon I preened myself in the sun and took an occasional dive. These baths were the finest I have ever seen, containing everything from a restaurant to a dancing floor. The admission fee was one lira, which entitled you to a cubicle and a long bathrobe with a girdle at the waist. There being no sharks, the swimming area was unenclosed and embraced the whole Bay of Naples. Quite early I dug up an acquaintance with a couple of youths practising law, and who took their books along to the Bagna and studied under ideal conditions of personal comfort. They spoke fairly good English and during our daily corobboree evinced considerable interest in Australiana, with especial reference to kangaroo feather farms. A favourite haunt of mine during the afternoons was the little cafe at the Cap Possillipo, overlooking a beautiful green valley stretching away into the distance. But few people foregathered here in the afternoons, so I found plenty of time to converse with the little lady who tinkled the mandolin and quaffed huge mugs

of Busala beer. The way she climbed outside those tankards was an eye opener. She discussed in halting Inglesi the war and the fashions of various climes until dinner time was at hand and I departed cityward. She was the daughter of the proprietor, and although the custom is consid-



ered somewhat infra dig, she accompanied me to town on one or two occasions to toddle round the shops, and, as is peculiar to the sex the world over, bought everything with a cold, calculating eye, and displayed a rare talent at bargaining.

After dinner each night I had a destination which was never varied. It was the Cafe Americano which was reached by way of the Via Roma, the Funicular to the top of San Martino, a flower bordered road past the fortress and in through an old world gate, almost hidden by roses. The cafe was right on the edge of the hill and the tables were in the open air, but under a roof composed of wonderful vines and flowers which filled the air with an elusive fragrance. The whole place was almost like a story book, too beautiful for words, and sitting there at the little table by the stone railing I seemed very far removed from wars and ships and submarines. The view from there was one I recommend to those who draw comparisons between cities and one I never tired of looking at. The whole of that wonderful bay, the distant harbor with its shopping, the tall peak of Vesuvius and closer at hand and right beneath the city spread out like a panorama.

The twilight hours between sunset and darkness seemed to me worth the whole of the other hours of the day and no pen could describe the changing beauties of the scene and the peace and stillness which seemed to descend upon the whole world. The last rays of the sun sinking behind the distant mountains glittered for a time upon the white walls of the palace of the Duca Di Abruzzi situated high up on the hillside to the north of Vesuvius.

As it disappeared, the light seemed to become more pure and clear and things situated away in the distance stood out abruptly against the sky—even the muffled noise in the city below seemed deadened and from the convent over near Possilipo a deep bell tolled every few seconds as though ushering out the dying day. The voice of Mario raised in song at the far end of the garden and the tinkling of the guitars fell softly on the air. About nine o'clock the first faint stars appeared in the sky, advance guard of the vast army which by ten o'clock blazed from the big dome above. In the city below lights sprang up one by one until the whole place was lit up like fairyland. And when the moon was at the full, she swept swiftly up over the fortress on San Martino and flooded the bay in a wonderful silver light. A dull glow floated like a halo around the peak of Vesuvius, and sounds of revelry floated up from a thousand restaurants and open air cafes in the city. The denizens of the Americano were mostly gay parties bent on gloom chasing and one never lacked company or a cheery soul with whom to quaff a vermouth and seltz and toast perdition to the Tedeschi who at that time were busy over on the Somme. A few Americans, representing cotton firms, trickled in each evening and before long I got used to toasting Woodrow Wilson and the lads over at the White House. One or two Britishers were regular patrons, but as it is the way with Englishmen, stowed themselves in a corner and remained aloof from all others, lookers on, but not to be drawn into the fun. Thus time passed pleasantly until midnight, at which hour all hands descended in a body upon the Galleria Umberto where the revelry continued into the early hours of the morning. Usually one got to bed somewhere around about 3 a.m., but in Naples where life is on an entirely different plane, it seemed that half the population never went to bed at all.

Having had my Foreign Office passport vised, I made a journey on a luxurious train to Rome and spent a couple of days poking around among the ruins, and sizing up the burg generally. Thus the hours passed all too pleasantly until one evening up at the Americano I watched the dull grey hull of a steamer come slowly around Cap Possilipo. Her lines seemed vaguely familiar to me, and by and by I carefully noted the placing of the funnel and the squat masts, the position of the bridge and the deck houses—and with a sigh I took one last look at the glorious bay and the changing lights of the sunset behind Vesuvius. With a final "Buona Saras" to Mario I went slowly down the flower bordered road past the fortress, and descending in the Funicular, reached the waterfront

just as the boat from the "Anglo Calithumpian" came alongside the mole. Next day, I stood outside the wireless shack and with my spirits down to zero, watched the shore sliding past and caught a last glimpse of the little cafe nestling high up on the cliff at Possillipo.

Ahead were the waters of the Mediterranean, peopled by the tin prowlers of the deep—the long hours of the night watches with the port-holes shrouded over and just a pin point of light playing on the log book; the melancholy long drawn "All's well" from the lookout on the mast, the swift S.O.S. and the deathly stillness while the ops. on a thousand ships held their pencils poised for the

last message from some stricken vessel; and that creepy feeling up the spine when one wondered if one's own ship would get it next.

And behind was Naples, city of cosmopolitans, of laughter and of beauty—and how extremely appropriate was the second ops. first query, "Shall I put the accumulators on charge?" For the second op. was strictly business and in his make up none of that elusive stuff which had enabled me to enjoy every moment of my six weeks' stay in the city which is described as the most beautiful and the filthiest city in the world. Vive L'Italia, e Napoli!

A One-Valve Portable Super

By JOHN RAE

SINCE the invention of the "Unidyne" circuit in England some time ago, the writer has been eagerly awaiting the chance to purchase a four-element valve; it came, some two or three months ago, and until quite recently results have been rather disappointing.

On testing the valve—a Phillip's D.V1—was found to detect fairly well without H.T., but was inefficient when used as an H.F. amplifier; a marked improvement was noticed in both respects when a low plate voltage was applied. Rather than condemn the "Unidyne" circuit, which appears to have met with great success in England, the writer would suggest that the valve was too soft to be suitable for this circuit.

While experimenting with various hook-ups, a modified form of Colpitt's circuit was tried with gratifying results. At a very modest estimate it may be said that its performance surpasses that of a single valve set with re-action, while on account of its extreme simplicity this circuit is ideally suitable for a portable set.

As will be seen from the circuit diagram, the plate is directly connected to the aerial, rendering the set rather liable to oscillate. This trouble is not nearly so great as when a triode valve is used in the circuit with considerable plate voltage.

Should trouble be experienced in this respect, a variable (filament) resistance in the earth lead will stabilise matters.

A variable 0-6 megohm grid leak is advisable although not absolutely necessary; if a fixed one is used its value will have to be found by trial.

For portable work dry batteries are used. An accumulator in such a set is a never-ending worry; it has always to be carried vertically and the acid fumes are injurious to components. An Ever-ready L.T.3 battery, tapped at 3 and 4.5 volts is therefore employed for filament lighting, while the low plate voltage is supplied by one or two 2½ volt flashlight batteries connected in parallel.

At this impecunious season you will doubtless appreciate the saving in expense, while the economy in space and weight, will save the soul of many a mar who humps his "port."

For the sake of simplicity the filament rheostat may be omitted, although the practice is not to be recommended. In that case the grid leak must be variable.

Two or three basket or honeycomb coils, a plug for mounting them, and a .0005 variable condenser are the only other components required.

A word of warning to the uninitiated. A coil and slider can not be substituted for the coil and condenser as is usual in conventional circuits. A glance at the circuit diagram will show that the variable condenser prevents the short circuiting of

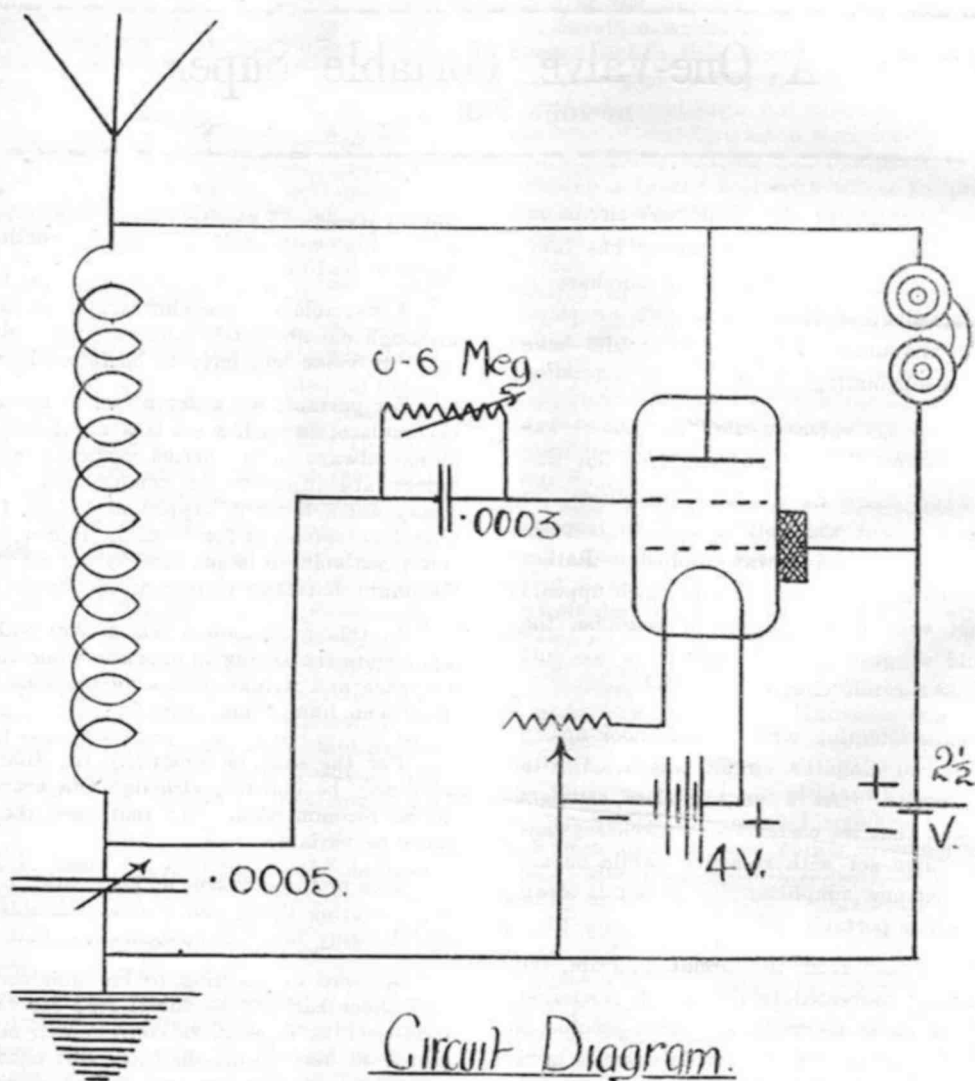
the high tension battery through tuning coil and 'phone.

The method of mounting will depend largely upon the case available, but a good plan is to make a wooden frame fitted with pigeon holes to take the components and fix it into the case. A cheap fibre one serves the purpose quite well, as there is no strain upon it.

Provision for aerial and earth must be made. The latter is quite easily arranged; a foot length of brass rod sharpened at one end, with a terminal screwed into the other, when driven into moist soil leaves nothing to be desired. This is accommodated in the lid of the case with two spring clips.

As regards the aerial, one cannot be so optimistic; a portable set has to put up with anything for an aerial, and about the best one can provide is a hundred-foot length of rubber covered wire with a stone attached, slung over a convenient tree.

Tuning is rather critical, but simple nevertheless. If the grid leak is variable, adjust it to its maximum resistance and turn the rheostat slowly to the position "on." A humming sound will be heard in the phones which will gradually cease as the filament brightens. The condenser should then be tuned to the desired wavelength and final adjustments made to the rheostat and grid leak.



Tuning is sharp although not exceptionally so, and if trouble is experienced in this direction, the introduction of a re-action coil between 'phones and plate will improve selectivity and would probably increase the range of reception.

In its present state this circuit has one great disadvantage. The writer has not yet succeeded in tuning down to the wave-length of 2BL or lower and aerials of very short length have been tried. Should anyone hit upon the solution to this problem I would be interested and grateful to know of it.

On a good aerial this set possesses undoubted possibilities, in fact good loud speaker signals might reasonably be expected at five miles range, but on an inefficient portable affair it is not intended to claim good reception at more than 20 miles.

Here are a few suggestions for modifying the circuit which might yield something worth while.

1. The use of a two-slider tuner to tune the plate and grid circuits.
2. Reaction coil between plate and 'phones as previously mentioned, coupled to aerial coil, and to
3. Reaction coil between auxiliary grid and H.T. positive.
4. Disconnect H.T. battery and connect together the terminals on the set which take the H.T. positive and negative leads.

The latter arrangement gives quite interesting results, and there seem to be possibilities of further development in that direction.

When it is taken into consideration that the complete set—provided a suitable case is available—inclusive of valve, batteries, and 'phones, costs just £5, and can compare favourably with sets costing three times as much, I think that when you have constructed and tested it, you will agree that it is a winner.

Editor's Note.—We would be grateful to know the results of readers' experiments with this circuit, and feel confident that when so many combine together the solution to the wavelength problem will soon be found, and maybe some novel and excellent circuit result.

FOR SALE—CHEAP.

One 4 Valve Wireless Set (Standard Make), complete with 6 volt. 120 amp. A Battery, B. Batteries, Aerial, Phones, and large Amplion Loud Speaker. Practically new. Demonstration given. Apply after 7 p.m., "Clyde-don," Kehellah Rd., Auburn (N.S.W.)

PICNIC CRICKET MATCH.

Amalgamated Wireless (A/sia) Ltd. v.
United Distributors, Ltd.

A MOST enjoyable day was spent at Sandringham on Anniversary Day, when the combined firms had their first "outing" together. Glorious weather fortunately made its presence felt, and from every point of view the visit to Sandringham was successful. A crowd of fully 75 persons — from the two firms — was taken by special buses from Sydney, and there was a happy gathering.

The cricket match resulted in a surprisingly easy win for the "A.W.A.," who scored 95. United were dismissed for 25, but they were excellent triers and good sports too

The outstanding performance in this match was the phenomenal success of bowler Frank Handley. His figures read: 9 wickets for 5 runs. He is heartily congratulated by the members of both firms. Owing to the excessive heat the athletic programme was abandoned; still the afternoon was not wasted. The beach was monopolised by the swimmers, whilst it was apparent that grassy slopes were availed of by many.

It is hoped that in the near future other picnics will be arranged.

Everyone present at Sandringham assisted to make the outing a success.

The organising committee desire to thank both the Directors and Management of both firms for the kindly assistance, financially and otherwise, which was given.

SCORES.

United Distributors Co.	A. W. A.
S. Wales 5	Thomas 6
R. Cooper 9	Brown 4
Stabbach 0	Handley 15
Davis 0	Baxter 5
Alexander 0	Hollingworth 0
Millard 0	Farmer 5
Thorpe 2	Borthwick 10
Call 6	Bodkin 3
Grace 1	Freney n.o. 9
Jarman 2	Bones 8
Luton 1	McIntyre 3
Weston 3	Nankervis 0
Wides 2	Byes 14
Byes 1	Wides 2
	Ball (No) 1

32

85

A.W.A. Bowling Analysis.

	O	M	R	W
Handley	8	5	5	9
Freney	6	1	20	1
Thomas	2	1	4	1

Care and Maintenance of "A" Batteries

By "Wireless Weekly."

PROBABLY more than 50 per cent. of broadcast listeners are still contented with their crystal sets for two reasons: (1) The valve sets are too expensive; (2) the batteries need a certain amount of care and periodical charging which they consider laborious.

Next week we intend to publish an article and a pictorial view showing full constructional details of a three valve set which is not at all expensive. This drawing is so explicit that we are sure the most inexperienced of our readers will be able to construct the set without any difficulty whatever. We quite realise that many of our readers are disinclined to learn the circuit diagram, then drill and mount the panel to the best advantage of the circuit used. Next week's article caters for them explicitly. If you read this week's article carefully you will be well prepared for the care of your batteries, the expenditure for which probably constitutes the most important item of the set which we propose describing.

"A" BATTERIES.

Voltage.

How many times has the question been asked "Is it best to buy a four or six volt accumulator?" The choice depends upon two things—the type and number of valves which you intend using. British valves operate satisfactorily with four volts but at least 5 volts are required for most American valves.

The life of the valve depends upon the life of the filament, which is absolutely dependent upon the temperature at which it is worked. It would appear then, that a four volt battery should always be used in preference to a six volt, but another factor which requires serious thought, enters into the question. If a large number of valves is used, the load on the accumulator will be considerable and therefore, unless the battery is of ample capacity, the voltage drop will be proportionally large. This means that after a little time the voltage will drop to such a value that insufficient current will flow to the filament of the valves and they will cease to function.

Those readers who intend to add extra valves to their sets will therefore be wise to buy 6 volt accumulators unless, of course, they purchase the unit type when an extra one could be added, when

the extra valves are in use. For a one valve set, there is very little to be gained by employing 6 volts for the filament, but very few readers, we are sure, are content with less than two valves and therefore we can arrive at the following conclusion. Always work the valves at the lowest possible filament current obtained from a six volt accumulator with a suitable filament rheostat in series.

Capacity.

The voltage having been decided upon, the capacity of the cells must next be considered. This will depend entirely upon the consumption of each valve and also the number of valves used. British valves generally take from .75 to 1 amperes filament current, thus the total consumption of four British valves would be about 3 amperes. It is evident therefore that a suitable battery to carry out the work of delivering a steady current of 3 amperes for a considerable time will have to be one of a fairly large capacity. Most American valves usually take .25 amperes filament current; thus four of this type would take 1 ampere. Before passing on we would like to make some mention regarding these two types of valves. The British make, although heavy in filament current is light on plate current; therefore life of B battery is long. The American type is light on filament current but heavy on plate current—therefore life of B battery is very short. So that, here again serious thought is required as to which type of A and B battery is most suitable to your own conditions.

The capacity of an accumulator is based upon the size and number of plates in each cell and is usually indicated by the maker in "ampere hours". For example if an accumulator gives 6 amps for 10 hours the capacity in ampere hours is given by $6 \times 10 = 60$ ampere hours. It should be remembered that the capacity depends to a very large extent upon the rate of discharge and therefore would not give 12 amps for 5 hours, as might be expected.

Discharge Rate.

It will be learned from the previous paragraph that to determine the capacity of a cell required to perform any particular duty, it is only necessary to multiply the current used, by the

number of hours during which this is to be delivered before recharging is necessary. If we decide to have our battery charged after 10 hours' service using four British valves, the capacity of a suitable battery will be given by $3 \times 10 = 30$ ampere hours

Maintenance.

Small accumulators require a very fair amount of attention to keep them in good condition and care should be exercised in connection with the electrolyte, sulphating, corrosion, charge and discharge rate. The behavior of a cell depends to a great extent upon the strength of the electrolyte; it is absolutely impossible to work a cell efficiently if the acid is not of the correct specific gravity. This electrolyte consists of dilute sulphuric acid prepared from pure acid and pure water. To prepare the electrolyte, the water is placed in a glass or earthenware container and the acid added little by little gently stirring to ensure thorough mixing. This process of mixing will cause a large amount of heat and it should be carried out with the utmost care.

A Word of Warning.

Always add acid to the water, never water to the acid, as the chemical action produced by the latter would be very dangerous. The specific gravity is determined by means of a hydrometer. The usual value for small accumulator acid is 1200 but it is usually marked on the cell by the makers. The electrolyte should always be allowed to cool before a reading is taken; if the value is too low add more acid; if too high it indicates an excess of acid. The electrolyte should just cover the tops of the plates; this of course in time evaporates and if it is not made good the acid will soon fall below the tops of the plates. It should be remembered however that although the quantity of liquid in the cell has been reduced, no acid has escaped; it is essential therefore that this deficiency should be made good by adding pure distilled water. If however, the solution is lost by leakage, or the battery is upset, this must be made good by the addition of electrolyte of the correct specific gravity. When a cell is discharged the specific gravity is lowered and therefore should an accident occur in this condition, the added acid should have a lower gravity, 1180 or 1190

Sulphating.

All cells have a tendency to sulphate and unless they are regularly attended to they are liable to be ruined. Sulphate may be caused by one or more of three things. Whenever the accumulator is allowed to stand idle, the acid acts very slowly

on the plates, gradually causing the formation of a thin film of sulphate. If this condition is allowed to continue, the sulphate becomes harder and harder until it is almost impossible to remove it. A battery which is not in use should be given a charge for two or three hours every two or three weeks, thus keeping the plates in an active state. Another very frequent cause of sulphation is the exposure of the top of the plates. It is always possible to prevent the formation of sulphate in this way if the level of the electrolyte is regularly examined and kept well above the plates.

A more obscure reason for the formation of sulphate lies in the strength of the acid. The stronger the acid the greater the tendency of the battery to sulphate. Too much attention cannot be drawn to the necessity of keeping the acid at the correct density. If through neglect a cell has become sulphated, it should be charged up at about half its normal rate for at least 40 hours and immediately discharged through a lamp and then recharged slowly. When a cell is to be put out of use for any considerable time, it is a good plan to charge it and then remove the acid and replace by pure distilled water.

Corrosion.

Every precaution should be taken to keep the brass terminals from the corrosive action of the acid. It is usually not sufficient to wipe off the acid from the brass; it is preferable to wash with water containing a little washing soda, as this has the effect of neutralising any free acid which may remain behind. It is advisable to smear all the brass work with a thin coating of vaseline.

Initial or First Charge.

The makers issue directions which must be carefully carried out if the battery is to be maintained in a state of efficiency. The general plan is to give a prolonged first charge. The acid will fall in specific gravity as soon as it is poured into the cells and will continue to do so for the first 12 or 18 hours. During the charge it will gradually rise and the charge should not be considered until the voltage and specific gravity shows no rise over a period of 5 to 6 hours and gas is being given off freely from all plates. At the end of the charge the voltage will have risen to 2.5-2.7 volts per cell. After the charging current is cut off, the voltage per cell will have fallen to 2.2 volts. The hydrometer reading is the most reliable guide as to the condition of the battery, but the following tests for completion of charge will no doubt be useful.

1 Appearance of plates (positive, chocolate brown; negative, slate grey).

Final Precautions.

Give proper initial charge; charge at correct charging rate about one fifteenth of normal capacity;

Do not charge too much or too little, or at too high or too low a rate;

Do not run batteries too low in voltage or specific gravity—charge once a week if possible.

Sediment should not reach the bottom edges of the plates. Keep plates covered with electro-

lyte, making up evaporation losses with distilled water;

Test strength of acid periodically;

Keep terminals and top of cell clean and dry and terminals coated with vaseline.

If your local garage man charges your battery ask him to give you a density reading before he hands you your battery. If it costs you a little extra to have your battery well charged you will be well repaid in the long run

"THE LIAR."

A FOOL there was, and he spent his dough
(Even as you and I)
For one of these new-fangled radio,
That was built for a hundred miles or so;
But the fool thought he ought to get Tokio
(Even as you and I).

Oh! the money it cost,
And the sleep he lost,
And the wonderful lies he planned
To tell to the fellows who hadn't got wise;
And never will understand.
And unless they're bugs they'll never get wise,
So the fool stayed up all night and tried
(Even as you and I).

To get the stations away outside
His natural zone, just to swell his pride;
When he said he got them, we knew he lied
(Even as you and I).

Oh, the stations he got,
And the ones he sought,
Are always one and the same
To the radio bug who has learned how to lie;
And we all know how easy one lies
If he's in the radio game.

—"World Wide Wireless."

**AN EXTRACT FROM A LETTER
FROM VICTORIA.**

"I casually bought a copy of Wireless Weekly a few weeks ago and the following morning gathered in all the back copies I could lay hands on. To save any further disappointment I want you to place me on your subscribers' list."

Where there's Wireless, there's Wireless Weekly ————— Isn't it so ?

EXCELLENT RECEPTION IN BRISBANE.

During the Christmas Holidays Mr. L. O. Kerlin, Manager, Mick Simmons Ltd., Radio Dept., paid a flying visit to his home in Brisbane in order to test out the various models manufactured by his firm. The results obtained were particularly good considering the amount of interference one has in Brisbane. Owing to the fact that as yet Brisbane has no broadcasting station, the bulk of the amateurs try for Sydney the result being that the howling valve menace is even worse than in Sydney. He picked upon the loud speaker the following stations:— 2BL and 2FC (Sydney), 3AR and 3LO (Victoria), 6WF (W.A.), 2YK and 1YA (New Zealand), and KGO (America). Numerous Sydney amateurs also came in at great volume.

A.W.A RESEARCH LABORATORY EQUIPMENT.

At considerable expense Amalgamated Wireless (Australasia) Limited has added to its Research Laboratory Equipment a Multi-Vibrator designed by D. W. Dye B.Sc., A.C.G.I. of the National Physical Laboratory, London.

This instrument is the only one of its kind in Australasia and we believe that there are only three or four such instruments in existence.

It is designed primarily for the absolute measurement of wavelength from which various other electrical values may be determined. By means of harmonics selected from a carefully designed tuning fork maintained in a state of vibration by means of valves and unlimited range of frequencies may be covered.

The instrument before shipment to Australia was calibrated at, and accompanied by certificates from the National Physical Laboratory, London, and is probably the only absolute standard of wavelength in the country. This apparatus, together with numerous other certified electrical standards which have recently been acquired make the Amalgamated Wireless Research Laboratory one of, if not the best equipped, south of the line.

A THREE VALVE PORTABLE RECEIVER

In the summer week ends, one's fancies lightly turn to thoughts of country motor tours or to camping parties out on one of the beaches. With the advent of week end broadcasting and with the new "B" class stations on the air, a portable set will add very materially to the enjoyment of open air outings. The set described in this article was designed and built by Mr. W. A. Stewart, whose articles are well known to readers of this paper, and is so arranged that everything, including loud speakers, batteries and aerial is incorporated in the one box which may be carried by a single strap. The set is not expensive, and as all the parts used are of standard make they may be obtained anywhere without trouble. We are indebted to the following firms for their courtesy in lending us the parts necessary for constructing this receiver:

Fox and MacGillycuddy Ltd.

Harringtons, Ltd.

Western Electric Co. (A/sia) Ltd.

Amalgamated Wireless (A/sia) Ltd.

Colville and Moore Ltd.

Pacific Electric Company Ltd.

Warburton Franki Ltd.

This portable receiver was tested extensively in and around Sydney and at various places as far out as Blackheath, and it gave consistently good loud speaker performance.

There is nothing peculiar about it, the circuit being the familiar P1, and two stages of audio amplification, this circuit being chosen for its few controls, simplicity of wiring and operation, and cheapness. This set itself is as compact as possible, and when fitted into the cabinet the overall dimensions are only two feet by one foot, by nine inches wide. This space can be somewhat reduced by the use of a smaller speaker, but at the time of building the original set the only small speaker obtainable was the Small Western Electric, and the cabinet had to be built accordingly. Here is a list of parts used in the original receiver, although other makes may be used if so desired.

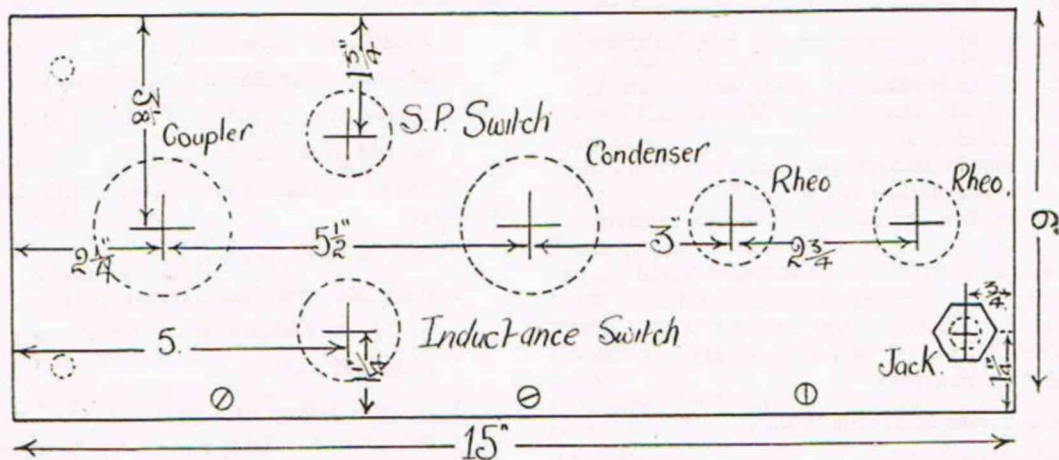
- 1 Panel, 15in. x 6in. x 1/8in. (bakelite).
- 3 Dry cell Valves (Phillips B2 with American base).
- 3 Sockets for same.
- 1 4½ volt Dry Battery (Eveready).
- 2 Audio Transformers (Jefferson 41).
- 1 60 volt B Battery.
- 1 Small Gilfillan Variocoupler with Internal Winding.
- 1 .001 Variable Condenser.
- 1 Back Mounted Inductance Switch.
- 1 Series Parallel Switch.
- 1 Plug and Jack.
- 1 Small Western Electric Loud Speaker.
- 1 Pair Brandes Telephones.
- 1 Fixed Condenser, .00025 with clips.
- 1 Fixed Condenser, .002.
- 2 30 ohm Rheostats (K & C).
- 2 Terminals.
- 1 Wooden Baseboard 15in. x 7in. x ½in.
- Panel Wire, Flex, etc.

In building the set first see that the panel is squared up and of the right dimensions, and then drill as shown in Fig. 1. The holes along the bottom are for securing the panel to the baseboard. It will be seen that on the panel there are the variocoupler, the variable condenser, the series parallel switch, the inductance switch, the two rheostats, aerial and earth terminals, and the jacks.

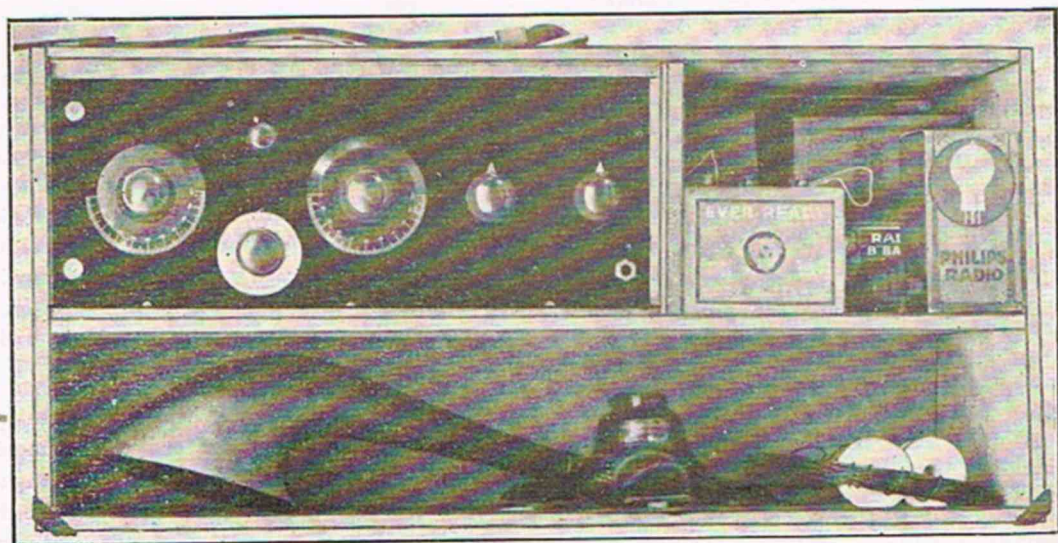
On the baseboard we have the three valve sockets, and the two transformers, mounted as shown in between the two sockets. This arrangement of the various components keeps the leads as short as possible, and makes the set easy to wire. It will be noticed that the grid condenser is secured directly to the valve socket and a fixed

grid leak is used. It will also be noticed that no terminals are shown for the batteries but that instead, pieces of flex are soldered to various parts of the circuit and taken through the partition in the cabinet to their respective batteries. The circuit diagram is shown in Fig. 2 and little trouble should be experienced in following it.

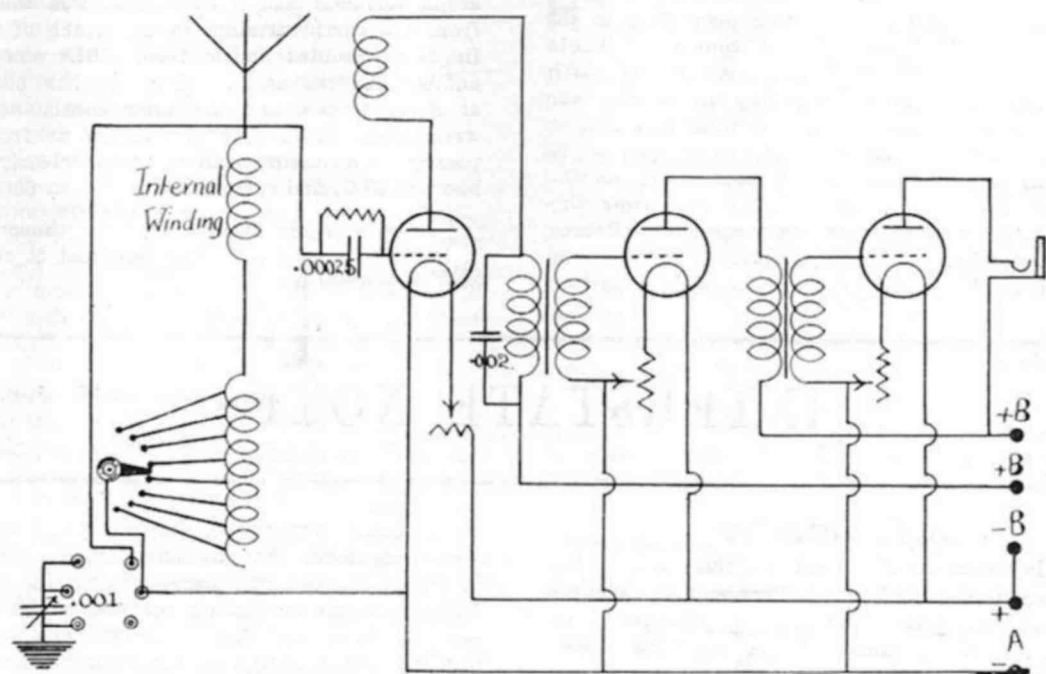
With regard to the aerial, any sort of wire may be used, but it is advisable to use something flexible, such as single bell flex. This is wound round a reel and one end of the wire is attached to an insulator. To this insulator attach about twenty feet of strong string or cord, and on the end of this fix an ordinary leaden sinker; it is



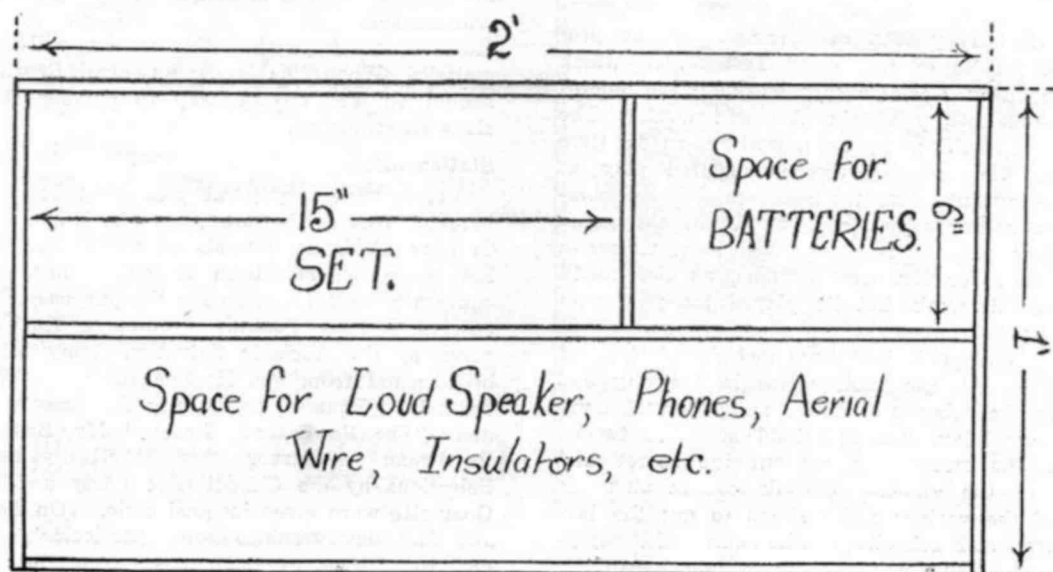
Showing Panel Drilling.



The Complete Receiver.



The Circuit.



Measurements of Cabinet.

(Continued from page 20)

then quite a simple matter to throw this sinker with aerial attached over a tree or similar object, the other end of the wire being made fast to the aerial terminal of the set. A convenient length for the aerial is 80 or 90 feet. As for the earth connection, a metal spike a foot or so long can be driven in the ground or a counterpoise can be run out under the aerial. If you happen to be in a car a connection to the metal work on the car will give good results. The first time this set was tested it was taken in a car out to Botany Bay, and after finding a suitable tree, some 80 feet of 20 d.c.c. wire was thrown over a branch

about twenty feet up; no insulators were used, as we forgot to take them. The wire was brought in through the windscreen, and made fast to the aerial terminal and a connection was then taken from the earth terminal to the brake of the car. In five minutes music from 2BL was clearly audible 30 feet away. The set has been tried at many places, and the same consistent results were obtained, showing this to be no freak happening. Amateur stations were clearly heard, likewise 2FC, and commercial traffic on 600 metres.

Details of the cabinet used are shown in Fig. 3, but of course this can be modified to suit your own requirements.

INTERSTATE NOTES

SOUTH AUSTRALIA.

AT last the A class broadcasting license has been issued. Central Broadcasters Limited have been the successful applicants. Although Mr. E. J. Hume's station would have been the more popular choice, everybody is pleased that the question of the A class license has been settled.

5CL Broadcasts Cricket Results.

Radio in South Australia has received a tremendous boost. Central Broadcasters Ltd., conceived the happy idea of broadcasting the progressive results of the Third Test Match which was played in Adelaide last week, and a microphone was set up at the Adelaide Oval. The services of Mr. Jack Lyons, a well known old time cricketer were secured to describe the play at short intervals. Mr. W. Smallacombe, the company's announcer gave each stroke of the game as it was played. It must have been rather a trying time for Mr. Smallacombe, as the match lasted a full week, but he played his part well and is to be commended on the clear manner in which he gave out the scores and descriptions of the game. All the radio shops in the city and many in the suburbs and also many private owners of receiving sets had loud speakers turned towards the street belching out the scores and results of the game. Crowds congregated in front of the various radio shops to get the latest scores and schoolboys who were still enjoying their summer holidays sat at home with the headphones glued to their ears, and many a school-

boy's mother found the simple crystal set to be something more than a mere toy, as she shared in the excitement of listening in on the big test. 5CL's transmission during the test match was the best we have had from that station, and radio has had such a boost that the trade has brightened up very considerably. There has been a tremendous demand for loud speakers. There is still much room for improvement in the studio transmissions of 5CL; the trouble seems to be in the microphone which, although suitable for speech transmissions, is not at all suitable for music. However we hope that this matter will soon be rectified. When this is done Central Broadcasters should be well on the way to putting out first class transmission.

Station 5DN.

It is with very great pleasure that broadcast listeners receive the news that Mr. Hume, of Park Terrace, Parkside, intends to accept the B class license, which has been issued to him, and to equip a powerful station for the purpose of broadcasting. Last Tuesday evening a fine concert given by the Adelaide Salvation Army band was broadcasted from Mr. Hume's station. The cornet solos "Titania," by Deputy Bandmaster Boase, and "The Song that Reached My Heart" by Bandsman A. Turner were beautifully rendered. Selections by the Citadel Glee Party and a Male Quartette were given in good style. On Thursday and Saturday evenings some particularly fine items were given by local artists from this station. A number of selections played on a one string

fiddle by Mr. W. Edge proved to be very good items, the tone of this instrument being very pleasing to listen to. Several organs solos by Mr. J. B. Jones were received, the tones of the organ being beautiful. Piano solos and songs rendered by male and female artists and several recitations helped to fill up the programme. The arranging of the concerts was done by Mrs. Hume who also did the announcing. Mrs. Hume deserves great credit for what she has done to help radio in South Australia. Mrs. Hume is a real radio enthusiast and seems to have been well bitten by the radio bug. The transmissions from Mr. Hume's station have lately been wonderfully clear, the modulation is perfect, and listening to this station on the loud speaker going full blast is just like listening to the real thing itself.

Among the Experimenters.

The bulk of the experimenters here have forsaken the canned music box and have taken to key punching. It is the exception rather than the rule to hear gramophone music from the experimental transmitters. Several of our local hams have now got down to short wave transmission below 100 metres, while low loss tuners are very popular. American hams are being logged by the score, and several English amateur stations have also been heard.

VICTORIAN NOTES.

Wireless as She is Novelised.

HERE is an elegant extract from the latest novel, now appearing in the "Age." You will observe it is not by William Le Quex, who they say bases his sensational episodes on an expert knowledge of wireless. But for sheer and vivid imagination give me that "crackling of blue fire at the masthead." I wonder how the "Maconi operator" appeals to "Brasso?" Doubtless to Phillips Oppenheim he appears with horns carefully hidden away under his peaked cap and a tail terminating inconspicuously in his sea boots. In capable hands fiction still manages to be stranger than truth. But listen-in; they are on board a yacht; the hero speaks to the daughter of England's Prime Minister:

"It's very nice to get you all here. It must be rather a relief to your father to be right away for a few hours. No messages or cables possible. Hullo!"

He looked up at the masthead. There was a little crackling of blue fire there.

"I'm afraid I spoke too soon. A wireless for somebody. I meant to have had it disconnected."

(Continued on page 26)

Just a Word of Advice

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3/20 Navy, per 100ft.	2/9
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3/20 Bare Copper, per 100ft.	2/6
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7/20 Lead-in, yard	7d.
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Freshman .001, 2/9; .00025	2/6
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The Marconi operator presented a message to Lord Yeovil. He tore it open, nodded, and waited till the young man had retired.

Long Distance Telephony Reception.

One good result of getting tired of the unvarying ease with which 3LO transmits is that an experimenter is tempted further afield. There are 14 broadcasting stations now in Australia, and has any one pair of ears heard them all? To make a tour of them all in one night would be something of a tour de force. This present gatherer of notes (journalistic, musical and other) was guilty on Friday night last of peregrinating the ether in search of as many telephony stations as could be picked up. Be patient with me when I confess I had only one valve and yet was favored with items from 2FC, 2BL, 5CL and possibly 7ZL, besides, of course, 3LO, 3AR and finally 3XF. The range was thus over 400 miles for audible telephony on one valve, and how many INAUDIBLE stations knocked vainly on the grid, who knows? To do this sort of thing requires what "Insulator" calls "stickoutiveness" and a high frequency resistance to the blandishment of Buckley and Nunn's orchestra, which although so tiny as to have been photographed for the press in a microphone (or so the inscription sayeth) is large enough to fill both ears very melodiously and tempt one away from further flights. Having evaded these sirens by opening up your condenser throttle or plugging in smaller coils their faint notes presently faded into the blur of 2FC's carrier wave, and the last imperceptible twiddle of the condenser knobs puts you suddenly en rapport with Sydney and its genial announcer. Having got his number, out come the big coils and you plug in the lower wavelength set. I won't tell you here how I do it, but in defiance of conventions I can range from 3BU up to 3AR and over—about 230 to 600 metres—and get pretty nearly everybody fairly loud, by condenser, tuning, filament adjustment, and juggling with the coils. You hear a lot of static and still a lot more about it, when using more than one valve, but heaven bless small things and mercifully reduces static when one valve only is in use. To hear 2BL faintly piping and gathering strength and at last to get that exasperating . . . L with the numeral and first letter obliterated, as if Dives were calling from his last abode is very thrilling, and makes one wish the fruity-voiced announcer would always call "2BL, Sydney" as at last he did. Then up and away to a little higher wave length where a welcome whistle arrests one, and there is "5BL, South Australia," announcing a song. For some reason our neighbour in the West is not so familiar to us as Syd-

ney, although the distance is about the same, and 5CL and 5DN have always something worth listening to. Creeping a little nearer to 3AR's territory another faint whistle comes and goes within one condenser degree and right in the heart of it a still small voice and a patch of elfin music that might be from Hobart, or New Zealand, or Chicago, or elsewhere, but at any rate not from 3AR. After that, the deluge of amateurs and Morse and cheery chats between 3BU and his pals completes the evening's entertainment, earned by strenuous concentration and delicate fingering. To tune in such distant stations requires a keen ear and a sensitive touch and a mind alert and so far as technique goes is exceedingly like playing the violin. As a fiddler becomes enamoured by his responsive instrument, so also do we who fiddle on a wireless set, and when music born of murmuring sound both float at last out from strange discordances there is a complexity of emotions produced. The pleasure of the music heard, the triumph of attainment, the suspense of attaining the announcer and his call sign, the last long lingering loving touch of final adjustment, that as likely as not upsets all the preliminary advantages, and then there you are again on the threshold, knocking humbly for admittance—until perhaps, like the foolish virgins, your lamp goes out and you are left lamenting. Have you got those fourteen stations at one sitting yet, or do you always travel express to 3LO? For me, a ticket to Perth.

Moscovitch on Wireless: Can plays be Broadcast.

In a recent interview this accomplished actor expressed his doubts as to the feasibility of adapting the drama to wireless transmission, and everyone who has had the privilege of watching Moscovitch act is very likely to agree with him. As an antidote to too much listening in it behoves all who have wireless to attend the real thing in drama and music at least once a year, and preferably fifty times as often. So the opportunity was taken to attend Moscovitch's staging of "The Outsider" last week. You can broadcast music and speech; but not action and eyes, nor what most people go to see in a ballet. As one hangs over the lofty rail of the family circle (better known as "The Gods") at Her Majesty's, and looks and listens while the players play their parts, let him transport himself in fancy to the backblocks with a pair of wireless telephones, or a loud speaker peopling the solitudes of the bush with the creations of the tragic muse. Then let him open his eyes again on that stage below him, where living men and women move and say their parts. What a difference! Of course there will be plays

written to suit wireless, but, after all, the essence of acting is to ACT. The face of Anton Ragatzky as he spat in derision at the discomfited doctors; his subtle gesture as he repeated "He loves you; he loves you!" indicating only by his hand over his heart that he meant not the absent wooer, but himself; the nervous fingers of Miss Robertson when impersonating Lalage Sturdee, she SHOWED her perplexity while VOICING her determination; these are fine touches outside the audible frequencies of transmission. But even if these too were transmissible, as doubtless they soon will be, what of the audience? There is an atmosphere in a tense audience that thrills each individual as the telling points are made. You are not alone. The sea of dim faces around you, agitated into waves of varying emotion, has a reflex action on your own sensations and you too vibrate more strongly than if you were alone. Maurice Moscovitch is right. When he ordered Miss Sparkes off the stage and she simply tapped her foot and cast down her rebellious eyes and wouldn't budge an inch, how could you get THAT by wireless. She was not that sort of sparks.

Popular Shibboleths in Wireless.

One cannot take up a recent book on wireless without noticing how many statements are repeated from one to another without any very evi-

dent attempt to verify them. Prominent among these is the damnably reiterated assertion that crystal reception is sui generis clearer than any other. In fact, if the statement is to be believed, it is only the painful fact that most of us like louder results that prevents valve manufacturers from going out of business. But is it? It has been remarked before in these notes that even if Melba's mellifluous voice bellowed its top-note in our ears there would be a distinct loss of the *sauviter* in *modo* as compared with the fortiter in *re*—or, in other words, over-tones and roughnesses of timbre and all sorts of musical incompatibilities would become very painfully apparent. It is only due to the very fact that crystal reception is strictly limited in volume that it appears to ordinary ears so excellent in modulation. Of course, it can be magnified—or, in other words, amplified—by a valve, and when a valve is used strictly as an amplifier it is theoretically almost or even quite impeccable, and yet the amplified crystal output can at times be very blatant. On the other hand, what statistics are there as to the actual comparative tests by a musician of music as received on a crystal and the same as received on a valve? The mere plotting of curves to show that the crystal is almost a pure rectifier and the valve isn't is rather beside the question.

WIRELESS

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Modern musical instruments are not designed to give simple musical notes. Their sounds are full of harmonics and overtones, and it would require a very highly-trained and hypercritical ear to differentiate between the original musical note and its reproduction in gramophone, telephone, or loud speaker. It can be done, of course, and in a sort of way it has to be done by those who construct or choose between such reproducing instruments, but it is evident that a telephone actuated by the faint vibrations passed by a crystal is not under the same disabilities as when energised by the plate current of a valve. The point is that we pay too little attention to the part played by the telephone diaphragm in murdering our music. Most telephones are chosen for their sensitiveness to Morse, and one much-advertised brand exploits its connection with certain efficient fighting forces, as if the drumming of Morse in our ears were necessarily the supreme test of an instrument we would choose to convey to use the dainty fingering of a first violin or the fairy overtones of a flute. In addition to possible shortcomings of the instruments themselves, however, what of our own ears? It is just possible that, although we can distinguish the buzzings of a bee from the trappings of a bull's foot, we may not be quite so sure of the difference between B sharp and C, and in this age of the piano who shall blame us? Even the violinist has to bow before the limitations of the piano octave, and the point is that, although there is a vast difference between music straight and the same by wireless, yet we are a complaisant people and accept the substitute readily enough, just as the eye accepts black and white drawings in lieu of half-tone and colour. This being so, why be so benign as to put the crystal on its little hard head for being so much more perfect than its hard-working brother valve, when we don't really know ourselves if there is so much difference, after all? Strange what a difference should be 'twixt Tweedledum and Tweedledee! As a matter of fact, those who have found crystal reception clearer have probably done so because they were inclined to force the valve, and were mercifully unable to force the crystal.

More Shibboleths.

«The remarks on the crystal shibboleth were induced by an entertaining book, "Radio for the Millions" recently published by Hodder and Stoughton. Like most books written for the millions, it is not free from stupid errors that a little care should have excluded. The "Edison effect," it is stated, is merely the discolouration of the interior of vacuum tubes that have been long

in use, whereas the "Edison effect" is really the unilateral conductivity of the vacuum in the neighbourhood of a glowing filament. Fleming did not discover this, as stated, but investigated it and applied to the rectifying valve.

Another misstatement is that the microphone current is very weak, and before it can be put out on to the ether it must be strengthened." Now, as a matter of fact, the microphone current is no more put out on to the ether than is the fiddlestring converted into sound. A further error that finds its origin in some ingenious speculations by Lodge (but not its justification) is that ether waves once started never die completely away, but that, for instance, "the voice of Napoleon urging his troops forward at Waterloo" may be heard again on a return wave of the ether. How it got on to the ether from its proper vehicle of mere air the awestruck author does not explain. Lodge's notion is that an ether-wave of light or other electrical disturbance does persist in an uninterrupted journey through space if not absorbed by the earth's atmosphere, and if it succeeds in dodging also the influences of other a nucleus for other valves, and altogether set planets, and stars may continue on until it forms a nucleus for other waves, and all together set up in course of time another world in space. As they travel with the speed of light the mere earth is not likely to catch up with them again, so we need not fear that historians will ever be refuted by the actual last words of great heroes materialising again out of the ether.

(Continued from Page 8)

held the station for 51 minutes, and his log corresponds very much the same as the results of Mr. McCullagh.—Editor.)

LIGHTNING ARRESTERS.

(To the Editor).

Sir,—I only wish my crystal detector had as many sensitive spots as Mr. Taplin. Whatever I say about lightning arresters seems to be taken by him as personal abuse. Does he wear one in his hat? Once again I assure him that I have the greatest possible esteem for him personally. It is only as an *advocatus diaboli* of the so called lightning arrester that I do not love him. Incidentally I might point out that in his previous letter he called me a fool and in my last I said he was no fool, so we will call the item about personal abuse a draw. Now to business. He says he showed my assertion about a "decent tuning coil" being a protection against lightning to be

wrong. I asserted nothing of the sort. I said that earthing the set was sufficient. He claims to have informed me that arresters are fitted to electric light wires at frequent intervals. I most emphatically give him the life. They are NOT. The active lead of electric lighting wires runs into the poor unprotected private house like a sword of Damocles and hangs over the householder's devoted head without any lightning arrester or other lawful excuse to justify its threatening behaviour. What on earth Mr. Taplin can say in answer to this I can't possibly foresee, but not even the publication of my immaterial name can alter the plain facts. He speaks further about being most concerned with direct discharges from clouds, having apparently been dislodged from his previous letter's dilation on inductive effects, and he gives an awful example of an unearthed pole that received a flash from the clouds, and became reduced to a bunch of celery, which he expects me to chew over. Well! In the first place the line itself was presumably earthed on the neutral side. So Mr. Taplin doesn't blame the wire. He has now got up the pole instead. But nobody was talking or disposed to talk about earthing a wireless pole. Not even the Underwriters have committed such a faux pas. But at any rate the other poles were merely earthed, and yet escaped scatheless. No question of fitting arresters to them! In the last place Mr. Taplin really should do me the same courtesy I extend to him, and read the letters he attempts to answer. I did not say or imply or leave to be inferred the absurd statement that because an aerial is only 60 feet long it does not require protection. On the exact contrary I pointed out from the very first that an aerial requires to be efficiently earthed and that it IS so earthed through a decent tuning coil, particularly when no series condenser intervenes.

I further stated that the whole paraphernalia of transmission line protection belongs to inductive surges that do not take place in a short line like an aerial. Last year the Melbourne electric railway system was frequently upset by electric storms, yet nothing was heard of damage to the thousands of aerials in the same locality, many of which must have been totally innocent of so-called protectors. Moreover, as I said before, nobody fits these relics of superstition to sewerage vents, iron roofs, spires, chimneys, reinforced concrete in course of erection, the house end of lighting wires, sheet poles, trees in parks and gardens, or any other standing invitations to lightning strokes. We don't even wear them in our hats! Yours etc.,

ION.

Melbourne, 28/1/25.

RECEPTION AT PORT MORESBY.

Extract from letter by Leo. C. Cusack, Radio Station, Port Moresby, to the Wireless Institute (N.S.W.)

"Have applied for an experimental license myself and my application has been approved of by the local administration, and I expect to receive my license next month. To date have been unable to draw power from anywhere, and the local power scheme will not be complete till April 1. Have a complete transmitting set completed and ready for work the moment power is laid on. My short wave receiver has been in operation for some time, but only ranges from 25 to 110 metres, although receiving conditions make work impossible on 600 metres, reception on short wave from all the short wave stations heard in both N.Z. and Australia on 1 Det. and 1 L.F. is so good that fast commercial work could be carried on without difficulty under all conditions.

Am attaching list of stations in N.Z., U.S.A., and Australia heard working on waves between 75 and 110 metres.—Yours etc.,

Leo. C. CUSACK."

List of stations heard on waves between 75 and 110 metres.

Aerial, single wire, 50 feet long, 30 feet high.

Receiver, Det. 1 L.F. Sigs. maximum strength 9 audible 50 feet from phones.

Australia	Strength	4AK	...	8
2AY	...	8	4AG	...
2YG	...	7/8	4AA	...
2GQ	...	6	U.S.A.	Strength
2HM	...	7	6CTO	...
2BK	...	7	6AO	...
3BD	...	5	6BUW	...
3BM	...	6	6TI	...
3JH	...	6	7WM	...
5BG	...	5	9QDU	...
N.Z.	Strength	9ZT	...	5
2AE	...	6	9AZO	...
2AC	...	8	3CJN	...

Mr. Perrett, Publicity Officer of the Wireless Institute, has bought a Ford. One night lately, he was cranking her up and the darn thing back fired and kicked him, nearly breaking his arm. Some people call a Ford a cow; but Mr. Perrett will tell you that the cow can surely kick. We hope it doesn't run out of its stall some night and bite him.

Bakelite v. Ebonite v. Other Insulators.

By E. Joseph.

IN the issue of *Wireless Weekly*, dated the 23rd January, 1925, there appeared a copy of a test sheet prepared by the Electricity Department of Sydney Municipal Council.

Radio enthusiasts are interested in these substances because they form so many parts in a modern set. Rheostats and potentiometers are sometimes constructed on bases of bakelite, but seldom on ebonite. Condensers have end plates—or insulation bushes—of them, valve sockets are moulded and terminals are sometimes covered with them. Knobs and dials are made of ebonite bakelite, celluloid (occasionally the former are of metal) or of condensite.

The choice of material for these parts rests with the manufacturer and a number of considerations must influence his decision to use one or the other of them and of these, cost is not the least important.

Panels for radio sets are usually of bakelite or ebonite although in a few cases metal is used but these cases are so rare that we may neglect them. Before proceeding to discuss the properties and relative utility of these substances let me emphasise that I hold no brief for any particular material or brand, nor am I in any way subsidised. The opinions expressed are based solely on an experience covering many years' handling, working, and testing insulating materials of all kinds. The test sheet referred to in my opening sentence was published, I presume, to assist readers in their choice of panel material. Let us take seriatim, the 5 tests mentioned therein and consider how they may affect our choice.

No. 1: Immersion in water for 48 hours; clearly this is of some importance, because a substance which will absorb water on prolonged immersion will absorb sufficient moisture from a damp atmosphere to adversely affect its use as a panel. Ebonite, it is stated, absorbed practically none which makes it satisfactory on this score; but bakelite! 84 per cent. of its own weight! That is to say 1lb of bakelite would increase in weight to 29 ozs. This indicates that bakelite is totally unsuitable for radio panels, parts, or any other insulating purposes. There is a "nigger in the woodpile," however, and to dig him out it will be necessary to give a little consideration to the structure and composition of the materials. Ebonite is black vul-

canite. It is a compound of rubber, sulphur, colouring matter and a certain amount varying with its quality, of "loading" or "filler." The plastic mass of well mixed ingredients is rolled or pressed into the desired shape and is subjected to a moderate degree of heat for some time, 20 to 60 hours usually. This causes the sulphur to combine chemically with the rubber, producing the material known as "vulcanite," the heating process being called "vulcanising."

Bakelite is a peculiar material resulting from a complicated chemical process which occurs when a mixture of phenol and formalin is gently heated. Bakelite is, in its original form, a syrupy varnish-like liquid, of a brown colour. If this varnish-like liquid is heated to a temperature not far above that of boiling water, it undergoes a remarkable change. It changes into a spongy mass which cannot be re-converted into its varnish-like state again. If this heating is carried out under a considerable pressure the spongy mass is not produced, but instead we get a hard—very hard, in fact—close grained mass. Colouring matter may be added to the varnish to produce a black appearance. It is of this material that bakelite knobs, dials, and the other intricate parts are made. Bakelite sheets, however, are not really bakelite at all. There is no essential difference between the material of ebonite moulded parts and ebonite sheet, but there is an essential difference in the case of bakelite.

Sheets of absorbent paper are dried and immersed in the varnish-like liquid until they are impregnated, are piled on top of each other until a sufficient thickness is obtained and are then subjected to the heating and pressure mentioned above. Thus "Bakelite" sheet is really bakelised paper. Prepared in this way the material is quite as impervious to water as ebonite.

There is, however, a cheaper material prepared by simply coating the sheets of paper and not soaking them in the varnish. This leaves the paper with its original absorbent properties very slightly reduced and consequently the product is not very satisfactory for panels or parts. It is, however, quite easy to distinguish between the two grades. The first grade is very hard to cut or machine, and if cut with a coarse tooth saw, min-

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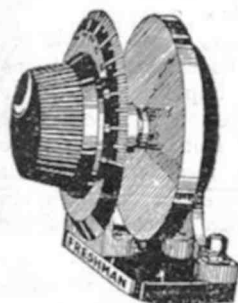
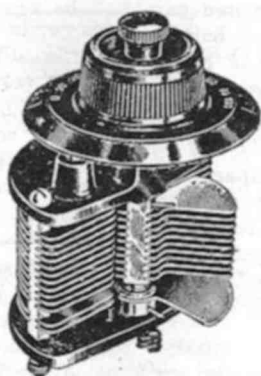
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ute chips appear along the edges of the saw cut. The second grade is far easier to cut and it does not chip. Instead, a furry edge is raised; this is the loose fibrous structure of the uncemented paper. I am quite sure that the sample of bakelite tested by the Electricity Department was of the second grade.

I am sorry I am unable to describe the composition of condensite which, however, is not of very great importance. It is a comparatively poor insulator, has a coarse granular structure and is very brittle. It is never used for panels and its sole merit appears to be low cost. Its principal use is for the cheaper class of knob and dial for which purpose it is surfaced with a varnish of the bakelite type.

No. 2: "Immersion in H₂SO₄," otherwise sulphuric acid "of specific gravity 1.2," or of the strength used in accumulators. The report says, "no action" in either case. This point is of negligible importance. No one is likely to subject his radio set to a bath of sulphuric acid nor of "caustic soda 10 per cent. cold," the 4th item on the test sheet; nor are they likely to treat it to No. 3—a bath in "Transformer Oil Hot" (sounds somewhat like an extract from a modernised version of "The Mikado.")

No. 5: Dielectric strength. Both samples broke down at approximately 30,000 volts. This again is of no importance in radio work. The samples tested had a thickness of one fortieth of an inch. This is far thinner than is used for any purpose in radio work except in a certain brand of condenser. If 1/40th inch broke down with 30,000 volts, 1/8 or 5/40 would break down with 70 or 80,000 volts. None of the modern high power valve transmitters use pressures even approaching this. Let us now consider the properties required for successful utilisation in radio panels.

- (a) High insulating properties.
- (b) Moisture proof (included in a).
- (c) Ease of working.
- (d) Good appearance.
- (e) Unaffected by exposure to sunlight.
- (f) Unaffected by temperatures up to say 120 or 130 degrees F.
- (g) Absence of tendency to warp or sag under weight.
- (h) Absence of brittleness.
- (i) Mechanical strength particularly resistance to shocks and blows.

Both ebonite and bakelite are first class insulators when new. They not only have high

intrinsic resistance new or old, but high resistance to surface leakage, the latter at all times for bakelite, but when new only for ebonite. This will be again referred to in dealing with (e):

- (a) Is covered in the following.
- (b) Has already been considered.
- (c) Ebonite is easier to saw, drill and file than bakelite. It blunts the tools, but bakelite does so as well and to a far greater extent.
- (d) Both ebonite and bakelite can be made to have a fine appearance either matte or polished. The surface of polished ebonite, however, is very easily scratched because it is not a very hard material. Bakelite is sufficiently hard to retain its finely polished appearance in the face of comparatively rough handling.

(e) This is a matter of great importance in Australia where the sunlight is so powerful. Bakelite is quite unaffected by prolonged exposure. Ebonite is affected and the result is not pleasing either in appearance or its effect on the behaviour of the set. The surface gradually turns a brownish yellow colour and becomes conductive. This appears to be due to the light decomposing the surface layers and causing a deposit of sulphur to arise. Sulphur is a very fine insulator far surpassing ebonite, bakelite, or even mica but unfortunately it does not remain as sulphur. It absorbs oxygen from the air, then annexes a little water from the same source and becomes sulphurous and sulphuric acids, both of which in the dilute state are conductors and very good ones. There is then a serious amount of surface leakage.

(f) Bakelite may be heated up to a temperature just below that at which it burns without serious disadvantage, but ebonite becomes quite soft at temperature far below that for boiling water. For certain purposes this is a very useful property. Ebonite tubes may be made for example, by warming a flat sheet in hot water and quickly rolling it round a wood mandrel, tying it down with tapes until cold. At the temperatures reached in Australia in summer, ebonite becomes sufficiently soft to "flow" from under screw heads and nuts which therefore become loose with disastrous effects on the adjustments of any apparatus of which it forms part.

(g) It is hardly necessary to point out after the above that ebonite will warp and bend on a hot day owing to the weight of apparatus attached to and supported by it and even under its own weight.

(h) Neither substance is very brittle, but ebonite subjected to a sudden bending force will snap. I have seen a panel 1/2 in. thickness break

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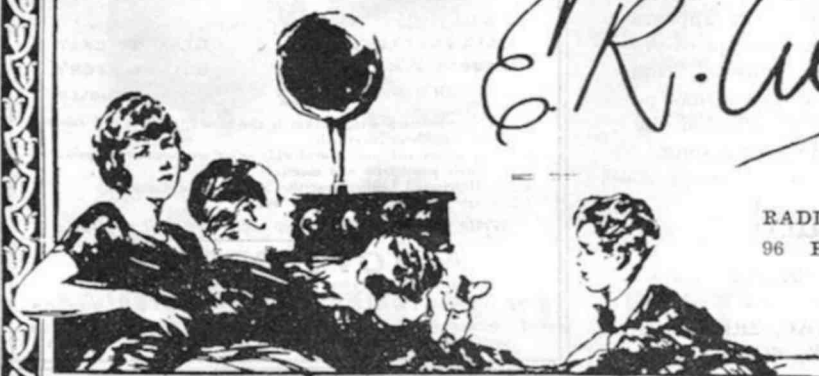
Forty to fifty letters thus reach us daily, letters that bear the marks that the wear and tear of hundreds of miles of travel imposes; enquiries from isolated dwellers seeking purchase of equipment; queries from amateur experimenters a thousand miles distant. Radio has carried its romance and delights to the heart of the "Never Never."

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clean into two on being dropped accidentally, but I have dropped a bakelite panelled radio set without damage except to the valves. To these it spelt disaster of course.

(i) Is dealt with in the above remarks also.

There is now one other matter and an important one to many of us. I refer to cost. Second grade bakelite is cheap (and nasty). Weight for weight there is very little difference between the costs of first grade bakelite and high grade ebonite. The relative weights also are almost alike, so that the cost of two similar sized panels, one in bakelite and one in ebonite, are about on a par. However 1/8 or 3/16 inch bakelite is ample for any ordinary size panel but 1/8 or 3/16in. ebonite would be hopelessly weak. Nothing less than 1/4in. should ever be used.

There is another material which might be used for panels, but it is not advisable to employ it. Fibre—red or black, is intensely strong. It is, however, not moisture proof and always contains traces of the acids used in its manufacture, so that whilst it always makes good supports and brackets it should not be used in any position which calls for high insulation.

Before closing I must refer to certain peculiarities in the behaviour of these insulating materials under high frequency high tension currents. The subject is not of great importance to amateurs because in no case will they ever attain sufficiently high potentials to bring these defects into prominence. My attention was first drawn practically to them in the years 1916-17-18. Under high frequency high tension stresses neither bakelite nor ebonite will "stand up" to continuous work. All rubber compounds harden and crack. Bakelite lasts longer than ebonite, but it too takes the road to destruction. I have seen a discharge slowly eat a path along a rod of bakelite about a foot long until it cut a channel about 1/8in. wide by 1/16in. deep the whole length of the rod. A material known as paxolin successfully withstood these conditions. Paxolin is a brown mottled material obtainable in sheets, rods, or tubes. It appears to have mica in it, but I have no knowledge of its actual composition. I do not know, however from experience, that it is a very fine insulator, has no appreciable surface leakage, is not affected by "Transformer Oil Hot," and is intensely strong.

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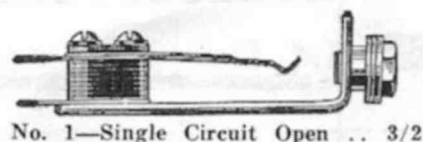
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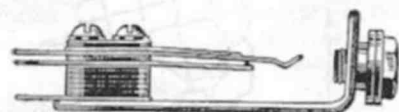
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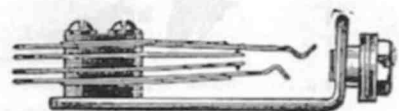
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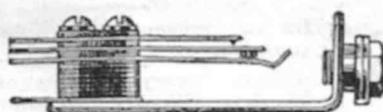
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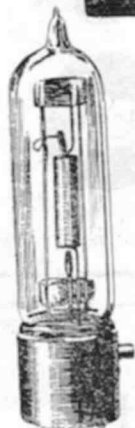
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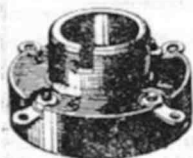
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INFORMATION



Conducted every week. Except in the case of subscribers a fee of 1/- is charged for not more than four questions. Questions will be answered by mail in the order of priority and, when considered of sufficient general interest, will be published under this heading.

H. G. (Warrnambool, Vic.)

Question: I would be glad if you would answer my following questions concerning a set which I propose to build:— (1) Are Gilfillan batteries the best I can use? If not what do you advise? (2) Which would you advise me to use—a vario coupler or honeycomb coils? (3) Are there any extras that would improve a set? (4) What transformers should I use and of what ratio? (5) Please supply me with a drawing of the best five valve set, fitted with three phone plugs, that you can suggest.

Answer: Your first query is out of order. Suffice it to say that Gilfillan are undoubtedly efficient but the same would apply to various other makes. (2) Honeycomb coils are vastly superior to the vario coupler method of tuning as we have to cover such widely different bands of wavelengths in Australia. (3) In the way of extras we suggest bradleystats and a bradleyometer for rheostats and potentiometer respectively. (4) Jefferson No. 41 transformers you will find quite O.K. but this doesn't bar any other makes of transformers. (5) Refer to your copy of "Wireless Weekly" dated December 19, in which we published full details together with a lot of constructional information of a set employing two high frequency, detector, and two audio frequency amplifiers. We are not quite clear about your mention of three phone plugs. Do you mean a jack between detector and first audio and a jack between first and second audio, or do you wish to use three pairs of phones on the last audio? If the latter, you only need four extra telephone terminals wired in parallel.

S.R.C. (Bankstown):

Question: Please supply me with the necessary information for making and wiring a crystal set capable of picking up some of the amateur stations that broadcast. At present I have a loose coupler but this fails to get them.

Answer: See last week's Wireless Weekly on "A Short Wave Crystal Receiver."

R.S.P. (West Maitland):

Question: Concerning my five valve tuned anode receiver, I find that I cannot pick up 2BL although 2FC comes in very strongly. I have

A.W.A. honeycomb coils for these stations, and the turns I have used in an endeavour to get 2BL are—primary 25, first plate 75, second plate 75, and re-action 50. These I have tested for continuity and find them O.K. Please give me your opinion. My aerial is a single wire 100 ft. long with a 10 foot ground lead to the set. I have purchased a Mar-co series parallel switch for the primary circuit which may possibly overcome this trouble. Would series parallel switches be an advantage in the tuned plate circuits? In spite of these perhaps minor troubles I am experiencing, I must congratulate you for supplying this hook up, and I am confident that soon it will be operating with clarity and strength on all stations.

Answer: Concerning your inability to receive 2BL satisfactorily: Probably your tuned plate condensers have a fairly high minimum value. Suggest you try two 50 turn coils in your tuned plates instead of the two 75 turn coils. You might also try a 20 turn coil in the primary instead of a 25. Concerning your query about series parallel switches for the primary circuit, we don't recommend switches of any kind where two stages of radio frequency are employed on account of the increased capacity which they cause. You might, however, try the three terminal system for series parallel. Series parallel switches are not practicable in the tuned plate circuits and the condensers must always be in shunt. Are there any others receiving 2BL in your town?

J.A.B. (Barjarg, Vic.):

Question: (1) Do you consider Cardwell and General Radco No. 247 condensers best procurable? (2) Where are they obtainable? (3) Is there any appreciable difference in UV199 and UV201 A valves when used in the ST100 circuit with an extra stage of high frequency? (4) What are the transformer ratios in the ST100 and in the ST100 with an extra high frequency? (5) Is a Bradleystat preferable to other makes of rheostats? (6) Is there such a thing as a knob with a self contained vernier? If so where is it obtainable? (7) Is radion superior to bakelite for panels, etc.?

Answer: The Cardwell and General Radio condensers are of a very high standard, and there are other makes such as Acme, etc., and we have no hesitation in recommending them to you. (2) We don't think the two former makes are obtainable in Sydney at present, but we suggest you write to our advertisers, placing an order for the particular kind you require. (3) This question is subject to so many conditions, and opinions differ so widely that it would be almost impossible to answer it. (4) We refer you to *Wireless Weekly*, November 28; see article "How to Improve your ST100." You will find Jefferson No. 41 or Stromberg Carlson excellent for the ST100; ratio 3.75-1. (5) Bradleystats will well repay you for the extra expense. (6) Yes, a self contained vernier is extensively used in America, but to the best of our knowledge it is not obtainable in Sydney. (7) Radion is much easier to drill than bakelite and for that reason only it may be considered superior.

L.C. (Quandi): See *Wireless Weekly*, December 19th. We would not recommend anything less than the 5 valve tuned anode receiver described on page 34 for the distance you require. A brief study of the circuit will show you what further parts you require. Please sign your name to your next communication.

S. G. (Willoughby):

Question: I would be glad if you would let me

know the standard way of tuning a three coil circuit. The three coils comprise aerial, coupled to which is grid coil and on the other side coupled plate coil from detector valve. One stage of radio tuned plate has coil in isolated position. .001 condenser series and parallel in aerial circuit, .0005 parallel with secondary coil and .0005 parallel with tuned plate. There is no condenser in the plate coil from the detector valve. I thus had three condensers to work and two coupled coils and am anxious to tune in 3LO.

Answer: You will find your circuit rather difficult to handle, but it is absolutely essential to use the 3 coil circuit together with a stage of radio if you wish to eliminate 2FC and bring in 3LO satisfactorily. The following coils are required with the circuit you are using, primary 150, secondary 250, regeneration 200, tuned plate 250. Following is procedure for tuning: Place primary coil as close to secondary coil as possible; this will enable you to use temporarily aperiodic aerial tuning and the primary condenser need not be altered. You have your two hands now free to work both secondary and tuned plate condensers together. As soon as you obtain the best position on these two condensers you should come back to your primary, altering your condenser and coupling until the maximum volume is obtained. A final adjustment of the potentiometer is all that is then necessary.

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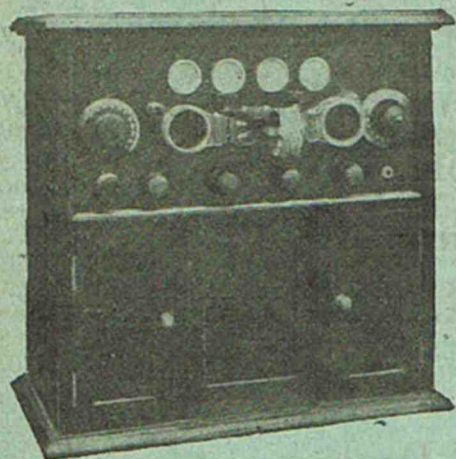
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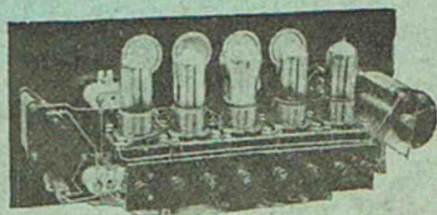
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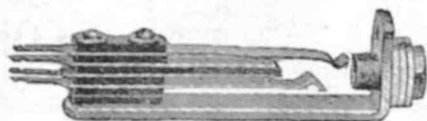
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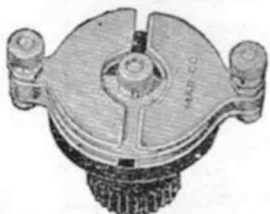


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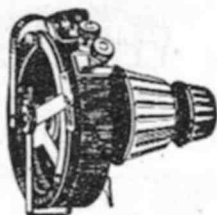
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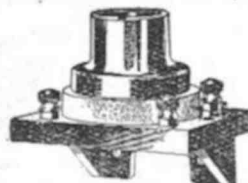
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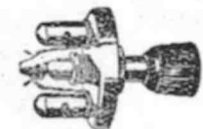
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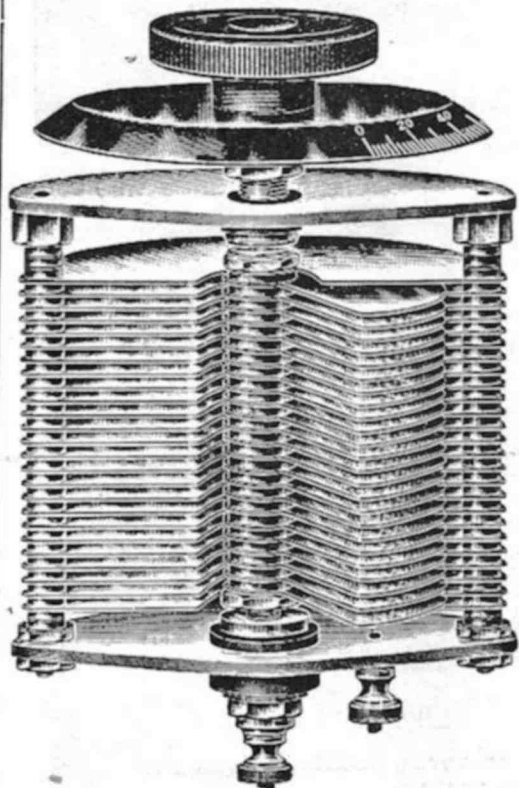
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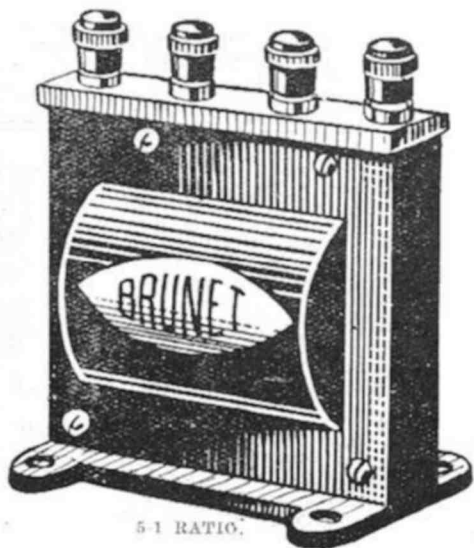
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200-400	35	50	75
300-500	50	75	100
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500-1100	100	125	150
700-1200	125	150	200
850-1600	150	200	250
1100-2400	200	250	350

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Expert advice available free from the Manager of my Assembling Branch, Mr. R. Shaw, Certificated 1st Class Operator.

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UV-201-A is a high vacuum tube which, while suitable for a detector, is intended primarily to be used as an amplifier of either radio or audio frequencies.

It contains a new Tungsten Filament, the characteristics of which are long life, low power consumption and low operating temperature.

FEATURES :

- (1) The electron emission from the filament of this new tube averages about five times that of the ordinary amplifying tube, and it therefore gives improved loud-speaker operation.
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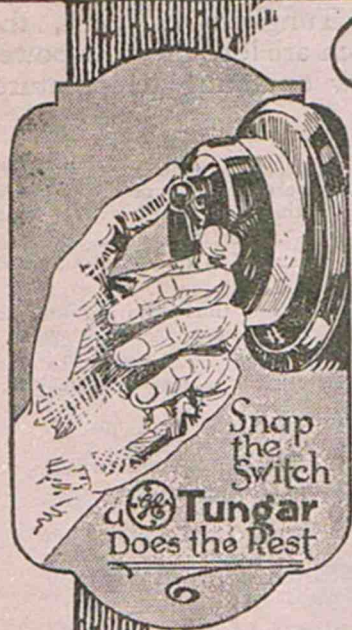
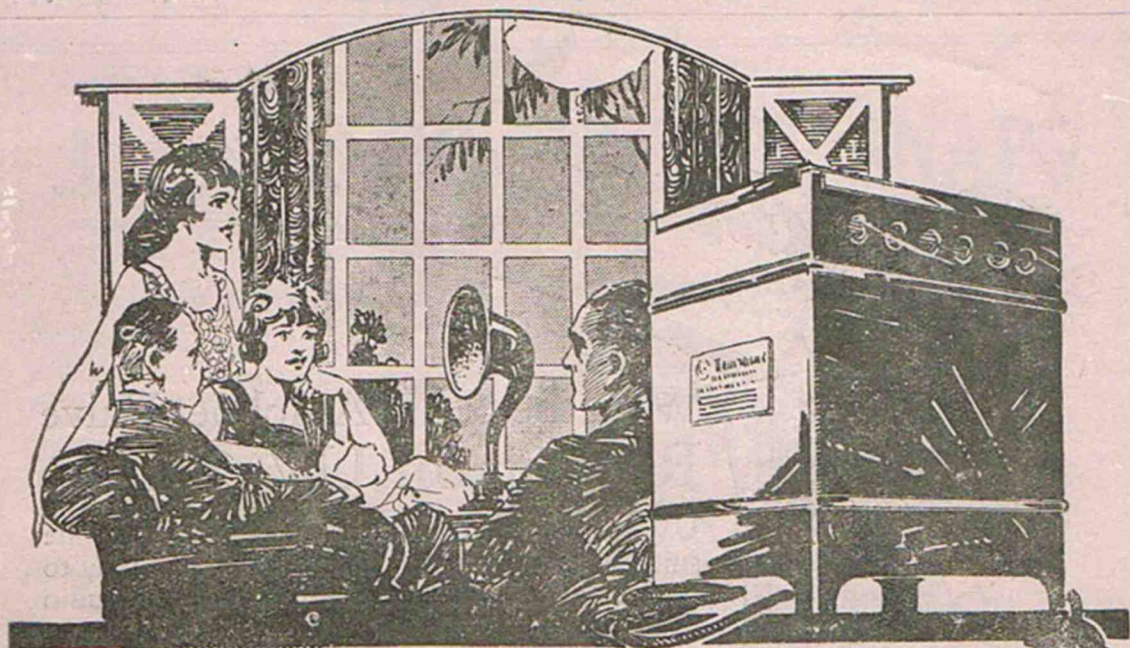
CHARACTERISTICS : Filament potential, 5 volts.
Filament current, 0.25 amperes.
Plate potential, 20-100 volts.

Price : £1/10/-

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