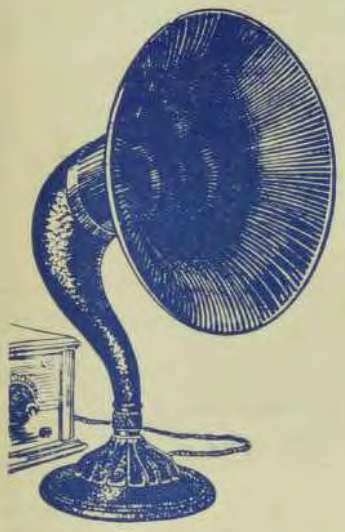

WIRELESS
WEEKLY
3D
FRIDAY, OCTOBER 31, 1924
WHY USE VALVES THAT EXHAUST YOUR "B" BATTERY IN A FEW WEEKS ——————?
IF YOU USE
COSSOR VALVES
YOUR "B" BATTERY SHOULD LAST AT LEAST TWELVE MONTHS
THEY ONLY TAKE 2 MILLIAMPERES AT 60 VOLTS. THIS LOW CONSUMPTION IS DUE TO THE UMBRELLA GRID AND HOODED PLATE
THEY CATCH MORE ELECTRONS
Distributors Price 20/- each
SOLE DISTRIBUTORS FOR AUSTRALIA
New System Telephones Pty. Ltd
Sydney Phone: M 3230
SYDNEY MELBOURNE ADELAIDE BRISBANE and PERTH
FEATURES:
Armstrong Super Set
Efficient Inductances



Loud Speakers

that give you radio as you OUGHT to hear it!

Let the wireless entertain your whole family and your guests. To listen to a good wireless programme is fascinating to everyone. You will hear them at their best with one of these superb Loud Speakers.

Choose your Loud Speaker with care—select one of these perfect examples.

MUSIC MASTER LOUD SPEAKERS.—This has a resonant wood amplifying bell which neutralises all mechanical effects and produces a remarkable volume of clear, pure tone, free from muffling or distortion—a life-like re-creation of the original. As illustrated above £12

ATLAS LOUD SPEAKER.—The "Musician of the Air." Its scientific design, with careful fabrication and assembly, goes far to compensate for any short comings of broadcasting. It gives you the programmes clearly, sweetly and naturally £7/10/-

SIGNAL LOUD SPEAKER.—Of special shape and construction, as illustrated on top of Radiovox Cabinet at foot of page. Strong and sweet £4/15/-

BRANDES' TABLE TALKER, known the world over—£4/15/-

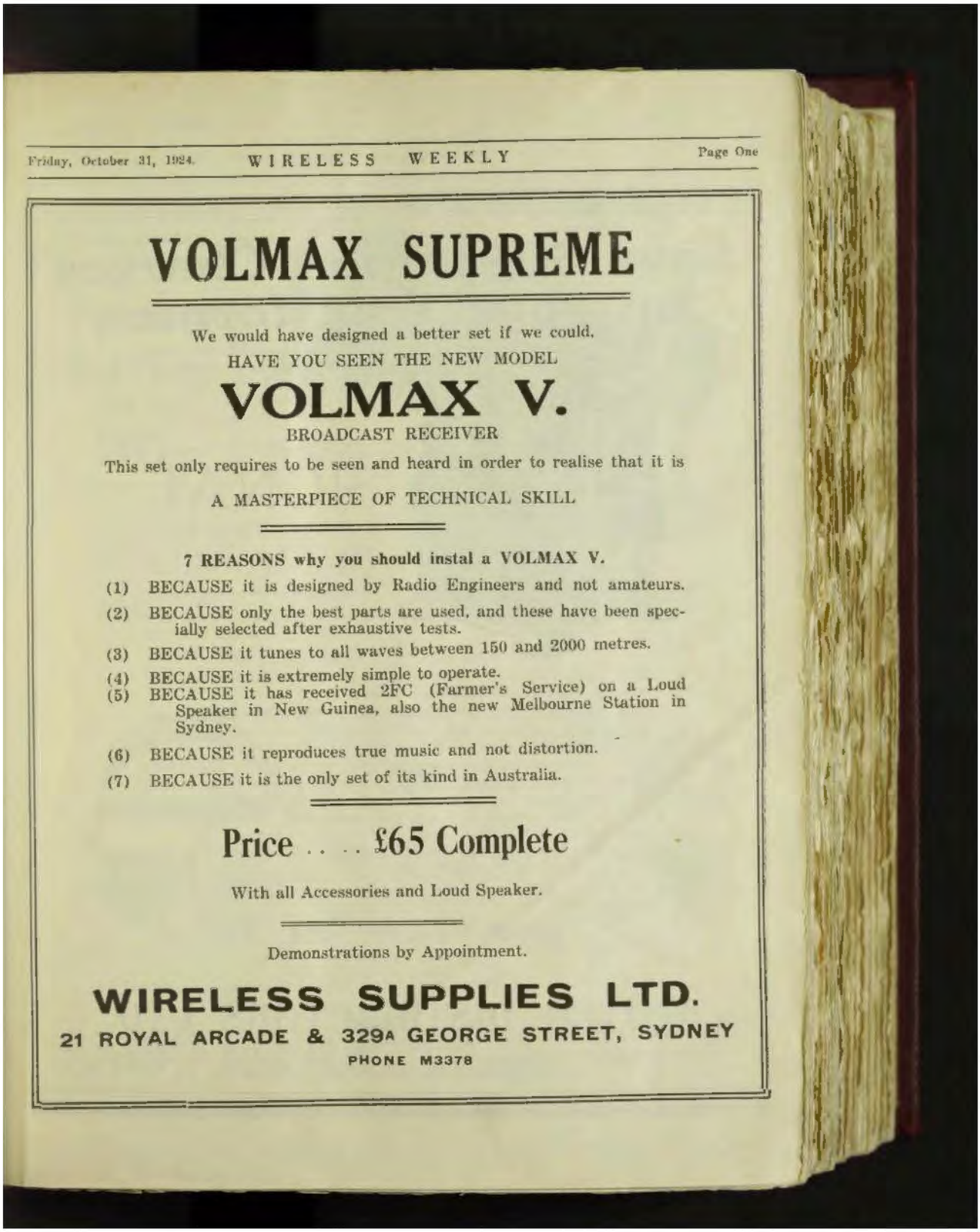
ALL RADIO DEALERS CAN SUPPLY YOU.

United Distributors Ltd.

(Wholesale Only)

72 Clarence Street SYDNEY. 592 Bourke Street MELBOURNE,

and at Brisbane, Adelaide, Perth, Hobart, Wellington.



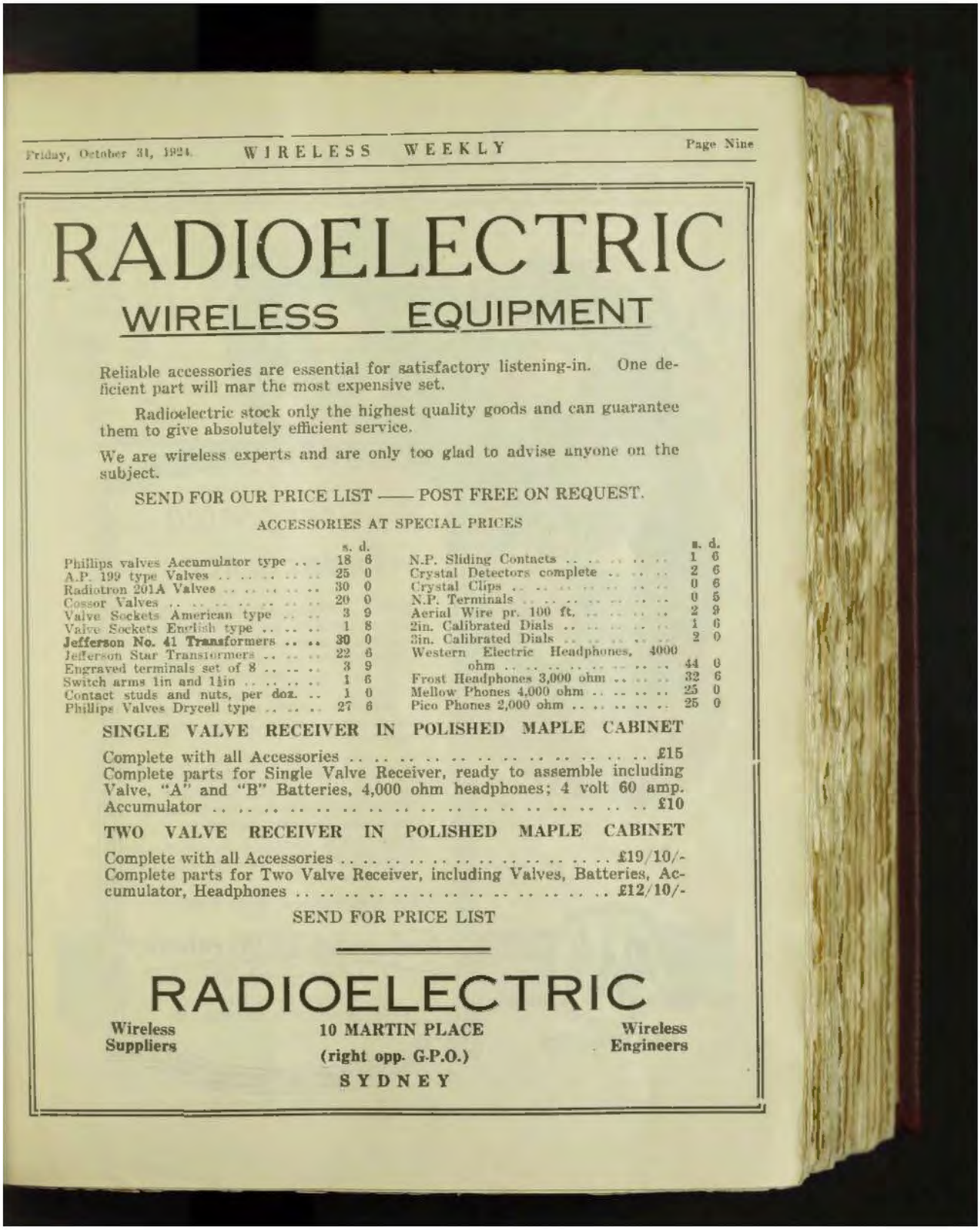
Gilfillan Radio Parts

PRICE LIST

EFFECTIVE NOVEMBER 1st, 1924.

Prices shown herein supersede all previous prices, and are subject to change without notice.

Code No.		Price.
R 100	Variometer, large size	£2 16 0
R 120	Solder Lug to fit No. 6-32 screw .. per doz.	0 0 5
R 125A	Variocoupler, large size, plain winding (170-1000 meters with internal shell winding, in series with Main Primary Winding)	2 16 0
R 125B	Variocoupler, large size, bank winding (205-2000 meters)	3 15 0
R 150A	3in. dial and knob, graduated half way round to fit 3/16in. shaft	0 5 0
R 150B	3in. dial and knob, graduated half way round to fit 1/4in. shaft	0 5 0
R 175A	2-1/4in. dial and knob, graduated three fourths round to fit 3/16in. shaft	0 4 3
R 175B	2-1/4in. dial and knob, graduated three fourths way round to fit 1/4in. shaft	0 4 3
R 200	4in. dial and knob, graduated half way round to fit 1/4in. shaft and bushing for 3/16in. shaft	0 6 0
R 225	Panel Switch, 1½in. knob, bearing type	0 6 0
R 250	Panel Switch stop .. doz.	0 4 0
R 275	Panel Switch contact	0 3 0
R 300	Tube Socket, standard size, new style	0 5 6
R 325	Binding Post, Nickel-plated body, black Bakelite knob .. each	0 1 0
R 350	43-plate Air Condenser, .00083 M.F.D., low loss type	2 2 0
R 375	23-plate Air Condenser, .00041 M.F.D., low loss type	1 15 0
R 400	17-plate Air Condenser, .00032 M.F.D., low loss type	1 11 6
R 425	11-plate Air Condenser, low loss type	1 8 0
R 450	2½in. dial and knob, graduated three-fourths way round to fit ¼in. shaft and bushing for 3/16in. shaft	0 5 0
R 475	Detector unit, 20 ohm rheostat	1 12 6
R 500	Tube Socket for 199 style tube	0 5 3
R 525A	Filament rheostat, 10 ohm	0 7 6
R 525B	Filament rheostat, 20 ohm	0 7 6
R 525C	Filament rheostat, 30 ohm	0 7 6
R 550	Detector-Amplifier Unit, 20 ohm rheostats	4 16 0
R 575A	1½in. knob to fit 3/16in. shaft	0 1 6
R 575B	1½in. knob to fit ¼in. shaft	0 1 6
R 600A	1in. knob to fit 3/16in. shaft	0 1 0
R 600B	1in. knob to fit ¼in. shaft	0 1 0
R 625	Panel Switch, with 1in. knob, bearing type	0 4 0
R 650A	Variocoupler, small size, plain winding, 220-655 meters (with internal shell winding in series with Main primary winding)	2 2 0
R 650B	Variocoupler, small size, bank winding, 220-1100 meters	3 0 0
R 675	Variometer, small size	1 18 6
R 700	Potentiometer, 400 ohm	0 10 9
R 725	43-plate Vernier Air Condenser, .00083 M.F.D.	2 8 6
R 750	23-plate Vernier Air Condenser, .00041 M.F.D.	2 2 0
R 800	Vernier Rheostat, 10 ohm	0 10 6
R 825	¼in. No. 6-32 Flat Head brass screw .. doz.	0 1 0
R 850	¾in. No. 6-32 Flat Head brass screw .. doz.	0 1 0
R 925	Adapter for 199 style tube	0 7 0
R 950	Primary Inductance switch, dial and knob, 15 contacts	0 12 6
R 1000	Radio Frequency Reflex transformer .. 1 pair..	1 3 0
R 1025	Radio Frequency Reflex transformer, with 17-plate condenser mounted. One pair, less dials	3 12 0
R 1050	Radio Frequency Variocoupler, bank wound, 190-950 meters	3 4 0
R 1100	Tuning Unit, two variometers and one variocoupler combined	4 3 0
R 1125	Audio Frequency transformer, 6 to 1 ratio	1 15 0
R 1125A	Audio Frequency transformer, 3½ to 1 ratio	1 15 0
R 1150	Tuned Radio Frequency transformer	0 15 0
R 1150A	Tapped Inductance, 270-2300 meters	0 15 0
R 1275A	Open Circuit Jack	0 4 6
R 1275B	2 Spring Closed Circuit Jack	0 5 2
R 1275C	3 Spring Single Filament Control Jack	0 6 0
R 1275D	4 Spring Double Circuit Jack	0 6 2
R 1275E	5 Spring Double Filament Control Jack	0 7 0
R 1300	Phone Plug	0 5 0
R 1350	Permanent Crystal Detector	0 7 0
RA 1	Reflex Kit, complete	9 0 0



Phones, Redfern 964 and 930.

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

FRIDAY, OCTOBER 31, 1924. VOL. 5. No. 1.

CONTENTS:

EDITOR: A. W. WATT — The Editor will be glad to consider Technical and Topical Articles of interest to Australian Experimenters. All Manuscripts and Illustrations are sent at the Author's risk, and although the greatest care will be taken to return unsuitable matter (if accompanied by stamps), the Editor cannot accept responsibility for its safe return. Contributions should be addressed to the Editor, "Wireless Weekly," 33/37 Regent Street, Sydney, N.S.W.

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

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

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

All accounts should be made payable to Publicity Press Ltd., 33/37 Regent Street, Sydney.

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

EDITORIAL

WIRELESS WEEKLY TRANSMITTING TESTS.

They went with a swing, and we want to seize this opportunity of assuring those who took part, both transmitters and receivers, of our appreciation of their efforts. The transmissions all round were excellent, and afforded a very good example of the high standard of efficiency reached by Australian experimental transmitters. A large number of reports have already reached us, and almost without exception they commend the excellence of the transmissions, and express a hope that similar tests will be held again in the near future. As soon as the final reports reach us we hope to finalise the matter of tabulating points, etc., and details will be published at a later date in Wireless Weekly.

MR. HUGHES IN A NEW ROLE.

Those who are opposed to the use of the broadcast stations by politicians must have had their beliefs badly shaken on Thursday (23rd) evening, when W. M. Hughes gave a talk from 2HC upon issues involved in the British Elections, with especial reference to Australia. His reasoned explanation of the mysteries surrounding the Geneva protocol was remarkably clear, and let in a flood of light upon a subject, which although of vital interest to Australia, is unfortunately not exactly familiar to many who regard the deliberations of the League of Nations with a tolerant, but puzzled eye.

It is to be hoped that 2FC will serve the broadcast public again in this interesting manner in the near future. Incidentally, Mr. Hughes possesses an undeniably good "microphone" voice, which we trust will be heard again.

Who is Next?

THE chief topic of conversation amongst enthusiasts generally is, of course, the wonderful work put up by 4A.A. (Bell, N.Z.) in establishing two way contact with England. First to reach the United States, first to raise an English amateur, the prize undoubtedly goes to our New Zealand friend—his name must go down to posterity as the world's most successful amateur.

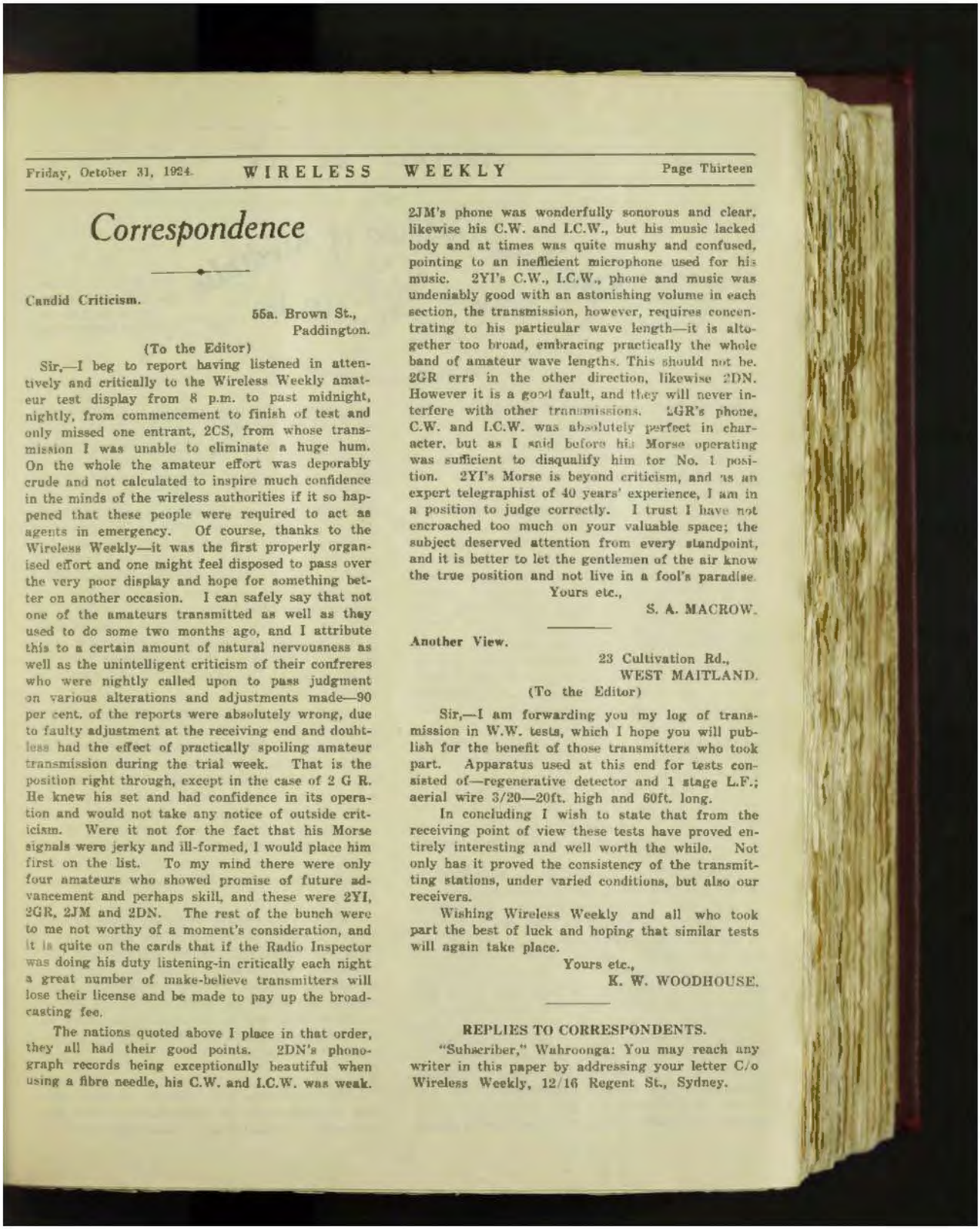
Considering the power used by Bell, something like 120 watts, his achievement was nothing short of extraordinary, and it is a striking illustration of the diligence and patience which have characterised the experiments of this enthusiast. He has established a record that leaves a great deal of lee way to be pulled up both by Australian and American experimenters, and has placed the blue ribbon at the masthead of the N.Z. Experimental Ship.

At the same time we must not overlook the records of lower power transmissions on the part of several Australian experimenters. These have not been approached in any other part of the world. Very few of our experimenters have attempted any exhaustive tests on higher power than 10 watts, and it is a strange fact that in cases where it has been known that certain experimenters have been trying to establish distant communication on higher power, their operations have been completely spoilt by the crowds of interested listeners who have hung on in the hope of hearing the "come back." Needless to say, in the universal Q.R.M. results were hopeless. In the recent instance when Bell got through to 6C.G.W., he had hardly made contact when a horde of hysterical Australians unanimously endeavoured to get over. Aside from its laughable aspect, it afforded a clear instance of what not to do, and showed very plainly that the way of the ambitious experimenter is hard. Not only must he overcome distance, but also the interference caused by those who probably do not realise the heartbreaking nature of the whole thing. To strive perhaps for months, to have success in view, and then to have it snatched away by the thoughtless and the ignorant is indeed hard. This has happened many times, and no doubt will go on happening.

However, to come back to Bell. We offer our sincere congratulations. As we remarked some time ago, we are now waiting for an Australian to get that record over here.

"What makes the radio squeal so, Johnny?"

"Well, mother, if you must know, what you call squeals are really the self-oscillations of the thermionic valves brought about by altering the potentials of the high and low tension batteries and varying the relations of the capacitative and inductive quantities in the receiver."—Judge.



Correspondence

Candid Criticism.

55a. Brown St.,
Paddington.

(To the Editor)

Sir,—I beg to report having listened in attentively and critically to the Wireless Weekly amateur test display from 8 p.m. to past midnight, nightly, from commencement to finish of test and only missed one entrant, 2CS, from whose transmission I was unable to eliminate a huge hum. On the whole the amateur effort was deporably crude and not calculated to inspire much confidence in the minds of the wireless authorities if it so happened that these people were required to act as agents in emergency. Of course, thanks to the Wireless Weekly—it was the first properly organised effort and one might feel disposed to pass over the very poor display and hope for something better on another occasion. I can safely say that not one of the amateurs transmitted as well as they used to do some two months ago, and I attribute this to a certain amount of natural nervousness as well as the unintelligent criticism of their confreres who were nightly called upon to pass judgment on various alterations and adjustments made—90 per cent. of the reports were absolutely wrong, due to faulty adjustment at the receiving end and doubtless had the effect of practically spoiling amateur transmission during the trial week. That is the position right through, except in the case of 2 G R. He knew his set and had confidence in its operation and would not take any notice of outside criticism. Were it not for the fact that his Morse signals were jerky and ill-formed, I would place him first on the list. To my mind there were only four amateurs who showed promise of future advancement and perhaps skill, and these were 2YI, 2GR, 2JM and 2DN. The rest of the bunch were to me not worthy of a moment's consideration, and it is quite on the cards that if the Radio Inspector was doing his duty listening-in critically each night a great number of make-believe transmitters will lose their license and be made to pay up the broadcasting fee.

The nations quoted above I place in that order, they all had their good points. 2DN's phonograph records being exceptionally beautiful when using a fibre needle, his C.W. and I.C.W. was weak. 2JM's phone was wonderfully sonorous and clear, likewise his C.W. and I.C.W., but his music lacked body and at times was quite mushy and confused, pointing to an inefficient microphone used for his music. 2YI's C.W., I.C.W., phone and music was undeniably good with an astonishing volume in each section, the transmission, however, requires concentrating to his particular wave length—it is altogether too broad, embracing practically the whole band of amateur wave lengths. This should not be. 2GR errs in the other direction, likewise 2DN. However it is a good fault, and they will never interfere with other transmissions. 2GR's phone, C.W. and I.C.W. was absolutely perfect in character, but as I said before his Morse operating was sufficient to disqualify him for No. 1 position. 2YI's Morse is beyond criticism, and as an expert telegraphist of 40 years' experience, I am in a position to judge correctly. I trust I have not encroached too much on your valuable space; the subject deserved attention from every standpoint, and it is better to let the gentlemen of the air know the true position and not live in a fool's paradise.

Yours etc.,
S. A. MACROW.

Another View.

23 Cultivation Rd.,
WEST MAITLAND.

(To the Editor)

Sir,—I am forwarding you my log of transmission in W.W. tests, which I hope you will publish for the benefit of those transmitters who took part. Apparatus used at this end for tests consisted of—regenerative detector and 1 stage L.F.; aerial wire 3/20—20ft. high and 60ft. long.

In concluding I wish to state that from the receiving point of view these tests have proved entirely interesting and well worth the while. Not only has it proved the consistency of the transmitting stations, under varied conditions, but also our receivers.

Wishing Wireless Weekly and all who took part the best of luck and hoping that similar tests will again take place.

Yours etc.,
K. W. WOODHOUSE.

REPLIES TO CORRESPONDENTS.

"Subscriber," Wahroonga: You may reach any writer in this paper by addressing your letter C/o Wireless Weekly, 12/16 Regent St., Sydney.

THE

Wireless Institute of Australia

N.S.W. Div. Inc.

Incorporating the Affiliated Societies and The Australian Radio Relay League

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

Phil Renshaw Hon.Sec.
Box 3120 G.P.O Sydney
Phone B 2235
Art.Perrett Publicity Officer

THE October general meeting was full of interest. Mr. J. W. Robinson delivered a lecture on "Modern Broadcasting" and his remarks proved both interesting and instructive. He explained the various divisions under which the modern broadcasting service falls, going into detail in such matters as arranging the programme, the actual production of the items and the means by which the actual sound waves are converted and transmitted. The arrangement of a modern broadcasting studio received considerable attention, and the apparatus used was fully dealt with. Those present left at the conclusion of the evening with a far better idea of broadcasting and its many rafifications, and no doubt next time those present listen in to a broadcast program (if ever they do such a thing) they will enjoy the items much more as they will be able to appreciate the difficulties which have attended their production. Mr. Robinson was very well received, and a most enjoyable evening was spent. There was much discussion during the evening over the problem of the issue of experimental licenses.

This is a matter which is being taken up very vigorously by the Wireless Iinstitute, and one point at least for consideration and differentiation is the relative values of the terms "experimenter" and "inventor."

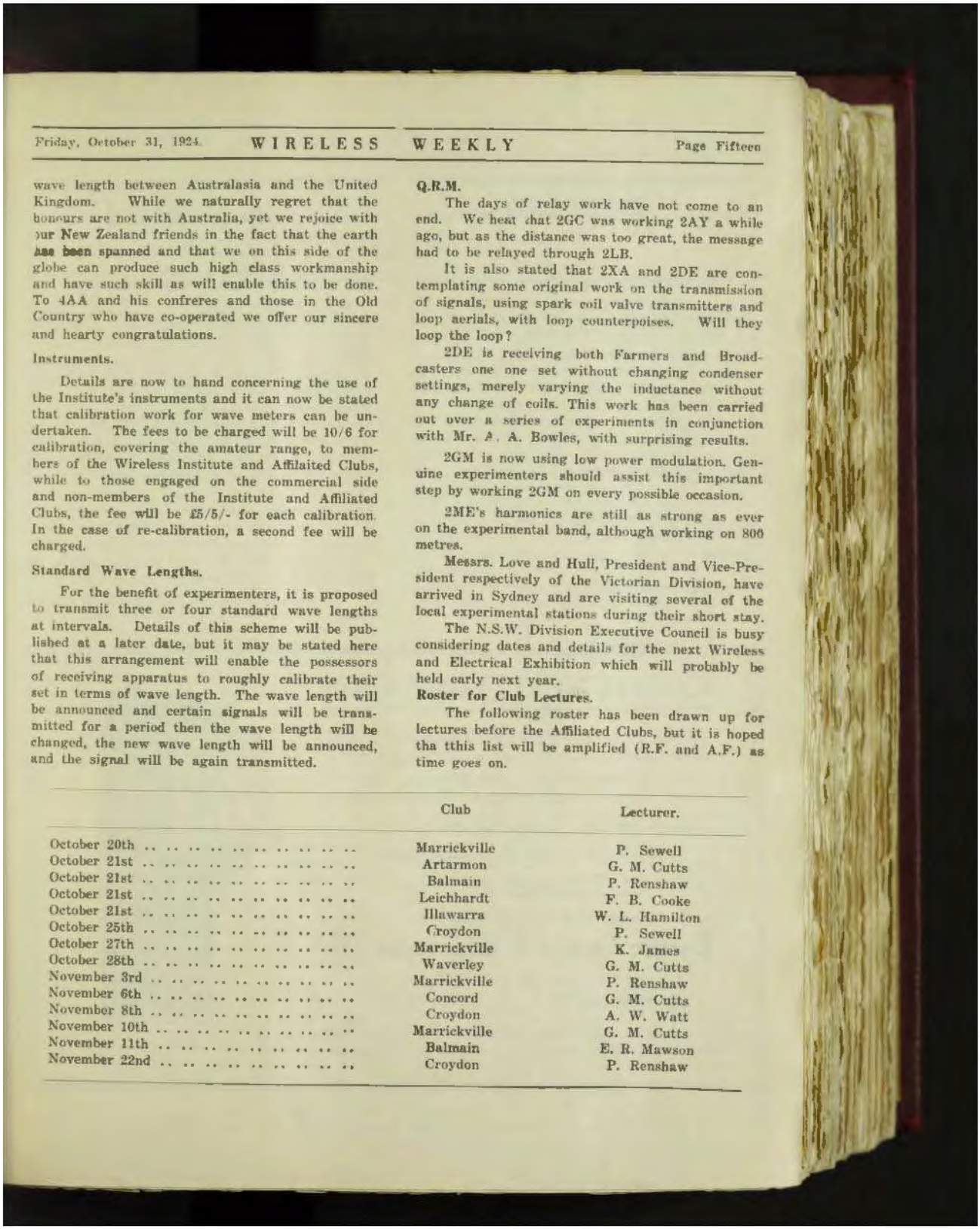
Probably every inventor is an experimenter, but the fact that a man does not succeed in inventing some new piece of apparatus or a new method of performing the same work does not prove that he has not been experimenting. After all, the main point to be considered is the object behind the work being carried out. Merely to transmit signals and seeing how far they can reach can hardly be classed as experimenting unless it is accompanied by more substantial reasons. The genuine experimenter will not buy or make standard parts connected in the standard way and be satisfied if his signals will reach over a standard distance. The genuine experimenter will endeavour to find some new and cheaper method of getting his signals across, or he will devise means by which with the same amount of apparatus and power he will be able to push his signals over a greater distance. This kind of work cannot be done with a fixed set. The same argument may be applied to methods of reception, and the genuine experimenter will not be content to have a set built into a cabinet but rather his apparatus will take one of the numerous forms of unit panel construction. At the same time no hard and fast rule can be laid down on this point, as a great deal depends upon the object he has in view in carrying out his work. It would be well for every experimenter to take stock of himself and see in exactly what direction his work is leading, as there is not the slightest doubt that much greater benefits could accrue from the experimentel movement if the work of the experimenter was carried on along correct lines.

At the last general meeting, the Institute was honoured by the presence of Mr. Reg. Fagan, of Mandurama. 2RJ is an enthusiastic experimenter and deserves great credit for the work he is carrying on with the extremely limited time at his disposal. 2RJ is always willing and anxious to cooperate in any movement tending toward the increase of the efficiency of amateur wireless in Australia. He has the spirit of the pioneers, and his motto seems to be "difficulties are made to be overcome." Keep at it, 2RJ, you are doing good work.

At the next meeting of the Wireless Institute, N.S.W. Division, to be held at the Royal Society's Hall, 5 Elizabeth St., Sydney on Thursday, 20th November, it is proposed to have an evening with the valve testing set. The actual characteristics of various valves will be taken and worked out and as the evening will be an intensely practical one, it is anticipated that a very heavy roll up of members will take place.

D.X.

Congratulations are offered to those pioneers of wireless who by their untiring efforts have succeeded in establishing communication with low



wave length between Australasia and the United Kingdom. While we naturally regret that the honours are not with Australia, yet we rejoice with our New Zealand friends in the fact that the earth has been spanned and that we on this side of the globe can produce such high class workmanship and have such skill as will enable this to be done. To 4AA and his confreres and those in the Old Country who have co-operated we offer our sincere and hearty congratulations.

Instruments.

Details are now to hand concerning the use of the Institute's instruments and it can now be stated that calibration work for wave meters can be undertaken. The fees to be charged will be 10/6 for calibration, covering the amateur range, to members of the Wireless Institute and Affilaited Clubs, while to those engaged on the commercial side and non-members of the Institute and Affiliated Clubs, the fee will be £5/5/- for each calibration. In the case of re-calibration, a second fee will be charged.

Standard Wave Lengths.

For the benefit of experimenters, it is proposed to transmit three or four standard wave lengths at intervals. Details of this scheme will be published at a later date, but it may be stated here that this arrangement will enable the possessors of receiving apparatus to roughly calibrate their set in terms of wave length. The wave length will be announced and certain signals will be transmitted for a period then the wave length will be changed, the new wave length will be announced, and the signal will be again transmitted.

Q.R.M.

The days of relay work have not come to an end. We hear that 2GC was working 2AY a while ago, but as the distance was too great, the message had to be relayed through 2LB.

It is also stated that 2XA and 2DE are contemplating some original work on the transmission of signals, using spark coil valve transmitters and loop aerials, with loop counterpoises. Will they loop the loop?

2DE is receiving both Farmers and Broadcasters one one set without changing condenser settings, merely varying the inductance without any change of coils. This work has been carried out over a series of experiments in conjunction with Mr. A. A. Bowles, with surprising results.

2GM is now using low power modulation. Genuine experimenters should assist this important step by working 2GM on every possible occasion.

2ME's harmonics are still as strong as ever on the experimental band, although working on 800 metres.

Messrs. Love and Hull, President and Vice-President respectively of the Victorian Division, have arrived in Sydney and are visiting several of the local experimental stations during their short stay.

The N.S.W. Division Executive Council is busy considering dates and details for the next Wireless and Electrical Exhibition which will probably be held early next year.

Roster for Club Lectures.

The following roster has been drawn up for lectures before the Affiliated Clubs, but it is hoped tha tthis list will be amplified (R.F. and A.F.) as time goes on.

	Club	Lecturer.
October 20th	Marrickville	P. Sewell
October 21st	Artarmon	G. M. Cutts
October 21st	Balmain	P. Renshaw
October 21st	Leichhardt	F. B. Cooke
October 21st	Illawarra	W. L. Hamilton
October 25th	Croydon	P. Sewell
October 27th	Marrickville	K. James
October 28th	Waverley	G. M. Cutts
November 3rd	Marrickville	P. Renshaw
November 6th	Concord	G. M. Cutts
November 8th	Croydon	A. W. Watt
November 10th	Marrickville	G. M. Cutts
November 11th	Balmain	E. R. Mawson
November 22nd	Croydon	P. Renshaw

HOW TO CHOOSE A RECEIVING VALVE.

By Maxwell McCalman.

IT is often a very puzzling problem for a beginner to choose what type of valve or valves to use in his receiver. He sees valves at 20/- to 25/- each in a hundred varieties, and some called "dull emitters," whose prices soar up to 35/- or more. Unless he has some knowledge of the distinguishing features of the various types, he will find himself hard pressed to know what to use.

Bright v. Dull Emitters.

The dull emitter is a comparatively new type of valve, in which the filament is heated only to a dull red or yellow heat with a consequent saving in the energy required. This type of valve may be separated into two chief classes, namely the .06 and the .25 ampere types. Both are suitable for running from dry cells, but the former type, though taking 3 volts is the more economical. Dull emitter valves are very quiet in working and although they give quite good results they are not as effective as the standard types, and so, if the beginner has an accumulator of fairly high capacity (20-40 actual, for one or two 1/2 amp tubes) he is strongly advised to leave dull emitters alone, except perhaps for radio frequency amplification, for which they are very satisfactory.

Soft and Hard Valves.

Soft valves are those which have not been evacuated as perfectly as hard ones and these are not manufactured very largely. The best known detector (soft) valves are the UV-200, Expanse B and Phillips D1, the last named of which takes 1/2 amp, and the two other 1 amp. A soft valve will "blue up" at anything above about 30 volts on the plate, while a hard valve will stand 70 or 80. Dull emitter valves are always hard.

General.

The ordinary R or E Type is a very good general valve, while the UV-201a type is a powerful amplifier, and uses only a 1/4 amp at 5 volts.

The following table shows what the various types are particularly suitable for, but as all of these except the three soft tubes are general purpose valves, they will function otherwise quite well.

Radio Frequency Amplifier:

U.V. 199; U.V. 201a; W.D. 12; R. V24.

Detector.

U.V. 200; D. 1; B; W.D. 12.

Audio Frequency Amplifier.

U.V. 201a; R; ORA; D. 11; E, and most general valves.

Increasing the Resistance of the Wire Rheostat

VARYING THE RESISTANCE IN THE FILAMENT.

By R. P. GINDERS.

THE purpose of the rheostat is to introduce a varying resistance in the filament circuit in order to control the voltage across the filament terminals of the vacuum tube. The usual wire rheostat has a constant change of resistance throughout the entire scale of its revolution. There is a critical point for some tubes, and in all tubes there is a certain setting of the rheostat that gives greatest volume with the least amount of current. Increasing the resistance a trifle gives less volume, but within a certain range better quality of production. This range is comparatively small, but the usual rheostat makes no provision for it.

Varying Amperage.

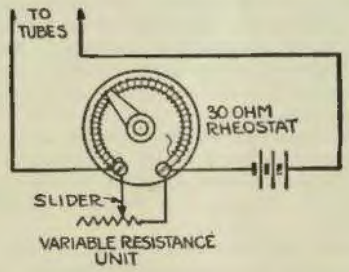
There are a few variable resistance units on the market that may be varied from 0 to 30 ohms, for example, that one can use in the filament circuit to adapt it to the range variation spoken of above. This may be done by shunting it across a rheostat, which, for most purposes, must also have a high resistance. For example, in the illustration the rheostat is 30 ohms, say, and the resistance unit is also 30 ohms. But move the slider or the adjustment member out so that only 1/2 of it is being used. Then we have 15 ohms resistance in the resistance unit, and if the rheostat is just turned on, we have 30 ohms in the rheostat. From the well known electrical law:

$$R = \frac{Y \times Z}{Y + Z}$$

Where R is the resistance of the whole unit, and Y, say, is the resistance of the variable resistance unit and Z is the resistance of the rheostat (the resistance for the certain setting, not for the whole rheostat), we can obtain R for any combination of Y and Z. So in this case Y is 15 and Z is 30 at full scale deflection, consequently R solves out to be 10 ohms. This is enough resistance to control two 1/4 ampere tubes, both tubes being controlled by the same rheostat. However, let us see how the resistance varies with the turning of the knob. Suppose we turn the rheostat half way on. Then we have from the above equation that R equals 7.21 ohms, but the total resistance is only 10 ohms. Therefore, for the first one-half of the rotation we have changed the resistance less than 2.8 ohms, slightly more than one-fourth the total resistance. This gives a vernier effect over the range of resistance and the place where this effect will be most pronounced can be controlled by varying Y, or the resistance unit. By setting V at about 6 ohms; it will be 5 ohms at full resistance of the rheostat, and from the equation it will be found that the first half of the scale deflection gives a change in resistance of only .7 ohms. This means a vernier control at a resistance which will be found about right for a detector tube drawing 1 amp.

Vernier Control.

This form of resistance has the advantage that it may be varied for any type of tube, drawing



any amount of current up to about twice what the manufacturer says is the maximum for the units he produces. The usual amount is 1½ amperes, but this may be safely increased with the two resistances in parallel to about 2½ amperes with a factor of safety allowed. Another valuable feature is that when vernier effect is most pronounced the greater the draw of current. This is a very valuable feature as may be seen when the problem is analysed. With a 1 ampere tube there is a critical point of control. This requires a vernier. However, with a 1/4 ampere tube used as a detector, say, there is no or little effect of the critical adjustment. However, when a rheostat is used that controls two, three or more of these tubes, there is a critical point in that a slight change in resistance means a greater change in the amount of current that flows through the tubes, since the resistance is less when two, three or more tubes are

controlled from one rheostat. But this comes back on itself, since the vernier effect is greater with the lower resistance settings of the variable resistance unit.

Another advantage is that there are no extra knobs to push in or pull out or turn in order to get to the vernier effect. This form of vernier is often unsatisfactory, since it gives quite a bit of trouble. In other vernier rheostats that use one knob, it is necessary to turn the rheostat through a great many revolutions in order to cover the entire range, since the vernier effect is used over the entire scale. As may be seen, however, this is unnecessary, and in fact undesirable. This form of rheostat unit has none of the above faults. It will be found to give entire satisfaction in any wireless circuit.

AN AERIAL IS A PROTECTION — NOT A DANGER.

There is a great deal of misunderstanding in regard to the lightning arrester protection for aerials used in radio reception. To understand better the reason for and the action of the lightning arrester, let us examine the conditions. Lightning is caused by a cloud disturbance in which the natural reservoir of electricity stored up in the clouds becomes of such a value that it will break down the air insulation between the cloud and another cloud or the earth. The discharge will never take place until the cloud is near an object that has a charge of opposite polarity or a charge of much lower potential.

Lightning will strike insulated objects because of the difference in potential between the cloud and the object, and this becomes so great that the insulation breaks down and a discharge takes place. If a radio set happens to be in such a house the blame is placed on the set. As a matter of fact the aerial of such a set might drain off the difference in the potential so that no bolt of lightning will take effect.

A radio aerial acts in the same manner as a lightning rod. The static charges of the earth are allowed to leak off from an aerial so that the danger of lightning striking a building is lessened.

GROWING BY WIRELESS.

A NEW ROLE FOR STATIC.

Listeners-in will be pleased to hear that their old friend static has at last been harnessed to work. Radio enthusiastis and wireless demons everywhere will rejoice in the subjugation of that rotter, Static. The new machine which uses Static's services is called the Atmospheristat and is the invention of a young Australian, out Fairfield way. Mr. Alec C. Bennett's invention accomplishes the seemingly impossible with plant life and we now have to chronicle a new marvel—growing by wireless. The Bennett Atmospheristat cajoles and drives static into hustling the vegetables along to the table in record time. Under the influence of the new machine lettuce have graced the table in 30 days from the date of seed sowing and radishes have made a toothsome meal in 14 days from seed sowing. Peas, cucumbers, and in fact everything in the charmed radius have shown surprising growth. The main thing in growing salad vegetables is their rapid growth and the atmospheristat sees it it that their growing period is cut in half. Mr. Bennett, who is the discoverer of seed electrification by induction, claims that this wonder makes every acre into four. The aerial, resembling a hay fork, induces the static to travel into the ground beneath and thence it is conducted by various wired routes to the rooted system of the plants.

At the base of the positive aerial pole is a box containing an induction coil run from 3 No. 6 dry cells, and the current passes through a high pressure cylinder and complex wiring and thence to the aerial. The modus operandi is to run the induction coil for 10 minutes and then cut off when a flow of the static takes place through the wired system to the influenced beds. Some scientists assert that there are 400 million volts in the Atmosphere so that the Atmospheristat has plenty of current to work on. A bell rings before the current becomes intense, so that onlookers may take a place on the safety mat.

Readers sending in queries are asked to kindly note the conditions at the foot of Page Eleven.

A testimony of one of the uses to which broadcasting may be put has been provided by the fact that the farmers in South of France have decided to erect a small station of their own. The greatest value of broadcasting for these people lies in the grain and market prices and the weather news. Most of the inhabitants in this district are unable to afford high-power sets with which to receive Paris or London transmissions, and therefore the small station of their own will be most welcome. Besides the business transmissions of the various market prices, etc., music and concerts will also be transmitted for entertainment.

EFFICIENT INDUCTANCES

By W. A. STEWART

THERE seems to be some doubt as to the most efficient inductance. Some swear by honeycomb coils, while others swear at them. For the shorter wave lengths (below 600 metres) I consider the straight wound inductance to be more efficient than any other. Honeycomb coils were only the outcome of attempts to build a compact inductance for the purpose of listening to long-wave signals, as the problem of building a coil of the straight wound type for the reception of signals on a wave length of 10,000 metres or more, was fairly difficult. Looking through old periodicals you will often see pictures of huge coils three and four feet long, with sliders on them. These coils were always in a prominent position, and were one of the most important things on any amater station.

Now, however, coils to cover the same wave length are quite small, and only occupy a space of at the most three inches. But below 600 metres it is quite simple to build a compact and neat inductance which with the aid of a variable condenser will cover the required wave length band easily.

Now that we have quite a few stations operating, selectivity has to be aimed at. That is to say, the tuning has to be sharp. The less resistance a coil has, the sharper it will tune, so that in designing an inductance, it is necessary to get the greatest value of inductance for the least amount of resistance .

This would seem to indicate that the thicker the wire the better. And in some respects this is correct, but of course there are limits, and although 12 gauge wire has a lower electrical resistance its high frequency resistance is enormous, owing to eddy currents being set up between turns, which gives the coil an enormous high frequency resistance.

Taken all round 18 gauge is the best for the average inductances. Litz or other stranded cables are a little more efficient, but the trouble required in the winding is not worth the little extra results. It is a well known fact that an insulator near a tuning circuit causes losses, so that the less insulation we have near a coil the better the results. If the coil has to be wound on a former, a thin dry cardboard tube should be chosen, and on no account should shellac or other insulating dope be used. Thin bakelite tubing with a wall of one sixteenth of an inch in thickness, can be obtained in all sizes, and is also very efficient.

For the shorter wave lengths (below 200) a coil as constructed in Fig. 1 is very efficient and is practically self supporting. 18 gauge wire is especially efficient for coils of this type, and can be used to advantage. Using these coils in a standard three coil circuit the coil required for low wave lengths are: Primary, 6 turns untuned; secondary, 12 turns tuned with .0005 variable condenser. Tickler, 12 turns untuned. The secondary is wound on a four inch former, and the tickler, and primary on a three inch former, as shown in Fig. 1. The circuit is quite a standard one, but is shown in Fig. 2. The wave length range, is from 100 to about 220 metres.

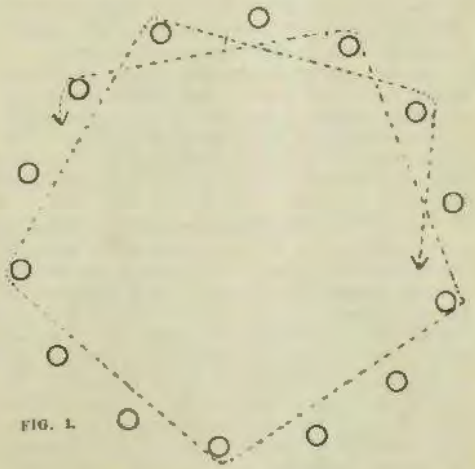


FIG. 1.

Another much talked of type of inductance is the spiderweb coil, and is usually wound on a cardboard or fibre former. The formers are circular, and have an odd number of slots cut in them. The wire is passed through one slot, and over one side, then through the next slot, and around the other

side. The same gauge (18) can be employed again and a neat inductance is the result. For short wave lengths, wind on twenty turns for the secondary, and on the same former wind on another five turns for the aerial or primary coil. The tickler should not be too big, about the same number of turns being about right (20).

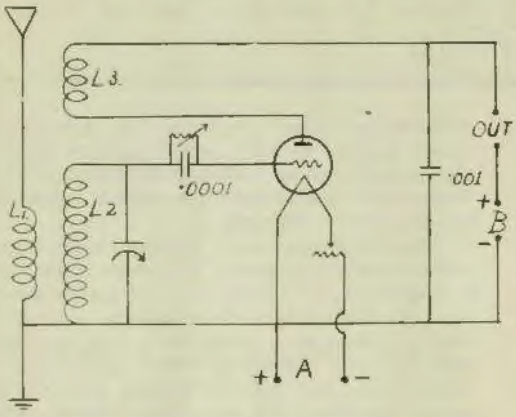


Fig. 2.

I have used a circuit of this type, and the tuning was extremely sharp. The wave length range is from 120 to about 200 metres (approx.), the tuning being effected by a .0005 variable condenser.

A variocoupler is another means of tuning which is extremely popular, and usually consists of a tapped winding, called the stator, inside which another coil, known as the rotor is revolved. The stator winding is usually connected to a switch, and studs, and fine tuning is done with a variable condenser.

One of the most popular circuits utilising a variocoupler is the P1, which consists of a single circuit regenerative circuit, with the aerial directly coupled to the stator. The rotor is connected in the plate circuit, to cause regeneration. A stator wound with 150 turns of 24 gauge D.C.C., tapped every 15 turns, and tuned with a .0005 variable condenser, in connection with a series parallel switch, has a wave length range of approximately 150 to 2000 metres. The rotor is a standard size one, and is wound full of 28 D.C.C. wire. The stator is 3½ inches in diameter.

This form of tuner is quite a good one, but is not very selective on the shorter waves. For the shorter wave lengths a three circuit tuner is required, and the aerial coupling has to be very loose. No matter how well a coil is built, it should be tuned with a good condenser, preferably one of the low loss type. Although this type of condenser may cost a trifle more, the results are far better as the tuning is much sharper, and interference is more easily eliminated. In mounting inductances, they should be kept at least two inches from any other part of the set, and should be mounted at right angles to all condensers. Avoid the use of metal in a receiver and if it has to be used, keep it as far as possible away from the tuning components.

In my opinion, it is impossible to build an efficient receiver to cover short and long waves, and if any consistent short wave work is to be done, two receivers will be needed.

Personal

Mr. S. E. Tatham, Managing Editor "Radio," has relinquished his position with that journal, and is entering into business on his own account in Sydney.

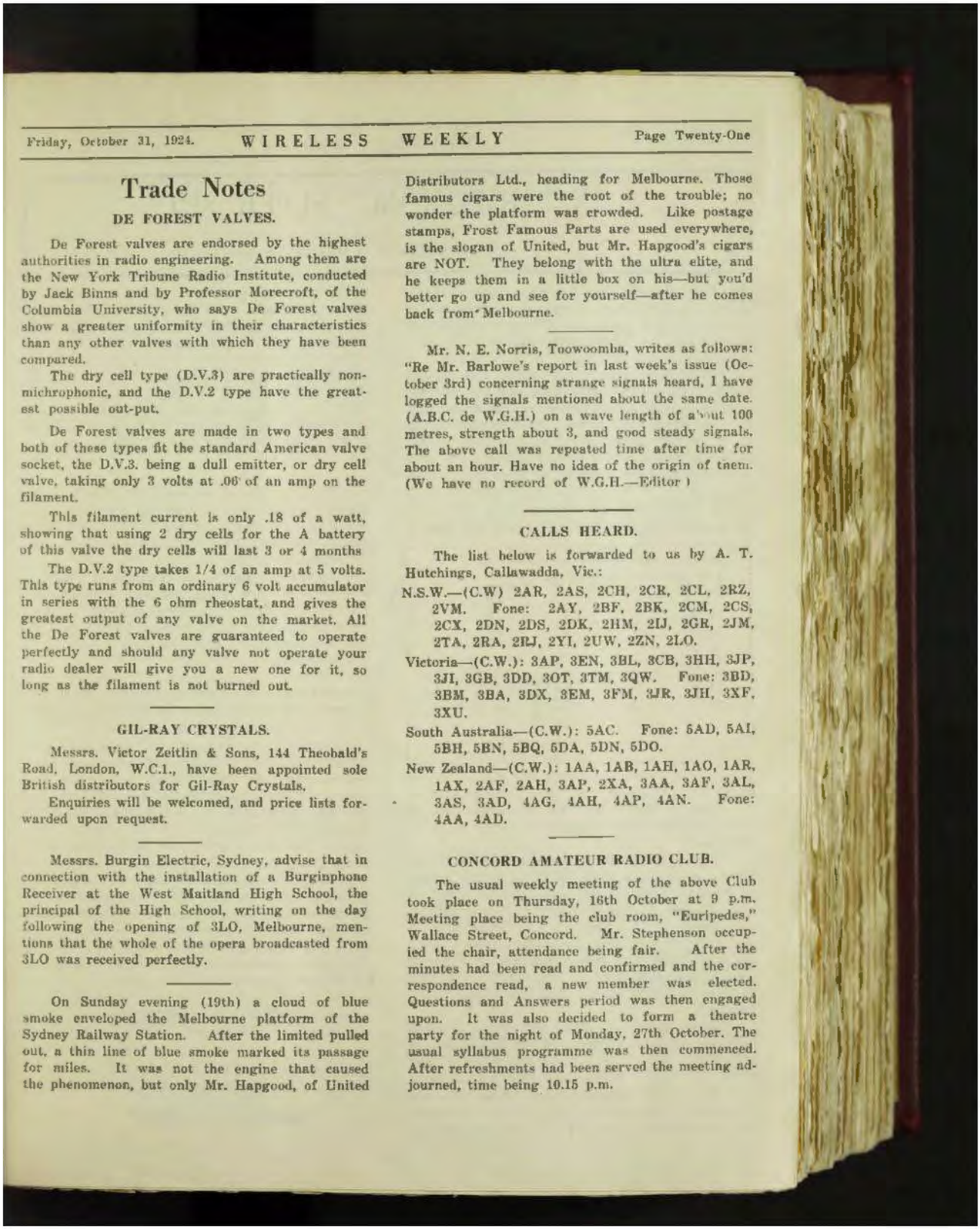
Mr. Tatham was for some time Managing Editor of "Sea, Land and Air," and was responsible for the establishment of "Radio," the journal which incorporated "Sea, Land and Air" over twelve months ago. He also established "The Wireless News," a daily paper published on board many of the Australasian vessels.

Mr. Tatham has many friends in journalistic and business circles, and in conjunction with them, we wish him every success in his new enterprise.

Wireless and Jamming.—

In reply to a suggestion in a recent issue of the "Evening News" that jamming was mainly due to multi - valve sets, Mr. Frank Phillips, A.M. I.E.E., of Messsrs. Burdept Ltd., writing from Blackheath, points out that it is not the case in his estimation, as most multi-valve sets have one or more stages of radio-frequency amplification between the detector and the aerial, while the circuits used in such amplifiers tend to trap to a considerable extent oscillation which may be set up in the detector valve through inexpert operation.

Mr. Phillips considers that the most serious offender is undoubtedly the person using a single-valve receiver with re-action on to the aerial, as, owing to the relatively small amount of amplification available, he pushes re-action to the utmost and hovers on the brink of oscillation.—Wireless and Allied Trades' Review.



Trade Notes

DE FOREST VALVES.

De Forest valves are endorsed by the highest authorities in radio engineering. Among them are the New York Tribune Radio Institute, conducted by Jack Binns and by Professor Morecroft, of the Columbia University, who says De Forest valves show a greater uniformity in their characteristics than any other valves with which they have been compared.

The dry cell type (D.V.3) are practically non-michrophonic, and the D.V.2 type have the greatest possible out-put.

De Forest valves are made in two types and both of these types fit the standard American valve socket, the D.V.3. being a dull emitter, or dry cell valve, taking only 3 volts at .06 of an amp on the filament.

This filament current is only .18 of a watt, showing that using 2 dry cells for the A battery of this valve the dry cells will last 3 or 4 months

The D.V.2 type takes 1/4 of an amp at 5 volts. This type runs from an ordinary 6 volt accumulator in series with the 6 ohm rheostat, and gives the greatest output of any valve on the market. All the De Forest valves are guaranteed to operate perfectly and should any valve not operate your radio dealer will give you a new one for it, so long as the filament is not burned out.

GIL-RAY CRYSTALS.

Messrs. Victor Zeitlin & Sons, 144 Theobald's Road, London, W.C.1., have been appointed sole British distributors for Gil-Ray Crystals.

Enquiries will be welcomed, and price lists forwarded upon request.

Messrs. Burgin Electric, Sydney, advise that in connection with the installation of a Burginphone Receiver at the West Maitland High School, the principal of the High School, writing on the day following the opening of 3LO, Melbourne, mentions that the whole of the opera broadcasted from 3LO was received perfectly.

On Sunday evening (19th) a cloud of blue smoke enveloped the Melbourne platform of the Sydney Railway Station. After the limited pulled out, a thin line of blue smoke marked its passage for miles. It was not the engine that caused the phenomenon, but only Mr. Hapgood, of United Distributors Ltd., heading for Melbourne. Those famous cigars were the root of the trouble; no wonder the platform was crowded. Like postage stamps, Frost Famous Parts are used everywhere, is the slogan of United, but Mr. Hapgood's cigars are NOT. They belong with the ultra elite, and he keeps them in a little box on his—but you'd better go up and see for yourself—after he comes back from Melbourne.

Mr. N. E. Norris, Toowoomba, writes as follows: "Re Mr. Barlowe's report in last week's issue (October 3rd) concerning strange signals heard, I have logged the signals mentioned about the same date. (A.B.C. de W.G.H.) on a wave length of about 100 metres, strength about 3, and good steady signals. The above call was repeated time after time for about an hour. Have no idea of the origin of them. (We have no record of W.G.H.—Editor)

CALLS HEARD.

The list below is forwarded to us by A. T. Hutchings, Callawadda, Vic.:

N.S.W.—(C.W) 2AR, 2AS, 2CH, 2CR, 2CL, 2RZ, 2VM. Fone: 2AY, 2BF, 2BK, 2CM, 2CS, 2CX, 2DN, 2DS, 2DK, 2HM, 2IJ, 2GR, 2JM, 2TA, 2RA, 2RJ, 2YI, 2UW, 2ZN, 2LO.

Victoria—(C.W.): 3AP, 3EN, 3BL, 3CB, 3HH, 3JP, 3JI, 3GB, 3DD, 3OT, 3TM, 3QW. Fone: 3BD, 3BM, 3BA, 3DX, 3EM, 3FM, 3JR, 3JH, 3XF, 3XU.

South Australia—(C.W.): 5AC. Fone: 5AD, 5AI, 5BH, 5BN, 5BQ, 5DA, 5DN, 5DO.

New Zealand—(C.W.): 1AA, 1AB, 1AH, 1AO, 1AR, 1AX, 2AF, 2AH, 3AP, 2XA, 3AA, 3AF, 3AL, 3AS, 3AD, 4AG, 4AH, 4AP, 4AN. Fone: 4AA, 4AD.

CONCORD AMATEUR RADIO CLUB.

The usual weekly meeting of the above Club took place on Thursday, 16th October at 9 p.m. Meeting place being the club room, "Euripedes," Wallace Street, Concord. Mr. Stephenson occupied the chair, attendance being fair. After the minutes had been read and confirmed and the correspondence read, a new member was elected. Questions and Answers period was then engaged upon. It was also decided to form a theatre party for the night of Monday, 27th October. The usual syllabus programme was then commenced. After refreshments had been served the meeting adjourned, time being 10.15 p.m.

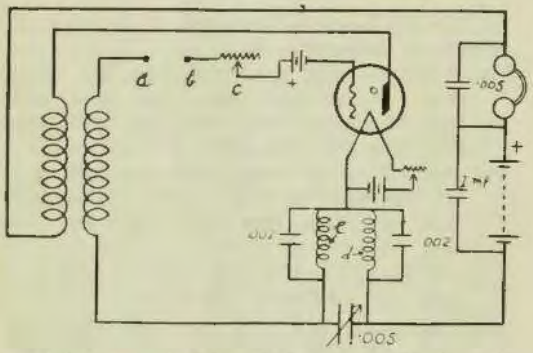
AN "ARMSTRONG" SUPER SET

By LAWRENCE E. DEANE.

BEFORE I begin on the details of this wonderful circuit, just a word of warning; the set will be of very little use to the B.C.L.; it is purely an experimental set for the experimenter.

Apparatus.

Practically any valve will be O.K. for the super, although I have never tried dry cell valves—however, they should be alright, and an Ediswan A. R. would be as good as any. The B battery should be of 70 volts tapped every 4 volts down to 60. The grid battery should be arranged so as to give a variable negative potential, of from 4 to 8 volts on the grid. A frame aerial is plugged in at A and B (see circuit) the ordinary aerial and earth being useless owing to the fact that damping is



much too pronounced. C. is a potentiometer of 100 ohms, D and E are two duo-lateral coils of 1500 and 1250 turns respectively.

Condensers.

The two .002 condensers across D and E should be of good make, and should be as tightly packed as possible, because if one plate is loose, it will vibrate at audio frequency and set up a most persistent scream. The re-aetion coil must be at least twice as large as in the usual receiver. Wind the grid coil on a 2½ inch former with 20 turns of No. 26 enamelled wire, and the re-action coil with 40 turns of No. 28 on the same size former.

Testing.

Having got so far O.K., and having assumed that your wiring is all that could be desired, the set should now be tested. Light the filament, and switch on your H.T., leaving the two oscillator coils (D and E) 90 degrees aptrt. Now bring the re-action coil in until the set starts to oscillate, then search round for a station. Having heard him, adjust the frame until he is Q.S.A., with minimum aerial condenser. Now slowly bring up the oscillator coils, and it will be noticed that the set stops oscillating and a higher pitched whistle takes its place. When this whistle is obtained, increase the re-action coil and A.T.C. slightly. By altering the A.T.C. and oscillator coupling the signals should come in with great intensity. If you spend an hour or so playing with the set, the knack of working it will strike you "all of a heap," and you will feel quite at home.

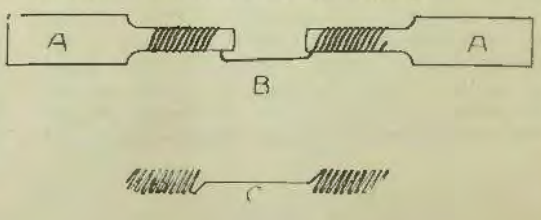
Mr. S. E. Tatham, who founded "Radio," the Sydney journal of which he has been managing editor for over twelve months, has relinquished his position with that paper, and is commencing business in Sydney on his own account.

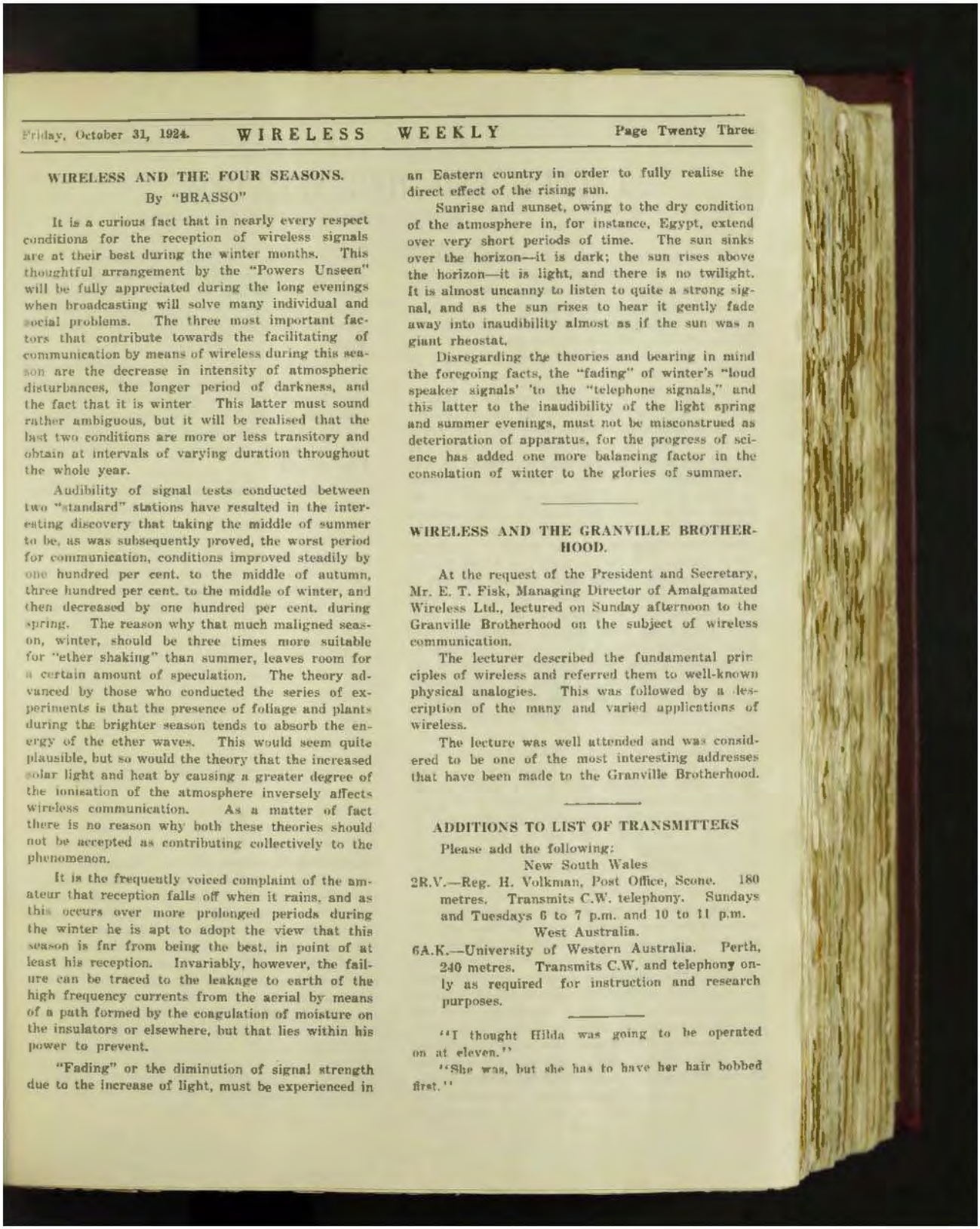
Mr. Tatham, prior to his launching of "Radio," was editor of "Sea, Land, and Air." He also successfully organised "The Wireless News," a daily paper published on board several Australasian passenger steamers. We wish him every success in his new enterprise.

A CHEAP AND EFFECTIVE CONNECTION FOR TWO OR MORE SETS OF TELEPHONES.

Contributed by S. R. Glazier.

Procure about six inches of fairly stout bare copper wire. Start winding this about the centre putting about six turns closely around the thin portion of one of your phone terminals, slip this off, turn the wire end for end and wind about six turns on the terminal leaving about 1/8 of an inch between the two sets of coils as indicated at B in the illustration, which by the way is slightly exaggerated. Give each of these coils which are shown at C a slight bend when on pushing the terminals in again you will have a tight and efficient coupling which, if you wish, can be further improved by covering with insulating tape. I have found this unnecessary myself, finding it handier to be able to disconnect any pair quickly.





WIRELESS AND THE FOUR SEASONS.

By "BRASSO"

It is a curious fact that in nearly every respect conditions for the reception of wireless signals are at their best during the winter months. This thoughtful arrangement by the "Powers Unseen" will be fully appreciated during the long evenings when broadcasting will solve many individual and social problems. The three most important factors that contribute towards the facilitating of communication by means of wireless during this season are the decrease in intensity of atmospheric disturbances, the longer period of darkness, and the fact that it is winter This latter must sound rather ambiguous, but it will be realised that the last two conditions are more or less transitory and obtain at intervals of varying duration throughout the whole year.

Audibility of signal tests conducted between two "standard" stations have resulted in the interesting discovery that taking the middle of summer to be, as was subsequently proved, the worst period for communication, conditions improved steadily by one hundred per cent. to the middle of autumn, three hundred per cent. to the middle of winter, and then decreased by one hundred per cent. during spring. The reason why that much maligned season, winter, should be three times more suitable for "ether shaking" than summer, leaves room for a certain amount of speculation. The theory advanced by those who conducted the series of experiments is that the presence of foliage and plants during the brighter season tends to absorb the energy of the ether waves. This would seem quite plausible, but so would the theory that the increased solar light and heat by causing a greater degree of the ionisation of the atmosphere inversely affects wireless communication. As a matter of fact there is no reason why both these theories should not be accepted as contributing collectively to the phenomenon.

It is the frequently voiced complaint of the amateur that reception falls off when it rains, and as this occurs over more prolonged periods during the winter he is apt to adopt the view that this season is far from being the best, in point of at least his reception. Invariably, however, the failure can be traced to the leakage to earth of the high frequency currents from the aerial by means of a path formed by the congulation of moisture on the insulators or elsewhere, but that lies within his power to prevent.

"Fading" or the diminution of signal strength due to the increase of light, must be experienced in an Eastern country in order to fully realise the direct effect of the rising sun.

Sunrise and sunset, owing to the dry condition of the atmosphere in, for instance, Egypt, extend over very short periods of time. The sun sinks over the horizon—it is dark; the sun rises above the horizon—it is light, and there is no twilight. It is almost uncanny to listen to quite a strong signal, and as the sun rises to hear it gently fade away into inaudibility almost as if the sun was a giant rheostat.

Disregarding the theories and bearing in mind the foregoing facts, the "fading" of winter's "loud speaker signals' 'to the "telephone signals," and this latter to the inaudibility of the light spring and summer evenings, must not be misconstrued as deterioration of apparatus, for the progress of science has added one more balancing factor in the consolation of winter to the glories of summer.

WIRELESS AND THE GRANVILLE BROTHERHOOD.

At the request of the President and Secretary, Mr. E. T. Fisk, Managing Director of Amalgamated Wireless Ltd., lectured on Sunday afternoon to the Granville Brotherhood on the subject of wireless communication.

The lecturer described the fundamental principles of wireless and referred them to well-known physical analogies. This was followed by a description of the many and varied applications of wireless.

The lecture was well attended and was considered to be one of the most interesting addresses that have been made to the Granville Brotherhood.

ADDITIONS TO LIST OF TRANSMITTERS

Please add the following:

New South Wales

2R.V.—Reg. H. Volkman, Post Office, Scone. 180 metres. Transmits C.W. telephony. Sundays and Tuesdays 6 to 7 p.m. and 10 to 11 p.m.

West Australia.

6A.K.—University of Western Australia. Perth, 240 metres. Transmits C.W. and telephony only as required for instruction and research purposes.

"I thought Hilda was going to be operated on at eleven."

"She was, but she has to have her hair bobbed first."

VALVES AND REGENERATION

By "INSULATOR"

THIS is a subject which is by no means easy to handle, but in this article I hope to show the newcomer in the radio field just what regeneration is and how it is produced. In doing so I hope to confine myself to simple terms, leaving all algebraical expressions on the one side and omitting, as far as possible, all symbols which may be liable to be misconstrued.

Let us start at the very beginning, shall's? Let's! Scientists tell us that all matter is comprised of atoms, and further still that each atom, small as it may be, is composed of a positive core around which are several minute particles of NEGATIVE electricity known as electrons. Already we have positive and negative electricity in the atom. It is found that some of these negative particles of electricity (electrons) may be withdrawn from the atom without affecting its chemical properties. These are known as FREE ELECTRONS, and it is with these fellows we deal in electricity. Normally, on each atom is to be found sufficient electrons to balance up the positive core, thus making the atom neutral. But if we take a few electrons from an atom it will become positively charged—the more electrons we remove the more positive becomes the atom, and the converse is true that the more electrons we add to the atom the more does it become negatively charged. Follow me?

Often one is asked, "What is electricity?" Here is the latest theory: "Electricity is a rapid vibration of the ELECTRONS of a conductor and in the space surrounding a conductor." In short, electricity is the flow of electrons from one part of a circuit to another. But electrons are negative so remember that electric current flows from negative to positive, not from positive to negative, which was an old theory.

Of course, we can't see these electrons, but we certainly can see their work. When an electric globe has been used for years a dark film may be seen on the inside of the globe. This film is made up of the "free electrons" from the filament which have adhered to the inside of the glass. Edison first of all noticed this effect, but he didn't go into the matter too far, it being left to Fleming to investigate further. He noticed that when the filament was heated to incandescence the electrons were shot off the filament at a very high speed due to the atoms vibrating or colliding with each other. Most of these electrons, however, returned to the filament without serving any useful purpose. Fleming put a metal sheath or plate around the filament inside the glass, and thus arrested these free electrons.

When a positive potential was introduced on this plate the electrons simply gushed across to the plate because "unlike charges attract whereas like repels like." Again if a negative potential were applied to the plate the electrons instead of being attracted would be repelled. So much for the Fleming valve.

In 1907 De Forest introduced a spiral of wire between the filament and the plate, calling it the grid. When this grid was positively charged it would assist the plate in attracting the electrons, but when negatively charged it would repel. It will be seen then, that this grid controls the flow of electrons from the filament to the plate (better known as the anode). This variation may be understood by consulting Fig. 1. Here we have a circuit in which L.F.A. represents an alternator, alternately supplying a negative and positive potential or charge to the grid G, a filament F heated to incandescence by the battery B1, and a battery B2 maintains a positive charge or potential on the plate or anode A. The alternator L.F.A. will raise the grid potential from zero up to the positive, down to zero and still lower down to negative and up again to zero and so on. While this is happening on the grid the anode current is varying at the same speed only at a much greater amplitude. This is brought about by the controlling factor of the grid.

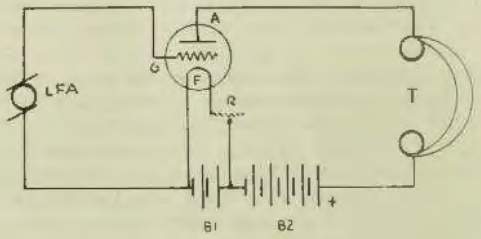


FIG. 1

Let us now look at Fig. 2. Here we have a three electrode valve placed in a circuit for the purpose of detecting radio signals. Radio signals we know are of alternating current, alternating at a very high speed or frequency. The incoming signal is tuned by L.1. C.1. and supplied to the grid which we know controls the current flowing in the anode circuit. We have already seen that as the grid varies so does the current in the anode circuit, hence with the valve we get a much louder signal due to this cause. Let us say for argument sake, the grid potential may be between minus 1 and plus 1 volts. This small potential is causing a variation in the anode circuit which may have as much as 30 volts. Hence the "trigger" action of the grid.

Now here is something you will read twice. "When two circuits are so placed relative to one

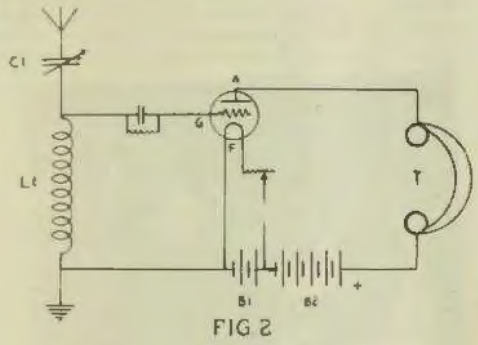


FIG 2

another that any increase or decrease in the current flowing in one causes an increase or decrease in the second circuit and when further this increase or decrease is added to the current already flowing in that circuit the currents will add or continue to build up until reaching a limit imposed by the physical properties of the circuit." Now read that two or three times and you will understand it alright, and then turn your attention to Fig 3 and follow me closely. This is a simpler regenerative circuit in which the incoming signal tuned by L1 C1 is supplied to the grid G which we know causes varintions in the anode circuit AL2, T and B2. It will be noticed that it is closely coupled to L1 and that the current flowing in L2 is at a greater amplitude than L1 normally. Now what happens? Read the above quotations and you will see that L2 transfers portion of its energy back into L1, and to the grid again which once more releases the "big effect" in the anode circuit which again transfers some of its energy to L1 and so on. Thus we see the building up process which is really practically instantaneous and which continues until the valve reaches a saturation point and continues to oscillate within itself. This transference of energy occurs only when the direction of the flow of the current is the same in L2 as in L1.

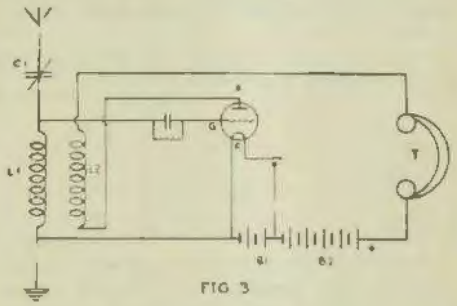


FIG 3

Should L2 be running in the opposite direction to L1 an opposing effect would be set up. Hence the closer L2 is coupled to L1 the greater will be the amount of current transferred from L2 to L1. It will be seen, therefore, that the value of regeneration is controlled by the relation of coupling between L1 and L2. So much for the theoretical —now the practical.

L1 may be the stator of a variocoupler while L2 may be the rotor which we know is situated inside the former supporting the stator, and which may be turned so that the wire it holds may run either in the same direction or in the opposite direction or at any point in between the two.

When the rotor (L2 is running in exactly the same direction as the stator, maximum regeneration is obtained; when running at right angles to the stator a neutral position is obtained, but when turned upside down and running in the opposite direction an opposing force is reached which we don't want at any time. Should there be too much wire on the stator the whole set will be somewhat critical as the maximum results are obtained just on the point immediately before oscillation within the valves takes place. So that when making a regenerative receiver employing a variocoupler you would be well advised to wind on a 4¼ inch

former, say 80 turns for the stator and no more than 60 for the rotor. This is, of course, provided you wish to receive broadcast music and employ a .001 variable condenser so that it may be placed in series or parallel position.

Honeycomb coils are very much in favour nowadays. They are so easily interchangeable for the different wave lengths of the various stations. Regeneration is varied by the proximity of the regenerative to the aerial coil—the closer it is coupled the more regeneration is obtained, provided of course, that both coils are running in the same direction.

When listening-in employ the following coils for the following broadcasting stations:

		P.	R.
1	Amateurs	25	35
2	2.B.L.	35	50
3	3.A.R.	50	50
4	2.F.C.	100 or 150	75 or 100
5	3.L.O.	150	100
6	6.W.F.	200	100 or 150

Sometimes it will be found that when the regenerative coil is brought closer to the primary coil instead of louder signals being obtained a decrease in signal strength is observed. This points out that the regenerative or re-action coil is running in the wrong direction and is consequently setting up an opposing force.

Regeneration is a wonderful thing if properly controlled, but when out of control much interference is caused among nearby listeners-in. This is brought about by self oscillation of the valve which sends out a carrier wave similar to a transmitting station. The amateur sending out what is known as C.W. (continuous wave) sets his transmitting set into oscillation and breaks the wave into dots and dashes by means of a telegraph key. You can therefore understand just how interference is created by an oscillating valve. To test if your valve is oscillating, the best method to adopt is to tap the aerial terminal with a wet finger and if a click is heard when the finger is placed on the terminal and another when the finger is taken away, you may rest assured that you are creating a veritable nuisance of yourself. Overcome this by loosening the coupling of the reaction coil or lowering the filament of the valve thus controlling the electron emission. Oftimes the grid leak wants adjusting so pay attention to it.

In my estimation some form of regeneration is necessary in all receiving sets as it is a great aid to signal strength (we all eat egg with salt).

The standard P1 single valve regenerative receiver will give more strength and greater distance than a crystal set with one stage of audio frequency. Bear this in mind.

BROADCASTING MELBA.

Some people believe that the broadcasting of Melba's voice from Melbourne was the first occasion upon which the Queen of Song consented to allow the use of the microphone on the stage while she was actually singing. It is stated in many quarters that the efforts of the B.B.C. (London) to induce Melba to co-operate in the broadcasting of La Boheme (in which she was appearing) from Covent Garden, were turned down.

This is incorrect. The voice of Melba was heard last year via 2LO, and the photograph below shows how the listeners-in expressed their gratitude. Members of the unseen audience made this floral tribute themselves; composed of over 2000 roses, it took the form of a house fitted with wireless. Doves, also made of flowers, represented the flight of song through space.

ELIMINATION OF INTERFERENCE

BY L. O. KERLIN

Some weeks ago we published an informative article by W. A. Stewart on ways on eliminating interference. Mr. Kerlin now throws some fresh light on this important subject in this article which will be of great help to those who are troubled by interference from other stations.—Editor.

IN some locations the owner of a receiving outfit has considerable difficulty in eliminating interference which may be due to an amateur transmitting on a wave length somewhat near to that of the broadcasting station, or to a commercial or amateur station with a low decrement forcing by shock excitation, its impulses into the receiver. These conditions may exist even should the receiver be of the highly selective type, with much more interference of course if the receiver is not so selective. The result is that the owner of the set becomes discouraged at the continual breaking in on a programme with dots and dashes from a spark station

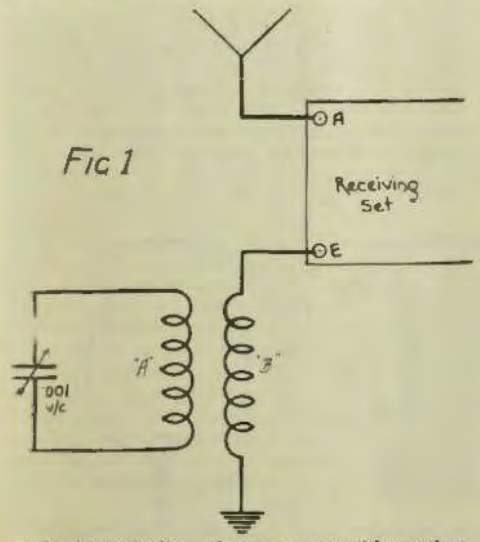


Fig 1

or the intermingling of one concert with another. Should interference be so slight as not to be discernible during the presentation of the concert programme, however, the interference will cause distortion. Though this may not be apparent to the listener of a newly bought set, due to inexperience in operating, as the novelty gradually wears out the owner becomes more critical about the quality of signal, he will want to remedy the cause of distortion.

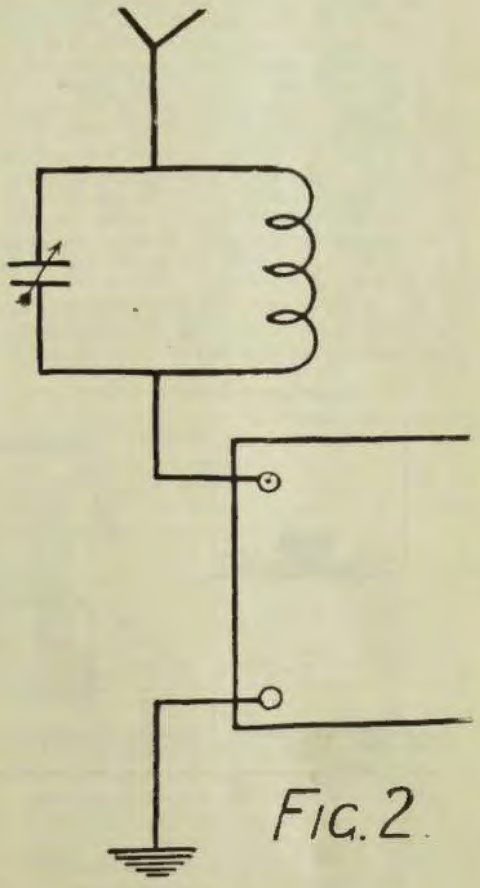


Fig. 2

The interference can be eliminated in two ways. The first is applicable to double circuit tuners and is done by shielding the entire secondary circuit in such a manner that only magnetic coupling is obtained between primary and secondary coils, the secondary coil being electrostatically shielded. The incoming interfering signals is then prevented from being directly induced into any part of the secondary circuit and can only be picked up by the aerial circuit. Sharp tuning will entirely eliminate the interference. This method is not practical for the average listener, as it requires almost an entire re-arrangement of parts and careful shielding.

The second method for eliminating interference is by use of the trap circuit. The trap circuit to be described was used very effectively in eliminating undesired signals (even though the station to be eliminated was close by) with little loss of signal strength. The circuit used in the trap is very simple in construction as shown in Fig. 1.

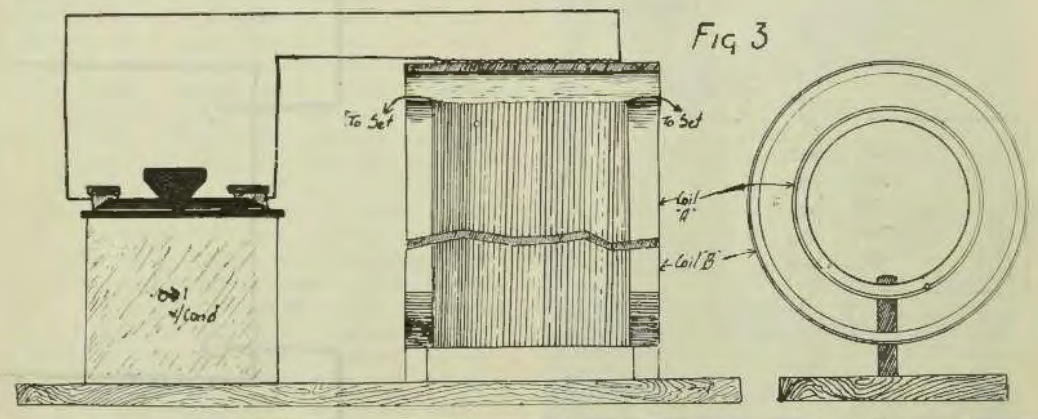
It consists of a variable condenser and two fixed coils. Attention is called to the feature not usually found in trap circuits. It is the use of a separate coil designated "A" coupled to the trap circuit inductance "B" instead of the usual method of inserting the trap circuit directly in the aerial lead as in Fig. 2.

By the use of the coupling coils the trap circuit tuning has little effect on the aerial tuning. When inserting the trap in Fig. 2, any change in the trap circuit tuning would require retuning of the receiver.

The design of the trap circuit can be seen by looking at Fig. 3. The coils are marked "A" and "B" with "A" as the coupling coil, and "B" as the trap circuit inductance. Coil "A" is 3 inches in diameter and is wound with 30 turns of No. 32 D. C.C. wire. It is placed inside of coil "B" which is 4 inches in diameter and is wound with 30 turns of No. 22 D.C.C. wire. Both coils are 2 inches wide and can be constructed of either bakelite or cardboard tubing, although the former is strongly recommended. Two separators are placed between the coils and are made from 3/8 inch bakelite rod with a No. 27 drill hole in the centre, which is clearance for a 6/32 screw. Two 3/8 inch bakelite pieces with the same size hole in the centre as in the separators are used to fasten the coils to the base. The No. 6/32 screws also act as fastening screws.

For tuning out interference a variable condenser with a .001 capacity is used. The wave length range obtained with the coil described is between 200 and 800 metres.

To operate the trap circuit the receiver is tuned to the desired signals as usual, and then the variable condenser of the trap circuit is rotated until it is in resonance with the interfering signal. This will cause the trap circuit to absorb the energy of the interfering signal and prevent it from being induced into tbe Receiver system.



A maid with a duster once made a great bluster
A-dusting a bust in the hall.
And when it was dusted, the bust it was busted,
And the bust now is dust, that is all.

Ned—What color are you going to paint your house?

Ted—Well, it will be either green with white shutters, or white with green shutters—I can't make up my wife's mind.

TEST YOUR CRYSTALS

By W. A. STEWART.

AT the present time the price of a crystal is governed by its size. By purchasing a large specimen the purchaser is usually under the impression that it contains a more selective range of sensitive "spots" than a smaller one. The dealer, too, is often under the same impression—on principle, perhaps!

Now, if anyone has experienced all the ups and downs of "crystaldom," they will know what often a very small specimen contains more sensitive spots than a specimen three or four times as large. Very often a mere chip of a piece of Hertzite would not be exchanged for a lump forty times its size.

An ordinary single layer coil about 3in. in diameter by 6in. long, wound with No. 24 (or nearest) enamelled wire, is mounted on a suitable baseboard and the ends of the winding connected to two terminals marked A and E in the diagram, one for the aerial and the other for the earth connection.

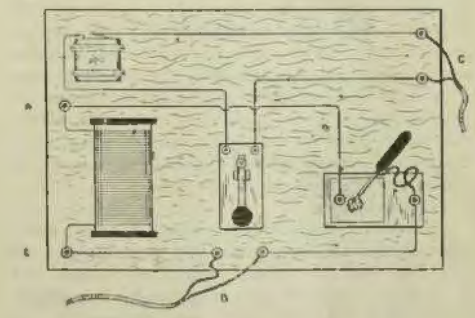
The "tester" consists of a piece of copper foil about 1½in. long by 1½in. wide, mounted on an ebonite base provided with two terminals, one of which makes electrical contact with the foil and with the aerial terminal as shown. A short length of brass or copper wire about 1/16in. in diameter is ground to a fine point at one end, and screwed into a short piece of round ebonite rod at the other end. A piece of single flexible wire is soldered to the wire pointer near the handle and electrically connected to the other terminal. To this terminal is also connected a lead to the nearest 'phone terminal, the other phone terminal being connected to the earth in the usual way. Leads from a two-volt dry battery are attached to two terminals situated in any convenient position and a Morse tapping key or switch is inserted in series with one of the leads. All connecting wires should be neatly arranged underneath the base board, which can be mounted on four short legs, if desired.

A length of twin flexible wire C is taken from the battery terminals to the buzzer, which should be situated some distance away, the best position usually being determined by experiment. An old electric bell movement will sometimes give better results than a high note buzzer, the gong of course being previously removed.

The aerial lead-in wire is connected to the aerial terminal A and the earth lead to the earth terminal E. A pair of 4000 ohm headphones should be used.

The crystals to be tested are placed each in turn upon the copper foil plate, the buzzer is operated by pressing down the tapping key with the left hand, and the crystals are gently probed all over with the pointer held in the right hand. Being first accustomed to the natural note of the buzzer it will be an easy matter to detect a decided increase in sound, which will occur every time the pointer touches a sensitive spot. During the operation a mental note should be made of the sensitivity of each specimen tested, finally placing them in separate boxes and grading them XXX, XX, and so on. Thus whenever a new receiver is to be tested out there will be no doubts regarding the crystal. Dealers would also benefit in many ways by adopting this method, for, after all, a crystal is worthless if it is not sensitive, and if they could sell guaranteed selected specimens at a slightly increased cost it would indeed be an all-round improvement.

By means of this simple little apparatus you may be saved the annoyance of "trusting to luck" when inserting a new piece of crystal in your receiver. When you have a "listening-in" party it is very annoying to have to try several new crystals before finding a sensitive specimen.



INTERSTATE NOTES

VICTORIA

Experimental Reception of 3LO.

THERE is yet another Richmond in the field of broadcasting, on whom those who search for fresh telephony laurels may flash their swords if so disposed. 3LO speaks with a big bass voice from the high broad waves of an ethereal ocean as compared with the other creeks and estuaries of local transmission. Yet he is not so loud as fancy painted him. There are two reasons for his, outside of any internal losses of power at the station itself. One reason is that crystal, valves and telephones all agree in limiting their output. They say to the vibrations of sound, "Hitherto shalt thou come, and no further, and here shall thy proud waves be stayed!" Even our own ears refuse to respond in proportion to the vigor with which they may be assailed. Excessive loudness affects our ears as too much light affects our eyes, and the shades of tone are blurred. High power in a station is requisite for long distances, but is no advantage within a suburban radius. Those geniuses in the city stores who receive 3LO on a 4 valve set simply increase the Dray and cut out the Brook effect of the station's well chosen name. They want to study the excellent modulation of Uncle Bunny, who rounds off every syllable with the finish of a real artist . . . The other reason why 3LO has not added UD to his initials as much as expected is rather interesting. He insists on a wave of 1720 metres long, although every schoolboy knows that long waves are out-of-date. In teleqhony, it is the accumulation of impulses that produces sound in the 'phones, and accordingly a wave of 100 metres will give 17 times as many impulses per second as a wave of 1700 metres. This bit of arithmetic also helps to account for the characteristic bass note of 3LO, heard when the set becomes unstable. On this long wave it is most interesting to note how variations in coupling can alter the quality of the music, accentuating the bass instruments in an orchestral number on one setting, and the treble instruments on another as the beat notes are varied.

A Practical Point.

You must some time or other, if at all given to experimenting, have stood over your devoted set and got results and then again no results, and worked with hammer and tongs and other implements until suddenly sanity was restored to the heterogeneous assemblage of incoherent parts, and music soothed your savage breast. Have you ever noticed that it is in part due to the aforesaid hammer and tongs that you get success or failure, not because of how you use them, but even more because of where you lay them aside? The proximity of pieces of metal affects an inductance coil very greatly. The Gecophone employs this principle in adjusting its reactance, and it is employed intentionally or otherwise, in all sets. When you "screen" your condensers or enclose your parts in a "super heterodyne" cell the same effect comes into play. Just poke your pen or penknife into the air core of your honeycomb coil and watch the effect! It is possible to tune or detune and even prevent oscillations by this means, as was shown long ago by Professor Hughes in his rather-forgotten induction balance. Now the point is that you are adjusting your set with screw driver in hand, pliers on table, watch in adjacent pocket, and probably a coil or reel of wire handy. These things play their part by mere proximity and when you lay these aside and pick up your 'phones from the table you doubly upset the equilibrium of induction. Even when a set is functioning perfectly the mere transference of headphones from one person to another will sometimes upset the delicate nerves of the instrument and it will screech a protest. The moral is to keep metal tools and in fact all masses of any material well away from the set when testing, or you will corroborate once more the curio: opinion held by some experimenters that a "junk" set is better than a "panel." If the "junk" artist surrounded his panel with his tools of trade, he would probably get equally as good results with either.

Broadcasting in Victoria.

It is very unfair to 3AR that in order to make a catchy headline the daily papers of this State put on the wireless ignoramuses of their staffs to record the advent of 3LO as the "Beginning of Broadcasting in Victoria," and "Melba Inaugurates Victorian Broadcasting." As the little steam tug labors painfully up the Yarra with an ocean liner in tow, that would never have reached its birth but for the tug preparing the way, so 3AR ushered in 3LO and indeed prepared thousands of listeners in who would otherwise not have had the experience necessary to tune in on 1720 metres. While the

standard of programme provided by 3AR during the day is undeniably low, yet his evening transmissions are well worth listening to, and all honor is due to the artists whom he has afforded the wireless public the pleasure of hearing. It is highly probable that in thousands of homely homes the light drawing room music of 3AR will prove more attractive than the blare and glitter of Braybrook.

Purchasing a Valve.

In purchasing a valve the unwary customer is apt to find there is a catch in it. A valve is not merely an electric light bulb; your dealer has not fulfilled the whole duty of man when he merely tests the lighting up of the filament. Occasionally and more especially in these days of dull emitters, the filament will light up even when grid and plate fail to function although connected, and it is not unlikely that with the queer way the connections are brought out to the valve legs in some otherwise excellent valves, even the grid and plate connections may be broken. Once a valve has left the dealer he is entitled to say his responsibility ends, but some more certain test of the valve before it leaves him should supplement the mere testing of the filament. Therefore let the unwary customer beware.

WIRELESS ON THE TRAIN.
AN INTERESTING EXPERIMENT

A SPECIAL train was chartered by the South Australian Division of the Wireless Institute of Australia last Thursday evening, for the purpose of testing out the reception of wireless music, whilst the train was in motion.

A receiving set with frame aerial attached, and a loud speaker was installed in each compartment, under the supervision of an experienced experimenter, so that each passenger was able to enjoy the music at the same time.

The train left Adelaide for Hallett's Cove at 7.35 p.m., returning at 10.15 p.m.

That the public do not lack interest in this wonderful science is evident by the way in which the seating accommodation was taken up; five first-class coaches made up the train, and nine receiving sets were installed.

Stops of five minutes' duration wer made at several stations en route, so that passengers were enabled to visit the other coaches, and to compare the results obtained by different receivers. At each of these stations crowds of small boys had gathered, and they besieged the windows of the carriages even before the train had come to a standstill. The transmissions received were from the local broadcasting station, 5AB, at the Grosvenor Hotel, North Terrace, Adelaide, and from the powerful amateur station 5DN, owned by Mr. Hume of Park Terrace, Parkside.

When the train arrived, Mr. Kauper hung his receiver around his neck and promenaded the station platform, carrying a loud speaker in his hand, from which issued the strains of music; he so reminded Mr. Miller Randle of an organ grinder that he (Mr. Randle) produced an imitation monkey from somewhere and sat it on the top of Mr. Kauper's set. Needless to say, this caused some merriment, and Mr. Kauper himself quite enjoyed the joke.. It was thought by many that having so many sets so close together, a good deal of interference would be caused in interaction and reradiation, but happily this did not prove to be the case, although when passing through several districts the howling valve became evident. Notwithstanding this the results were surprisingly good, the music and speech being clearly heard above the clatter of the train.

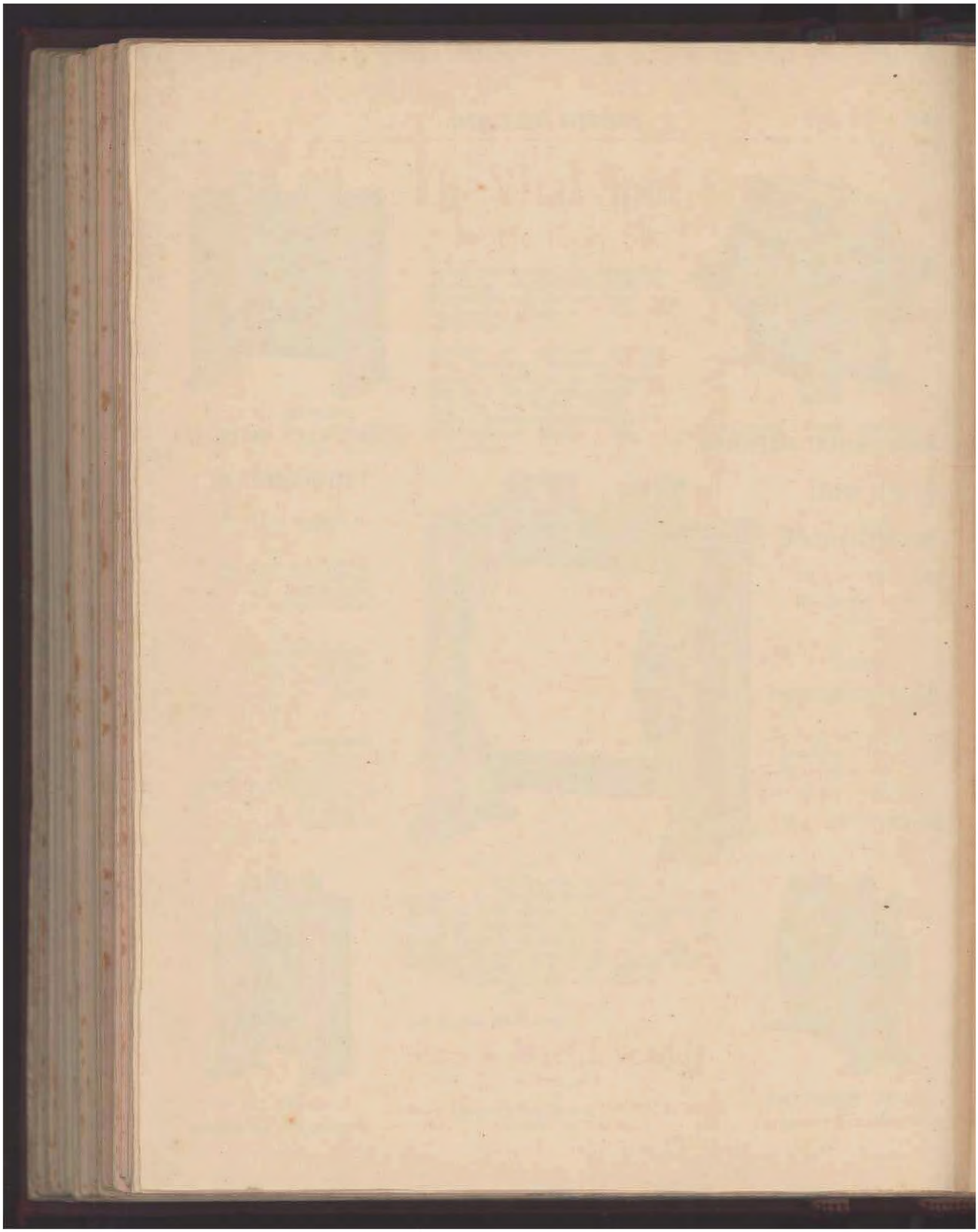
Mr. L. C. Jones, who was operating station 5DN added another touch of humour when he called over the ether, "Hullo, Mr. Harrington, on the wireless train. I hope you've made sure that all the operators there have brought licenses and that you'll cancel them if they let their valves howl." Mr. Harrington joined heartily in the laughter. On the way home Mr. Harrington was discussing "canaries" and "joeys" with Mr. Ames, the Secretary of the Wireless Institute, when Mr. Miller Randle entered the carriage and remarked to Mr. Harrington, "We've caught the two that were on the train for you, anyway," and he handed to the Radio Inspector two colored celluloid parrots.

Among those who took the trip were the Hon. Lionel Hill (Minister of Education) and Mrs. Hill. Mr. J. W. Kitto, Mr. J. G. McGuire (Railway Commissioner) Mr. A. N. Day (Traffic Manager) Mr. C. H. Harrington (Radio Inspector), and Mr. and Mrs. E. J. Hume.

To each of the gentlemen, short messages and greetings were sent by Mr. Jones from Station 5D.N.

The Minister for Education stated on his return to Adelaide that the experiment had been a wonderful success. It had shown the potentialities of wireless and no doubt it would ultimately be installed in every train. From an educational point of view wirelesss had a great future, especially in Australia, where before long the children in the outlying parts of the country would be able to par-

(Continued on Page 34)

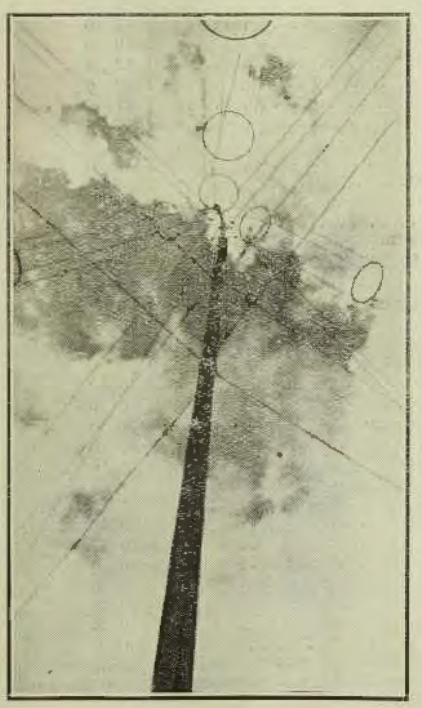


(Continued from Page 31.)

take of the culture of the seats of learning in the cities through this medium.

Mr. McGuire (Railway Commissioner) was much interested and suggested that wireless may be used some day, on the Melbourne Express, East-West Express, and other long distance trains for the purpose of making the hours of travel pass more pleasantly.

The operators in charge of the different sets were—Messrs. Kauper, Williamson, Austin, Barber, Buckerfield, Caldwell, Ames, Ashwin and Hale. The organising Committee for the trip was composed of Messrs. R. B. Caldwell (President, T. S. Bagshaw, R. Barker, and F. E. Earle.

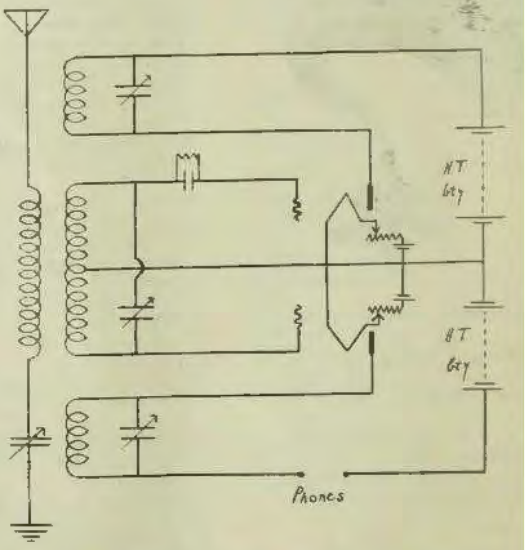


The Aerial used by the Concord Amateur Radio Club. The aerial shown is 80 ft. high and consists of three cages of six wires each; the length of each cage is 60 ft.

MORE ABOUT PUSH-PULL.

(Contributed by "Rotor"

While drawing some push-pull circuits began to wonder if something after the same idea would act as a detector and amplifier; after a little trouble (mainly in tuning) I tried two "3-coil" circuits in parallel, eventually getting splendid results. I found the following method of constructing the tuning coil to be easily assembled. Wound a primary of sixty turns—tapping at every ten turns. After a search found two vario-couplers. Re-wound these to suit and joined primaries in series, taking a lead from the centre. These primaries are the secondary of our proposed circuit, so be careful to have exactly the same number of turns on each. The rotors form the tickler coils. This circuit is well worth the trouble to make, but without rather difficult additions has only a limited band of wavelengths; all amateurs, however, may be conveniently covered.



"Listen to this, Maria," said Mr. Stubbs, as he unfolded his scientific paper: "This article states that in some of the old Roman prisons that they have unearthed they found the petrified remains of the prisoners."

"Gracious, John," exclaimed Mrs. Stubbs in horror. "Those are what they call hardened criminals, I expect."

LIGHTNING ARRESTERS

By H. E. Taplin (Sales Manager Electric Control and Engineering Ltd., Sydney.)

AS this is the time of the year usually attended by thunderstorms, it will be of interest to readers of "Wireless Weekly" to consider some of the causes and effects of Lightning. Those who have aerials need not feel uneasy if they take the simple precaution of attaching a Lightning Arrestor to the "lead-in" wire.

Right through the ages lightning has been held in awe by man and we find references to it in many of the legends which have been handed down to us, but it is within a comparatively recent period of 150 years that electricity has become a subject of proper investigation. The similarity to the discharge given by electricity and the flash of lightning in the sky was noticed by scientists and Benjamin Franklin, a famous Philosopher and Scientists, made experiments with a view to discovering whether lightning was a form of electricity. For this purpose he employed a kite flown at the end of a metallic string (or wire) and connected the ground end to a suitable instrument and then to earth. The kite was flown in the midst of dense clouds and it was noticed that discharges of electricity took place to earth and were recorded by the instrument connected for the purpose. Further experiments have been made in regard to lightning, but mostly with a view to the protection of property from direct strokes. More thorough scientific investigation as to atmospheric electricity could be made to-day with the aid of the scientific instruments we now have, and, as general interest is aroused, steps will probably be taken in this direction.

Without going into the matter very fully, it may be stated that lightning is the result of clouds increasing their electrical pressure until it is built up to such a potential that a discharge takes place, either to another cloud of lower potential or to the earth. This discharge of electricity takes the path of least resistance. For instance, rain falling between the cloud and the earth would form a suitable low resistance pather for such a discharge Lightning is a discharge at high frequency and of enormous potential (probably running into millions of volts.) It has been noticed that lightning always takes a straight path and is averse to doubling back on itself. Where a wire has been bent back at a sharp angle, it has been found that lightning will continue straight on and across an air space rather than follow the lower resistance path offered by the wire. Lightning follows the path of the least resistance and as an illustration of resistances it may be instanced a tall chimney in the centre of a plain would naturally offer a path of lower resistance to earth than would be offered by the air at the same height. In traversing a chimney from top to bottom a certain amount of resistance would be offered to the lightning discharge, and moisture contained in the chimney would be immediately gasified and cause damage to it. To protect it, it is only necessary to fasten a thick copper wire to the chimney from top to bottom and thereby offer a lower resistance to the passage of the lightning discharge than is offered by the chimney itself. The lightning would, of course, flow down the copper wire without affecting the chimney at all.

In the case of wireless, the aerial may take a discharge to earth, via the "lead in", receiving set and earth wires, and, if unprotected, the receiving set would be destroyed by the lightning in this case. If the receiving set were not in circuit the lightning would take the nearest path to earth, either by way of the earth wire, or a convenient wall of the room. It is left to the imagination of the reader as to what would happen if the "lead-in" wire were not connected to the earth wire.

In such a case the proper protection against lightning discharges for the receiving set and house as well, would be to instal a so-called lightning arrester. This arrester consists of a device connected between the aerial and earth wires and thus providing an alternative path to earth. This lightning arrester should be of such construction that it can be fixed outside the house and be left permanently connected to the aerial and earth wires without interfering with the normal working of the receiving set. Lightning arresters usually consist of two metal surfaces fixed at a small distance apart, and, in order to comply with the Fire Underwriters' Regulations, should operate at under 500 volts. From the point of view of the radio enthusiast, a radio arrester must have small

"capacity," otherwise it will act as a condenser and reduce the efficiency of the receiving set. It must also be of such construction that it can take repeated lightning or static discharges from the clouds without damage to itself, as an arrester which blows up at the first discharge is a source of annoyance, as well as expense. A good lightning arrester should, therefore, have the following points.

(a) Be constructed for outdoor use.

(b) Operate at low potential.

(c) Have small capacity.

(d) Operate repeatedly without damage to itself or apparatus connected to it.

One of the chief enjoyments of wireless is the making and fitting of the component parts of the receiving set oneself, but when it comes to lightning arresters the matter is considered of such importance that the Fire Underwriters' Booklet, "Radio Installation Rules" states: "The protective device should be an approved lightning arrester, the use of cheap home-made devices should be discouraged," also, "the use of an antenna grounding switch is desirable but does not obviate the necessity for the approved protective device."

Now a word about installing the arrester. Mount it just outside and below the ventilator where the lead in enters and connects the "lead-in" wire to the top of the arrester, then up through lead-in tube and down to the set. From the bottom of the arrester connect a wire to the nearest "earth." If a water pipe is not available, solder the wire to a galvanised iron plate, say 18 inches square, and bury this plate a couple of feet in the ground, first of all placing a layer of ashes on top, which have been soaked with water.

SPONGE RUBBER MOUNTS FOR TUBE SOCKETS.

The dry cell vacuum tubes now on the market are rather delicate instruments, and are subject to microphonic noises unless mounted correctly. This is easily accomplished by fastening the sockets on sponge rubber.

But the mistake usually made in doing this is to leave a lot of rubber in the centre of the socket, which makes connection to the tube prongs. This causes a high resistance path for the radio frequency currents and lowers the efficiency of the set to a great extent. Be sure to remove the rubber in the centre of the socket.

THE LEICHHARDT AND DISTRICT RADIO SOCIETY.

The 104th general meeting of members of the Leichhardt and District Radio Society was held at the club-room, 176 Johnston St., Annandale, on Tuesday, October 21st.

The attendance was all that could be desired, and members settled down for an hour's intensive Morse practice, after which a demonstration was given by means of the Society's three-valve receiving set.

Next Tuesday night the Society will hold its 106th general meeting, when the main business of the evening will be the delivery of the 7th lecture of syllabus No. 2. Mr. E. J. Fox will officiate on this occasion, and the subject of his talk will be the important one of "Batteries."

On the following Tuesday evening the third of a series of "Sale and Exchange" evenings will be conducted, and is bound to be successful, if the previous functions of this nature offer any criterion.

It is the intention of the Society to hold two social functions in the near future. One will be a social and dance, and the other another launch excursion. Further details will be published in these columns shortly. Watch for them.

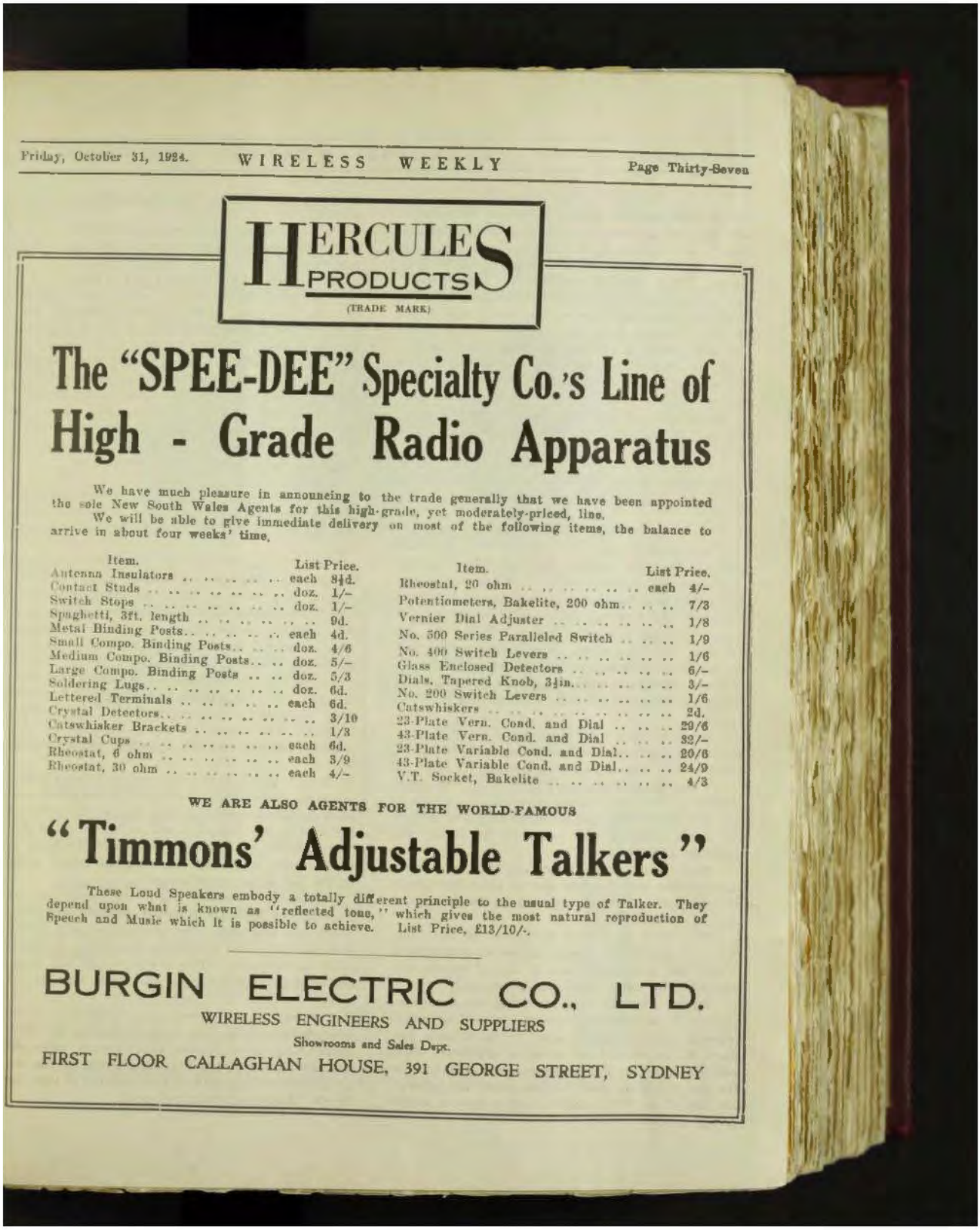
Inquiries regarding the activities of the Society are always welcomed, and should be addressed to the Hon. Secretary, Mr. W. J. Zech, 145 Booth St., Annandale.

NORTHBRIDGE RADIO CLUB.

This Club held its usual weekly meeting last evening at Northbridge. There was a good attendance and several motions for alterations in the conducting of the club were carried.

The committee are completing arrangements to take possession of a large motor garage in the rear of new premises at the intersection of Sailor Bay Road and Strathallen Avenue, Northbridge, which will be the future clubroom.

(Continued on Page 38.)



(Continued from Page 36)

It was resolved that a workshop be installed and the club commence practical operations immediately in the form of the building of a club set, when our Wednesday evening broadcasting will be picked up and phenomena explained. An interesting syllabus has been drawn up, including lectures from prominent radio authorities, which will be delivered at various early dates.

The future of the club is indeed very bright, with the adopted progressive policy, which should not only prove beneficial to all members of the club, but will help to enhance the popularity of wireless in Northbridge. The club can still enrol a number of new members and the committee would be glad of enquiries from all interested persons.

The honorary Secretary, Mr. A. Cameron, of Clanwilliam Street, Chatswood, will promptly reply to all enquiries re new membership.

ARTARMON RADIO CLUB.

The usual weekly meeting of this club took place in the local Scouts' Hall on Tuesday night last when the members were entertained to a very interesting and instructive "chat" by our esteemed friend, Mr. G. Maxwell Cutts. By request a brief outline of the splendid success achieved by the Croydon Club was given so as to show what can be done by attention to detail and co-operation of wireless enthusiasts—it was an eye-opener to those present and many good hints we hope will be taken care of.

Mr. Cutts then took his audience through radio and audio frequency and explained many points of interest with regard to valves and crystal sets.

No doubt the lectures or "talks will be of great interest to the radio clubs especially to amateurs and will be the means of strengthening and helping the many members who endeavour to further the stability of wireless.

Many ladies were present and they were more than pleased with the easy way in which the speaker told them about the method of receiving and sending the sounds.

Mr. Chas. H. Smith, Treasurer of the Club, in a few well chosen words, expressed appreciation of the visit and a spontaneous vote of thanks was accorded Mr. Cutts, who suitably replied.

By the way, the boys attending the Artarmon, Chatswood and Hornsby Schools as well as others residing in the district, seem to be looking forward to the crystal set wireless exhibition which will take place at the Artarmon Scouts' Hall about the 5th November next. Five prizes are offered, and Mr. C. A. Wiles and two other experts are to be the judges for this show—so look out, boys, and see that you get a prize.

All enquiries will be promptly attended to by the Secretary, Mr. Myles Ariel, 22 Hampden Rd., Artarmon.

THE BAY ROAD RADIO CLUB.

The usual weekly meeting was held on Thursday, the 16th inst., at the club-room, "Rewa," Bay Road, North Sydney. This is a young and enthusiastic club. It has found it necessary to restrict the membership to 50, although there are still a few vacancies. Much useful work was accomplished during the evening to the complete satisfaction of all members. All enquiries regarding the club will be obtained by ringing North 594. Hon. President, Fred Brinwood; Hon. Secretary, T. Burgess; Hon. Treasurer, W. Bergstrom.

The firm of Keith Stokes Pty. are amongst the earliest specialising on radio, and we had the pleasure of inspecting their new factory a few days ago.

This factory was specially established to manufacture the "Radiokes" inductance coils which are proving so popular in Australia, and it is with interest we learned that though the machines were only installed a few months ago, it is now necessary to extend the factory to cope wtih the ever increasing demand for the coils.

In addition to the coils, Keith Stokes Pty. hope to put on the market shortly a special low capacity coil for the low wave lengths. The sample we inspected should be very efficient, and will specially appeal to all experimenters.

It was with interest we noted that the winding machines were designed and built in Australia and were further gratified to learn that a proportion of the wire used is manufactured in New South Wales. The machines are fitted with automatic counters so that there is a check on the exact number of turns on the coil under manufacture.

When the "Radiokes" Coils are wound they are impregnated with a special low capacity compound which not only makes the coil mechanically strong but has the added advantage of making it impervious to dampness. This is a boon that will be appreciated by all listeners in who reside near the sea side.

It may be of interest to our readers to know that the length of wire used in making up "Radiokes" Coils is as present about twenty miles per day, and Keith Stokes Pty. expect that by the end of this month they will be in a position to turn out 10,000 "Radiokes" Coils per week.

MAXIMUM EFFICIENCY

TYPE AH TYPE DH TYPE GH

RADIOKES
HONEYCOMB
INDUCTANCE COIL
TYPE..... TURNS.....

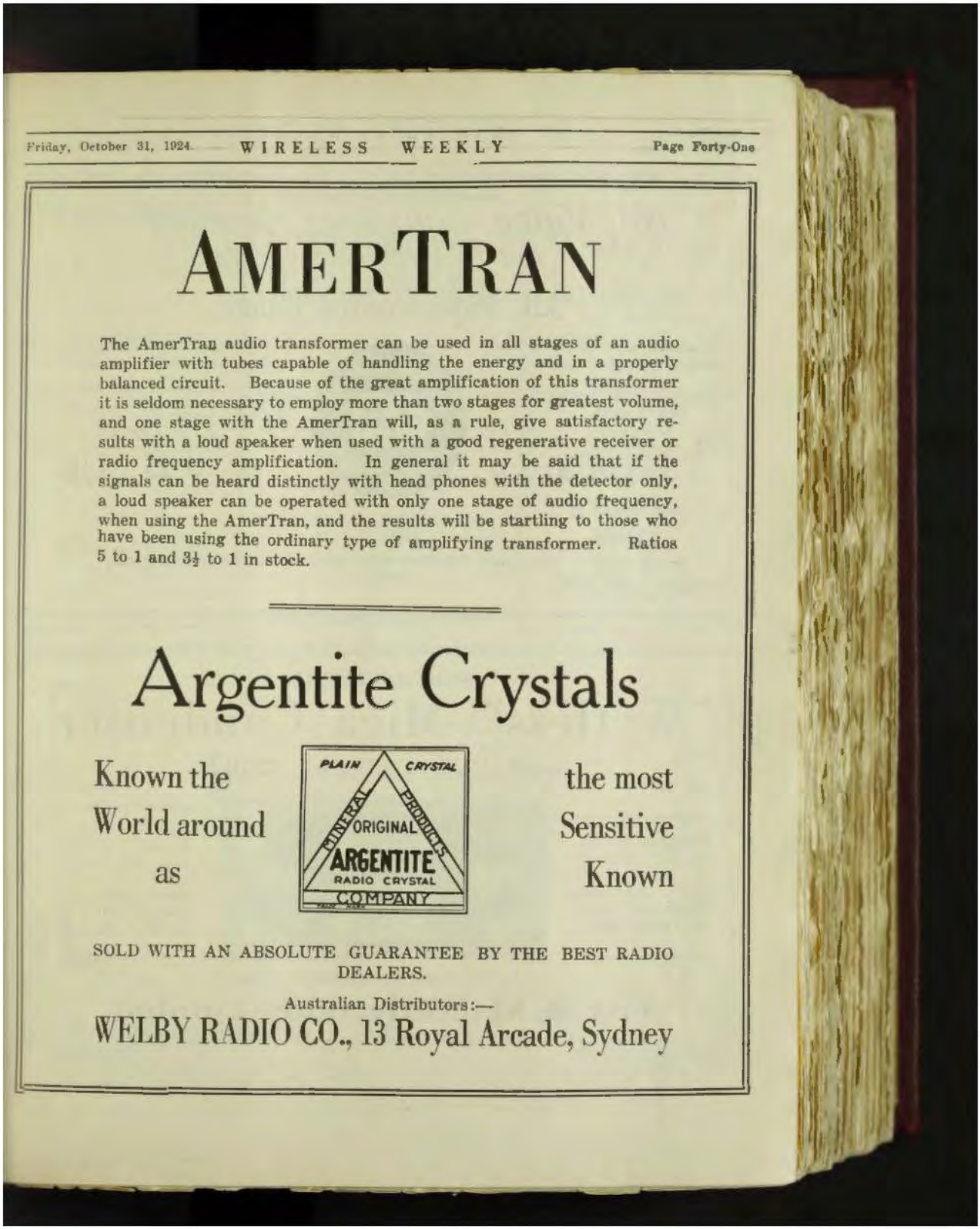
RADIOKES Coils are wound to give ample spacing, and are impregnated with special low capacity compound, ensuring maximum signal strength, maximum selectivity, maximum mechanical strength. Are not affected by damp.

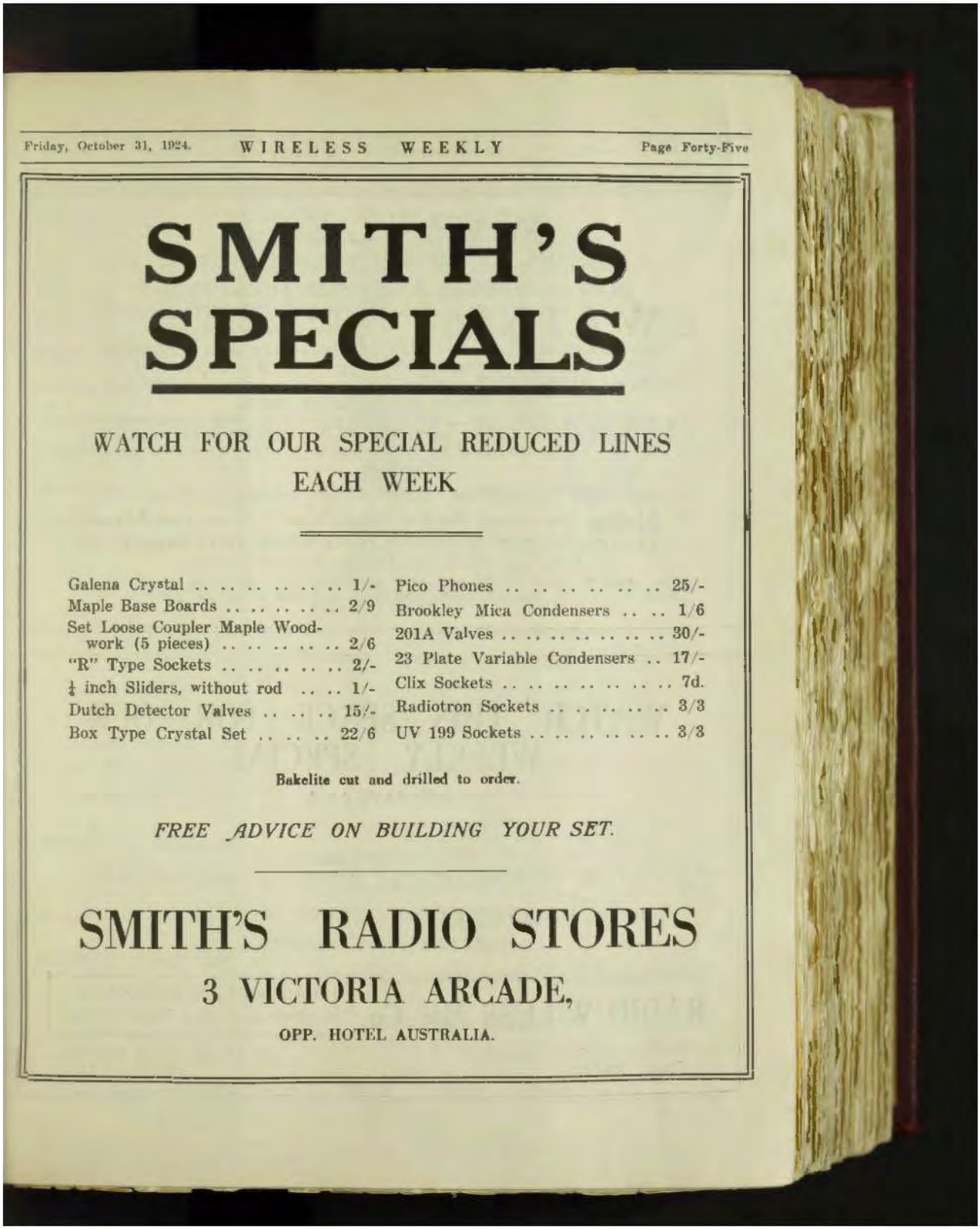
Stocked by Leading Radio Dealers.

RADIOKES
HONEYCOMB
INDUCTANCE
COILS

Approximate Wave Length with .001 Condenser. Turns	Wave Lengths
25	60-230 Metres
35	85-340
50	150-500
75	200-750
100	280-1000
150	360-1450
200	470-2000
250	530-2500
300	700-3000
400	900-4000
500	1150-5200
600	1350-6100
750	1600-7700
1000	2200-14700
1250	2700-18200
1500	3200-22200

Trade Enquiries from KEITH STOKES Pty., Montana House, 27-29 King-st., Sydney





2DS GETS GOOD DISTANCE

As a result of the recent Transmitting Test Week, Jack Davis (2DS) has received a Q.S.L. card from 6AM, Peter Kennedy, 210 Walcott St., Mount Lawley, W.A., reporting 2DS signals as beautifully clear and wave length very stable.

"Oh, I think I'm getting on. Last night he asked me to call him by his first name!"

"Pooh, that's nothing! I wouldn't trust any man till he called me by his last name."

First English Tourist (viewing the Alps)—not bad, that!

Second ditto—Yes, it's all right; but you need not rave abaht it like a bally poet.

Wireless Weekly

SUBSCRIPTION RATES.

Single Copies .. .. .. 3d. net

12 months (52 issues), 13/- post free.

6 months (26 issues), 6/6, post free.

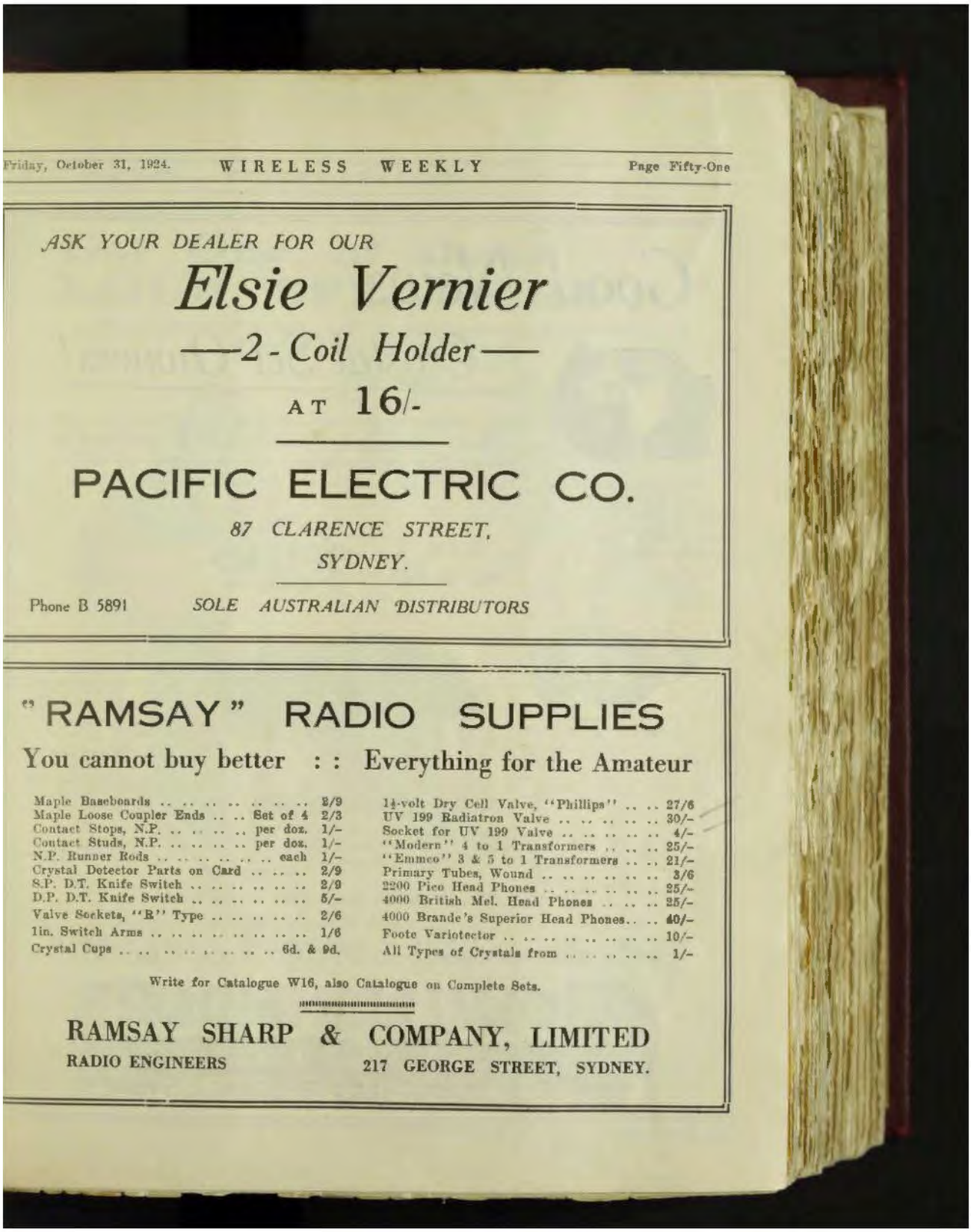
All communications to be addressed to the Editor, "Wireless Weekly," 33 Regent St., Sydney.

Telephone: Redfern 964.

All advertising and other matter for insertion should be in the hands of the Editor by Friday.

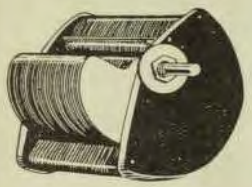
All copy must be written in ink or typed, and on one side of paper only.

Advertising Rates on application.



Good News

for Crystal Set Owners!



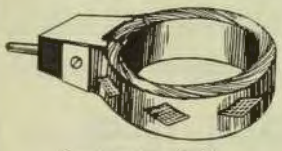
That wonderful Crystal——N.H.M. GALENA——is now reduced. You can buy the best Crystals obtainable in Sydney from Colville-Moore. We have made special arrangements for supplies, and can quote these low prices:—

A1 Quality Condenser.
77a-43 Plate, .001 .. 15/-
77a-23 Plate, .0005 .. 12/-
77a-11 Plate, .0003, 10/-
55-43 Plate Vernier, complete with knob and dial 25/-
55-23 Plate Vernier, complete with knob and dial 22/6

N.H.M. No. 2--1/-.

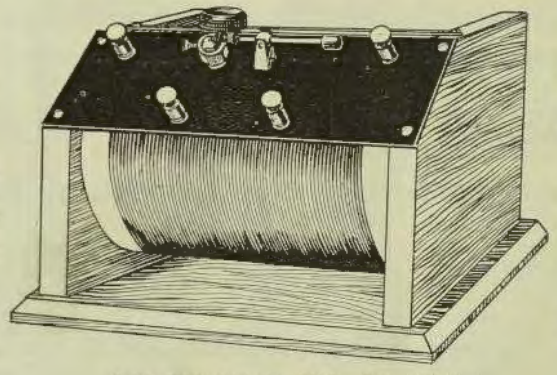
N·H·M GALENA

N.H.M. Guaranteed Super Sensitive 1/6



Honeycomb Coils.

Coils.	Mtd.	Unmtd.
19	5/3	2/6
25	5/3	2/
35	5/3	2/
40	5/3	2/
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



Unassembled Sets can be supplied; all parts ready drilled for assembling.

Wound primary, and complete with wiring and assembling diagrams.

PRICE is only 16/-

COL-MO Single Slide Crystal Set
Complete with Phones, Aerial Wire, Insulators 50/-

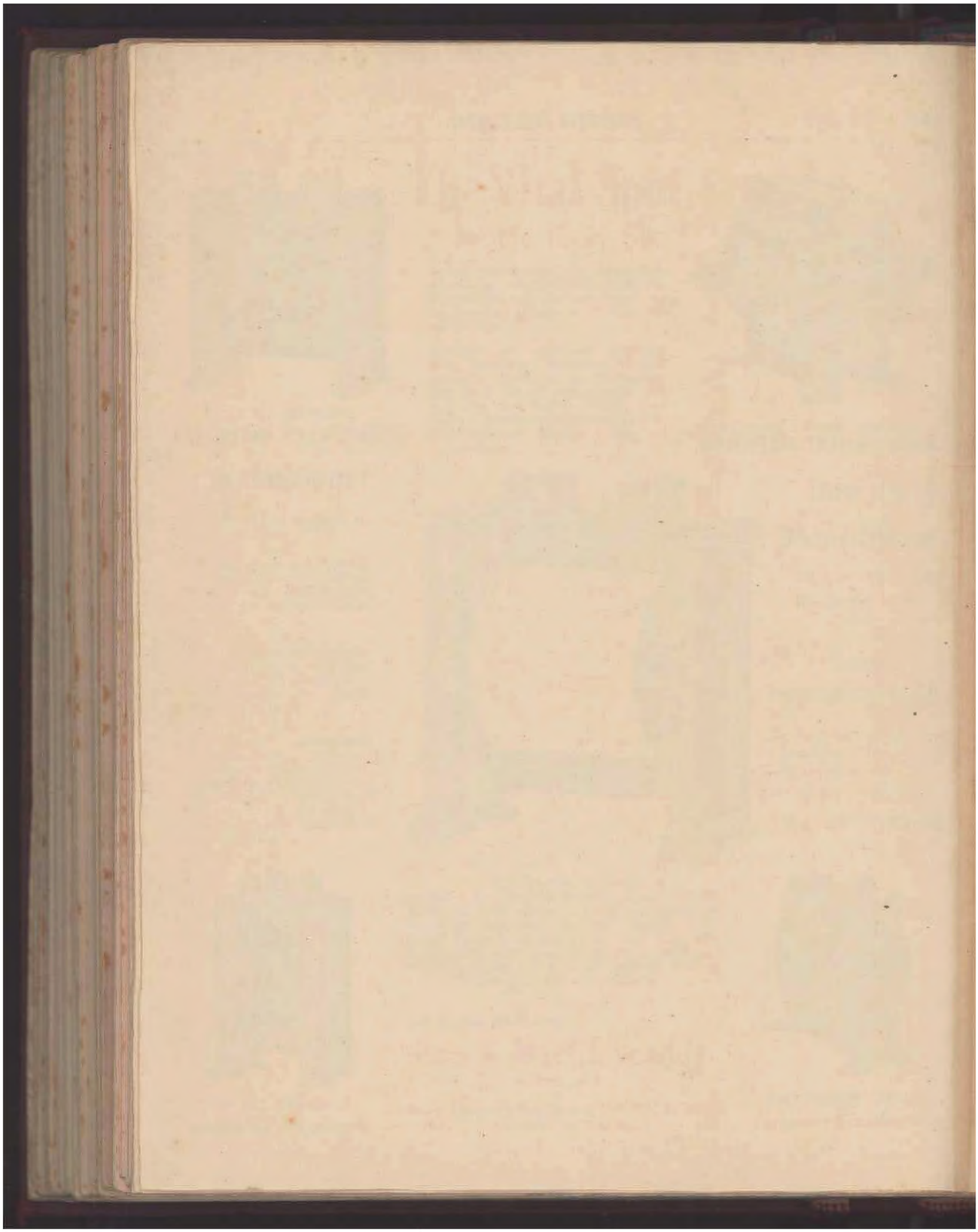
SOLE DISTRIBUTORS OF N.H.M. GALENA FOR AUSTRALASIA:

COLVILLE-MOORE

TUNE IN

WIRELESS SUPPLIES, LIMITED.

10 ROWE STREET (NEXT HOTEL AUSTRALIA) SYDNEY



All American Transformers

AUDIO FREQUENCY AMPLIFICATION—Clear, Strong and without howl or distortion

Ratio
3 to 1
5 to 1
10 to 1

All American Transformers after the severest competitive tests have been adopted as standard equipment by leading manufacturers.

PUSH PULL POWER AMPLIFIER.

The addition of power amplification to the ordinary audio-frequency amplifier solves the problem of faithfully reproducing broadcast programmes with greater volume. You will surely be delighted with the purity and richness of tone that this form of amplification develops in any good loud speaker.

TRIMM HEADPHONE

TRIMM HEADPHONES ARE GUARANTEED BY THE TRIMM FACTORY FOR LIFE.
TRIMM HEADPHONES ARE PROFESSIONAL.
PRICE 45/- PER PAIR

THE TRIMM PROFESSIONAL HEADSET is the established standard of those to whom radio means much more than mere entertainment. Dr. Donald B. MacMillan, who is now exploring the Arctic, and also the Wm. Hale Thompson Expedition which is setting out on an exploration of the far South Sea Isles, chose the **TRIMM PROFESSIONAL HEADSET** as the VERY best for scientific reproduction. The **TRIMM PROFESSIONAL** was proved to be the most sensitive Headset available to-day through the exhaustive tests conducted by members of both these expeditions.

TRIMM HEADPHONES ARE DEPENDABLE.
PRICE 32/6 Per Pair
TRIMM HEADPHONES MAKE HEARING EASY

The TRIMM DEPENDABLE, in appearance, results, sensitivity and volume is the equal of any metal case Headset on the market, **regardless of price.** A really fine Headset at a popular price. The aluminium case construction makes continued use pleasant as the complete Headset is light in weight. Distant stations are brought in with a clearness and distinctness. Perfectly matched tone is the result of thorough factory testing.

516 COLLINS ST., MELBOURNE. **O. H. O'BRIEN** (late O'Brien & Nicholl) 37-39 PITT STREET Phones: City 10952 & 8302

Obtainable from Electric Utility Co., Radio House, 610 George St.; Anthony Hordern and Sons, Ltd., George St.; Radio Co., Ltd., 15 Loftus St.; Colville Moore, 10 Rowe St.; Wireless Supplies, Ltd., 21 Royal Arcade; Miss F. V. Wallace, 6 Royal Arcade; W. H. Wiles, Goulburn St.; David Jones, Ltd., George St.; Burgin Electric Co., 591 George St.; Ridgway's, Ltd., 708 George St.; Mick Simmons, Ltd.; Railway Radio Co., George St.; Harrington's, Ltd.; Electricity House, George St.; J. Lawrance, Pitt St.; Sterman Ltd., Castlereagh St.; Radio and Electrical Supply Co., [illegible] Pitt St.; [illegible], 60 Hunter St.; [illegible] & Co., Pitt St.; B. H. Howell, 19 Barlow St.; Hamilton & Baker, 305 Pitt St.; Nock & Kirby, Ltd., George St. North; [illegible] Vickery, Ltd., [illegible] Pitt St.; [illegible] & Co., [illegible] Pitt St.; Grace Bros., Broadway; Murdoch's Ltd., Park St.; Sirius Radio & Elec. Co., Macquarie Place; [illegible], Ltd., Queen Victoria Markets; [illegible] Ltd., King St.

To win, Name Objects in Picture, beginning with Letter "S"

Solve this Easy Puzzle Picture

WIN £250

FREE!

"Narrow Escapes"

EVERY PERSON WHO SENDS IN A LIST OF WORDS UNDER CLASS "A" OR "B"—WHETHER WINNING A CASH PRIZE OR NOT — WILL RECEIVE, FREE OF CHARGE, A SPECIAL PRIZE OF A COPY OF OUR NEW BOOK, ENTITLED "NARROW ESCAPES."

This brilliant book has been specially compiled and is awarded to commemorate this grand Competition. It is a book of thrills, of funs and fancy—160 pages of interest, amusement and adventure, beautifully printed and bound with an art cover. Remember, every competitor in Class "A" and "B" will receive a copy of "NARROW ESCAPES," free of charge.

Of course you would like to win £250. Here's your opportunity. Make a list of the things in the above puzzle picture beginning with the letter "S." There's Saddle, Stump, Screw-driver, Shirt, Stockwhip, etc. It's a great game for your spare time! Over £600 will positively be paid in cash to the thirty persons who submit the nearest correct answers, so send in your list of "S" words as soon as possible.

If your list is awarded First Prize in Class A, you'll win £250. If you enter for Class B and win First Prize you will be paid £100. Under Class C (no subscription payment) you would win £10 for First Prize. The correct list by which judging will be done will be made up only of the correct words in the lists received, thus you are insured honest and impartial treatment. WISHING WILL NOT WIN—so start now. Surprise yourself and friends by winning £250. Then you can travel, pay a deposit on a new home, buy beautiful things, or establish your own business—the possibilities are great. Two Four Valve "Radiovox" Wireless Sets are also offered as prizes.

More Readers for "THE TRIAD"

IT COSTS NOTHING TO TRY! There is absolutely no entrance fee of any kind. Our aim is to secure more readers for "THE TRIAD," which, with its unusual stories, its clever verse, its chatty criticisms or art, literature, music, and the drama, is of interest to all. In Classes "A" and "B," your payment is solely for subscription to "THE TRIAD," which is issued monthly at 1/- per copy, including free of charge, reproductions, in full colour, of oil and water-colour pictures by representative artists. By taking part in this picture puzzle competition, you make a clear saving of 4/- in the £ on your subscription to this bright, beautiful, entertaining, informative and original journal. It will be a joy for you and yours to receive, every month, "THE TRIAD," the leading literary journal of Australia and N.Z.

See opposite page.

£600

In 30 Cash Prizes

Prizes	Class A.	Class B.	Class C.
1st	£250	£100	£10
2nd	£100	£40	£4
3rd	£40	£15	£1
4th	£15	£5	7/6
5th	£5	£2	2/6
Five additional prizes, each of	£2/10/-	£1	1/-

CLASS "A." Send £1 for twenty-four (24) months' subscription to "THE TRIAD," post free—a saving of 4/-.

CLASS "B." Send 10/- for twelve (12) months' subscription to "THE TRIAD," post free—a saving of 2/-.

CLASS "C." If no subscription is sent.

Make up your list of "S" words and send it with your payment for subscription to "THE TRIAD," if you are competing in Class "A" or "B". No subscription payment is necessary for Class "C." Remit payment by Postal Note, Money Order, Crossed Cheque, or Bank Note. It is advisable to send entry and remittance in the same envelope and by registered post. Add exchange to cheques: 6d. N.S.W.; 1/- other States. Payment from N.Z. should be made by Post Office Money Order only.

FOLLOW THESE EASY RULES

(1) Anyone, excepting employees of "THE TRIAD" MAGAZINE, LTD., or their relatives, may take part in this fascinating puzzle game. Competitors may send in any number of entries and may enter in any or all classes so long as the conditions of subscription to "THE TRIAD" are fulfilled. Enlarged copy of picture will be sent on receipt of stamped addressed envelope.

(2) Name only those objects visible in the picture beginning with letter "S." The idea is to have as many correct words as possible, and the method of awarding the prizes will be to deduct the number of incorrect or omitted words from those which are correct. Whichever list receives the most points will be awarded first prize, and so on down the list of 30 prizes, all of which will be awarded. IN CASE OF TIES FOR ANY PRIZE OFFERED, THE FULL AMOUNT OF EACH PRIZE TIED FOR WILL BE AWARDED TO EACH TYING CONTESTANT.

(3) Contestants in each class compete only against those in the class which they enter. The correct list, by which judging will be done, will be made up from the lists sent in by contestants, and not from a "master" list or an artist's list. Correct list, list winning £250 prize, and names and addresses of all prize-winners, will be published in the January issue of "THE TRIAD."

(4) Use only English words. An object may be named only once, but any part or parts of objects may also be named. Either the singular or plural of a word may be used, but not both. Words of same spelling but different meaning or synonymous words will count once only. Compound (words made up of two complete English words) and hyphenated words are acceptable, but obsolete or foreign words will not be permissible. Any dictionary may be used, but Webster's International Dictionary will be the final authority.

(5) Number your words in the order that you find them —1, 2, 3, 4, etc. Write on one side of paper only, and place your full name and address at the top of the sheet. Answers and subscription payments must be enclosed in the same envelope.

EXTRA!

Two (2) 'Radiovox' Four Valve Wireless Sets To Be Won!

To the gentleman, sending in the nearest correct list of "S" words, an Extra Prize of a Four (4) Valve "Radiovox" Wireless Set will be added to whichever prize he wins if he enters in Class "A" or Class "B."

This set (valued at over £75) has a range of over 6,000 miles. It will be supplied to our order by United Distributors, Ltd., complete with beautifully finished cabinet, valves, loud speaker, batteries and aerials. Delivered with full instructions and all charges prepaid.

An Extra Prize of a Four (4) Valve "Radiovox" Wireless Set, as above, will also be awarded under the same conditions to the lady sending in the nearest correct list of "S" words.

The patented equipment in these "Radiovox" Models is distinctly superior to any Receiving Set offered in any country and combines a three years' study by an American Expert, supplemented by the experience of Australian and British Wireless Experts.

The winners may choose from two artistic models, either of which will prove a delightful addition to the furniture of any home, as well as providing an entertaining and educative adjunct for the family and friends.

The function of the Cabinet in a Receiving Set is twofold. First, to combine all units into a sightly whole, housing the Batteries, Loud Speakers, etc., out of sight, and away from dust and harm, and secondly, and most important of all, to refine the acoustic properties, delivering voice and music in perfect volume and purity.

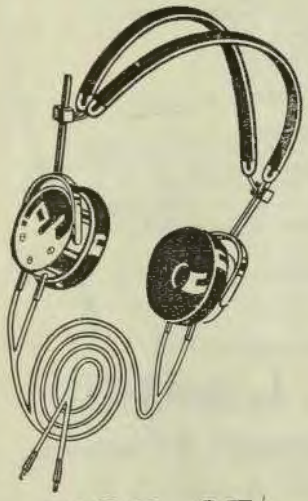
Decide now to win one of these "Radiovox" Sets and also win a substantial cash prize. This is YOUR opportunity. Don't miss it.

(6) All answers mailed and postmarked November 18th, 1924, will be accepted. CONTESTANTS UNDER CLASS "A" OR "B" MAY QUALIFY BY MAILING SOLUTIONS UP TO MIDNIGHT, NOVEMBER 26th, 1924. All entries received will be carefully considered.

(7) The judges will be the Very Rev. Dean Talbot, Sir Frederick Waley and the Hon. W. A. Holman, K.C. The judges are in no way connected with "THE TRIAD," and all competitors agree to abide by the conditions of the Competition and to accept the decisions of the judges on any matters as absolutely final and conclusive.

Post your answers to the Puzzle Editor,

THE TRIAD Ltd., Desk 34. 160 Castlereagh St., Sydney



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