



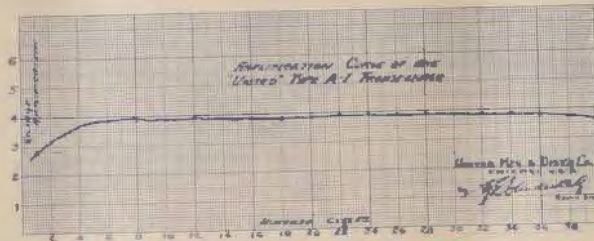
UNITED.....



Transformers

UNITED
Type A-1 Ratio 5 to 1

UNITED
Type A-2 Ratio 3½ to 1



Let Us Once and for All Times Settle This Question of Audio Amplification

Transformers, in order to give perfect audio amplification must have a characteristic curve as near to a straight line as possible. **United Audio Transformers** have just such a curve as can be seen from the above chart.

A perfect audio transformer necessitates the best of core and winding design and construction. In the **United** the best of core iron is used, a proper air gap is another reason for their perfect performance, and the winding construction and impedance further combine to make it the absolute best. The winding ratio and shielding present other items necessary to a perfect transformer.

The Good **United Transformers** have solved both questions in an admirable manner.

Last, but really first, a perfect audio transformer must give perfect practical results.

Recently, **United Audio transformers** came out **FIRST** in tests conducted by the University of California—conclusive proof that **United** is supreme.

Ask your dealers to show you these transformers, and other **United efficient Radio parts**. Variable Condenser, plain and vernier

Try them and convince yourself. Results speak louder than advertisements.

Try a United Radio Frequency Transformer. Now on the market

Dealers' Winter orders for Signal, **United**, Remler and other parts should be placed soon in order to give us an opportunity to protect dealers' requirements. Our sales are now many times larger than expected. Please advise us.

United Distributing Co. Limited
Manufacturers of Radiovox Sets (wholesale only)

Each Set Sealed for both Farmers and Broadcasters Ltd.
28 CLARENCE ST., SYDNEY and at 592 BOURKE ST. MELBOURNE



OFFICIAL ORGAN OF THE AUSTRALASIAN RADIO RELAY LEAGUE.

Vol. 3.

March 7, 1924.

No. 23

GET TOGETHER

In every branch of the many industries carried on in Australia, men have been forced to get together so that by united effort, they may gain and hold those privileges which go to make life worth living.

Unity is strength, and the sooner the experimenters realise this the better for themselves.

The experimenters have certain rights, and as recent events have shown, they must be safeguard-

ed. In America there is a strong, well organised body of experimenters whose opinions and suggestions are listened to with respect, not only by the authorities but by the general public.

In Australia we have need for something along the same lines and it is up to experimenters to stir themselves towards greater unity. Should ever the need arise to put up a protest upon any matter affecting the privi-

leges of experimenters, a concerted and powerful kick carries more weight than isolated mutterings.

Every holder of an experimental license should be a member of a Club, and between clubs there should be the closest co-operation.

So to those experimenters who are still carrying on along the same old narrow groove, we address this message. Get together!

Watch for our New Cover

Roster for Week ending 12th March, 1924

	7.30 to 8.0	8.0 to 8.30	8.30 to 9.0	9 to 9.30	9.30 to 10
Thur, Mar. 6	2 RA 2 GR	2 IJ 2 JM	2 AR 2 ZG 2 AR	2 UW 2 ZN	2 YI 2 ZZ
Friday, 7	2 IJ 2 GR	"	"	"	"
Saturday, 8	2 RA 2 GR	2 IJ	"	"	"
Sunday, .. 9	2 RA 2 GR	"	"	"	"
Mon.,10	2 RA 2 GR	2 IJ	"	"	"
Tues.,11	2 IJ	"	"	"	"
Wednes., ...12	2 RA 2 GR	2 IJ	2 VX	2 ZN 2 UW	"

In addition, the 10 Watters Club is working 2 CDM from 9 till 10.30.
Each transmitter works for 10 minutes.

Wireless Weekly

Subscription Rates:

Single Copies 3d. net
12 months (52 issues) . . 13/- post free
6 months (26 issues) . . 6/6 post free

All communications to be addressed to The Editor, Wireless Weekly, 33 Regent St., Redfern, Sydney.

Advertising Rates on application.

Wireless Weekly Cup Competition

This competition is open to any experimenter in any part of Australia.

Competitors are required to submit:

- 1. One photo not less than 4in. by 3in., showing the set complete.
2. One photo not less than 4in. by 3in., showing the wiring of the set.
3. An ink diagram not less than 4 in. by 3in., showing the circuit and wiring.
4. A small paragraph of not more than 100 words describing the set.
5. The nomination form shown here, witnessed by a member of the committee of a radio club or any trader advertising in Wireless Weekly, or a local J.P.

6. Entries should be sent to the Editor, Wireless Weekly, 33 Regent St., Sydney, N.S.W., and marked "Wireless Weekly Competition" in the bottom left hand corner.

Send in your nomination form now.

NOMINATION FORM

I
of

desire to enter my set in Wireless Weekly Cup Competition. I agree to abide by the conditions set down by the proprietors, and I solemnly declare that I am a wireless amateur as defined in page 2 of W.W., No. 15, Vol. 3, of January 18, 1924.

(Signed)

Witness

BROADCASTING

The Present Position.

It may safely be said that the chief item of interest, and incidentally the main topic of conversation in the wireless world to-day, and particularly in Australia, is the broadcast movement.

A certain stage has been reached in connection with broadcasting operations, and a somewhat bitter controversy is now raging in regard to not only the present state of affairs but also to possible future developments.

In considering the broadcasting question as far as Australia is concerned and is endeavouring to form some opinion and to arrive at some decision whereby all interest will be served, it is of vital importance that a broad outlook be maintained throughout. Many distinct sections are interested in the movement, each has its own particular opinion, and it is only by giving due consideration to each and all of them that arrangements satisfactory to all concerned may be finalised. A complete review of broadcasting, the most remarkable movement the world has ever witnessed, is necessary before any opinions may be ventured regarding a local scheme.

The Growth of Broadcasting.

The invention of wireless telephony by means of which it was found possible to transmit the human voice through countless miles of space without the aid of any conductor was quickly seized upon by enthusiasts in the United States of America as a means of popularising and adopting to everyday public use the science of wireless. Several companies whose business it was to manufacture radio equipment, erected studios and stations and transmitted from them programmes of speech and music. Public interest was awakened, hundreds at first, next thousands, and lastly hundreds of thousands of persons purchased receivers and the radio fever became a veritable epidemic.

The manufacturers found that it paid them to maintain the interest in radio and the exceptional demand for apparatus was such as to enable them to maintain broadcasting stations solely out of their increased profits. From the point of view of the "listener-in" this system was a splendid one. Countless stations worked, numerous pro-

A Broadminded Review.

grammes were receivable, and consequently great work could be done with a receiver. As time progressed, however, and the demand for radio apparatus dwindled, some of the stations closed down, while others found that it did not pay them to furnish high-class programmes.

To-day, the position in America is not at all too clear. The question of continuity of broadcasting operations is very much to the front, and, coupled with the question of the maintaining of high-class programmes, is being widely discussed by almost every journal of importance. The opinion which is rapidly gaining ground is to the effect that the providing of free programmes is a mistake, that broadcasting is a form of entertainment, and as such must be paid for by those who patronise it, and that some sort of scheme should be instituted compelling listeners to pay. Exactly what scheme should be adopted is being debated keenly. In some quarters a tax on vacuum tubes is suggested, in others a general tax on all radio apparatus is considered best, and it has also been claimed that the formation of a National Association with fees to support broadcasting would solve the problem. America, therefore, is by no means in a settled state over the broadcasting movement.

Loose-Coupler set, slonite panel, crystal detector, etc., 25/-; also re-wound phones, 2/6 each. Saturday afternoon. L. C. Davies, 449 Glebe Road, Glebe Point.

Tell your friends about "Wireless Weekly"

Real Snap—2 valve set, Radiotrans, £9. Must sell. Demonstration, C/o, Electricity House, George St.

Tell your friends about Our Big Competition

March 7, 1924.

WIRELESS WEEKLY

3

England's Broadcasting Scheme.

England followed America very closely in broadcasting, but not close enough to make several of her mistakes. When the matter was seriously taken up in England a scheme was evolved under which the B.B.C. (British Broadcasting Company) was formed. This was financed chiefly by six of the largest wireless and electrical concerns in Great Britain, but membership of it was open to any genuine manufacturer who subscribed even one £1 share. Stations were erected in several parts of England, and licence fees, and royalties on the sale of apparatus furnished the revenue necessary to maintain operations. Difficulties arose, however, and the B.B.C. for some time was in trouble owing to the growth of a great number of illicit stations and the evading of the payment of full fees by large numbers of listeners, who built their own apparatus. An appeal which almost amounted to a threat to cease operations if listeners did not "play the game" was very fruitful, and some slight alterations to the regulations put matters right. It will thus be seen that in England also the broadcasting problem hinged around the question of "who must pay?"

Australia's Experiences.

The efforts of a few experimenters who, with home-made transmitters, provided musical items by wireless, rapidly whetted the appetite of the Australian public for broadcasting, but it was very early realised that some definite scheme should be considered and adopted before any operations should commence. A conference of those interested was therefore summoned by the Postmaster-General, and after several days' sitting adopted the sealed receiver scheme, which is now the core of all contention. The conference was attended by many interested in wireless, but only one scheme, the present one, was put forward. Much bitterness is now being displayed regarding this scheme, but it must be admitted that that scheme was the only one put forward at the time. Although in the light of subsequent events opinions may have changed, it should, and must be remembered, that those present at the conference adopted it practically without the slightest opposition.

Briefly, the scheme provided for the allotting of certain bands of wave lengths for broadcasting purposes to the sale of receivers adjusted to respond only to the wave length of the

particular service for which they were intended. It was hoped in this manner to make broadcasting a service similar to an ordinary telephone service. The view was held that the broadcast listener was not theoretically or practically interested in wireless, that he merely wished to receive programmes for his education and amusement, and that the simplicity of control which a sealed set would ensure, would be appreciated by him. The owners of these sets would pay broadcast fees, those interested merely as experimenters would not be called upon to do so, and as several broadcasting concerns could work at the same time the competition which would result would ensure high-class programmes. The most important aspect of the scheme from the critic's point of view was that it was based mainly on the correctly assumed opinion that those desirous of listening to broadcasting should pay for it.

Present Day Difficulties

The Australian scheme has been in operation for some little time, and under it a commencement has been made with the broadcasting of very fine programmes at regular hours. Farmer and Company, Limited, a well-known Sydney firm, has expended a large sum of money on the erection of a very fine station, the establishment of up-to-date broadcasting studios, and the securing of the rights to broadcast high-class amusements, such as the programmes from leading theatres, etc. Broadcasters (Sydney), Limited, has also erected a very fine station, and has given a regular service of news and high-class vocal and instrumental programmes daily. The efforts of this company has been magnificent, when it is considered that they commenced operations on a much more limited scale than Farmer's. The quality of Australian broadcasting has been nothing short of perfect. Studio items have surprised even hardened experimenters, who, in many cases, have boasted that nothing in connection with wireless could surprise them.

It has been said, and rightly too, that the broadcasting movement must be the means of relieving isolation, and binding the lonely outposts to the centres of civilisation. And yet, in spite of practical demonstrations of utility, and in spite of a carefully considered scheme, broadcasting is in a very indefinite position to-day, and much discussion is taking place regarding it.

It is now claimed that the regulations are not effective, that the sealed receiver system is not practicable, that the public will not support it, and that instead of broadcasting being pushed ahead in Australia it is being retarded. Meetings have been held, and representations are to be made to the Federal Authorities for substitution of open receivers for sealed ones, and a different system of the collection of fees for broadcasting stations.

It is proposed that one licence only be issued to all classes of receiving stations, that one licence fee be paid by all, and that the stations be subsidised by the Government authorities from the licence fees collected.

In considering any question with a view to settling a problem, the matter must be viewed from the point of view of all parties concerned if something definite and satisfactory to all is to be arrived at, and these remarks apply very, very straightly indeed to a consideration of the broadcasting problem.

Broadly speaking, there are four parties to be considered in connection with broadcasting. These are, the broadcasting station owners, the manufacturers of radio apparatus, the retail traders, and the "listeners-in." Each of these sections has certain views, and certain rights to which it is entitled, and any disregard of one section by the other must, and will, prove fatal to the movement as a whole.

To calmly and logically sum up the question of broadcasting, finance must be taken as the main basis, and the question of who is to pay for the undertaking must be considered. Broadcasting is essentially a form of entertainment and amusement, and there can be no opposition to the argument that those who desire to avail themselves of it must be prepared to pay for what they get. And this brings us to a consideration of whether those holding experimental licences should pay fees. Had the suggestion been made six or nine months ago that all holders of experimental licences should pay fees there would have been a very vigorous protest. To-day, however, the opinion is gaining ground in experimental circles that all amateurs avail themselves of broadcasting, and therefore should pay fees. The extraordinary increase in applications for experimental licences since broadcasting commenced has demonstrated the truth of this contention. There are now between three and four thousand experimental licences held in this

Continued on page 4

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State alone, and applications have been pouring in at the rate of four or five hundred a month. As these applications have been made since the commencement of broadcasting, it is reasonable to assume that they are from persons who desire to hear speech and music. Furthermore, however much the already established amateur may voice his opinions, he knows from practical experience that the great majority of amateurs are broadcast listeners.

It must not for one moment be thought that this statement is intended to convey the impression that they are "pirates." Their action is perfectly legal under present regulations, but surely there should be either a tightening of, or amendment of, the regulations to prevent this wholesale reception without the payment of fees. Amateurs themselves are a thinking body of men, they have appreciated the efforts of broadcasting stations, and with few exceptions unhesitatingly support this view.

To return, however, to a closer consideration of the system. While it is realised that it is only fair that those who listen should pay, it must also be remembered that the radio manufacturers and the retail traders have much to gain from the successful carrying out of broadcasting operations. Only successful and high-class broadcasting can create a radio boom. Such a boom will build up their businesses, and it is therefore only fair that they, too, should contribute their share towards the maintenance of broadcasting. In some quarters there is a tendency to overlook this point, and, although it is, without doubt, due to carelessness, it is very important nevertheless. Exactly in what manner the small traders can contribute is a matter for discussion, and a satisfactory solution could be arrived at.

The broadcasting companies point of view is somewhat different. The establishing of a station and service requires the expenditure of much money. No person in his right senses is prepared to expend money in a business undertaking with no hope of reward. Views have been expressed, regarding governmental broadcasting, but this is quite out of the question, firstly on the grounds of finance, and secondly on the grounds of efficiency of control. A privately controlled station operated to return a reasonable profit to the owners is necessary for continuous and regular broadcasting—

any other description of operation cannot be tolerated. The maintaining of a service is a heavy expense, and revenue is needed. The payment of fees, and the royalties on apparatus, even if some of that apparatus is sold by the broadcast company itself, must be applied towards making the carrying out of a service a profitable undertaking to the owner.

This does not imply the necessity for huge dividends, it is generally recognised that those who are now conducting services are possessed of breadth of vision and of an outlook which results in their being satisfied to carry on with their work providing that they are treated fairly.

The point of view of the public is also somewhat different. The listener, or the prospective listener, pays money for his set, and pays fees for his service, and is therefore entitled to value. Such value can only be given if the stations are well financed and supported. Moreover, the listener above all demands must have continuity of service. If he purchases an instrument he must not, at the end of a few months, find that the programmes dwindle, and that the services decrease in value. If he does he will doubtless refuse to contribute his share the next year. It is therefore absolutely essential that the station owner, the trader, and the manufacturer, give him of their very best, and the closest and heartiest co-operation between all concerned should solve the problem.

CRYSTALS

Courtesy, "Popular Wireless"

Before the introduction of the "synthetic" crystals, iron pyrites found considerable use in wireless sets. It is difficult to find a satisfactorily sensitive crystal of the pyrites, but once obtained, such a crystal will be found to retain its sensitivity for a much longer period than many other types of crystals.

It is best used with a rigid steel contact, such as an ordinary pin, applied with a firm (but not too heavy) pressure. Iron pyrites also gives good and clear rectification when used in conjunction with a crystal of silicon, but the adjustment is apt to be rather difficult. The pyrites has also been used successfully in contact with zincite.

Iron pyrites has a lemon-yellow colour, much darker in shade than the analogous copper pyrites. Like zincite, bornite and many other crystals, it is brittle, and should therefore be used with care.

Apart from its radio uses, iron pyrites is interesting inasmuch as it generally contains a small percentage (about 1 per cent.) of the curious element selenium, which has been put to so many electrical uses. The sludge which settles in the tanks of sulphuric acid factories which have used iron pyrites as a source of sulphur is often rich in selenium, and the element can be obtained in the form of a brick-red powder by pouring the selenium-rich sludge into water.

Crude iron pyrites is fairly common, and is sometimes to be obtained in considerable quantities, especially in the neighbourhood of some chemical works. It might perhaps, pay the radio enthusiast to obtain a few lumps of this mineral, and after breaking them up, to test each piece for sensitivity.

Iron pyrites is a very much neglected crystal, speaking "wirelessly" of course. A really good specimen is capable of giving excellent results, both as regards tonal purity and signal strength, and also on account of the stability of the necessary contact. If at all obtainable, therefore, the pyrites is certainly well worthy of a thorough trial.

Everybody I meet now is telling me of some new sea-sick cure. Met Malcolm Perry in the street the other day. First thing he said was: "Charlie, you take my tip and be sure you have your six meals a day." "Why six, George?" I said (of course I always call him Jack 'cause his real name's Henry). "Why six, Claud?" "Oh," says he, "three down and three up."

If you will give me a few moments to change my boots, I will show you a few steps.

J. L. SCOTT Radio Engineers

We are putting on the market an Experiment-er's Wavemeter of good quality at a reasonable price.

Experimenter's wants catered for generally.

March 7, 1924.

WIRELESS WEEKLY

5

MAKING THE AMATEUR THINK

By Malcolm Perry

I want in this article to have a bowl at the transmitters, not at all with the idea of stumping them, but in order that my bowling may make them bat all the harder. It has been very interesting to me to observe the various methods adopted by transmitters in order to create records, and I want every transmitter to thoroughly understand that I am not attempting for one minute to be sarcastic, but as I see things, the experimenters' status is hanging in the balance, judging by a circular letter sent to all radio clubs. My sole desire is to strengthen and stiffen the amateur movement.

For, as I stressed in my previous article, a big body of trained experimenters with efficient transmitting and receiving stations would be an invaluable asset to Australia.

It occurred to me a few days ago, seeing a friend making preparations for his annual military training, that far from penalising the amateur and charging him a fee for the right of experimenting, that it would be a reasonable thing for the Government to subsidise him. My friend, who is shortly going into camp, will be paid for his services, but what is it costing the Government to maintain an efficient army of wireless men? Why, nothing at all, and they are actually making a revenue out of them in license fees. I think it is the duty of the Wireless Institute to bring these facts under the notice of the Minister for Defence, as it is to the Institute that all amateurs are looking for a lead. Has not the Government actually subsidised aeroplane companies by assisting them with mail contracts, and where is aviation going to be in Australia without Government assistance? Are not all rifle clubs subsidised by the Government, and surely wireless men played an important part in the great war, both on land and sea.

A body of men decide to erect and maintain a hospital in a town, and the Government subscribe £1 for each £1 subscribed by the public. Why? Simply because this body of men is assisting a work of national importance. Yes, let these words, "national importance," sink into every amateur's brain, for have not the British Army authorities issued instructions that every officer, no matter to what arm of

the service he belongs, must undergo wireless training.

Australia is a country of great distances, sparsely populated, and its politicians are crying out for more population. Why? Simply in order to defend the country and to make it more prosperous. And where are we going to settle this extra population? Why, on the land. And how are we to encourage people to go on the land? Give them rapid communications, motors, railways, aeroplanes, telegraphs, telephones and wireless. But telephones and telegraphs are expensive. The solution, therefore, is wireless, and it is the amateur movement, and that movement alone, that can successfully demonstrate its possibilities.

One cannot help thinking of the early days of wireless in Australia, when Mr. Maclurcan, Mr. Cooke, Mr. Stowe, and many others, demonstrated the fact that small spark stations could easily be erected for a few pounds and maintain good communication over a distance of 25 miles. But what good did these experimenters accomplish when the people, who need wireless most, cannot have the benefit of their discoveries? Mr. Maclurcan has just left on a trip to America to make certain experiments in connection with low power transmission, but his object will have failed if, as I said before, the results of his discoveries are denied the people. I suggest that the Wireless Institute cable Mr. Maclurcan, and request him to enquire fully into the amateur transmitting position in America, so that we might have first-hand information of what has happened there. Every American wireless man that I have met laughs at our howling valve bogey. What a different position the amateur has in America compared to his brothers in Australia, and does not the leading company there, the Radio Corporation of America, encourage him. I quote an extract from "Canadian Wireless":—"Through the kindness of Mr. W. A. Winterbottom, Traffic Manager of the Radio Corporation of America, MUU, on 14,200 metres and WII, on 13,600 metres, will broadcast at 2 a.m., Eastern standard time, the results of reception by the English amateurs." The above refers to the recent Trans-Atlantic tests: Yes, in America and England, the amateur is recognised and

encouraged, but here all amateurs are shortly to undergo examinations, with a view to thinning their ranks. I wonder if Marconi, Sir Oliver Lodge and Armstrong would have passed an examination in wireless, before they seriously took up the study of wireless. Has not everybody to make a start, and how about the coming generation? Are they going to be allowed to make a start? How about a man taking out a licence to drive a car, he certainly can get a learner's licence in order to make a start.

I have been reading through the various conditions of one of my old licences, dated 1910, and the following paragraphs are interesting: "On no account shall His Majesty's ships be called by means of the licensed appliances." Whenever the operators at any of the said stations perceive through the medium of the instruments used by them that naval or military signalling is proceeding, they shall refrain from using the licensed appliances until an indication that naval or military signalling is proceeding, has ceased." My argument is that all the regulations under which the experimenter works, have been drafted with a view to protecting shipping at sea, and rightly so, because, as I said in my previous article, the greatest blessing of wireless is that of saving life at sea; but are there any 10,000 ton ships steaming on the River Darling, or the River Murrumbidgee, let alone any 100 ton ships?

Protect ships at sea by all means, but do not protect imaginary ships on land. What harm to shipping could thousands of small spark transmitting stations do 200 miles from the coastline of Australia, and isn't it inland wireless that is badly needed?

I suggested in last week's issue of "Wireless Weekly" that all long distance amateur records should be scrapped with the exception of those obtained at 15 words per minute. Clause 11 of the old licence referred to gives the Government power to take over and, mind you, operate any experimental station in cases of emergency. Does not that prove that the Government once did recognise the value of the experimental transmitting stations? It should therefore be the aim and ob-

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ject of every transmitter to perfect himself in Morse signalling at 15 words per minute to know the constant range of his station and to forget to a certain extent its experimental range, for this will necessitate and encourage the establishment of hundreds of other transmitting stations, which will eventually form unbreakable chains of communication right throughout Australia. In closing, I do want to sheet home those words, "constant range." When you buy a valve, you do not ask what life you are likely to get out of the filament, but what life you are certain to get out of the filament. Again, if a salesman sells you a car, he does not tell you that it will go 100 miles per hour down hill, but he presses home what the car will do up hill, and forgets altogether what the car will do on the level.

Turrumurra,

29/2/24.

Editor,
"Wireless Weekly."

Dear Sir,—The present position of wireless in Australia demands that immediate consideration be given by the Postmaster-General to the effectiveness of the existing regulations, with special reference to the "experimenters' licences."

A Radio Home is a Radiant Home

If your purchases are made from me.

- Jefferson Star Transformer 28/6
- Complete Vernier Rheostats 9/-
- Double and Single Jacks, 4/6 and 3/3
- Dials, 3 1/2 in., 3 in. & 2 in. 2/3, 1/9 and 1/4
- Phone Plugs 3/-
- Remler 20 Coil & Plug, 5/3

A SAVING ON EVERY ARTICLE.

A. F. PRICE

Licensed Radio Dealer
220 OXFORD ST., WOOLLAHRA
WAVERLEY 451
Agent for Farmer's Broadcasting Service

The British Postmaster-General stated about six months ago that his legal advisers had advised him that "he could not legally refuse a British subject an experimenter's licence if such was applied for." This was affecting the progress of broadcasting in England, and it was found very necessary to amend the "Wireless Act" so that he could use his discretion.

I believe that the same position holds good in Australia, and I also believe that the P.M.G. and the Chief Manager of Wireless know that they cannot legally refuse a licence.

Believing this to be a fact, then the existing regulations are not worth the paper they are printed on. All the regulations ever made cannot override an Act of Parliament. The broadcasting interests have appealed to the P.M.G. on this point, and it appears that instructions have been issued to the various radio inspectors to curtail the granting of such experimenters' licences by carrying out an examination of applicants. If the applicant does not know anything about the subject of wireless he is told to re-appear in a month or two for another examination.

It can be readily appreciated that (1) the public are debarred from purchasing sealed sets because there are none to purchase; (2) the public cannot construct sealed sets; (3) the broadcasting services which must be subscribed to are unable to compel experimenters to pay.

Therefore, the existing regulations and act do not allow of the successful operation of subscription broadcast services, so that the P.M.G. should immediately call another conference to devise a more efficient scheme. The position drives the public to obtain an experimenter's licence, whereas the majority would be willing to pay, say, £3 3/- per annum for the right to use an open receiver and listen to all services.

I would ask the P.M.G., through your paper, the following questions:—

- (1) Can the Minister legally refuse an experimenter's licence to a British subject?
- (2) Can he refuse a renewal of an existing licence, unless the holder of same transgresses the regulations?
- (3) Is the Minister aware that the majority of experimenters at the present day would undoubtedly be quite willing to subscribe a reasonable fee to a broadcasting system.

Yours faithfully,

O. F. MINGAY.

Make Your Taps Neater

(By Arthur S. Gordon.)

After you have wound the primary of that home-made variocoupler so tightly and have taken out taps that are the proud equal of any found on commercial instruments, it is somewhat discouraging to have them pull away from the cardboard tube, as most tapped turns have a habit of doing. The fault is not in the cardboard tube nor in the wire used, but in the method of taking out the taps.

The usual procedure is to bend back a loop in the wire and twist it close down to the tube, leaving a small eyelet to which the connecting wire can be soldered. While this arrangement will stay taut for a while, it is bound to loosen and, in many cases, the whole coil has had to be rewound.



In the interests of neatness and thoroughness therefore, the following method of making taps is suggested. After you twist the loop as before, instead of going on with the winding, bend the tap down 2 inches and wind the next two turns over it. Then bend the tap up again and continue until the next tap.

Now, with every tap held down by the two succeeding turns, there is no danger of stretching or loosening. Even if colloidion or coil cement is not applied, the turns will hold together, and not only will you have a tuning coil that is exceptionally neat, but you will also have one that will remain exceptionally neat until its last and probably distant day of service.

A GEM.

An enquiry was recently received by a large Sydney department store (which also conducts a radio department), from a reverend gentleman in the country, asking for honeycomb coils for short and long waves. The enquiry was inadvertently forwarded to the haberdashery department, which replied, stating that while it could not supply from stock, an effort would be made to procure locally if further particulars were supplied.

Notes on the 201A and UV199 Valves

By the Little American

If one were to ask what single factor has made radio universally popular in the world to-day, the answer might not be as difficult as it first seems. The vacuum tube stands supreme in the number of radio enthusiasts it has added to the list of listeners-in, and the making possible of present day broadcasting.

The question of electron source in the use of the high vacuum receiving valves has been foremost in its design, manufacture and use. The important desirable features of the ideal electron emitting filament for this type of valve should have long operating life, low filament energy to supply the necessary electron emission, uniformity of valves, quietness of operation, and "electrical robustness" of the filament.

The X-L type of filament, as used in the 201A and UV199 valves was designed to meet the above requirements. The outstanding features of the new X-L tungsten filament considered from the viewpoint of the desirable fea-

tures of the ideal, and in comparison with the old pure tungsten filament, may be best made by the following table:—

Type, 201; volts, 5; Amperes, 1; Watts, 5; emission M.A., 7.5.
Type 201A, volts, 5; amperes, .25; watts, 1.25; emission M.A., 45.

There is approximately fifty per cent. increase in mutual inductance. The X-L filament has a long life, not terminated by a burn-out, but by loss of electron emission. A great many amateurs may wonder why, after using their valves over 1000 hours, it does not deliver the goods, and this is why. The drop of emission does not occur continuously during the life of the filament, but quite suddenly, and in a very pronounced way at the end of its useful life. The relation between life and filament voltage is not a simple one, because electron emission may be destroyed by abnormally high voltages which, however, can be renewed

by the proper procedure in the hands of the user.

The manufacture of these valves is a very intricate and tedious job. There are 13 or more steps or processes through which the parts go before they emerge as the complete vacuum tube. These processes are described after a trip taken through the factory of the Westinghouse Electric and Manufacturing Company, at East Pittsburg, U.S.A. There is a test made after each stage of the assembly, and still further tests after the valve is completed. The tests are so severe that a valve after it passes through them is rarely returned from a customer for failure to operate correctly.

There are two main units in these valves, the outer tube, from which the air is removed, and the assembled inner unit. If this is kept in mind, and if it is understood that all assembly is done on the inner unit which is then inserted in the outer tube, sealed in, and the outer tube exhausted of air, the various stages of manufacture may be followed very easily.

The valve is made up of a glass blank, coming from a glass manufacturer, already shaped, this forms the

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glass walls of the valve; a thin glass stem, a short tube of glass, which is later shaped and which holds the wires in place in the valve; the filament, the plate and the grid. The plates are shaped from a rectangular piece of metal and the grid wires are wound in the rectangular shape on a form welded to its two upright supports.

The first step in the process is the making the flare on the small tube to seal on the large tube later. This consists in heating the small tube on one end to soften it, and then spinning on the flare. These operations are all done by girls.

The five wires that support and connect the elements are next inserted in the press. These wires are white at the top, but red where they adhere to the glass in making the seal tight. Dumet wire is used for the seal, nickel being welded to it at the top. A copper covering is necessary so that when the press is melted to hold the wires at its top, a gas-tight joint is formed.

Next the stems are cut to the proper length so that when the plate, grid and filament are inserted they will fit in their proper places. This is the fourth step in the operation.

The spot welding on the grid, slipping the plate in place and welding the fine X.L. filament, consist of the next three steps, making the valve elements complete ready for placing in the glass blank which must first be made ready for exhausting.

Step eight is what is called tabulating the glass blank. A thin point flame is blown against the rounded end of the glass blank so that a tiny hole is melted through. The blank now has a glass tube running from its end for the purpose of exhausting the valves. As the other end is sealed this end remains so that it can be attached to the pumping machines.


Number nine is termed as sealing-in. When it is finished, the glass weld with its mounted plate, grid and filament, and the four wires, running out of its end, is firmly sealed to the glass blank. The flare, first spun on the press, is used for this job.

The valve at this stage resembles a completed valve except for the absence of the base and the long tube at the top. When sealing is completed, the valve is tested for leaks and short circuits between filament, grid and plate. The tenth step of exhausting air


from the valve is very important. From 10 to 15 minutes are required to exhaust each valve. A chemical is inserted in the valve to eliminate contamination of the filament. This causes the valve to become opaque and discoloured. It has nothing to do with the hardness of the valve or to the degree of exhaustion as so many amateurs think.

In exhausting, the glass stem at the top is inserted in a piece of rubber tubing which leads directly to the pumps. These are two in number, an oil pump and a mercury vapour pump. A covering is pulled down over the valves, serving as an oven to bake them, at a temperature of 400 degrees Centigrade, and thus reduce the gas content. Then the pumps are turned on and the valves exhausted to a pressure of one-millionth of a millimeter of mercury. This is somewhat higher than the exhaustion of an electric lamp.

As the valve sits in the holder, it is surrounded by a coil of heavy copper wire. The covering is now pulled up and a high frequency spark is thrown on the surrounding coil to test the valve for cracked glass. After this the



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March 7, 1924.

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plate is heated red hot by an oscillating current having a frequency of a million cycles—generated by two 250 watt valves, similar to transmitting valves, to remove the gas from the plates and metal supports.

The tip is now sealed off by the machine operator, using a gas flame, which he runs round the bottom of the tube until it melts off and forms the tip. This completes the valve except for the base.

The tubes now pass through several stages of inspection before the bases are cemented on. During this inspection valve is carefully looked over for appearance and poor tips, and for degree of vacuum. The rejected defective valves are thrown away and smashed to fine bits.

Number eleven is cementing the base to the valve. The base is filled with cement, the four wires are threaded through the stems in the bottom of it, and all are placed in a machine, where the base is baked firmly on. The wires are then soldered in the stems and rounded off in a special machine for this purpose.

Now test: the first is called "lighting out." The valve is placed in a base connected to three electric lamps, one red, one blue and the other white. The red is in series with the grid, the blue in series with the plate, and the white with the filament. If any of the lamps glow when testing a valve, the valve is discarded, for this shows a short between the elements, and makes it unfit for use.

The valves are next aged by connecting several hundred on a table to a slightly higher filament voltage than normal, and let one burn for an hour. After leaving the aging table the valves are stored for three days to determine whether there are any air leaks. After this they are again tested for all circuits, and are ready for shipment.

The process of assembling these valves is a long and tedious one, calling for the utmost skill on the part of the various operators. Girls are used mostly in the operations, but men run the vacuum pumps. Difficulty is experienced in getting girls who are dexterous enough to do the work. The de-

partment figures that one girl out of fifteen is found satisfactory for the job. The skill of the worker is largely responsible for the efficiency of the valve.

COOKING HINTS.

How to Make Bean Soup.—Take one bean and four quarts of water, add a couple of quantities of salt, and wait till the bean dissolves. Then stir the liquor well with a broom handle. If you keep a boarding house, put in more water.

How to Make Cheese.—Get a pint of milk, and skim it in the morning. Then get a tub and drop in 2 flies. Then you let the milk stand a little while till it gets tired, and then you let it sit down. Now dig a hole in the yard and build a wall around it so the cheese can't get away. Then in six weeks, when the cheese is grey-headed and able to stand alone—grab it by the back of the neck and eat it quick.

ANNOUNCEMENT

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NEWS IN BRIEF

HIGH SCHOOL CLUBS.

During the last few days, radio clubs have been formed at the Cleveland Street Intermediate High School, and at the Petersham Intermediate High School.

MR. MACLURCAN'S DEPARTURE.

Mr. C. D. MacLurcan the well-known experimenter (2CM) left on the R.M.S. Tahiti, on Thursday, 28th February. As is well-known, he will conduct tests on low power during the voyage.

Among those present on the wharf to see "Mac" off were Miss F. V. Wallace and Messrs. Renshaw, Crocker, Perry, Mingay, Wilson (president Kuring-gai Radio Club), and Jackson (president Queensland Division W.L.A.).

RESULTS WITH MR. MACLURCAN.

The genial 2JM reports as follows, Thursday, 28th February:—

Got into communication with 2CDM at 3.10 p.m., at which time he was speaking to 2CM. Strathfield signals were coming in very strong, and 2JM was using a loud speaker off 1 detector and 2 audio.

2CDM was not using a counterpoise

BOOKS ON WIRELESS

Construction of Crystal Receivers for Broadcast and General Reception, by A. Douglas. Price 2/3 posted.

How to Make a "Unit" Wireless Receiver, by E. Redpath. Price 2/3 posted.

Wireless: Popular and Concise, by C. Crawley. Price 2/3 posted.

A.B.C. of Wireless: A Popular Explanation by P. Harris. Price 10d. posted.

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at the time, but was radiating 1.1 amps. He complained that to add to his troubles there was a bit of a sea running, and the ship was bobbing up and down, but was most emphatic that nobody was—er—ill.

2CM sent a few private messages to Mrs. MacLurcan, and closed down to erect a counterpoise.

At 7 p.m., 2CDM spoke to 2CM. 2JM, still using 1 detector and 2 audio, got good results on a loud speaker. The distance was then about 130 miles. 2CDM was testing with 2CM. 2JM noticed slight swinging, but with careful adjustment signals were held well. The conversation went on until about 8 p.m., when 2CDM closed down for a while prior to the evening tests, as arranged per roster by 2JM. At 8.55 p.m. 2JM sent out time signals. Time was supplied by Mr. James Nangle's private observatory. Transmitters started up dead on their allotted times. With very few exceptions all those who applied for times on the roster carried on. In the case of those who did not transmit to their schedule, 2JM called upon other stations who had been unable to get on the roster, and these carried on. The tests concluded at 10.40 p.m.

During the afternoon tests, 2CDM reported 2JM, QSA on 'phone. The results of the evening's tests will not be known for a while.

SOME D.X. WORK

This card has just been received from 6AOS (California), by 2LO (Mr. L. Schultz, "Waraba," Burns Bay Rd., Lane Cove, Sydney. 6AOS is certainly a D.X. king. And, by the way, doesn't this card offer some suggestions for something similar for use among the Australian experimenters?

Radio, Australian 2LO; Date, 12/29 '23; Your QSA, QRK, QRZ signals were heard and worked here on not yet, at M, PST, QRM, QRN, QSS, QSB; Receiver, Grebe CR8; Detector only (blank) step; transmitter, 3-5 watt; tubes, Hart; circuit, 1500 volts C.R.A.C. on plates; radiating, 6T.C.A. Aerial, 6 wire, 7 type, 35 high, 60 long,

6 wire lead; counterpoise, 9 wire, fan type, 7 high; DX, 39US; States, Australia, New Zealand, Alaska, etc.; remarks: This is the transmitter which was in use when you heard me; the other card contains a description of my present transmitter. Your report was very much appreciated. Thank you for your recent card to 6AOS. Best 73's. W. C. Rodgers. W. C. and H. E. Rodgers, 1016 Pacific Avenue, Alameda, Calif.

During last week 2JM conducted two-way conversation with 4AA (Mr. Bell, Waihemo, N.Z.) and 5BQ (S.A.). He also heard a W.A. station, but the call was not received.

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Wireless Institute
South Australian Division

The monthly general meeting of the South Australian Division of the Wireless Institute of Australia was held recently, in the Prince of Wales Theatre, Adelaide University.

There was a large attendance. Mr. R. B. Caldwell, president, occupied the chair.

A letter received from one of our country members stated that he was able to receive Broadcasters, Ltd., Sydney, 2SB, quite clearly at any time, on one valve.

A letter from Mr. Miller, of Murray Bridge (5BF), stated that he would shortly be having his transmitter (phone and C.W.) in working order.

A communication was received from Mr. Hull, of the Victorian Division, desiring to arrange for a message to be relayed through from Brisbane to Perth on the first of March, and members expressed much doubt as to getting through to W.A., as none of the Western experimenters have been logged here, nor have any of our transmitters received any report of their

signals being heard in W.A. A great deal of laughter was caused by the Secretary stating that he could not get answers to letters let alone radio messages from that State.

The secretary announced that the Council had decided to hold meetings for the junior section of the Institute, on the last Wednesday of each month, at which lectures of an elementary nature will be given. The first of these meetings will be held in the University, on the 27th February, at 8 p.m.

It was decided that a small donation should be made to the Bedford Park and Myrtle Bank consumptive soldiers' hospitals, and already instruments to the value of £275 have been presented, and sums to the amount of about £400 subscribed.

The secretary was also instructed to inform them that members would be pleased to give them any technical instruction, assistance or advice in the installation or working of their apparatus.

A lengthy discussion on the broadcasting situation took place, and extracts from publications dealing with the situation were read by the secretary, showing that the public would not tolerate the sealed set.

One publication stated that there was an effort afoot to bring in a flat rate of £2/10/- per annum for all licences, and the opinion of several members was that the experimenter would soon be called upon to help pay for broadcasting programmes. Quite a number of those present favoured a scheme such as that adopted in New Zealand, where only one class of licence was issued, which cost £1/5/- per annum, five shillings of which goes to the Government, and the balance to the broadcasting company, and where no sealed set is compulsory.

The majority of the members present, however, were antagonistic to any increase of the experimental licence, and the motion that any attempt to raise the fee for experimental licences will be emphatically protested against, was carried.

First Lady (in village shop, speaking to another patron): "Would you mind if I made my small purchase first? We have a horse outside, and he won't keep quiet."

Second Lady: "Certainly; but you won't be very long, will you? I have a husband outside and he's rather restive, too."—"Punch."



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The Tungar Battery Charger.

The Tungar battery charger, so long in popular use for charging automobile starting and lighting batteries from any alternating current lamp socket, is particularly suitable for charging storage batteries used on radio receiving sets with vacuum tubes. In fact, the bulb used in the Tungar is quite similar in action to the radiotron used in the receiver. The difference is that there is a very appreciable amount of gas in the Tungar, and little or none in the radiotron. Obviously the bulbs are not interchangeable as the one is designed for two or six amperes, while the other is for about a thousandth of that amount.

Two sizes of Tungar chargers are listed—the 2-ampere and the 5-ampere. Either one is suitable, but a few suggestions on the size to select are here given.

The storage battery used with the radio set should be quite frequently charged for these reasons:

First, frequent charging keeps the voltage of the battery near its maximum (something over six volts), giving better results on the receiving tubes.

Second, frequent charging keeps a reserve capacity always available, which would not be the case if a battery were allowed to reach the discharge point before charging.

As to just what "frequent charging" means—this depends upon the ampere-hour capacity of the battery and the number of receiving tubes used. Assuming that the receiving set uses three radiotron tubes (a detector and two amplifiers), this set will take three amperes (one ampere per tube). If it is used for three hours per day the ampere-hours drawn from the battery are 3×3 , or 9 ampere-hours per day (or 9×7 equals 63 ampere-hours a week). To replace the nine ampere-hours would take about six hours with a 2-ampere or 2.3 hours with a 5-ampere Tungar. There are limits in current at which a battery should be charged. A 40 to 60-ampere-hour battery should not be charged at much over 2 amperes, while an 80-ampere-hour or larger battery may be charged with the 5-ampere Tungar, although the 2-ampere will charge it just as well.

Frequent charging at a low rate is good for any size battery, and the 2-ampere Tungar is therefore a very popular size. The 5-ampere Tungar is employed where larger batteries are used,

and also a greater number of receiving tubes.

Frequent charging prevents the weakening of batteries, and low rate charging keeps the battery clean and cool by preventing excessive gassing.

Whichever Tungar is used, it should be located near the battery to make it easy to charge. Instructions for installing and use accompany each Tungar.

The owner of a radio outfit does not care to have an inactive station. He may miss some long-awaited concert or talk by some famous speaker. Yet he loses these pleasures if his battery is too weak to give full strength to the receiving. Without a Tungar he is obliged to disconnect the battery, which must then be brought to some service station. Most batteries are too heavy to be easily carried about. Under these circumstances it is often several days before the charging is done. All this time he is missing many programmes, which are daily becoming more popular and of higher grade. This situation arises frequently, and more often in proportion to his activities in radio. A Tungar does away with all these troubles at a very slight expense.

Very often the concerts received by the radio operator are not sufficiently clear. This is due to the declining strength of the battery. It may often mean an evening of disappointment, for it frequently happens when least expected, and company invited to hear some artist, go away without the promised entertainment. The Tungar prevents such disappointments, and by its frequent charging saves the radio battery from becoming run down. Enjoy the pleasures of your radio set by avoiding those inconveniences which the Tungar so readily prevents.

Tungar is approved by National Board of Fire Underwriters—will operate safely overnight; is clean and quiet—no oil or grease to soil home furnishings; is economical—efficient design; is convenient—eliminates necessity for removing heavy battery from home; is portable—small, compact and light in weight; is easy to operate—attachment for ordinary a.c. lamp socket; is automatic—battery cannot discharge through charger when a.c. supply fails; will automatically resume charging when a.c. returns; requires very little attention—no moving parts to give trouble. In

fact, Tungar gives a maximum of satisfaction with a minimum of effort.

Tungars can be furnished for 25, 30, 40 or 50 cycles, and for any voltage.

A product of General Electric Co., Schenectady, N.Y.

The Importance of Consolidating the Amateur Movement in N.S.W.

The importance of consolidating the experimental movement in N.S.W., does not seem to be generally realised. The time has now arrived when the amateurs of this State must combine and find some means of voicing their opinion as one united body. In fact the authorities have demanded that this shall be done, as was evidenced in the circular letter recently sent to all radio clubs and associations. With this end in view the special meeting convened by the Wireless Institute of Australia, N.S.W. Division, to which each Club is invited to send a delegate fully empowered to act on behalf of those he represents, has a special importance. Every holder of an experimental license should be represented. Judging by the very poor response to the request to forward their names, club secretaries do not seem to be fully awake to the fact that the time is short. The meeting is to be held on Wednesday, March 19th, and in their own interests every amateur should take steps to ensure that he will be represented by seeing that his secretary forwards the required particulars immediately to the Hon. Sec. W.I.A. N.S.W. Div. Box 3129 G.P.O. Sydney. The particulars required are (1) The name of the Club; (2) The name and address of the secretary; (3) Any suggestions for the co-ordination and consolidation of the experimental movement. The proposals of the Wireless Institute appear elsewhere and that the importance of this matter is realised in well informed circles is vouched for by the fact that the Radio Association has already passed a resolution approving of the Wireless Institute's proposal and agreeing to affiliate with the Institute if this course becomes necessary. Amateurs one and all, get busy!

A little riddle, people: First one to guess it gets a gum drop. Who was the first wireless manufacturer? Adam. He made a loud speaker out of his spare parts.

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RADIOCULOUS

As a woman was walking a man looked at her and followed her.

"Why," said she, "do you follow me?"

"Because," he replied, "I have fallen in love with you."

"Why so?"

"You are so beautiful."

"My sister, who is coming for me, is much more beautiful than I am. Go and make love to her."

The man turned back and saw a woman with an ugly face, and being greatly displeased, returned and said:

"Why should you tell me a falsehood?"

The woman answered: "Neither did you tell me the truth; for if you were in love with me, why did you look back for another woman?"—"Musical Courier."

A drummer was "making" Ottawa, Kansas, from Wichita one day when he suddenly realised that he was off the main road. Not being able to find his way again he drew his Ford up to a farmhouse and inquired for the main road of a bashful farmer boy who loitered there. The following uncomfortable situation developed:—

"Which is the way to Ottawa, my lad?"

"I—I don't know."

"Which is the way to Topeka, then?"

"I—I don't know."

"Well, can you tell me how to get back to Wichita, then?"

"I—I don't know."

By this time the drummer was quite impatient and said to the boy: "Say, you don't know very much, do you?" to which the lad retorted:

"No! But—but I ain't lost!"—H. F. Blevins, Norton, Va., in "The Yellow Strand."

First Flapper: "The cheek of that conductor! He glanced at me as if I hadn't paid my fare."

Second ditto: "And what did you do?"

"I just glared back at him—as if I had!"—"Judge."

Recently a tourist was covering the country, and, during his travels, he found himself one morning in a good-sized southern city. This city happened to be religiously inclined; therefore, had as its asset many beautiful churches. So, this traveller said to the porter around the hotel:

"Rastus, if you will direct me to the many beautiful churches in this town, I believe I will look them over."

"Yes, sir, Sap'n," said Rastus. "Go down to the corner and you will find the First National Bank, and that's the Jewish synagogue right next door; down on the next corner you will find the gas works, and that's the Methodist Church right next door; just across the street you will find the Theatre—that's the Episcopal Church right next door; go on down the street towards the river and you will find the cold storage plant, and two doors from the cold storage you will find the Presbyterian Church; and right across from the river, you will find the Baptist Church."—Paul R. Puckett, Chattanooga, Tennessee, in "The Yellow Strand."

Aunt Jinny, a Carolina negress, was a great advocate of the rod as a help in child-rearing. As a result of an unmerciful beating which she gave her youngest and "onierst," she was brought into court one day by outraged neighbours.

The judge, after giving her a severe lecture, asked her if she had anything to say.

"Jest one thing, Jedge," she replied. "I wants to ax you a question. Was you ever the parent of a perfectly wuthless cullid chile?"—"Everybody's Magazine."

"You have entered the debit under credit."

"Yes, sir, I'm left handed."—Kasper (Stockholm).

The ford taxi came suddenly to a halt in the middle of the street.

"What is the matter?" called the man from the back seat.

"I thought the young lady said 'stop,'" answered the chauffeur.

"Well, she wasn't speaking to you, was she?"—Geo. J. Blend, St. Louis, Mo., in "The Yellow Strand."

STAFF CHANGES.

Coastal Radio Service.

Radio-telegraphist A. S. Hart, Sydney to Adelaide; Radio-telegraphist H. E. Oates, Adelaide to Darwin; Radio-telegraphist J. J. Howe, from Hobart to Radio-telegraphist in Charge, Samarai; Radio-telegraphist M. Mortimer, from Radio-telegraphist in Charge, Samarai to Sydney, R.; Radio-telegraphist J. B. Stoyke, from O.I.C., Darwin, to O.I.C., Adelaide; Radio-telegraphist D. B. L. Fleming, Darwin Radio to Hobart Radio; Radio-telegraphist A. H. Brown, Melbourne to King Island (relieving duties); Radio-telegraphist R. Simons, Melbourne to Flinders Island (relief duties); Mech. W. Jessop, Senior Mechanic, Townsville, to Sydney Radio; Mech. D. Bowles, Sydney to Townsville.

QUESTIONS AND ANSWERS.

Under this heading "Wireless Weekly" will be pleased to assist any experimenter with his wireless troubles. If a reply by mail is required, send stamped addressed envelope. Otherwise questions will be answered in the columns of the paper.

C.W. (Westernport, Vic.): (1) No. It interrupts the buzzer current, thus inducing trains of damped oscillations into the oscillatory circuit, which the crystal rectifies. (2) Yes. (3) Yes. (4) Yes, it should.

The very small boy, with a penny clutched in his hot sticky hand, entered the toy shop and, standing on tiptoe, inspected the goods displayed therein. After a long look he did not see anything to satisfy, and asked to see some other things.

Nothing seemed to please him, however, and at last the shopkeeper lost his patience and said rather sharply:

"Look here, my lad, do you want to buy the whole world with your penny?"

The prospective purchaser thought deeply for a moment, and then replied:

"Let's see it."—"Pittsburgh Chronicle-Telegraph."

THE S.T. 100 RECEIVER

Contributed by W. L. Hamilton

Reflex or Dual Amplification circuits are to-day claiming the attention of a considerable number of amateurs in all parts of the world. There have been many such circuits published, and the one I am about to describe has proved to me worthy of the effort of building. To that well-known Englishman, Mr. John Scott-Taggart, is due the credit of producing this one in particular.

The S.T. 100 employs 2 valves and a crystal, the first valve acting as radio and audio amplifier, crystal detecting and the second valve as a straight out low frequency amplifier. It will be thus seen that the combination virtually produces the results of four valves which can be proved by all who care to make it up.

It is perfectly simple to handle when correctly assembled, and the correct components used, and I would strongly advise everyone to pay strict attention to the latter factor. I say this because I, in common with some other experimenters I know, made the error of overlooking the necessity for correct values of parts, resulting in very poor signals. First of all let me describe the circuit and I will tell you of the little pitfalls as I go along.

In the accompanying diagram, L1 is a honeycomb coil as is L2. For the amateurs I use 25 and 35 turn coils respectively, and for broadcasters 35 and 50 or 60 turns, while the combination of 135 and 150 turn coils brings in 2FC. Although L2 introduces reaction into the circuit, I find a very loose coupling effective, and I do not fear energising the aerial accordingly.

As will be seen the variable condenser C1 is in series and not parallel. This condenser in my own case has a value of .001, although I have found .0005 to be quite satisfactory. For C2, which is shunted across L2, I employ a variable condenser having a value of .0005.

A fixed resistance of 100,000 ohms is connected from the grid to the positive leg of the filament of the first valve (v1). This resistance is important, for without it the receiver is liable to create weird and wonderful low frequency growlings. Do not employ the many and varied types of variable grid leaks on the market, as usually they won't come down to 100,000 ohms. Fixed resistances of this value

are obtainable from many advertisers in this journal.

That one which is in my circuit was kindly given to me by Mr. C. A. Wiles, and is of a value of 70,000 ohms, which is quite satisfactory.

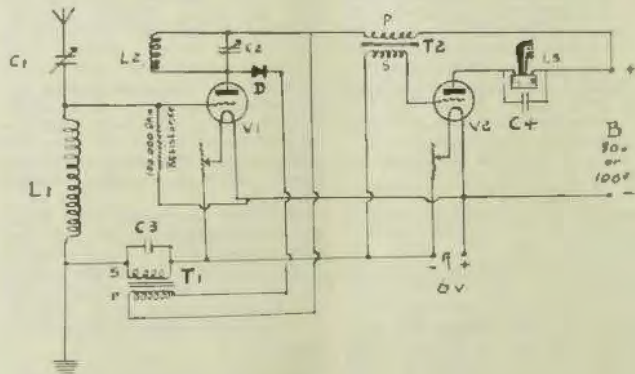
T1 and T2 are audio frequency transformers, and must be of a good make. Shunted across the secondary of T1 is a fixed condenser of .0005 m.f., but this will vary according to the transformer used. The use of this condenser is to stop the low-frequency growlings, and it consequently balances the circuit. Note carefully that the inside secondary of T1 is connected to the earth terminal, while the outside secondary goes to the filament resistances and to the inside secondary of T2. The inside primary of T2 is taken to the L.P. of T2, but it may be well to try taking the O.P. of T1 to the L.P. of T2. The other end of the primary of T1 is taken to the crystal detector.

on the crystal. Let me emphasise the necessity of a hard pressure on the crystal, otherwise microphonic noises will cause trouble. Try reversing the connections of the crystal, for it often happens that better results accrue with the reversal.

The loud speaker, it will be noted, is shunted by C1, a fixed condenser having a value of .002. This is advisable for a considerable difference in tone is noticed should this condenser be omitted.

Like all dual amplification circuits, this one requires a high voltage of the order of 80 to 100 volts, for the B battery. Personally, employing B.T.H. valves, I find 80 volts on the plates to yield splendid results, but at the same time employing only 40 volts high tension the resultant volume of sound was sufficient to fill the average sized room on a home-made loud speaker.

As stated, the valves I use are B.T.H., but on trial Mullard Ora, Edi-



Now, this crystal detector is the vital spot of the whole circuit. I experienced considerable trouble in finding a suitable crystal, but a fellow experimenter advised me to try the well-known Zincite-Bornite combination, which functioned admirably. Since then I have found carborundum to be quite suitable, as is argentite, with a good, hard catwhisker pressing

swan's and D.E.R. functioned splendidly, and I have no doubt that American valves will suit.

At the beginning of this article I mentioned that C1 should be in series and not parallel. For quite some time I had this condenser in parallel, and I was very disappointed with the results. Immediately I altered this to series my troubles were over. This was ac-

counted for by my aerial being very long and of the average height of 46 feet, and I now find that a low, short aerial renders yeoman service, provided the A.T.C. is in parallel.

Now, the tuning of this set does not present any great difficulties. Set L2 at right-angles to L1 and tune with C1 until signals are heard. Turn your attention now to C2 and tune L2, after which retune on C1. You will be agreeably surprised to note the exceptional purity of signals, and if music is being received the absence of distortion will be noticed.

Naturally, the crystal detector should be adjusted on very weak signals. Detune slightly and set the crystal most sensitively. On tuning correctly you will be surprised with the clarity of tone. Pay careful attention to the coils, noting that they are both running in the same direction. Always turn your valves low before extracting either coil from its socket, otherwise the set will howl at low frequency with a volume which will almost deafen you. Squeezing the telephone cords will also cause to be emitted some wonderful sounds, which are also produced if one touches the telephone terminals.

Up to the present I have not yet had an opportunity of trying this circuit out on long distance work, but I am advised by Mr. C. W. Slade that several New Zealand amateurs have picked up American broadcasting, using the S.T. 100. I have had the misfortune to be without my proper aerial for over a week; the rope broke, and the whole contraption came down with a bang. (I often wonder if it is sheer cussedness which causes the average otherwise well behaved aerial to elect to come down with a crash at three o'clock on a miserable wet morning. Our local chemist, or cough-mixture man thinks so.) However, with my aerial lying on clothes lines and over fences, and on wet lawns on Sunday, the 17th February, I had the pleasure of listening to 2CM on an improvised loud speaker, using only 40 volts H.T. Let me here interpose a word of warning. When employing 40 volts H.T., see that the crystal is functioning properly. It sometimes does not; leaving the first valve to do the detecting. This can be overcome by lowering the filament of both valves and setting the crystal as usual.

A frame aerial also yields splendid results on the S.T. 100. Broadcasters were satisfactorily received on a frame, as was 2RA. Should the amateur elect to build this set I feel sure he will be perfectly satisfied with the results. I myself prefer it to either the Neutrodyne or the Cockaday.

I have endeavoured in this article to clearly explain myself. Should there be any points which are not understood, or should any further information be required, I shall be only too glad to assist, and I am certain the editor of "Wireless Weekly" will allow space in his columns for the purpose.

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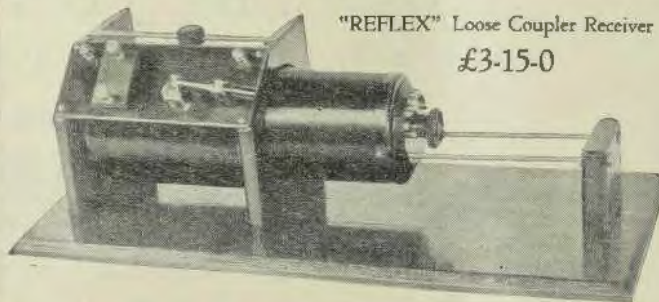
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The Leichhardt and District Radio Society

The second lecture of the new syllabus was delivered by Mr. F. Lett, before the 69th general meeting of members of the Leichhardt and District Radio Society, which was held at the club room, 176 Johnston Street, Annandale, on Tuesday, February 26th.

The meeting was well attended, and the lecturer dealt with the important subject of "Tuning Elements." Various types of inductances and condensers were described, and their various uses explained. At the conclusion of the lecture Mr. Lett was called upon to reply to many questions arising from the subject matter of his talk,

after which he was accorded a hearty vote of thanks by acclamation.

Mr. Johnston, of the Burwood Radio Club, who was an interested listener throughout, in responding to a motion of welcome, spoke very highly of the good name which the society holds amongst the ranks of the experimenters, and it is the intention of the Society to endeavour, at all times, to maintain the high standard which it at present enjoys.

On Tuesday night next, the third lecture will be delivered, when Mr. W. J. Zech will talk on "Crystal Detectors and their Action." All local experimenters are invited to be present.

Inquiries relative to the activities of the society are always welcome, and should be addressed to the hon. secretary, Mr. W. J. Zech, 145 Booth St., Annandale.

Kuring-gai District Radio Society

At the general meeting of the Kuring-gai District Radio Society, held on Tuesday, 19th inst., it was suggested that a syllabus be drawn up.

Accordingly, a syllabus was drawn up (which it was decided to have

printed, so that a copy might be supplied to each member), containing a very interesting programme for the next six months. The general business for the evening having been dealt with, Mr. H. A. Stowe delivered an interesting lecture on the measuring of electric current.

It was decided that the next meeting be held on Tuesday, 4th March, at 8.15 p.m., be left open, as it is anticipated that something definite will be known regarding the new club room.

Killara Exhibition

This proved to be very successful, there being a most appreciative audience of over 600 present. The following were the prize winners, for which information we are indebted to Mr. O. F. Mingay.

- Class A (open to members only).—
 (1) Most efficient valve set, Mr. Dalton; (2) most efficient crystal set, Mr. C. Gee; (3) most economical set, Mr. W. Gill; (4) best part or unit constructed by member, Mr. Chilton.
 Class B (open to non-members).—

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(1) Most efficient valve set, Mr. Stan-White; (2) most efficient crystal set, Mr. D. Watt; (3) best part or unit constructed by amateur, Mr. McKenzie.

A talk by Mr. W. Crawford was unfortunately inaudible more than a few feet away from the stage on account of the noise.

It was unfortunate that it apparently did not occur to the organisers of the exhibition to forward us any intimation concerning the fact that it was to be held, nor to afford us an opportunity to witness the judging of the sets. Our next trip will be through a bakelite plant.

Newcastle District Radio Club

The usual fortnightly meeting of the above Club was held at the Club Room, 25 Winship Street, Hamilton, on Wednesday, 27th inst. There was a good attendance of members.

After the usual 30 minutes' buzzer practice, Mr. Swain gave a short address on "Oscillatory Circuit and Wave Metres."

Mr. Whysall, the Deputy Post-Master General, who was visiting Newcastle, paid the club an informal vis-

it and expressed admiration of the work being done.

The Club continues to gain success with its radiophone transmitter. Mr. A. E. Connoley, of Darlington Point, near Hay, sends a further report stating that using two valves he could hear our speech and music two feet from the phones. Mr. Trevor Evans of Blayney reports that, "... you come in better than the Sydney amateurs with the exception of one..." Further reports from experimenters, especially in the 3rd and 4th district would be appreciated.

Mr. Le-Roy Filmer, of Brighton Parade, Toronto has been appointed Honorary Radio Inspector for Newcastle District.

Mr. Filmer was the nominee of the above Club for that office, and is a foundation member of the Club.

He is one of the keenest experimenters of the Newcastle District and is thus assured of the loyal support and co-operation of the local amateurs in the execution of his duties.

E. T. Swain, Hon. Secretary.

Croydon Radio Club

On Saturday, February 23rd, the Croydon Radio Club met as usual at

7.30 p.m., at "Rockleigh," Lang St., Croydon.

Mr. C. W. Slade presided and Mr. E. B. Crocker (2BB) gave the club a interesting talk in his experiences with a set at Katoomba.

The Club members asked Mr. Crocker many questions and a very interesting evening was spent.

Some of the Club members tested a fine two valve amplifier which they had constructed.

New members will be welcomed at any meeting and any persons interested in wireless will be welcome.

All communications should be addressed to the Hon. Secretary, G. Maxwell Cutts, "Carwell," Highbury St., Croydon.

TO RADIO CLUBS

Wireless Weekly will be glad to publish reports of meetings held by all Radio Clubs.

We would like copy to reach us before Friday in each week in order to ensure its publication in the ensuing issue.

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Clubs Set Ball Rolling.

To date, seven Clubs have forwarded amounts for this very worthy appeal. In Sydney and suburbs there are something like forty Radio Clubs, and we want the secretaries of those Clubs which have not yet subscribed to bring the matter up again before their members. The need is urgent, so we ask you not to put this aside until a later date, but act upon that time-worn motto and "do it now."

The Waverley Club is carrying on a week by week appeal to its members, and a lump sum will be forwarded at a later date. We offer this as a suggestion to others.

Appeal to Traders.

During last week, the Wireless Institute has made a special appeal to Traders, some of whom have generously responded. To those who have not, we want to stress the fact that their subscriptions will be welcomed to the fund.

Send along the contributions to the "Wireless Weekly," 33 Regent Street,

Redfern, or to Mr. Phil. Renshaw, Box 3120 G.P.O., Sydney.

The funds will be handled by a Board of Trustees, consisting of Messrs. F. Basil Cooke, Phil. Renshaw and J. W. Robinson. These gentlemen will see that the money is properly disbursed.

A considerable portion of the wireless apparatus belonging to the late Mr. Moore is on sale at the shop of Miss Wallace, Royal Arcade, Sydney. Call in and see whether there isn't something worth having. Every item purchased means a little extra to the fund.

The owner of the late Mr. Moore's residence has requested the removal of the aerials, in order to make way for new tenants. Will some one make an immediate offer for the gear as it stands?

The mast is of wood, in two sections, each 40ft. high. The top section is so constructed that it may be lowered by sliding down the lower section. The aerial is of the umbrella type, comprising four squirrel cages, each about 80ft. long.

The whole of the outfit would be a valuable and permanent adjunct to any experimental station.

Contributions to date:

Proprietors Wireless Weekly	\$5 0 0
United Distributing	10 10 0
Mr. Quife	0 10 0
Wireless Weekly Staff	1 3 6
P. Renshaw	3 3 0
Mr. Jones	0 10 6
G. Taylor	1 1 0
J. W. Robinson	1 1 0
F. Basil Cooke	1 1 0
O. Sandel	1 1 0
Mr. Allsop	0 10 6
Mr. Saunders	0 10 6
Robert H. Doyle	1 1 0
Miss Day	0 10 6
A. F. Price	0 10 6
R. C. Marsden	1 1 0
A. Dare	0 10 6
M. McIntosh	0 10 6
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Continued on page 20

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More of Mr. Maclurcan's Humour.

A little resuscitation, entitled, "The Thusness of the Which":—

Folks have sung of England's heroes,
On the sea and on the foam,
But they quite forgot those heroes
Who do gallant deeds at home.
Scene, it is a railway station,
Woman falls upon the line,
The signal's down—the time—ten-
thirty,
Express is due at half-past-nine,
Women shriek—strong men turn pale,
When in the midst of all the strife
A porter jumps down off the platform
Shoves back the train—and saves her
life.

Second Verse:

Now we'll journey to the racecourse,
That's if you've the time to spare—
Will the favourite last the distance?
You don't know and I don't care.
See the plungers wildly plunging,
You can hear his pulses throb,
When heedless of his wife's entreaties,
On the favourite puts—a hob,
They're off! They're off!—and so's the
bookie,
Shut your eyes and with me gaze,
The favourite's last—he comes in
backwards.
Thank heaven we backed him both
ways.

The next song is entitled, "O For a Pair of Pants." Of course, this isn't a song that the tailor likes to hear sung, because too many people owe for a pair of pants—coats also. But talking of pants—do you know how to make a pair of pants last—you make the coat first. While on this subject, there seems to be some doubt as to whether pants are singular or plural, because if a man didn't wear them—that would be singular. But talking of pants, you've heard that lovely song, "As Pants the Heart." But what a silly thing. Whoever saw a heart with pants on? I read in a book the other day, "As the heroine ran on her breath came in short pants"—well, I think that's positively indecent, considering that she was over twenty-one. Do you know why the Prince of Wales wears blue braces? Because he couldn't get pink ones.

The garage time is now jolly near bed time.

I was dining with a friend at the Wentworth the other day. He'd heard that they often had frog legs to eat in France, so he thought he'd like some. He sent for the waiter and said: "Waiter, have you got frogs' legs?" "No, sir," said the waiter, "that's rheumatism makes me walk like that."

A resuscitation entitled, "The Punters' Lament," or "Oh, What a Day is Monday."

All War Department telegrams, cablegrams, and radio messages are handled directly through the Army Message Center, located in the Munitions Building, and under the direction of Major-General George O. Squier, Chief Signal Officer of the Army. An average of 322 messages a day is now handled, the bulk of the dispatches being sent and received by radio. As a financial saving to the government, the Message Center is a unique factor. Through the operation of its radio net it has reduced the tele-

graph tolls from 5,500 dollars in July, 1922, to 1,650 in March, 1923. Through the use of its radio net, now including 112 stations in every corner of the country, the Message Center handled 62,222 official radiograms, totalling 2,235,417 words, during the last calendar year. If this traffic had been handled over commercial telegraph lines, the cost to the government would have been 38,202 dollars, but the army cost was only 18,039 dollars, exclusive of enlisted operating personnel. The saving to the country amounted to 20,163 dollars.

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The Moore Fund

Continued from page 18

C. Storm	0 15 0
H. Carter	0 5 0
A. Larkin	1 0 0
E. Mason	0 5 0
N. Ambrose	0 3 0
J. G. Prichard	1 0 0
Keith Davis	0 5 0
C. Leaver	0 5 0
R. Seach	0 2 6
Campsie and District Radio Club	0 15 0
A. E. Henry	0 5 0
Charles Tripp	0 5 0
Wireless Branch (P.M.G. De- partment, Melbourne)	1 8 0
Illawarra Radio Club	0 10 0
T. E. Dickinson	0 5 0
Aust. Radio Relay League	£1 1 0
Goulburn & District Radio Club (Member)	4 0 0
Charles Tripp	5 0
Wireless Branch, P.M.G., Melbourne	1 8 0
Illawarra Radio Club	10 0
T. E. Dickinson	5 0
Edison Swan Electric Co.	1 1 0
W. Harry Wiles	1 1 0
Farmer and Co., Ltd.	5 5 0
F. T. S. O'Donnell and Griffin Ltd.	0 10 6
O. F. Mingay	0 10 0
G. E. H. Blanchard	0 10 0
Aust. Radio Relay League	1 1 0
Goulburn and Dist. Radio Club (member)	4 0 0
Total	367 17. 6

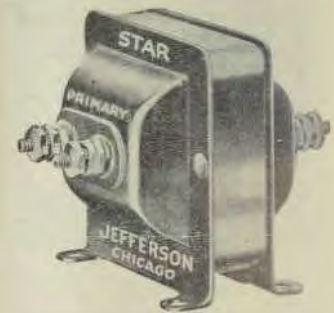
Lady: "What is that peculiar odour I get from that field?"
Farmer: "That's fertiliser."
Lady: "Oh, for the land's sake!"
Farmer: "Yes, lady."—"The Lightning Line."

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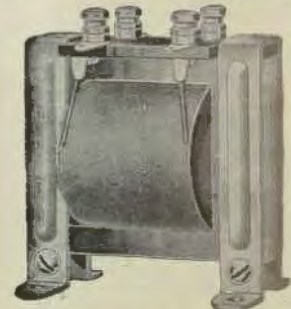
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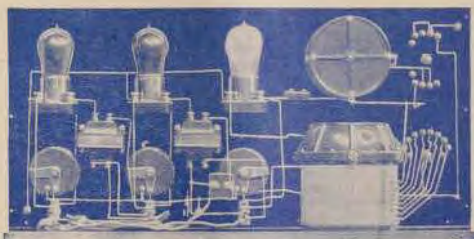
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