

WIRELESS WEEKLY

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VOL. 5. No. 5:

FRIDAY, NOV. 28, 1924.



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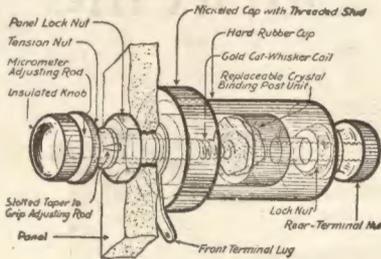
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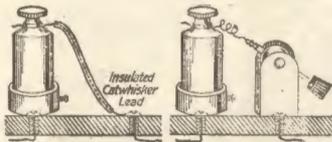
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OR REFLEX SET WITH TEST CRYSTALS

Letter from Basil Cooke, F.R.A.S.

FOOTE TRIPLETEST CRYSTALS.

Keith Stokes, Esq.,
Indent Agent,
King Street, Sydney.

Dear Mr. Stokes,—

Just prior to my recent holiday you kindly forwarded me a complete set of "Foote" Crystal. I have given these a very careful try-out, and I am convinced that the quality of the Crystal, from a Wireless point of view, is excellent—another feature being the ease with which sensitive spots were found.

It is unfortunate that many Crystals that come before the public, although possibly having one or two very sensitive points, they are difficult to find, whereas in the Crystals submitted by you this is not the case. These Crystals are well assembled, attractively packed, and altogether should be an asset to anyone possessing a Crystal Set.

On account of the proximity of my Station to the different Broadcasting Stations, it is difficult to form any comparison as to the relative merits of the different Crystals submitted; but, on the whole, for any Crystal work whatsoever, these Crystals should prove as good as any obtainable on the market in Sydney at the present time.

The above remarks are, of course, relative to those Crystals from the "Foote" Manufacturing Co. in my possession, and it would not be fair to judge by these remarks that I am of the opinion that there are no other perfectly good Crystals available, as undoubtedly some of the Australian products give wonderfully good, reliable results. But, in all fairness, I must say that I have not come across any Crystals from any part of the world which are more reliable or more sensitive than yours.

I wish to take this opportunity of thanking you for your courtesy in making available these Crystals for testing; and, with kind regards,

Yours faithfully,

(Signed) F. BASIL COOKE.

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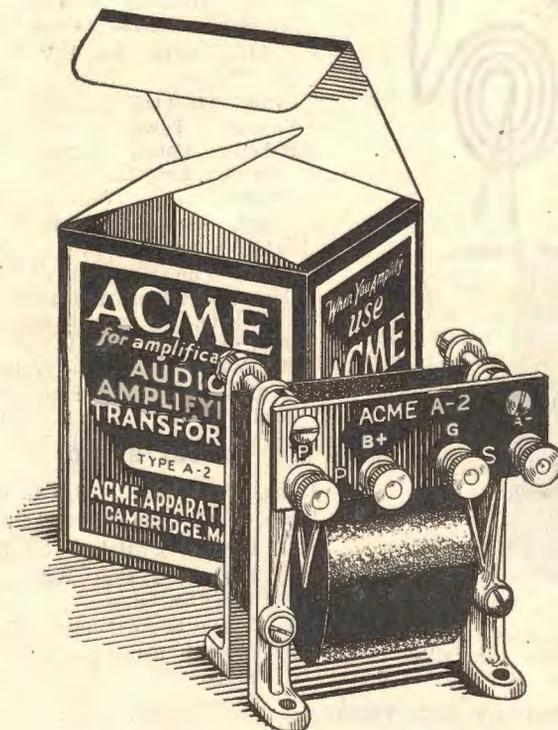
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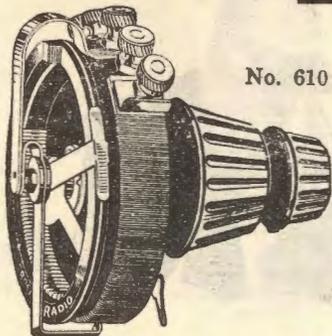
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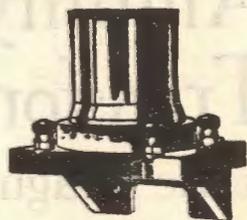
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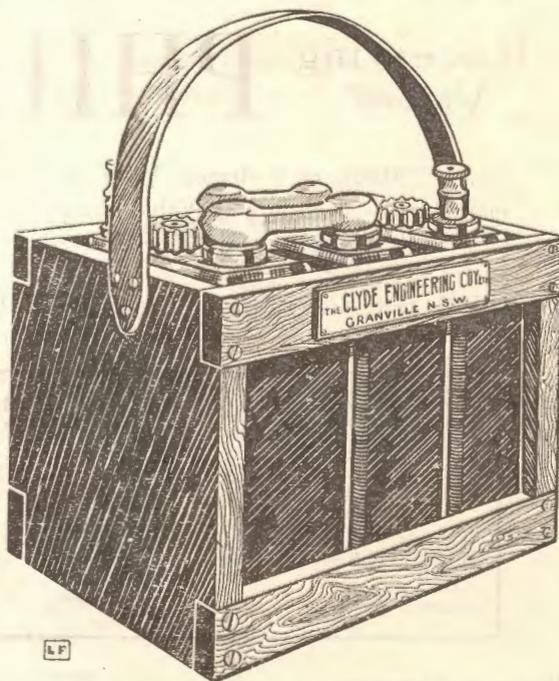
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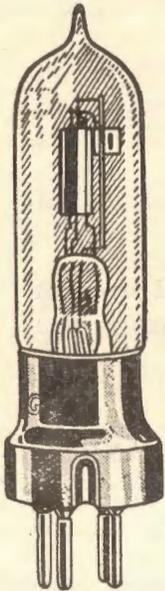
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EDITOR: The Editor will be glad to consider Technical and Topical Articles of interest to Australian Experimenters. All Manuscripts and Illustrations are sent at the Author's risk, and although the greatest care will be taken to return unsuitable matter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

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EDITORIAL

Get Him a Crystal Set.

AT Christmas tide one's fancy lightly turns toward buying Christmas presents and parents especially ponder seriously upon the important question of what to buy. There is no enviable task, because with the wheels of evolution working overtime and with the educational facilities now available, your modern boy is apt to be somewhat critical as to what is handed him by way of a Christmas present.

The trouble with most things is that they either wear out, they become stale, or on account of something more topical or interesting cropping up, they pass the nine days' wonder stage and are thrown aside. The interest of youth is indeed a fickle thing.

If the average parent could be shown something that, besides being instructive and wholesome, possesses the power to hold a boy's interest week after week, month after month, one would imagine that such a thing would be rushed. Yet it can be had, and at very low cost. Ever since electro magnetic waves have been harnessed to man's uses, the pursuit and study of wireless have provided an absorbing hobby for countless thousands the world over. There is a peculiar fascination, common alike to young and old to listening to wireless signals or music—perhaps more so in the building of an instrument with which wireless waves may be trapped and transformed into Morse code signals or music. No one who has not experienced it can possibly appreciate the joy of fashioning with one's hands a crystal receiver—to hook up the last terminal, tune in and hear signals. The fact that the signals travel through space, borne upon invisible ethereal waves, provides a fascination that even to wireless operators of many years' experience, retains its hold. There is something wonderful, unearthly about the whole business that defies description, and it seems almost incredible that the voice of an artist in a broadcasting station can be heard on a simple and inexpensive crystal receiver situated miles from the studio, or that Morse signals sent out from a steamer hundreds of miles at sea are audible on the same receiver. Yet science has reached so remarkable a stage of progress that a boy of ten can at the cost of a few shillings build a receiver which will intercept the wireless waves, the principle of which and the design of the appar-

atus for their propagation cost great scientists years of study and thousands of pounds to discover. Truly we live in a wonderful age.

It is impossible for the mind of man to conceive anything more wonderful than modern broadcasting or anything that can develop such tremendous interest for a boy than this tracking of wireless music.

According to a prominent Sydney wireless dealer, a Macquarie Street doctor prescribes for his convalescent patients—a crystal receiver. This doctor, with his intimate experience of the workings of sick and weary minds, with his sympathetic understanding of the impotence and weariness of long, long hours on a sick bed, has discovered that invariably the simple wireless set completely separates his patients' minds from their troubles and provides them with an interest that could be given them in no other way.

If this is so in the case of sickness what must be the effect with the average boy who is eternally looking round for something to do—something to occupy his mind? Scientists tell us that the mind is most receptive of impressions when the body is young, and no one can deny that most boys turn out just what their parents make them; or in other words the early influences of the home fit them either for good or ill when they grow up.

The problem is to make the home appeal to the boy—to provide perpetual interest that will keep on being interesting to his restless soul. The solution of the problem was worked out by Marconi years ago; it lies in a simple, common or garden crystal receiver. It costs but little, is easy to instal requires no upkeep and yet will provide night after night pleasure and interest that cannot wane.

Therefore, when you are puzzling your brains over what to buy, just keep this thought before you—a crystal receiver. It will keep him at home.

CONGRATULATIONS are the order of the day in the experimental world, and so sudden are the developments, we hardly know where we are at, so to speak. Victoria, represented by 3BQ, has successfully raised England, and N.S.W. has worked the double with America, since both 2CM and 2DS have got over. We notice 2YG and others

using low power are now trying their hands at working U.S.A., and we look forward to one of them connecting up before long. The point is after 2CM has succeeded in working England on 250 w. and then in the ordinary course of events and in conformity with ancient custom, reduced his power to somewhere around .002 of a watt, where are we going to try for next?

Mars, they say, uses wireless!

Highlights on Broadcasting.

AFTER nearly two years of wrangling and wire pulling and the misguided advice of the many so-called experts with whom we are cursed, Australia has succeeded in establishing five "A" class broadcasting stations, two in New South Wales, two in Victoria, and one in Western Australia. A review of the present situation leaves us without a tremendous amount of enthusiasm, especially with regard to the unfortunate listening-in public of South Australia, Queensland, and Tasmania who are forced to pay for the upkeep of broadcasting stations which do not exist—at least so far as their own particular States are concerned. Imagine the position of Tasmania where the unlucky but wholly defenceless listener is compelled to part up 35/-, although he is situated outside the first zone of the nearest broadcasting station, Melbourne. Actually, best results are obtained from 2FC, Sydney, and whether this station receives any of the revenue is quite immaterial beside the fact that in order to receive 2FC satisfactorily in Tasmania a four or five valve receiver must be used. The listener-in in Tasmania gets it both ways; although hundreds of miles from broadcasting stations he pays just as much as the license holders situated in the suburbs of Sydney and in order to get as good results as the Sydney crystal set user, he must pay anything from thirty to fifty pounds for a suitable receiver. Obviously the position is ridiculous and urgently needs revision. Either Tasmania should be considered in its distance relation to Melbourne and the listener charged accordingly, or special exemption should be made until such time as a broadcasting service is established; in the latter case it might pay the authorities to examine the situation to determine whether an "A" class service could be made a payable proposition and to base their calculations upon this. Obviously a small revenue means a poor service, and unless the public could be guaranteed broadcasting that would be entirely satisfactory, then they should not be expected to support a station putting out an inferior service, to pay for the upkeep of stations in other

States. According to reports from South Australia the position there is very little better and were it not for the generosity of a private individual in providing a free service, those people who have paid for satisfactory broadcasting would be left quite out in the cold. The position in Queensland is almost similar to that of Tasmania, and it would appear that if the establishment of an "A" class station were ever seriously contemplated, then something definite would have resulted ere this.

In common justice to the broadcast subscribers in South Australia, Tasmania and Queensland, their case should be reviewed and something a little more equitable than the present arrangement be put into effect.

Correspondence

(To the Editor)

Dear Sir.—Referring to Mr. P. Boulton's letter published in Wireless Weekly regarding freak receptions. It does not appear to be generally known that a telephone receiver made on the "condenser" principle has been used with good results and has worked loud speakers. The plates of condensers are usually spaced with a thin rubber dielectric and the rapid charge and discharge of "electrical" vibrations or oscillations set up a mechanical vibration of condenser plates which is reproduced as "sound." In some portion of Mr. Boulton's set there must be something of this nature occurring, and I would suggest he first carefully remove condenser from his third 'phone terminals after which change condenser across P. or S. of second transformer and follow backwards right to grid condenser.

As Mr. Boulton asked for opinions, others might help also I would be glad if he would notify you when he discovers the reason of this interesting phenomenon.

Yours etc.,

L. R. HEWETT,

352 Railway Parade, Kogarah.

(To the Editor)

Sir,—I thought I would write to you and tell you about the results I am getting on my crystal set, using the following circuit with an "Australite" crystal.

On September 25th, I heard 2FC for the first time, and since then until the present date, I have received this station regularly, with the exception of four nights only.

((Continued on page 16))

HEADQUARTERS
Room 24 2nd Floor
82 Pitt Str.
SYDNEY N.S.W.



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

N.S.W. Division.

THE monthly general meeting of the Wireless Institute, N.S.W. Division, was held at the Royal Society's Hall, 5 Elizabeth Street, Sydney, on Thursday, November 20. The meeting was an interesting one in many respects. First of all some very interesting extracts from the minutes of the Executive Council meeting held recently were read by the Hon. Secretary, and the position was fully explained to members. Further details of these are given in another paragraph. A general appreciation of the action taken by the Executive was expressed by members present, and it was felt that something tangible had been accomplished.

The election of new members was then proceeded with. The following were unanimously elected as full members:—R. H. Fry (2KC), "Barretta," Brighton Street, Croydon; F. P. Clarke (2YF), "Winawa," Lauderdale Avenue, Manly; K. Campbell, c/o 44 Bayard Street, Mortlake; C. F. A. Luckman (2JT), 14 Queen Street, Croydon; H. A. Marshall (2HM), Allingham Street, Armidale; and as an associate member, Mr. A. H. H. Steele, 280 Railway Parade, Kogarah.

The Institute is the richer for the acquisition of members of such distinction, and it only emphasises once again the fact that the advantages accruing from membership of the Institute are being recognised by experimenters.

The main business of the evening was a very interesting paper by Mr. H. A. Stowe, Vice-President of the Institute, on the subject of Valve Testing. Mr. Stowe first dealt very thoroughly with the reasons for testing valves and the method of applying the knowledge which was gained. Valves may be used as detectors or amplifiers, and probably the most important curve was that showing the relationship between the plate current and the grid voltage. The action of a valve as a rectifier both with a biasing battery and with a grid condenser was fully explained, and the conditions under which the valve would work best were demonstrated from a specimen curve. The question of amplification was next dealt

with, and here again it was very clearly demonstrated that the valve would only work without distortion under certain conditions.

Mr. Stowe then dealt with the various characteristics of the valve. He explained the meaning of the term mutual conductance and its application to ordinary work. He then explained that the best tube would be the one with the highest mutual conductance. The amplification constant was then taken up very fully, which he explained while its value was worked out from a specimen curve. Finally, output impedance was explained, together with such items as the presence of gas in the tube and the hump caused by soft valves. The whole of the paper was very clearly demonstrated by means of actual experiments on the valve testing set, and the characteristics of a 201A and Phillips D.4. were actually plotted on the blackboard.

An Apexegesis.—In these columns last week reference was made to the action which had been taken by the Executive Council with reference to the question of licenses, and the following information should prove of extreme interest to experimenters. It was the outcome of a combined meeting of Victoria and N.S.W. Executives of the Wireless Institute of Australia:—

"Mr. Love (Victoria) outlined the proposals to be made to Mr. J. Malone, Chief Manager of Telegraphs and Wireless, and moved their adoption. Mr. Cooke (N.S.W.) seconded the proposals, which were as follows:—

"1. That the fees for experimental licenses be equivalent to those for broadcast listeners' licenses, with the addition of the examination fee, if necessary.

"2. That the examination for an experimental license be set on the basis of a syllabus to be drawn up as the outcome of discussion between the Wireless Institute and the Chief Manager, Telegraphs and Wireless.

"3. That there be only one experimental license, including transmitting, as it was considered that the experimental receiving license was unnecessary."

All Experimenters' Night.—The meeting which has been arranged for Tuesday, December 2, at the Royal Society's Hall, is timed to take place at 8 p.m. On this occasion a film showing the actual working and functioning of the electronic valve will be screened.

The chair will be occupied by Mr. C. D. MacLurean, President of the N.S.W. Division of the Wireless Institute.

Only those scientifically interested in radio, including radio experimenters holding experimental licenses, members of radio clubs or of the Wireless Institute of Australia, will be entitled to attend. Any purely broadcast listener cannot be accommodated. Mr. MacLurean will deliver a short address referring to the film, and the film will give a very vivid idea of what goes on inside the valve, and the application of this knowledge will enable those present to appreciate the need for the proper handling of valve apparatus.

Calibration Work.—Anyone requiring the Institute to do calibration work on their behalf is invited to get in touch with Mr. H. A. Stowe, J5157, or to leave their apparatus at Institute Headquarters, with full instructions as to what is required and the method of working their particular apparatus. It will be readily appreciated that much valuable time may be lost in examining apparatus to ascertain the exact way in which it is connected, and if full directions are given for its operation this time can be more profitably spent on the actual calibration work.

New Radio Club.—News has just come to hand that a new Radio Club has been formed at Wahroonga. We understand that one of the first steps to be taken by this new body will be to affiliate with the N.S.W. Division of the Wireless Institute of Australia, and this is certainly a step in the right direction. Superintendent Brack is connected with this new society, which we hope will make rapid progress.

Special Notice.—Members of the Wireless Institute of Australia, N.S.W. Division, are requested to particularly note the following: It has been ascertained that several members have failed to receive their notices of the last general meeting. These were duly posted, and the matter of their non-delivery has been taken up with the postal authorities. Those who did not receive notices should communicate with the Hon. Secretary, Box 3120, G.P.O., Sydney, and all members should particularly note the dates of the meetings and turn up whether they receive a notice or not. The next meeting will take place at the Royal Society's Hall, 5 Elizabeth Street, Sydney, on Thursday, December 18. Note the date and roll up in force.

QRN.—Mr. H. A. Stowe notifies us that many QSL cards for 2CX have been forwarded to Mr. Exton, Lismore. This is apparently due to a mistake in a Victorian list of call signs, where 2CX was given as the call sign of Mr. Exton. Victorian hams please note particularly.

Wireless is making rapid progress in Australia. We think the following is the first advertisement of this kind to appear in this country:—To let, unfurnished, 2 room flats, kitchen, etc., beautiful grounds, glorious views, garage (7/6), 'bus passes door, mast for aerial available, rent 35/-." The owner of these flats certainly deserves success.

It is reported that 2BK is taking up crystal work again, but owing to the scarcity of catswhiskers he is —!!!

Mr. F. Basil Cooke, F.R.A.S., has returned.

2DE and 2BF must be working on a new system of a beam transmission. 2DE was heard the other night very plainly, but the replies of 2BF could not be located, in spite of the frantic efforts of all the local hams.

Overheard at the general meeting of the Wireless Institute: "Did Mr. Stowe get the assistance of 2BK in preparing his paper? He has a lot to say about micromho's."

The American Radio Relay League is very anxious to get regular service with the Australian Radio Relay League during the next six months.

2DE will again be testing (receiving only) at Great Mackerel Beach this week-end under the Institute's license, 2HH, which is temporarily located at "The Shack."

2CX has received an interesting letter from Melbourne stating that A. W. Hedlam, using three valves, detector, and two audio, has picked him up on C.W. with great strength. He has also heard 2RJ on phone and 2J.M. He has also logged on one detector and one audio, 2RJ, 2BL, 2FC, 6WF, 7BK, 5BI, 2Y1, 2HM on phone, and 2AY, 2CR, 2IJ, 2KO, 2OI, and 2JM on C.W.

A. H. PERRETT,
Publicity Officer.

The training of radio men in the Argentine Navy is being stimulated by the award of prizes to operators who qualify in copying code messages of fifty words at the rate of 22, 24, and 26 words per minute. These prizes, however, are withheld for bad conduct and if the man is not in good physical condition. Athletic training is required in all radio stations both afloat and ashore, wherever there is more than one operator.

(Continued from Page 13.)

Also on the 15th October, I received 3LO, but did not hear this station again until 30th October, and I have received 3LO every night since, as well as 2FC. I have received 2FC and 3LO on nights when no other set in town was working. I would be pleased if you could find space in your fine little paper to publish this report.

I have also heard a valve oscillating on my set. Has this been heard before?

Yours etc.,

G. W. REID.

de Boos Street, Temora,

5/11/'24.

(To the Editor)

Sir,—Can you please publish the following report in your columns? On 12th and 13th November I received with one tube:

U.S.A.: 1SU, 1CZ, 1XZ, 3ABW, 4SA, 4XE, 5 AK, 5UC, 6AHP, 8ZZ, 9CLO, 9CJ.

The owner desires to thank Mr. Raleigh Thomas (2HT) for his assistance and skill in the reception of the above stations while in charge of 2CP (late 2ZZ).

Yours etc.,

C. PRESTON-SMITH,
(Owner Operator, 2CP)

Cabramatta Rd., Cremorne.

(To the Editor.)

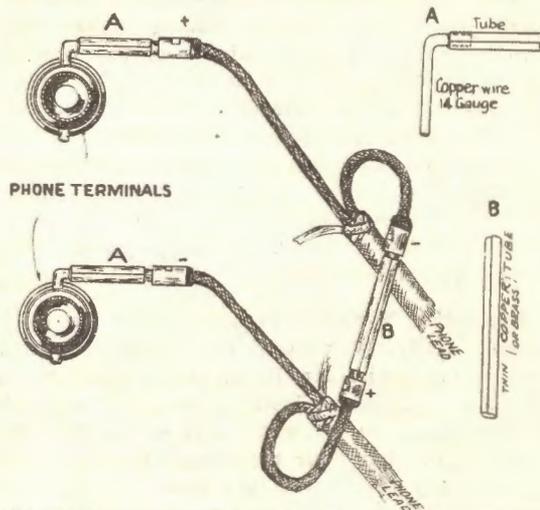
Sir,—I have noticed in your paper that you are always willing to find room for contributions likely to assist your readers so I am enclosing a sketch made of an idea of mine that I put into effect some little time ago in connection with the Claravox competition for the best Crystal set. The idea is to make a connection for head phones that will give under a strain. The present method of screwing the pins into terminals makes a fast connection and should one forget the length of the lead and reach for something beyond that length, the result is that either the head phones are pulled off or the set is shaken and probably the crystal detector upset. I knew when my children have been listening in, I have saved the headphones only by constant watching, but now I have the attachment on I have no fear so the only thing that can happen is a disconnection. The sketch very nearly explains itself. A shows a short length of about 14 gauge copper wire with short length of brass sleeve soldered on. Thin brass wrapped around a stout hat pin or something a shade smaller than

phone connection pins will form the sleeve. If too big the sides may be pressed in and a good connection made. Sketch B is sleeve only; this is used when 2 or more phones are to be connected in series to one pair of terminals, one extra sleeve is needed for each pair of phones.

Yours etc

S. J. HINLEY.

Edward St., Willoughby.



Some D.X.

(To the Editor)

Sir,—The following is a list of loggings for the last week at my station, A130.

U.S.A.: 6AHP, 6AWT, 6ARB, 9EF, 9CJC, 6 CGO, 6COC.

Great Britain: 620D, G1KC.

These last two stations were logged using a single tube low loss set quite QSA. G1KC was working with Z2AC, and was informing 2AC that his power was 155 watts. This station was had just before sunset, too.

The other station, G2OD was logged calling CQNZ on the night of Friday, 14th inst. I would like to know if any other experimenter had either of these two stations. 6CGO, U.S.A. has been had using a 2 foot frame aerial and a single tube set.

Also the following N.Z. stations have been had: 4AA, 4AK, 4AG, 4AD, 4AP, 2AC, 2AP, and 2CP.

I would be glad if any experimenter could supply me with the address of 6AHP and G1KC.

Yours etc.,

THOMAS R. ANTHONY.

Radio A130.

(6AHP is W. Williams, 711 N. Gordon, Pomona, Cal. 1KC is unknown to us.—Editor.)

Getting the Best out of your S.T. 100

The third of the Wireless Weekly series, this article discusses some of the difficulties in the way of successfully constructing and operating this famous receiver. It will be found of very practical assistance.

A NUMBER of our readers have written to us recently stating that they have had trouble in constructing the S.T. 100 circuit or at least getting the full efficiency out of them. The following article we hope will assist them to get out of their difficulty.

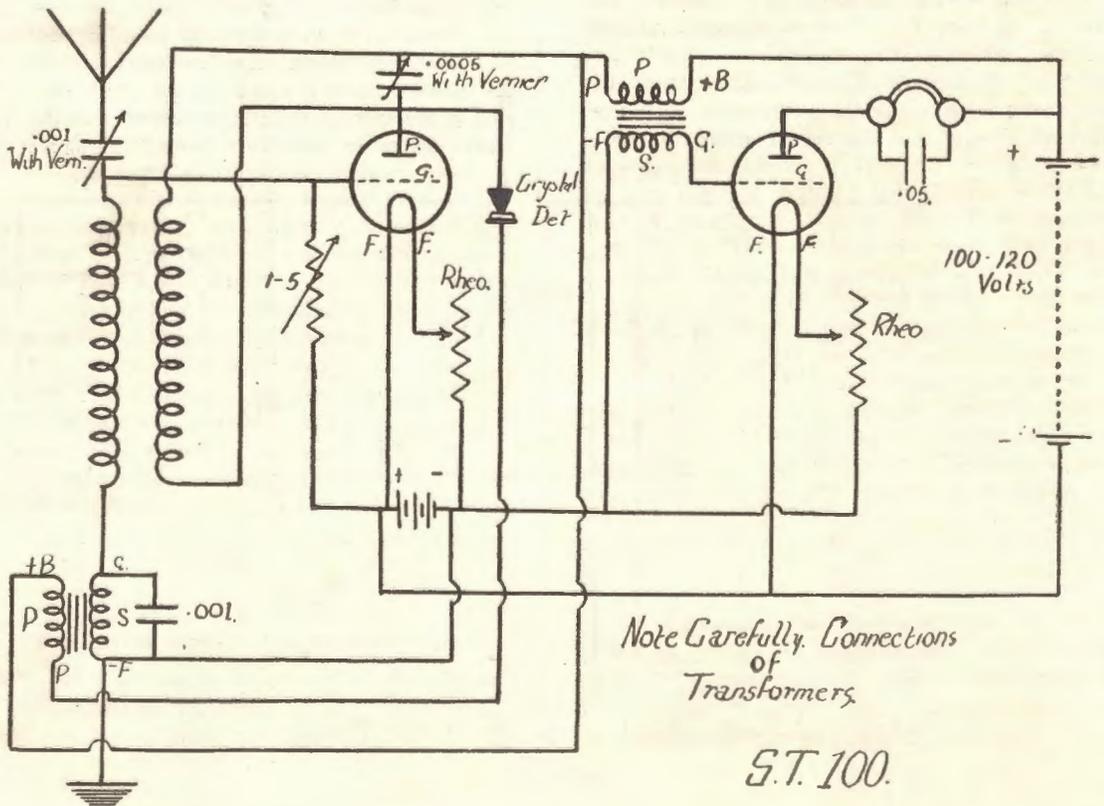
In the S.T.100 as in all other reflex circuits, self oscillation at audible frequency is very commonly experienced.

If properly designed and wired, however, and by using good quality components and correct high tension voltages and filament current the S.T. 100 is very stable circuit and by far the best for broadcast reception.

Sources of Trouble.

Scott Taggart strongly recommends a 100,000 ohm resistance to be used across the grid and + A Battery to stabilise his circuit but you will find this resistance to be inadequate when using American valves. The Freshman Variable grid leak without condenser will be found an excellent stabiliser but once you have got a good adjustment don't keep altering it, as by constantly turning the dial you will lower the whole of the variable resistance and no variation is obtained.

Regeneration is obtained by coupling the tuned plate coil back on the aerial; this tends to make the set howl, but if the set is properly arranged and handled regeneration may be introduced without any fear of howling.



If too strong a regeneration is used, the set will oscillate at high frequency and then begin howling at low frequency. Should this happen, reduce the coupling by placing the plate coil farther away from the primary when the low frequency oscillation or Hoot should stop.

Next look to your crystal—make sure that the crystal is doing its full duty i.e., that of detecting. If it is a poor crystal, or if signals are very strong in the first place; the absence of the crystal detector will not make very much difference and signals MAY be heard with the catswhisker lifted from the crystal. This, of course, should only happen when no regeneration is used, but effect MAY be obtained when regeneration is employed.

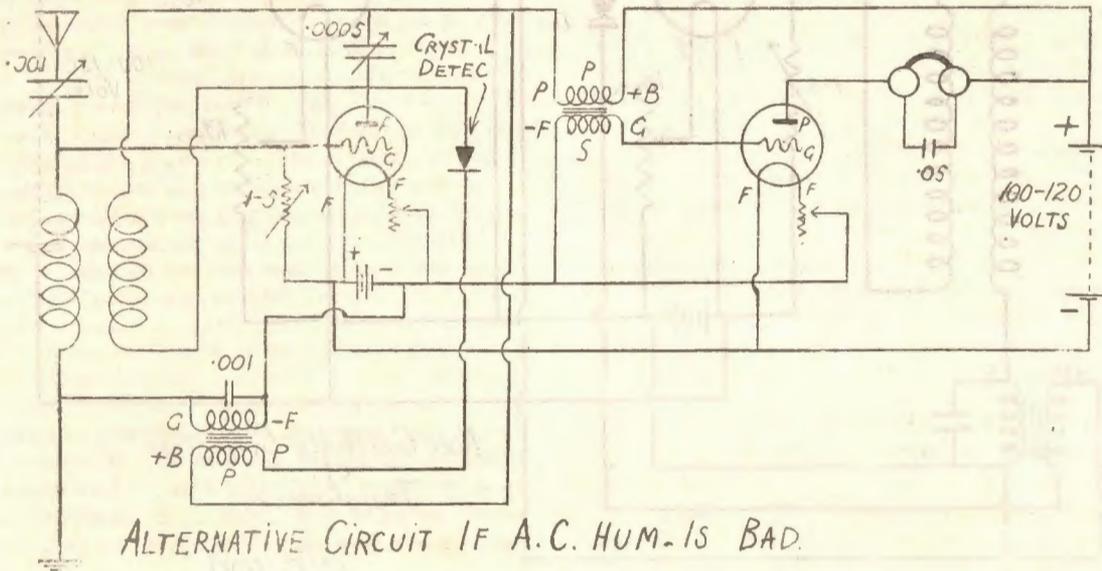
To adjust the crystal it is as well to detune the aerial circuit until the music is very weak then adjust the crystal until maximum volume is obtained. Now retune the aerial. Too light a pressure between the spring and crystal will sometimes cause a howl; if it is possible to obtain a fairly firm pressure without sacrificing signal strength, the receiver you will find will remain more stable. The writer has experimented with practically every type of home made and commercial crystal and without a doubt the Burndept crystal detector is by far the best for the job, it being fitted with a micrometer thread adjustment, which enables the operator to obtain a very fine adjustment of pressure. From the plate of the first valve the connection should go to the catswhisker, not the crystal direct.

A Word about the Coils.

If you mount your own coils, mount them all the same way, viz., outside end of coil to pin. If you buy mounted coils buy them all of the same make as various makes of coils are mounted differently. I recently visited a friend's house who was quite proud of his S.T.100—he was getting very fair volume, but when I told him he ought to be getting the same volume on a loop he seemed a little disappointed. However, before I left that night he had almost doubled his volume using a small aerial inside the house. My friend had been using a reversed reaction for nearly three months and didn't know it.

The voltage of the "B" Battery is very important. You will find in most cases, especially with 201a valves you will require 120 volts. The loud speaker is more practical than phones with this particular receiver, as when phones are used there is a greater likelihood of howling owing to the capacity of the human body in relation to earth and different parts of the receiver. If you wish to prove this try the following when your set starts to howl; take the phones down and lay them on a book or piece of rubber or other insulating material and in nine cases out of ten you will find the howling, or really the low frequency oscillation, will cease immediately.

The S.T.100 is essentially one for use with a loud speaker; recent experiments carried out with one of the leading clubs proved that the S.T.100 gave more volume than four valves, 1 radio (tuned plate) detector, and two audio, the same audio

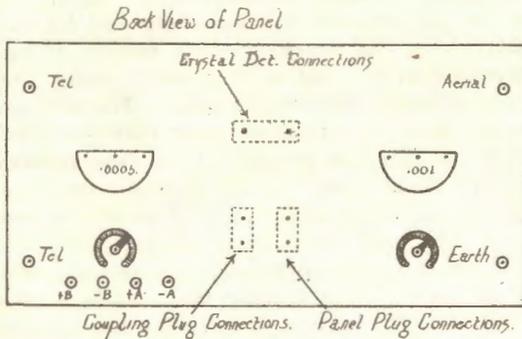


transformers being used in both sets.

A negative bias of from 4 to 9 volts on the grid of both valves will improve quality of speech and amplification.

A Few Hints on the Construction.

1. Don't cramp the parts (panel should be at least 15in. x 8in.).
2. Don't use soft valves (both hard valves).
3. Don't be in too great a hurry to wire your



set. Take your time. Check and recheck before you finally test your finished receiver.

4. Don't use a bias battery until you have your receiver working up to the mark.

If you are near any power mains and are troubled with A.C. hum, use the alternative circuit. The only parts mounted on the panel should be the tuning condensers, panel plug, a coupling plug, two rheostats, terminals and crystal detector. All the remaining parts should be mounted on a base board, which should be secured by wood screws at the bottom of the panel. This base will keep the whole rigid while you are wiring and testing, after which it can be placed in a suitable cabinet. The secondary of the first transformer should be placed on the base as near to the primary coil holder as possible.

Coils Required for Broadcast Reception.

- Sydney 2BL, primary 50, tuned plate 75.
- Melbourne 3AR, primary 75, tuned plate 100.
- Sydney 2FC, primary 200, tuned plate 150.
- Melbourne 3LO, primary 350 or 400, tuned plate 250 or 300.

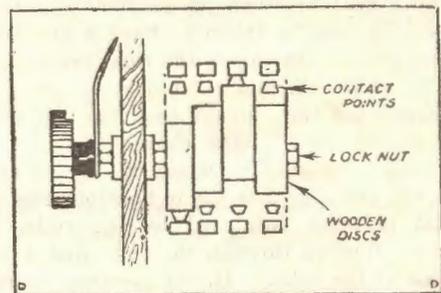
If short aerials are used, larger primary coils will be needed.

AN EASILY MADE PANEL SWITCH.

AN easily made panel switch, which can be constructed to take the place of more complicated and expensive jacks, is illustrated in the ac-

companying diagram. The mechanical action is performed principally by the aid of circular wooden blocks, about an inch or so in diameter, and approximately 1/4 in. thick. A short length of broomstick sawn into sections of the required width and smoothed down with sandpaper, will answer the purpose admirably.

Having fashioned the wooden discs, a small hole should be drilled through each piece, about 1/4 in. from the centre of the disc. The number of pieces required, will, of course, depend upon the type of circuit which the switch is desired to operate. The contact made of any springy material, which will give sufficient "play" to allow of their proper operation.



Panel Switch.

An Easy Adjustment.

A rod is then threaded for an inch or so on both ends, and lock nuts placed in position to prevent the cams from turning. By loosening one of the nuts the cams may be easily adjusted to meet the demands of the various circuits. In order to mount the switch a hole is sunk in the panel through which the rod is taken, care being observed to see that a washer is placed over the rod on either side of the panel mounting.

Before fixing the control knob to the end of the shaft, a pointer might be fastened between the knob and the washer and lock nut on the outside of the panel if it is desired. The contact strips are then fastened to a base in such a position that the es the contact strip against the second strip which turning of the knob moves the cam until it press-is necessary to make a good connection to complete the circuit.

AN APOLOGY.

In last week's issue of Wireless Weekly the call sign of W. H. Newman was shown as 2JM (page 15) instead of 2MJ. The box number of The Wireless Institute was shown on page 14 as 1320. This should have read 3120.

DRY CELLS FOR LARGE CURRENTS

By F. ELLING.

IT is very often convenient to employ a battery of dry cells, even at comparatively high cost, rather than have the trouble of charging accumulators. A few years ago the present writer would have advised any experimenter on no account to employ dry cells for large current; but during recent years they have been enormously improved, and it is now quite safe to use them when other reasons, such as convenience, dictate.

Dry cells may be taken to have a pressure of 1.5 volts per cell; but this is the total pressure furnished by each cell, and is subject to the effects of a charge for the current that the cell is furnishing at any time. The charge is found from the formula $E = CR$; where E is the charge in volts, the pressure that has to be subtracted from the total pressure furnished by the cells; C is the current flowing through the cells, and R is the resistance of the cells. If, for instance, there are 4 cells connected in series, and the internal resistance of each cell is 0.15 ohm the total internal resistance of the cells will be 0.6 ohm, and a current of 1 ampere flowing through the cells will make a charge of 0.6 volts, leaving only a pressure of 5.4 volts for use in the external circuit. If two such sets of cells are connected in parallel the internal resistance will be halved, making it only 0.3 ohm, and the charge for the passage of 1 ampere flowing through them will only be 0.3 volt. If three such sets are connected in parallel, the combined resistance of the three sets will be 0.2 ohm, and the charge on the pressure for each ampere flowing through them will be only 0.2 volt.

Gauging Available Current.

Current applies because the lower the resistance of the cells the larger they are, and the larger the current they will carry without breaking down too quickly. As pointed out previously, each size of dry cell has a limiting current which it will supply for a certain time continuously. If that current is exceeded, the cell runs down very much more quickly than it should do; if that current is not worked up to, the cell will go on furnishing current for a longer time; and, if the cell is given a good deal of rest between times of furnishing current, it will go on for a much longer time than

if the current is taken from it continuously.

This is the secret of the comparative success of some flash lamps compared with others. If they are only switched on occasionally and for only a short time, and are given long periods of rest between, they will last a very much longer time than if they are used continuously. This also applies to batteries furnishing large currents. Make the cells as large as possible in the first instance and give them plenty of rest between the times they are furnishing current and they will do good service.

If one cell will furnish, say, 1/4 ampere safely without running down quickly, two cells in parallel will furnish 1/2 ampere, 3 cells 3/4 ampere, and so on.

When cells are connected in series their pressures are added together; when they are connected in parallel their possible currents, the currents they will furnish, are added together. Thus, if a cell of a given size will furnish 1.5 volts, 4 such cells will furnish 6 volts and as mentioned above, if one set of such cells will furnish 1/4 ampere, it is only a question of the multiplication-table to find how many such sets will be required to furnish the necessary current. Two sets will furnish 1/2 ampere, 3 sets 3/4 ampere, etc.

Each size of dry cell has its own current that it will supply continuously. If it is made to furnish a larger current the time will be shorter, and the greater the increase in the strength of the current the shorter will be the time it will furnish it. Doubling the current will more than halve the time, and the ratio goes up very rapidly as the strength of the current increases. On the other hand, lessening the current increases the time during which it will be furnished; but the time does not increase so rapidly with decreased current as it decreases with increased current for similar increase and decrease.

Series-Parallel Grouping.

Cells are arranged in series, it will be remembered, by connecting the positive terminal of each cell of the series to the negative terminal of the cell in front of it in the series, and the negative terminal of each cell to the positive of the cell behind it in the series leaving out a positive terminal at one end of the series and a negative ter-

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terminal at the other end. Cells are connected together in parallel by arranging wires leading to all the negative terminals. The wire connected to all the positive terminals becomes the positive terminal of the group and the wire connected to all the negative terminals becomes the negative terminal of the group.

Cells are connected in series parallel, or parallel series, by looking on a group of cells arranged in parallel as a single cell, so far as connection with other cells is concerned. The positive wire of a parallel group is practically the positive terminal, and the negative wire of the parallel is the negative terminal of the group.

A Few Examples.

Suppose for instance, we have 10 cells in two groups of 5 each, and it is desired to connect them in series parallel, the positive wire of one parallel is connected to the negative wire of the parallel in front of it in the series, just as the positive wire of a single cell is; and the negative wire of the group is connected to the positive wire of the group in front of it, just as the negative terminal of a single cell would be. The pressure furnished by the whole of the cells, when they are connected in a series parallel, will be that of a single parallel; in this case, supposing the cells to have a pressure of 1.5 volts per cell, 7.5 volts. This again is the total pressure furnished by the group and the nett pressure available for work outside the battery will be this pressure less the charge for the passage of the current through the cells. Suppose, again, the internal resistance of each cell to be 0.15 ohm, the total internal resistance of the 5 cells in series will be 0.75 ohm, and so on. And the charge upon the initial pressure will be 0.75 volt for each ampere of current for a single series, 0.375 for each ampere with two parallels, 0.25 for each ampere with three parallels, and so on.

To use dry cells, therefore, for large currents, obtain from the makers the largest current that each size of cell will stand for the time required without breaking down, and arrange as many groups of cells in parallel as will make up the required current, each group consisting of the number of cells required to give the required pressure.

The Use of Resistance.

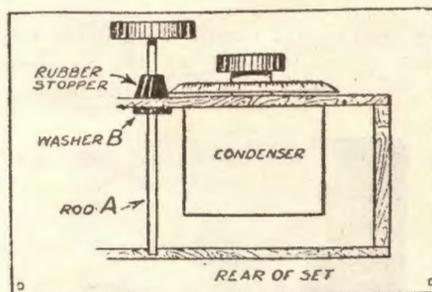
There is a point that should be mentioned here. It will usually be difficult to arrange for a definite number of cells to furnish the required pressure, owing to the charge passing through the internal resistance of the cells. The remedy is to employ a larger number of cells in series than would be required if it were not for the internal

resistance, place an adjustable resistance in circuit to use up the surplus pressure. The adjustable resistance will be useful in another way. Dry cells work down as current is taken from them, and it is therefore, necessary if the pressure is to be maintained at a constant value, to increase the initial pressure furnished by the battery as a whole, as the individual cells work down. This is done very conveniently by the aid of the adjustable resistance.

VERNIER ADJUSTMENT

A SIMPLE vernier adjustment which can be adapted to act on the variable condenser of any existing apparatus is shown in the accompanying diagram. A rod A, of approximately 1/4in. diameter, is taken through a hole bored for the purpose in the front of the panel to the back of the set, where it is supported in a second hole sunk in the rear of the cabinet. A rubber stopper is then procured and a hole bored through the centre, this hole, of course, being of a diameter corresponding to that of the shaft over which it has to be fitted.

A rubber washer, B, is treated in a similar manner, and is fitted over the shaft in such a way



that it lays close to the rear of the front panel of the set as shown above.

A control knob is then fitted to the end of the rod, and the device is ready for operation. It is as well to mention that the rod should be of a sufficient length to allow it to stand out well clear from the front of the panel in order to avoid self-capacity effects.

The distance should be at least two or three inches if the best results are to be obtained. It is hardly necessary to mention that care should be taken to see that the rubber stopper acts smoothly on the edge of the condenser dial, as any error in adjustment will either render the action stiff, which is not conducive to good working, or will fail to operate the condenser at all, which is worse.

BRINY REMINISCENCES

By "BRASSO."

(Continued from last issue)

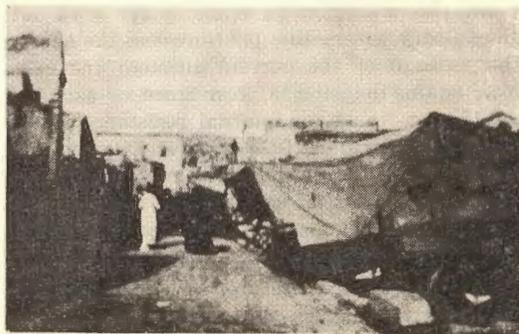
Quite frequently I fell into their company and without exception found them good fellows; in fact the average American I bumped abroad measured up to a very high standard. Usually he is possessed of a fund of quiet humour, a quaint way of sizing things up and a general attitude of "why worry" which makes him a very likeable citizen and right excellent company anywhere. On occasions in foreign ports I have been up against it for some part of the radio set—perhaps a valve or a B battery. If there was an American steamer in the Port I promptly went aboard, dug out the operator, made my wants known, and was never once turned down. Not so in the case of some British ships, sometimes because the operator knew nothing outside of magnetic detectors and fixed dischargers, and sometimes because it was not in the nature of the brute to be obliging.

Salonika will always remain fresh in my memory as THE cosmopolitan city of the universe, O. Henry to the contrary. Here all the nationalities



The Gangway Man at Salonika. Before leaving he was presented with a safety razor.

of the near East, Eastern and Middle Europe, rub shoulders and add to this a leavening of the far East, Africa, Great Britain, and America and you have the truly cosmopolitan city. Imagine the high heeled, smartly frocked, Parisian lady, the hook-nosed Jew from Palestine, the Serbian grandee with his silk pantaloons and gorgeous cloak, Turks from Macedonia, swarthy Greeks with luxurious black ziffs, Bolsheviks, Italians, Czechs, Roumanians, Niggers, and so on, almost all in national costumes, crowding along the narrow, filthy streets. Allied soldiers were everywhere, armed to the teeth and here and there Red Cross sisters flitted in and out of the shops. The city is really composed of a group of cities, because each particular nationality had its own quarter. Part of my time was spent wandering around these various quarters with a camera, shooting up all I could conveniently get a shot at and side stepping the heaps of garbage which was conveniently dumped out of the second storeys on to the cobbled roadway. On these



A Street in the Turkish Quarter.

heaps, dogs, cats, hens, and goats browsed all day long, while cabs, carts, and trams bumped and crashed along without regard to any particular rules of the road. Unless an extra sharp back and front look out was kept, it was an even chance that something would hit one on the nose or on the back of the neck, and as there was no footpaths to step on to, pedestrianism was a continual flirt with annihilation. Despite the stench, the flies, the poverty and the filth I put in hours and hours

wandering around getting an eyeful of everything and on breaking into the Turkish quarters with its squalid streets flanked here and there with imposing minarets, I found my passage barred by a Tommie armed with two big revolvers, who casually informed me that the denizens had a habit of dropping hardware on the heads of infidels from the shuttered windows of the hovels along the streets. However, as he was shortly going the rounds, I stayed a while chatting and then went in with him. Keeping close to my friend with the six shooter and a sharp look out on the top storerooms, I soon realised the necessity for caution. From cracks and slits in the shutters eyes peered forth and the ragged humanity that hurried past us shot glances full of hate. From my guide I gleaned the information that this particular tribe had a grudge against the whole world and were responsible for ninety per cent. of the throat slittings that were nightly occurrences. There were no gendarmes game enough to go in there, but past experience had taught the inhabitants a wholesome respect for British Tommies. And strange to say, amid those gay and cheerful surroundings as we strode along, my friend discussed with me a most interesting topic—The football matches between the various regiments at Salonika, and waxed enthusiastic over the scores as they stood. Meanwhile I would have given all the footballers in the world to know what was going on behind those closed doors.

Periodically, an army of typhus, smallpox and malarial bugs descend upon Salonika and considering the filth and the entire lack of sewerage, it cannot be wondered at. On the Eastern side of the city however, the better class Greeks and the British and French residents live in almost modern homes, some of them quite palatial, surrounded by wonderful gardens with here and there a fountain splashing in the sunlight. The average Greek gentleman possesses the usual courtly manners of the continental generally; there is much hat raising, bowing and deference, which although somewhat extravagant, still is very refreshing after the blunt manners of a lot of Australians. But such little things as offering his seat to a lady in a tram did not occur to him—nor is it apparently expected by the fair one. On one occasion I performed this little function, much to the amazement of the Greek gentlemen aboard, who nudged each other and regarded me evidently as some kind of lunatic. Not so the lady however—she further embarrassed me by smiling amiably at me throughout the whole journey, and commenting audibly upon the matter to her lady friend across the aisle, who occasionally studied me closely through a long-

nette. For a brief period I was famous—just like the new giraffe at the zoo.

On the outskirts of Salonika was a large prisoner's camp, mostly occupied by Turks and with a sprinkling of renegade Russians and a few Bulgarians to make things homely. The guard over these fifteen hundred war worn veterans constituted one British Sergeant Major and fifteen Tommies, and when I expressed surprise, the old Sergeant major assured me that those prisoners could not have been chased out of camp—they were well fed, well housed, well clothed, and except for the bi-daily round up and roll call at which they stood like statues and grinned cheerfully at the Sergeant Major, they had nothing to do all day long but watch old tempus fugiting. After the treatment they had dealt out to them by their own governments it is hardly surprising that they regarded their new status as something in the way of a party. The only prisoner from whom you couldn't have borrowed a match at any time was a Turkish doctor whose grudge was not eased by the habit that the Sergt. Major had of calling him Johnny. Once a day a British Lieutenant wandered in from somewhere or other, gazed boredly around, and departed whence he came on horseback.

The camp housed a sort of independent unit known as the Military Foot Police composed of a dozen or so of hard bitten hoboes whose function it was to wander round the streets armed to the teeth, looking up old man trouble. If a crowd gathered, these swashbucklers sauntered nonchalantly up, and committed assault and battery upon whatever persons they could lay hold of, after which they would find out what it was all about. One of their hobbies was in assisting the crowds to board the tramcars—at the city terminus there was invariably a stampede among the crowd waiting to hop on and the M.F.P. took great though solemn delight in lining the mob up and then putting the ladies on first. Having started the ball rolling they retired to the footpath and watched the proceedings, among the disgruntled remarks of the Grecian gentlemen, and the adoring glances of the ladies.

However, the Tommies generally were very popular with the Salonikians, due to the kindness shown to the latter by the British during, and after the great fire of 1917 when almost half of the town was wiped out. While others were looting and preying the British Tommies saved hundreds of lives and afterwards established depots at which

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the homeless were clothed and fed, and the sick taken care of.

The guiding hand of the M.F.P., the ruling brain—what we might refer to as the “stouch-in-chief” was Corporal Jack Hyams who was followed blindly and without question by his henchmen. Formerly of Wellington, N.Z., he was invalided from the N.Z.E.F., off the Peninsula and was returned unfit for New Zealand. Upon being rejected for further service, he kissed farewell to his native land, worked his passage to England, and succeeded in linking up with a Lancashire Regiment, eventually being shanghaied to Salonika and the delights of beating up fractious dagoes.

Situated somewhere up in Serbia was another and much larger prisoner's camp confined solely to the care and maintenance of something like six thousand Bulgars whose cyclonic progress through Serbia had been rudely interrupted by the Tommies. The location of the camp was at a dismal dump, the name of which I will not attempt to spell, but which was usually referred to en Anglaise as Porvalich. In Serbski, this name contains a couple of “Z's”, and an “X” or two, but as the Balkan languages have a habit of inducing toothache, it is common practise for foreigners to have a rough shot at the pronunciation of certain names and then to spell as pronounced. There is a famous precedent in the word “Wipers,” the English version of Ypres. However, Porvalich was situated some 75 miles from Belgrade and was reached by way of the Struma valley down which the great Serbian retreat took place when the combined German-Austrian-Bulgarian offensive was launched. Perhaps a few words upon the Balkan States in general would not be out of place here. While not posing as an expert upon international affairs my wanderings around Salonika brought me into direct contact with Serbians, Roumanians, Greeks—in short with almost every nationality of the turbulent near east, and I gleaned a great deal of information from them—and from long talks with Clyde Welch who for over nine years had represented a group of New York financiers in most of the Balkan states. Welch was an eye-witness of the incident at Serajevo when the Austrian Arch-Duke was assassinated and which led directly up to the Great War. Essentially an adventurer and a citizen of the wide world, Welch was the most extraordinarily interesting personality I ever met in my life; quiet, courteous, shrewd, and far seeing, he represented the very highest American type produced by that wonderful nation.

From the very cradle, the children of the Balkan States are taught to hate their fellows in the neighboring States and just as soon as they can toddle, the use of a gun is instilled in their minds; the result is that these people live perpetually on the very brink of a volcano and ready at a moment's notice to go to war. Their outlook is reflected in the folk songs which are features of their national life; those of the Bulgars breathing fire and slaughter, and the mournful tunes peculiar to the Serbs depicting the oppression under which they have groaned and suffered for long years.

However, with Salonika as the objective and with Roumania, like the “Emden” beached and done for, hordes of German, Austrian, and Bulgarian troops poured into Serbia and swept everything before them. One can perhaps imagine an army in flight but it is extremely difficult to picture one third of the population of an entire nation in panic stricken retreat; that is what happened to Serbia. Shelled and slaughtered, the line of flight of these poor devils was down through the Struma valley, and those who have read eye-witnesses' stories of the retreat in Belgium may perhaps form some idea of the tragedy of these Serbian people whom Welch described as “sand to the backbone.” Well, Serbia being practically without food at this time, just after the Armistice, supplies were sent up to Porvalich by motor transport, and by dint of a little string pulling by “Pas” and the S.M.O., I was lucky enough to be included in the party going up the very next day. So at dawn I climbed up on the seat next to the Sergt. in charge and we roared out along the road for the border which we crossed that afternoon at Janisch. Camping that night, next day brought us out into the stream of traffic passing along the valley. The vanguard of that vast army of civilians who months before had fled down that road were returning home and it would be impossible to describe the scene. After a spell of dry weather the road was thick with dust and through clouds of this toiled the plodders homeward bound; some on foot, some in carts, in British, French, Italian and Greek motor transports—all bound the same way. Unfortunately on account of the dust I was unable to use my camera but, when in due course we chugged up to the top of a pass, and the crowded road wound away beneath us, I climbed to the top of the wagon, leveled the camera—and just at that moment the front wheels negotiated a two feet pot hole, and amid delighted yells from the onlookers I fell off. Much as I had cursed the thick dust I had reason to be glad of it, because the near side wheel passed over

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my right hand, and the foot or so of dust acting as a cushion undoubtedly saved me from losing it altogether. As it was, the flesh between the



At Janisch. The arrow shows the wagon from which the fall took place.

fingers was pulped, one bone was broken, and practically all the skin on the back was taken off. Needless to say the camera was only fit for a decent burial. Three miles further on we struck an American Red Cross Station and my wants were attended to by a lady medico who mistook me for a Serbian refugee. That hand took all the fun



"Darky" (on left) and Neas.

out of the jaunt because it developed a terrific pain, and that night when we hit the camp at Porvalich I spent two or three precious hours having it bathed and dressed, and was forced to turn in

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early. I was awakened early next morning by a rough hand shaking me and imagine my joy when I glimpsed the grinning face of a Turk hovering over me—brandishing in one hand a cup of coffee. He turned out to be a Neas, a Turkish prisoner who was so tame he would eat out of your hand, and on account of his peace loving nature, to him and his pal Darky, was assigned the entirely responsible task of shaving spuds and bearing the matutinal cups of coffee to the guard. Darky's name was entirely unpronounceable, hence, because of his hereditary complexion, the expressive nickname. Two small Serbian boys, sole survivors of two Serbian families, were also included on the domestic staff, and according to the Commandant, were regularly sworn in privates. At Porvalich, a $\frac{1}{2}$ K.W. Marconi spark set with a standard crystal receiver maintained constant communication with Salonika, and the crash of the disc dis-



A peaceful scene at Porvalich.

charger could be heard all over the camp. I wondered how the old Ford on the ship would have acted under such foreign conditions and could easily imagine her absolutely refusing to budge. As in the Salonikan camp, the Tommies were a most happy go lucky bunch, and except that a strict watch had to be kept on the Bulgars, the discipline was of the free and easy type.

Meanwhile, the hand showed unmistakable signs of becoming septic and much to my relief we departed again for Salonika with yours truly nursing the damaged mitt all the way; upon arrival there it resembled nothing on earth, and any blacksmith would have envied the size of my arm. What with probing and dressing, the last three days I spent in Salonika succeeded in inducing the

most respectable grouch I ever remember. It was three months later before I finally got rid of the last bandage and only after hospital visits at Genoa, Naples, and Glasgow; perhaps being in Scotland, the hand was too mean to wear a bandage.

Anyway, amid the war whoops of the assembled Military Foot Police and the tears of gaily bedecked Greek ladies on the Quay, we swung out slowly from the anchorage and slid out, bound for Genoa.

(To be continued.)

COLD WEATHER AIDS RADIO TRANSMISSION.

A NEW natural phenomenon, in the form of cold waves, improves radio transmission especially at a distance of between 250 and 300 kilometers, radio engineers of the Bureau of Standards at Washington state. In daylight, cold waves affect radio transmission long wave signals from Trans-Atlantic stations at New Brunswick and Tuckerton, N.J., a preliminary report from the bureau points out.

The signal strength varied and the apparent direction of the sending station deviated, according to the observations. From a moderate distance the signal strength was found to be quite uniform during most of the year, but with the coming of cold waves in January, the signals increased to more than twice their normal strength. At the same period there were deviations of many degrees in the apparent direction of the transmitting stations shown by a radiocompass, even in forenoons, when long-wave compass bearings are usually free from errors.

When cold waves subsided at the end of January, uniform transmission conditions were not restored, but an unstable condition persisted throughout the milder weather of February and March. The signals frequently fluctuated from high to normal values, through apparently no connection with the weather. After March 19, the irregularities disappeared.

No definite explanation of this phenomenon has been found, although the cause is believed to be atmospherical. The connection with the cold waves suggests that either the part of the atmosphere concerned with signal variations lies much below the Heaviside layer, between 80 and 100 kilometers, or that weather phenomena are correlated with atmospheric action at much greater heights than has been supposed.

Thousands of letters from foreign lands, reporting reception of the KGO international broadcast

of August 30th, between 1 and 3 a.m., are now being received at the General Electric Station and will be reviewed by Howard I. Milholland, studio manager, Wednesday, October 1.

"Two hundred letters from the South Seas were received in to-day's mail," said Milholland. "It is certainly inspiring to know that our station has so successfully entertained people on the opposite side of the earth." Listeners in New Zealand, Australia and Tasmania apparently heard KGO the best. But many cablegrams have been received from Japan, Samoa, Fiji, Honolulu, Alaska, Bermuda, and Haiti, congratulating KGO on the broadcast. "Drink to Me only With Thine Eyes," the song, seems to have made quite a hit in Ba, Fiji Island, as is indicated by letters from there.

This is the first report of an international broadcast to be given on the Pacific Coast. Letters from Australia particularly request that the performance be repeated.

MORE GOOD WORK BY NEW ZEALAND STATIONS.

A NOTHER world's record has been recorded with the last week. The now world-famous 2AC of Gisborne has gone one better and actually worked in two-way communication with an amateur station in Boston, U.S.A.

Not only has the broad Pacific Ocean now been spanned by signals from New Zealand, but the signals from 2AC have also travelled right across the United States to the Atlantic side. One begins to wonder how long it will be before New Zealand amateurs are actually talking to friends in England. 2AC's accomplishment is easily the world's best to date. That 50-watt tube of his is certainly justifying its existence.

Next comes Ralph Slade, of 4AG, Dunedin, who got into communication with Yankee 3BVH in Pennsylvania. Some 7000 odd miles, or nearer 8000, to be correct. With an input of about 200 watts, the Dunedinite certainly does some remarkable work. Congratulations, old man!

So far, Christchurch seems to be out of it, mainly because there is no high-power amateur station here at present. However, I have it on good authority that 3CG will soon be burning some good current in a 50-watt radiotron. Then the Garden City will have something in the way of records. The same amateur will most probably have a motor generator running in a few days, so as to radiate a clean wave, which will not cause any interference to broadcast listeners. His rectified A.C. transmitter is very fair, for all that.—"Aerial," in Christchurch "Star."

BELOW THE BROADCASTING BANDS.**Some Dope on Amateur Activities**

LAST week has been a good one for DX work, and N.S.W. has bridged the ditch. Yes 2CM has done it—worked with two of them in U. S.A. There is not the slightest doubt as to the efficiency of the short waves; the Yanks with their twenty and forty metre bands are getting quite surprising results, although very little has been done around five metres, but of course this is to come. The problem now is to design a receiver which will cover wave lengths ranging from twenty to fifty. Of course they had to be constructed on the low loss principle.

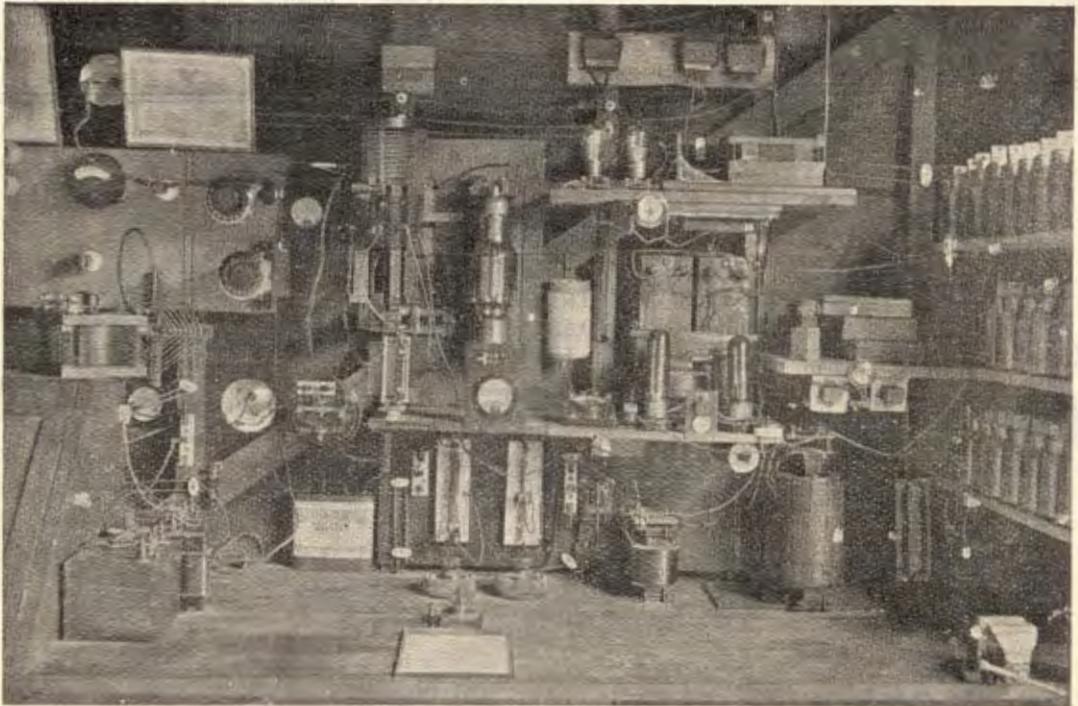
Radio frequency seems out of the question for short waves; notice all the DX that is being done on a detector and one or two audio! I know of one amateur who dragged in seven Yanks one night with a detector and one audio. The lower we get the less howling valves we hear, owing to the fact that Ham Handed Horace and Oscillating Oswald have not got a receiver that will go down

that far, one advantage of the short waves for weak signals.

What we want now is a system whereby we can tell on what wave length a station will come back on if we call it. Most of the local amateurs stations are not the same two nights running, as they are always carrying out tests to benefit their transmission. A better scheme would be to build a transmitter incorporating a standard circuit and also a reliable receiver. Allow these two units to set permanently and if any experimenting is to be done, do it with other gear so that you will be able to operate your station at any time, and the other chap will always be sure of receiving you on approximately the same setting. Of course we know that a swinging aerial or poor power supply may cause the wavelenghts to alter; it will not be very far out, however.

It has been found that for the shorter waves, pure D.C. is too hard to receive and for this reason Rectified A.C. is better as there is a tendency towards broadness which is an advantage.

The next thing that will have to be attempted is an "around the world" relay, starting in Sydney and finishing up here again. Properly organised,



THE VERY LATEST FROM 2CM, SHOWING THE TRANSMITTER USED IN WORKING U.S.A. NOTE THE LARGE RADIOTRON TUBE.

this stunt would be successful, but of course, co-operation is necessary to ensure the desired results.

Key Clicks.

2YG is again on the air with plenty of punch and good modulation; tube modulation does the trick.

2JM delivered an interesting lecture on Sunday afternoon. FB, OM, must have been popular judging by the howling valves around his wave.

Don't forget the Institute's All Club Night in December, on Tuesday, the 2nd inst. All club members, holders of experimental receiving and transmitting licenses and Institute members are invited to attend. The Western Electric Co. have kindly lent a motion picture film, depicting the action of a valve, so roll up and show your appreciation of their kindness. Make it an Experimenters' Night; there's no room at this session for the B.C.L. Don't forget the date—Tuesday, December 2nd.

The New Zealanders are still coming in on the short waves, and prominent among them are 4AA, 2AC, and 4AG.

Has anyone heard of the Boomerang that is to be given to the first American to work with an Australian or N.Z. transmitter? Who's going to get it?

That's all till next week. C.U.L.73.

Correspondence

(To the Editor)

Sir,—In connection with Mr. Anthony's letter published in your paper, I had somewhat similar results, though not in the same degree. On Tuesday, 28th ult., on account of the thunderstorm, I decided not to connect up with the outside aerial, and before connecting to loop, I thought I would try for something without an aerial. Result: 2BL very weak. On connecting earth lead to aerial terminal and throwing the set into oscillation, I got sufficient strength to work a home made loud speaker so as to be audible in the next room; and after a few minor adjustments, succeeded in getting almost, if not quite, the same strength as on the outside aerial. At this point, body capacity plays a big part—the set howls like a cranky baby if you leave it—but I succeeded in getting about ½

(Continued on page 30)

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strength, with the set sufficiently stable to leave. On Friday (31st) I tried out for amateur stations on "low loss" tuner and succeeded in picking up many local stations, and one with call sign—"2AQ"—which I cannot find in W.W. N.S.W. list, but is mentioned in N.Z. list. Time, between 7 and 8 p.m. I thought I was doing pretty well, but Mr. Anthony leaves me streets behind, as I was using 1 detector and 1 audio. However, wishing to get to the bottom of things, I lowered my aerial a couple of feet, one windy day last week, and as my lead-in is simply the end of the aerial led through a fairly large tube, the said lead-in, when disconnected from set, swayed in time with the aerial in the wind, coming close and receding from the tuning coils.

I noticed that as it swayed close the strength increased, fading as it receded, so I placed a book on the lead-in end, pinning it down about 2 inches from coils, and the result was that signals were up to full outside aerial strength. The evident deduction in my case would seem to be that, after all, though disconnected from the set, the aerial was responsible for bringing in the signals.

Of course, I cannot say that the same applies in Mr. Anthony's case, but you might suggest to him to try out with the set outside, right away from the aerial, and see if results are still O.K. I believe that I have found the explanation in my case, and possibly in his.

Yours etc.,

Post Office Stores, Como. J. WALMSLEY.

(To the Editor)

Sir,—On Monday and Tuesday nights, 3rd and 4th inst., about 8.15 p.m., I was listening in to 2BL (Broadcasters Ltd.) when I heard another voice say "This is 2XA speaking to 2XO." With the noise that both these amateur stations made I could not hear 2BL and without thinking what I was doing, I disconnected my lead-in wire and put it about 8 to 10 feet from the set, and to my great surprise I lost 2BL but still held on to both the amateurs and received them as loud as when I had the lead in wire connected to the set. This incident happened on a home made loose coupler. I shall be very thankful if any wireless enthusiast can explain this.

Yours etc.,

ARTHUR R. ANDREWS

57 Edward St., Carlton.

REPLIES TO CORRESPONDENTS.

F.B.J. (Matraville): This is old stuff. It is caused by a very fine coating of film from the

crystal becoming attached to the cup, hence the signals. Thanks for good wishes, o.m.

Clemax (Moree): A similar phenomenon was observed at Narromine last year—in fact we are told it is quite common up that way—due to dust particles becoming charged with positive electricity and settling on the radiator. It can be overcome by earthing the radiator for half an hour or so.

COMMERCIAL WIRELESS RESEARCH.

The wireless industry by reason of its highly complex technical problems is one which from its early inception has called forth the need of technical specialisation. Provision for coping with this phase was early made by the commercial interests, and the progress that has been made in every branch of wireless in Australia can be very largely attributed to the excellent work carried out by the trained research and engineering staffs maintained by the commercial wireless interests.

In Australia no less a sum than £7,000 per annum is spent by Amalgamated Wireless (A/sia.) Ltd. in research and experimental work, having as its objective the elimination of defects, the establishing of new principles, and more efficient or more economical practice. While many successful experiments, especially those of interest to the man in the street are made public, at the same time a great number of valuable experiments have been achieved which cannot be made public, as the knowledge and method of their attainment is an asset to the Company to be utilised wherever possible in the design, manufacture and operation of improved apparatus.

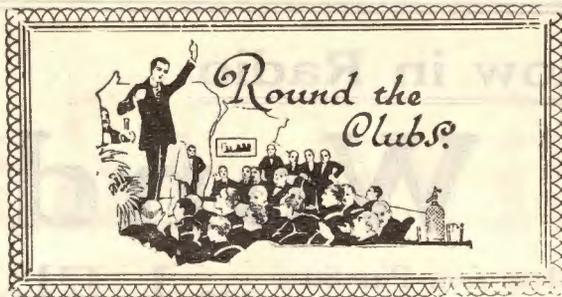
The maintenance of such a research staff not only tends to advance the Company's interests, but is at the same time of national advantage, inasmuch as Australia does not have to depend on overseas countries for advanced ideas and their application, but is in the position of achieving results ahead of other countries.

BOOKS WE CAN RECOMMEND.

Lately we have been inundated with requests for diagrams for one, two, three, and four valve circuits.

Here are two good hand books we can thoroughly recommend, because they not only show diagrams of modern circuits from the simple crystal to the five valve, but components to be used.

"Practical Wireless Valve Circuits" and "More Practical Wave Circuits," by John Scott Taggart, each 3/6, plus postage, from N.S.W. Bookstall Co., Ltd., George St., Sydney.



STRATHFIELD AND DISTRICT RADIO CLUB

The usual weekly meeting of the above club was held at the club-room, corner of Albert Rd. and Duke St., South Strathfield, on Thursday evening, 13th inst. Mr. A. F. Jacob presided, and a fair number of members attended.

The Secretary reported having discussed the matter of club lecturers from the Institute with Mr. A. H. Perrett during the week, when he was informed that it was hoped that final arrangements could be made at the monthly delegates' and council meeting of the Institute, being held this evening. He also read a letter from the Editor of Wireless Weekly detailing arrangements made for publishing club reports and offering the fullest co-operation in publishing reports or other matter beneficial to the club movement. Members were entertained for a portion of the evening by an interesting lecture on Receiving Circuits and apparatus by Mr. Turner Makin, and the remainder of the evening was spent in a discussion on various problems submitted by members.

Suggestions for improvement of the Club's organisation and programme were offered by the Hon. Secretary and some of the other members and as a result they hope to further stimulate the keen interest displayed by members and make the Club an attractive resort for all persons interested in the study of wireless subjects.

The desire to offer congratulations to Mr. C. D. Maclurcan on his fine achievement in establishing two-way communication with two American amateur stations, was expressed.

One of the members, Mr. T. Harris, has been receiving some wonderfully good results of late on short wave DX work, particulars of which will most probably be published later; and various other members report having installed new receiving sets and are getting good results.

Inquiries regarding the club's activities addressed to the Honorary Secretary, Mr. K. Campbell, 44 Bayard Street, Mortlake, will receive prompt attention.

THE CROYDON RADIO CLUB.

The usual weekly meeting of the Croydon Radio Club was held at the Club rooms, Rockleigh," Lang Street, Croydon, on Saturday, November 15th, at 7.30 p.m.

Alteration of the meeting night was discussed, but no decision was reached, so the matter was postponed till a future date.

Mr. G. M. Cutts reported on the Delegates' Meeting, his views expressed at the meeting endorsed by the club.

Mr. Luckcuck explained the "Mean Root Square Law" which was thoroughly appreciated by those present.

Light refreshments were partaken of after which the meeting closed at 10 p.m.

All intending members are cordially invited to communicate with the Hon. Secretary, Mr. G. M. Cutts, "Carwell," Highbury St., Croydon.

WAVERLEY RADIO CLUB.

The question of the merits and demerits of British and American gear was thrashed out in a debate at the Waverley Club Meeting of November 18. The advocates of American gear won by a narrow margin, according to the judgment of the chairman, Mr. A. Burrows.

The sides were as follows: British gear—Messrs. J. Miller, R. Howell, G. Thomson, W. Horrell, and Mr. Lockwood. The American team consisted of Messrs. E. Bowman, W. Stewart, D. Graham, W. Anderson and Simpson. The debate was interesting throughout, being a highly successful club night.

Much discussion took place at this meeting concerning the transmitting and receiving sets and £23 was voted for the transmitter.

WIRELESS SOCIETY OF NEWCASTLE.

The usual fortnightly meeting of the Wireless Society of Newcastle was held last night (19/11/'24) in the Society's Rooms, Y.M.C.A. Buildings, King Street, Newcastle, with the usual good attendance.

At the request of the Technical Committee, Mr. R. Filmer, a member of the Society, gave a short lecture on the various types of inductances used in receiving apparatus. The form of winding of each coil was lucidly explained with its effect on the distributed capacity of the device.

The lecture was greatly appreciated and was followed by a keen discussion by members on the relative merits of the various inductances.

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| Frost, 2000 ohms | 1 12 6 |
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| Frost, 3000 ohms | 1 17 6 |
| T.M.C., 4000 ohms | 1 15 0 |
| Brandes | 1 15 0 |
| Western Electric, 4000 .. | 1 17 6 |
| Stromberg Carlson | 2 0 0 |
| Sterling Lightweight, 4000 | 2 4 0 |
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| Silvertown, 8000 ohms .. | 2 10 0 |
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| 2 30 ohm Rheostats | 0 10 6 |
| 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 0 9 |
| 1 42 Panel Plug | 0 3 9 |
| 1 43 Panel Plug..... | 0 5 9 |
| 1 44 Extension Handle .. | 0 1 10 |
| 1 Jefferson Star Transformer..... | 1 2 6 |
| Panel Wire, Solder and Screws | 0 2 6 |
| 1 Maple Cabinet | 1 5 0 |

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| 1 Battery Switch | |
| 8 N.P. Terminals | |
| 1 42-Panel Plug | |
| 1 43-Panel Plug | |
| 1 Extension Handle | |
| 1 .00025 Condenser and Grid Leak | |
| 3 Valve Holders | |
| 2 Jefferson "Star" Transformers | |
| 1 Single Circuit Jack | |
| Panel Wire, Solder, etc. | |
| Maple Cabinet | |

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|---|---------|
| Panel, 18 x 6½ x 3/16, Drilled and Engraved | £0 11 3 |
| Variable Condenser, with Vernier | 1 10 0 |
| Rheostats | 0 10 6 |
| Switch | 0 4 0 |
| Terminals | 0 2 8 |
| Panel Plug | 0 3 9 |
| Panel Plug | 0 5 9 |
| Extension Handle | 0 1 10 |
| Condenser and Grid Leak | 0 0 9 |
| Holders | 0 12 0 |
| on "Star" Transformers | 2 5 0 |
| Circuit Jack | 0 4 6 |
| Wire, Solder, etc. | 0 2 0 |
| Cabinet | 1 10 0 |
| | <hr/> |
| | £3 4 0 |

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| 6 H.C. Coils, 130 to 3000 metres | £1 11 0 |
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| 1 amp. Accumulator | 3 3 0 |
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| 2 42-Panel Plug | 0 7 6 |
| 1 43-Panel Plug | 0 5 9 |
| 1 44 Extension Handle | 0 1 10 |
| 3 30 ohm Rheostats | 0 15 9 |
| 1 Battery Switch | 0 4 0 |
| 8 N.P. Terminals | 0 2 8 |
| 4 V.T. Holders | 0 16 0 |
| 2 Jefferson "Star" Transformers | 2 5 0 |
| 1 .00025 Fixed Condenser | 0 0 9 |
| 1 Freshman Variable Leak | 0 5 6 |
| Panel Wire, Solder, etc. | 0 3 0 |
| 1 Maple Cabinet | 2 5 0 |
| 1 Single Circuit Jack | 0 4 6 |
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| | £11 17 3 |

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|---|----------|
| 6 Mounted H.C. Coils, 130 to 3000 metres | £2 6 0 |
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| 2 42-volt "B" Batteries | 1 5 0 |
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| Magnavox R3 | 10 10 0 |

VALVE OR CRYSTAL AS RECTIFIER

By H. W. Beamish.

AMATEURS who have been successful in handling the crystal often regard valve rectification as a superfluous consumption of high and low tension current. The amateur who has never found "a decent point" hails the prospect of a soft rectifying valve with genuine ecstasy.

Relative Disadvantages.

Neither the crystal or the valve can be regarded as perfect rectifiers. There is, however, greater scope for improving the valve as a rectifier than there is of perfecting the crystal method. The crystal fails because if the detector is shaken, it needs readjustment owing to the comparative insensitiveness of many of its points.

The majority of the valves manufactured today are too hard to function as rectifiers. It would at present not be a paying proposition for any firm to start manufacturing a very soft valve on purpose for rectifying, because the average valve purchaser requires a good amplifying valve, and to amplify well a valve has essentially to be hard—"hard" implies highly exhausted. Furthermore, when using the valve as a detector or rectifier the grid leak is often as much trouble to adjust as adjusting the potentiometer of the crystal circuit or even the contact point.

Relative Advantages.

The brighter side of the question shows that the crystal will reproduce speech or music absolutely faithfully, while the valve is often guilty of distortion. Having adjusted the grid leak to the requirements of the valve in use (different makes of valves require different values in megohms of grid leaks) there is no further operation than to switch on the H.T. and L.T. to affect a steady rectification. The valve has an additional advantage, and that is that a single valve detector set has a range of at least 40 miles for telephony, using an outdoor aerial, while the crystal is not of much use over 30 miles from a high power station.

In Conjunction With Valve.

The next case to be considered is the relative advantages and disadvantages of valve and crystal rectifiers when employed with high and low frequency amplifiers.

High frequency or "radio" frequency is affected by amplifying the incoming signals before they reach the rectifying panel. This increases the range of the set considerably, but, remembering that the current reaching the detector varies as

the square of the sound is produced in the phones, it will be seen that it increases the sound considerably also. The crystal rectifying circuit may be connected to plate and the filament of the amplifying valve by a direct connection. The transformer may be used in conjunction with a crystal rectifier if desired, but a considerable loss of energy is the result, and it is not advised. The valve is thus seen to be superior as a detector following high frequency amplification for this and a second reason.

When a stage of high frequency amplification is employed, the incoming signals come in at some five times the strength, using the average valve in the high frequency socket; this means that current arriving at the detector will be five times the strength and this will cause a "cat-whisker" detector to "jog" from point to point; the sound produced will vary as the difference of the square of sensitivity of the points, and not merely as the difference of the points. This actually happens and it is very unsatisfactory. The valve, however, does not "jog."

Low Frequency.

Low frequency or "audio" frequency is affected by amplifying the signals after rectification, when they may be regarded as rather less mobile. Here, again, the crystal detecting circuit is connected directly to the valve amplifying circuit, but, remember, the detector comes first. The valve this time is coupled to the valve amplifying circuit by an "iron core" or low frequency transformer; and this gives the crystal a distinct advantage as a direct coupled detector, for the iron core transformer does, unless it is of a very superior quality, cause distortion. This distortion is due to induced currents set up in the iron, and when two stages of L.F. are used for loud speaker work it quite spoils reception of faint telephony. The crystal therefore, is the better rectifier if it is to be followed by low frequency amplification.

Which Frequency to be Utilised.

Low frequency should be employed when the station to be heard is within the range of the detector alone. Do not think that because a station is just audible using detector alone, low frequency should be employed—try high frequency. The lengthening of range as explained may be superior as regards an increase in volume to merely increasing the sounds already received.

VARIOMETER TUNED CRYSTAL SET

By Insulator.

EVERY week when I hand my article to the Editor, I usually ask "Do you want anything special for next week?" Thus am I handed my instructions, so in keeping with them this week I am presenting a crystal set employing variometer tuning.

It is somewhat difficult to give something new in Crystal sets and this style of crystal set is far from new, being very much in favour in England.

Personally, I don't think Australia is going to be a crystal country; rather do I think that valves will be the order of the day. As a matter of fact, valves at the moment, are the order of the day. This is perhaps, to be regretted, as the crystal set is worth while and lends itself to many interesting experiments.

The set being described this week will hold its own among crystal sets. It is very easy to tune and greatly overcomes the difficulty of dead end effect which is common to most crystal sets. We in this country are unfortunate in as much as Broadcasters (Sydney) Ltd., 2BL reign on a wave length of 350 metres while Farmers (2FC) transmit on 1100 metres. To employ a set to incorporate both to give maximum efficiency is very difficult, indeed for in the ordinary slider type of crystal set with the average aerial, 2BL is picked

up when the slider is generally about an inch from one end, while 2FC is received when the slider is about an inch or so from the other end.

As a consequence Farmers are generally received well, whereas broadcasters are at a great disadvantage due to the dead end effect.

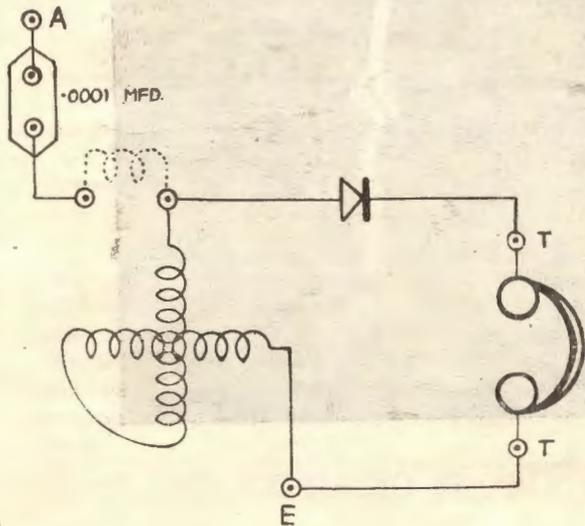
To overcome this it is proposed to employ a variometer for Broadcasters and to receive Farmers a loading coil is inserted in the circuit. This loading coil takes the form of a honeycomb coil of the order of 100 turns.

The materials required are to be found in most of our scrap boxes. I found this list in my lot:—

- 1 panel 9 x 9 x 1/8.
- 1 Crystal detector.
- 1 Panel Plug.
- 6 Terminals.
- 1 .0001 Fixed Condenser.
- 1 Variometer.

The panel may conveniently be 3 ply wood well shellaced. The .0001 condenser is in the aerial circuit to give constant aerial tuning. This is an advantage for when used it allows any set owner to take his set to a friend's place, hook on to the friend's aerial and by employing the same coils as he does at home, tune in to any station he wishes. There is no necessity to juggle about to find new coil values as the .0001 condenser neutralises the varying capacities of different aerials.

The variometer is quite an easy thing to make. Procure two ordinary cardboard formers, one 4½ inches in diameter and one 3½ inches in diameter. Cut 2½ inches off the big one and say 1½ inches off the smaller one. On the larger one and starting about ¼ in. from the edge, wind on ten turns of No. 22 or 24 D.C.C. wire close to one another and take the wire over a space of say ½ in. and wind on a further ten turns. Secure the end by lacing it through a small hole in the former. Do exactly the same thing with the smaller former, securing the ends as before. Now, as the smaller former has to revolve inside the larger one some means to this end has to be adopted. Here's how to do this.

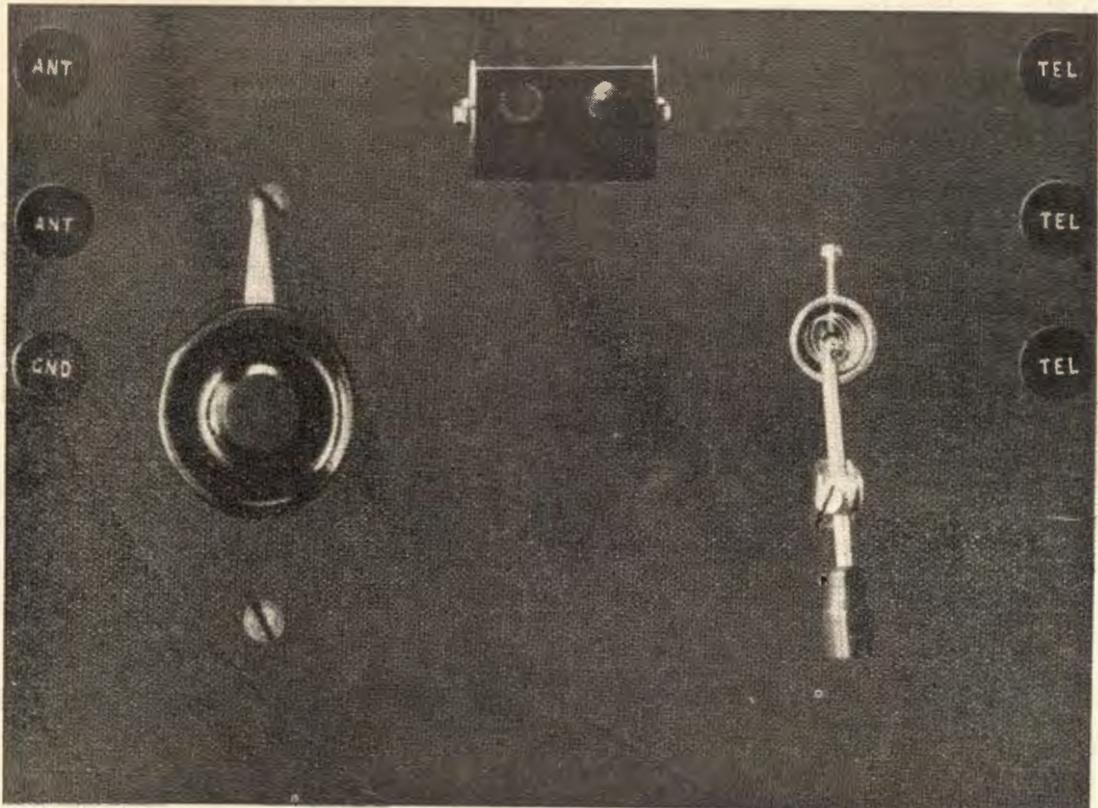


Procure two brass screws on $1\frac{1}{2}$ in. x $5/32$ in. and one $1\frac{1}{2}$ in. x $5/32$ in., both with round or cheese heads and both complete with two nuts. Take each former and in the space in the middle of the former pierce two holes just sufficiently large enough to allow the screws to pass through and exactly opposite one another. Through the hole in the larger former and from the outside insert the $1\frac{1}{2}$ in. screw. Run the nut along about a quarter of an inch and assemble the smaller former on this screw and inside the larger former. Put another nut on the screw now sticking through the hole in the small tube and tighten it up so that the small tube is gripped between it and the first nut. The two remaining holes should now be opposite to one another. Pick up the remaining screw and from the inside insert through the remaining hole in the smaller tube. Secure this with a nut and poke the end of the screw through the remaining hole in the larger tube. Run the remaining nut on this screw and try out to see that the small tube revolves nicely within the larger tube.

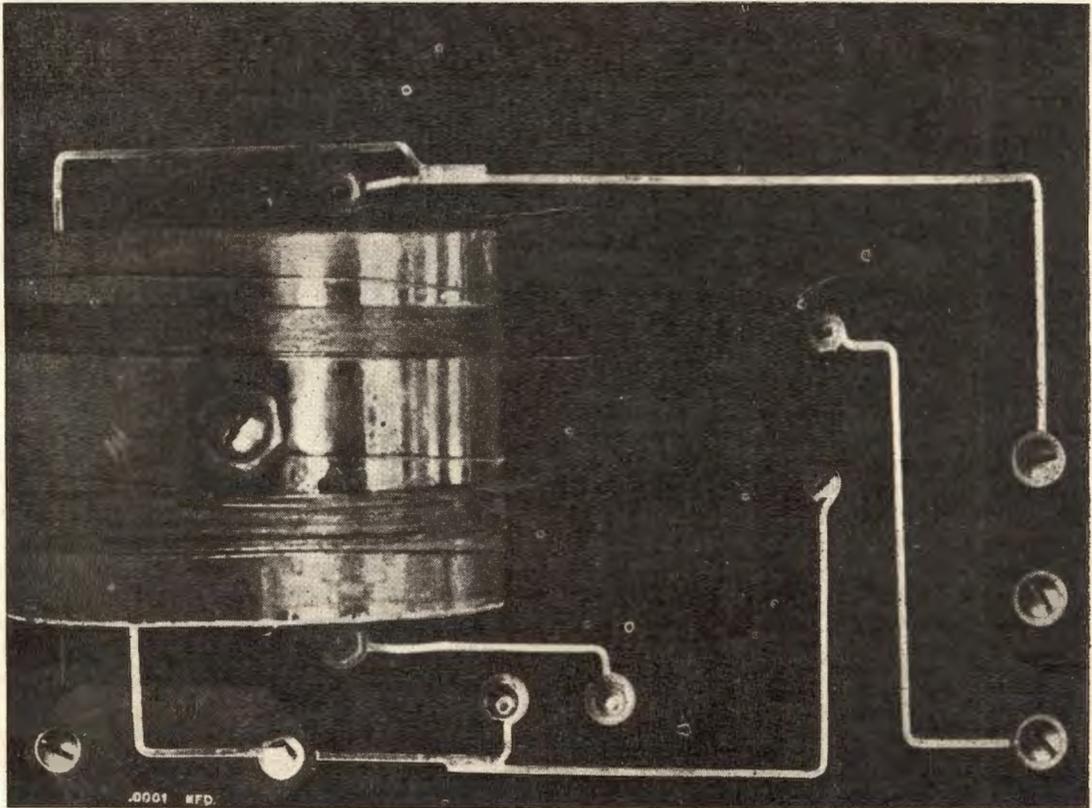
Heat up the soldering iron and solder one end of the wire to each former to the short screw or as it is now known, the short spindle.

The remaining end of the wire on the small tube or rotor is now to be soldered to the long spindle leaving the remaining end of the wire on the big former, or stator, free.

Now the panel. Look at the illustrations and see the lay out. Arrange yours accordingly and drill your panel to suit. I have made provision for two aerial terminals and three telephone terminals. The top aerial terminal gives constant aerial tuning, the lower one just ordinary tuning, and the odd telephone terminal is to allow two sets of phones to be used in series. However you go ahead and assemble your components. A small knob is necessary to turn the rotor and an indicator or pointer is an advantage. The back of the panel will show the wiring which is quite simple. Carry on with it—it is a matter of a few moments only.



Front View of Panel.



Back View of Panel.

When completed hook on to the aerial and earth, and connect phones to the two outside phone terminals. If 2BL is going, short the plug; that is, join the pin to the socket. An easy method of doing this is to obtain another coil mounting plug and with a piece of wire join the terminal screws. Plug this into the panel plug and slowly rotate the variometer. Presently 2BL will be found good and clear. Adjust your crystal and play about a bit till you "get the hang" of it.

Now for 2FC: Pull out the shorting plug and insert the 100 turn coil in its place. Tune in again with the variometer. How's that? O.K. I thought so.

Rightoh! I'm off now till next week. Oh! by the way I thought I'd just mention that perhaps next week I will tell you something about the high tensionless type of valve receiver. I am experimenting now and if I find it alright I'll tell you how I made mine.

AUSTRALIA BRIDGES THE WORLD.

Commenting upon the cabled news that messages sent out from the experimental station at Sydney were received by Mr. Hunter and Mr. Martin, in England, using Australian-made valves, Mr. E. T. Fisk said that Amalgamated Wireless engineers had now performed the remarkable feat of bridging the world with Australian-made equipment.

The apparatus with which the messages were transmitted from Sydney was built and operated in Australia and operated by Australian engineers, and valves with which the Company's engineers, Messrs. Hunter and Martin, had received the messages in England were also made in Australia. This is an Australian achievement which should become historical and which will prove to the whole world the remarkable development and efficiency of Australian manufacturing and technical science.

BUY SIMPLEX RADIO PRODUCTS.

NAUTICAL TERMS AT K.G.O.

WHILE radio broadcasting may be but 36 months old, many of the words used by station operators are descended from the vocabularies of seamen of remote times.

The necessity for ship to ship and ship to shore communication perhaps furnished much of the incentive to develop radio. Nearly all broadcasting operators have been ship radio operators. And it is natural that in the control room at KGO, the General Electric Pacific Coast Station, visitors are inclined to feel as if they were on board ship from remarks made by operators.

Here operators refer to the floor as the "deck." Walls are spoken of as "bulk heads." Windows are called "ports." Operators do not work so many hours; they simply "stand watches." Standing the "600 meter watch," means to listen in with a special receiver during the time KGO is on the air for SOS signals from ships in distress. The book recording transmission and changes of apparatus is called the "log." There is no clock in the KGO control room. But there is a real ship's "hack" chronometer, all rigged up in gimbels to take care of the swaying of the ship, in the regular little brown mahogany case. Even the record of the chronometer's variation is called the "chronometer log." This shows its "daily rate," which means simply the daily loss or gain in fractional seconds. Even radio listeners often hear over the air the ancient bo'sun's warning, "stand by!"

But the old sea dog visiting the KGO studio control room would certainly feel at home, as if he were on the bridge, when he took a look at the time: "G.M. Time." That is, the KGO. chronometer shows time at the meridian upon which Greenwich, England, stands, and from which mariners compute time and position on the earth's surface.

Mr. W. J. O'Brien, of the Pacific Electric Co., Sydney, is at present in the United States on a business trip, during which he will visit San Francisco, Chicago, and New York, returning to Australia in about six months.

According to Mr. O'Brien, the radio business continues to boom over there and all people in the trade are very optimistic and are looking forward to a record sales season this winter. Already a shortage of supplies is making itself felt. Broadcasting stations have improved wonderfully since Mr. O'Brien was last in America and with the highly selective receivers now the vogue over there, interference is practically unknown and a choice can

usually be made of perfectly received programmes from one of six or more stations any night.

Add to your list of transmitters the following: (New Zealand) 2BJ, Allen Evans, 269 Taranaki St., Wellington, 140 metres, 5 watts. Transmits C.W. or phone any evening 6 to 7 p.m. and 8 to 11 p.m. New Zealand mean time.

AVOIDANCE OF PANEL SURFACE LEAKAGE.

WHETHER or not a radio panel should have a highly polished surface or be given a dull finish has in the past been more or less a matter of taste. Some experimenters didn't care for a lustrous, satin-like surface, and, accordingly, roughened it with fine sand-paper or pumice-stone, and rubbed a little oil in when the roughening process was completed.

This is not good practice. The manufacturers of Radion, for instance, have taken particular pains to provide a surface of mirror-like smoothness for their panels, and to finish both sides of a panel in the same manner. While it is true that Radion's surface is handsome, the high polish is intended to insure a permanently high surface resistance.

When the builder of a set dulls the panel's finish, he very greatly increases the surface area and provides many tiny cavities for the lodgment of dirt and grime. And when he finishes the dulling process with an oil rub-down, he is in reality doing his best to assist dust particles floating in the air to settle on the panel and fill the small pockets he has already placed there. Moisture also can collect in the pores of a roughened surface and dust may dissolve in it, forming an attractive path from one binding post to another for radio frequency current to follow.

Hence BOTH front and rear surface of one's panel should have a high polish which never requires oil for "beauty" purposes." Sub-panels, as well, should have flawless surfaces, as well as any other material upon which sockets or tuning instruments are to be mounted, if one is going to be consistent and apply the principle of "a chain is no stronger than its weakest link."

Telephone City 4429

CHARLES D. MACLURCAN
Consulting Radio Engineer

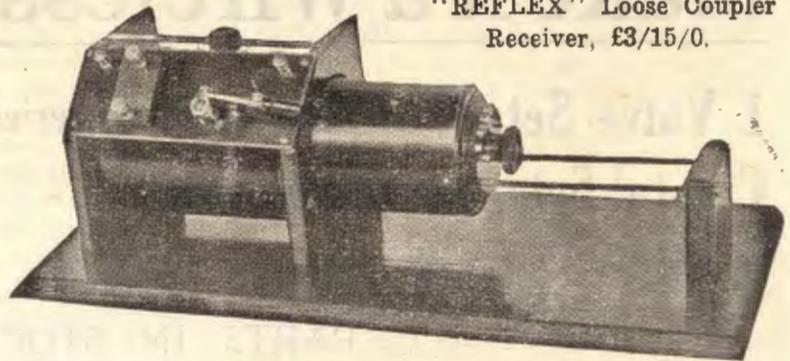
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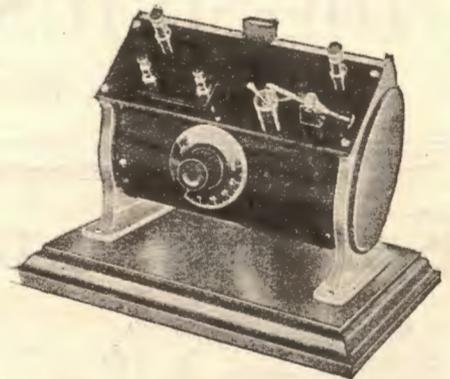


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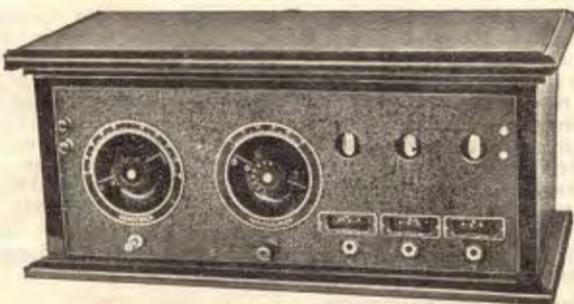
The Crystal Set (shown at right) is our latest Reflex Rotocoupler. It has vulcanite rotor with dial setting for secondary tuning. For selectivity and volume there is no Crystal Set to equal it. It is finished in the usual "Reflex" manner.

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



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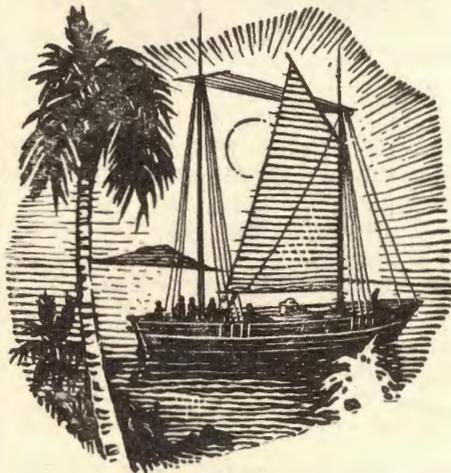
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*"Radion" Panels in the South Seas
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On July 4, 1924, the auxiliary ketch rigged ship, "Bill Jones" sailed from the Great Lakes, Illinois, U. S. A., bound for the South Sea Islands.

An important part of her equipment was a Zenith Radio set equipped with Radion Panels and Parts. An experienced radio operator was taken along to carry on constant communication with amateurs in the United States, Canada, Australasia and the Orient. It is planned to make the "Big Bill" the first intermediate relay point between the United States and Australian amateurs.

Long, careful consideration was given to the construction of this apparatus. As proved in the set used by Dr. MacMillan in his recent Polar Expedition, also equipped with Radion, panels and parts must be of the highest quality to withstand extreme atmospheric conditions. That Radion Panels and Parts were chosen for the "Big Bill" is another definite proof of their superiority.

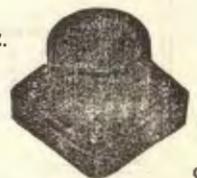
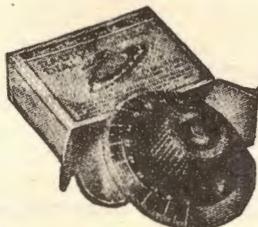
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NEWCASTLE NOTES

Residents of Newcastle will be pleased to hear that within three months' time they will have a 500 watt broadcasting station in their district. This means that listeners-in within a range of from 25 to 50 miles will be able to hear broadcasting fairly easily on a simple crystal set. There will also be a great number of people who will now buy a valve set of smaller size than that which was previously necessary to work a loud speaker.

This station will be one that is at present in operation at Broadcasters (Sydney) Ltd., which has been received and worked on a loud speaker in other States. The new Newcastle station will act as a relay station for the Sydney station (2BL) and will also broadcast local items of interest from time to time, i.e., local news, entertainments, and also the Sydney programmes, and by this means the public of Newcastle and Districts will be well catered for in the way of radio broadcasting. It will be of interest to readers to note that Broadcasters (Sydney) Ltd. are becoming much more popular in Newcastle because of the increase in strength of the transmissions and the better programmes of late; this increase in strength is very noticeable as they are now quite as loud as Farmers' (2FC). Whether this is noticed all over the State is not known, but it is very apparent in Newcastle. The outer districts of Newcastle are now becoming interested in wireless to a great extent. During the week two "Burginphone" receivers were installed at Toronto Lakes and Bulahdelah and these both had exceptional results and entertained quite a number of local people.

The Radio Society of Newcastle hopes to be on the air very shortly and this will be another boom to wireless enthusiasm in Newcastle. So far as we have learned there is nobody in Newcastle who has logged the New York station. What is at first hard to believe, but is now an established fact, is that broadcast listeners up here are regularly hearing Sydney broadcasting on small single slide tuners, i.e., crystal sets, and without any valves too.

ALDERMAN LEADS THE WAY.

In our issue of September 12th we published an editorial pointing out that in order to ensure the improvement and enlargement of existing broadcasting services, it was only fair that those who were pirating entertainment for which others were paying should come forward and part up the amount of fee.

That the Postmaster General's Department means business is shown by the fact that action

was taken against certain residents of the Longueville district, each of whom were fined £2 and £1/5/- costs, in default 21 days hard labor. By the irony of fate one of the defendants was an alderman of the Lane Cove Municipal Council.

Long Distances on Crystal.

(To the Editor)

Sir,—I've just read of your announcement in Wireless Weekly, November 21st, about trying to get into touch with some of these "de luxe" long distance crystal fiends. Now I have a friend, a Mr. James Kerley, of 94 Swanson St., Geelong, Victoria, who can receive 2FC every night on the simplest sets—H.C. coil with no condensers whatsoever. I received a letter from my friend yesterday which might interest you. His aerial is just an ordinary one; the earth consisting of a sheet of iron buried three feet deep, the set as I have said before simply a 150 H.C. coil with detector and phones.

Using another set he can pick up Melbourne amateurs 50 miles away, some of his "victories" being 3BQ, 3BD, 3ZF, 2ZL, 3OT, and a host of others. If you desire more details of Mr. Kerley's set you could write to him at the address mentioned, but I assure you there is nothing much to be learned—he is simply getting remarkable results without any apparent cause.

Wishing the Weekly every success.

Yours etc.,

E. ROBERTSON.

22 Victoria St., St. Peters.

(To the Editor)

Sir,—A probable explanation of the freak reception of 3LO by P. Boulton, which was mentioned in last week's issue is that the filament or some other part of the valve (2nd audio) is loose allowing vibration thus functioning in the same way as a phone or loud speaker.

I wish the enquirer would try substituting another valve next time this freak receiving happens, and see of the music stops or continues.

Is Wireless Weekly going to publish lessons in Esperanto, for the benefit of Australian readers?

Yours etc.,

(We are already considering this last proposition.—Editor.)

Columbia Radio Batteries Are the Best

COLUMBIA Radio Batteries have proven to be the best batteries for radio receiving sets that money can buy. They are made in different styles suitable for every radio equipment and will give more satisfaction than any other make.

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COLUMBIA Dry Cell "A" Batteries for vacuum tubes of low amperage are made especially for this work. They will withstand the slow steady drain required and give satisfactory results for a much longer period of time than any other similar type of battery.

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For vacuum tubes of one-half ampere or over, the COLUMBIA "A" Storage Battery is ideal. It is shipped dry and charged and filled when sold, thus assuring a fresh, powerful battery. It is tightly sealed and contained in an attractive mahogany finished box with handles.

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COLUMBIA "B" Batteries are made in 22½ and 45-volt sizes. They are equipped with Fahnestock Spring Clip Connectors to insure easy, secure connections. They are thoroughly insulated and waterproofed. They are portable, powerful and long lasting.

Columbia "Three"

COLUMBIA "Three" Batteries are designed so that under certain conditions they can be used as an "A," "B" or "C" Battery. They are made of extra large sized cells, and are used as an "A" Battery for light, portable sets using UV-199 tubes; as a "B" Battery for obtaining additional plate voltage; as a "C" Battery for grid biasing.

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How To Make Your Own Re-
ceiver (Scott Taggart), 2/2
posted.

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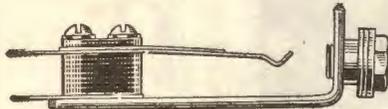
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CLARKE & HAGBLOM Products.

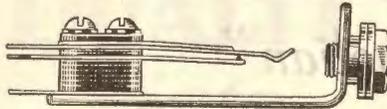
IMPROVED PHONE CONDENSER 001 MIC

PRODUCTS OF QUALITY

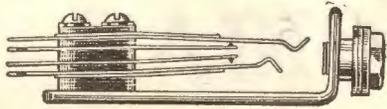
SATURN PRODUCTS



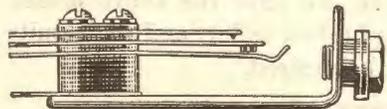
No. 1—Single Circuit Open .. 3/2



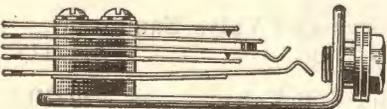
No. 2—Single Circuit Closed .. 3/6



No. 3—Double Circuit Closed 4/5

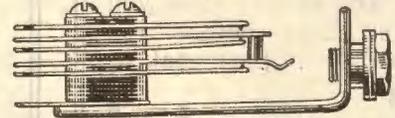


No. 4—Single Filament Control, 4/9

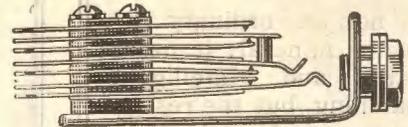


No. 4a—Second Audio Jack .. 5/4
(For Neutrodyne Receivers)

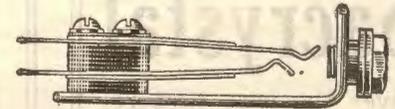
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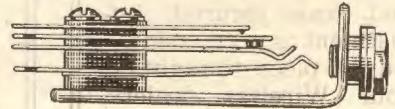
No. 5—Double Filament Control, 5/-



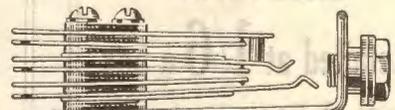
No. 6—Detector Jack .. 6/-
(For Neutrodyne Receivers)



No. 7—Loop Antenna Jack .. 4/5



No. 8—First Audio Jack .. 5/8
(For Neutrodyne Receivers)



No. 9—Seven Spring Automatic Jack 6/-



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is not an ordinary detector mineral; it needs care and intelligent handling, but the results from such attention will repay you a hundredfold.

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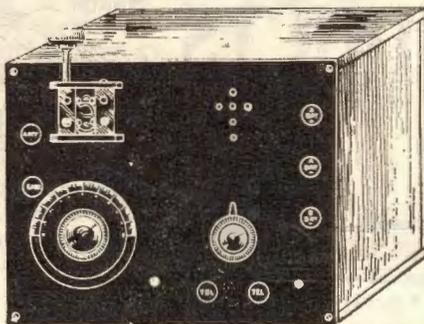
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To those who find the constant crystal point finding a bugbear when listening-in, we offer the above model. The workmanship is of the highest order, and the results obtained leave nothing to be desired.

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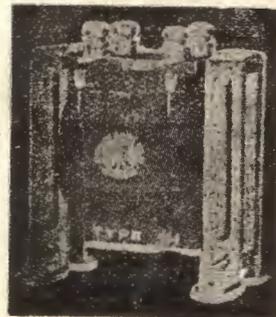
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| Spring Pocket Aerial 13/6 | .0001 7 p. 16/- | Do., Double, Circ. 4/6 |
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| VAR. CONDENSERS, WITH VERNIER—COMPLETE— | Spider Plug Formers 1/6 | |
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| .0005 23 p. £1 & 16/- | | |

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Remember **"SPARKS"** in all your Requirements. We will help you

RADIO AND AVIATION.

THE arrival of the world flyers in San Diego resulted in a rather successful experiment—continuous communication from a flying ship to a fixed station. This was accomplished by A. McDonald, radio engineer for KF1, Los Angeles, the Earle C. Anthony station, and E. G. Arnold, radio manager of Kierulff and Ravenscroft. Tests were carried on all the morning previous to the official start, and were quite satisfactory.

The plane that accompanied the flyers was piloted by Major Mosley, of the 115th Observation Squadron, National Guard of California. Plane No. 218 was equipped with standard navy telegraph equipment, and operated by Mr. McDonald, who began his series of reports immediately upon leaving Rockwell Field, San Diego. These reports were received by Mr. Arnold on a Kennedy Model XV, loaned through the courtesy of Kierulff and Ravenscroft, the Kennedy distributors for California. Upon being received they were decoded and then sent broadcast from KF1. A leased line from the studio to Clover Field fur-

nished the reports for the field. It was surprising how consistently the signals were received from the ship, when we consider that the transmitter was only twenty watts' capacity and was transmitting under adverse conditions, as you may appreciate in a moving plane. Aeronautic development is only being rivalled by radio development. This can readily be appreciated by the successful accomplishment of the above feat.

FIRST WIRELESS TRANSMISSION—AUSTRALIA TO ENGLAND.

Mr. E. T. Fisk, Managing Director of Amalgamated Wireless (A/sia.) Ltd., announces that experimental wireless signals transmitted on low power from the Company's experimental station at Sydney have been received in England. These tests were commenced on Monday, and the Marconi Company, London, has cabled that the signals of part of yesterday's tests were received at medium strength.

This is the first direct transmission of wireless signals from Australia to England.



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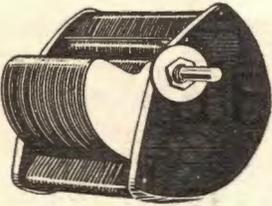
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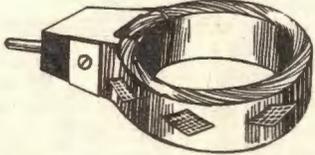
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| 40 | 5/3 | 2/6 |
| 50 | 5/6 | 2/9 |
| 75 | 5/9 | 3/- |
| 100 | 5/9 | 3/- |
| 135 | 6/3 | 3/4 |
| 150 | 6/3 | 3/4 |
| 200 | 6/6 | 3/9 |
| 225 | 6/6 | 3/9 |
| 250 | 6/6 | 3/9 |

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1234 or 5 Valve sets

There are on the market to-day variously priced valve sets that provide a wide range from which to choose.

"Which set shall I buy?" is an important question to the prospective purchaser. Perhaps he has approximately fixed the price about which he wishes to pay. Round about this price a number of sets are sold. Some higher, some lower.

The question faces him, "Which of these sets will best suit me?"

The truth is, sets vary in price with the quality of the parts used and the accessories attached.

You will find it profitable to get expert advice before you purchase. It will save you money and, perhaps, disappointment.

Mr. W. L. Hamilton, of our experimental dept., is at your service.

Mr. Hamilton, the originator of many well-known valve and crystal sets, has practical experience at the back of his advice, and is only too pleased to help in any way, from the charting of valve sets to the selection of its minor parts.

C. R. Cullen *Late AIF*

96 BATHURST STREET

Phones: City 869 and 2596

Wireless Weekly Transmitting Tests

THE delay which has prevented the publication of the reports was quite unavoidable, as reports in many instances arrived slowly; and, needless to say, the work in tabulating the points was considerable. Unfortunately, during that particular week atmospheric conditions were very prevalent almost all over the country, particularly in Queensland and South Australia, where on one or two nights signals were absolutely blotted out by the continuous roar of "X's." The most complete reports received were those of Lt.-Col. Fortesque, Toowoomba; Mr. H. L. Hobler, Rockhampton; and Mr. J. Walmsley, Como; and we much appreciate the trouble these gentlemen went to in the matter. While not for a moment wishing to detract from the value of the other reports received, it was largely a very difficult matter to get down to bedrock and arrive at the actual figures, but the figures presented below represent the actual results forwarded to us by listeners-in. They were tabulated by Messrs. R. Ginders, E. C. Mumford, and the Editor of "Wireless Weekly." The two former gentlemen are not interested in the Experimental movement, and we appreciate their courtesy in assisting us with the compiling of these reports.

Although we understand that 2CM and one or two others did not transmit upon certain evenings, the figures below are those actually received by us.

A report from Port Moresby shows 2GR as the only station heard there. It should be remembered that both 2CM and 2DS were using low wavelengths, which would not be received on the average tuner, so that the figures applying to them cannot be seriously considered.

In conclusion, we want to again express our appreciation of the courtesy of the transmitters and of the listeners-in in co-operating with us in these tests. We feel sure they will realise that, considering the distances from which reports had to come and the time required in their compilation, publication could not be effected earlier.

"Wireless Weekly" having paved the way, we now look forward to other papers carrying on the good work of endeavouring to foster the Experimental movement.

THE figures under the heading of "C.W., I.C.W., and Speech" represent the strength at which those items were received. The total strength is shown. In the last column is shown the points which were awarded for modulation.

| First Night. | Total Points Strength. for | | | | Third Night. | Total Points Strength. for | | | | | |
|---------------|----------------------------|---------|-------------|-------------|---------------|----------------------------|---------|-------------|-------------|-----|-----|
| | C.W. | I.C.W. | Speech. | Modulation. | | C.W. | I.C.W. | Speech. | Modulation. | | |
| 2CM .. . | 172 | 195 | 179 | 546 | 126 | 2CM .. . | 93 | 93 | 82 | 268 | 193 |
| 2GR .. . | 200 | 213 | 168 | 581 | 194 | 2GR .. . | 222 | 204 | 197 | 623 | 187 |
| 2YI .. . | 147 | 183 | 116 | 446 | 101 | 2YI .. . | 201 | 187 | 276 | 664 | 211 |
| 2BB .. . | 117 | 82 | 65 | 264 | 90 | 2BB .. . | 112 | 84 | 76 | 272 | 182 |
| 2DK .. . | 90 | 73 | 84 | 247 | 57 | 2DK .. . | 97 | 112 | 83 | 292 | 117 |
| 2CS .. . | 93 | 62 | 48 | 203 | 38 | 2CS .. . | 82 | 82 | 71 | 235 | 109 |
| 2BF .. . | 204 | 273 | 219 | 696 | 192 | 2BF .. . | 203 | 243 | 185 | 631 | 271 |
| 2JM .. . | 188 | 256 | 204 | 648 | 232 | 2JM .. . | 217 | 252 | 192 | 661 | 270 |
| 2DS .. . | 93 | 47 | 110 | 250 | 156 | 2DS .. . | 56 | 63 | 93 | 212 | 171 |
| Second Night. | Total Points Strength. for | | | | Fourth Night. | Total Points Strength. for | | | | | |
| C.W. | I.C.W. | Speech. | Modulation. | C.W. | | I.C.W. | Speech. | Modulation. | | | |
| 2CM .. . | 116 | 134 | 198 | 448 | 201 | 2CM .. . | 114 | 173 | 162 | 449 | 187 |
| 2GR .. . | 198 | 237 | 194 | 629 | 213 | 2GR .. . | 193 | 122 | 172 | 487 | 198 |
| 2YI .. . | 182 | 176 | 229 | 587 | 210 | 2YI .. . | 126 | 140 | 139 | 405 | 71 |
| 2BB .. . | 93 | 84 | 57 | 234 | 147 | 2BB .. . | 96 | 73 | 101 | 270 | 68 |
| 2DK .. . | 90 | 79 | 48 | 217 | 83 | 2DK .. . | — | — | — | — | — |
| 2CS .. . | 81 | 72 | 37 | 190 | 79 | 2CS .. . | 93 | 62 | 71 | 226 | 84 |
| 2BF .. . | 234 | 298 | 189 | 721 | 201 | 2BF .. . | — | — | — | — | — |
| 2JM .. . | 176 | 176 | 224 | 576 | 271 | 2JM .. . | 214 | 271 | 182 | 667 | 199 |
| 2DS .. . | 81 | 36 | 80 | 197 | 200 | 2DS .. . | — | — | — | — | — |

| Fifth Night. | Total Points Strength. for | | | | | Seventh Night. | Total Points Strength. for | | | | |
|--------------|----------------------------|--------|---------|-------------|-----|----------------|----------------------------|--------|---------|-------------|-----|
| | C.W. | I.C.W. | Speech. | Modulation. | | | C.W. | I.C.W. | Speech. | Modulation. | |
| 2CM | 158 | 152 | 144 | 454 | 134 | 2CM | 84 | 76 | 60 | 220 | 118 |
| 2GR | 193 | 116 | 172 | 481 | 219 | 2GR | 300 | 286 | 217 | 803 | 262 |
| 2YI | 126 | 128 | 132 | 386 | 97 | 2YI | 277 | 234 | 181 | 692 | 137 |
| 2BB | 132 | 94 | 72 | 298 | 81 | 2BB | 182 | 116 | 97 | 395 | 84 |
| 2DK | 94 | 86 | 93 | 273 | 84 | 2DK | 116 | 101 | 83 | 300 | 71 |
| 2CS | 131 | 79 | 63 | 273 | 119 | 2CS | 87 | 76 | 61 | 224 | 58 |
| 2BF | 171 | 214 | 187 | 572 | 183 | 2BF | 261 | 300 | 286 | 847 | 271 |
| 2JM | 176 | 234 | 204 | 614 | 232 | 2JM | 284 | 292 | 271 | 847 | 297 |
| 2DS | — | — | — | — | — | 2DS | — | — | — | — | — |

| Sixth Night. | Total Points Strength. for | | | | |
|--------------|----------------------------|--------|---------|-------------|-----|
| | C.W. | I.C.W. | Speech. | Modulation. | |
| 2CM | 81 | 111 | 124 | 316 | 186 |
| 2GR | 211 | 264 | 197 | 672 | 237 |
| 2YI | 186 | 219 | 172 | 577 | 207 |
| 2BB | 99 | 80 | 73 | 252 | 186 |
| 2DK | 91 | 112 | 76 | 279 | 112 |
| 2CS | 76 | 60 | 46 | 182 | 93 |
| 2BF | 276 | 291 | 203 | 770 | 197 |
| 2JM | 259 | 265 | 197 | 721 | 243 |
| 2DS | — | — | — | — | — |

SPECIAL NOTICE

On Tuesday, December 2nd, at 8 p.m. at the Royal Society's Hall, 5 Elizabeth St., Sydney, under the auspices of the Wireless Institute, a special film will be shown illustrating the action of the Vacuum Tube.

An invitation is extended to all experimenters, members of radio Clubs and members of the Wireless Institute to be present, but unfortunately there is no accommodation available for those who do not come under the above headings.

MAKE A REAL SET FOR CHRISTMAS ! AND USE REAL PARTS

THERE IS A GILFILLAN PART FOR EVERY NEED.

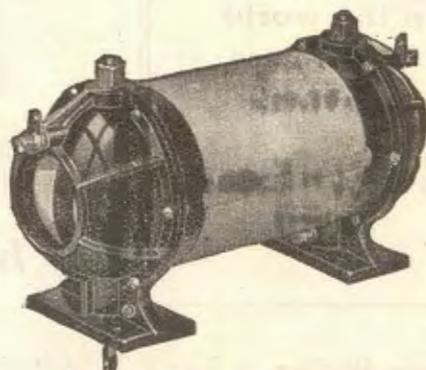
This article, while offering something different in a compact tuning apparatus, is a considerable advancement over anything heretofore obtainable for use in a limited space, and where two variometers and a variocoupler are desirable. None of the selective features of the individual units, which this article replaces, have been sacrificed, and a most selective tuning arrangement is had.

The construction throughout is of the best, split bronze bearings being used, and all connections are direct to binding posts or to the regular solder taps. Short leads and simplicity of mounting are important features of this article.

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| Height. | Diameter. | Length. | Net Weight. |
|---------|-----------|---------|-------------|
| 4½in. | 3½in. | 8½in. | 22oz. |

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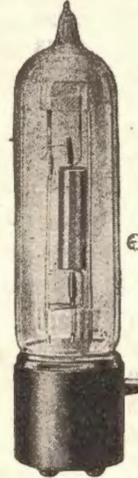
Brickfield Hill, Sydney

Phone City 9440.

Box 2712 G.P.O.

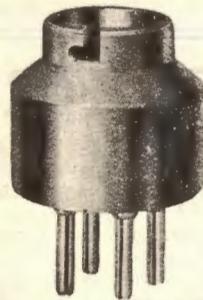
You can get it on a Wecovalve

One of these little valves has given wonderful results to a Radio experimenter in Brisbane. He calls it "the little marvel, she stands on her dignity and I received 2 B.L. and 2 F.C."



K.G.O., Oakland, California, U.S.A., has been distinctly heard on TWO WECOVALVES, also 4 Y.A., Dunedin, N.Z., and 5 A.B., South Australia. Any Radio Dealer supplies Wecovalves.

Something to get enthusiastic about



*The Wecovalve
Adaptor*



The Wecovalve Socket

Send for free pamphlet describing the all purpose WECOVALVE, which operates on dry cells — no accumulator necessary. They are particularly robust in construction and are entirely free from microphonic noises.

WECOVALVES are a "WESTERN ELECTRIC" product. A guarantee of reliability.

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to Wireless Weekly yet?**

RADIO - W'LESS SUPER UNIT

will convert your crystal set into a valve set, complete with De Forest Valve, A Battery and B Battery, no extras to buy £8/17/6
Money back if you are not satisfied.

SINGLE VALVE SET

Unassembled

can be assembled with a screw driver.

There is no catch; this set of parts is complete with a full set of Honeycomb Coils. De Forest Valves, A Battery, B Battery and Phones. Not a penny to be spent on extras. Guaranteed to receive Sydney broadcasting at a distance of 500 miles £8/7/6

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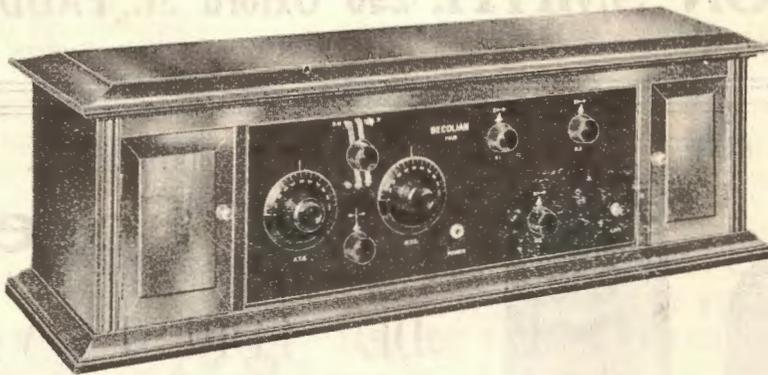
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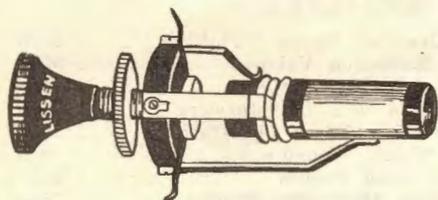
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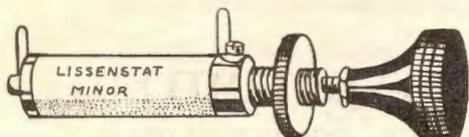
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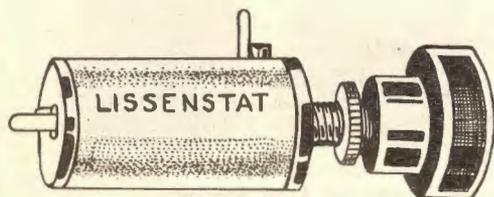
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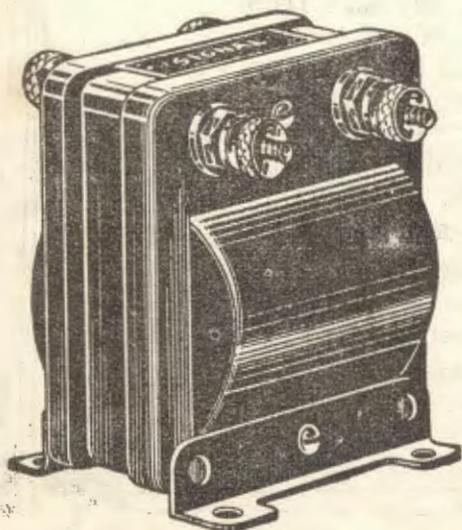
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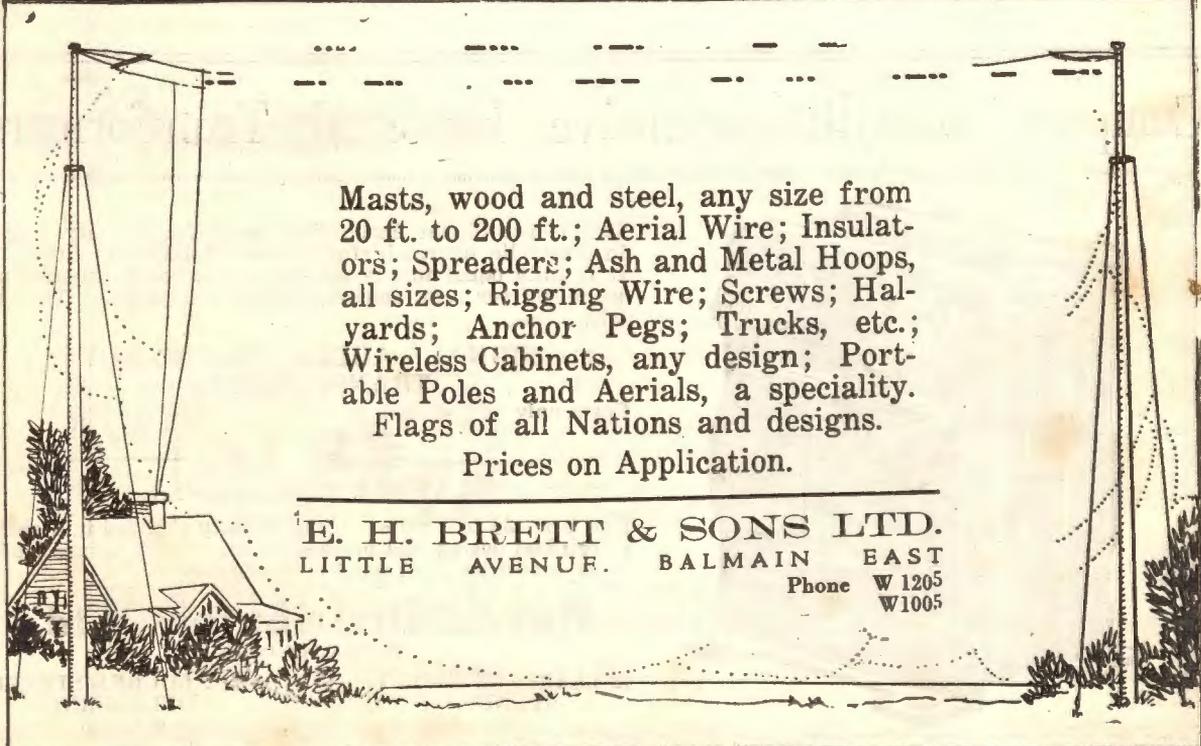
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