WIRELESS WEEKLY

Registered at the G.P.O., Sydney, for transmission by post as a newspaper.

VOL. 5. No. 12. 3D FRIDAY, JANUARY 16, 1925.

CALCULATING RESISTANCES

Feature

A LOW LOSS SET

VL

Make your own Valve Set

PARTS FOR THE FAMOUS SINGLE VALVE P1 SET.

1 Bakelite Panel, 10 x 8 x 1/16	0	6	6
1 Two Coil Vernier Holder	0	12	0
1 .001 Walnart Condenser	1	0	0
1 3-inch Dial	0	2	0
1 H. & H. Valve Socket	0	3	6
1 Frost 35 ohm Rheostat	0	5	6
1 Grid Leak and Condenser	0	3	6
7 Terminals	0	2	4
1 DV3 De Forest Valve	1	10	0
1 42v B Battery	0	12	6
1 A Battery	0	9	0
Panel Wire, etc.	0	1	6
	£5	8	4

No accumulators to be recharged. In compiling a list of parts for the construction of this set only those parts which are thoroughly reliable have been chosen.

Every assistance is offered to those who wish to construct their own set. Expert advice and help assures success.

Every part is of the highest quality commensurate with the price. A set constructed of the parts advised by us will always achieve maximum results.

A 2 Valve Receiver is equipped in addition to other list with:

1 Jefferson Star Transformer	1	12	6
1 H. & H. Valve Socket	0	3	6
1 Frost 35 ohm Rheostat	0	5	6
1 DV3 De Forest Valve	1	10	0
1 Terminal	0	0	4
1 Terminal Board	0	1	0
Panel, 14 x 8 x 3/16, Extra	0	6	0
	£3	18	10
	5	8	4
Total Cost for 2 Valve Receiver	£9	7	2

"You have my word for it"

E.R. Cullen

Late A.I.F.

RADIO AND ELECTRICAL STORE

96 BATHURST STREET

TELEPHONE CITY 869 AND 2596

Phones, Redfern 964 and 930.

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. 6. No. 12. FRIDAY, JAN. 16, 1925.

CONTENTS:

EDITOR: A. W. WATT

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.

SUBSCRIPTION RATES

Twelve months (52 issues), 13/-, post free. Six months (26 issues), 6/6, post free. Single Copies, 3d. each, or post free, 4d.

QUESTIONS and ANSWERS DEPT.

Except in the case of subscribers, all Technical Questions, or those entailing research work or drawings, must be accompanied by a postal note or stamps to the value of 1/-.

ADVERTISING

Advertising Rates may be had on application to the Advertising Manager. Copy must be in the hands of the Editor by the Friday preceding each issue. If copy is not received in time, the previous week's advertisement will be repeated.

All accounts should be made payable to Publicity Press Ltd., 12/16 Regent St., Sydney.

Agents in Great Britain: The Colonial Technical Press Ltd., Dudley House, South ampton Street, Strand, W.C. 2.

EDITORIAL

Low Power Transmitters

A FEW weeks ago we published an article entitled "A Low Power Transmitter," which has led to a vast amount of correspondence from country readers. We showed the circuit of this small transmitter for telegraphy only, and not for telephony. .. Now everybody wants to know whether it could be used for telephony, and how; and whether regulations would permit of this type of transmitter in country districts for use between farms or stations. Our usual mail from country readers is considerably varied, ranging from desirable hook-ups to the elimination of atmospherics. But—and this point seems to us most important—on no single article have we had more enquiries than concerning this low power transmitter, and from the nature of these communications we are forced to consider whether the present regulations governing wireless in Australia are as comprehensive or as beneficial to the people as one could wish. There can be no question that a simple form of low power transmitter would prove very useful to those isolated in the country, and, despite the fact that party lines and interstation telephone systems prove valuable aids in the domestic and business life of country people, their sphere is limited, and they certainly cannot be considered as entirely overcoming the inconvenience of isolation. Indeed, it is no uncommon sight to see a few miles of telephone wire lying along the roadside after a storm; and, after all, ten miles is the same as a hundred when one is without means of rapid communication. The country represents the very best field for demonstrating in a practical form the service of wireless to mankind, and it seems to us that, notwithstanding the wonderful progress achieved during the last ten years, this is the very territory which might well have been exploited by progressive commercial interests years ago. The mere fact that heretofore country dwellers have evinced no particular interest in the matter conveys nothing because very few of them appreciate the desirability of a broadcast receiver until they actually see and hear it in operation—and anyway, for that matter, motor cars were regarded by them as a luxury until practical demonstration proved their utility, with the result that to those who can afford it, a car is part of the stock equipment of the farm. And why not also a low power transmitter? A brief consideration will show that, quite aside from the benefits the farmer would derive from such an installation, its extensive adoption would open up a field for exploitation by wireless traders which could otherwise only be reached through the medium of relay broadcasting, a scheme which on the face of things as they exist at the present, can never be finalised except on paper. No more effective means of popularising wireless in the country, where half the population of Australia resides, than this system of inter-farm wireless communication, could be devised. It seems reasonable to suppose that if a farmer can be convinced of the necessity of purchasing a motor car costing from £200 upwards, then a wireless transmitter which would, or should, cost much less initially and for upkeep would prove a far more attractive proposition, since it represents a means of constant communication with his neighbours and his nearest town. It would, of course, be foolish to suppose that EVERY farmer would instal a transmitter, but encouragement and assistance should be given to the man who is genuinely anxious to improve his conditions of life with the aid of wireless, and there should be nothing to prevent him purchasing outright a small transmitter at reasonable cost. Since the Government assures us that the development of the back country areas spells prosperity for Australia, and wireless could certainly be utilised in this direction, perhaps something might be done to determine just to what extent it could be found useful. What concerns us most at the moment however, is the fact that under the present regulations there is no provision for those who are genuinely anxious to construct their own small-power transmitters for the purpose of communicating with their distant neighbours, but who are not desirous of mastering a lot of extraneous and unnecessary technicalities in order to negotiate an examination which in these cases could be dispensed with. Under these special circumstances, and with proper restrictions, no interference would be caused to other existing means of wireless communication, and nothing but benefit could result. On behalf of our country readers we have approached the Chief Manager of Telegraphs and Wireless to ascertain whether some means can be devised whereby the use of home made low power transmitters may be permitted to those situated where such sets could prove of domestic advantage.

Apathy.

THOSE remarks by Mr. Perrett last week seem to us very apt, and he strikes a note to which every transmitter should respond. It seems chronic with most of us to sit back and let the other fellow do the hard graft, but, quite humanely, we all like to be in it when the reward for labor done is being handed out. In our case the reward is that we still have our experimental status, and it is a hard fact that we have to thank three or four individuals who kept things together and fought the battles necessary to save the experimental movement from being kicked into oblivion. We have only to trace the progress of the club movement, and to count up the number which have pursued a more or less erratic course for a little while and then pined away and died, solely through apathy and the lack of enthusiasm on the part of members. Yet there are others which are models of efficiency and stability, but mainly so because the leading lights have the faculty of injecting loyalty and enthusiasm into the club members.

The trouble is that so many join, attend a few meetings and then drop off. Why is it? Is it merely apathy, or is it due to dull and uninteresting proceedings? Radio Clubs as a rule, do not put the social aspect very prominently forward, partly because of finances and because after all, it does not run hand in hand with discussions on wireless. So the only alternative is to make the ordinary proceedings so interesting that members will look forward to the next meeting. Since the affiliation last year, the Wireless Institute has done everything possible, by arranging a roster of lectures, to help the clubs along. But here again we have a case of leaving everything to a few.

There is only one cure for this general apathy and that is individual effort to shake it off and to each play a part in boosting the experimental movement along. So, if you've never done anything before, come out of your shell and do it this year. If you can't decide upon some way in which you could be useful, ask your club secretary.

Those Low Power Records

IN humorous vein, our Victorian correspondent dwelt lightly last week upon the low-power records of 2CM, and quite without prejudice, questioned whether perhaps 2CM hadn't been indulging in a little leg pulling when he recounted his remarkable achievement in working across to New Zealand using a power of only .0037 of a watt. The trouble is, of course, that one's impression of 2CM is largely influenced by that vagrant strain of humor which runs through most of his past announcements and his writings in the press, and it is a trifle difficult for the uninitiated to link up the reciter of some of those old-time Sunday evening verses such as "She Sat in the Sink and Sunk" with so serious a performance as working two-way communication with England. Peter Persnurkus himself, they say, is privately a splendid judge of native flora.

However, at the time that 2CM worked Bell on .0037 of a watt, all the instruments were read by disinterested parties and on the day following the test, the instruments were brought to Sydney and subjected to a test by Mr. E. Joseph, one of our leading instrument men, and found to be correct within one per cent. As a matter of fact, it is not generally known that the record was achieved on the night prior to the test, but as there were no witnesses present, nothing was said about it.

During the "Tahiti" tests, when 2Cm's small transmitting set was working on an input power under 7 watts, Amalgamated Wireless sent their own engineer and instruments and, as read by the engineer, the greatest possible power that could be pumped into the small set was just under 8 watts.

In all other cases of low power records, the readings were always checked by a third person, and it is worthy of note that the voltage used on the New Zealand stunt was supplied by a 15 volt B battery.

Chicago Broadcasts

TO AUSTRALASIA THIS MONTH

According to the "Wireless Daily," five special concerts are to be broadcast from Chicago and Dallas, Texas, for the entertainment of listeners here and New Zealand; whether they will be successful in their kindly enterprise will be a matter for conjecture—when we remember the failure of WGY and KGO recently.

Four of the big Chicago stations are to commence transmission at 8 p.m. Australian time on the dates hereunder, and the concerts will continue for four hours without cessation:—

January 14.—WEBH: The Edgewater Beach Hotel, Chicago, station on 370 metres.

January 21.—WTAY: The Oakleaves' Hotel, Chicago, on 283 metres.

January 28.—WGN: The Chicago "Tribune" Newspaper, on 370 metres.

February 4th — WQJ: The Chicago Rainbow

(Continued on Page 15, Col. 2.)

HEADQUARTERS
Royal Society's House
5 Elizabeth St.
SYDNEY, N.S.W.

Wireless Institute of Australia

N.S.W. Div. Inc.

Incorporating the Affiliated Societies and The Australian Radio Relay League

Phil. Renshaw, Hon. Sec.
Box 3120 G.P.O. Sydney
Phone B2235
A.H. Perrett Publicity Officer.

Monthly General Meeting.

BY the time these notes are due to reach the reader's hands, the monthly general meeting of the N.S.W. Division of the Wireless Institute will have taken place. At the time of writing, however, we are looking forward in pleasurable anticipation of a most interesting evening, as Mr. R. C. Marsden, the genial owner and operator of 2JM, is to take for his subject the "Practical Operation of Transmitters." There is no doubt that this is a subject which lends itself to a good deal of interesting discussion, and much could be learned from an evening such as this. It is one thing to own a transmitting set, and even to be able to radiate with it, but the intelligent use of the controls, the careful observation and recording of the results obtained, and the scientific deductions to be drawn from those results is quite a different matter.

Much has been said in the past in various quarters against the man who mercilessly churns out gramophone records by the yard, and this practice is certainly to be condemned from whatever point of view the matter is looked at. There is, however, a good deal to be said in favour of the use of gramophone records for testing purposes, providing, of course, intelligent use is made of this method of producing signals. After all what is really required is a definite policy behind the experimenters in hand. The man who is genuinely pursuing some scientific research will not make a nuisance of himself by churning out more or less unmusical noise. His records will be short ones, and his enquiries from those who are listening in will be concise. Alteration in his circuit will be effected, and a new trial made with the object of obtaining his goal. But the senseless transmission of records without end will find no place in his programme.

This brings us back to the practical operation of transmitters, and another question which is closely bound up with it, namely, that of "Co-operation."

If co-operation is made the keynote of our work throughout 1925, and if further definite scientific results are aimed at, there will be little need for any accusation of apathy to be levelled at the heads of experimenters at the beginning of next year. Co-operation with its twin brother, organisation, will lead to some very intreesting and helpful times. For instance, suppose a party of experimenters are organised to investigate the relative strength of signals radiated under different weather conditions. One station might be chosen as transmitter for, say ½ hour, while another might follow for a similar period, etc. Observations will be taken at various receiving stations of the signal strength, together with meteorological notes of such things as temperature, direction and strength of wind, barometric pressure, humidity, pressure of clouds, direction and strength of sunlight, etc.

Having carried out these experiments over an extended period a general meeting of this particular organisation of experimenters could take place, at which those results will be co-ordinated and tabulated, and who knows, but what valuable deductions might be made.

If it is felt that the actual drawing of deductions is beyond the scope of the individuals concerned, the tabulated results might be forwarded to some central body, as the Wireless Institute, who would be in a position to draw scientific conclusions from the results obtained, and who would suggest, even if they did not actually direct, that certain additional experiments should be carried out with a view to obtaining more data on some particular point.

Another way in which the spirit of co-operation might be attained would be in the relaying of messages between local stations. This would form a very pleasant interlude to the more strenuous work of scientific research, and the owner and operator of a station would naturally take pride in having his apparatus in a fit state to be operated at any time. The method of procedure outlined in the columns of Wireless Weekly should

be committed to heart by every experimenter as one phase of the experimenters' duty, which is not generally realised is that of being ready at a moment's notice to assist the authorities in any case of national emergency. The matter of the American Radio Relay League coming to the rescue of the authorities in the recent hurricane which swept certain of the United States recently has already been mentioned in these columns.

Communication between various portions of the Commonwealth once established and maintained on a co-operative basis might prove even more valuable to Australia should the necessity arise, and it is only by practical operation of transmitters along the lines suggested that experimenters can fit themselves for this work. It is, therefore to be hoped that every member of the Institute will endeavour to be present when Mr. Marsden gives his address so that the many valuable hints which will be given by our old friend, 2JM, may be availed of by the greatest possible number of members, and may thus be of benefit to the community. Another thing which is not to be lost sight of in considering the attendance at meetings, such as this is the tremendous amount of information which is made available in the discussion on such a subject. This is co-operation in one of its widest senses. Attendance at Club and Institute meetings has repeatedly been urged in these columns, and apart from the benefit which the individual will obtain, the benefit which he will confer upon his fellow members is incalculable.

Delegates' Council Meeting.

The first Delegates' Council Meeting to be held in the new headquarters of the New South Wales Division of the Wireless Institute of Australia, at 5 Elizabeth Street, Sydney, will take place on Friday, January 16. Much important business has been placed upon the agenda, and as the meeting is also the first in the New Year, it is hoped that every club will be represented. Where the regular delegate cannot attend through causes beyond his control, it is clearly his duty to see that another member of his club takes his place. There are many matters which call for comment from time to time, and it is only by getting together on such occasions as these in the co-operative spirit when a united form can be presented by the experimenters.

QRM.

Will 2JM deliver his lecture in full dress costume of pink tights and fluffies?

What has happened to the transmitters? Nobody seems to have heard them of late? Has the Xmas fare proved too much for them? Or have they all gone down below (on the lower wavelengths, of course). Always append your signature when transmitting gramophone records. If you are ashamed of your transmission rectify your circuit before you transmit.

W. L. Carter, Assistant Ton. Treasurer of the Wireless Institute of Australia, N.S.W. Division, and Honorary Secretary and Delegate of the Railway and Tramway Institute Radio Club is now on holidays. We hope he will have a good time.

2YG has been heard in China. Has he been studying Esperanto?

With the advent of the new year we are expecting great things from 2ED. He has had a long rest.

1925 has given us many surprises. It has also brought Insulator back to the fold.

It is reported that 2BB spent a sleepless night during the recent gale. Many other experimenters will have cause to remember this particular period.

Did anyone observe any peculiar radio effect from the earthquake the other night.

It is reported that Wireless is responsible for the large amount of rain that has been falling lately, and that Victorian hams are going to close down entirely for one month to test this.

A. H. PERRETT,
Publicity Officer.

(Continued from page 13)

Gardens' Million Dollar Restaurant, on 448 metres.

February 10—WFAA: The "Dallas News," Texas, on 476 metres.

Send us Reports.

We will forward to the proper authorities any records of reception from our readers—who should not the call letters, name or kind of selection heard and the exact time.

With Our Readers

7th January, 1925.

Sir,—Now that the reception of signals from United States and British amateurs is becoming an every day performance, I write to suggest a means whereby experimenters may obtain the QRA's of these stations.

To ask you to publish lists of overseas call signs "en bloc" would be over the fence, and therefore I beg to suggest that you publish the QRA's of stations already heard as set out in DX reports from time to time, experimenters being asked per your paper to forward immediately any new call sign they may log.

At present, if we don't get the stations QRA from the text of his traffic, we have to invariably write to the station he is working, a time-wasting and troublesome procedure for all parties concerned.

Trusting that the above suggestion meets with your approval.

Yours for low lossers,

LIONEL T. SWAIN,

Ep. Radio a2CS.

(Editor's Note.—And a very good suggestion, too, and one that we shall be glad to take up. We shall be pleased to publish the QRA of any overseas transmitters whom local experimenters may desire information about—that is, of course, provided the dope is on our files. As Mr. Swain points out, it would be "over the fence" for us to publish the call signs of several hundreds of American stations at once, and this suggestion of Mr. Swain's seems to us a very good way of overcoming the difficulty.)

(To the Editor)

Sir,—In reference to the letter of Mr. McLoughlin, of Deewhy, as to his reception of 2HM (Marshall, Armidale), I would like you to know that I also have received 2HM K3 on a crystal set. About two months ago at about 11.30 p.m., I was listening in to the amateurs, and especially 2YI. I could not tune this station in very well, but when I did I heard him calling 2HM. After tuning in very carefully I heard 2HM answering on 'phone not very loud, but clear enough to get his call sign with certainty. Not having kept a log of his transmissions I cannot furnish proof by comparing my reception with his radiation. I am using a home-made experimental loose coupler, Sterling phones, QSA crystal and a directional aerial 3/20 wire. My DX list to date is as follows: 2FC, 2BL, 2ME, VIS, 2JM, 2BF, 2YI, 2FF, 2ZN, 2HM, 2XA, 2OI, 2BB, 2DS. I intend keeping a log of receptions from now on, and I guess that this just about scrambles Mr. McLoughlin's egg properly. Yours, etc.,

PERCY G. FEENEY,

"Avondale," Rolfe St.,
Mascot.

Bent Street, Lindfield,
January 9th, 1925.

(To the Editor)

Sir,—Mr. Sewell's suggested classification of transmitters (W.W., 9/1/'25) appears to me to be without any definite form. His remarks caused my pen to oscillate more freely.

I personally admire a station which can show a good DX list, particularly so if backed up with a select and exclusive design of DX wall paper. It goes to prove that the operator is awake, and the station an efficient one.

Scientific research is a big undertaking, which if to be carried out successfully needs continued application, much work, and unlimited time, to say nothing of a very solid financial backing. This is very essential these days when wireless has reached such an advanced stage. Much promising work has been abandoned through lack of funds to provide for the expensive instruments that make research possible.

Again, an ordinary broadcast listener-in may in one unconscious act achieve what a well equipped laboratory has been striving for for months, or even years.

Wireless is a science of a very high nature, and investigation or experimenting cannot in my opinion be classified in the manner your correspondent suggests.

In concluding, I might say that I am always very pleased to receive an acknowledgement from a distant station, which I have been successful in logging on my little set. I am very proud of my "wall paper" and like many others I place the results to the credit of scientific experiments "Hi Hi" (plain Australian, kindly note).

Yours, etc.,

B. WATSON.

Information Column

UPON requests from a number of readers we have decided to inaugurate a Questions and Answers column. The queries and replies published will limited to those which, in our opinion, are of the greatest general interest. Except in the case of subscribers, that is, those who receive lished will be limited to those which, in our opinion 1/- for not more than four questions is charged. The reply will be sent by mail as quickly as possible and, if considered of sufficient interest, will also be published in this column.

I.J.A. (Torrensville, S.A.):

Question: In Wireless Weekly, December 12, you showed a low power transmitter. Please name the parts required. Are two batteries necessary or is the one 160v. sufficient? Would an ordinary telephone do in place of the microphone? Is the wavelength regulated by two sliders and rods on the inductance coil? Is a rheostat necessary? Would an ordinary .0005 mfd. 23 plate condenser be O.K.? Could I use a transformer on the electric light and bring the current down from 200 volts?

Answer: The materials required are: One Marconi R valve, one 6ohm. rheostat, one 6 volt A battery and a high tension battery of 160 volts. This last battery should be made up of four Ever-ready 45 volt B batteries. The ordinary carbon Granule microphone is quote O.K. to use. Only one slider is necessary and this is connected to one side of the microphone and the other connection joined permanently to the centre of the coil. The ordinary type of .0005 condenser is quite suitable. You could use a step-down transformer if you wished but it would be necessary to rectify it by two (2) electrode rectifying valves or electrolytic rectifiers The B battery method of high tension would undoubtedly prove the most suitable for such low power because you would have a steady D.C. which is essential for speech.

I.S.M. (Wagga). ———

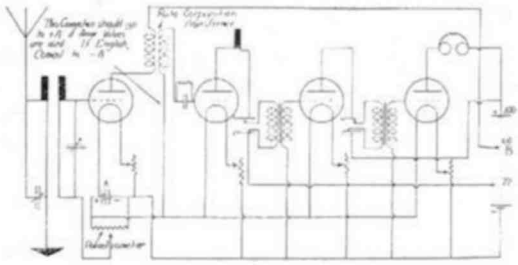
Question: I am anxious to learn the morse code to pick up ships and the experimental stations. How long would it take me to learn enough to be able to read ordinary signals and are there any methods I could use at home? Are Gramophone records suitable?

Answer: The length of time is entirely governed by the amount of practise. Gramophone records are unsuitable unless you have a lot of them and in our opinion the expense you would be put to in purchasing a sufficient number would be entirely unwarranted. Your best and quickest way would be to get in touch with another party who is familiar with the code and get personal instruction. Provided you can do this and practise steadily say one hour daily, three months ought to see you pretty well up.

M.H.C. (Currabubula).

Sent along a hook up of a 3 Valve circuit and asks for a diagram showing the addition of a stage of R.F. He also asks what would be the ratio of the third transformer if a further stage of audio were added.

Answer: Circuit herewith. If you propose to add a further stage of A.F. the ratio of primary to secondary should not be more than 4-1. Suggest a Jefferson No. 41. You would, however, have difficulty in preventing interaction if you use 3 stages of audio. Strongly recommend you to try the extra H.F. addition first.



C.Q.X. (Leeton). ———

It would be difficult to say and would depend entirely upon circumstances. For instance, if Leeton is not a dead spot, if your aerial is suitable, if your components are of decent quality and if you operate the set properly, here is what we consider a reasonable range. Morse (600 metres) all Australian stations, Suva, New Zealand stations and ships as far west as the Bight, between Australia and New Zealand and on the Queensland Coast. Amateurs (morse) all states except W.A. New Zealand. Phone N.S.W., Victoria and Brisbane. Broadcasting 2FC, 2BL, and perhaps 3LO and 3AR. (our correspondent referred to a single valve receiver recently described in Wireless Weekly).

H.H.P. (Belmore), Q.:

Question: Referring to the loose coupler with valve amplifier described in Wireless Weekly, December 19th. Would another stage of amplification to this set operate a loud speaker at Belmore? If so, please show the wiring diagram and suggested panel layout.

Answer: The set should work a loud speaker. The two drawings required are shown here. If English valves are used place the valves above the

(Continued on page 50)

The Crystal in Valve Circuits

WHILST many writers on wireless topics have from time to time, occupied themselves in indicating the precise conditions which make for general efficiency with the use of radio-sensitive crystal receiving sets, the remarks which have been made concerning the employment in crystals in valve circuits have, on the whole, been very few in number.

To the average enthusiastic amateur in the art and science of wireless reception the simple crystal receiving set represents only the very first stage of his interest in the subject. Every amateur, at one stage or another of his career, experiences a desire to attain a greater choice in the number of transmitting stations which he is able to pick up with his simple apparatus, and accordingly the mind of the interested amateur automatically turns itself to the fascinating subject of valve reception.

Utilising the Crystal.

Many amateurs, after they have passed the "crystal stage" of the radio evolutionary progress, construct valve receiving sets in which a crystal detector is employed for the purpose of rectification. The absolute purity and the distortionless nature of the signals which are produced through the agency of crystal rectification is becoming more or less traditional. A crystal rectifier entails practically no expense of upkeep, and for this and the reason stated above the use of crystal detectors in valve circuits is rapidly becoming very popular. It is, however, no uncomon thing for the amateur to find that, although his crystal detector gave excellent results when used in a crystal set alone, when employed in a valve circuit the same satisfactory results are not forthcoming. There are many reasons which may be put forward to account for this fact, and in this article we shall endeavour to deal in brief with those conditions which make for the most satisfactory behaviour of a crystal detector when it is incorporated into the circuit of a valve receiver. In the first place, the direction of wiring of the crystal detector is of considerable importance when this device is employed in a valve set, especially if such a set be of the reflex variety. Generally it will be found that if the crystal detector is wired in one way it will give better results than if it is connected up in the reverse direction. Moreover, under these conditions, it will also be found that a greater facility of reaction control will be imparted to the set.

The bringing in of distant stations is a feat which requires the utmost degree of sensitive adjustment to be made between the crystal and the catswhisker. It is thus advisable to employ only one of the best types of detector in a valve set. Such a detector would consist essentially of a device whereby a micro adjustment could be made at the crystal contact. Detectors which are used for panel mounting will be found to provide a more staple adjustment if the crystal cup is fixed in the same plane as the panel itself, for under these conditions the catswhisker will tend to take its place naturally upon the sensitive surface of the crystal.

Detectors in which the catswhisker is held in a horizontal position, whilst they often permit of quite satisfactory adjustments being made, are generally more or less liable to be shaken out of adjustment by slight shocks, or under the influence of strong signals. Especially when H.F. amplification is being used does this fact hold true. If, of course, the contact between the crystal and the catswhisker is too light, the set will be found to very easily oscillate, that is, of course, if re-action is employed. Oscillation is also brought about in crystal-valve sets if the anode and aerial coils are not kept well apart when the crystal contact is being adjusted.

Variations.

All radio-sensitive minerals offer a high degree of impedance to the path of the oscillating current, and on account of this fact, it is not to be supposed that an oscillating current of, say unit 10, will leave the detector as a direct current of the same unit amount.

Suppose now that a crystal detector is being employed in the receiving set in conjunction with one stage of L.F. amplification. The detector when working at its best may pass a current of 5 milliamps. This on being passed on to the L.F. amplifying portion of the circuit would be amplified five or six times, giving in the latter case a telephone current of 30 units. If, however, the detector is not adjusted to its maximum degree of efficiency, the amount of current which it allows to pass becomes very much less in amount, and the amplified current is similarly decreased. Thus a detector in which a stable adjustment can be effected is required, if the best working results are to be obtained in crystal-valve reception, for, from

a consideration of the law concerning the milli-amperes of current and the volume of sound produced, it will be evident that, especially in those circuits which include one or more stages of L.F. amplification, a mal-adjustment of the crystal will result in very much decreased signal strength.

Crystals to Use.

The type of detector which is the most liable to get out of sensitive adjustment is, of course, the ordinary catswhisker galena variety. Nevertheless the galena type of crystal has the great advantage of being highly sensitive, and therefore attempts have been made to devise a detector which, so far as possible, eliminates the tendency of the crystal contact to get out of adjustment. If, however, the receiver is not required for long-distance work, the catswhisker-galena combination can very advantageously be displaced by the perikon type of detector. This detector, whilst it is not so sensitive as the former, possesses the well-known advantage of being fairly staple in adjustment, and therefore, once a satisfactory contact has been obtained, the volume of the received sound will not be liable to decrease.

Again, if the set employs H.F. amplification, and there is a persistent tendency of the strong signals to jog the sensitive contact out of adjustment, a cure for the trouble may be very well looked for in the employment of the perikon type of detector.

All crystaline minerals which are used in crystal-valve sets should present a sufficiently high resistance to any direct current which may be passed through them. Especially in the case of reflex amplification is this requirement necessary. For this reason, the naturally-occurring specimens of galena should be employed in the catswhisker of detector in preference to the synthetic varieties on account of their higher resistance. If a perikon detector is used the crystal combination should be one of zincite and copper pyrites, or bornite in preference to a zincite-tellumium combination.

Among other contacts which are suitable for use in crystal-valve sets may be mentioned iron pyrites-steel and silicon-zincite. Many amateurs, when they are working a reflex amplification set for the first few times, are amazed to discover that signals will come through even when the point of crystal contact is broken. Again, it will often be noticed that the adjustment of the catswhisker on the crystal may not produce the looked-for improvement in the signal strength of reception.

When the Valve Rectifies.

In both these cases, however, the cause may be looked for in the incorrect tuning of the set. When signals are received on those occasions when the point of the catswhisker is raised above the crystal surface, it is evident that the valve is undertaking some of the work of rectification in addition to its required function of amplification. Why, under these conditions, the valve should undertake this function has not yet been entirely agreed upon. It has, however, been held that improper insulation of the components of the set may have something to do with the matter, and that a grid leak may be influenced by some possible imperfect insulation in the aerial tuning circuit.

Careful Insulation Essential.

However, in those instances in which rectification takes place to some extent when the crystal contact is broken, the phenomenon may be generally taken as a sign that the anode coil has not been correctly adjusted to the wave-length of the received signals. A re-adjustment in this respect will nearly always remedy matters, and result in much clearer signals being received. All the components of a crystal-valve set should be very carefully insulated, for if the crystal becomes charged with current obtained by means of high and low-tension leakages, these stray charges on the crystal will result in a very imperfect degree of reception being obtained, as well as a considerable amount of distortion in the received signals.

The Fleming valve was a comparatively simple affair until Dr. Lee de Forest, an American, complicated matters by introducing the grid. The latest effort is an attempt by another American, Mr. H. Gernsback, to restore the status quo. The Gernsback valve contains nothing inside the tube but a high degree of vacuum and a filament in contact with the inner glass surface. The only other electrode is an external plate in contact with the outer surface of the glass. The heat from the filament is stated to render the glass wall separating the two electrodes highly conductive, thus permitting a considerable current to pass from one electrode to the other. If an alternating potential is applied to the outer electrod the glass apparently acts as a one-way conductor, the tube being used in this way to detect wireless signals.

BROADCASTS IN ESPERANTO.

Denmark has organised regular programmes in Esperanto from the new Copenhagen broadcasting station, while from a Moscow station Professor P. F. Jakovlav commenced a series of talks in Esperanto with an address on "The Seven Years' Dictatorship of the Proletariat."

BRINY REMINISCENCES

By "BRASSO."

THESE days, my contact with the briny is confined to roaming the bosom of Sydney Harbour in a ten-foot sailing skiff, and I have in mind an occasion recently when we were zooming along with a ballooner and a spinnaker set, and our course took us right across the bows of a large steamer slowly moving up the harbour. Acting upon the rule of the road that a steamboat must give way to a vessel under sail, we kept our course, and on account of the steamer stopping her propellor we just cleared the bow by about a sixteenth of an inch. The skipper on her bridge was almost overcome by wrath, and, shaking a fist at us, demanded to know what the Hades things were coming to—which brings me to the title of this little narrative, which should be, "Skippers I Have Known." They pass through my mind in a little procession, each leaving his own impression, good or bad. In these days of strictly business, a wireless officer joins a ship with due formality and only upon presentation of his credentials from the wireless company. Each passenger ship has its own table in the saloon for the wireless man, and at its head during meals he sits in awful splendour, his sleeves adorned with two curly rings of gold braid with a diamond in between. He is accepted as a member of the ship's company and is automatically included in whatever goes on. Some years ago, however, when some of the old shellback skippers were forced to readjust their ideas to keep in step with the march of progress, the advent of the new operator was often greeted with mixed feelings, in much the same way as the sudden appearance of a bobtailed cat in the doorway of one's dining-room. If some of those old salts had their way, ships would still be propelled by the gentle breezes, and those on board would exist on hard tack and limejuice. I have vivid memories of one such who scoffed at the idea of wireless time signals. Accustomed for years to shooting the noonday sun with a hambone, even his own officers couldn't get him to place any reliance in this new-fangled idea; and, in fact, his attitude towards me convinced me that some dark night the wireless set and myself would probably go over the side. These wireless time signals have proved their value over and over again, and their significance briefly is this: The chronometers on the ship are regulated to Greenwich Mean Time, but very often they show an error of a few seconds, which would probably represent a difference of some miles at sea. Assuming time signals are sent from, say, Adelaide at midnight, exactly nine and a half hours after G.M.T., the navigation officer of the ship stands by his chronometer and checks the exact second corresponding to the last signal from Adelaide Radio. Noting this, he then checks the ship's position in relation to Adelaide, figures this in conjunction with the nine and a half hours between Adelaide and Greenwich, and knows immediately the error on the chronometer. Stations all over the world now send time signals, and, needless to say, they are universally made use of by ships of all nations. Well, anyway, this old salt wouldn't see the use of them until on one occasion, after a long run down from Calcutta, we struck bad weather in the Bight, and for five or six days the sun refused to shine. According to the old man, our course would place us about three miles south of Cape Nelson (I think that's the one) at such and such a time, but the second officer, to whom I had been giving Perth and Adelaide time signals under the lap, worked out the distance as 26 miles. Sure enough Cape Nelson was not sighted, and next day there was again no sun, so taking the bull by the horns I offered to give the old man a time signal from Melbourne, which, after chewing over, he decided to take. There was never any more scoffing after that, and I was regarded as an ordinary human being.

There was old Capt. X., of the steamer "Capetown" (I have invented that name for the occasion), trading between Sydney and Fiji, whose attitude towards wireless operators was similar to that of a small dog to a tin can tied on his tail—a darned nuisance, but not to be got rid of. The average life of an operator on that ship was about two months, at the end of which time he either applied for a transfer, or the old man got him shifted for some minor breach or other. His aversion to operators was the source of much amusement to the rest of the crowd, and all sorts of stunts were pulled off to put one over on the old chap. I found that the best way to treat him was to ignore him altogether, and so we passed each other on deck like a couple of strange animals Exasperated by these methods, he took to paying surprise visits to the wireless cabin, to invariably

find me on watch or attending to some portion of the gear. I religiously kept off the promenade deck to give him no possible chance of catching me bending, and this he was well aware of. By the passengers I was labelled "The Hermit," "The Recluse," and so on. Later on the ship was taken off that run to trade on the Queensland coast, and on one occasion, with a full passenger list, had a case of suspected bubonic plague aboard and was quarantined off Townsville. I kept a continuous watch for 24 hours while traffic poured back and forth, and the old man, who was nearly off his head, suddenly took to spending long periods in the wireless cabin, during which he watched with a new interest the procedure. I paid not the slightest attention to him, but continued logging entries and making adjustments as though he wasn't there. But his replies to the messages addressed to him were all advised by me, because the worry of the whole business had left him weary. After that incident, so far as I was concerned he was a changed man, and I had the unrestricted run of the ship.

The last vision I had of Captain Z., of the "Bulwark," was typical of him. It was as I was leaving the ship, and through the saloon porthole I saw him feeding, with a sausage sticking out of one side of his mouth and a sardine out of the other—he always fed with both feet in the trough, and, particularly with the soup, ate to music. The rest of us grouped around the table used to imitate him, but apparently he was unaware of it. He was one of those old shellbacks dug out of a back-country farm during the war by the Commonwealth Govenmment Line, and after 10 years away from the sea came back to find that turbines, refrigerators, pursers, and wireless had been invented while he had been feeding the chickens. He took to spending long hours in the wireless cabin, boasting of his past prowess up the Nor'-west Coast, until finally, with the aid of a sheet of Munz metal laid carelessly on the floor and the emergency spark coil, I gave him a shock which kept him away. On a voyage out round the Cape from Antwerp he brought along a number of prize Belgian chickens and bantam roosters, which for safety's sake he stowed in a large crate on the roof of the wireless cabin. Their infernal racket at dawn, when they greeted the rising sun, used to give me pains, and no amount of hints would induce the old man to shift them. So, at Capetown, I purchased two bottles of whisky and had a pow-wow with one of the firemen. The whisky went west, and so did the chickens, because on going up to feed them one morning, old Dogsbody, as he was termed, found the cage empty and the birds flown. It was never discovered who stole them, but sundry bursts of sentimental music from the fo'c'stle indicated that the menu was agreeing with the firemen. On deck the boys of the sweat-rag greeted me thereafter with solemn winks, and every letter I get now from the then second officer of that ship finishes up with "Who stole the chickens?" I once quite inadvertently made a faux pas with Dogsbody at the table when he was recounting his experiences up near Broome in a small ship called the "Hesperus," and I innocently asked him if it was the same "Hesperus" that the poem was written about.

Very spirited are my recollections of Captain X.Y.,, of the "Nonesuch," who was much addicted to the study and classification of Scotch whisky, and spent long hours reclining on his bunk and snoring at the skylight above, which gave access to the wireless cabin. On this ship I did semaphore and Morse lamp signalling as well, and was often routed out of my bunk in the dead of night to decipher the indifferent Morse-lamping of a passing Dago or Swede. Captain X.Y. was never known to visit the wireless cabin,, and by virtue of his friendship with the chief steward was universally disliked. One black night we were groping along somewhere near the Scilly Isles, and a submarine had been reported just ahead. Suddenly a ship very close to us sent out an urgent CQ message in code, and, sensing something serious, I hotfooted it below to the skipper to have it decoded. In the chartroom the old man was lying in a drunken stupor on the settee, so there being no time for formalities I went through him for his keys and opened the safe to get the code book. In the search two or three hundred notes became scattered on the floor, but the code book was found, and sitting there amid the old man's thunderous snores I decoded the message.

Of strictly naval bearing was Captain G., of the "Limejuice"—elegantly dressed at all times, and filled with a sense of his own importance. His favourite expression was "Carry on," which became a universal remark between members of the crew. His two hobbies were annoying the banjo and feeding a pet monkey, both of which incurred my disapproval. One hot day in the tropics I was sitting half-dozing on watch, when something heavy landed on the back of my neck and commenced eating me. 'Twas the monk.! Making friendly overtures, I allowed him to prowl about while I attached a wire to each side of the mains; then, approaching casually and making pet sounds, I touched one wire to the tip of his nose and the other to his rear. He never troubled me again, and his exit on that occasion has rendered me dubious concerning the travelling speed of wire-

(Continued on Page 43.)

Calculating Resistance Windings

IN the following table all the necessary data for making calculations are given. The resistances stated refer to Eureka wire, which is the brand most commonly offered at wireless shops. The column headed "Turns per inch" refers to enamelled wire with the turns wound so as to touch each other. It must be understood that the figures in columns 2, 3 and 5 are approximate, since there are slight variations in any kind of wire. Those valves with large current consumption, such as the "R." Ediswan, or ORA, are all rated at .75 ampere, but as they grow old their demands increase; we must, therefore, allow 1.5 amp. to be well on the safe side and to ensure that the rheostat does not heat up.

For this carrying capacity No. 24 S.W.G. is suitable. This wire makes 42 turns to the inch, or 31 when spaced with string. The 1/4 inch diameter former will give each turn a total length of 3/4 inch; we shall be quite near enough if we take the circumference as three times the diameter, and do not bother about π.

Forty-two turns will thus go to a yard of wire.

Now, 210 yards of No. 24 have a resistance of 400 ohms; hence the resistance per yard is $\frac{400}{210}$, or 1.9 ohm. Three yards will give a total resistance of 5.7 ohms, and will occupy rather under 4 in. of a rod; a winding 4 1/4 in. in length will give the required 6 ohms.

Next take the case of a 300-ohm potentiometer suitable for grid control use. Here the current passed (20 milliamps, with a 6-volt battery) is so small that we need take no account of it. We wish to use a rectangular former 1 in. wide, and 1/4 in. thick. In this case unspaced enamelled wire will be the most suitable. The distance round the former is $1 + 1 + \frac{1}{4} + \frac{1}{4}$, or $2\frac{1}{2}$in., which gives approximately $14\frac{1}{2}$ turns to the yard. If we use No. 32 wire the resistance per yard will be $\frac{6,900}{900}$, or 7.6 ohms; thus to obtain 300 ohms we shall need, roughly, 40 yards or 580 turns, which means that the windings will be 7 in. long at 83 turns to the inch.

As this is too long to be convenient, we select No. 36, which works out as follows:—

Ohms per yard, 15.5.

Yards for 300 ohms (approx.), 20.

Yards per inch of windings, 8.

Length of windings, $2\frac{1}{2}$ in.

S.W.G.	Yards per lb.	Resistance per lb. Ohms.	Turns per inch (Enamelled).	Carrying Capacity, Amps.
16	26	5.6	15	6.0
18	46	17	20	4.0
20	83	56	26	3.0
22	130	150	33	2.3
24	210	400	42	1.5
26	320	900	50	1.0
28	475	1,970	61	0.75
30	680	4,000	73	0.60
32	900	6,900	83	0.50
34	1,250	13,200	98	0.40
36	1,800	28,000	116	0.30
38	2,950	72,800	143	0.20
40	4,590	180,000	180	0.15
42	6,200	368,000	211	0.13
44	10,100	900,000	253	0.10
46	18,900	2,845,000	307	0.07

A LOW LOSS RECEIVER

By "INSULATOR"

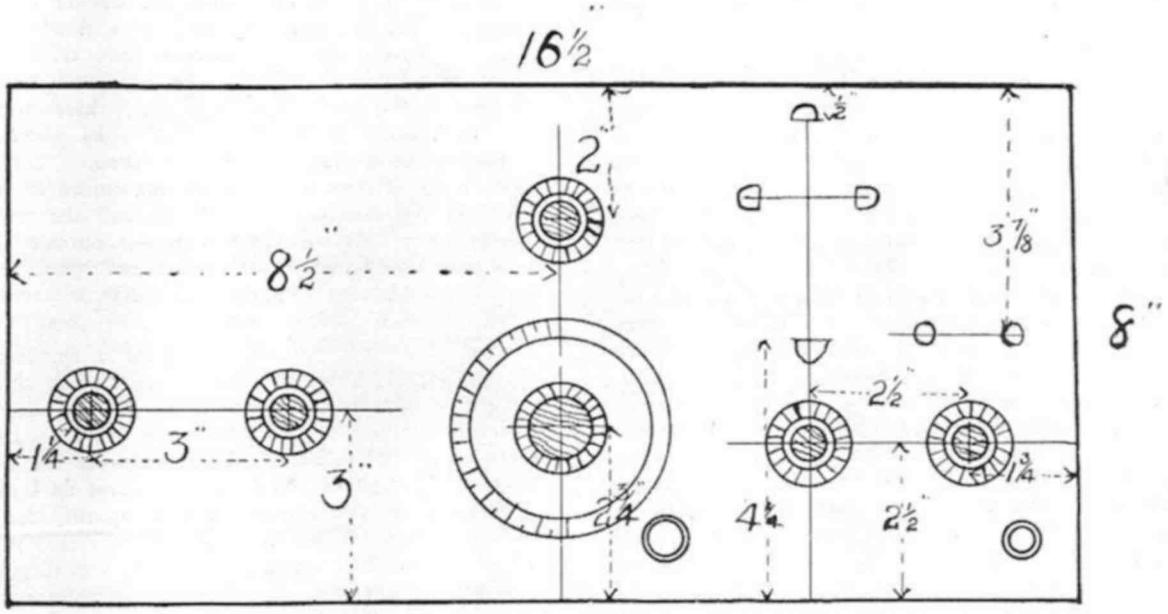
THIS subject is, as you know, quite new for me. Mr. Stewart is the low loss writer in Wireless Weekly, but this week I have stolen his thunder. My reason for tackling this subject is because of the present demand for low loss parts which prove to me that many people contemplate building a set of this type. The particulars here will, I hope, assist many in this direction. Strange to say, bad luck has dogged me in my own effort. The set I am going to describe is my second effort—the first having been smashed up in its journey to the photographer. This must take place of course, before particulars of panel layout, etc., had been noted. Disappointing, isn't it? Hence the reason why this article did not appear last week.

The whole of Saturday afternoon and evening was spent in building this, and I am very pleased with the result. From the circuit you will observe that I have added a stage of audiofrequency amplification to the standard low loss tuner, a system which is very popular with many at the moment. I obtained the following parts for this set:—

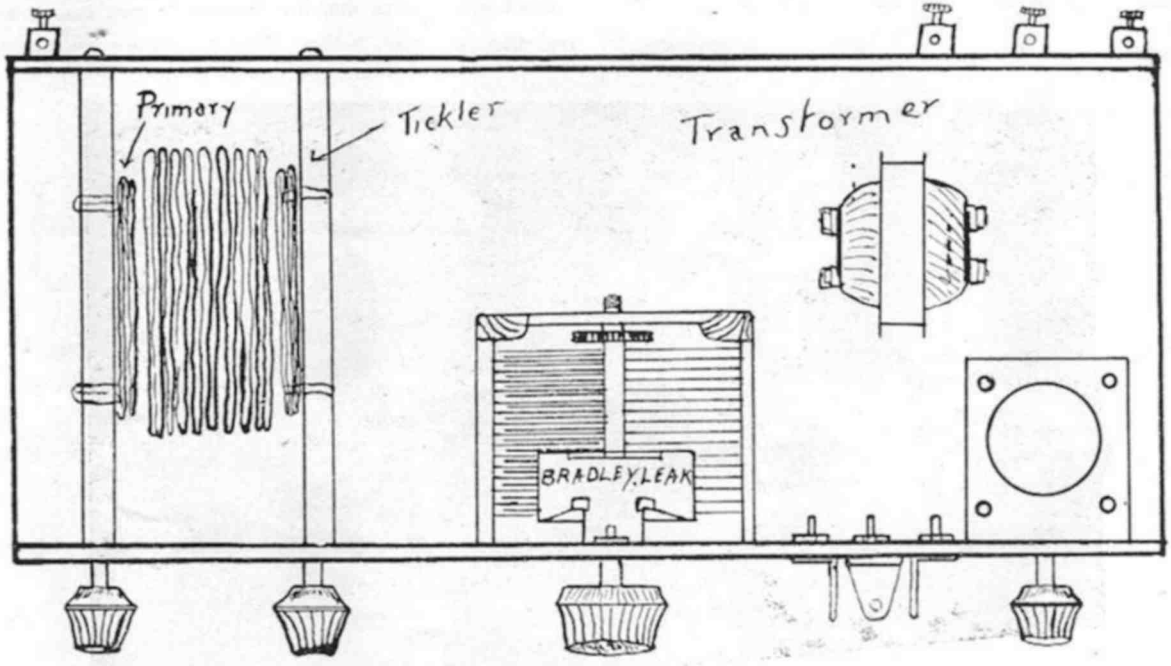
1 Bakelite panel 16¾ x 8 x 3/16.
1 Bakelite panel, 16¾ x 4¾ x 1/8.
1 .0005 low loss condenser.
¼lb. 16 gauge D.C.C. wire.
1 Bradley leak.
1 Bradley micadon .00025.
1 6 ohm Vernier Rheostat for QX valve.
1 35 ohm. plain rheostat for 201a.
1 Panel mounting valve socket.
1 Porcelain socket for 201A valve.
4 clips for V24 or QX valve.
1 Audio transformer.
2 Knobs.
7 Terminals.
1 Single Circuit Jack.
1 Baseboard 16 x 7 x 3/16 (maple).
2 Pieces of ¼in. ebonite rod, 7in. long.
Sundry Screws, etc.

When I say I obtained the above list, this is quite true, although I experienced difficulty in obtaining the baseboards. Some people are particularly lucky as far as wood is concerned. I searched everywhere for a suitable piece (Saturday afternoon, mind you, when all places are closed). Nothing short of Mrs. Insulator's pleadings saved the front of the grand piano from being pressed into service. Len came to light with a loose coupler baseboard which was used satisfactorily. Len is very handy that way—later on when I was tearing my hair searching for my taps, Len came to my assistance again and made the necessary taps. He picked up one of the screws I was going to use and filed three faces on it thereby making a really good makeshift. The variable condenser I have is one known as the American Brand Geard Worm Drive 100 to 1 ratio, which I find is very good indeed. In mentioning this I do not for the moment intend you to confine yourself to this brand as there are many excellent makes of low loss condensers available to-day, any one of which will function admirably in this set. It will be noticed that I am using a QX valve as a detector. This is because there is no stray capacity between the legs, thereby allowing maximum efficiency. The clips are the ordinary clips usually sold for holding grid leaks. So much for the materials. In actual making, my first job was to search all over the house for the copy of wireless weekly containing Mr. Stewart's article on "Low Loss Formers." This being found the template given there was used for winding the secondary coil. Eleven nails were driven into the outer edge of the four inch circles and twenty two turns of No. 16 d.c.c wire were wound between these nails in the manner suggested by the writer in this article. Some writers suggest No. 12 D.C.C. wire for this purpose, but I fail to see just why this very heavy gauge of wire is necessary. No. 16 gauge I have employed here satisfactorily. The primary coil consists of 6 turns of the same gauge of wire wound round a Havelock mixture tobacco tin, while the tickler coil is 18 turns of 20 gauge wound round the same tin. All these coils are bound securely with string before being taken off the "formers." This coil winding is a very simple process, so don't be scared of it in any way. Do you know I spent more than five minutes looking at this peculiar contraption of wire? Please do the same so that I may not be thought peculiar. Laying out the panel is the next consideration. Look at the drawing and work from it. I have to thank my brother for this

(Continued on Page 26.)



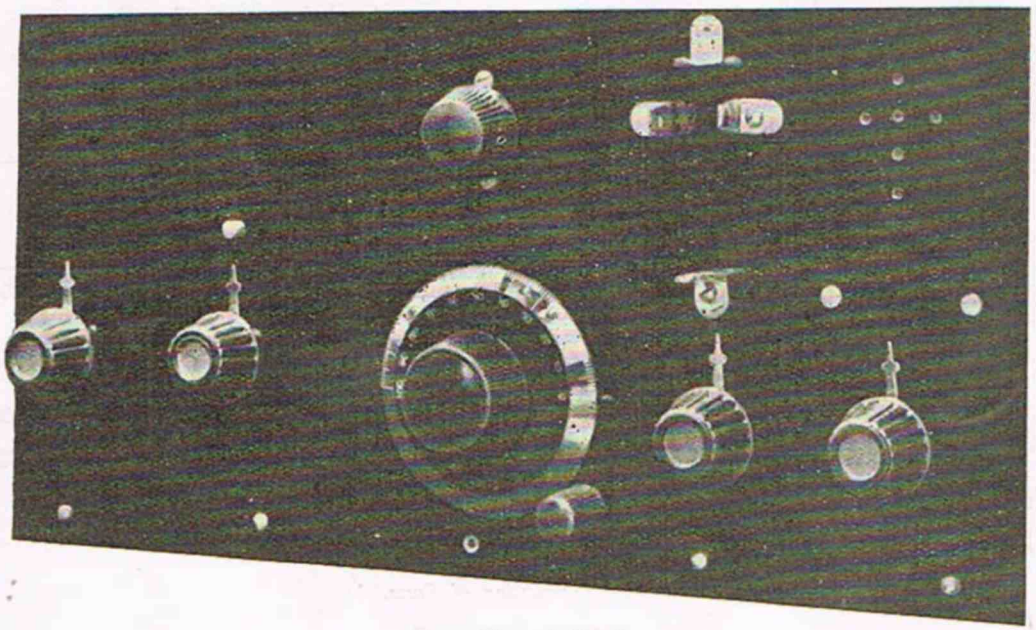
Showing Panel Drilling.



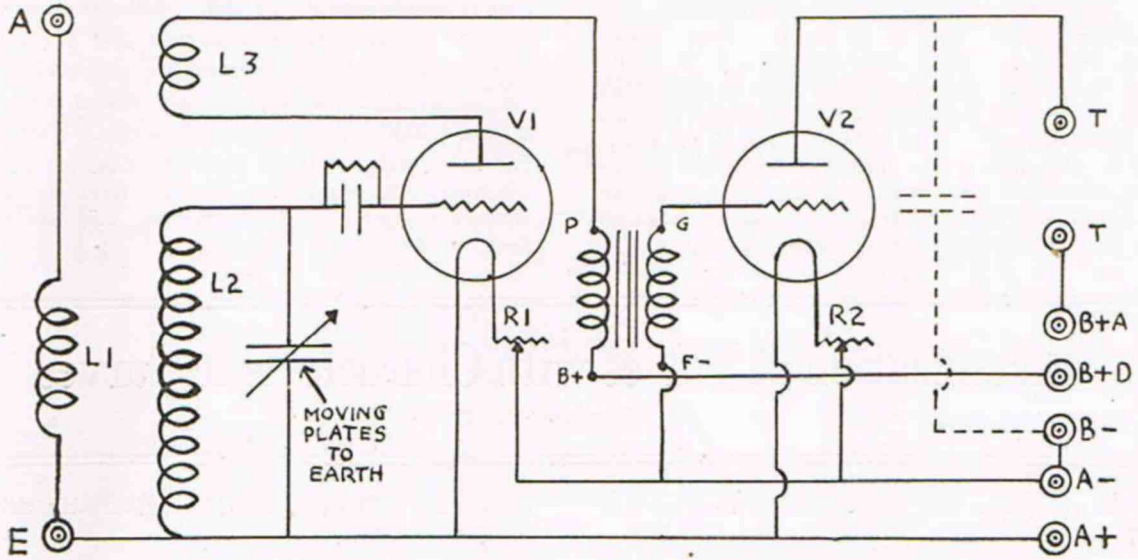
Illustrating Mounting of Parts.

drawing, so don't please blame me. I know it is a bit off, but nevertheless the measurements are accurate. The ground plan will also be of some use to you in the layout. By comparing the two you will be able to pick out the various parts. The primary and tickler knobs may be seen on the left, condenser in the middle with the Bladley leak above it. The two rheostat knobs are seen on the right of the panel layout. Above the 6ohm (inside) rheostat may be seen the clips for the QX valve while on the ground plan the Hoosick socket for the 201a valve is seen above the 30 ohm rheostat. Come back with me to the panel layout and see the single circuit jack on the bottom right hand corner. Thus it will be seen that no terminals whatever are to be found on the front panel, all of these being mounted on the back panel which also supports the rods holding the two moving coils. After all this explanation you should be able to drill the panel without any difficulty. Proceed now to mount the condenser, rheostats, valve socket, and clips, jack and Bradley leak on the panel and transformer on the baseboard. On the back panel mount the terminals, aerial and earth behind the coils and the two B positive and B negative, A positive and A negative terminals behind transformer. Screw both panels to the baseboard preparatory to mounting the coils. These are tied to the ebonite rod—Oh, Willie, wait a moment—ebonite rod is very hard to obtain I know, so don't cry, use wooden dowls instead. Tie the primary coil to a dowl, thin string is alright for the purpose, and treat the tickler in a similar fashion. A wood screw driven in through the back panel will hold these dowls from the back. Some means has to be provided so that a knob may be fitted to each. This I achieved by drilling a hole down the centre of the dowl and screwing a valve leg through the panel and down this hole leaving sufficient outside the panel to allow for a knob to be attached. See that the coils just turn easily, not too stiffly or not too loosely.

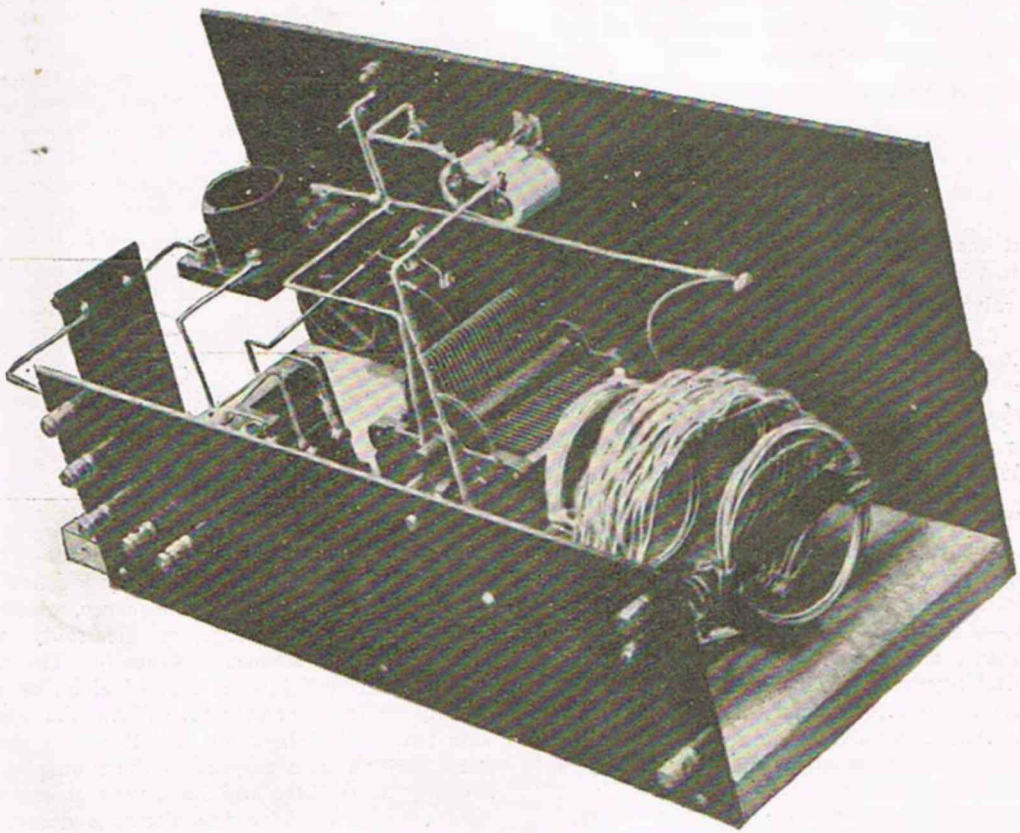
The secondary coil is to be fixed to the baseboard between these two moving coils. A short piece of 1/8in. bakelite and two short screws should accomplish this. Next wire up according to the circuit given here. This completes the job. Heave a big sigh of relief just the same as I did. In listening in, you are now able to qualify for a DX hound. A DX hound, by the way, is that particular person who forgets all about a real good local programme and sits with the earphones cemented to his face hoping to be rewarded with a few Morse notes from outside the State. It is fascinating all the same—actually in my opinion, the most fascinating end of wireless. Perhaps you don't agree with me, but listen; do you remember



Front View of Panel.



"LOW LOSS & ONE STEP"



Back View of Completed Tuner.

just the other night when the broadcasting programmes didn't appeal to you? You closed down, didn't you—and then wondered what to do with yourself? Well, if I had been you I would have got on to the low loss receiver and listened in for amateurs. This set will tune from about 100 to 250 metres and most amateurs, New Zealand, American and local chaps are to be found on or about that bands. Of course you must know the Morse Code and mind you the learning of the code is simple enough in itself. It is the speed that counts. Only practice will give you proficiency in reading speed. It was a long and trying job for me to gain mastery of the elusive dots and dashes. But "stick-outiveness" counts. Oh! just one more word. Don't burn the filament of the QX valve too brightly. You are liable to cause damage if you do, and, mind you, they are very dear.

Classification of Valves with Characteristic Curves

(By "Wireless Weekly.")

WE trust that our readers, after reading last week's article on the "Elementary Principles of the Valve," are now prepared to go a little farther into the study of this wonderful little instrument. It is almost impossible to design or construct a faultless multi valve set unless the constructor has a fair knowledge of the most important parts of his set.

Classification of Valves.

Valves are classified according to two points, in which their construction differs:

1. The grid may be either a spiral of a very small number of turns, when it is termed an open grid, or it may be a spiral of a large number of turns, in which case it is termed a close grid.

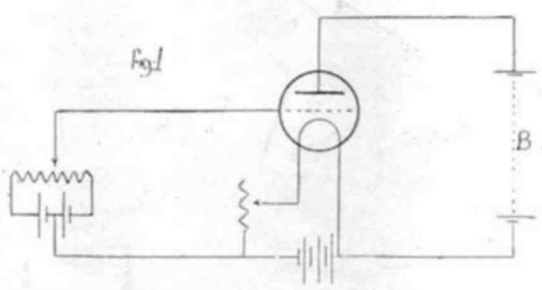
2. A valve may be exhausted so far as to be almost a perfect vacuum, in which case it is termed a hard valve, or it may have a small quantity of gas admitted into it after having been exhausted, when it is termed a soft valve.

Valves may, therefore, be spoken of as being —hard open grid valves, soft open grid valves, hard close grid valves, soft close grid valves. The radiotron UV200 is a soft close grid valve. The radiotron UV201A is a hard close grid valve. Valve manufacturers endeavour to involve the following requirements in the design of their receiving valves:—Long life, durability and robustness, small filament, small current consumption, constancy, suitability for use in heterodyne circuits, effectiveness as detectors, and silence for use in amplifiers. Any one valve seldom combines in itself all these properties at once, and valves are generally designed for one special purpose, viz., as detectors, high frequency amplifiers, or low frequency amplifier. The reason for the various requirements will become evident after this article has been carefully read.

Electron Current in the Valve.

It will be necessary here to repeat portions of last week's article, so that readers who probably did not get "Wireless Weekly" will be able to follow this one step by step.

Fig. 1 shows the ordinary A battery and rheostat joined to the filament of the valve, a potentiometer and a second battery joined between the grid and filament, and a high potential battery (B battery) joined between anode and filament. Neglecting for the moment the effect of the

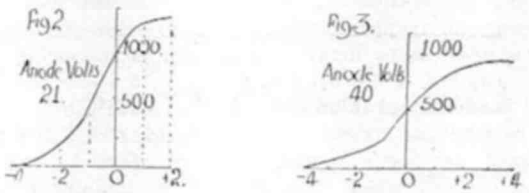


grid, the following action will occur:—The filament is heated to a white heat by the flow of the current through it. In consequence, electrons or minute charges of negative electricity will be forced from its surface continually. The filament is thus surrounded by a sort of cloud or mist of rapidly vibrating electrons. When the high tension battery is joined up, it will render the anode very positive with respect to the filament, and as a consequence there will be a very strong electric field tending to drive the electrons across to the anode through the space between the grid wires.

What actually happens on the way depends on the extent to which the valve has been exhausted.

Hard Valves.

If the valve has been completely exhausted the electrons will fly across from the filament to the anode without encountering any molecules of gas. On the other hand, if the valve has been deliberately or accidentally made soft by the introduction of gas or air, a great many electrons



will strike molecules of gas. These collisions cause additional electrons to be driven out of the molecules, which will also move on towards the anode. The result, then, of the softening of a valve is that the electron current is much denser applied voltage.

Effect of the Grid.

Figure 1 shows a potentiometer and battery joined between grid and filament in such a manner that when the potentiometer is moved to the left the grid is made positive to the filament and

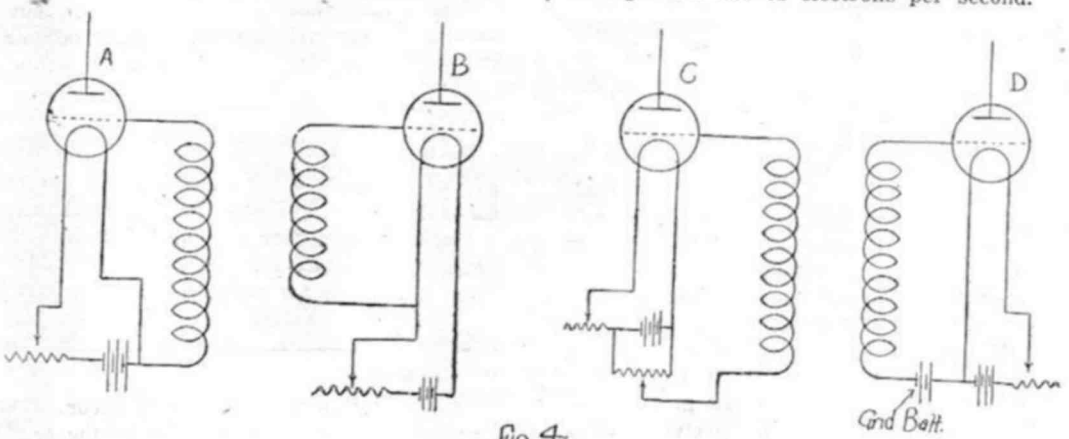


Fig 4.

negative when moved to the right. A brief study of Figs. 2 and 3 will show what effect a change in grid potential will have upon the electron current flowing to the anode.

Fig. 2 gives the curve of a soft valve. Fig. 3 gives the curve of a hard valve. Fig. 2 shows that when the grid is at the same potential as the filament, a current of 1000 microamperes; if the grid is made 1 volt negative to the filament, the current is cut down to about half this valve. This is because the grid which is very close to the filament, with its negative potential of 1 volt, is more effective in repelling the elecvtrons than the 21 volts applied to the anode is in attracting them. Similarly when the grid is made 2 volts negative to the filament, the anode current is cut down to a very small value, and at 4 volts negative anode current is completely stopped. On the other hand, when the grid is made positive to the filament, the anode current is considerably increased. Thus we learn that when the grid is made positive to the filament the anode current is increased, and when it is made negative to the filament and anode current is decreased.

2. The change in valve current for a given change in grid voltage is much greater in a soft valve than in a hard valve, on account of the multiplying effect caused by the electrons being split up by collision with the molecules of gas.

Saturation Point.

It will be noticed that after 1 volt positive the curve becomes flatter. All the electrons emitted by the filament are now carried across to the anode, and, however much the grid voltage is increased, no increase in anode current can be effected at that temperature. If, however, the filament current is increased, the filament temperature will rise, and will then be capable of emitting a larger number of electrons per second.

Effect of Increasing the Anode Voltage.

For any particular potential of the grid the anode current is increased, subject, of course, to the limit of saturation by an increase of anode voltage. We now learn that a very small change in grid potential will produce a very large change in anode current, and the valve thus acts as a very delicate relay for effecting a very big change in a current for a very small change in a voltage,

so that a very small change of current in a circuit joined between grid and filament may be made to effect a very large change of current in another circuit joined between anode and filament. If this change of current is made to pass through an inductance as in tuned plate, it will produce a big voltage across it. It is for this reason that it is given the name of valve, because it is like a valve of a steam engine, which effects a very big change in the amount of steam passing through a pipe for a very small movement of itself.

Steady Potential of the Grid.

The following four diagrams, Fig. 4, A, B, C, and D, show the various methods of connecting the grid. As a rule, valve manufacturers give advice concerning the grid return connection of their valves when used as a detector and an amplifier. As low frequency amplifiers, grid returns should always be connected to the negative unless a separate grid bias battery is employed, when the grid goes to the negative and the positive of bias battery to negative of A battery. See Fig. 4D.

Fig. 4A shows the grid connected to the negative end of filament; it is then at the same steady potential as the negative end of the filament. If it is desired to make it more positive, grid connection should be altered to Fig. 4B, when it will be at the same potential as the positive end of the filament. If it is desired to regulate the steady potential at will, it may be connected to a potentiometer slider as in Fig. 4C.

In conclusion, we urge our readers to experiment along these lines. You will find that as soon as you are familiar with the characteristic properties of the valves you are using, more DX reception will be obtained and much clearer broadcast reception. If you have never tried a grid bias on your audio frequency amplifiers, do so at once, and we are sure you will be pleased with the result. Small dry cells may be used for this purpose, and between 3 and 9 volts will usually be found suitable.

CONCERNING RHEOSTATS.

THE performances of many a set are ruined by the unevenness of its rheostats, the contact arms going round the turns of resistance wire, not with a smooth quiet motion, but in a series of jumps from turn to turn. The result is that when one uses the rheostat to adjust the filament potential, a rattling noise occurs in the receivers as the knob is moved. This is particularly annoying when one is using a single valve set, a valve whose filament potential is critical, for it makes it exceedingly difficult to find just the right adjustment. Jumpiness in a rheostat may result from several causes. It may happen that the coil is wound with wire of rather large gauge and that the turns are placed some way apart. If this is the case, it is best to remove the coil and to replace it with one that is more suitable. Or the cause may be that the arm is made of metal which is not sufficiently pliable. If the contact is not springy there is bound to be a certain amount of jumping as it passes from turn to turn. Here the remedy is to make a new arm from springy sheet copper or German silver. In a rheostat a very hard contact is unnecessary, for both the point of the arm and its path round the turns of the resistance coil are automatically kept clean by use. Another fault which will give rise to jumpiness is a looseness of the spindle in its bush. To see whether this is the root of the trouble, turn on the valve and then press the rheostat knob gently from side to side with the fingers. Should there be undue play, a noise will be heard in the receivers as the knob is moved. When buying a rheostat one is often rather in a quandary. The smooth, velvety contact is obtained when the resistance coil is not wound upon a former, for then the turns of wire themselves provide the necessary springiness. Rheostats so wound, however, are liable to be short lived, since the coil is very easily damaged. The former wound rheostat is far stronger, but unless its arm is very well designed it may be inclined to be jumpy.

MARKING ENGLISH VALVE LEG HOLES.

EVERYONE who has tried to mark out valve leg holes has found that it is a much more difficult business than might be thought. No matter how much care one takes one can seldom make them a good fit for valves if marking out is done by means of measurements. The best way of all is to use a template of some kind. Two sorts are now available for amateur use. One is a metal plate containing four correctly spaced holes through which centre punching can be done with great accuracy. The other is a small disc of steel on the lower side of which are four centre-punch points. A central hole in the disc allows it to be correctly centred up. IIt is placed upon the panel and given one tap with a medium hammer which suffices to punch all four holes at once. Should no template be handy, one can be made fairly accurately if a valve with correctly spaced pins is available. Place a small piece of white paper upon a folded newspaper and press the valve hard down upon it.

The legs will make indentations in the paper at each of which a pencil dot may be made. With the help of such a paper template one can dispense with marking out and feel sure that the legs will fit pretty well. It is well to make the holes for the valve legs rather large so that they allow a little play for the nuts to tighten up. Place a valve in them whilst they are still loose and screw up the nuts without removing it. This will automatically ensure that the legs are properly spaced.

A few days ago we had a telephone call from a gentleman at Manly complaining that, although he had constructed the ST100 according to instructions published in "Wireless Weekly," results were nil. Eventually the set was produced, and it was immediately discovered that it had NOT been built to our instructions and that the parts were mounted any old how. Now, in these reflex circuits particular care must be taken that the components are mounted so that electrically they can't interfere with each other. The gentleman at Manly was advised to rebuild his set as per instructions, with the result that a telephone message came through a day or so later—"The set is now working beautifully."

When charging a storage battery it is best to remove the vent caps, as this will allow the generated hydrogen gas to escape.

You will not find this absolutely necessary if you charge your battery at a low rate (about 3 or 4 amperes), because the chemical action will not take place so rapidly and therefore less heat will be generated.

BACK TO THE ICE FLOES.

Most of our readers were interested in the trip of the little schooner "Bowdoin" last year to the Arctic regions for the purpose of tabulating meteorological data. Captain D. B. MacMillan, who was in command, is already preparing another trip, although back only two months. Wireless on his former trip proved of the utmost value, and the vessel was almost continuously in touch with civilisation through its medium. Further extensions of this important section of the expedition are planned for the next cruise.

THE NAME TO KNOW IN RADIO

Wiles' Wonderf

56—62 GOULBURN ST., (1 door from Pitt St.)
384 PITT ST., (Near Goulburn Street.)
23 PITT STREET, Near CIRCULAR QUAY

and Electrical S

CONSTRUCT YOUR OWN BROADCAST RECEIVING SET. WE SUPPLY COMPLETE

PARTS FOR 1 VALVE BROADCAST RECEIVING SET.

1	9 x 6 x 3/16 Drilled Bakelite	0	5 9
1	.001 Variable Condenser	0	14 0
1	30 ohm Rheostat	0	5 0
8	N.P. Terminals	0	2 8
1	V.T. Holder	0	4 0
1	.00025 Condenser & Leak	0	1 0
1	42 Panel Plug	0	3 9
1	43 Panel Plug	0	5 9
	Panel Wire, Solder and Screws	0	2 0
		£2	3 11

ACCESSORIES.

4	Mounted H.C. Coils	1	6 2
1	Dry Cell Valve	1	7 6
2	Dry Cells	0	6 0
1	30 V. B Battery	0	9 6
	Headphones as selected; see list.		
		£5	13 1

HEADPHONES.

	Superphone, 4000 ohms	1	1 0
	Picco, 4000 ohms	1	5 0
	Murdoch's, 2000 ohms	1	5 0
	Murdoch's, 3000 ohms	1	7 6
	N. & K., 4000 ohms	1	7 6
	No. 1 Special, 4000 ohms	1	7 6
	Frost, 2000 ohms	1	12 6
	Trimms' Dependable	1	12 6
	T.M.C., 4000 ohms	1	15 0
	Brandes Matched Tone	1	15 0
	Western Electric, 4000 ohms	1	17 6
	Stromberg Carlson, 4000 ohms	2	0 0
	Sterling, 4000 ohms	2	4 0
	Trimms' Professional	2	5 0
	Silvertown, 8000 ohms	2	10 0
	Baldwin, Type C, Mica Diaphragm	3	0 0

PARTS FOR 2 VALVE BROADCAST RECEIVING SET.

1	12 x 6 x 3/16 Drilled Bakelite	0	7 6
1	.001 Variable Condenser	0	14 0
2	30 ohm Rheostats	0	10 0
1	Battery Switch	0	4 0
8	N.P. Terminals	0	2 8
2	V.T. Holders	0	8 0
1	.00025 Condenser & Leak	0	1 0
1	42 Panel Plug	0	3 9
1	43 Panel Plug	0	5 9
1	Jefferson Star Transformer	1	2 6
	Panel Wire, Solder and Screws	0	2 0
		£4	1 2

ACCESSORIES.

4	Mounted H.C. Coils	1	6 2
2	Dry Cell Valves	2	15 0
2	Dry Cells	0	6 0
2	30 V. B Batteries	0	19 0
	Headphones as selected; see list.		
		£9	7 8

PARTS FOR 3 VALVE BROADCAST RECEIVING SET.

1	18 x 6½ x 3/16 Drilled Bakelite	0	11
1	.001 Variable Condenser with Vernier	0	18
2	30 ohm Rheostats	0	10
1	Battery Switch	0	4
8	N.P. Terminals	0	2
1	42 Panel Plug	0	3
1	43 Panel Plug	0	5
1	.00025 Condenser & Leak	0	1
3	V.T. Holders	0	12
2	Jefferson Star Transformers	2	5
1	Single Circuit Jack	0	4
	Panel Wire, Solder and Screws	0	2
		£6	0

ACCESSORIES.

4	Mounted H.C. Coils	1	6
3	Dry Cell Valves	4	2
3	Dry Cells	0	9
2	32 Volt B Batteries	0	19
	Loud Speaker & Headphones as selected; see list.		
		£12	17

CABINETS BUILT TO ORDER.

1	Valve, stained Maple, front Panel, 9 x 6	£1	5 0
2	Valve, stained Maple, front Panel, 12 x 6	1	5 0
3	Valve, stained Maple, front Panel, 18 x 6½	1	10 0
3	Valve, stained Maple, front Panel, 24 x 9	2	5 0

The parts of these home constructed sets have been carefully tested both individually and together in the particular set for which they are intended. We employ a staff of experts to test out and find the right parts for whichever set you wish to build, not the most expensive parts, nor the cheapest; but the right parts that will perform faithfully whatever is demanded of it by the particular set being built.

Mail Order Department, 60 Goulbu

Variable Condensers for Radio Purposes

SOME POINTS TO KNOW.

(By W. A. Stewart.)

NO matter what circuit you use, you always have inductance, resistance, and capacity. No circuit can be built without the three, but it is desirable that the circuit should be designed so that they can easily be controlled.

Much has been said before this concerning low loss coils, and much talk has been heard regarding so-called low loss condensers. In this article I hope to be able to throw some light on variable condensers in general and the low loss variety in particular.

Many makes of so-called low loss condensers have made their appearance here lately, and figures are often supplied stating that "the losses are equivalent to a series resistance of so many ohms at 1000 cycles." These figures sound all right; but what is the use of measuring radio frequency losses at an audio frequency current? Sounds rather peculiar, doesn't it? Yet there it is, and nearly all the low loss condensers have some figures concerning losses at 1000 cycles. The only way to get satisfactory readings is to take them at radio frequency. Besides the resistance, another important figure is what is known as "the phase angle difference." This needs a little explanation.

When current flows in a circuit having capacity, counterforces are set up; an inertia is imparted to the current, causing it to get ahead of the voltage. The voltage naturally follows, but is out of phase. The condenser should be constructed so that the current leads the voltage by 90 degrees, that is the current passes through the zero value when the voltage is at maximum. The difference between the two phases is the phase angle, and the nearer this angle approaches 90 degrees the more efficient the condenser. It is practically impossible to build a condenser having a phase angle difference of 90 degrees, but many of the better class condensers are almost correct.

Another form of loss in a condenser is what is known as dielectric absorption. If a condenser having a solid dielectric is charged and discharged a few times it becomes warm, this being due to portion of the charge being absorbed by the dielectric. There has been no satisfactory explanation of this, but it is thought that the insulation, instead of being a solid mass, is composed of a number of small capacities. For this reason it will be seen that the least possible insulation consistent with good construction should be used, and should be located in positions where it will not easily charge up. In air condensers losses are not so great as in mica or paper condensers, and, taken all round, any air condenser has fairly low losses when compared with other condensers.

Another means of loss occurs in the construction of the condenser itself, that is the resistance of the plates themselves, and the resistance of the connections to the moving plates. The plates should preferably be constructed of some rigid metal of low resistance. Brass answers the purpose, and is used on most of the better condensers. Copper certainly has a lower resistance, but is not nearly so rigid, and unless care is exercised the plates are liable to touch. The plates should be fairly thick to be a good job. Aluminium is often used for plates, but owing to the fact that there is always a film of corrosion on the surface they are undesirable, as there is always a poor connection between the plates and the spindles. Aluminium is rather difficult to solder, and is gradually being replaced by brass for condenser plates.

Another source of loss occurs in the contact with the moving spindle, and for this reason a pigtail connection is an advantage, this simply consisting of a spring so coiled that it will not break when the condenser is rotated. If the insulation has a tendency to absorb moisture, an easy path is provided through the insulation itself, therefore only the best should be incorporated in a condenser, pyrex glass or hard rubber being O.K. The leads between the condenser and the terminals should be short, so as to cut down any inductance effect. A condenser having plates cut so as to give a straight line wavelength curve is an advantage for fine tuning and accurate work.

Many condensers have a metal end, which is connected to the moving plates, and is insulated from the fixed plates by small strips of good insulating material. This design is certainly a good one, and has practically been universally adopted by manufacturers of low loss condensers. However, the mere fact that a condenser has metal does not necessarily make it a low loss job, unless all the other features are employed as well. Another point about a good condenser is that the

plates are soldered together, thereby cutting out contact losses between plates. A gearing arrangement to turn the plates slowly is an advantage, as it allows fine control. Care should be taken that the gearing is connected to the earthed portion of the circuit. Casing round a condenser is desirable, as it stops dust getting between the plates, and may also prevent the condenser getting damaged.

If the few foregoing remarks are borne in mind when buying a condenser, the results will be better and the money spent will be well returned. Remember, it is better to buy the best at first, as if a cheap article is purchased it is scrapped sooner or later and a better one bought, which means two expenditures instead of one.

INTERSTATE NOTES

WESTERN AUSTRALIA.

Western Australias' broadcasting station, 6WF, is the only one in Australia which gives up a short period of its valuable time once a week for the fostering of the experimental movement. Half an hour is available every Friday evening to any member of a society who cares to deliver an address. Opportunity is availed of informing listeners of the meeting nights of various clubs, the former gaining much intelligence on his set by listening to these lectures. It is an innovation which other stations might copy to advantage.

An artiste whose voice is particularly pleasing when heard by listeners-in is Miss Lilian Crisp, a popular W.A. soprano who is to pursue her musical studies outside the State at an early date. A recently broadcasted concert was her farewell recital tendered in Queen's Hall. A large audience attended, and expressed high appreciation of everything in the varied programme. Sir William Lathlein, on behalf of Miss Lilian Crisp, thanked all concerned. He spoke of the need for an artist to have courage as well as talent, and added: "I don't know whether we are getting degenerate, but not so many people come forward to listen to a great artist nowadays as a few years ago." Perhaps they all listen-in now!

The radio picnic organised by the Subiaco Radio Society was acclaimed a complete success. About fifty people comfortably filled the launch "Sunbeam," and the voyage round the river was run under perfect climatic conditions. Stops were made at several resorts in order to pick up other passengers and to partake of refreshments. A full orchestra was engaged for the trip, and dispensed some enjoyable numbers.

COLOUR BY WIRELESS.

Description of Process.

An interesting traveller who passed through Fremantle a few days ago on a steamer returning from England was Captain Geo. A. Taylor, F.R.G.S., of Sydney, President of the Association for Developing Wireless in Australia. Captain Taylor, who is editor of a Sydney technical magazine, informed a pressman that his hobbies were wireless, aeronautics, and astronomy. He lectured in Australia House, London, upon the subject of encouraging invention, and his machine for transmitting coloured pictures by wireless was shown for the first time in Europe. The cables have contained references of the recent experiments of transmitting pictures by wireless between London and New York, and it was interesting to hear the captain's explanation of the process used by him.

Captain Taylor said that the coloured picture for transmission by radio was photographed through screens on to metal plates in the ordinary way for printing in the three primary colours, yellow, red, and blue. Each plate was printed in black ink, and the print was enlarged so that when acid etched on a metal plate, it would have deep etchings between the screen lines. The plate was then placed on a cylinder moving with a needle coming in contact with the metal parts untouched by the acid, and such contacts were transmitted by wireless in the simple "dot and dash" method, the "dot and dash" being easily picked up as in ordinary reception by wireless, and made to establish contact by means of an ink-marker on to a cylinder moving at the same speed as that at the transmitting station, the receiving cylinder, however, being covered with paper, so that at the receiving station the picture was received in black as transmitted. It was then reduced to the original size and printed in the colour, the black print of which had to be transmitted. The three pictures received at the receiving station were reduced and printed in the three primary colours, yellow, red, and blue, and gave the effect as shown in the original coloured pictures at the transmitting station.

Wireless Then and Now.

The cable message published in the "Daily News," W.A., that an amateur in New Zealand had sent messages which were received in the Pyrenees region of France makes me marvel at the progress which wireless has made in the last quarter of a century. It is only 25 years ago since Commander E. R. Statham, R.V., wrote in the "Navy and Army Illustrated" on wireless trials during naval manoeuvres as follows of the marvellous achievements and greater possibilities of that time:—"Reaching the convoy at 4 o'clock one afternoon, and leaving it and the other cruisers in charge of the senior captain, the 'Europa' hastened back towards another rendezvous, where the admiral had intended remaining until he should hear whether the enemy had found and captured the convoy. But scarcely had she got ahead of the slow ship when the 'Juno' called her up and announced the admiral coming on to join the convoy. The 'Juno' at this time was fully sixty miles distant from the 'Europa.' Now, imagine a chain of vessels, sixty miles apart; only five would be necessary to communicate some piece of intelligence from a distance of 300 miles, receive in return their instructions and act immediately all in the course of half an hour or less."

Half an hour or less! To-day such a lapse of time would be regarded as an eternity by the anxious naval commander awaiting instructions. It may be of interest to record that about the time the foregoing was written we in Western Australia, in our own little way, were investigating the possibilities of the new science. Included in the archives of Parliament is Paper No. 47 of 1899, being a report on "Experimental Work by the Telegraph Branch of the General Post Office to ascertain the practicability of establishing communication by wireless telegraphy between Rottnest Island and the mainland." The experiment was carried out on the Swan River by Mr. G. P. Stevens, the then manager and electrician of the G.P.O., and now general secretary to the Civil Service Association. Reporting to the Superintendent of Telegraphs, Mr. Stevens stated that a series of experiments had been carried out with a view to testing the distance to which it was possible to signal without wires with the apparatus at present at command, viz., a six-inch spark coil as a transmitter and unexhausted coherers as receivers. The results were not as satisfactory as anticipated, but were quite sufficient to confirm the opinion that, with proper appliances, the system would be quite reliable, and meet all the requirements for conveying shipping intelligence to and from Rottnest. Describing the experiments in detail, Mr. Stevens wrote: "Using a vertical conductor suspended from the flagstaff of the Royal Yacht Club, at a height of 40 feet above water level, and a similar conductor supported by a temporary mast on the police launch, we commenced signalling across the water at 200 yards; then, putting the launch under slow steam, the distance was gradually increased, communication being kept up all the time until, at about three-quarters of a mile, the coherers failed to respond. Careful tests were made, and all possible variations of spark length tried, but no effective waves could be detected outside the three-quarter mile radius. By means of flag signals the launch was instructed to return slowly, and immediately it entered the magic circle the electric waves were again picked up and steadily increased in volume as the launch approached, the Morse code being easily read throughout. Assuming that perfect signals were obtained at half a mile with conductors 40 feet high, we should require conductors 160 feet high to work eight miles and 196 feet high to work 12 miles; thus, to establish communication between Rottnest and the mainland it would be necessary with the apparatus available in this colony to erect masts at each station 200 feet high." That was a short 20 years ago. On Sunday night (as recorded in "The Daily News" on Tuesday) the ex-Minister for Mines was able in half a jiffy, so to speak, to rig up a bijou wireless set on the roadside and properly observe the Sabbath evening with a church service at Perth, over 30 miles away. Truly, wireless has moved; and who is able to say to-day how much further along that road science will take the world?

Unlicensed Broadcast Listeners.

In the City Court on December 24, the P.M.G.'s Department commenced their initial proceedings against persons maintaining broadcast listening-in plant without having taken licenses. Although the Wireless Telegraphy Act provides for a very severe penalty, only a nominal penalty was sought. The magistrate imposed a fine of £1, with £1/4/- costs, adding a warning to the effect that future cases appearing on a similar charge will be severely dealt with. I have been asked to state that the P.M.G.'s Department regard the matter of prosecution as a distasteful but unavoidable duty, as every reasonable precaution has been taken to bring under the notice of all concerned the necessity and reasonableness of obtaining licenses. Some people, I see, are alarmed at the activities of the sleuths reported from several quarters as hot upon the trail of the few remain-

(Continued on Page 40)

ing pirates. Anyone who wears a trying air and is continually looking up at roofs is at once pointed out as one of the new smellers out of unlicensed sets. I know an eminent professor of ornithology who had a terrible time some weeks ago. He was engaged in observing the habit of the orange-spotted willow-burbler—a rare bird, whose shyness makes him most difficult to approach. The professor, therefore, armed himself with a powerful pair of field-glasses and lay hidden in all kinds of queer places. You would find him once swaying dizzily in the topmost branches of a tall tree, then lying prone concealed beneath an inverted cattle trough. His actions aroused suspicions of the local wireless desperadoes. One day they fell upon him, armed with bamboo-spreaders, and beat the poor man into a passable imitation of a jelly.

The Wireless Exhibition.

Just concluded, the W.A. Wireless Exhibition is thought to have been the most successful event staged. This is the fourth of its kind in the State. The first all-wireless exhibition in W.A. was held on December 12, 1922, and was carried out by the Wireless Institute of Australia (W.A. Division) at James Street State School, Perth. This, by the way, was the first exhibition in the Commonwealth, about 800 people attending in the one night. Since then, two exhibitions have been held by clubs, thus making the recent exhibition the fourth. The Wireless Institute of Australia (W.A. Division) and affiliated clubs intend to hold another one early in the next year (1925), to be held at Government House ballroom. The latest event afforded many dealers an opportunity of launching many new gadgets.

QUEENSLAND.

IT is some time since any notes have appeared from this State. Wireless has been very quiet here for some months. For nearly two months static monopolised the air, and it was an impossibility for anyone to listen to the Sydney broadcasting. So far we have no "A" class station, although, mind you, the Commonwealth Government collects the full fee (35/-) from the Brisbane zone. It seems peculiar that a listener-in in Brisbane, which is 500 miles from an "A" class station, should have to pay this full fee. Sydney reception is not comfortable here on anything under three valves, and is even impossible on these sets during the greater portion of the summer months.

We even had no local broadcasting up to two or three weeks ago. As this state of affairs was seriously affecting trade, the wireless traders of the city formed a committee and leased the well-known 4CM station. This now provides us with three programmes weekly. Even this station has been impossible to hear properly two miles away on some nights owing to static.

A manager has been appointed by the Queensland Government for their proposed new "A" class station. This is a long time coming, but will be greatly appreciated when in full swing.

The most prominent of our local amateurs are at present 4CM, 4AN, 4AZ, and 4CW. The first three are usually heard carrying out tests on a Saturday afternoon and Sunday morning. The last station, 4CW, gives us a concert now and then, and obtains really good results considering the difficulties he transmits under.

4AE has been quiet for some time, but report has it that the institute will shortly be in the air again. We are waiting for them, as we remember the excellent quality attained in their previous transmissions.

If the sensitive spot on a crystal is worn out or the crystal is dirty, immerse the crystal in a bath of alcohol for about fifteen minutes, then remove the crystal and allow to dry. Never touch crystals used in radio work with your hands, as dirt and grease are conveyed to the surface of the mineral.

Full Stocks of American, Signal, U.S. Tool, & Tunup Variable Condensers

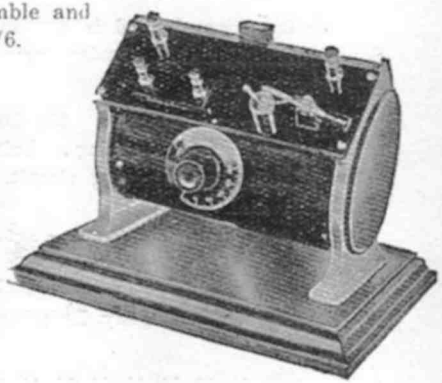
AND NOW We offer you the beautifully made "UTILITY" British made Condensers.

These are guaranteed mechanically and electrically perfect. They are fitted with Genuine Radion Dial.

Verniers		Without Vernier	
Size .001, 50 plate . .	19/6	Size .001, 49 plate . . .	16/-
Size .0005, 26 plate .	17/-	Size .0005, 25 plate . . .	14/-

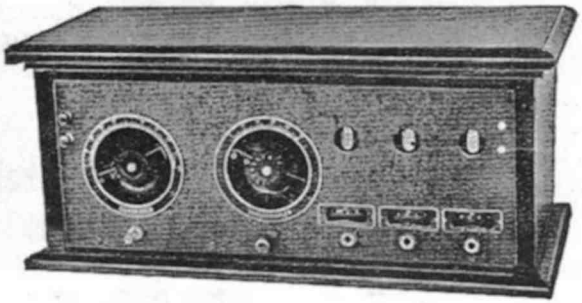
..DO NOT FAIL TO INSPECT THESE BEFORE PURCHASING...

We also have the "UTILITY" Set of Parts ready to assemble and complete with knob: 49 plate 8/6; 25 plate 6/6; 15 plate 5/6.



The Crystal Set (shown at right) is our latest Reflex Rotocoupler. It has vulcanite rotor with dial setting for secondary tuning. For selectivity and volume there is no Crystal Set to equal it. It is finished in the usual Reflex manner.

PRICE £4/5/-



To the left we have a beautiful Eismann 3 Valve Set, supplied complete, as illustrated, with all accessories, **£36.**

A Complete Set of Parts to make this Set (including Maple Cabinet, but not including valves, batteries or phones. . . . **£16**

HEAD PHONES: PEERLESS SPECIAL, NOW 27/6

RADIO HOUSE, 619 GEORGE STREET, SYDNEY

THE QUALITY RADIO STORE.

SEND FOR PRICE LIST

(Continued from Page 21.)

less. For the banjo there was no cure, but eventually it disappeared over the side in Catania Sicily when Captain G. was transferred from the steamer.

There are many others I have the most pleasant recollections of, especially "Pas," "Rat," Johnny Buchanan, and several whose wonderful qualities were particularly pleasant at sea, where, cooped up on a freighter and living mostly on tinned chow, one's temper was not always as perfect as it might be. The skipper makes or unmakes his ship so far as personal comfort is concerned, and particularly in the case of the wireless operator, who is neither of the deck or the engine-room, but directly under the jurisdiction of the skipper, who can make the job a pleasure or the reverse.

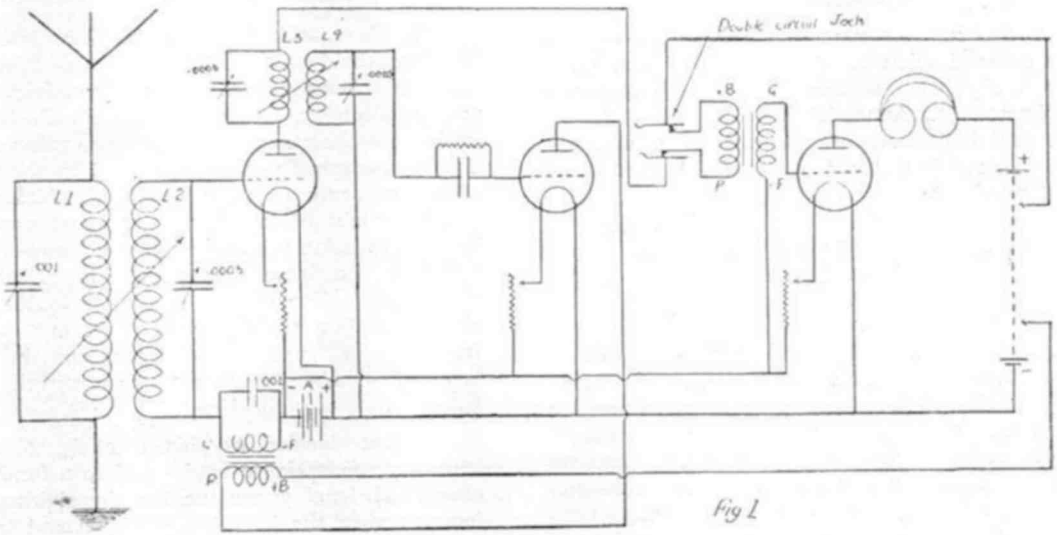


Fig 1

A CORRECTION.

In our article, "A Very Selective Three-Valve Receiver," published in the issue of January 2nd, a mistake occurred in the wiring diagram of Fig. 1, in which the "A" battery leads were incomplete.

The drawing here shows the correct circuit, and we sincerely trust readers have not been put to any inconvenience.

CHINA LISTENS-IN.

Aussies are through to the land of mandarins and unshingled hair. Mr. Faraiva, of Macau, China, reports to 2CM that he has logged 2CM, 3BQ, 2AY, 2YG, and one or two others.

INTERESTING EXPERIMENTS.

Some interesting experiments were recently carried out at Southampton to test the possibility of direct wireless telephone communication between incoming ships and the dock authorities ashore. A 50-watt transmitter and a three-valve receiver were used, and there is no difficulty about tuning-in, as the apparatus works on a fixed wavelength of 250 metres. Some very promising results were obtained, and it is possible that this aid to the pilot will soon be universally adopted.

SECRET RADIO.

Mr. William Dubilier, of condenser fame, has been investigating a new German invention by means of which commercial news by wireless can be transmitted without fear of its being "tapped" by unauthorised listeners. The machine is fundamentally simple, but absolute secrecy is obtained by reason of the fact that countless transmitting combinations can be used and altered at will, the result being meaningless to all except to the authorised listener.

THE LEICHHARDT AND DISTRICT RADIO SOCIETY.

On Tuesday, January 6th, members of the Leichhardt and District Radio Society held their 27th monthly business meeting at the club-room, 176 Johnston St., Annandale.

Several important matters were dealt with including the election of two new members, and those present were reminded that, at the following meeting, the result of the "Short Papers" competition would be announced by Messrs. Watt and Hamilton, who had been appointed by members to act as adjudicators in the matter.

Members of the Council and Technical Committee are at present at work on the compilation of a new Syllabus. This will be the third drafted for the benefit of members, and special efforts are being made to arrange one which will appeal to both the beginner and the advanced experimenter as well. Details will be published in these columns in our next issue. Watch for them. They will be most interesting.

Members are now settling down to work in earnest, and it is confidently expected that this year will see much good accomplished by all.

At the conclusion of the meeting held on the 6th instant, Mr. H. F. Whitworth treated members to a very interesting and instructive demonstration with an ST100 receiving set constructed by himself, and the results obtained were indeed excellent.

The Society is anxious to increase its already membership, and inquiries regarding its activities are invited from those interested. These should be addressed to the Hon. Secretary, 145 Booth St., Annandale, and will receive prompt attention.

WAVERLEY RADIO CLUB.

The first meeting of this club after the Xmas recess was well attended, and augured well for an active start to the New Year.

Three new members were enrolled and it was decided, on the motion of Mr. J. Miller, that those who were in arrears in their payments be written to and asked to become more regular members.

Another decision was that at the annual celebrations (about the beginning of February) the new transmitter be officially opened. This agreement was reached unanimously.

Mr. G. Thomson, the club's technical adviser, notified the mmebers that 2BV had been on the air. With certain adjustments he expected the transmitter to exceed expectations.

The chair was occupied by the President, Mr. A. Burrows.

STRATHFIELD AND DISTRICT RADIO CLUB.

The first weekly meeting in 1925 of the above Club was held at the club room, corner of Albert Road and Duke Street, South Strathfield, at 7.30 p.m. on Monday, 5th inst. Mr. R. F. Jacob occupied the chair and the attendance was very fair. Our ranks were further augmented by the addition of a new member at this meeting. Almost every meeting night of late proceedings has commenced by the admission of one or two new members, which indicates the increasing popularity of the Club movement. Our Club is fortunate in the possession of a fair sprinkling of what our American friends term "sugar cured hams" and the enthusiasm of members generally, argues well for the future.

It was decided at this meeting to strike a small levy monthly to be devoted to a fund to purchase additional apparatus for the club's use. We have in view the installation of a small transmitter when finances permit and very shortly we hope to be able to carry out demonstrations and illustrate lectures with the aid of actual apparatus. Other business matters having been attended to, a short time was devoted to discussion of practical problems submitted by members, and proceedings terminated with an hour's lecture on valves delivered by the Secretary.

This lecture is the first of a series on the subject and covered briefly and in elementary language the electron theory and the characteristics of the 2-electrode valve. Subsequent lectures will deal with the triode valves, their operating characteristics in various receiving and transmitting circuits and method of plotting characteristic curves.

The Institute are also making provision for lecturers to visit our club periodically, so with their aid and the programme of club activities already mapped out by our Committee, the next few months work will be most interesting and instructive.

Our membership roll is not full yet and a few more members would be a welcome acquisition. The Hon. Secretary, Mr. K. Campbell, 44 Bayard St., Mortlake, will be glad to supply information regarding the Club's activities to anyone interested.

THE WIRELESS SOCIETY OF NEWCASTLE.

At the meeting of the Wireless Society of Newcastle, held at the Society's rooms, Y.M.C.A. Buildings, King Street, Newcastle, on Wednesday, the 7th inst., at 8 p.m., Mr. L. T. Swain, President, gave a very instructive lecture on Low Loss Tuners.

Low loss tuners have only been introduced in Australia recently, and have become very popular among the genuine experimenters, as they are extremely efficient on low wave lengths, as well as being economical, selective, and easy to operate.

A vote of thanks was passed to the lecturer, which was carried with acclamation.

The Society's transmitting set, which has been undergoing reconstruction is now in complete order, and arrangements are now being made for the erection of the new aerial, when the Society will again provide the entertainment and experiments which were eagerly looked forward to last year.

2CS 49 Everton St.,
HAMILTON.

HELP.

Quite recently we were put to a lot of inconvenience through delay in receiving an important letter which was addressed to us at Redfern.

This address was incerrect, and as mail addressed Redfern does not reach us until a late hour, we ask readers to kindly note that our correct postal address is 12/16 *Regent Street, SYDNEY. Thanks.*

ONE of the most prominent attractions at the Chicago Radio Show, held at the Chicago Coliseum, was the exhibit given by E. T. Frewelling of amateur station 9XBG, who set up his station for broadcasting and handling messages for visitors. The most unique feature of the experimental station was the fact that the entire equipment, from the current supply to the aerial and counterpoise was located entirely in the building. The transmitter was a 100 watt set, broadcasting on 80 metres and operated entirely from power supplied from storage batteries.

Special permission was secured from E. K. Beane, supervisor of radio for the ninth district, to permit broadcast on short waves. Musical programs were given by two entertainers. Mr. Flewelling was assisted in the operation of the set by members of the Radio Traffic Association, affiliated with the A.R.R.L.

REPLIES TO CORRESPONDENTS.

To several enquiries concerning low loss receivers. Everything you have asked has been well covered in previous issues. See this week also.

Radio Congresses

Some Interesting Information for Transmitters.

THE first congress of the International Juristic Committee of Radio and the first congress of the International Union of Radio Amateurs will take place in Paris, Easter, 1925 (16th to 20th April).

What with the increased number of radio telephone transmissions, the development of radio telegraphic relations between amateurs and the wonderful rapidity of progress in the radio departments of science and technics, it is anticipated in the near future that quite a new state of inter-relationship between the people of different lands will arise; because of this many important international problems will need adjustment.

Every participant in this wonderful movement certainly thought of its ultimate success. Without a doubt a methodical co-ordination of labor organisation of present relations is desirable and very soon will be necessary. During the month of March last, Mr. Hiram P. Maxim, President of the American Radio Relay League was in France. The Inter-social Committee consisting of delegates from the oldest French Radio Association seized the opportunity of Mr. Maxim's presence to investigate as to what manner the amateurs of the world could strengthen the bonds which unifies them and how they could work for such an organisation. The following minutes were drawn up: Radio Amateurs of Belgium, Spain, U.S.A., Franch, England Luxembury, Italy, and Switzerland assembled or were represented in Paris, 12th March, 1924, to discuss with Mr. Hiram P. Maxim, President of the A.R.R.L. the desirability of an International organisation of Radio Amateurs. The desirability for forming such an organisation was agreed upon unanimously. Conditionally, and to be afterwards approved by those who were not commissioned by their national societies, they selected to discuss as to what manner such an organisation could be made effective. For Belgium Mr. Henrotay; for Spain, Mr. Balta Elias; for U.S.A. Mr. Hiram P. Maxim; for France Dr. P. Corret; for England Mr. G. Marcuse; for Luxemburg Mr. De Groot; for Italy Mr. Guilio Salmon; for Switzerland Mr. Cauderay. Denmark, which did not send a representative, was to be informed by Dr. Corret of the arrangements made with Hiram P. Maxim. (A delegate from Chekoslovakia was afterwards accepted.)

The so elected amateurs or their representatives assembled 14th March with the exception of Mr. Marcuse who could not continue his stay in Paris.

(Continued on Page 48.)

The committee so established adopted the name Provisional Committee for the organisation of the International Union of Radio Amateurs and elected Hiram P. Maxim as President and Dr. Corret as Secretary. The opinion was that after a preliminary discussion of a project established by the A.R.R.L. the definite foundation of an international membership of Radio amateurs be proposed for discussion at the international congress to be held in Paris during Easter 1925. The name International Union of Radio Amateurs seemed to be the most suitable.

The different national radio societies should be invited to provide the guarantee capital for the initial expenses of the Congress. The money donated by the societies would be repaid if there be no deficit. If a deficit, then proportionally according to their donation.

In conformity with the above minutes the associations of Radio amateurs in France attended to the organisation of the first congress which will definitely establish the International Union of Radio Amateurs and at which will be investigated the different questions of international interest. On the other hand, Radio Telephony and Radio Telegraphy are now playing a great part in the economic, political, and artificial movement of the Nations, this has given birth to many juristic problems. Now relations have been created by Radio between states and between the different categories of persons concerned, viz., Governments, Transmitters, authors, artists, amateurs and users. The rules applicable to the juristic occurences established in practice are definable within each state. but the national laws which govern radio must be perfected by international regulations.

In the year 1923 there was founded in Paris an association named the International Committee of Radio, whose duties were to work out the international regulations of radio. The committee now consists of members belonging to the following states: Argentine, Austria, Belgium, Canada, Columbia, Cuba, Denmark, Egypt, Spain, U.S.A., France, England, Hayti, Hungary, Italy, Japan, Luxemburg, Monaco, Norway, Holland, Poland, Portugal, San Domingo, Siam, Sweden, Switzerland, and Chekoslovakia. The committee has mutual relations with the League of Nations and with such like Federations and Associations: Union of International Associations, International Commercial Chamber, International Juristic Association, Society of Legal Studies, Federation of Intellectual Workers, Society of Literateurs, International Literature and Art Society, Syndical Chamber of Musical Artists, Professional Syndicates of Radio Electrical Industries in different countries, etc., etc.

The International Committee of Radio is organising the first congress in order to discuss the juristic problems established by applications of radio electricity, which will also take place in Paris during 1925. Because of the great number of common points met with in the questions which were suggested to the jurists, technicians, amateurs, and users of radio, the organisers thought that it would be better to have it at the same time the International congress or Radio Amateurs, and the International Juristic Congress of Radio.

With this aim in view there was established in Paris an organising committee with a Secretariat to organise both congresses according to the same general plan with accordant programs under the same patronage and upon the same date, although both congresses will retain their own independence. Both congresses will take place in Paris on Easter Thursday, 16th April, and continue to the 20th. All jurists and amateurs will be accepted at these congresses but only the official delegates of the National Radio Societies. The organising committee will look after the collecting of the necessary funds for the preparation of the congresses and it leaves to each Society to decide as to what degree it will be able to take part in the expenses.

The programme of the congresses will be arranged as much as possible and in such a manner that the members of one congress will be able to attend the sessions of the other and also to take part in the receptions and the different congress functions. The cost of the congress ticket is minimum 25 francs for the congress of the International Union of Radio Amateurs or for that of the International Juristic Committee of Radio, and 40 francs for the membership of both congresses. The subscription is calculated according to French francs and as soon as possible to the General Secretary's office, 2 rue de l'Euchaude, Saint Germain, Paris (6E).

Michael H. Crowley, Superintendent of the Boston Police Dept., announced recently that he had received a message on an American Radio Relay League radiogram giving a description of two students, Robert Higgins and Leonard F. Wolfe, claimed to have disappeared from Norwich University. Superintendent Crowley declared that both the local and New York police had been notified of the case, and were on the look-out.

Below the Broadcast Bands

COUNTRY TESTS.

MR. H. K. JAMES, operator of experimental station 2XA, of Summer Hill, is going to Goulburn with a view to carrying out a great deal of experimental transmitting and receiving. He will work in conjunction with R. Turner of that town, whose experimental call sign is 2RT. A four coil Meisner circuit transmitter is to be constructed on the spot, and should be in operation at an early date. The plate supply is being derived from a three hundred volt storage battery, and should insure a steady working wave. The probable wave length of the transmitter will be 170 metres, but the whole amateur band and (from 125-250 metres) will probably be tried, for best results, and the call sign used will be 2RT. The station will be prepared to test any night from 6.30 to 12 p.m., and it is hoped that the tests will be arranged with Sydney and Interstate amateurs. It is Mr. James' intention to carry out extensive tests regarding fading, and absorption of signals, as Goulburn has a reputation of being a partial "dead spot." Both amateur and broadcast waves are to be covered. For the amateur waves a receiver of Mr. James' own design is being used, while for the broadcasting a "Volmax" super five valve set, together with other receivers will be used. It is hoped that this series of tests will prove a boon to Sydney transmitters, as it is hard to get authentic reports from country districts. Some interesting facts should be obtained concerning transmission from a so-called dead spot. Further schedules will be arranged later, and the particulars of the experiment carried out, times of working ,etc., will be published as soon as possible. It is hoped that all will cooperate to make these tests a success as Mr. James and Mr. Turner are going to great trouble to make their end of the business as good as possible under the prevailing conditions.

Many new stations have appeared on the air lately, and prominent among them is 2FP. This station has made a wonderful improvement and seems to get better every time he works. The modulation at present is prétty right and except for some A.C. background hum everything is O.K.

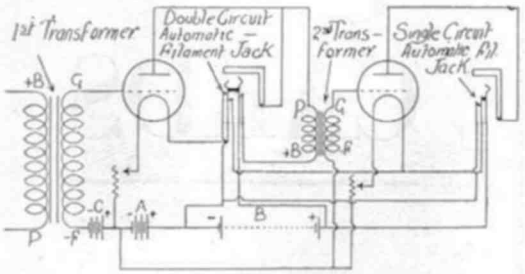
2ZN seems louder than ever, especially Sunday Mornings when his transmissions are particularly good.

Another station heard lately is 2XY who is coming in fairly well seeing that he is quite new. He was swinging a lot however, his wave often changing 10 metres or so when he switched over to phone, after sending C.W. However efficiency only

(Continued on page 52)

(Continued from page 17)

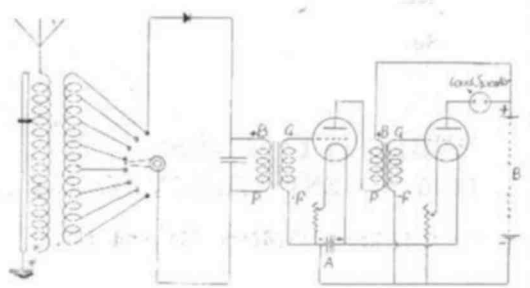
rheostats as illustrated. If American valves, place the valve holders on the baseboard as near as possible to the transformers. See that you have the correct type of rheostat for the valves you use, and don't forget to link your minus A to minus B.



F.E. (Sydney).

Question: Please supply the following circuit. 2 stage amplifier with rheostat connected in the negative filament lead and the return from the grid circuit connected to the negative side of Battery. A.B. and C. Battery. Double circuit jack after first stage and a single circuit automatic filament control jack after the second stage. Can I procure a variable resistance from zero to 500,000 ohms for shunting the secondary of the first transformer. If not, what is a good alternative?

Answer: Circuit shown here. With this circuit arrangement, when the plug is placed after the first stage the first tube lights alone and when plugged into the second stage both tubes will light. When the plug is not inserted at all the tubes will not light nor will they be in operation at all. The C battery and rheostats are shown as you require but you will need to experiment to arrive at the correct value of the C battery voltage. Usually, between 3 and 9 volts are required for a B battery of 100 to 120 volts. Suggest you use a .001 fixed condenser across the primary of the first stage in lieu of 500,000 ohm resistance and this you will find to be quite O.K. Be sure you get jacks of good type with faultless insulation, otherwise you are liable to blow your tubes.



A LITTLE NONSENSE.

THE questions and answers department of a wireless journal occasionally gets queries which cause it to scratch its head. This one below must have caused the editor of an American journal to reach for his gun:—

"I have a 5-kilowatt, double-barrelled, seven passenger, triple-valve, nonskip outfit, complete with U.S. safety appliances (standard) and Timpkin rear axle, which I use in connection with a 210-volt, hammerless, self-winding, automatic, 16-jewel, nickel-plated, Marconi antenna with pneumatic tyres. Have had a great deal of trouble with my galena at night since I started using vegetable compound, but get better results by painting it with iodine. I can get undamped waves all right with my regenerative vacuum sweeper in dry weather, but on Sundays I find that my rheostat keeps interfering with the differential so that it is necessary to cut in a small .0045 mfd. washboard between the piano and the kitchen sink.

"Until recently I used a five-string, tenor, hardwood amplifier with 240 turns of No. 4½ barb wire around the front sight cover, but I found that with this arrangement the felicity of the heating element had a tendency to become impregnated with the pigment from the valve stem, so I removed the drift slide and substituted a duplex automatic stoker, which allows the left dorsal ulna bone to oscillate between the hydrometer and the upper sling swivel and prevents the choke coils from short-circuiting the permanent wavelength.

"I was wondering if by placing the blow-off cock in juxtaposition to the universal joint on the loop aerial and using an emergency application of air on the primary windings, would the cubic capacity of the variable condenser in any way affect the centrifugal dirt collector of the three-way switch of the microphone, and, if so, would this be a reversible reaction? Also, do you think that by using more chalk and a little high English on the cue ball, would the pilot beam interfere with the insulation on the superheater pipes?"

(Continued from page 49)

comes by experiment, and it should not be long before this station is one of the loudest, if these preliminary transmissions are anything to go by.

2BV has also been working lately, and the transmissions are quite strong. A motor generator set of special design supplies the plate supply for the valves, the circuit used being a Hartley. The modulation is excellent except for the commutator ripple from the generator. This however is in the process of being smoothed out. The buzzer, and C.W. are particularly steady, and it should not be long before this station is working consistently.

Commenting on radio in America, Mr. Vincent, a New Zealand amateur who has just returned from the States, says that Australasian amateurs, as a body have nothing to learn from America as regards sending and receiving. Aerials are slung from chimney pots and back fences there, just as they are here in places, and everyone seems crazy over radio. In any radio store a large crowd of purchasers may be seen at any time of the day, and one has to wait one's turn to be attended to. This is certainly a marked difference from radio business here. Broadcasting, far from being on the wane in 'Frisco, is busier than ever, and all sorts of institutions including schools, are installing receivers.

Stations Heard

Mr. L. R. Hewett, Kogarah, using a low loss one-valve set with a UV199, logged the following U.S.A. stations; all sigs. were easily readable:—6CAX, 9ZY, 9HK, 9DL, 2BRB, 6AWT, 6BDT, 7WM, 9ACQ, 6CDT, 9BDT, 9AQD, 6CW, 9VC, 9CIW, 6EW. Many others heard were not identified.

—o—

ACTING upon a suggestion by 2CS in another portion of this issue, we are publishing the QRA of the stations heard by Mr. Lawrence E. Deane, Lindfield, N.S.W., a list of which appeared in last week's issue. In all future reports that reach us we shall act similarly with regard to the overseas stations, except New Zealand. And while we are on this subject we would like to see a regular "Stations Heard" list in "Wireless Weekly." Quite a number of American and New Zealand amateurs subscribe to this paper, and such reports would be interesting to them. But aside from this, the list would be of value to readers in general, and to Australian transmitters in particular. So don't keep that list of yours to yourself, but pass it on to others through "Wireless Weekly."

1ABF: C. T. Jorey, 253 Bliss Road, Longmeadow, Mass. 1BUX: O. T. Woods, 17 Grenada Terrace, Springfield, Mass. 1JS: G. W. Tyler, 144 Greenwood Street, New Haven, Conn. 1OW: N. B. Stackpole, 139 Pratt Street, Providence, R.I. 1PL: W. Potter, 19 Braemore Road, Boston, Mass. 1XB: Minton Cronkhite, North Street, Greenwich, Conn. 1XZ: Clark University, Worcester, Mass. 1XAM: No record. 1XAB: No record. 2BFB: G. W. Smith, 147 Hobart Street, Ridgefield Park, N.J. 2BGI: M. J. Cranmer, Union Avenue, Lakehurst, N.J. 2BRB: E. M. Claser, 845 E. 13th Street, Brooklyn, N.Y. 2CQZ: B. M. Morris, 827 Cross Avenue, Elizabeth, N.J. 2RK: No record. 2XE: N.Y. Union College, Schenectady, N.Y. 2AB: A. B. Goodwall, 1824 Ingleside Terrace, Washington, D.C. 3ADB: E. S. Burrell, 404 Gowen Avenue, Mt. Airy, Philadelphia, Pa. 3HG: G. L. Deichman, Peak Heights and Bancroft Park, Baltimore, M.D. 3AUV: J. Young, 418 W. Miner Street, West Chester, Pa. 3WB: R. E. Crosser, 153 Logan Street, Audubon, N.J. 4KL: J. C. Fleming, 106 Powel Street, Atlanta, Ga. 4KU: H. L. Reid, 69 E. Park Lane, Atlanta, Ga. 4OA: J. H. Lewis, 188 South, Charles Avenue, Atlanta, Ga. 4SB: A. Allman, 149 San Marco Street, St. Augustine, Fla. 4UK: No record. 4IN: L. L. Hordon, Jnr., 2801 Millwood, Columbia, S.C. 5QY: W. L. McKee and L. Buford, 526 Border Avenue, Tyler, Tex. 5ZAI: No record. 5ZAB: L. Moffett, Jnr., 3122 Broadway, Oklahoma City, Okla. 6AHP: W. Williams, 711 N. Gordon, Pomona, Cal. 6AK: L. D. Mealer, Box 128, Walnut Grove, Cal. 6AKW: L. B. Potter. 5FDI: Lancaster, Cal. 6ALO: C. J. Riekeberg, 1070 W. 3rd Street, Pomona, Cal. 6AO: C. V. Litton, Box, 231, Redwood City, Cal. 6APW: B. S. Pigg, 405N, Merryland, Glendale, Cal. 6ARB: C. Duncan, 3029 Atherton Street, Berkely, Cal. 6AWT: B. Molinari, 6 by 3, Union Street, San Francisco. 6BUW: A. Selinger, 709 Hermosa Street, Sth. Pasadena, Cal. 6CGO: G. A. Litten, 1002 W. Bishop Street, Santa Ana, Cal. 6CN: B. J. Campo, 207 Gaven Street, San Francisco. 6CNL: M. Hexter, 129 N. Serrreno Avenue, Los Angeles, Cal. 6CTO: No record. 6EB: L. F. Seefred, 343S. Freemont Avenue, Los Angeles, Cal. 6ETC: No record. 6EW: No record. 6UC: L. C. Beckman, 522E 11th Street, San Francisco, Cal. 6VC: No record. 6XI: S. G. McMeen, 683 Los Robles Avenue, Pasadena, Cal. 6ASE: H. Beneoff, 1295 E. Villa, Pasadena, Cal. 6BOT: C. M. Vonder Heiden, 1037 Fillmore, San Francisco. 6BIP: G. A. Becker, 2231 W. Shepherd, Winnimucca, Nevada. 6CCT: W. G. Smith, 5529 Flemming Avenue, Oakland, Cal. 6CRX: No record. 8BA: E. H. Koehn, 3983 Meldrum Avenue, Detroit, Mich. 8CPB: F. W. Bell, 379 E. North Broadway, Columbus, O. 8PL: W. K. Francis, W. Main Street, Shawnee, O. 9BCJ: C. C. Messman, 726 Atlanta, Webster Groves, M. 9CJC: J. C. Mosby, Jnr., 425 Fairlawn, Webster Groves, Mo. 9FEZ: J. S. Serber, Frances Ville, Indiana. 9EKY: R. K. Rohan,

5809 De Giverville, N.W., St. Louis. 9XI: University of Minneapolis, Department of Electrical Engineering, Minneapolis. 9ZT: D. C. Wallace, 54 N. Penn Avenue, Minneapolis. 9ZY: V. A. Ott, 241 S. 17th Street, La Cross, Wis. 9AQD: W. D. Woodruff, 419 N. Rockford, Ill. 9BDW: N. J. Brandell, 392 N. 17th Street, Omaha, Neb.

ENGLAND.—20d: E. J. Simmonds, "Meadowlea," Queen's Way, Gerrard's Cross, Bucks. 2MN: G. Marcus, Coombe, Dingle, Queen's Park, Caterham, Surrey.

THE development of radio in the last three years has contributed to the growth of three distinct radio classes all of which combine to make one big radio fraternity, says "QST." The word fraternity is used because an interest in any one of the three phases of citizen radio establishes a common ground for fellowship. Few things make for impromptu conversation and chance acquaintances so much as a mutual interest, and that factor radio readily furnishes.

The three distinctions intended may be applied to fields other than radio and can be classed generally under the headings—mildly interested, technically inclined and "hobby riders." Translated into radio terms, these distinctions mean the owners of manufactured receiving sets, experimental listeners and the amateurs who not only receive by radio, but transmit as well. If you belong to any one of these groups, you are a member of the radio fraternity, but your ability to hold your own in conversation with a group of radio fans depends entirely on whether you have taken the first, second, or third degree. To be merely the owner of a rereceiving set, without knowing the first thing about its construction, admits you into the circle. However, you cannot get farther without the ability to converse in terms of "hook-ups."

In order to get the most out of radio, if one seeks more than the ordinary entertainment and educational advantages, it is necessary to go through all of these stages. The amateur game represents the limit that can be reached while maintaining an interest in radio avocation. Amateur radio, when one has mastered the code and a certain amount of technical knowledge, admits one to the greatest thrills in radio, the exchange of personal messages over distances limited only by the world itself.

Published by A. W. Watt, "Keira," Alfred St., North Sydney, for the proprietors and printers, Publicity Press, Ltd., 12/16 Regent Street, Sydney.