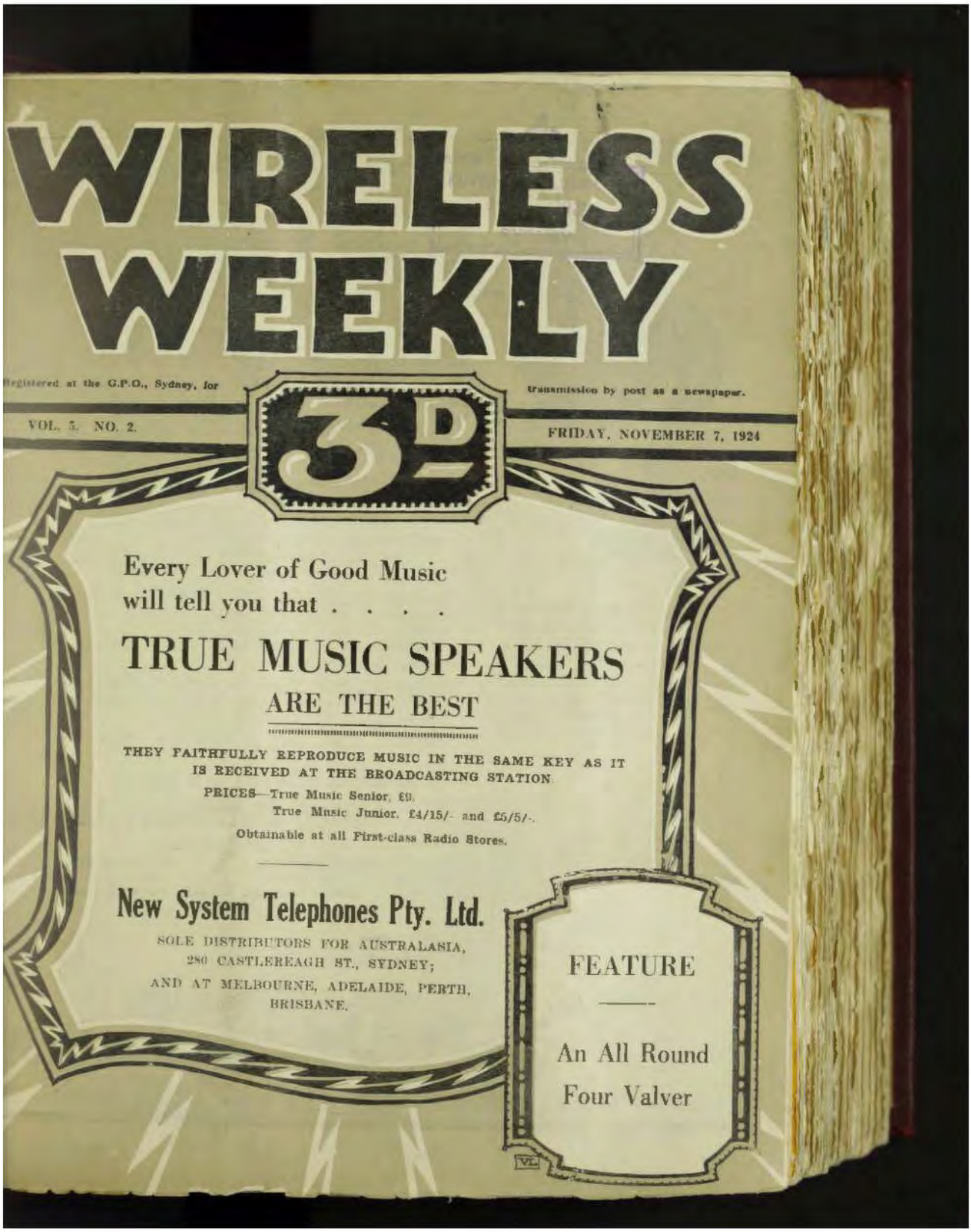

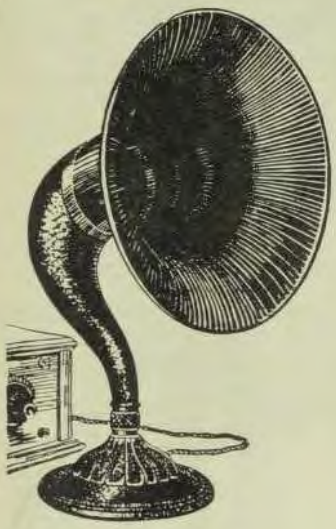

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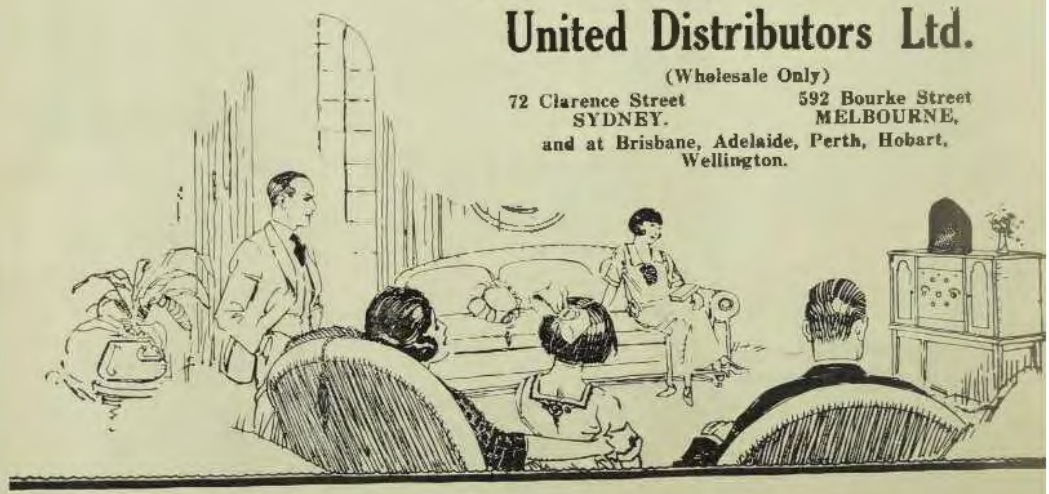

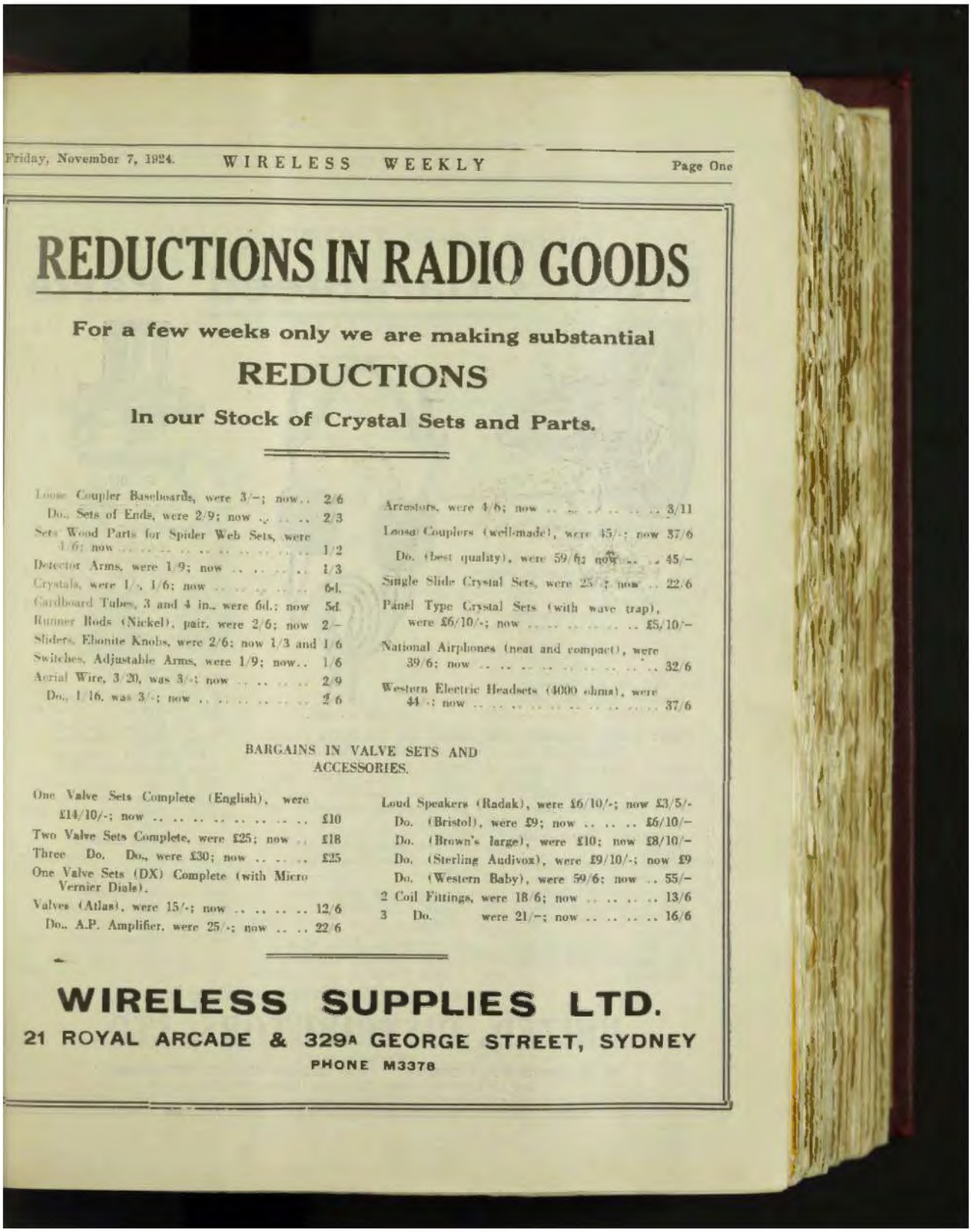

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Official Organ of the New South Wales Division of the Wireless Institute of Australia, with which is incorporated the Affiliated Radio Societies and the Australian Radio Relay League.

VOL. 5. No. 2 FRIDAY, NOVEMBER 7, 1924.

CONTENTS:

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

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EDITORIAL

Lest We Forget.

IN our Editorial last week we made a little comment upon the achievement of F. D. Bell (4AA) Waihemo (New Zealand), in establishing two way communication with an English experimenter. Naturally we, in common with Australian experimenters get a great deal of pleasure from the fact that an experimenter has shown the world just what can be done, and there is hardly any need to mention here that the progress of our friends across the Tasman is always interesting to us. The fact that it was a New Zealander and not an Australian to earn the plaudits of the multitude on being the first to work England did not make our congratulation to Bell any the less sincere, and so that we could not be accused of endeavouring to belittle his record, we refrained from making any comparisons except a general reference to the work already done by Australians.

However, it seems that Bell has to a certain extent lost his sense of proportion, to put it mildly. In the October issue of N.Z. Wireless and Broadcasting News, to which 4AA is a regular contributor, he comments upon the working of X 3AA (Orbell, on the "Port Curtis") by Maoriland experimenters, and blossoming forth in the role of critic, he comments upon the 6000 mile stunt between N.Z. and 3AA when the "Port Curtis" was lying in Monte Video harbour.

Here is what he says:—

"In the writer's opinion this is the finest thing that has yet been done in amateur radio—none of the much-boomed stunts and records of the past can look at it. You have read of Paul Godley, who, with his 8 tube super-het., was actually able to hear u 1BCG on about 900 watts input, at 3500 miles—sometimes! Forget him, gentle reader. You have read of the marvellous doings of 6KA, 6AWT, 6JD, and Co., who used up to ten thousand watts input. Forget them, too, for their glory is departed—R.I.P. In fact, to put it crudely, our Jack has knocked 'em rotten.

"It is too early to give full details of the results achieved, but a brief summary will serve to show that WNP, 2CDM and others are not in the same street with x 3AA. Also these tests have afforded another striking demonstration of the remarkable carrying powers of the shorter waves from 100 to 140 metres."

Now just in case there may be some foolish enough to interpret Bell's statements literally, let us examine the actual position, and then draw our own comparisons. Let us throw the names of say six Australian experimenters into a hat, and draw one—here it is—2CM. Read carefully a few of the records which have induced "Q.S.T.", "Radio News" and "Modern Wireless" to say that Ausralian experimenters are the most efficient in the world.

May, 1922: 2CM was the first experimenter to communicate between Sydney and Melbourne, 450 miles on 9 watts.

June, 1922: Worked S.S. "Montoro," at 705 miles. 8.7 watts used.

July, 1922: Worked S.S. "Ulimaroa," 8.7 watts, distance 1100 miles.

July, 1922: Ditto above, at 1200 miles.

September, 1922: On 3.2 watts worked Hull at Melbourne, 450 miles.

December, 1922: In DAYLIGHT, worked Channon, at Inverell, 350 miles, using .36 watt.

April, 1923: Received signals from MOTT, U.S.A.

July, 1923: Worked one way to 6CCR, Honolulu. Power used, 8 watts.

October, 1923: Using .08 watts, worked Hull, Melbourne IN DAYL GHT, and the same night, pushed .0037 watts across to 4AA, New Zealand.

December, 1923: Was the first 2nd district station to be heard in W.A. 8 watts across 2000 miles of variegated country.

April, 1924: (Note this carefully) — Worked 2CDM on 6.7 watts certified input, at 6000 miles. And in those days, short waves had not been tapped —so to speak.

2OZ, input 160 watts, 4AA, 150 watts, and 4AG, 250 miles (all N.Z. stations) have succeeded in working 600 miles with x 3AA, who is himself using 50 watts and yet, comparing these powers with the humble 6.7 used by 2CM to cover the same distance, Bell calmly informs us that "Our Jack (3AA) has knocked 'em rotten." In passing, it may be mentioned that our own Jack (2DS) worked 3AA at 4750 miles, using a power not ex-

ceeding 25 watts, so all things considered, this seems to us no mean achievement.

A few comments upon the different powers used will do no harm. Let us get down to a basis of miles per watt, 4AA, using 150 watts at 6000 miles, would be pumping about 40 miles per watt, 2OZ, using 160 watts, 38 miles per watt, 4AG, 250 watts would be covering about 24 miles per watt, and 3AA on 50 watts would disturb 120 miles per watt. Jack Davis, Australian 2DS, working 3AA on 25 watts at 4750 miles, covered 190 miles per watt—so thats' that! It's one way of looking at it.

Now here's something else. 2CM, in working 2CDM on 6.7 watts at 6000 miles, covered somewhere in the vicinity of 870 miles per watt, and .0037 watts at 1200 miles (2CM to 4AA) would wallop up somewhere close to 30,000 miles per watt.

So it would seem that, far from being knocked rotten, Australians have still just a few insignificant achievements to sit back on. Their glory has not yet departed, and the erection of that R.I.P. headsone is very far from being in sight. If ever the job is done, we are perfectly safe in assuming that the stone-mason will be an Australian.

That Record to England.

Bell lives out in the virginal bush, his chief source of QRM being the high notes of the sheep masticating daisies on the hillsides. Everything taken into account, it may be said that, situated as he is, miles away from the city's teeming valves, tall buildings, and so on, everything is in his favor for D.X. work. He worked England at 6.30 p.m., N.Z. time, which would correspond to about the same hour in the morning in England—otherwise, darkness all the way. 6.30 p.m. in New Zealand corresponds to 5 p.m. Sydney, at which hour we are blessed with strong, glorious daylight. The signals received by Bell would have to cross approximately one hour of daylight before reaching Sydney.

As an indication of what this means in its relation to signal strength may be easily seen by the following figures. They represent the readings taken by audibility meter by 2CM on signals from Bell.

5 p.m.: Strength 15; 5.30 p.m.: Strength 40; 6 p.m.: strength 150. Tells its own story, doesn't it?

Now it may be argued that just before daylight in Sydney would mean a period of darkness all the way from here to England, and that the distance to be covered by the signals would be about 1000 miles shorter. But when we consider that those weak signals must pass over 2000 miles of largely desert country, that argument will not stand up. The Bureau of Standards has compiled figures showing the enormous loss of signal strength over desert land, and they are conclusive.

Finally, to confine ourselves to Sydney experimenters, their location must be taken into account. Contrast their position close to a huge city full of tall buildings, thousands of valve sets, power lines and other obstructions, to that of Bell situated well out in the country, far from the maddening crowd, and his record loses a little of its glamour.

However, far be it from us to detract from his performance. The fact that he worked England constitutes a record to be proud of, and one that merits the congratulations of every Australian—but when a man who should know better, makes foolish statements about putting up the R.I.P. notice over Australians and others, then it behoves us to point out to him with all due reverence that the world's record for long distance working is still held by Australians.

This we think we have shown.

Correspondence

Albury,
October 24th, 1924.

(To the Editor)

Sir,—In reference to "freak happening" in my set where music was audible over the whole room although neither phones nor loud speaker were in proximity to, nor connected to my set in any way, and about which I wrote you last week, I have to again report having the same happening last night. I notice by the footnote to my letter that you ask the assistance of your subscribers to solve the mystery, and although on the first occasion it was something I had neither heard of nor read of before, I thought you might be interested to hear it had happened again. Last night when changing over from 3LO to 2FC the latter seemed to simply come out of the set everywhere. Both the phones and loud speaker were disconnected, but the volume of music still easily filled the whole room. On this occasion the phenomenon only lasted one or two minutes and then disappeared until the loud speaker was again connected when things were normal again. It would be interesting to know the cause of this freak occurrence.

In your issue which reached me to-day, requests are made by your Western Australian cor-

(Continued on page 15, col. 2)

THE

Wireless Institute of Australia

N.S.W. Div. Inc.

Incorporating the Affiliated Societies and The Australian Radio Relay League

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Art.Perrett Publicity Officer

THE fact that numerous applications for membership with the N.S.W. Division of the Wireless Institute of Australia continue to reach this office points to the fact that the advantages of Membership are being recognised more and more. Apart from the fact that every experimenter should belong to a radio society of some sort, the qualifications which are required before Membership in the Institute can be obtained undoubtedly give Members a status in the movement. While it is not desired to turn away anyone who desires to become associated with the Institute, full membership is only granted to those who can satisfy the Qualifications Committee as to their knowledge and ability in the wireless field. At the same time provision has been made for everyone to join the Institute, as Associate Members can be admitted without the high qualifications necessary for full membership. On the other hand, it should be the aim of every experimenter to qualify for full membership as the standard required is generally recognised as beeing of no mean order and it stamps the member immediately as being one who is sincere in his actions and whose knowledge is undoubted. We may even go so far as to state that no true experimenter can afford to be outside the ranks of the Institute.

It may be urged however, that for those who are not resident in the Metropolitan area, the Institute has very little to offer—this however, cannot be admitted as the interests of all members are kept prominently in view and special efforts are made to keep in touch with country members, both by written communication and by radio, while they have such undoubted advantages as full qualification for membership with the Radio Relay League togther with the moral and active support of the Institute in all matters of difficulty. They also reap the benefit of reduced fees for all calibration work done by the Institute on their behalf and it should be emphasised that the work which is done in this respect will bear comparison with that which is performed in any of the standardising laboratories of the world. The Institute wave meter for instance, has an accuracy of one in ten thousand, and the Institute numbers amongst its Members, those who are capable of handling this instrument and obtaining the best possible results. Mr. H. A. Stowe, a foundation member of the Institute and one who is well known by experimenters both for his activities in the amateur field and also for his honorary Radio Inspectorship, is at present in charge of this section of the Institute's activities, and members generally have the greatest confidence in Mr. Stowe's abilities in this respect.

To those who reside in metropolitan districts however, the Institute can offer even greater attractions. The monthly meetings of the Institute are full of interest, and it is expected that the next meeting to be held on the 20th Novemher will prove unusually interesting. It is proposed on this occasion to hold a practical demonstration with the Jewel Valve Testing Set, working out the actual characteristics of various valves and explainiig the different functioning of the various types. Visits of interest to wireless enthusiasts are arranged from time to time and these alone are well worth the subscription to the Institute. Moreover, there is the advantage of personal intercourse with the leading lights of the experimental movement and the opportunity of discussing matters of mutual interest provided by the general meetings and informal gatherings at Institute Headquarters. These matters could be elaborated much further but enough has been said to prove that membership with the Institute is a thing which should be coveted and it is evident that those who have already made application realise the advantages accruing there-from and are anxious to seize Dame Fortune by the forelock.

Q R M.

Messrs. Kingsley Love and Ross A. Hull have spent a brief but enlightening time in Sydney. They arrived on the morning of the 27th of October, and were met by Mr. Phil Renshaw. They have spent their time in whirlwind visits to many of the leading amateur stations in the metropolitan

area and in sight-seeing round the premier city of Australia We have no doubt that the impressions gained by these stars of the Victorian Division have been such as to arouse their envy and our advice to them is "Go thou and do likewise."

Mr. Lionel T. Swain, Secretary of the Radio Society of Newcastle is on a brief visit to Sydney. It is hoped that he will be able to get in touch with numerous experimenters and we trust that his visit will be of mutual interest and advantage.

Mr. H. R. Gregory has returned from his southern tour. During his trip he visited the South western part of New South Wales and Victoria, but owing to the pressure of time and the distance to be covered he did not visit as many stations as was at first intended. From Bathurst onwards, he was particularly impressed by the number of aerials in what appeared to be out of the way sections. At Bathurst, 2BL was being received very clearly and a number of experimenters are also received well in this district, 2JM being the one operating on the occasion of Mr Gregory's visit. After his visit to this district, 2ED thinks it advisable to suggest that a certain experimenter use a heavy lubricant on the condenser, and failing that, a monkey wrench. From Narandera, he received a hearty welcome from an old experimenter Mr. C. W. Roach, who, we understand, is investigating the various problems pertaining to amateur transmitting sets. One point of particular interest which was heard in this district was the fact that on a very clear night, static effects were of the worst, while on a wet night with rain falling, reception is generally perfectly clear.

The first impressions of the Victorian suburbs are the few aerials compared with Sydney suburbs. The opening of 3LO will no doubt alter this. Station 3BD, who appears to be trying to imitate 2BK as far as masts are concerned, has what we would call a genuine experimental station (not a fixed set,—see last week's notes) and no doubt within a few minutes can put together almost any circuit required. The operator himself coincides with the impression obtained of him from his work over the ether and in black and white. The favourite type of aerial with Victoria generally appears to be the cage. Station 3OT (R. M. Cameron) is preparing to erect his new mast and aerial, and when his station was visited, he had just received a very satisfactory report from a Western Australian experimenter. Station 3JU, although at present undergoing overhaul, completed a most interesting evening.

From the interview with Mr. Malone, 2ED understands that the question of experimental licenses is receiving very careful consideration, particularly with reference to country transmitters. The only regrets that 2ED brought back with him are that time was too limited and the amount of material available was too comprehensive for a brief survey.

2DS has been doing his usual good work in communicating with New Zealand. A curious coincidence happened the other evening when a message from 3JU from station G2MM was received by 2DS relayed from 4AG New Zealand, while Mr. Hull was in station 2DS.

A. H. Perrett
Publicity Officer.

Why in the world does his wife call him Picket fence?"

"Well, she says he's easy to see through."

"And, then, he's very useful round the house."

(Continued from Page 13.)

respondent for reports of those who hear 6WF. I might state that I have been hearing this station regularly almost from when they first opened, and going back through your earlier issues mention was made of this reception, and I feel sure I was the first to hear this station either in Victoria or New South Wales. However, as to their present transmissions I have no trouble in getting them practically any night I care to tune in after 2FC closes down, and very often can work them with good volume on the loud speaker. I refer to their special broadcasting on Tuesday or Wednesday last (memory fails the actual day) when some beautiful orchestral music was broadcasted from some entertainment house. Both the music and the applause that followed could be heard from the loud speaker all over the house. I find no difficulty whatever in tuning in 6WF, in fact he comes in so strongly that I sometimes amuse myself trying to bring him in without aerial or lead-in connection, and feel sure will be able to report success almost any night. 2FC can be tuned in nightly without any aerial or lead in connections, and very often without earth connection also. 3LO can also be tuned in without any trouble practically nightly without aerial or lead in wire, but I have not tried them without earth yet. 2BL has been tuned in but only once without aerial or lead-in wire, but with earth. No luck with them with-

out earth. 3AR, although they come in on the aerial, I have failed to pick up without aerial or lead-in connections. Have you any other correspondents situated so far away from the broadcasting stations that they have reported hearing all the above stations with good audibility under the same conditions.

Yours etc.,

P. BOULTON.

"Tenarbyn," Griffith St.,

P.S.—I omitted to mention in my last letter that the lead-in wire on which I got K.G.O. was only 10 ft. long.

* * *

In connection with the above, Mr. W. A. Stewart mentions that he has observed a similar effect with a receiver using a couple of stages of audio frequency. The phones, when disconnected from the set, produced signals when held at a good distance from the receiver. His theory that the effect was caused by induction from the last audio transformer seems to be supported by the fact that when someone walked between the phones and the set the signals disappeared.—Editor.

(To the Editor)

Sir,—I read with keen interest the letter by P. Boulton, of Aubury, published in your paper of the 24th ult., Mr. Boulton must be congratulated on the excellent results his set is giving.

With reference to hearing music and speech from a set with 'phones and speaker disconnected; this is by no means uncommon among high powered receiving sets. The cause of this effect, I traced to the last audio frequency transformer which I found to be functioning as a telephone receiver, the iron core case acting as a diaphragm and resonating with the highly amplified voice current as it passed through the primary winding of the transformer. This effect I found more marked in cases where the core of the A.F. Transformer is rather loosely packed. My present receiver gives the same effect. It is a P1 circuit using detector, one audio, and push pull amplifiers. I hope this explanation enlightens Mr. Boulton.

Yours etc.,

FREDERICK THOMPSON,

(2HF) Vice-President L. & D. R. Society.

(Other Correspondence will be found on Page 50.)

RADIO 3AL, N.Z.

3AL is the amateur station owned and operated by Mr. W. M. Dawson, of 263 Wills Street, Ashburton, New Zealand.

The owner's first insight into wireless was gained some years ago on a crystal outfit when broadcasting in N.Z. was non est and 600 metre signals were all that were to be heard.

Later, when the Trans-Tasman tests came along this enthusiast managed to win both receiving prizes on the N.Z. side—and this on a one valve home built set. This station was one of the first few to hear the U.S.A. amateurs on a one valve set in New Zealand.

Early this year a transmitting permit was obtained and while poing experimental work on extremely low powers using a dry cell receiving valve for the transmitter, an urgent C.Q. was pushed across to Wellington in daylight with an input of .044 watt.

Since being licensed as 3AL, this station has carried on a good deal of experimental work on low powers with very satisfactory results. (400 miles has been covered on .012 watt input with no R.F. at receiver end).

Communication has so far been established with 16 Australian amateurs representing 3, 4 and 5 districts and reports from many more, and no doubt the following description of 3AL will prove of special interest to those who have already worked or heard 3AL.

3AL is essentially a home designed and home built station, an absolute minimum of bought gear being used, but as the owner is in charge of the mechanical and electrical engineering departments at the Ashburton Technical School, this statement loses its significance somewhat perhaps.

After experimenting on many types of tuners, freak and otherwise, the good old three coil circuit was settled upon as being the best all round, and a tuner developed using this system and minimising the losses and by careful attention to wiring, etc., it gives excellent results even on waves as far down as 50 metres. For the shorter waves self-supporting basket coils of heavy gauge wire are used—wire obtained from electricity meters. To get the best results from a good low resistance secondary coil, high resistance circuits must be tightly coupled to it, and with this in view the primary for all short wave work is a single turn of No. 10 gauge bare copper, the ends being fashioned into split plugs to fit the coil mounting. Incidentally this coil mounting was a prize earned in the Trans-Tasman tests. As a result of the extremely loose coupling used the set is wonderfully selective and re-radiation from it is inappreciable.

It has been proved experimentally at 3AL that (when using an efficient low loss secondary) loose coupling gives more readable signals from DX stations than tighter coupling does (tight coupling re-radiators please note!). It should be explained that this is not intended to apply to stronger signals from local stations where tighter coupling no doubt gives increased volume. A U.V.-199 is used for this purpose with 10 volts on the plate and a Bradleystat controls the filament temperature to a nicety. A D.V.-3 is used for the amplifier with 40 volts on the plate and a Gilfillan 6 to 1 transformer completes a very efficient amplifier unit.

A wave meter designed and built by the owner and calibrated to a Telefunken wave meter has checked up very accurately against several relinble meters since. The tuning range is from 88 to 5000 metres, obtainable by plugging in various coils with the exploring lead. The "resonance click" method is used for checking wave lengths for C.W. signals but a shunted buzzer is proved for use on non-oscillating circuits and a crystal detector for use as a receiving wave meter. The whole fits in a case 7 x 7 x 4½ provided with a carrying handle. The bottom is hinged as well as the top and gives room for carrying the coils, charts, buzzer battery. The tuning has proved very sharp, due no doubt to the low minimum capacity of the variable condenser designed for the instrument, and its careful planning. It is interesting to note that by using this wave meter in conjunction with the regular receiver, it is changed to a 4 circuit Cockaday set in a couple of minutes and good results have been obtained with it used in this way. The present transmitter employs a radiotron U.V.-202 5-watt valve in the reversed feed-back circuit as may be seen from the diagram. The value of meters is appreciated for serious experimental work, being regarded as essential rather than a luxury, as by some experimenters. The meters are 0-100 plate current milliameter and a 0-15 voltmeter for

filament metering. A Dewar type switch breaks the plate lead to the set and puts the milliameter in series with a 10,000 ohm resistance, across the plate voltage. This value of resistance is particularly fortunate for it gives the voltage by multiplying the M.A. reading by 10 and at the same time the current consumed by the meter (or load on the rectifier) is almost identical with the current drawn by the valve at each respective voltage. Consequently, although the plate voltage is not measured while the transmitter is drawing plate current, it measures the voltage at a similar load and so is quite accurate.

The aerial and counterpoise condensers are specially designed for the job with heavy brass plates soldered to brass columns and a minimum of hard rubber as the insulating medium. The values are .0005 mfd. each and permit the transmitter being worked down to about 50 metres.

The panel size is 12 x 12. The hot wire aerial current placed on the panel in keeping with the general policy of 3AL (of keeping R.F. gear all supported as far as possible).

Patterns were made for the massive key used and the gun metal castings machined up and mounted on an oak base. The balance and action is excellent and the substantial knob and disc make for good control. Tungsted Ford Coil contacts have proved most suitable.

The transformers used are considerably smaller than the usual "Ham" transformers; they were designed for the set and built at a trifling cost. The cords were made from Norway iron which originally held rolls of newsprint and by allowing a moderate flux density in the design the transformers run quite cool.

Every part of the set described above, except the valves, were manufactured by the owner.

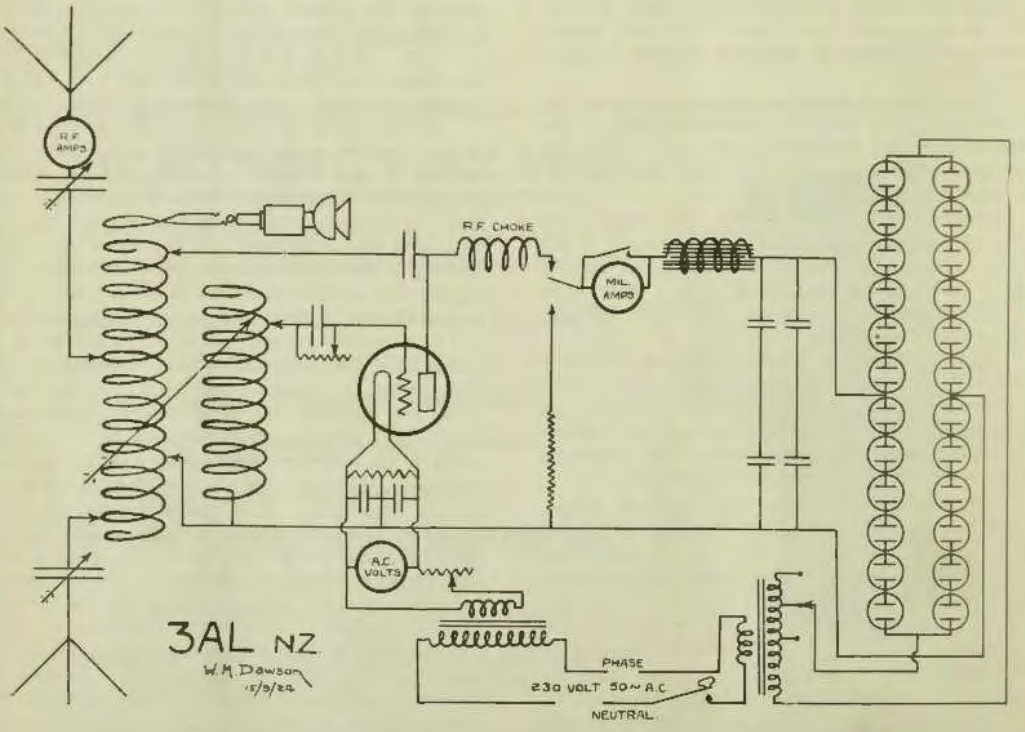


Diagram of Circuit used at Z3AL.

IMPROVING THE RECEIVER

By H. A. Stowe, M.W.I.A. (Radio 2CX)

The publication of this informative article by Mr Stowe affords us very real pleasure, because it will be found of very great help to those who are confronted with the problems of the receiver. Mr. Stowe's activities in wireless experimenting extend over many years, and the fruits of his experience are offered in this article. He not only clearly deals with the many causes of annoyance to listeners; but he shows the remedy.—Editor's Note.

DURING the last few months many of us have been kept busy answering such queries as: "Why can I receive Farmers and not Broadcasters?" and vice versa, or "Why can't I cut Broadcasters out while listening to Farmers?" and vice versa.

In all these troubles here is a reason that can be overcome, and in order that we may better understand how to remedy the trouble let us study for a moment just what is necessary for our receiver to function properly and why.

For any circuit to become responsive to oscillations it, in itself, must be capable of oscillating—and to do this it must contain two elements—capacity and inductance. Inductance in the form of the wire or coil and capacity in the form of some type of condenser as shown in Fig. 1 where L equals the inductance and C equals the capacity. The reason why this circuit or combination will oscillate will not be attempted in this article, as it is intended to help the non-technical person.

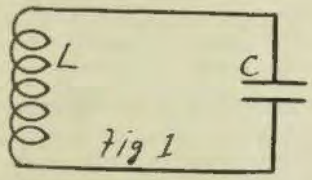


Fig 1

Both these components, L and C, may exist in different forms and degrees; for instance we may have an arrangement such as Fig. 2, where A is a large aerial which possesses inductance and C the condenser. In this it will be seen that the total capacity is very much greater than the inductance, for the aerial also possesses capacity. It is therefore evident that the arrangement is of little use because it is very much unbalanced or both components are a long way out of proportion.

We may also have the arrangement shown in Fig. 3 where A is the aerial and L the inductance In this case the capacity is provided for by the self-capacity of the coil and aerial. Here again the inductance is large compared to the capacity. Both these types of circuits will operate and give results but the aim of this article is to produce the best results. Those who have had experience in the operation of wave meters will have found that maximum strength is obtained on the wave meter

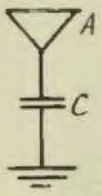


Fig 2

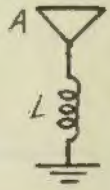


Fig 3

when used as a receiver, when the capacity and inductance bear a certain relation to one another, or are balanced. In this condition we are getting maximum current into the receiver and this is the aim of our receiver design. It follows then that a circuit containing definite capacity is better as in Fig. 4. This circuit has many advantages, besides the points already mentioned.

A crystal detector is a current operated instrument, so that we must aim at keeping our resistance low. With a tuning element as in Fig. 4, we can use a smaller coil and so reduce the resistance of the circuit. From this fact also it follows that our aerial resistance should also be as low as possible, which means the use of a multiwired aerial and fairly large wire, not less than 3/20.

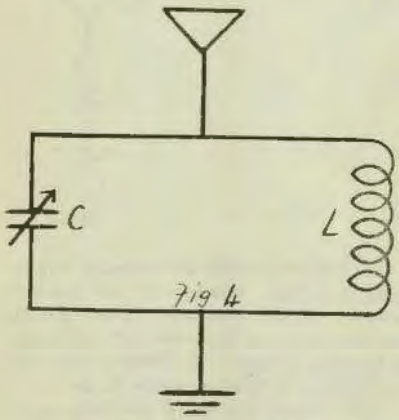
Another great advantage of this method is that there is no waste or dead wire on the coil. Dead wire is always a source of large losses in a receiver. Take for instance a single coil tuner suitable for receiving 2BL and 2FC; 2BL is 350 metres and

2FC 1100 meters, which means that when the slider or switch is set for 2BL, about 4/5 of the wire is dead or useless.

This is the chief reason why so many people find that they cannot receive 2BL but get 2FC strong.

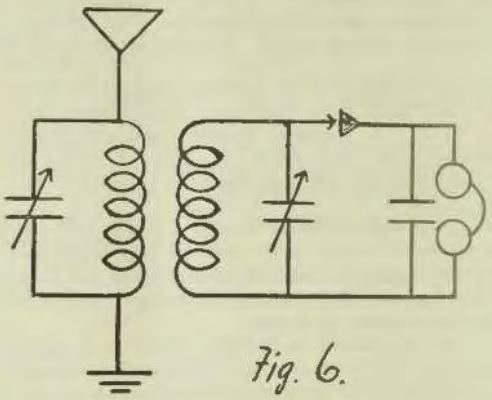
Again, so many of the single coil tuners are wound with such fine wire that their resistance is relatively large to high frequency currents and high resistance circuits will not tune sharply, hence another trouble—the interference of one station with another, or the failure to entirely eliminate one station while receiving the other.

Now, to make our wire large would mean a very large coil to receive 2FC, but by adding a variable condenser the coil may be reduced and much finer tuning and balance obtained. As it is better not to use too large a condenser, as the larger the condenser the more difficult the tuning becomes, it follows that two coils must be used, one for 2BL and one for 2FC as, for instance, Honeycomb coils.

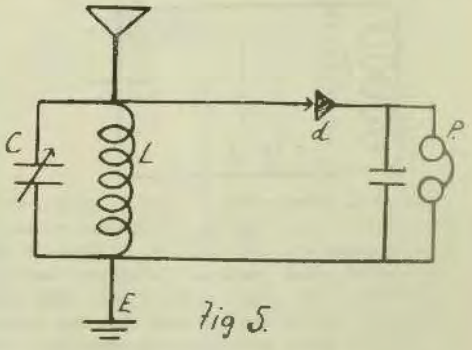


A circuit arrangement will be given later incorporating the use of two coils, but in which they really act as one in two sections. With all these improvements, however, the single coil tuner is not the best proposition, as owing to the tightness of the two circuits contained therein, interference elimination is practically impossible. These two circuits are shown in Fig. 5, where the tuning circuit is from A through L to E and the other from D to P through L back to D. They are shown separately in Fig. 6. In this case a tuning condenser may be used for tuning both circuits. For those who are particularly desirous, for reasons of simplicity, etc., of using the single coil method of tuning, the following diagram is given which incorporates the best features.

In Fig. 7, C equals variable condenser from .0005 to .001 mf., P equals phones, COS equals D.P. D.T. switch, say, of "Marco" type. The coils are so selected that coil 1 by itself is suitable for 2BL with switch in position 1 and coil 2, together with coil 1 suitable for 2FC, with switch in position 2. Suitable coils would be 35 turns H.C. for 2BL, and



about a 75 turn for 2FC. In this circuit there are no losses due to end turns owing to the large coil not being in electrical connection to the small one when not in use. The variable condenser tunes the coils irrespective of which are in use, thereby providing the finest tuning. It must not be assumed that this circuit arrangement will give any greater selectivity, for this cannot be obtained with single coil tuners, owing to the fact as before mentioned, of the circuit being so tightly coupled. This is the reason why so many have found that one of



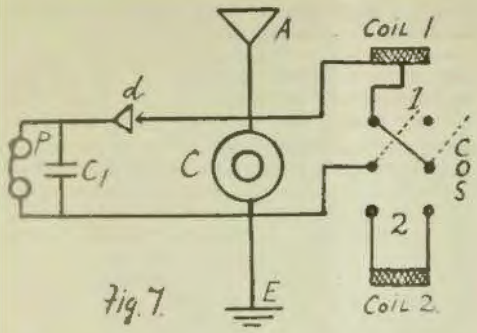


Fig. 7.

the broadcasting stations interferes with the other. Of course, where simplicity is desired and the selectivity is not particularly required when these circuits meet the case. This is the great feature of the super-crystal set described in this journal some time previous. I would like to point out for the benefit of the large number who are using this set that it can be greatly improved along the lines mentioned in this article.

In the first place, spider web coils are used which have a much lower self capacity than the tubular form of coils, so that as an oscillatory circuit, it is very much unbalanced, and seeing that most of the capacity is in the aerial it explains the reason why this set is so critical regarding the size of the aerial. Then again when the short wave coil is in use, the larger coil is still connected, producing dead end losses. I tested one of these sets out the other day and got fairly good results as it stood. I then isolated the coils and made up a variable condenser by placing a piece of thin brass on either side of a piece of mica and by varying the relation of the pieces of brass the signal strength was increased about three times.

Two other points which are often overlooked, if more efficiency is required, is the presence of a phone condenser .001 mf across the phone terminals and also the insulation of the set. No doubt many will say that they have got good results without the phone condenser. The reason that results are obtained is due to the fact that the cords of the phone and the phone itself act as a condenser. It will easily be seen how uncertain a condenser this forms. This condenser serves two purposes, as a bye pass condenser for the high frequency oscillations in the circuit and as a reservoir condenser for the proper operation of the phones.

The phones themselves offer a fairly high impedance to the passage of H.F. currents, thereby tending to damp them out as a high resistance would do to the passage of a direct current. The phone condenser allows them to pass, but stores up the voice currents for use in the phones. Hence the need of a fixed capacity in this part of the circuit. There is no need to emphasise much the need of good insulation; it should be obvious to all. Wood, even of the driest, is subject to moisture, and wood obtainable to-day is not perhaps as dry as it might be.

All parts carrying any of the currents should be well insulated, preferably with bakelite or ebonite. Let us see how the loose coupler may be improved. It generally consists of the circuit as shown in Fig. 8 where A equals aerial; P equals primary coil with slider; S equals secondary coil with switch; D equals detector; C equals fixed condenser; Ph equals phones. In the first place the loose coupler has the advantage of the inductive coupling which greatly increases its selectivity. We will leave for a minute the primary coil and look at the secondary coil which is the most critical

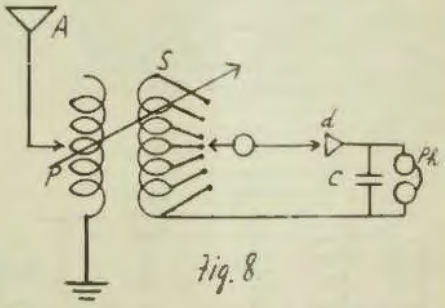


Fig. 8

as far as operation is concerned. The first thing noticed is that it contains one of the faults of a single coil tuner, that is, end turn losses, and also as it has to be put into certain positions, it has to be wound with fairly fine wire, hereby increasing the damping or making it more broadly tuned.

These are not the principal troubles, however. The greatest fault is the switch. Let us look for a while and see why. The wave lengh of 2FC is 1100 meters. Now, suppose that our secondary is wound with say 200 turns tapped every 10 turns which makes 20 switch stops. This means broadly speaking, that if say the natural wave length of the full coil is 2000 meters, each section will approximately be equal to 100 meters so that each time we move the switch we jump 100 meters.

It so happens that 2FC is an even number of hundreds as far as our switch goes, so that we would put the switch on contact No. 11. Now

suppose that this wave length varied slightly we have no means of following it, so our signals decrease in strength.

Now what about 2BL with a wave length of 350 meters? It will be seen that we can only get 300 meters or 400 meters, leaving us 50 meters out of tune and 50 meters represents about 15 per cent. error, and the lower the wave length, the bigger his error becomes. This is why so many users of loose couplers cannot get 2BL properly, but are able to get 2FC, and this trouble would be still further increased for the reception of the experimenter.

This detuning trouble is greatly increased as the two coils are drawn apart to cut out some interference say from V.I.S., for our coupler becomes more sharply tuned. In the case of the primary many may have noticed that the tuning coupling is fairly close, and its effect as a tuner increases as coupling decreases. There are certain amount of losses which occur in this coil, mainly end turn and resistance — the use of small gauge wire. It is of no use having a low resisance aerial and a high resistance primary, that is, our aerial may consist of 1, 2 or 3 or more 3/20 wire with a heavy lead-in and our coil is wound with 26 gauge wire.

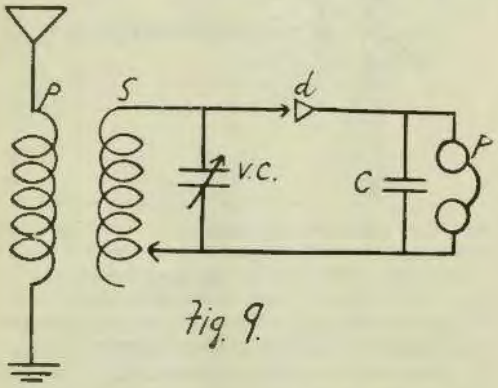


Fig. 9.

We must always remember that the high frequency currents with which we are dealing travel on the surface of the wire and the smaller the wire the smaller the surface and so more resistance to the passage of the currents. Our primary is not so important as the secondary. What was said before regarding phone condensers and insulation applies equally as well to the loose coupler as to the single coil. How may we then eliminate these losses mentioned and so improve our loose coupler? We will deal with the greater fault first—the switch.

This trouble may be overcome quite simply by the addition of some type of variable condenser, connected as shown in Fig. 9 right across the secondary coil or across the active end of the coil and the switch arm. Its effect is now as follows. We can say roughly that the wave length is proportional to the inductance and the capacity, that is, if we have a condenser and coil connected as in Fig. 1 the wave length of the arrangement is proportional to the value of the condenser and the value of the inductance. If we then vary the condenser say to increase it we will increase the wave length, or if we increase the number of turns on the coil we will increase the wave length. If we then employ a variable condenser it will easily be seen which will be the easiest to vary our wave length by. For one thing the variable condenser

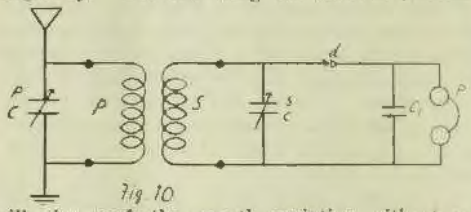


Fig 10

will give perfectly smooth variation without any jumps in it where as with the coil even if we use a slider we must jump one turn at a time which may make a reasonable amount of difference to the wave length. If we apply this principle to the loose coupler secondary it will be seen how the tuning is improved. A small condenser only is necessary simply to carry the tuning from one contact to the next. For instance, to use our previous example, for 2BL we would use No. 3 contact and then vary the condenser until we get maximum results, which will indicate that our secondary is tuned to 350 meters. Similarly with 2FC we may follow any variation of the wave length with the condenser.

The addition of the condenser allows the circuit to become better balanced and also to reduce the resistance of the circuit by virtue of the fact that it is the condenser that stores up the energy for use in the circuit. With the condenser also we may work with a much looser coupling between the coils and so reduce interference. We will also find it easier to tune in to the experimenters by means of the condenser, although our circuit will become less efficient the lower we go in wavelength, on account of the large amount of wire on our coil that will not be in use.

It is possible to overcome this last mentioned fault by means of specially designed "dead end" switches which automatically disconnect the unused turns as the switch is moved. This switch,

however, is not to be recommended as it is difficult to construct and switches are always a source of weakness in any circuit.

It should be mentioned here that by far the greatest trouble with the loose coupler is the need of a variable condenser, and those interested will find that the addition of that article will meet all their needs. It must be remembered that one must not expect to receive all ranges from 100-1100 meters on the one tuner with equal success for the reasons already given. For those who really want to cover those ranges with success the following diagram will, I think, meet their case and provide a set free from all the faults mentioned. It certainly will cost a bit more, but we must not expect to get everything for nothing. The arrangement is shown in Fig. 10.

In this set P and S are honeycomb coils selected to suit the wave length desired, and PC and SC are the primary and secondary tuning condensers and are the only means of tuning, thus eliminating all end turn losses and switches. The coils are efficient ones and are of low resistance. They are arranged on a standard 2 coil honeycomb mounting so that they may be swung apart or close up to provide a variation of coupling. When higher wave lengths are required the coils are pulled out and larger ones substituted. The condensers should not be larger than .001 mfd and the addition of a vernier will prove helpful. The phone condenser C should be about .001 mfd fixed, and the whole can be mounted on a panel. This has the advantage that all the parts are useful if the change over to a valve is desired. Above all don't provide all the parts mentioned and then mount them on a wooden panel. A bakelite panel will repay you for the slight extra cost. You must not expect to get the highest efficiency if you study cheapness first. Wireless is very much like a motor car—the best set costs more. Many a young chap has done well with his paper tubes and scrap wire and rough sliders, and all praise is due to him who starts from the bottom rung, for he will know his work better later on, but there are many who have got a certain height up the ladder and who are yet not satisfied. For these I hope that this article will prove a help.

Any criticism that this article makes is not adverse to those who have contributed to the education of so many, with the excellent designs which have been published, but simply to try and carry their work a step further. We may be satisfied for a time with a Ford, but the time comes when we aspire to, shall I say, a Rolls Royce. Never think you have the best results until you have heard other sets.

All the remarks here regarding the tuner apply just as much to the valve set as to the crystal set, remembering that with a valve set we can make up by amplification what we lose, but not so with the crystal set.

CATALOGUES RECEIVED.

Messrs. Edison Swan Electric Co., Ltd., Sydney, have sent us a copy of a new and attractive catalogue produced by them. The apparatus listed and illustrated is entirely of British manufacture, and, besides the well known Ediswan valves, there is featured a particularly attractive four valve receiver which has separate terminals for phones or loud speaker and a switch providing for the use of two, three, or four valves. The set has a wave range of from 250 to 2000 metres, making it particularly suitable for Australian conditions.

"Televox" is the name of the well designed loud speaker illustrated in the catalogue. The resistance of this is 2000 ohms and it has an attractive appearance. Double head receivers of 4000 ohms are featured in the Ediswan catalogue, in addition to accumulators, H.T. batteries, variable condensers, rheostats, English valve sockets and L.F. transformers. They should prove of popular appeal, and should find a ready sale in Australia.

WIRELESS AND SHORT WAVES

Developments in wireless communication during the past twelve wonths have been so startling that everyone has become keenly interested in the subject and its great possibilities.

A few months back Marconi himself spoke by means of his new transmitter at a station in Cornwall in England, and his voice was clearly heard at a receiving station near Sydney. Since then Amateur wireless enthusiasts in England and New Zealand have exchanged Morse signals with very small power, and Marconi, from his mysterious experimental yacht, S.S. "Ellettra," has just reported that he believed he has discovered a method of secret wireless communication between any two points on the earth.

These remarkable and far-reaching discoveries have arisen because an entirely new field of wireless activity has been opened up by the use of very short wave lengths. Marconi first opened up this field by experiments undertaken in the Mediterranean as far back as 1917, and he has worked continually at it to the present day. Others, including many amateur experimenters, have recently followed him into this new field and have obtained results far beyond their expectations.

WHAT IS MEANT BY "LOW LOSS" RECEIVERS

By W. A. STEWART.

AT present there seems to be an influx of so called "low loss" receivers. They are extremely popular with the real experimenter, and there is no doubt as to their efficiency. Many amateurs are sceptical, and claim that the low loss idea is all wrong, but if carefully considered they are the only logical means of achieving short wave reception. By short waves I mean, anything from 80 metres to 200 metres.

Many experimenters seem to think that the idea is new, but it is really as old as the hills, so to speak. The Telefunken, and other German radio companies, made use of these principles as far back as 1912, and built gear, including variable condensers, which were as good a job, if not better, that some of the present products. I saw one myself which was made before the war. It was a proper straight line job, of the grounded rotor type, with pigtail connections, and as little insulating material as possible.

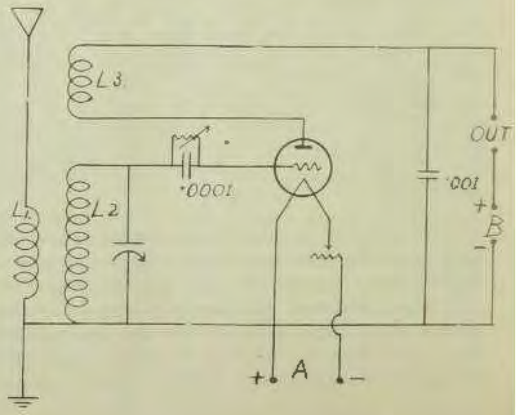
What really brought this type of tuner into prominence was an article in "Q.S.T." (which is the official organ of the American Radio Relay League, and which is accepted as one of the most practical amateur journals obtainable in any part of the world), in the December, 1923, issue, and again in February, 1924. This is one of two papers devoted solely to the amateur, the other being an English paper, "Experimental Wireless," which is also an excellent publication. But even before this, an article was published in "Radio News," entitled a "D.X. Receiver for Short Waves," which embodies the same principles, and which was quite an efficient receiver.

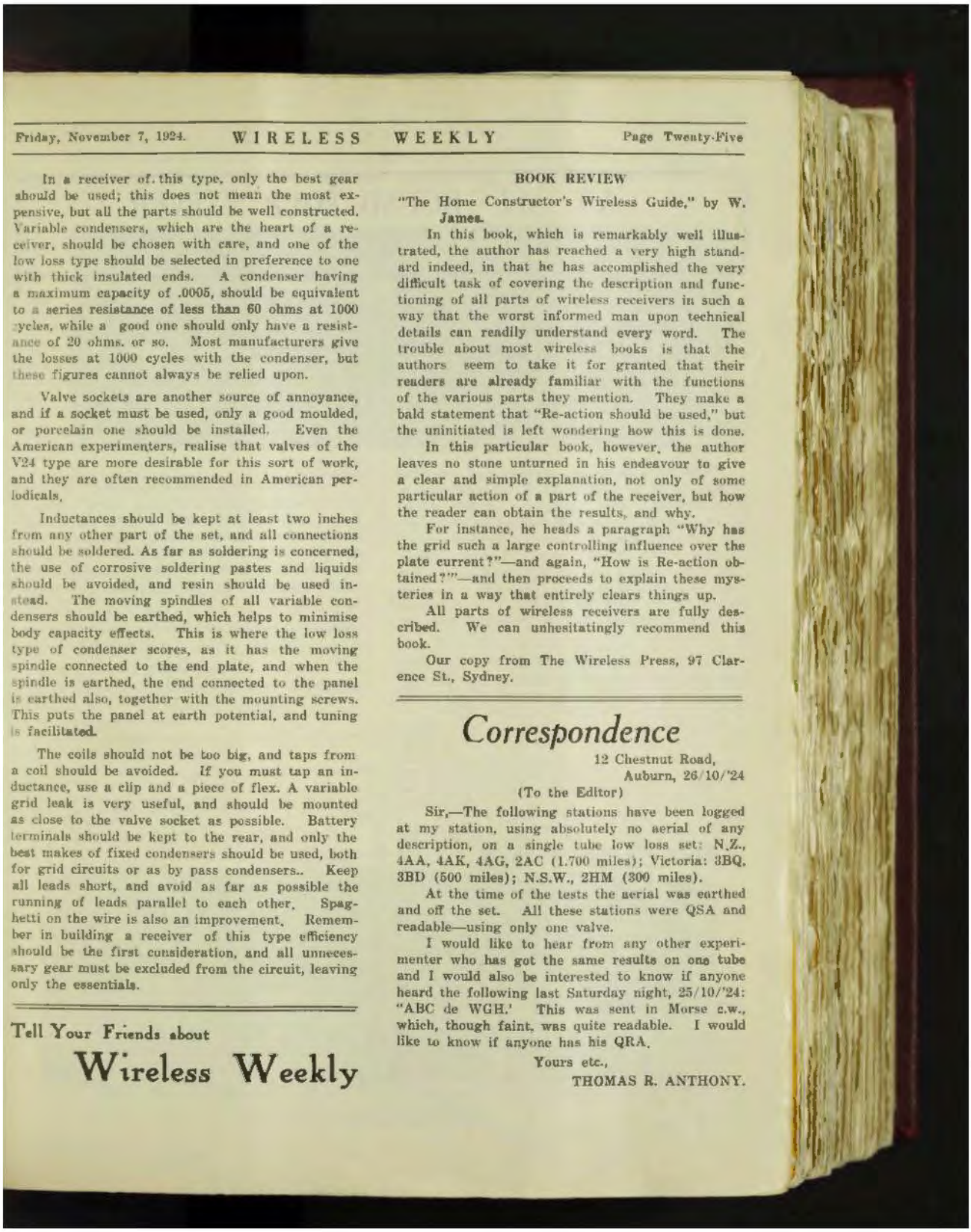
From these few remarks it will be seen that low loss receivers are by no means new, but it is only lately that the need for a receiver of this type has been felt, and weird and wonderful are some of the contraptions called tuners, which are being built. Briefly explained a low loss tuner is one that contains only the essentials for good tuning, and all unnecessary gear is dispensed with. Only the best gear should be used, and the various components should be arranged on the panel and baseboard, with a view to efficiency first, and appearances as a secondary consideration.

It also should be simple to handle, and should reradiate as little as possible, when it is receiving C.W.; furthermore it has to be selective, as there are quite a number of stations operating round about the same wave length. Complications should be avoided, and it is best to stick to simple circuits. This would seem to indicate that the single circuit receiver (P1) is satisfactory, but this type of tuner must be used carefully, as it is not very selective, and furthermore it is a very good transmitter.

The most efficient circuit is the standard three coil, which is well known to all, but which has for clearness been reproduced in Fig. 1. The aerial circuit is untuned, which makes the tuning no harder than the single circuit set, increases the selectivity, and decreases the reradiation to a minimum. It is a well known fact that a high resistance circuit will not tune sharply, and that the less resistance a circuit has the better its selectivity, so that in designing a receiver, the resistance of the circuit has to be taken into account.

This does not mean that the thicker the wire the better, as there are limits, and if 12 D.C.C. wire were used the high frequency resistance would be enormous. Usually 18 D.C.C. wire will be about right. On no account use enamel wire as the turns are too close together, and the efficiency decreases. Coils where possible should be made self-supporting as the less insulation there is near a tuner, the better the results; for this reason basket inductances are very desirable. Failing this the coils can be wound on very thin cardboard tubes. On no account use shellac or other insulating dope; instead secure the coils with thread.





In a receiver of this type, only the best gear should be used; this does not mean the most expensive, but all the parts should be well constructed. Variable condensers, which are the heart of a receiver, should be chosen with care, and one of the low loss type should be selected in preference to one with thick insulated ends. A condenser having a maximum capacity of .0005, should be equivalent to a series resistance of less than 60 ohms at 1000 cycles, while a good one should only have a resistance of 20 ohms, or so. Most manufacturers give the losses at 1000 cycles with the condenser, but these figures cannot always be relied upon.

Valve sockets are another source of annoyance, and if a socket must be used, only a good moulded, or porcelain one should be installed. Even the American experimenters, realise that valves of the V24 type are more desirable for this sort of work, and they are often recommended in American periodicals.

Inductances should be kept at least two inches from any other part of the set, and all connections should be soldered. As far as soldering is concerned, the use of corrosive soldering pastes and liquids should be avoided, and resin should be used instead. The moving spindles of all variable condensers should be earthed, which helps to minimise body capacity effects. This is where the low loss type of condenser scores, as it has the moving spindle connected to the end plate, and when the spindle is earthed, the end connected to the panel is earthed also, together with the mounting screws. This puts the panel at earth potential, and tuning is facilitated.

The coils should not be too big, and taps from a coil should be avoided. If you must tap an inductance, use a clip and a piece of flex. A variable grid leak is very useful, and should be mounted as close to the valve socket as possible. Battery terminals should be kept to the rear, and only the best makes of fixed condensers should be used, both for grid circuits or as by pass condensers.. Keep all leads short, and avoid as far as possible the running of leads parallel to each other. Spaghetti on the wire is also an improvement. Remember in building a receiver of this type efficiency should be the first consideration, and all unnecessary gear must be excluded from the circuit, leaving only the essentials.

BOOK REVIEW

"The Home Constructor's Wireless Guide," by W. James.

In this book, which is remarkably well illustrated, the author has reached a very high standard indeed, in that he has accomplished the very difficult task of covering the description and functioning of all parts of wireless receivers in such a way that the worst informed man upon technical details can readily understand every word. The trouble about most wireless books is that the authors seem to take it for granted that their readers are already familiar with the functions of the various parts they mention. They make a bald statement that "Re-action should be used," but the uninitiated is left wondering how this is done.

In this particular book, however, the author leaves no stone unturned in his endeavour to give a clear and simple explanation, not only of some particular action of a part of the receiver, but how the reader can obtain the results, and why.

For instance, he heads a paragraph "Why has the grid such a large controlling influence over the plate current?"—and again, "How is Re-action obtained?"—and then proceeds to explain these mysteries in a way that entirely clears things up.

All parts of wireless receivers are fully described. We can unhesitatingly recommend this book.

Our copy from The Wireless Press, 97 Clarence St., Sydney.

Correspondence

12 Chestnut Road,
Auburn, 26/10/'24

(To the Editor)

Sir,—The following stations have been logged at my station, using absolutely no aerial of any description, on a single tube low loss set: N.Z., 4AA, 4AK, 4AG, 2AC (1,700 miles); Victoria: 3BQ, 3BD (500 miles); N.S.W., 2HM (300 miles).

At the time of the tests the aerial was earthed and off the set. All these stations were QSA and readable—using only one valve.

I would like to hear from any other experimenter who has got the same results on one tube and I would also be interested to know if anyone heard the following last Saturday night, 25/10/'24: "ABC de WGH.' This was sent in Morse c.w., which, though faint, was quite readable. I would like to know if anyone has his QRA.

Yours etc.,
THOMAS R. ANTHONY.

AN ALL ROUND FOUR VALVER

By "INSULATOR"

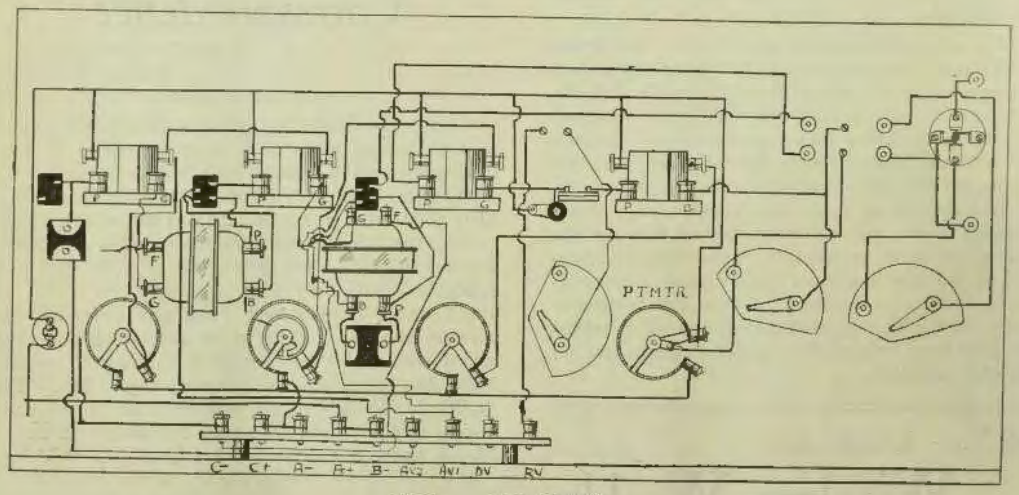
MOST of the people whom I've met this last few days have requested particulars of a receiver suitable for long distance work. The clamour is distance, distance, and more distance.

While the ordinary three coil circuit with one or two stages of audio frequency amplification will certainly lend itself to a receiving distance favourably, I certainly prefer to employ a stage of high frequency amplification for this purpose.

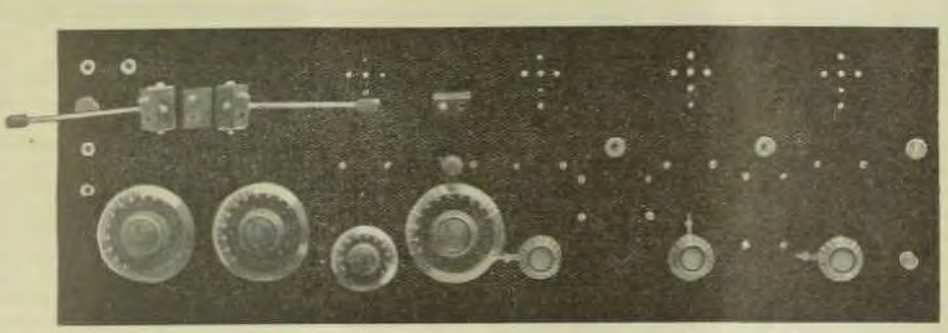
With radio frequency amplification the incoming signal is stepped up in strength before being detected, hence very weak signals which otherwise would be inaudible can be rendered audible. You know there is a certain fascination about bringing in that distant station. It often happens that when you are chasing distance a very weak signal is heard and is hung on to, only to hear at the end of the item the familiar voice of Uncle George saying "2BL here," etc. Annoying isn't it? But such is radio.

Now the set I am going to tell you about this week employs one stage of tuned anode detector and two stages of audio frequency amplification, the latter to provide loud speaker strength. I won't make any vain glorious boast that it will bring in KGO on a loud speaker. This depends on the skill of the person who handles the set. You see what I mean. Take a motor car for example. Some drivers get more out of a car than others with the same car, because some can handle it more skilfully than others. It is just the same with a wireless set.

Nevertheless this receiver properly constructed will prove thoroughly satisfactory and will bring in distant stations quite clearly after the owner thoroughly understands it. Western Australian Farmers will be enjoyed at reasonably good loud speaker strength, as should most other Australian broadcasting stations. But remember this is up to you. In passing, I may mention that from now on the brand of parts required for the sets will be left to the discretion of the reader. From this you will of course understand that I am not able to furnish you with details of panel lay-out and drill-



BACK ELEVATION

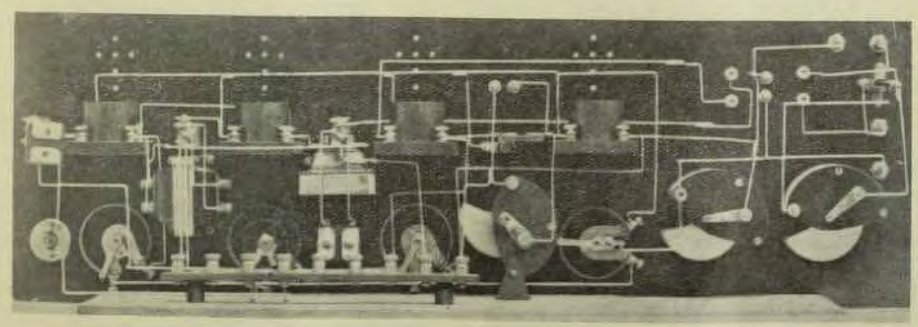


Front View of Panel.

ing. Instead, I am going to give you a ground plan, and where possible, a back panel wiring diagram. This, I feel sure, will meet with your approval, as you will certainly employ a little initiative with satisfactory results. Here is a list of parts necessary:

1 Panel, 27 x 9 x 3/16.
1 3-Coil holder.
1 1-coil panel mounting holder.
3 .0005 variable condensers (vernier preferably)
5 standard panel mounting sockets.
2 audio transformers.
1 series parallel switch.
1 400 ohm potentiometer.
1 grid condenser and leak (variable an advantage).
3 30 ohm rheostats (1 vernier).
2 double circuit jacks.
1 single circuit jack.
2 .001 fixed condensers.
1 battery switch.
11 terminals.
3 3-inch dials (for condensers).
1 2-inch dial potentiometer.
1 strip of bakelite, 10 x 1 x 1/8.

The valves I use are U.V. 201a which require a 6 volt accumulator to run them, and arrangements are made to supply the different valves with different plate potentials. The detector valve (D. V.) usually requires about 50 volts, radio frequency (R.V.) valve up to 80 volts, first audio valve (A.V.1.) up to 80 volts, while the second audio valve generally works best on 100 volts on the plate. These different voltages are obtained by tapping the positives of the B battery, the negative of the B battery being taken to B terminal (see plan). H grid biassing battery (C— battery) is provided and is a worth while im-

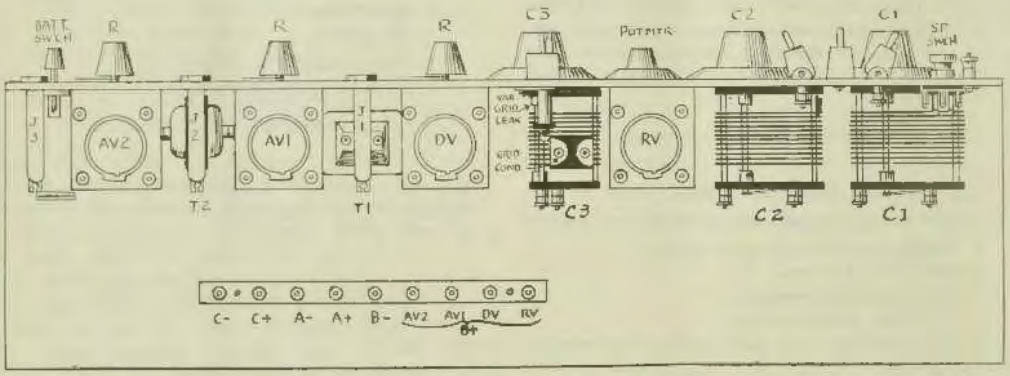


Back View of Panel.

provement; the inclusion gives a wonderful zest to the signal strength. If desired it may be left out altogether and the two terminals C— and C+ should then be joined together. The potentiometer is, we might say absolutely necessary as it controls oscillations greatly. Juggle it about and note the difference in reception. The battery switch is useful, as it cuts out all valves by the action of one now. It is a luxury really, as are the jacks which allow the owner the choice of two, three or four valves at will.

That's that! In the actual making of the set first of all study the two diagrams given here. Taking the back elevation in conjunction with the plan the lay-out will be seen accomplished. Having procured your panel, paste some clean white paper over one side of it and draw just where you intend placing your separate parts of apparatus. Using a centre punch or nail, punch the centres of all prospective holes and drill afterwards. Next assemble your components and then wire up. Note carefully the position of the battery terminals which are at the back of the baseboard. Also, for convenience sake, I have "pushed" the filament terminals of the valve sockets a little out place to show the wiring a little better. Tuning this set, at first requires a little care, but it will soon come to you. Keep the primary and tickler coil well away from the secondary (middle) coil and tune with the C2 and C3, then C1 and retune after bringing your tickler and primary a little more closely to the secondary coil. If the set tends to oscillate severely, alter the position of the potentiometer and vary the grid leak.

After a while, the operation of this set will become second nature to you, so persevere.



PLAN

WAVERLEY CLUB'S DANCE.

The dance on the 22nd ult., organised by Waverley Radio Club was even a bigger success than was anticipated. The hall was almost uncomfortably full, an actual estimate placing the attendance at 150.

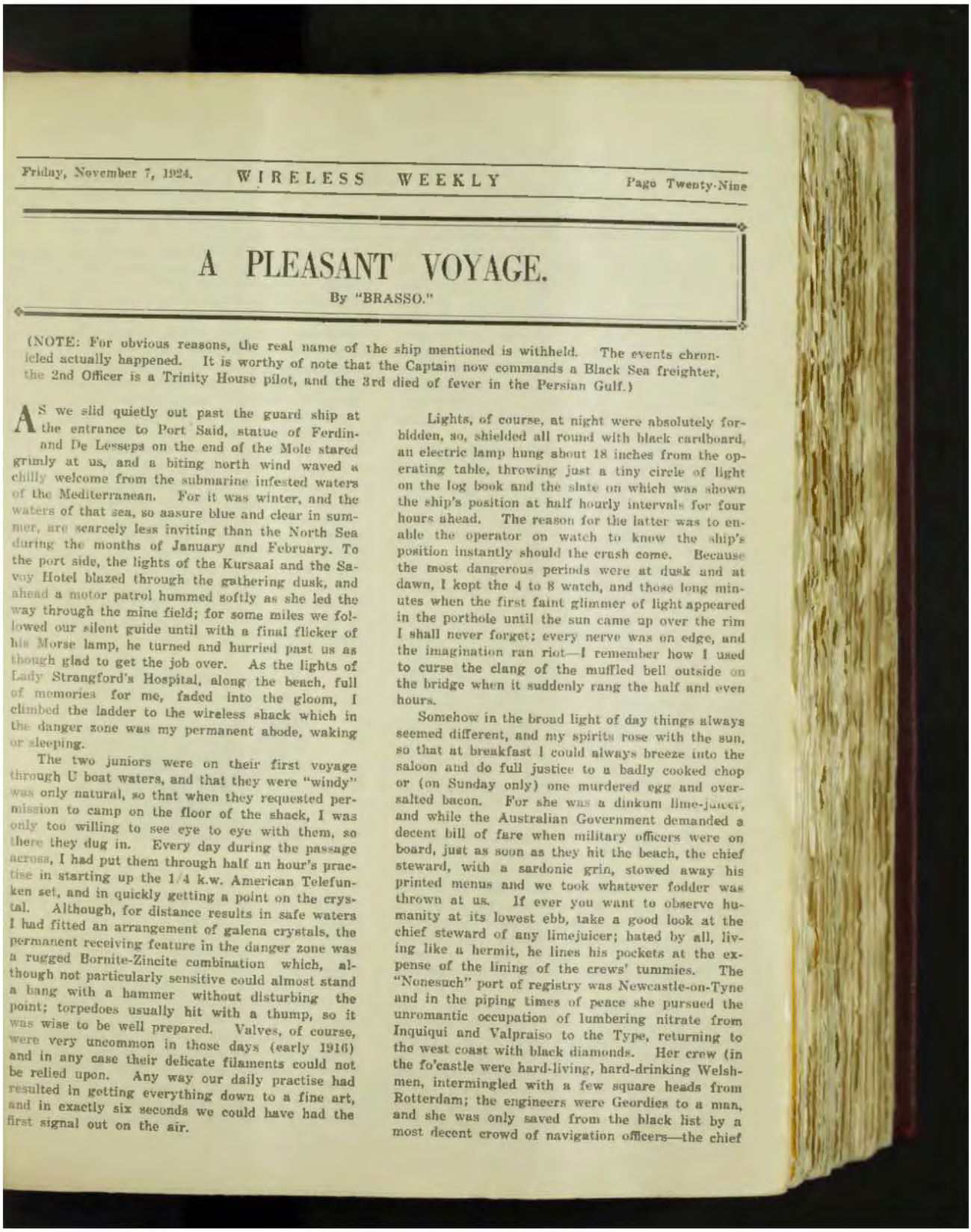
The set, consisting of 5 valves and a stage of push pull, worked well, and was used freely between dances. Messrs. Wireless Supplies Ltd., kindly supplied the gear, Mr. W. A. Stewart being the operator. Mr. D. Graham made an efficient M.C. Towards the close Mr. A. Burrows thanked those who had so generously helped in making the evening a success, and invited any present to join the club, which, by the way, is approaching its 6th anniversary.

MURDOCH SOLID HEADPHONES.

Radio enthusiasts will be glad to hear that a large shipment of Murdoch Solid Headphones has just arrived.

The enormous demand for these famous headphones can now be met in full by all radio dealers.

On Wednesday, 29th October, Mr. W. L. Hamilton delivered a general all-round talk to the members of the Railway and Tramway Institute Radio Club.



A PLEASANT VOYAGE.

By "BRASSO."

(NOTE: For obvious reasons, the real name of the ship mentioned is withheld. The events chronicled actually happened. It is worthy of note that the Captain now commands a Black Sea freighter, the 2nd Officer is a Trinity House pilot, and the 3rd died of fever in the Persian Gulf.)

As we slid quietly out past the guard ship at the entrance to Port Said, statue of Ferdinand De Lesseps on the end of the Mole stared grimly at us, and a biting north wind waved a chilly welcome from the submarine infested waters of the Mediterranean. For it was winter, and the waters of that sea, so aasure blue and clear in summer, are scarcely less inviting than the North Sea during the months of January and February. To the port side, the lights of the Kursaal and the Savoy Hotel blazed through the gathering dusk, and ahead a motor patrol hummed softly as she led the way through the mine field; for some miles we followed our silent guide until with a final flicker of his Morse lamp, he turned and hurried past us as though glad to get the job over. As the lights of Lady Strangford's Hospital, along the beach, full of memories for me, faded into the gloom, I climbed the ladder to the wireless shack which in the danger zone was my permanent abode, waking or sleeping.

The two juniors were on their first voyage through U boat waters, and that they were "windy" was only natural, so that when they requested permission to camp on the floor of the shack, I was only too willing to see eye to eye with them, so there they dug in. Every day during the passage across, I had put them through half an hour's practise in starting up the 1/4 k.w. American Telefunken set, and in quickly getting a point on the crystal. Although, for distance results in safe waters I had fitted an arrangement of galena crystals, the permanent receiving feature in the danger zone was a rugged Bornite-Zincite combination which, although not particularly sensitive could almost stand a bang with a hammer without disturbing the point; torpedoes usually hit with a thump, so it was wise to be well prepared. Valves, of course, were very uncommon in those days (early 1916) and in any case their delicate filaments could not be relied upon. Any way our daily practise had resulted in getting everything down to a fine art, and in exactly six seconds we could have had the first signal out on the air.

Lights, of course, at night were absolutely forbidden, so, shielded all round with black cardboard, an electric lamp hung about 18 inches from the operating table, throwing just a tiny circle of light on the log book and the slate on which was shown the ship's position at half hourly intervals for four hours ahead. The reason for the latter was to enable the operator on watch to know the ship's position instantly should the crash come. Because the most dangerous periods were at dusk and at dawn, I kept the 4 to 8 watch, and those long minutes when the first faint glimmer of light appeared in the porthole until the sun came up over the rim I shall never forget; every nerve was on edge, and the imagination ran riot—I remember how I used to curse the clang of the muffled bell outside on the bridge when it suddenly rang the half and even hours.

Somehow in the broad light of day things always seemed different, and my spirits rose with the sun, so that at breakfast I could always breeze into the saloon and do full justice to a badly cooked chop or (on Sunday only) one murdered egg and oversalted bacon. For she was a dinkum lime-juicer, and while the Australian Government demanded a decent bill of fare when military officers were on board, just as soon as they hit the beach, the chief steward, with a sardonic grin, stowed away his printed menus and we took whatever fodder was thrown at us. If ever you want to observe humanity at its lowest ebb, take a good look at the chief steward of any limejuicer; hated by all, living like a hermit, he lines his pockets at the expense of the lining of the crews' tummies. The "Nonesuch" port of registry was Newcastle-on-Tyne and in the piping times of peace she pursued the unromantic occupation of lumbering nitrate from Inquiqui and Valpraiso to the Type, returning to the west coast with black diamonds. Her crew (in the fo'castle were hard-living, hard-drinking Welshmen, intermingled with a few square heads from Rotterdam; the engineers were Geordies to a man, and she was only saved from the black list by a most decent crowd of navigation officers—the chief

a huge Cardiffian, 2nd a Gravesend publican's son, and the third a ticketless apprentice hailing from Ipswich. The skipper was a big rip roaring cuss from Plymouth who quite early in the piece hit the booze with a hard bang and was rarely ever seen except during his rare sober spells. He was frequently heard however, because his cabin was immediately below the wireless shack and his thunderous snores were wafted up through the skylight in a continual static stream. The real captain, and the man to whom I looked for guidance was the second officer; he was the kind the Americans aptly term "a he man"; his only obsession being a deep hatred for the skipper and all his ways.

Bound for Genoa, our passage as far as the Straits of Messina was uneventful save for a few stray S.O.S. calls from torpedoed vessels in the fairly close vicinity. Now and again a patrol slid up alongside, asked if we had heard any gun fire, seen any submarines, picked up any lifeboats and other equally gay and cheerful questions. These being satisfactorily answered, the officer on the bridge waved a megaphone at us, grinned blithely, and away she would go.

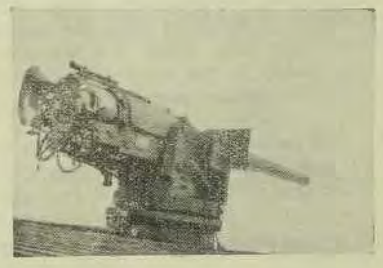
After passing Messina we ran up the Italian Coast and at nightfall were somewhere abreast of Naples.

It was one of those clear winter nights without a breath of wind, the sea dead calm, and the sky so ablaze with stars that it was almost like moonlight; added to this the dull glare from the volcano of Stromboli cast un unearthly glow over the face of the waters. At nine o'clock I was sitting yarning with the second operator, who was wearing the phones, when a tap came at the bulkhead, and as I walked out into the bridge the third officer pointed to a hospital ship crossing our bow some distance ahead. We watched the big red cross and the row of green lights for some time until we gradually came up closer, and just in case the other vessel changed course and to let him know that we were close upon him, the third officer switched on our sidelights for a couple of seconds. And, as if by magic every light on the Hospital ship went out.

Grabbing a telescope, the third peered intently ahead, and then said tensely: "It's a submarine"; then to the helmsman "Hard astarboard", and round she came in a wide sweep while the third rushed to the engineroom telephone and slipped the engineer on watch the glad tidings. And so the chase was on; and in a few moments our speed went up to 14 knots, an emergency gang was in the stokehold, and the second officer was on the bridge, cool and calm, complete master of the proceedings. The skipper snored placidly in a drunken sleep in the chartroom.

Zigzagging and twisting, we sought to shake off our Hun friend, but maintaining just about the same position, she was always just dimly visible through the telescope about a mile astern. She hung there like the shadow of fate, grim and inexorable. Meanwhile I took over the phones from the second operator, who, together with the third was quickly absorbed in the stokehold gang. The ship throbbed and shook under a pressure she had never felt before. About ten o'clock the second officer came in and put the question bluntly. "If we send an S.O.S., will she shell us?" There could be only one answer to this.

Without doubt friend Hun was trying hard to manoeuvre us into a position where she could pump a pill into us; failing in this objective, she would undoubtedly endeavour to give us the coup de grace by gunfire. This much I communicated to the second, who pondered a moment and then said "Right, we'll take a chance, go to it," and a moment later he was bawling to the gun crew on the poop to stand by for action. More out of a morbid sense of curiosity I took the time on the second hand of my wristlet, and exactly eighty



Our Gun

seconds after my last S.O.S., trailed into silence there was a distant boom of a gun and almost simultaneously the scream of a shell as it whizzed by overhead. At the same instant came the crash of our own 4.7 gun and in the phones the harsh clatter of I.C.N (Naples Radio) as he flashed back "O.K". Immediately I switched over again and, with my spine creeping while I waited for the next shell I ripped out "SOS SOS, 'Nonesuch' Lat——N, Long ——E, chased and gunned." Back came I.C.N and hard on his heels I.C.B (Genoa Radio), followed by B.Y.Y (Malta). Three seconds of dead silence, then from every Coast station along the Medi-

terannean came the call "L.L.W.W (the war time C.Q. call) "Nonesuch" position so-and-so chased and gunned." Traffic ceased immediately and there was uncanny silence while hundreds of ship and shore operators listened for my next call. Then came the boom of the distant gun and the scream of the shell, and believe me, I had its course mentally mapped out, with a landing place already selected on the back of my neck. It missed, however, and just then there was the boom of our own gun, and a moment later a wild yell from the gun crew. Up came the word that the U boat had dropped back, and a wild hope that we had finished him was dispelled when again came the whine of another shell coming closer and closer—there was a thud—a fraction of a second of dead silence—and then a terrific explosion and a blinding glare as, the shell burst in the wing of the bridge. Various thumps and crashes denoted the passage of pieces of timber and I became suddenly aware that the stars were peeping at me through the roof of the cabin, portion of which was non est. A numb feeling in my right arm also denoted that the flight of a lump of timber had been arrested, but fortunately nothing was broken. The only damange done to the wireless set was a broken Leyden Jar, a cracked unit panel, and a ruined picture of Jack Binns which had reposed on the wall. The jar was quickly replaced, and the fact that signals were still coming in showed, to my relief, that the aerial was still up and doing. My chief concern was for the second officer, for I knew that without his guiding hand, the game was not worth a candle. However, just as I was getting an acute attack of "wind-up", his face appeared in the porthole with the remark "All set? Nobody hurt out here. We were on the other side"—just then another shell burst on the boat deck. With that I discarded all rules and regulations and sent another urgent call as follows: "'Nonesuch' hit twice. If there is a patrol handy please signal when you will be up with us. Wireless may go any moment." To this there was complete silence; apparently there wasn't a patrol within miles of us. Meanwhile our gun crew were having the time of their lives. Without anything visible to fire at, they waited for the flash of the Hun's gun and then put one over in that direction. However they had apparently been successful in driving him back so far that his own aim was uncertain, because with the reception of one or two, the rest of his love messages went wild.

About one o'clock in the morning we came abreast of the island of Elba, and here the second officer executed a shrewd move. Running in close under the Island where the loom of the land threw a deep gloom, he came swiftly round in a narrow sweep and ran straight back over our course—and in the darkness we gave Hun the slip. So that was the end of the little adventure.

Up from the stoke hold came two grinning and grimy junior operators after shovelling coal for over two hours.

Next day we passed in through the entrance at Genoa, battered and worn, and our feelings were not at all relieved when we passed a long row of Italian destroyers lying in the harbour. According to the British residents, the Italian patrols swept gaily out in the morning and came in again at dusk—no wonder we couldn't raise a patrol.

However, the music of the Cafe Olympia, the sight of the gay crowds along the Via Settembre and the military band in the Piazza De Ferarl that night soon eased our ruffled feelings and we decided that we were indeed, on a pleasant voyage.

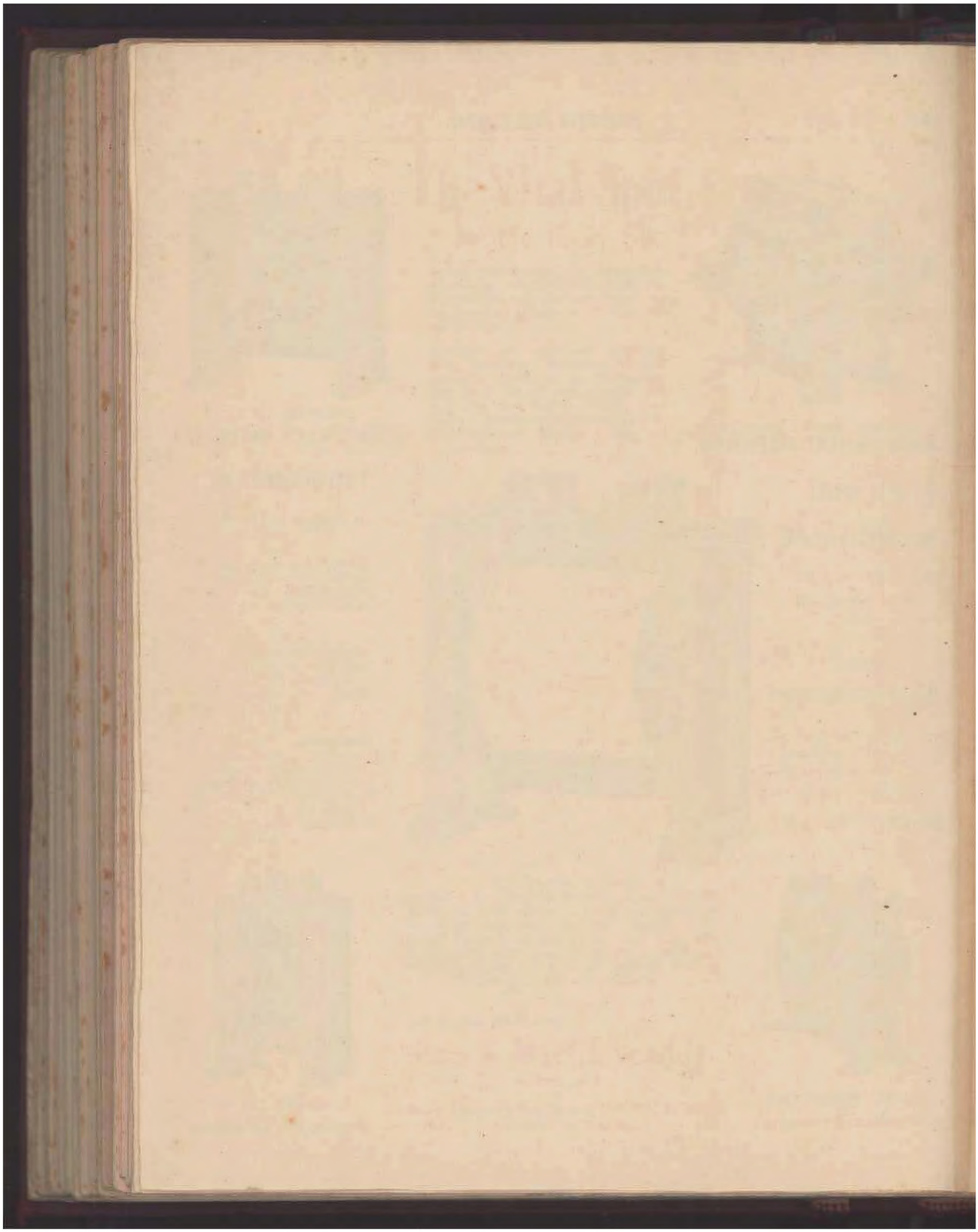
AUSTRALIAN PRODUCTS.

Manufactured locally by the Electricity Meter Manufacturing Co., Ltd., which concern makes electrical meters for the Government, the Signal Audio Frequency Transformer is a very good sample of what can be produced in Australia. This instrument has several features, among which may be mentioned its delicate precision of adjustment, its strength and the fact that it is magnetically shielded in a shell of original design and neat finish. Every Signal transformer is guaranteed by the manufacturers and distributors. The retail price is 21/-. Wholesale distributors are Messrs. United Distributors Ltd.

An addition to lines "Made in Australia," is the range of completely shielded S.S. transformers, manufactured by Messrs. Scott Brothers, of Reuss St., Forest Lodge, Sydney.

The novel methods applied in making these transformers efficient will appeal to all users. They are impregnated with insulating compound which renders the coils entirely waterproof, and the insulation is of the order of approximately 750 megohms.

After being assembled they are finally tested at the pressure of 1000 volts. Being listed at the low price of 20/-, they should find a very big demand, as they have all the features needed to give efficiency, with clear undistorted volume.



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SAME PRICES.
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CONSTRUCT YOUR OWN BROADCAST RECEIVING SET. WE SUPPLY COMPLETE BUILDING INSTRUCTIONS AND ADVICE FREE WITH EACH ORDER.

SINGLE SLIDE BROADCAST CRYSTAL SET FOR HOME CONSTRUCTION.

1 Maple Base Board	2/-
1 Cardboard Tube	8d.
2 Maple Ends	2/-
4 ozs. 24 Enamel Wire	1/1
1 Slider and Bar	1/9
1 piece Moulded Ebonite	1/-
4 N.P. Terminals	1/4
1 Crystal Cup	6d.
1 Detector	2/9
1 .001 Fixed Condenser	9d.
1 Guaranteed Crystal	1/-
	14/9

DOUBLE SLIDE BROADCAST CRYSTAL SET FOR HOME CONSTRUCTION.

Similar Parts as Single Slide, as above	14/9
1 Additional Slider and Bar	1/9
	16/3

HEADPHONES.

Pico, 2000 ohms	£1	5	0
Mello, 4000 ohms	1	5	0
Murdoch's, 2000 ohms	1	8	0
Murdoch's, 3000 ohms	1	7	0
Fornier, 4000 ohms	1	10	0
Frost, 2000 ohms	1	12	0
Trimm's Dependable	1	10	6
Frost, 3000 ohms	1	17	0
T.M.C., 4000 ohms	1	17	6
Western Electric, 4000	1	17	6
Stromberg Carlson	2	0	0
Sterling Lightweight, 4000	2	4	6
Nutmeg, 2000 ohms	2	5	0
Trimm's Professional	2	5	0
Silvertown, 8000 ohms	2	10	0
Baldwin Type C, Mica Dia.	2	10	0

LOOSE COUPLER BROADCAST CRYSTAL SET FOR HOME CONSTRUCTION.

1 Maple Base Board		3/-
1 Set Maple Ends		2/9
2 Cardboard Tubes		1/-
4 ozs. 24 Enamel Wire		1/1
4 ozs. 30 Enamel Wire		1/3
1 Slider and Bar		1/9
1 Switch Arm		1/9
10 Contact studs		10d.
2 N.P. Stops	0	3
1 Yard Bell Flex	0	3
1 Piece Moulded Ebonite	1	0
4 N.P. Terminals	1	4
1 Crystal Cup	0	6
1 Detector Arm	2	9
1 .001 Condenser	0	9
2 Extra Phone Terminals	0	8
2 Secondary Slider Rods	1	6
1 Guaranteed Crystal	1	0
	[illegible]	[illegible]

PARTS FOR 3 VALVE BROADCAST RECEIVING SET.

1 Bakelite Panel, 16 x 6½ x 3/16	£0	11	3
1 .001 Variable Condenser, with Vernier	1	10	0
2 30 ohm Rheostats	0	10	6
1 Battery Switch	0	4	0
8 N.P. Terminals	0	2	8
1 2-Panel Plug	0	3	3
1 3-Panel Plug	0	3	9
1 Extension Handle	0	1	10
1 .00025 Condenser and Grid Leak	0	0	9
3 Valve Holders	0	12	0
2 Jefferson "Star" Transformers	2	5	0
1 Single Circuit Jack	0	4	6
Panel Wire, Solder, etc.	0	2	0
Maple Cabinet	1	10	0
	£8	4	[illegible]

ACCESSORIES.

4 Mounted H.C. Coils, 150 to 2000 metres	£1	11	3
3 UV 201A Valves	4	10	0
1 6V 40 amp. Accumulator	0	8	0
2 45-volt B Batteries	1	5	0
Head Speaker and Head Phones, as selected, see price list.			
	£[illegible]	18	0

PARTS FOR 4 VALVE BROADCAST RECEIVING SET.

1 14 x 8 x 3/16in. Bakelite	£1	[illegible]	[illegible]
1 .001 Variable Condenser, with Vernier	1	10	0
1 .0005 Variable Condenser, with Vernier	1	7	0
2 2-Panel Plug	0	7	6
1 3-Panel Plug	0	3	9
1 14 Extension Handle	0	3	10
3 30 ohm Rheostats	0	15	9
1 Battery Switch	0	4	0
8 N.P. Terminals	0	2	8
4 V.T. Holders	0	16	0
2 Jefferson "Star" Transformers	2	5	0
1 .00025 Fixed Condenser	0	0	9
1 Freshman Variable Leak	0	6	6
Panel Wire, Solder, etc.	0	2	0
1 Maple Cabinet	2	5	0
1 Single Circuit Jack	0	4	6
	£11	17	[illegible]

ACCESSORIES.

8 Mounted H.C. Coils, 150 to 2000 metres	£2	0	0
4 UV 201A Valves	6	0	0
1 6-volt 40-amp. Accumulator	4	0	0
2 45-volt "B" Batteries	1	5	0
Head Phones and Loud Speakers as selected, see Price List.			
	£24	11	[illegible]

LOUD SPEAKERS.

Grelan, without Unit	£2	10	0
Manhattan Gramophone Attachment	2	0	0
Western Electric, 4000	2	19	6
Sterling Dinkie	3	0	0
Clearltone	3	10	0
Sterling Baby	4	15	0
Amplion, 39	4	0	0
Amplion, 41	5	0	0
Amplion, 3	6	12	6
Western Electric, 4004	7	2	6
Stromberg Carlson	7	10	0
Amplion, 19	8	0	0
Manhattan Adjustable	8	0	0
Magnavox, M4	8	15	0
Amplion, 15	9	0	0
Ethovox	9	0	0
T.M.C.	9	0	0
Sterling Andover	9	0	0
Magnavox R3	10	10	0

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

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It is our intention that every article listed herein shall be truthfully described. Therefore, we guarantee everything you buy from us to be satisfactory in every detail. You take no risks whatever in sending us your order, for, unless you are completely satisfied with the goods and your saving, you may send back everything you buy from us, and we will promptly refund your money and all transportation charges you have paid.

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WHAT TO LOOK FOR IN TELEPHONES

By C. L. HARRIS

IT is a recognised fact that the telephone head set is a vital element in every wireless receiving set and this holds true regardless of whether a crystal set or a valve set is involved. In the case of a valve receiving set, it is essential that the telephone head set should compare in sensitiveness with the remainder of the apparatus. With the crystal receiving set the substitution of sensitive telephone receivers for poorly constructed ones will practically double the efficiency of the set. In view of the extreme importance of the head set in wireless work, it is rather surprising to find that the average user does not understand the basic principles involved in the choice of a telephone receiver.

Resistance not All-Important.

There are still a number of radio enthusiasts and also radio dealers who judge a head set solely on the basis of its resistance. Without a correct comprehension of other elements involved, such a basis is sure to prove extremely misleading. Since the telephone head set used in connection with radio receiving must respond to very minute currents, its most important requirement is that of high sensitivity. It must also be designed to give loud responses without rattling or distortion. The materials used must be such that the receiver will retain most of its magnetism indefinitely.

Beginners often bring up the question as to why good telephone receivers cost more than the poor ones, although the latter apparently look the same and are claimed by their makers to be suitable for all purpose.

It would be just as logical to compare an expensive watch with the ordinary variety. It is true that both are watches and both perform the function of telling the time, but the high-grade watch is an accurate, dependable instrument which will stand the test of time. In many ways the high-grade telephone receiver is comparable to the watch. Like the watch, it is a sensitive, finely constructed precision instrument made to give service for years. However, it differs from the good watch essentially in its ruggedness and ability to stand abuse. While the analogy between telephone head sets and watches is very apt, it should be noted that the difference in price between a high-grade telephone head set and a poorly constructed one is not nearly as great as the difference in price between the good and the poor watch.

The telephone receivers used for radio receiving sets operate on the same principle as ordinary telephone receivers. The incoming currents pass through electro magnets, thus affecting the strength of the magnetic field and in this way causing the soft iron diaphragm to vibrate and emit sounds of practically the same nature as those entering the distant transmitter.

Watch the Number of Turns.

Our technical friends would state that the magneto-motive force is equal to the product of the amperes flowing times the number of turns. Since the current flowing in radio receiving circuits is necessarily small, it is therefore essential to have as many turns as possible in order to build up the ampere-turns, and hence the magnetic force.

In order to get a large number of turns into the small space available it is necessary to use very fine wire. The use of this wire results in a high resistance telephone receiver and this is what originally gave rise to the high-resistance method of judging telephone receivers referred to above.

Because of the difficulties involved in winding very fine wire, certain American manufacturers substituted thicker German silver wire, having high resistance in the place of the fine copper wire. In this way they obtained a high-resistance receiver, but one lacking in sensitiveness because of the vastly decreased number of turns. From this it is obvious that in order for a resistance rating to mean anything in connection with a telephone head set, it should he accompanied by a statement of the size and material of the wire used in winding the receiver as well as the number of turns.

When the fact is taken into consideration that No. 40 B and S gauge wire takes up more than twice as much room as No. 44 wire, the advantage of using finer diameter No. 44 wire becomes apparent at once. More than double the number of turns can be put in the same space and thus a very sensitive telephone receiver can be obtained.

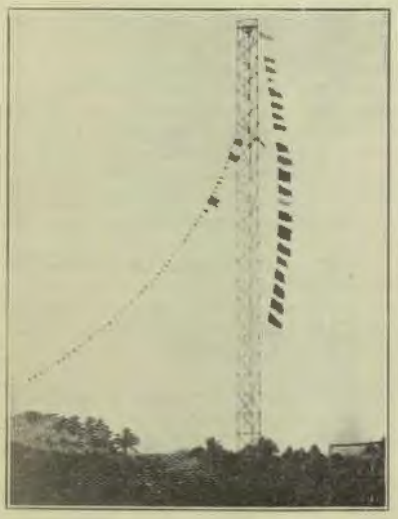
However, trouble comes as soon as a manufacturer attempts to wind magnets with No. 44 wire. In order to get quantity production magnets must be wound rapidly. Anyone who has had exper-

lence with No. 44 wire knows that machines cannot wind such fine wire rapidly without breaking the wire. As a result the inexperienced manfacturer compromises by using No. 40 wire. Even if a much larger, heavier and bulkier receiver is made it is impossible to get the same number of turns as where No. 44 wire is used.

Accurate Construction Very Important.

Of course, size of wire is only one of the factors entering into the construction of a good head set. Accurate construction is very important to insure a minimum air gap and one which will be absolutely the same in every telephone receiver turned out. The soft iron diaphragms must be of uniform thickness throughout and each diaphragm must be tested to respond to the same frequencies. The magnetic circuit must be properly designed to ensure a strong magnetic field and permanency of magnetisation.

In this connection the materials used for constructing the permanent magnets must be specially selected. If the steel used for the permanent magnets is not properly selected and heat treated the magnets will be anything but "permanent."



The 280 ft. mast at Townsville Radio. It is a portion of one of the masts captured from the Germans at Bita Paka, in 1914. Townsville handles the bulk of the traffic to the Mandated Territory, and to the Islands. The station is fitted with a 25 k.w. type, one transmitter (similar to those installed on battleships), a 2KW Poulsen arc, a 1½ k.w. loose coupled transmitter, with quenched gap, and a 2 K.W. De Forest valve set. Motor alternators are used for the first two sets, and the arc is fed by a motor generator supplying 500 volts D.C. The valve set is supplied by motor, driven from the town mains, driving two generators, one feeding the filaments at 15 volts, and the other the plate at 2000 volts D.C. Reception is effected with Rabaul on a type 55 Marconi 7 stage amplifier, using 6 H.F. and one detecting. On 600 metres reception is done on a Model L receiver. V.J.Z., Bita Paka is equipped with a similar valve transmitter and works at schedule times on 2500 metres with Townsville.

The photograph below shows the standard receiver in use throughout the coastal service.

D. X.

Trevor Evans, Blayney, sends us a pretty substantial list:

N.S.W.—2CM, 2ZG, 2SO, 2HM, 2GQ, 2YI, 2HH, 2YG, 2GR, 2YA, 2FA, 2RA, 2UW, 2CH, 2BK, 2IJ, 2OI, 2ZZ, 2GF, 2XA, 2DS, 2LO, 2ZN, 2JM, 2CR, 2KC, 2WA, 2BF, 2RJ, 2AR, 2JS, 2ME, 2WV, 2EK, 2CS, 2ZR, 2CJ, 2BB, 2DE, 2DK.

Victoria: 3BD, 3BV, 3BH, 3EM, 3ZL, 3BY, 3JH, 3GF., 3JU, 3BN, 3BQ, 3UX, 3AY, 3SW, 3BC, 3DD, 3HH, 3BL, 3RY, 3GI, 3BK, 3CB, 3EP, 3XF, 3DB, 3GL, 3XN, 33XO, 3LM, 3ZN, 3OT, 3AP, 3AR, 3PM.

Queensland: 4CM, 4CK, 4EG, 4CW, 4AE, 4AN, 4CF.

South Australia: 5BQ, 5AD, 5BN, 5AH, 5AI, 5DA, 5BN, 5BF, 5AC, 5WJ, 5LO, 5BG, 5BO.

Tasmania: 7BN, 7BK.

New Zealand: 1AX, 4AA, 2AC, 4YA, 1YA, 2AQ, 2YB.

INTERSTATE NOTES

WEST AUSTRALIA.

"WE will now take up the offering," and those seated around the loud speaker helped themselves to another of their host's excellent cakes, and said nothing. This is perhaps just a little incident in the homes of many who listen in to 6WF's broadcasted church services on Sunday evenings. A few weeks ago the Cathedral, Church of England Service was on the air, the chimes from the tower even being heard in the farthest outback farm. Last Sunday the Westley Church had its turn, and so on; 6WF hopes to broadcast all the various religious services in turn. I addressed one of the sidesmen of the church with the following remark: "I suppose you experienced rather a shortage of threepenny bits when your service was broadcasted?" "Oh, no," he replied, "two listeners in each sent in a pound note!" So there you are.

One hears "nought" of our radio societies lately, except perhaps, the Subiaco Club, which continues to give publicity to its reports in the Wireless Press. They have but recently completed the construction of what is termed the W. Gil-white Memorial Set. It is a handsome 4 valver in a polished garrah cabinet and will prove an added advantage in use with the 3 valve unit set.

A remarkable boom in wireless is spreading here; at least three new firms have commenced operations, and loud speaker demonstrations are becoming more popular. Even the business abode of a local jeweller has a radio receiver to entertain the workers, and is installed mainly, of course, to obtain the correct time which is sent at 1 p.m. from 6WF, and issues forth in the form of a single gong strike.

The Perth Academy (Director Mr. P. Burt) has obtained the services of a qualified instructor and classes in both theory and practical work are in progress. Students are prepared for the P.M.G's Proficiency Certificate Examination, also the new Amateur Proficiency Certificate.

Radio Inspector Scott, whose den is located at the G.P.O. buildings, finds it hard to cope with the excessive work lately. Continual appeal has been made to the authorities for an assistant; but no. Having to "father" the installation of each vessel that enters port, and also attend to intended broadcast listeners clamouring for experimental licenses, coupled (tightly) with the pleasure (!) of seeing thousands of aerials he has no record of, on his Perth to Fremantle route, does not improve matters.

Sydney Farmers Ltd. (2FC) has lost its glamour as far as W.A. listeners (on the coast side of the Parling Range) are concerned. There is no doubt about it that there is a decided difference in long distance telephony signals in Perth, from say, what there is in any wheat farm or outback country. Some have it that an unusual deposit of iron stone materials existing all along the range is the culprit; as this seems to be the only reason forthcoming at present, we can do nothing but accept it. Perth has not yet been accused of being a blind spot. There has been no cause for the assumption although certain spots on the coastal steamship route to Albany around the Cape are notorious in commercial work.

The manager of a prominent firm of dealers, to wit, Mr. Wilkes, of Craig and Co., in conversation with the writer recently remarked that one thing he wished to impress on the firm's salesmen was "leave out Sydney," meaning of course that he did not wish to convey to persons interested that their sets were guaranteed to receive 2FC. "What you can get in Perth," he went on, "this side of the Ranges, I would not give you twopence for."

6AM9, Mr. P. Kennedy (Mt. Lawley) though a professional engineer, is one of our most enthusiastic amateurs, and a very active transmitter. He can often be heard with a beautifully clear c.w. note, carrying out two way work with the fives, threes and twos.

6BN (Mr. A. E. Stevens) is at present in the midst of a reconstruction period, having recently changed quarters. The transmitter is being remodelled, special attention being paid to counterpoise and earth system. 6BN expects to be brass pounding again in about a fortnight's time. We all know this amateur's records in the past, some 800 miles on an input of 1 watt, and most of us are familiar with the real high class telephony (with the perfect modulation) he was wont to give us, so we are looking to 6BN to let South Africa

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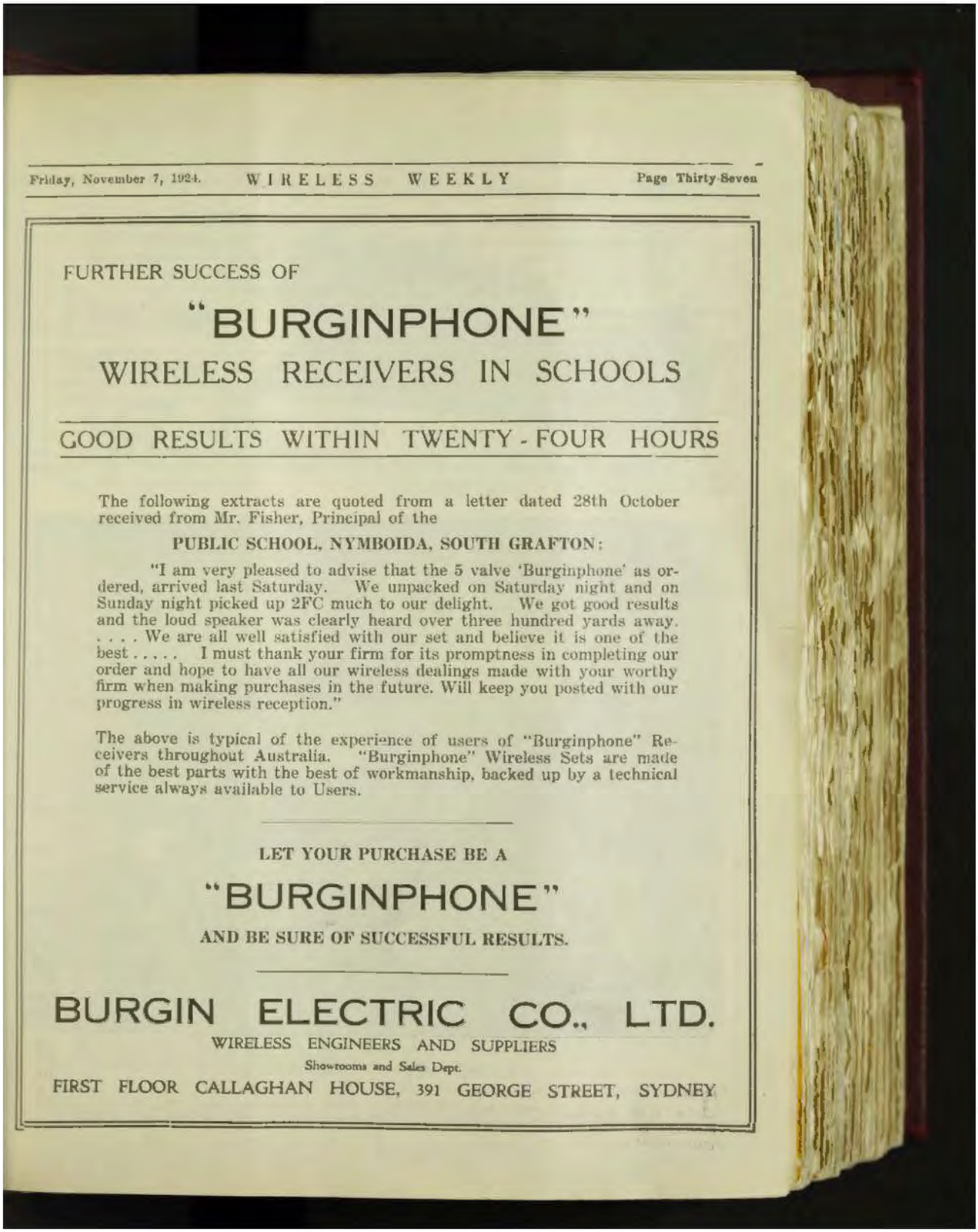


(Continued from Page 36)

know we are a lively bunch. 6BN's cheery voice was heard from 6WF some time ago, when the Affiliated Radio Societies' Committee secured his services to give a brief enlightening chat on the value during the experimenters' half-hour. For all his magnetic personality before his own microphone for months past, he admits that the night he had to face the studio "soap box" he was in a blue funk. Listeners, happily, did not know this fact. Listeners never realise the terror the microphone has!

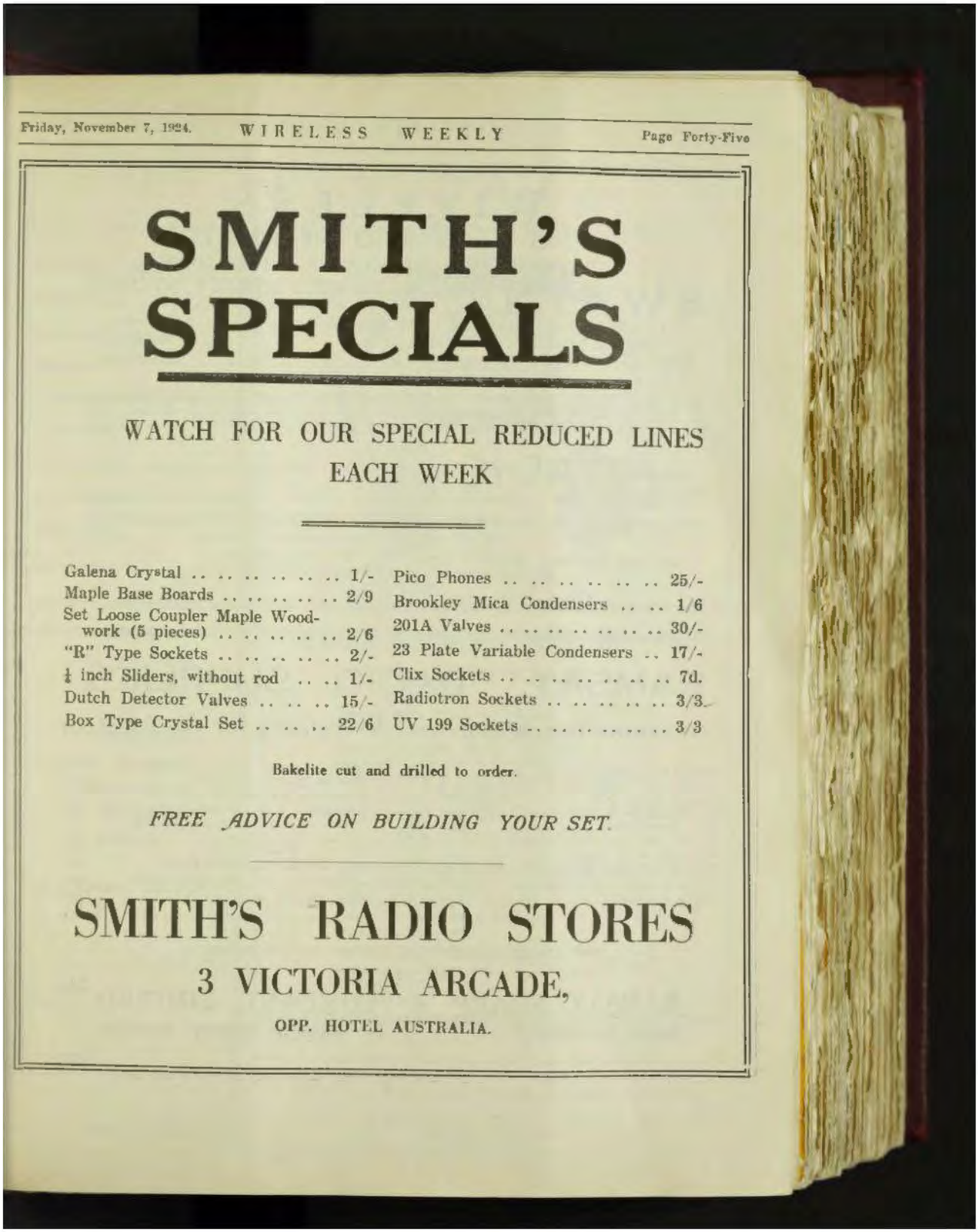
The B.B.C. people have been experimenting at the Zoo. They have found that starving the hyena makes him laugh like anything; that you have only to look at the sea-lion and he will cough loudly and that it takes a black man to make a lion roar.

All this is promised for the wireless at some future date; but in the meantime, could they not try reading aloud the Anglo-Soviet Treaty in the Morning Post office?—Daily Herald.

To any firm who gives good service to wireless enthusiasts and by means of unusually good value brings down prices to a level permitting the "little fellow" on a small wage to have a really good set—to such a firm we give our hearty endorsements. Murdoch's Special Offer, which inspired these thoughts, provide a one valve set in cabinet and with 2 honeycomb coils for 3 guineas, an achievement worth while. Firms that make such reductions are worthy of every encouragement.

RADIO 4EG, TOOWOOMBA, Q.

THE photograph above shows the station of Ted Gold, familiar on the air as 4EG. The set is a 15 watter, and the phone has been heard in every Australian State, and at loud speaker strength by Frank Acton, Invercargill. The reception records at 4EG include over 35 stations including KGO and 1YA.



(Continued from Page 16)

Walcha Road, N.S.W.

(To the Editor)

Sir,—Noting your items on oscillating crystals reminds me of an incident which occurred some months ago and may be of interest to those experimenting with the oscillating crystal, as I put this down as in some way being the cause of this mysterious occurrence. About eighteen months ago I had the pleasure of accompanying Mr. R. Hill, of the Western Electric Company, on a test which he was carrying out at the time of 2FC's transmissions with his Company's sets. On going to the experimental station of Mr. Killen, of Singleton, we met with an unusual experience. On his instrument bench stood a regenerative receiver and crystal set. On the end of the bench was placed the Western Electric Company's set and amplifier and hooked up.

When all was ready the sets stood in this fashion—the Company's set, single valve set, regenerator and crystal set, and on the wall hung a single Brown's adjustable phone connected to crystal set and all three sets were connected to the one earth. The aerial was connected to the Company's receiver and we lit up the valves of the Company's set and switched on the H.T. Donning the headphones, to the surprise of all three present, every sound that was made for 50 yards around, even a piece of paper blowing across the floor, was clearly and most perfectly reproduced in the head phones at good loud speaker strength. On removing the secondary of the crystal set, which was H.C. coil tuned there was no reproduction, but on replacing the coil back she came as clear as a bell and to leave the coil out was the only way we carried out the test without all the reproduction of the slightest sound that occurred in the room. All investigations failed to reveal the cause of the mystery and it is still unsolved. If anyone can throw any light on the cause of this incident I would be pleased to see it in the columns of Wireless Weekly." Yours, etc.,

D. CRAIG.

Inverell,
25th October, 1924.

(To the Editor)

Sir,—In the Correspondence Columns of your issue of the 24th inst., P. Boulton tells of his set giving the programme of 2FC although neither telephones nor loud speaker were connected to the set.

The same thing happened to me about 18 months ago in the days when no hairs were split

by the powers that be as to who were experimenters. My set was a five valve—one detector and four audios. The target—the Sydney experimenters, 350 miles distant by airline.

In my case, although all connections were intact, one secondary terminal of the 4th audio transformer was undone about ¼ to ½ of a turn, so that the wire was not making firm contact. The programme was reproduced at this semi-loose connection. My wife also heard it plainly.

I would suggest your correspondent extinguish the valves in turn, commencing with that in the last audio stage. This will help to locate the stage in his set responsible.

LEONARD L. SNOW.

362 Victoria St., Darlinghurst.
24/10/'24.

(To the Editor)

Sir,—It is not often I feel as bad as I do now, but I think I have a grievance here with a capital "G."

Some time ago, in fact a very long time ago, I received a letter inviting me to lecture before the Radio Clubs affiliated with the Wireless Institute. On my part this letter received very prompt attention as I am always willing to do my bit for radio. Well, not so long ago I was asked if one night per week would be too much for me to fulfil as regards lectures, and I replied that that suited me O.K. As an experimenter I always place radio before eating and frequently find meal-time highly objectionable.

Mr. Cutts, Hon. Secretary of the Croydon Radio Club, was kind enough to let me know that his Club was expecting me to lecture there on 25/10/'24, and gave me full instructions about finding the place. I thank Mr. Cutts for his thought in this matter but now my egg must bust.

It is now one day before the lecture is due, and that Committee has not done its job. I have received no syllabus of lectures, and I feel I am the goat. Should there be any Club I have disappointed, I offer my deepest regrets, and I ask the members and those of other clubs involved to take steps to put this matter on a proper basis.

Yours etc.,
PERCY L. SEWELL.

Sydney, 27/10/'24.

(To the Editor)

Sir,—It may be a matter of interest to your readers to know that our agents, Messrs. Sexton and Green, of Tenterfield, while listening in to K.G.O. on Wednesday, the 8th inst., with their

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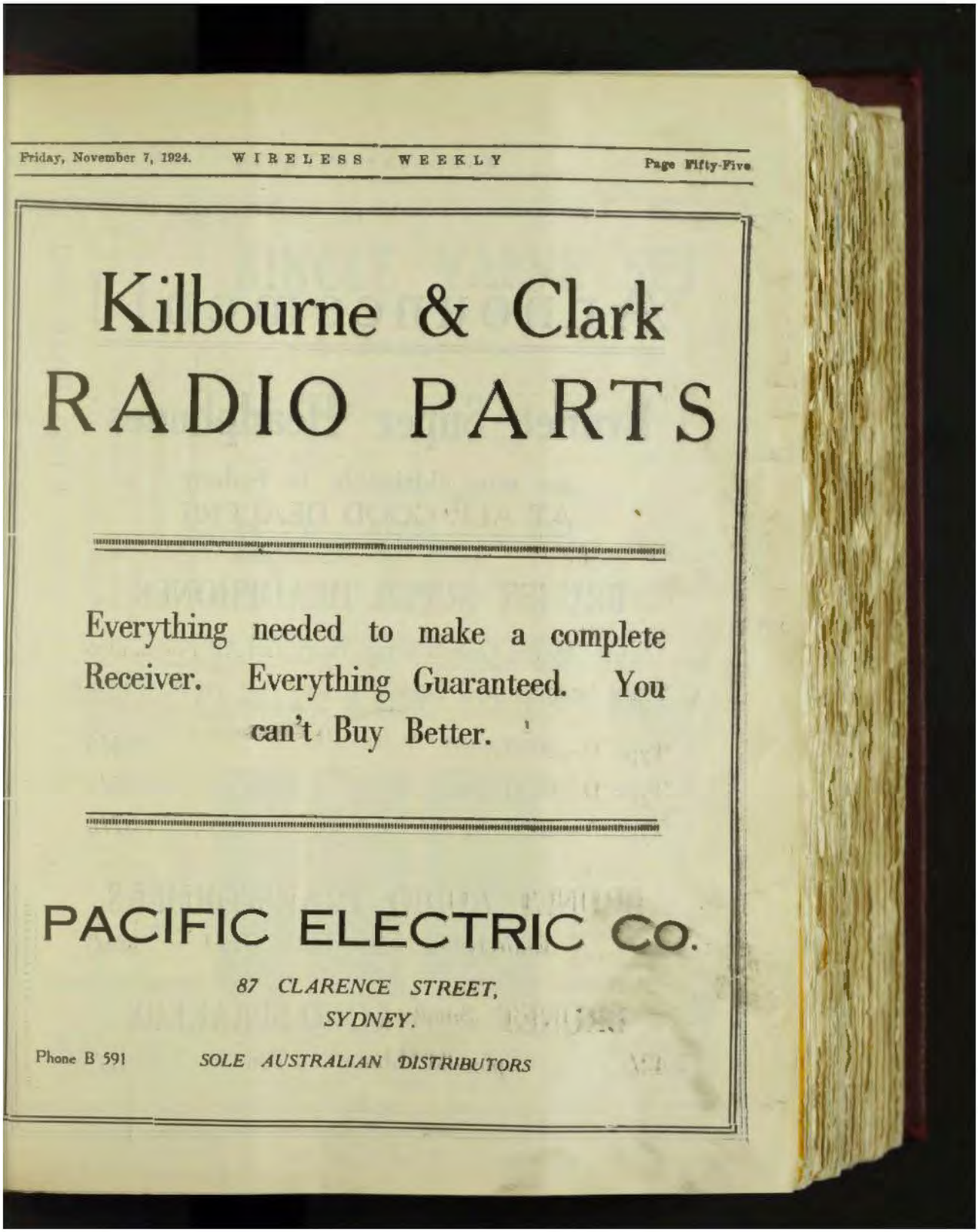
standard 5 valve Western Electric receiving set, heard Miss Wallace, of the Royal Arcade, Sydney, speaking from K.G.O.

Mr. Green informs us that after hearing several musical items from the Hotel Saint Francis, K.G.O. announced the following at 6.40 p.m. "K. G.O., Oaklands, California, Miss Wallace, an electrical engineer from Australia will now talk from the studio." Mr. Green states that Miss Wallace said she was speaking for the benefit of experimenters in Australia. Her remarks, however, were chiefly confined to her impressions of American business methods. One item which he particularly remembered was that she compared the tramway system to that of Sydney, and remarked how different the trams in an Francisco were to those of our own.

Mr. Green, not realising that Miss Wallace was a well-known personality in local radio circles, did not appreciate the importance of the reception of this particular item, or otherwise he would have notified us much earlier.

Yours etc.,
Western Electric Co. (A/lia), Ltd.,
H. F. Pearce,
Radio Department.



NEW ZEALAND.

Recently the N. Z. Government decided to appoint the Broadcasters' Agents of the Crown.

Teh bill provides in clause 6 that a portion of the fees in respect of wireless telegraphy licenses may be applied to assisting broadcasting agencies.

The new clause which is to follow immediately thereafter is in the following terms:

"6a (1) Every person or company for the time being party to an agreement with the Minister of Telegraphs in respect of a broadcasting service as provided for in the last preceding section shall during the currency of such agreement be deemed for the purposes of section 32 of the Patents, Designs, and Trade-marks Act, 1921-22, to be the agent of the Post and Telegraph Department duly authorised by the Minister of Telegraphs to make, use, or exercise, in connection with the maintenance of a broadcasting service pursuant to such agreement, any invention the subject-matter of any patent.

"(2) For the purpose of sub-section 2 of section 32 of the Patents' Designs and Trade Marks Act 1921-22, in its application in respect of any invention to which this section relates, any benefit or compensation received, directly or indirectly, from any person or company which is by this section declared to be the agent of the Post and Telegraph Department, shall be taken into consideration as if it was received from the Crown.

"(3) No person shall have any right of action against any person or company, being the agent of the Post and Telegraph Department as herein provided, in respect of any infringement of any patent arising out of the making, use, or exercise of any invention, the subject matter of the patent, in connection with any licensed broadcasting service.

"(4) Any moneys payable to a patentee, in respect of any invention to which this section relates, whether pursuant to an agreement made under Section 32 of the Patents, Designs and Trade Marks Act, 1921-22, or pursuant to an order of the Court or of any referee or arbitrator made under that section, may be paid out of the Consolidated Fund, without further appropriation than this section."

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