SPECIAL A.C. NUMBER

BIGGEST, BRIGHTEST and BEST

THE RADIO RECORD

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RADIO OF TO-DAY

RADIO has rapidly outgrown its infancy. A few years ago it was a doubtful, unheard-of experiment. A few brilliant scholars and scientists were dabbling with something new about which the world knew nothing, and about which they cared less. They were soon to recognise, however, that this new science was to mean to the world one of the most outstanding and most brilliant discoveries that its experimenters has ever given to it.

The introduction of the all-electric receiver has given radio a tremendous impetus. A radio receiver is no longer an annoying disfigurement to the home or a collection of troubles. Its simplification has rendered it able to be operated by all; its power has given tone and its operation reliability. What more can be desired ?

The growth of radio since its inception some 30 years ago has been more than phenomenal. Within 10 years it has left the laboratory and spread over the whole world as some rapidly moving force until it is now a necessity to every home.

Some three years ago radio, although popular, was, in another sense, very unpopular. Just at this time it was entering the home, and there making a very great nuisance of itself. Crude, heavy apparatus was strewn about, rough signals were being handled by inadequate apparatus, experimenters were keenly wrapped up in hearing morse or even scraps of telephony coming over the air, Throaty horn speakers annoyed all except the experimenter who was wrapped in this growing science. This was certainly a step forward, but radio was not yet popular. It had left the laboratory, and was at the home experimenter stage. Its development henceforth was even more rapid, and within these last few years, wireless has become part of our very lives. The rapid growth signifies that it is not a transient fancy.

THE question of power for radio has been one that has caused a great deal of concern. On one side high voltage was necessary; on the other a great deal of current at a low voltage, but this had to be absolutely smooth. To meet the demand of high power, batteries were rapidly perfected, and to meet the low steady current drain, the accumulator came into being. With the rapid A.C. reticulation of even most outlying districts, battery chargers and battery eliminators found their way into the homes with radio receivers.

ABOUT 12 months ago, the cry "electrify your set" was heard. Eliminators meant greater power, greater power meant better valves—power valves that could handle almost unlimited current without the slightest trace of distortion were evolved to fill a need. Prior to this, the general purpose valve was found in each stage of the radio receiver, but now, as more specialised power became available, more specialised valves could be evolved to fill the respective places in a set.

Radio for the home then moved on yet faster; battery chargers and eliminators were reasonably priced, and easily handled, and they gave radio a greater impetus. Still many were not satisfied. They said, "We do not want to be bothered with "messy batteries and eliminators from which you can get a nasty shock. The battery is always running down and has to be re-charged, and re-charging is inconvenient." They added, thinking that it would never be fulfilled, "All we want to do is touch the button and it plays."

THEY little thought how close that day was. It is to-day. Wherever electric power is available, electric radio receivers, which, if of a good quality, are almost troubleless, can be installed. There are neither messy batteries nor dangerous eliminators. Everything is enclosed within a metal-bound cabinet, and this is earthed. Danger of shock even although 450 volts may be put upon the last valve, is reduced to an almost negligible minimum. Problems of sensitivity and selectivity have likewise been met and dealt with, and the overbearing local station is no longer the annoyance of all who are under its shadow. Distant stations can be brought in at good strength, and their programmes enjoyed. Our columns frequently contain letters of listeners who enjoy American and Japanese transmissions.

WITH the rapid improvement of the audio side of the receiver and the introduction of the gramophone pick-up, listeners can have at their will the programme provided by a range of stations, or that provided from their gramophone. Even a cheap portable machine may be converted into an electric panatrope by the addition of a pickup. A fine class of music comes over the air, and this must have a definite bearing on the musical tastes of its listeners, and where perfect reproduction both from gramophone and wireless set is possible, this can have only one effect, and that an elevating one.

THE future of radio is a bright one, though it has been said, "What will come in after radio goes out" Radio will never go out, it cannot. It will be improved, though even now it appears almost to be perfect.

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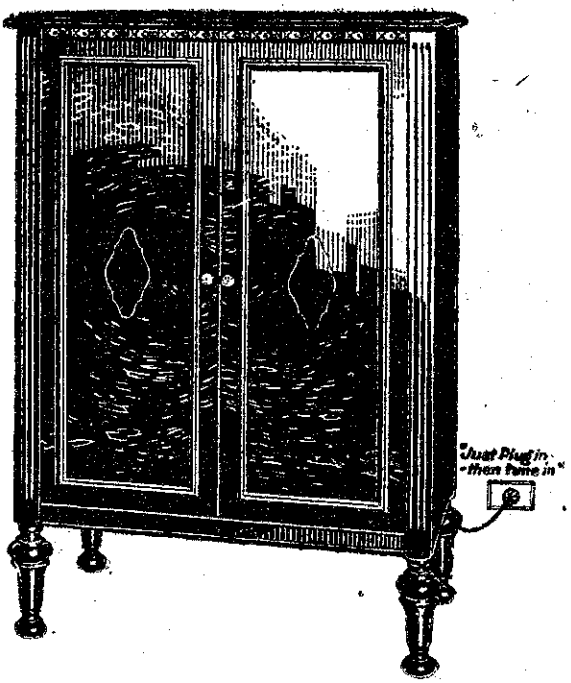

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Report on 2YA.

Summary of Views

SOME little time ago the Radio Branch of the Electrical Federation called for reports from listeners in various districts concerning Station 2YA. It was desired that these reports should cover all features in connection with the station, viz., reception of the transmission and the quality of the programmes put over.

In response to that appeal, a number of reports were received by the Federation, covering the months of April, May, June and July. These reports have been summarised insofar as they emanate from the area definitely within the sphere of influence of Station 2YA. The summary shows some interesting features, which it will be instructive to outline under the different heads.

In relation to reception, it is interesting to note that different districts give different reports of the quality of reception at the same time. For instance, in June the Hutt Valley district reported that throughout that month fading was practically continuous in that area, but throughout the balance of the area served by 2YA the reports on reception were that it was excellent. A seasonal factor would also seem to affect reception. In the autumn months, April and May, the country districts returned a fair number of unfavourable reports of the reception of Station 2YA, but the same districts in the winter months gave credit for very good reception. In April and May, Wellington and suburbs, judging by the reports received, characterised reception as poor, but in the same months and for the same time Wairarapa recorded reception as good. Manawatu in the same month also reported reception as fairly satisfactory.

In the month of June the Wairarapa reported reception as being good, and Taranaki characterised the month as a particularly good month for the reception of both 1YA and 2YA. Hawke's Bay also recorded reception as being good, apart from several bouts of fading. The Blenheim area for this month recorded the reception as being particularly good.

In July, without exception, all areas under review reported favourably upon reception.

The Programmes.

IN connection with the programmes, a general note of appreciation characterises the reports received. In April and May some complaint was made regarding the orchestral numbers from 2YA, but appreciation was expressed of the inauguration of the Dinner Music Session. Complaints, however, regarding delays between the groups of items or tacet, were fairly general. Hawke's Bay reported the programmes as being satisfactory and Wellington in June also commented favourably on the programmes. Wairarapa for this month recorded objection to the frequent repetition of items by artists and the orchestra. Hawke's Bay recorded the programmes as satisfactory. Taranaki also was satisfied according to the summary, but suggested that additional instrumental solos and trios from members of the Studio Orchestra should be presented.

A Special Trouble.

A SPECIAL trouble is recorded as occurring in the Manawatu, centring upon Palmerston North. Local interference is the main problem worrying listeners there. This is held to be due in large part to experimental operation of home-made sets by boys and juveniles. One report states that this is provable by careful watching upon drill nights. The report states:

"On regular nights in each week reception is clearer and better than others, due probably to the habits of certain listeners, particularly boys who may be absent from home attending drill on these evenings. When special attraction is provided by an Australian station and is duly advertised, the reception is generally very mushy and distorted, but on these occasions the YA stations are received with exceptional clarity."

Deduction is made from these facts that the mushiness of reception of Australian stations on this evening is due to the special attention being concentrated upon receiving those stations by operators of sets which may be under strain to receive the station. Because of this concentration upon Australian stations the YA stations on those evenings are particularly clear.

A Summary of Views.

A CONCISE summary prepared for the Electrical Federation of the July reports may be quoted in its entirety:—

News Session. — The manner in which the news is put over is favourably commented upon at all points.

Weather Reports.—Prior to the inauguration of these reports it was thought that the weather report might be considerably curtailed. The position disclosed, however, shows that throughout the country districts the weather report is of great value and is of interest to the majority of listeners.

Dinner Session.—From its inception the introduction of dinner music proved a great success, and the extension of the service to all stations should, in view of the reports received, prove a profitable one. The opinion is expressed that the period between the groups of items should be considerably shortened, and exception is also taken to the announcing while items are in progress.

Programmes.—In the majority of instances exception is taken to the substitution of items other than those advertised and, judging from the statements received in this connection, it would appear that changes are frequent and in some cases apparently quite unnecessary.

Radio Exhibition.—Reports from all districts state that the special programmes in connection with the exhibition were enjoyed, and from the listeners' angle it is apparent the show was a success.

Announcing.—The remarks relating to the announcing are in all instances most complimentary to the announcer, and his work appears to give more general satisfaction than any item in the programme."

Mr. George Barnes, lyric tenor. Often heard from 1YA.
—S. P. Andrew, photo.

Mr. Stan Pritchard, a leading Auckland baritone.
—S. P. Andrew, photo.

The Secret Station

New Book with Radio Theme

OUR readers will be interested to know that "The Secret Station," written by Ellersley Hall, of Christchurch, will be on sale in the Dominion within the next few weeks. As "Peterkin," of 3YA, Mr. Hall is already known to a wide circle as a writer and story-teller and the many listeners who are familiar with his voice may look forward with pleasant anticipation to a thrilling and interesting book.

"The Secret Station," as the name suggests, is a story for boys, and the heroes are two New Zealand lads who discover that an unknown radio station is broadcasting a strange and mysterious force which interferes with radio communication. The book is well illustrated and should be particularly acceptable to boys—and girls, too, for a very courageous young lady plays an important part in the unfolding of the plot.

To Increase Production

Lectures from 3YA

A PARTICULARLY valuable and informative series of lectures has been arranged by the Primary Productions Committee for presentation from 3YA. The detailed schedule of this series is presented below, and rural listeners will be able to select the special lecture in which they are interested. As will be seen, effort has been made to make a definite appeal to different sections of farmers. Probably one of the most interesting general lectures will be that by Mr. Baird on "Weather Forecasting in Relation to Farming," which will be presented on Thursday, November 21. The talk on "New Zealand Native Plants" by Mr. Darton, secretary of the Canterbury Horticultural Society, may be expected to interest many city listeners as well as those in the country.

Thursday, September 19.
"Seasonal Orchard Work from October Onwards," by Mr. J. D. Carolin, Orchards Division, Department of Agriculture.

Friday, September 20.
"Review of Principal Articles in the Journal of Agriculture," by Dr. Chas. Chilton.

Thursday, September 26.
"The Case for Top-dressing in Canterbury," by Mr. A. Y. Montgomery, Fields Division, Department of Agriculture.

Thursday, October 3.
"The Aims and Objects of Horticultural Societies," by Mr. O. W. B. Anderson, Chairman of Committees, Canterbury Horticultural Society.

Thursday, October 10.
"Scheme of Official Pig Recording," by Mr. N. O. D. Alexander, Agricultural College, Lincoln.

Thursday, October 17.
"Fireblight—Its History and Measures to Prevent Its Spread," by Mr. L. Paynter, Orchard Division, Department of Agriculture.

Thursday, October 24.
"Shelter Belts on Farms," by Mr. R. G. Robinson, Superintendent, Selwyn Plantation Board.

Thursday, October 31.
"Manuring of Root Crops," by Mr. R. McGillivray, Fields Superintendent, Department of Agriculture.

Thursday, November 7.
"Co-operative Marketing of Wheat," by Mr. Robert McPherson, Manager of New Zealand Wheatgrowers' Co-operative Association.

Thursday, November 14.
"Keeping Up the Wool Clip," by Mr. D. Sidey, B.Ag., Canterbury Agricultural College, Lincoln.

Thursday, November 21.
"Weather Forecasting in Relation to Farming," by Mr. H. F. Baird, Christchurch Magnetic Observatory.

Thursday, November 28.
"Certification of Wheat," by Mr. C. C. Leitch, Fields Division, Department of Agriculture.

Thursday, December 5.
"New Zealand Native Plants," by Mr. H. L. Darton, Secretary Canterbury Horticultural Society.

Thursday, December 12.
"Weaning Lambs on Rape, or Supplementary Feeds for Sheep," by Member of Staff, Canterbury Agricultural College, Lincoln.

Thursday, December 19.
"Farm Chat—Review of Journal of Agriculture," by Dr. Chas. Chilton.

Burnt Cork, Bones and Banjos

At 4YA on Wednesday

FREQUENTLY listeners forward requests for old time songs and choruses that "bring back memory days of long ago." The announcement that 4YA is to broadcast another programme by the Dunedin Orphans' Club Christy Minstrels on Wednesday, September 25, should be welcome news to the many writers of letters of appreciation of the last concert, which was received from all parts of the Dominion.

The songs and choruses are selected from old time favourites of the Moore and Burgess Minstrels, such as:

"Come Where My Love Lies Dreaming"
"Lily of Laguna"
"Susan Jane"
"Kingdom Coming"
"Massa's in de Cold, Cold Ground."

The end songs include—
"Keep dem Golden Gates Wide Open"
"Dandy Coloured Coon"
"R-i-r-e-d"
"Louisana Loo."

"Satisfied with Life," by the Interlocutor, is the most modern number, and it dates back to programmes of 30 years ago, "so the oldest listeners should be satisfied."

Gags and jokes galore will be fired by the end men, and the pianist will also provide appropriate melodies.

The cast is as follows:—

Quartet: T. Bachop, H. F. Grant, L. Booth, R. Macdonald.

Corner Men: C. de Andrews.

Bones: A. Clapp.

Tambos: "Pom" Watson, C. Wessman.

Interlocutor: Allan Young.

At the piano: D. Bewes.

RECENTLY a young lady in New York desired to go through the ceremony of marriage with her fiance who was stationed in the Argentine. In order to avoid a long and expensive journey, she set about inquiring whether wireless would step into the breach. She succeeded in winning the co-operation of the station officials of both countries, but met with no success in taking out the necessary license. Such a mode of marriage may one day be possible, but it is not an innovation which is to be looked forward to.

GOOD long-distance reception is absolutely impossible if the set is oscillating.

The New Zealand
Radio Record
(Incorporating the "Canterbury Radio Journal.")

P.O. BOX, 1032, WELLINGTON.

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N.Z. RADIO PUBLISHING CO., LTD.,
P.O. Box 1032, WELLINGTON.

WELLINGTON, FRIDAY, SEPTEMBER 20, 1929.

EDITORIAL NOTES.

THIS issue of the "Record" takes the form of a special enlarged number dealing with A.C. Radio Equipment. The manner in which this simple and efficient equipment has swept the radio field has been surprising. There are obvious reasons for this. The apparatus embodies three outstanding and striking features which commend it to the ordinary buyer. The A.C. set is simple. All that is required is that connection be established with the electric light or power mains, and working efficiency is secured. Added to that simplicity is additional power and volume given to the set by the stronger resources of the A.C. mains. And the third desirable feature is economy of operation, in that power derived from the mains is on a cheaper unit basis than that from the batteries. These three features constitute so strong an appeal to the ordinary listener that, in the cities and country districts where suitable current is available, the tendency has been for those who can afford it to scrap their battery sets and install A.C. equipment.

IN addition to the conversion factor, the A.C. set brings into the field a number of fresh buyers. The factors of simplicity and economy of operation are such as to appeal to many who have not hitherto troubled with radio, largely throughout disinclination to fuss with batteries and acquire the necessary technical knowledge for efficient operation of a set. This new field is considerable, and accounts in itself, to a large extent, for the steady expansion of licensed listeners. With the steady electrification of the countryside the field of buyer is extended into that area. Here simplicity makes perhaps its strongest appeal, because in addition to the disability represented by unfamiliarity with the technicalities of radio, the country listener suffers the drawback of distance from points for replenishing his batteries. Thus it is that both city and countryside join in welcoming the A.C. set. In this number our technical staff has, we think, excelled itself in covering adequately and efficiently the field of knowledge necessary to listeners wishing to either change over to, or acquire, A.C. equipment.

WHILE it is impossible to deny the increased efficiency of the A.C. set and its appeal to buyers, it must yet be recognised that the battery set is, in certain circumstances, capable of holding its own with the A.C. receiver. There will always be those who delight to experiment and adapt equipment to their own needs, or whose circumstances are such as to make A.C. apparatus unavailable to them. In this field battery radio will hold its own.

THE vigour with which the committee in charge of the arrangements for the forthcoming Auckland Exhibition is prosecuting its task assures a satisfactory outcome to the venture. There can be no doubt that when Auckland takes a thing in hand it is done well, and we have no doubt whatever but that the fullest success will attend the efforts being made in Auckland to provide an adequate display of radio apparatus for the information of the public. The co-operation of the Radio Broadcasting Company is assured in making the venture a success, and it is certain that the aggregation of the wide range of radio apparatus now possible to the trade will provide the public attending that function with a wonderful insight into the simplicity and efficiency of the modern radio receiver.

THE decision of the B.B.C. to set aside half an hour daily for the experimental transmission of pictures under the Baird Television apparatus is very significant of the march of events and the insistence of the public upon all possible assistance being given to furthering the approach of that long-expected day when it will be possible for the ordinary listener to sit in his home and see and hear historical happenings. While in the meantime the B.B.C. takes the conservative attitude of disclaiming responsibility for results that may be secured by listeners, the action in itself is significant and ensures definite speeding-up of the time when full success will be attained. Much controversy has raged in the past round the efficiency of the Baird Television system, and there have been technical experts who have asserted that the system in itself was not capable of the fullest success. Time will show who is right. From the listeners' point of view, intense interest is felt in the march of science, and all progress that can be recorded in this field will be eagerly welcomed.

Interesting Talks from 4YA

"Wireless Talks—All About Your Set"

COMMENCING on Monday evening at 7.40 p.m. a series of talks designed to interest the listener who wants to know the "why" of his wireless set, will be heard from 4YA. The "Radio Man" will be at the microphone, and as he is a highly competent authority listeners will find plenty of interest in following his explanations of what perhaps they lightly term "gadgets."

With a view to enlarging the scope of the matter dealt with, questions will be answered, and listeners are invited to send their queries along to the "Radio Man," c/o 4YA.

Hastings Radio Society

Further Donations

AT the recent concert organised by the Hastings Radio Society to provide funds for the installation of wireless in the Napier Hospital, an appeal was made over the air by His Lordship the Bishop of Aotearoa for funds from listeners. In last week's issue we published a detailed list of donations received up to that point. Since that list was compiled, further donations have been received, which brings the total from the appeal up to £15 1s. The additional contributors are:—

H. R. Harper, Waimate; Misses MacAuley, Middlemarch; "Sandy Mac," Dunedin; Mrs. Cousins, Beaumont; "A. and I. R." Otago; "Good Cheer," Pukehou; "330 Oriental Bay"; "Listener in Manawatu."

Anderson's Bay Glee Club at 4YA

THE Anderson's Bay Glee Club (Dunedin), to perform on Friday, was formed in 1908, so that this is its twenty-first season. There are over 50 members for the chorus work. Mr. James Clark is the conductor, and Miss Marjory McAdam accompaniste. This performance is being specially arranged for broadcasting and should prove of great interest.

B.B.C. and Baird Television

Half-Hour Experimental Transmissions

IT is announced by a British official wireless message that the British Broadcasting Corporation has set aside half-an-hour daily for the broadcasting of television on the Baird system. It is specifically announced that the transmissions are to be of an experimental nature only, and the Corporation declines to accept responsibility in the meantime for their quality or the results obtainable by receivers. The object of the demonstrations is to give wider opportunity for the development of the possibilities of the system.

This decision marks the end of a controversy which has waged in Britain for some time past. Various experimental demonstrations have been given at different times to B.B.C. officials, and in the early days were met with a negative outcome so far as the Corporation was concerned. Supporters of the Baird system, however, were not satisfied, and in consequence of private demonstrations given by the Baird Corporation, sufficient press support was forthcoming to create a public opinion insisting upon a more sympathetic attitude by the B.B.C. Finally a demonstration was given to B.B.C. officials which had the effect of convincing them that there was scientific grounds for helping, and that favourable outcome would be possible if experimental co-operation could be secured. Negotiations took place between the B.B.C. and the Baird directors, with the result now announced. It is hoped that the experimental transmissions now being undertaken will lead to rectification of such troubles as still require solution.

ONE of the most informative and concise summaries of the Baird system ever written was that recently published in the "Review of Reviews," from the pen of Major E. R. Macpherson, O.B.E., F.R.G.S., F.A.G.S. He is a Fellow of the Television Society, and wireless correspondent of the "Review of Reviews." In the interests of our readers we produce part of this article from the "Review of Reviews," as reprinted in "Television":—

"The credit of being the first man to demonstrate, publicly, true television, belongs to John Logie Baird, a brilliant young Scot.

"In order to achieve successful television the requirements may be briefly stated as follows:—(1) Means of scanning an image, so as to subdivide it into tiny sections, or elements. (2) Means of transforming the resulting picture elements, or light impulses, into electrical impulses, which can be transmitted to the distant receiver, either by wire or wireless. (3) Means of reconverting electrical impulses into light impulses, and by means similar to (1), causing them to cover, or illuminate, a screen, thus reproducing the image at the transmitter. (4) Means of synchronising the transmitter and receiver, i.e., causing them to run in step or exactly at the same speed.

"These are the requirements as Mr. Baird saw them six years ago.

"Many optical methods were already known which would fulfil (1). The selenium cell and the photo-electric cell were in existence and seemed to cover (2); and for (3) there was the neon valve. Methods of synchronism had already been developed to a high degree, and seemed to meet the requirements of (4).

"It all appeared so simple that Mr. Baird fancied there must be a catch somewhere. He soon discovered that the stumbling block lay in requirement (2), viz., the light-sensitive cell. A further difficulty lay in (4), for Mr. Baird realised that the usual methods of synchronism were quite unsuitable for television. After six months' work he was able to transmit shadowgraphs, but he found that to transmit the images of the objects themselves was a very different thing.

"It was not until October, 1925, that he had the satisfaction of seeing the doll's face (which he used for experiments) on his receiving screen not as an outline, but as a real image with shading and detail.

"On January 27, 1926, he gave a demonstration to more than forty members of the Royal Institution, the first demonstration of true television ever witnessed. This demonstration, and others which followed (including the trans-Atlantic tests), aroused considerable interest and enthusiasm. The original machine can now be seen in the South Kensington Science Museum.

The System Described.

"Since then, Mr. Baird has continually improved the technique of his instruments, and his system (an adaptation of the spot-light and scanning disc) may briefly be described as follows:—

"A light proceeding from a brilliant source is condensed into a slender beam not more than an eighth of an inch in diameter.

"By means of a revolving disc this spot of light is made to traverse the face of a sitter in such a fashion that it flies across it again and again at slightly differing levels, so as to scan the face completely in less than one-tenth of a second. In front of the sitter's face, but screened from direct light, are a number of photo-electric cells of special design. These cells gather light reflected from the part of the face which at any distance is illuminated by the spot of light.

"The photo-electric cells generate a current proportional to the intensity of the reflected ray, and this current is used at the receiver to build up an image by the aid of a neon glow lamp. At the receiving end, slotted and rotating discs then select the light from part of this glow, and deposit it on a screen in such a fashion that each patch of light occurs exactly on the part of the object from which it was reflected.

"It is interesting to note that several other well-known experimenters are being converted to Mr. Baird's methods of solving the television problem. Mihaly has abandoned oscillating mirrors for discs. Professor Hans Thiring, of Vienna University, is of the same opinion as Mihaly.

"Our own leading men of science, including Sir Ambrose Fleming, have expressed their high appreciation of the Baird system.

Recent Progress.

"A few days ago I was permitted, through the courtesy of Lord Angus Kennedy, to visit the Baird Laboratories in Long Acre, where every facility was given me to see things for myself.

"I was much impressed by what I saw. The improvement in technique since the Radio Exhibition last autumn was most marked. The clarity and detail of vision were such that I easily read the time to a minute on a boldly marked watch held in front of the transmitter (the receiver was, of course, in another part of the building), and I easily recognised the faces of people whom I had seen before.

"Music and speech were almost simultaneously transmitted in perfect synchronism; and in the case of a man playing the piano the limits of the picture permitted the whole keyboard to be seen. I was informed that extended scenes had been successfully transmitted, taking in all the performers, though, of course, the figures were much smaller. They had to be compressed, as it were, into the same area as a head and shoulder view. One can sum up the Baird system in two words: "It works!'

"I was also introduced to the wonders of noctovision, where the sitter is in complete darkness, but his face is flooded with infra-red rays (which are visible to the naked eye), and the image comes out clearly on the receiving screen at the other end. One can imagine the most startling developments from this side-line of Mr. Baird's discoveries. I clearly recognised my friend's face, and all the contortions he did for the experiment, despite the fact that he was in complete darkness at the other end."

In supplementary comment, it is stated that the transmission of television does not occupy a very wide wave band, but that it can be transmitted within the 10 kilohertz band, that is, the frequency band allotted by the Geneva Convention to European broadcasting stations. Mr. Baird readily admits that finality has by no means been reached, but is confident that further progress will be made in this system if given opportunity to use one or more of the B.B.C. stations. That opportunity is now available to him, and the radio world will await the outcome with interest.

Radio Progress

Short Wave Transmission

THE following communication has been received through National Electric Engineering Company:—

As interest in the broadcasting from Schenectady by the shortwave transmitters has been increasing, the studio management has for some little time been sending out the schedules, giving complete programmes two days in advance of the actual broadcasting. In other words, on Mondays, the listeners in the foreign field received planned programes for the following Wednesday.

These programmes are sent out first by the voice, followed by the repeating in morse code. Following are the days, with wavelength and kilocycles and time of transmission. Time given is Greenwich civil time, with New Zealand time in brackets:—

Monday: W2XAF, 2140 G.C.T. (Tuesday, 9.20 a.m.); W2XAD, 2140 G.C.T. (Tuesday, 9.20 a.m.).

Tuesday: W2XAF, 2140 G.C.T. (Wednesday, 9.20 a.m.).

Wednesday: W2XAD, 2140 G.C.T. (Thursday, 9.20 a.m.).

Thursday: W2XAF, 2140 G.C.T. (Friday, 9.20 a.m.).

Friday: W2XAD, 2140 G.C.T. (Saturday, 9.20 a.m.).

Saturday: W2XAF, 2140 G.C.T. (Sunday, 9.20 a.m.); W2XAD, 2140 G.C.T. (Sunday, 9.20 a.m.).

Sunday: W2XAD, 2140 G.C.T. (Monday, 9.20 a.m.).

After September 9, the above schedule will be transmitted one hour earlier.

W2XAD is broadcast on 15,340 kilocycles and approximately 19.56 metres. W2XAF is broadcast on 9530 kilocycles with approximately 31.48 metres.

We would be greatly interested in learning as to whether this broadcasting of programme schedules in advance is of benefit or service.

The local studio is also much interested in receiving comments as to reception and the acceptance of the programmes. We do not ask detailed facts, but information only that will show us the radio public is interested and willing to co-operate in that we may plan our programmes and broadcasting, in a technical sense, that will enable us to give you more complete satisfaction in this respect throughout the foreign field.

The Choice of a Radio Receiver

All-Electric Advantages

THE all-electric receiver, with its simplicity of operation, excellent tonal qualities, and freedom from servicing troubles, has, without doubt come to stay. Very many would-be listeners have been awaiting the advent of a receiver that dispenses with batteries, battery chargers, and aerial and earth equipment. The all-electric set is the one they have been awaiting, and although it does not fulfil all the requirements of a perfect set it is a good compromise that anyone who now waits for a vast improvement is missing very much that they might otherwise be enjoying.

The all-electric receiver has very many advantages other than those cited, and where it is possible to use the household alternating current the A.C. set will be popular. Greater power can be supplied to the A.C. valve, giving it a greater amplification factor and excellent tone.

The range of these new receivers is equal to the battery set. One has only to glance through the D.X. columns to realise this. Japan, America, and Australia can be heard quite regularly by some owners of 7-valve sets. The problem of selectivity has been, to a very large extent, solved, in that the local station can, on most receivers, be eliminated within a very few degrees of the dial. This makes it possible to listen to other New Zealand or Australian stations while the local is operating.

A very large number of these receivers is now on the market, and although a large number of listeners could give advice concerning battery sets, few are in a position to do so with regard to the all-electric.

Choosing a Receiver.

THERE are a few specific points that the purchaser of an all-electric set should bear in mind. They are:—

1. Cabinet. The modern radio set is no longer an untidy piece of apparatus stored in the corner, or all over the room, as the case may be. It is no longer necessary to make frequent adjustments within the set, so that the console model has become popular. A console is a receiver in which power pack, receiver proper, and speaker are built in to the one cabinet, which, in itself, is a piece of furniture. Very little can be said about design, as much rests with the purchaser. If the radio set does not combine with itself an electric gramophone, provision should be made for a gramophone pick-up.

2. Number of valves. With the rapid perfection of the all-electric set, the number of valves need not exceed that of the D.C. set for equal performance. In the larger sets, the number is usually seven. This number has been made possible because battery power has no longer to be considered. Such a set is usually the equivalent of a six-valve, the last two valves being in push-pull, but this is not always the case. It is becoming customary to refer to a certain number of valves, plus rectifier. The rectifier does not enter into the amplification of the signal, but is merely a valve which transforms alternating current into direct current.

3. Types of valves. There are mainly two types of alternating current valves, and full reference to these has been made in another section of this paper. For silence, and amplification, the four-electrode valve is the better, but it is rather more expensive. It is certainly the better valve, though the 226 is not far behind. An almost silent background can be had in a carefully designed receiver. It is always used as detector, and sometimes in all positions except the last stage, when it is replaced by a power valve.

4. Power valves. The electric set has made possible the use of adequate power valves in the last stage. Some of these require up to 450 volts on the plate, and take over an ampere of filament current. This would be impossible unless the set were all-electric, consequently there can be no comparison in tone between both models. The question of power valves has been further discussed elsewhere.

5. Selectivity. By selectivity is understood the power of the set to separate one station from another when they are operating on an adjacent frequency. A good set will tune out a powerful local station in two or three degrees, and will separate distant stations ten kilocycles apart. Over-sharpened selectivity spoils the tone. Technically speaking, the side bands are cut off, leaving the tone impoverished.

6. Hum. With the advent of the four-electrode valve, hum has been reduced to an almost perceptible minimum, and should not be audible more than a few feet from the set. Where hum is more pronounced than this, tone is very much impaired.

7. Rectification. It was explained previously that the rectifier converts A.C. current to D.C. There are mainly two types of these valves, filament and filamentless. Of the filament type there are two distinct valves, half-wave and full-wave. Sufficient power for true tonal qualities can be obtained only from full-wave rectification. Where high voltages and heavy current are required two half-wave rectifiers (two 281's) give the best results. The filamentless Raytheon valves are adapted for medium work, where up to 300 volts and 125 milliamps. have to be delivered. It is understood that Raytheons giving a greater output than this have been developed in America. The 280 (full-wave with filament) valve will deliver up to 260 volts, with an output of 125 milliamps. In addition, there is the metal rectifier which is earning wide popularity.

8. Speaker. There is no question that the dynamic cone is the only one possible where the purest tone is required. Almost invariably these are used in consoles. Where table models are used, it is possible to employ a good magnetic cone speaker, or even a good horn.

9. Tone. This is one of the most important points in selecting a receiver. Good tone is manifested by a set that gives a good over-all reproduction. Listen carefully for the upper registers. They should ring clear, giving a brilliance as apart from the preponderance of the bass. This latter, if over emphasised, makes the music heavy and dull; although it may sound good to anyone who has been accustomed to a poor horn or cone, yet it will soon become wearying, and once capital is outlaid, the purchaser will not wish to feel that his set is not coming up to expectations. Remember, if you are not critical now, you will be before long.

10. Line voltage control. Unless provision is made to regulate the input voltage from the mains valves will burn out quickly. For this reason automatic line voltage controls are fitted to modern receivers.

Schneider Cup Race

ALL the YA stations took the opportunity on Sunday, September 8, of announcing the results of the Schneider Cup race, and for this purpose remained on the air until 3.13 on Sunday morning. Reception of 5SW in Christchurch was fairly satisfactory, and the noise of the 'planes and the announcer's remarks could be clearly heard, especially earlier in the evening from 3YA's rebroadcast.

At 1.45 a.m. the announcement came through that Waghorn had completed the course record of seven laps at an average of 328 miles per hour, a world's record, and on completion of the course by the other 'planes, it was learnt that Waghorn had won the race at this speed. Reception towards the close of the rebroadcast was somewhat marred by static and singing, but the description could be heard for the most part quite well and the YA stations' enterprise in conducting a rebroadcast and announcing the results, was appreciated by listeners.

To Increase Production

Tree-Growing on Farms

"YE may be aye stickin' in a tree, Jock, it will be growin' when ye're sleepin'," was the text upon which Mr. R. G. Robinson, Superintendent of the Selwyn Plantations Board, based a very interesting "Talk to Farmers" from 3YA on forestry matters recently. Mr. Robinson proved himself a complete master of his subject, and discussed the merit of afforestation on a big scale. The principal point of his address, however, was that even medium or small farmers can profitably use trees as a means of both beautifying and benefiting their homesteads. Many farmers have portions of land where surface cultivation is either difficult or undesirable—steep hillsides, light or shingly surfaces, gorse or broom infested land being easily convertible into timber belts.

Farmers were advised not to "put all their eggs in one basket" by using only one species of tree, but rather to include various soft and hard woods that would combine usefulness for fencing, shed-building, fuel, culverts, telephone poles, etc. These should not be associated indiscriminately in a single plantation, but in small blocks, so that the fast-growing trees would not overpower the slower-growing trees.

While certain pests had particularly affected gum growing in Canterbury, it was hoped that the liberation of parasites recently undertaken would have the effect of counteracting them and making this tree a profitable speculation again in that district. Spring planting was recommended as being better than autumn planting.

Mighty Monarch of the Air!

MAJESTIC All-Electric Radio Receivers

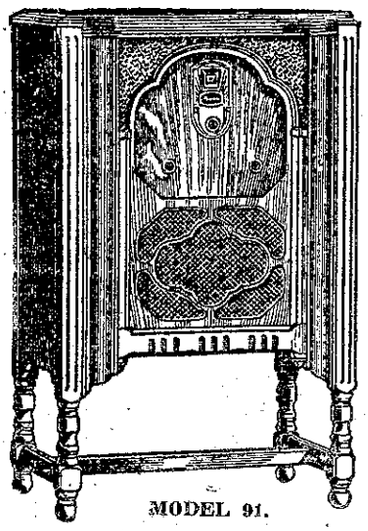
The greatest Valve ever offered in Radio!

Extract from a Hawke's Bay newspaper:—

"'Radio extraordinary.' Can justly be claimed of the Majestic all electric radio and gramophone combination set after its broadcasts of the Wairarapa-Hawke's Bay football match on McLean Park on Saturday last. This particular performance is claimed by experts to be the best demonstration yet heard in New Zealand. Every word could be heard the length and breadth of the large playing ground whilst the gramophone records playing during intervals were a musical treat."

MODEL 91 (illustrated at right).—

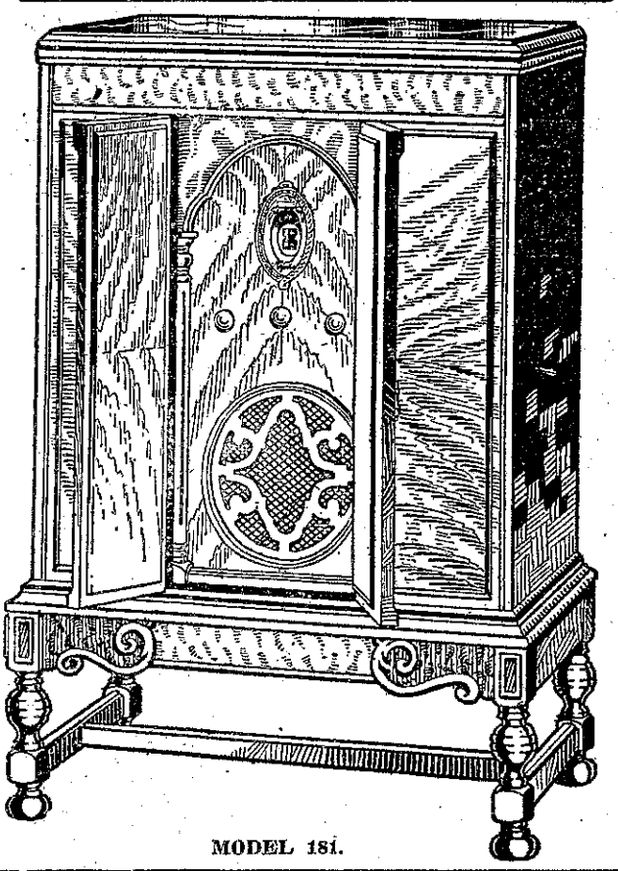
Beautiful Console of Matched Burl Walnut, 7 valves and Rectifier. Dynamic (moving coil) loudspeaker built in. PRICES, complete with valves: Auckland, Wellington, Christchurch and Dunedin.....£48
Inland and outports.....£50



MODEL 91.

MODEL 181 (illustrated below).

Combination electric gramophone and radio receiver. 9 valves. Superb cabinet. Dynamic (moving coil) speaker. The turning of a knob switches from gramophone to radio at will. PRICES, complete with valves: Auckland, Wellington, Christchurch and Dunedin.....£95
Inland and outports.....£97/10/0



MODEL 181.

And Now Majestic Valves!

Are specially designed and produced to match these wonderful receivers—will be capable of enhancing the marvellous reception and beautiful tonal qualities which have already made the Majestic world-famous—in fact, adding that last detail which sets the Majestic on a pinnacle of attainment high above all others.

Every MAJESTIC is GUARANTEED against defective material or workmanship

There is a "Majestic" distributor in every part of New Zealand. If you have any difficulty in arranging for a demonstration, communicate with the factory representatives: C.P.O. Box 462, Auckland; P.O. Box 1581, Wellington; P.O. Box 922, Christchurch; P.O. Box 516, Dunedin.

The Choice of Power Valves

Meaning of Undistorted Power

THE advent of the all-electric set has to a very great extent solved the problem of power valves. Prior to this, the last valve in a multi-valve set had to be more or less economical in both "A" and "B" current, with the result that certain compromises had to be made. This usually amounted to a reduction of the "A" current and "B" voltage; but the all-electric set has rendered economy in these directions unnecessary.

The primary function of a power amplifier is to supply undistorted power to a loudspeaker, in amounts sufficient to that the speaker can give undistorted reproduction with the amount of volume desired by the listener. Power valves and power amplifiers are essential for satisfactory reproduction because of the low efficiency of loudspeakers. This lack of efficiency necessitates that the speaker be supplied with perhaps fifty times as much power as it will finally radiate as sound. If the power valve has not sufficient capacity to supply the required amount of undistorted power, the speaker has either to be operated at a volume level lower than desired (so that less power is drawn from the valve), or the power valve has to be overloaded. Under these conditions serious distortion is produced.

Distortion makes itself evident by a very large number of symptoms, and all but the most untrained ear can perceive this condition. With the magnetic cones and horns a rattle indicates that the speaker is being overloaded, but with the dynamic cone speaker, overloading is almost impossible under normal household conditions. Overloading of the power valve shows itself generally in harshness, lack of clearness, confusion of both lower and upper notes, and a tendency to blast.

Types of Power Valves.

THERE are now available the following types of power valves: 112A, 171A, the 245, 210, and the 250. All of these can be used singly or in push-pull, and there are consequently ten possible combinations. The problem arises in determining which combination will be chosen by constructor or purchaser. It will be noticed that several types of valves have been given. These names apply to Radiotron valves, but almost every manufacturer makes the equivalent, and the onus is on each constructor to find out the designation of these valves in the make he prefers. Table 3 shows a few of the better-known examples.

In deciding which power valve or combination of power valves to use, the first point to be determined is how they compare with regard to power output. In Table I has been listed these types of valves and their combinations indicating the power output at various voltages. The table has been arranged in order of power output. In all cases it has been assumed that the power output to be obtained from two valves in push-pull is equal to three times that obtainable from a single valve operated at the same plate voltage.

To bear this out we see that the output of a single 171A operated at 135 volts is .33 watts, while two 171A's in push-pull give an output of 1 watt. The wattage is computed by multiplying the voltage applied to the valve by the milliamps. emission, and then dividing the equation by 1000.

An example will serve to make per-

Table No. 1.

Arrangement No.	Power Output in Watts.	Type of Valve.	Single or Push-Pull.	Plate Voltage Required.
1	.120	112A	Single	135
2	.195	112A	Single	157
3	.330	171A	Single	135
4	.360	112A	Push-Pull	135
5	.600	112A	Push-Pull	157
6	.600	210	Single	300
7	.700	171A	Single	180
8	.750	245	Single	180
9	1.0	171A	Push-Pull	135
10	1.5	210	Single	425
11	1.5	250	Single	300
12	1.6	245	Single	250
13	2.1	171A	Push-Pull	180
14	2.25	245	Push-Pull	180
15	3.2	250	Single	400
16	4.5	210	Push-Pull	425
17	4.5	250	Push-Pull	300
18	4.6	250	Single	450
19	4.8	245	Push-Pull	250
20	9.6	250	Push-Pull	400
21	13.8	250	Push-Pull	450

power amplifier capable of supplying 3 watts of power. Since the amplifier must supply at least this, all arrangements up to No. 15 in Table 1 may be disregarded. This latter will supply 3.2 watts, and will be sufficient for our purpose. We see, however, that it requires 400 volts on the plate, and this necessitates the construction of a big transformer. Glancing down the column of plate voltages, we come to 250 volts as being required by two 245 type valves operating in push-pull. This gives us an output of 4.8 watts, which is ample for our purpose. Because of the comparatively low plate voltage, it is possible to effect a considerable saving in the construction cost. In addition, there is much less danger of filter condensers breaking down, and 250 volts is much less dangerous in the case of accidental shocks, than is 400.

Table 1.

Watts output.	Best arrangement to use.
0.5 or less	One 171A at 180 volts
0.5 to 1	171A's in push-pull with 135 volts; or a single 245 with about 200 volts on the plate
1 to 1.5	Single 245 at 250 volts
1.5 to 2	171A's in push-pull at 180 volts
2 to 5	245 valves in push-pull
Higher powers .	250 valves in push-pull

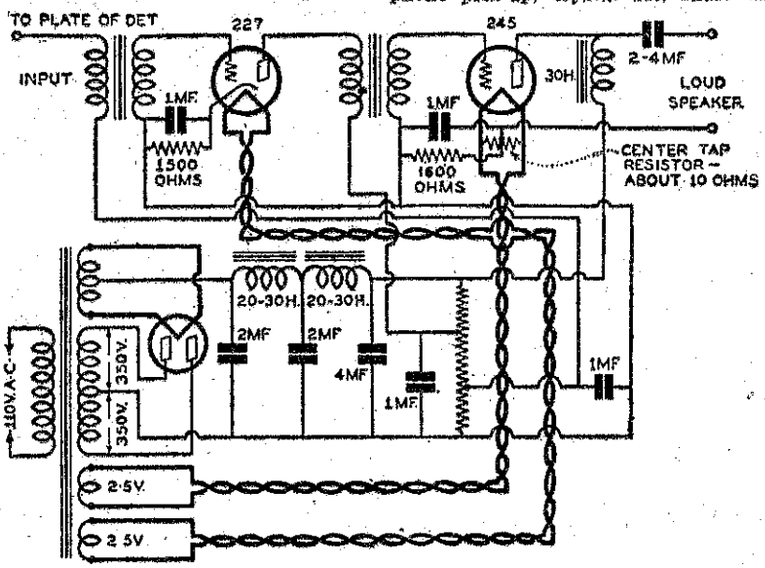
We would, then, feel more disposed to construct an amplifier using two 245's in push-pull rather than either the 250 singly, or the 210's in push-pull.

Output Expressed as Volume.

FOR some time reference has been made to the various power outputs, and it will be worth while to translate "power output" in the terms of volume of sound. The following is about the average: Power output up to .3 or .5 watts will give fairly low room volume; about 1.5 watts gives very good room volume; and 5 to 10 watts gives volume sufficient for a hall. It is unwise to build an amplifier to give an output of less than .3 watts, so in designing a power amplifier we must consider either the outputs .3 to .5, .5 to 1.5, or 1.5 to 3 watts. For usual home use for wireless set or gramophone such as in the amplifier described in another section of this issue, two 171A's (or their equivalent) in push-pull can be used successfully. These valves were used in the original model, and were found to give ample volume from either gramophone or crystal set on the local station. A second possibility for this range is the use of a single 245 type with 200 volts on the plate, but the advantage of the two 171A's with 135 volts is quite evident. For a greater output, 1.5 watts, a single 245 valve may be used with 240 volts on the plate. By increasing the voltage on the 171A's to 180, two watts may be delivered comfortably. From 2 to 3 watts of undistorted power may be supplied by two 245's with 250 on the plates. For higher outputs, use two 250's in push-pull. This position has been summarised in Table 2.

From the following discussion, it has become evident that the 210 type valve does not appear. This valve did not enjoy great popularity in New Zealand. It was used in America when A.C. amplifiers first became popular. This valve is capable of supplying approximately 1.5 watts at a plate voltage of 425, whereas a single 245 type can supply 1.6 watts with only 250 volts. It then seems hardly feasible to use the 210 with all the difficulties, and expense of constructing a sufficiently powerful amplifier.

Another interesting fact is that the 245 valve can be used to supply up to 5 watts of power, and this is sufficient for a small hall. Another interesting point is that the power valves have been limited to the 171A for general house purposes, the 245 for slightly greater power and hall use, and the 250 for still greater power. The 112 valve is also absent. This is a medium-power valve that is hardly used because, whilst ample power is available, one might as well use the 171A, and obtain the greater output.



Illustrating the use of a single 245 in an amplifier.

Push-pull v. Single Amplifier.

SOME years ago, push-pull was very fashionable. With the coming of the super-power valves it then lapsed, but now, with the popularity of A.C. operation, it is coming back into greater use. Among the reasons for its popularity are increased power output, less hum with A.C. operation, and less distortion.

Distortion in a power amplifier frequently takes the form of the introduction of new frequencies—harmonics, they are called. From experiment, it has been found that the maximum permissible harmonic output to be 5 per cent. The maximum that a single valve in these tests could handle was .6 or .7 watts. At the same output, the two valves in push-pull had only 7-10th of one per cent. harmonic. Therefore, if the single valve is always operated below .7 watts, we can get essentially distortionless output from the valve, but with push-pull the output may be raised considerably.

When single valves are used in an amplifier it is essential that they have a power rating sufficiently high so as to prevent any possibility of overloading. When push-pull is used the normal rating of the valves may more nearly coincide with the value required for good reproduction, because good push-pull valves do not produce serious distortion even when called upon to supply more power than their rating. Those who have been following the design of manufactured receivers will note this decided tendency towards this use of valves in push-pull.

Because the home experimenter is always anxious to construct a power amplifier giving the best possible reproduction, it generally is advisable to use this type of amplification. For this reason, the amplifier we have selected for this issue has been one embodying this popular and distortionless circuit. It may be used with gramophone pick-up, crystal set, radio and detector stages from A.C. or a D.C. set, short wave adapter, or phones and radio amplifier. Believing that a separate amplifier is of more service than the audio stages of a set, they have been separately constructed, and the A.C. Browning Drake has been designed as a unit merely to feed this amplifier. In the writer's opinion, it is not worth while constructing a straight-out all-electric set. Sooner or later, not only will a gramophone be introduced, but a short-wave adaptor will find its way into the home of the wireless enthusiast, and he will want a good amplifier apart from his set.

The choice of valves for this set has now been made reasonably clear. It is merely a matter now of decision as to the amount of power required. Most of the power transformers supply up to 200 volts, and this renders them admirably suited to the 171A type of valve. This is all that can be desired for the ordinary home use, and unless unnecessary power is required, the writer would not recommend the use of any other valve. Generally speaking, the following are the best known examples of the 171A type of valve on the New Zealand market: Mullard AC4 and PM256; Philips C603, C605; Ce-Co J71A; Corror 610P; Osram P625A; Six-sixty 620SP. Some of these requires only 150 on the plate.

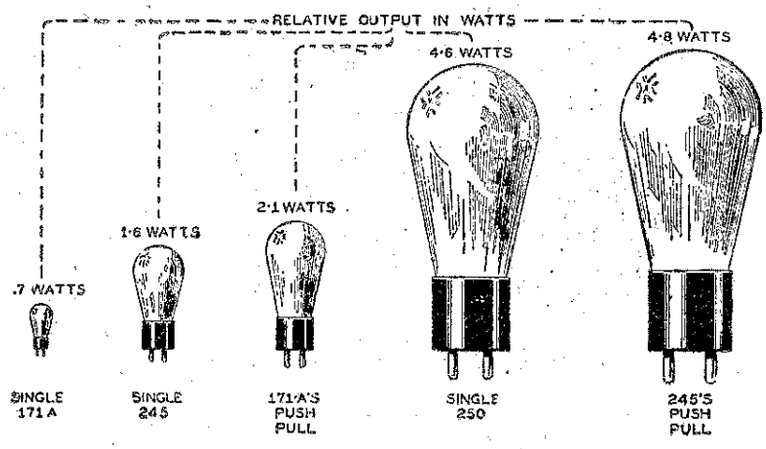
The 245 Valve.

AT various points in this article, we have referred to the type 245 valve. Because this valve is not readily known, it is worth while to give some data referring to it.

The details of the original 245 are as follows: Filament voltage, 2.5 A.C.; fil. current, 1.5 amps. A.C.; plate voltage, 180 to 250; plate current, 26 to 32 mills.; neg. G.B., 33 to 50 volts; amplific. factor, 3.5; impedance, 2000 ohms; power output, .75 to 1.6 watts. Other makers are producing this type of valve. We refer in Laboratory Jottings to the new Osram P625A.

In summarising the characteristics of the new valve, we can say that it is designed to supply fairly large amounts of power at medium plate voltages. We are thus able to obtain comparatively large amounts of power from a power supply of reasonable cost. Regarding the circuits for the 245, we show in the diagram a suitable circuit, though it may be used in push-pull in the amplifier previously referred to. The grid bias resistances have also been given in this article. Note that in using a single 245, none of the circuit constants need be changed except the bias resistance.

The question might be asked, "Can the power for this valve be taken from the 2.5 winding for the 227 valves?" It can, if the wire comprising the secondary of the transformer for this particular purpose is sufficiently heavy. For two valves in push-pull, 3 amps. will be needed, and each 227 valve requires 1.75 amps. If an amplifier alone is to be constructed, the total power to be supplied by this winding is a total of 4.75 amps., and to supply this, No. 14 gauge wire must be used. Where radio and detector valves are to receive their power from this winding, it must be at least No. 12 gauge. There are mechanical difficulties in winding a transformer with heavy gauge wire, so an extra winding would be preferable.



The relative outputs of familiar power-valves.

Auckland Notes

(By "Listener.")

A PROGRAMME as unique as it was entertaining was presented from 1YA on Friday last. It was a New Zealand composers' evening, and listeners were as delighted with the items of the choir, the trio, and the individual artists, as they were agreeably surprised at the quality and variety of works of New Zealanders. We could thoroughly enjoy more of the same type of evening. Such nights are an incentive to budding composers and writers, as well as an education to the whole community.

MISFORTUNE dogged 1YA, as it did most other antipodean stations in their attempt to rebroadcast the English account of the Schneider Cup race. Quite a number of listeners sat up through the early hours in the hope of hearing the description of this world contest for air speed, and though they were disappointed, all to whom the writer has spoken were of the opinion that the local station did all that was possible with the elements against it.

THAT 1YA'S short-wave receiving equipment is quite capable of doing its job, was capably demonstrated on Saturday afternoon. A transmission from a Californian short-wave station was picked up and sent out perfectly. It was a most successful long-distance re-broadcast, of which Auckland has of late been doing quite a lot.

NO additional feature during the past two years has been more to the general public taste than the dinner music session, now in its second week. On all hands one hears praise of the excellent transmission, and the splendidly arranged programmes, which are blended so that all types of listeners find them attractive. It is safe to assert that the dinner music session receives most favourable comment of all sections of our weekly programmes.

THIS week the radio exhibition is the main topic of conversation among both listeners and the trade. The organising committee has got to work with a will, and the opening date of the big show has been fixed for October 30. The official ceremony will take place in the evening, and as it will be put on the air, the whole of the Dominion will be able to hear the speeches and the programme which will be presented.

SO keen have been the demands for space, that all available accommodation provided on the floor of the big Town Hall has already been booked up by local and southern exhibitors. There will be at least twenty stalls, and as the exhibition will be solely a radio one, there will be ample to draw the attendance of the large numbers now evincing an enthusiasm for all matters appertaining to broadcasting.

THE Committee have all the experience gained at the Wellington and Dunedin Exhibitions to guide them, with the result that they will be able to add features which these places now recommend in the light of that experience. It is understood that special accommodation will be provided for amateur transmitters, who are a very keen band in these parts, and their special display should be an incentive to the young to adopt amateur transmission as a pastime that has also prospects ahead.

IN the way of "stunts," next week's relay of a programme presented in Waitomo Caves will provide something quite unusual. Listeners who regularly discuss programmes—and what gathering of two or more does not?—have found the "Caves Concert," as it has been christened, quite a big theme for speculation. They are hoping for a demonstration of acoustic properties which will be a revelation.

Wellington Society

Monthly Meeting

MR. BYRON BROWN, president, occupied the chair at last week's monthly meeting of the Amateur Radio Society of Wellington, held in the Cambridge Terrace Congregational Church Schoolroom. About forty were present.

A motion was unanimously carried expressing appreciation of the Broadcasting Company's enterprise in relaying from 2YA, Wellington, competition events from the Town Hall, and for the results of the Schneider Cup race for which 2YA remained on the air until 3.30 a.m. on Sunday.

A letter was received from the Acting-Secretary of the General Post Office, in reply to complaints concerning interference experienced during broadcasting hours from warships' Morse transmission, while the ships are in port at Wellington. The reply stated: "I have to inform you that this matter has already been represented to the naval authorities, who are co-operating with the Department in reducing interference. Should further cause for complaint arise, I should be glad if you would quote the date and time at which interference is experienced. It would be helpful also if you would obtain confirmation by a telegraph operator that the transmission causing interference do actually emanate from warships."

A letter was received from the Broadcasting Company in reply to suggestions from the society that the company should hold singing, instrumental, and laughing competitions, and broadcast same. The company stated that the broadcasting of competitions of this type would, by virtue of presentation of necessarily similar items, prove, in practice, monotonous to the great majority of listeners. It was also pointed out that it would be necessary to allow every entrant to appear before the microphone without check or previous knowledge on the company's part as to each performer's ability, with the consequent possibility of the broadcast of a series of indifferent performances.

In view of the company's expressed desire to avoid the risk of broadcasting uninteresting or indifferent items in the interest of listeners, the meeting agreed that the competitions should not be further advocated.

Mr. L. H. Wright gave an interesting and instructive lecture on the screened grid valve, which he illustrated with blackboard diagrams. At the conclusion Mr. Wright was accorded an enthusiastic vote of thanks.

Speakers for the All-Electric

Modern Improvements

WITH the rapid improvement of the radio receiver, its accessories likewise improve. Where both radio and audio stages of a set can reproduce almost without distortion, the music from either the air or gramophone set, a suitable speaker has to be installed, to complete.

There are roughly three types of the horn, the magnetic tone and dynamic tone. Where a great deal of volume has to be handled, the quality maintained, there is only one speaker that can do the job efficiently, and that is the dynamic tone, although several types of a megnetic cone come very near to it.

The horn speaker is very sensitive and very pleasing on certain types of sets, and has not entirely disappeared from the radio world. Its popularity, however, is not increasing, though it is sometimes discarded when it should still remain.

Magnetic cones have been improved rapidly, and some of the now existing models are very like the dynamic. They give a good overall reproduction, and have the advantage of being light and transportable. Another advantage they have no need for a baffle or baffle cabinet. The dynamic cone is universally recognised as the perfect speaker, although, really, it is not perfect, as far as power utilisation is concerned. It has been pointed out in another article that only a very small percentage of the power fed from the power valves can be finally utilised as sound by the speaker. This means that there is a big waste. The listener and the technician do not notice this (in fact it is unnecessary to notice it) when a good speaker is heard. Adequate power can be provided, especially with a good push-pull amplifier to feed any speaker. Where the amplifier and speaker are matched almost perfect results obtain.

Modern power amplifiers with low impedance valves require for their best results a speaker with a low impedance, and this is most often met with in the dynamic.

It has been explained many times that there are several types of this speaker, two of which will become more popular than the third. The hundred volt winding and the 230-volt AC mains unit will be used in preference to the 6-volt. This, of course, is inevitable with the disappearance of the battery charger and the accumulator. Modern dynamic speakers no longer cause a preponderance of the base and an attenuation of the treble. Reproduction is round and even, having a definite proportion of both sides of the musical scale.

WHEN it is newly received from the charging station a 4-volt battery should show a reading of approximately 4.2, and a 6-volt battery a readi.g of approximately 6.3 volts.

ONLY low-impedance valves which can handle a considerable current are of use for the output valves.

No Dull Lectures

Fundamental Principles in American Broadcasting

AMERICA has determined that her listeners are not to be bored by dull lectures. Station WRNY, New York, has set out a number of rules which should satisfy the most frivolous listener. The following fundamental principles have been laid down:—

1. The subject must be indicated by a pleasing and catchy title which will attract attention.
2. The first few sentences must be arresting and even startling in character and in some subjects deliberately provocative.
3. Lectures in general should contain more explanation than fact.
4. The speaker must be of such standing that his statements will not be questioned. He must be a recognised or unassailable authority.
5. The maximum duration of a lecture should be fifteen minutes.
6. The speaker must possess personality. It is not generally realised how broadcasting betrays colourless character. The speaker must "punch" rather than "pat."

WHEN received from a charging station the voltage of a 2-volt battery should be a little above two volts, the usual reading being 2.1.

New York "Bombed" by Huge 'Plane

GOVERNOR'S Island, in New York Harbour, the headquarters of the 2nd Army Corps, was theoretically, reduced to a heap of smouldering ashes by a giant army bombing 'plane, which appeared over the city last night and dropped a theoretical load of 2000 lb. of explosives.

Army men applaud the fact that the 'plane with its wireless and navigation equipment was able to remain in the air when other machines were compelled to seek refuge at airports. From the time the 'plane left Fairfield (Ohio), 700 miles away, until New York was reached, it was in continuous wireless communication with successive stations and was able to keep on its course without any great difficulty.

This is the first time in the United States that a 'plane has taken advantage of the network of wireless stations spread across the country. Despite rough weather over the Alleghany Mountains, also low clouds, drizzling rain, fog-filled valleys and extremely poor visibility, which obliterated all landmarks, the crew had throughout complete information as to their exact whereabouts.

IF you use an aerial it should be fitted with an earthing switch so that the aerial can be connected direct to earth outside the house when not in use.

DX Notes

Some Queries.

IN reply to K. Dixon (Kelburn), the station you undoubtedly heard on the night you mention was 2UE, Sydney. This station has been powerful lately, almost as strong as 2FC, and broadcast the programme you mention. In regard to the controversy about the Japs, JOAK is the station which overlaps with 4QG. I have had him every night for over a month and heard him announce scores of times; he distinctly says JOAK at the close of his announcements and has been heard by dozens of people in my house at different times; the other Japs are weaker. JOHK, just below 2BL, is the next best.

Can anyone inform me of results with a Mullard Master 4? H.F. is S.G., two P.M.3's and last stage P.M.4 on short wave. I get perfect results on the broadcast band, but so far have only been able to get two short-wavers, PCJ on good speaker strength and 2ME very loud. I have only been able to get these once each about a week apart, and being new to short wave think it may be my own fault. On the broadcast band I have got on good speaker strength three Japs, JOAK, JOHK and JOACK, and 13 Australians, 2BL, 2FC, 2GB, 2UE, 2KY, 5CL, 7ZL, 4QG, 2UZ, 3AR, 3LO, 3KO, 2ZM, 2YB, 2ZF, 3ZC, 1ZB, and 4ZL. So there is nothing wrong with the set, but on the short wave I can get nothing but morse. Can any DX'S help me? What time do the best short-wave stations transmit?—E. W. Anglesey. (Tadmor, Nelson).

[The "Radio Listeners' Guide" has a good list of short-wave stations and times; also see Mr. Sellens's notes weekly.—Ed.]

Javanese Stations.

HAVING received verification from two stations, I thought there might be some information that would interest short-wave listeners. RFM has now changed its call to RA97 and operates on 70.2 metres. Government Telegraph and Telephones, Banoing, Java, state that they operate the following 'phone stations: PMB, on 14.5 metres; PLE, on 15.74 metres; PLF, on 16.8 metres; PLG, on 18.88 metres; PLR, on 28.88 or 37 metres; PMY, on 67 metres. Hours of transmission to Holland between 640 and 1610, G.M.T., daily, except Sundays and holidays.—A. D. Rogers (Newtown).

Mr. Ellis Wins.

MY log totals 81 stations, but I have verified 26 only, so that Mr. Ellis is an easy winner. The frequency of W1XG is 1060 kcs., or 283 metres, just between 2KY and KNX. My letter should also have read, "With the exception of 2ZQ., etc., all my verifications are American. I logged 2ZD, Masterton, last week. I had heard it before, but thought it was 2ZQ working on a higher wave. Strength was good speaker.—Kauspanka.

A New American.

TO-NIGHT, September 11, another American station was added to my log, of the broadcast band, it being KZGA, California. Was first heard at 6.45 p.m.; the announcer stated the station was owned and operated by the Standard Oil Company of Los Angeles, California. He gave his wavelength as 332.1 metres. There was approximately only one kilocycle separation from the R.B.C. station 1YA, 333 metres, so it took a little careful operation. A new shortwaver was heard on Saturday, September 7. Another G.E.C. station, call 2XAB, approximately 33 metres wave. This was evidently a test transmission because of station continuing on well after 2XAF and 2XAD closed down. Strength of station was on a par with 2XAF. Station KZGA is not listed in my latest call book, evidently a new one. —A. P. Morrison (Brooklyn).

KPO's Wavelength.

THE answer to "Puzzled" (Masterton) inquiring as to KPO wavelength and station heard on 368 metres, on consulting latest list of Pacific Coast American stations just to hand (dated August 10), it gives KPO 680 kilocycles or else 440.9 metres. Station heard on 368 metres is KFQZ. I logged in this American on September 1 at 'phone strength. 250 watts, and closed down at 8.30 p.m. Now, DX listeners, keep the competition going, and very pleased to see my list lowered. Carry on.—S. Ellis, Okato.

Mailbag

A Newchum Howler.

CAN anything be done to muzzle a newchum howler who has just been inflicting himself upon the residents of this locality? Obviously some beginner has purchased a set, and is revelling in the novelty of radio for the first time. Unfortunately his capacity to handle the instrument is not equal to his enthusiasm, and the result is that we more experienced listeners, after a period of comfortable reception for some time past are suffering from a weird outburst of shrieks, howls, and maniacal noises that are no credit to this newcomer. Presumably they are occasioned by a complete novice, who has yet to learn how to really appreciate radio. Could not some instruction be given over the air for persons of this kind?—"Brougham Street."

Radio Announcing.

IN reference to "Lux Cum Amore's" letter entitled "Radio Announcing," in your last issue of the "Record," I most heartily disagree with him and his views of 2YA's announcer. In my opinion he is the best announcer I have heard and his closing "Good-night" at the end of the evening's entertainment is really the "topping off" of the programme. I place the announcers this way. 2YA first, WENR second, 2BL third, etc. The English announcing is very commonplace. At least, it is from 5SW. Also I think it is very good of 1YA to "go on the air" on their silent night to broadcast boxing. This is very enjoyable as I like listening to a good description of boxing. It was also very good of 2YA to stay on the air as it did on Saturday night to give the results of the Schneider Trophy contest. I consider my 30s. well spent. Including batteries and license my set costs me about £6 a year to run, which is very cheap entertainment. I know quite a number of people whose expenses run in to from £10 to £20 a year, and they consider they are getting their money's worth. I think listeners have a lot to thank the company for. —Fred J. Martin (Pahiatua).

Blame and Praise.

IN the past 2YA has had many notable relays and rebroadcasts, and they have been greatly appreciated; but the wrestling contest relay on Monday night was, in our opinion, absolutely spoilt. We greatly appreciated 2YA's extra "stunt" of staying on the air till 3.30 Sunday morning to give the results of the Schneider Cup race. I tuned in to 2FC, Sydney—they were rebroadcasting DSW—and we could head the 'planes roaring between the static. Mr. Announcer's "Good-morning, everybody" at 3.30 a.m. was as bright and cheerful as his famous friendly good-night.—"Robpuni."

Broadcasting in Canada

Proposals of Commission

THE report of the Commission which was appointed to investigate the question of establishing a satisfactory broadcasting system in Canada has now been presented. According to Press cabled information, the recommendation is that a comprehensive system should be established and be operated by a Government-owned company, comprising three representatives in the Dominion of Canada and one from each of the nine provinces. It is proposed to service Canada by seven super stations of 50,000 watts each, at an estimated cost of £700,000. For this figure a very strong series of stations should be available. The proposal is that each licensed listener shall contribute the sum of 12s. per annum, which is calculated to yield £200,000 annually. Direct advertising and sponsored musical programmes are expected to return a similar amount, and a grant from the Government of up to £200,000 annually is relied upon to meet the annual operating cost, which is estimated to be £500,000 sterling annually.

The present owners of stations will be recompensed when the plants are taken over or dismantled.

The report will require the detailed consideration of Cabinet before it is finally adopted, as of course important legislation will be involved if the proposal is proceeded with on the basis advanced.

As a preliminary to the presentation of this report, the Canadian Radio Commission paid a visit to Britain, where it fully investigated the system initiated and operated by the British Broadcasting Corporation. The report is obviously based upon the procedure of the B.B.C., with various adaptations to Canadian circumstances. Canada has only nine millions of a population, compared with Britain's forty-five millions, so that her initial revenue from listeners is much less. Further, the areas to be served in Canada are so vastly greater that high-powered stations at wide distances are required to serve the population and give adequate coverage. In addition, by reason of her proximity to the United States, many Canadian radio enthusiasts have been able to derive entertainment from American stations which are operating entirely without cost to the listener.

The report is an interesting testimony to the importance of radio as a social service. It illustrates, too, the need for each country adapting the conditions of service to its own requirements. The fate of the present report at the hands of the Canadian Government will be awaited with interest.

Notes and Comments

By "SWITCH"

WELLINGTON listeners who are troubled by noises picked up from street lamps, loosened by strong winds, should immediately notify the electricity department of the City Corporation. Each post which carries an electric light bears a letter and numbers. A note of these should be taken so that the troublesome light can be located immediately by the man sent to rectify the trouble. Listeners should telephone 41—074 to lodge complaints in the day-time. A postcard addressed to "Complaints," Electricity Department, Harris Street, Wellington, would serve the same purpose.

A WELLINGTON listener appealed to "Switch" "to step around and hear the noise" in his set. More or less expert listeners had paid him a visit for the purpose of diagnosing the trouble, and each had expressed the opinion that the trouble was in the set itself. All endeavours to locate the source in the set had failed. The noise sounded like a rough attempt to simulate Morse code, and it was audible on all wavelengths. It was a wild night when "Switch" went round to his friend's domicile, but it was worth while, as the writer was able to locate the source of trouble before he examined the set. A street lamp almost in front of his friend's house was popping in and out through the violence of the gale. When the lamp was fixed t' noise ceased.

A LOW-POWER broadcast station which is heard by many North Island listeners is 2ZE, Eketahuna, owned and operated by Mr. G. R. S. Allen. The wavelength is 248 metres. 2ZE, which is located at the Eketahuna "Express" building, operates on Wednesdays from 5.30 p.m. till 8 p.m.; on Thursdays from 1 p.m. till 2 p.m.; on Sundays from 4.30 p.m. till 6 p.m.

THE new Australian Broadcasting Company is threatened with unexpected competition by the J. C. Williamson Co. Ltd., the well-known theatrical entertainers. It is reported that the J. C. Williamson people were closely associated with 2FC and 2BL, Sydney, and 3LO and 3AR, Melbourne, until the new Australian Broadcasting Company were given the contract for the supply of programmes for those stations. The J. C. Williamson Co. were among the unsuccessful tenderers. This company is said to have purchased interests in a Sydney and a Melbourne B class stations, and will supply the programmes. The power of these stations is to be increased, according to report, and the programmes are to be "a revelation." The only source of income by these stations is through advertising.

MR. BYRON BROWN, president of the Wellington Radio Society, was one of the assistant adjudicators at the late Wellington competitions in the elocutionary classes. He strongly advocated that some of the items should be relayed by 2YA, Wellington, and listeners had the satisfaction of listening to numbers from the Town Hall stage.

THE interference experienced from Morse transmission by a warship at Wellington is agitating those listeners who are located near the waterfront. A listener with a portable set and a loop recently took three bearings and found that the loop always pointed to H.M.S. Dunedin. He spent the whole evening in his motor-car carrying out this investigation. Listeners welcome the announcement by the Acting-Secretary of the G.P.O. that the naval authorities are co-operating with the P. and T. Department in reducing interference."

THE annual report of broadcast station 4QG, Brisbane, issued by Mr. J. W. Robinson, director of the Queensland Radio Service, provides interesting reading, as in more than one respect it has a bearing on broadcasting in New Zealand. While some people have advocated a wider variety of artists in each programme of 2YA, Wellington, Mr. Robinson is a strong advocate for programmes provided by a few highly trained artists, instead of programmes provided by many badly trained performers."

MR. ROBINSON, director of 4QG, Brisbane, is a discerning person, and during the past year yielded to the clamour for a greater variety of performers sooner than abide by his own judgment. 4QG was then a Government station, and in some measure politically controlled. Mob control is not in the best interests of art or music. Mr. Robinson remarks in his annual report: "During the year under review 820 different individual artists were employed at 4QG. . . . It does not require the exercise of very much common sense to realise that there are not 820 first quality artists in Brisbane." It appears then that Mr. Robinson yielded to the most clamorous section, probably in reality a minority of the listeners. Purely a case of obtaining quantity, not quality. "Fewer and better artists" should be the slogan of any up-to-date broadcast service.

THE mediocrity of the performers who broadcast from 4QG, Brisbane, although they numbered 820 during the past year, is reflected in the station's balance-sheet. This discloses that although the station staff salaries totalled £5389, the payment to artists (820) amounted to £7344. 4QG is on the air daily (excepting Sunday) from 7.45 a.m. till 8.30 a.m., from 11 a.m. till noon; from 1 p.m. till 2 p.m.; from 3 p.m. till 4.30 p.m.; from 6 p.m. till 6.25 p.m.; from 6.30 p.m. till 7.45 p.m.; from 8 p.m. till 10 p.m. or 10.30 p.m., and sometimes 11 p.m. On Sundays the station broadcasts morning church services, also from 3.15 p.m. till 4.30 p.m., and from 6 p.m. till 9.30 p.m. The income from license fees during the year was £23,276. The annual profit was £5211.

STATION 4QG, Brisbane, is about to pass from the control of the Queensland Government to the Commonwealth Government. The programmes will, therefore, be handled by the new Australian Broadcasting Company, comprising the Fuller, Albert and Sons, and Union Theatre combination.

THE severe gale and bitterly cold weather reported from Sydney last week had a considerable effect upon reception from the Australian stations while it lasted. Static, intense fading, and weak reception prevailed until the disturbance moved away. Even the Japanese stations did not come through as well as usual, although they improved considerably after 11 p.m.

DURING his recent lecture before a general meeting of the Wellington Radio Society, Mr. L. H. Wright made reference to the peculiarity of the neutrodyne circuit. He mentioned that if a neutrodyne were tuned to a long-wave station (say, 2FC, Sydney, on 665 kilocycles) it would break into oscillation on the stations on the shorter wave-lengths, such as 3YA, Christchurch, on 980 kilocycles. It was always best, he said, to neutralise a neutrodyne on the shortest wave-length station available, although the sensitivity of the set would steadily decrease as the wave-lengths increased. This peculiarity is well known to many, but there is a probability that a large number of owners of neutrodynes have not heard of this.

MR. L. H. WRIGHT, who is one of the most experienced and well informed radiotricians in Wellington, is a firm believer in the screen-grid valve. He insists, however, in its use in a proper circuit. Too often this "wonder" valve never gets a chance to utilise its extraordinary amplifying power in the radio-frequency stage owing to some of the circuits in use not being suitable. For either the normal broadcast band or short-wave work the screen-grid valve is a great performer provided it gets fair play.

An A.C. Power Amplifier

To Operate from Wireless Set, Gramophone, a Short Wave Adaptor

By the Technical Editor

THIS amplifier has been designed to fill a long-felt need—that of an amplifier completely operated from the A.C. mains, and useful for a number of purposes. The amplifier about to be designed can be used in conjunction with any of the pieces of the apparatus mentioned in the heading, and as a voice amplifier by connecting a pair of telephones to the input.

List of Components.

Power transformer to deliver at least 180 volts, rectified and smoothed.
Smoothing chokes.
Filter condensers, either in a block or in the following capacities: 6 microfarad (three 2 m.f.d's. in parallel), Both these to withstand 400 volts working. A 2 microfarad to withstand 800 volts working, two .5 m.f.d.'s condensers, and three 1 m.f.d. (or five 1 m.f.d's.). Two buffer condensers, each one .1 m.f.d.
Three variable resistances, 0 to 8 megohms.
One fixed resistance 1250 ohms (50 mills), and one 0 to 3000 ohms variable.
A pair of push-pull transformers.
One audio transformer.
Two UX valve sockets.
One UY valve socket.
A dozen terminals.
Two jacks and plugs.
Heavy insulated connected wire (insulated square busbar).
Rectifying valve (280, or Raytheon).
Two 171A type valves and one 227 type.

A list of requirements is appended, and a few moments' discussion of these will be worth while.

The power of transformer might quite readily be made by any constructor who has the necessary time at his disposal. A transformer is by no means difficult to make, and full descriptions have quite frequently appeared in the "Radio Record," while a very complete treatise appears in the "Radio Listeners' Guide." For those who intend constructing their own it would be unwise to build one delivering less than 300 volts or 250 rectified and smoothed. The provision of a transformer with this output will enable it to be used for the new 245 type of valve, which will become popular before very long.

It will be necessary to put on to this transformer secondary windings to supply the filament current for both the push-pull valves in the last stage and the 227, or other indirectly heated valve in the first stage. The details of this part of the construction have appeared in the "Listeners' Guide," and with the aid of Table A (page 55) a transformer to suit any need can be designed. Commercially manufactured power transformers are readily available and for those who have not a reasonable amount of time at their disposal, the writer would advise them to purchase one already made up. When more than 300 volts have to be delivered by the transformer the use of two 281 valves as rectifiers is recommended. Otherwise the 280 (filament) or the Raytheon filamentless type should be used.

The construction of smoothing chokes has also been very fully described in both "Radio Record" and "Listeners' Guide." Space will not permit of their redescription here. They also may be purchased in compact form.

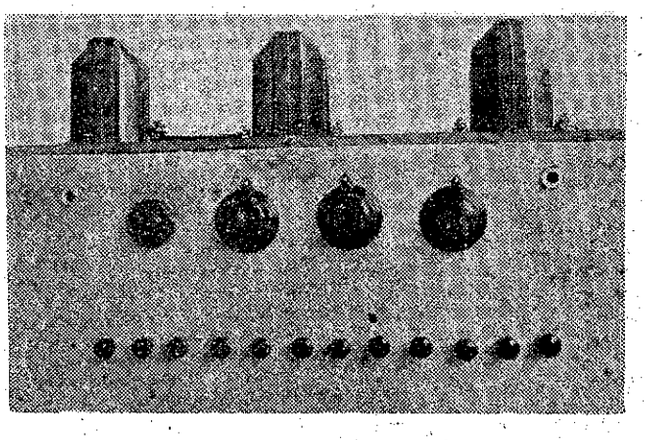
For those who wish to assemble their own condenser blocks, as the writer has done, the specifications given will be sufficient for their purpose. Condenser blocks are, however, available in a very compact form, and these are eminently suitable for the purpose.

The resistances are quite readily obtainable, and if 171 type of valve is not used in the last stage, the equivalent bias resister will be found in the table. For 171A type a 1,000 ohm variable will do quite well.

The arrangement of the amplifier and power unit leaves much to the constructor's initiative, but it is also described in detail for those who prefer to follow instructions explicitly.

Secure a box about 18 inches x 10 x 10. Remove both sides (10 x 18) and top and shellac thoroughly. Assemble the transformer, the condensers and the chokes so that they will fit neatly and so that the filament windings from the transformer will be nearest one side which when replaced will carry the resistances and the terminals.

Diagram No. 4 shows the lay-out of the writer's power pack. In this case a transformer incorporating the choke was used. A slight adaptation is necessary when transformer, choke block and condenser block are uniform.



Photograph showing panel and disposition of resistances. The one on the right controls grid bias, the others 0—8 megohm resistances are for power supply.

Wiring the Power Pack.

PROCEED with the wiring thus:—

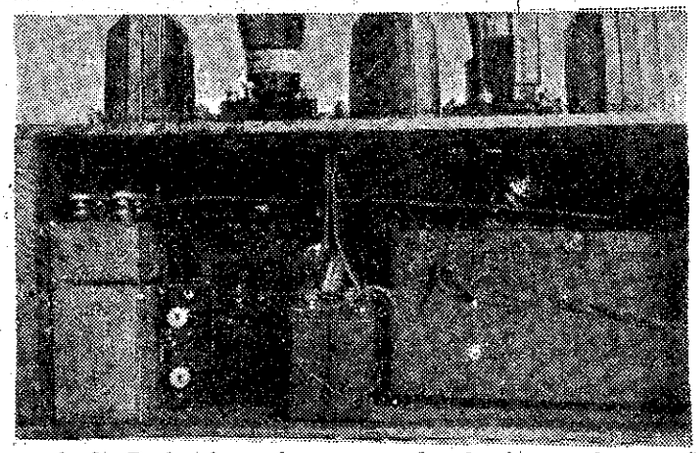
Take the centre tap of the transformer to the junction between the two buffer condensers or to the common terminal if these are incorporated in the one case. This will be the negative wire and will go directly to the 2 mfd. condenser via the 2 amplifier condensers C4 and C5 with a working voltage of 800. This now connects

with the negatives (either terminal) of each of the 2 and 6 mfd. condensers (two mfd. condensers arranged in parallel). Having completed the wiring of the condensers, carry this lead outside the box and label it C— (if grid bias is to be provided as a separate tap. It is unnecessary in most cases). From a point in this line the wire runs to the 1 mfd. condenser.

Now return and pick up the two leads from the power windings. These go to the two free terminals of the buffer condensers and then to the rectifying valves. In the case of the Raytheon valve (shown in lay-out diagram) these two wires go to the filament terminals of the valve socket. In the case of the 280 full-wave filament rectifier they go to P and G. The filament wiring for the full-wave valve goes directly to the F terminals, and one of these becomes a common positive.

Returning to the Raytheon valve, the P terminal is connected first with the filter choke and this with the free terminal of the big 2 mfd. condenser. The common terminal of the chokes is then connected with the free terminal of the smaller 2 mfd. condenser. A lead from this wire is marked "Bu. or 220" and taken out where the panel will be. The remaining side of the choke now becomes the common positive wire from which all others will be broken down. Connect this with the free terminal of the 6 mfd. condenser and carry the end (marked B+) to where the panel will eventually be placed.

The common — terminals of the two .5 and the 1 mfd. condensers will be connected, and this will beome B—. If "C" bias is not required for purposes other than the amplifier, connect this "B" negative wire to "C" negative. If, however, separate bias is required a resistance of 400 ohms must be connected between them, such that the moving arm may either short out the resistance or put it in. The moving arm is "B" negative. A lead from each of the free terminals of the two .5 condensers must be carried out to where the panel is to be placed, and marked R and D, corresponding in diagram 2 to R. and R2. Place a fixed resistance of 10,000 ohms where shown, connecting one side to B— and the other to be marked B + 2 or D. This completes the base lay-out. It now remains to wire the panel.



Photograph 2.—Back view of power pack, showing condensers (left), transformer and chokes (right), with bias-resister condensers in foreground.

The Distribution Panel.

SELECT a piece of ebonite, or well "Ducoed" 3-ply timber or any other insulating substance that might be conveniently handy. The writer found a piece of carpenter's asbestos such as is used in the construction of light out-dwellings, quite suitable. Four variable resistances (one 400 ohm for bias and three 0-5 megohm) are to be mounted on this panel and their spacing is left to the constructor. Along the bottom drill a dozen holes and mount the terminals. This board will now be mounted as one side of the uncompleted box.

Connect the wire marked Bu or 220 to the terminal third from the end away from the transformer. Label this "B + unvariable," followed by whatever voltage the transformer may be delivering. From the common positive (B+ or +) run a wire along the top of the panel, dropping leads to one side of each of the variable resistances, with the exception of the 400 ohm resistance. Connect C— to one side of the bias resister and this to the first terminal on the board labelling it "C—." Connect B— to the other side of this and to the second terminal, labelling this "B—." It is unfortunate that the highest B+ and B— come so close together, but in the case of the original amplifier it was almost impossible to do otherwise, owing to the shortness of the A C leads from the transformer.

Connect the fourth terminal, marking it A, to the first resistance and then to No. 1 of the small condensers. The second variable resistance is connected to the next free terminal marked R and to the small 1 mfd. condenser No. 2. The final resistance is connected to the next terminal, labelling it D, and to the fixed resistance.

The next terminal is connected with a long lead to be taken to the cathode of the 227. The next two terminals are connected to the A C filament winding delivering 5 volts (or whatever the power values required) and marked A C 5, the next two marked A C 2.5 to the corresponding winding of the trans-

former. The remaining two terminals are connected to the A.C. 1.5 winding (if necessary).

Mount two jacks as shown.

If the wires down below are beginning to look somewhat complicated before finally screwing the panel to the box, connect a twin flex to the A C 5 and A C 2.5 terminals on the inside, the lengths of flex will need to be about 18 inches. This completes the eliminator section of the amplifier. It now remains to build the amplifier section on the top of the box.

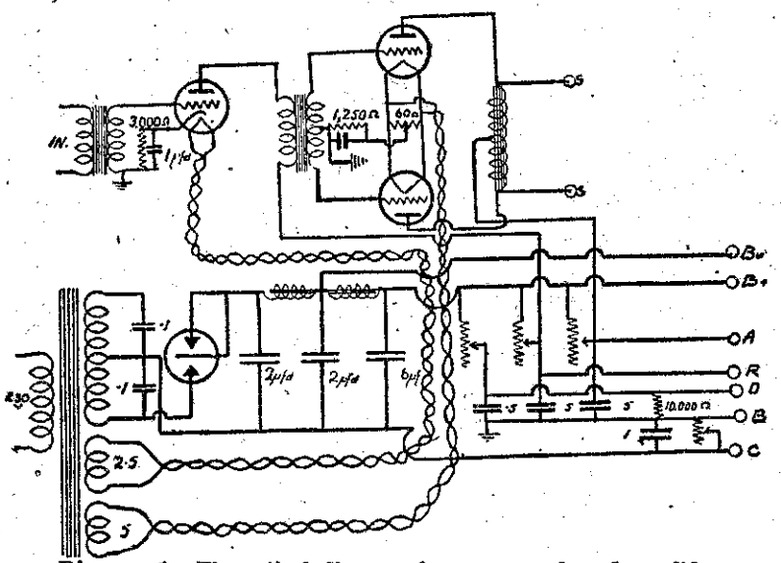


Diagram 1.—Theoretical diagram for power-pack and amplifier.

Where valves with different characteristics from the 227 and 171 A are used it may be necessary to adapt the filament terminals accordingly.

The Amplifier.

FOR the top of the box select a piece of timber (or insulating substance if available) and shellac it well. Do not screw it to the sides until the wiring is completed. Assemble the units as shown in the photograph, and screw them to their base. Now solder a wire to each of Numbers 1 and 2 of the variable resistances on the panel as is shown in diagram 2 (marked PP and B+). Leave sufficient length of wire to carry through to the transformers.

Diagram 4 depicts the method of wiring the underneath portion of this top. The faint lines indicate where the components appear on the upper side. Before commencing the actual wiring, drill small holes at the points indicated by a small circle. The most systematic fashion of carrying out the wiring is to complete the under portion first. Commencing with the input, join a wire from each side of the jack to "P" and "B" + of the audio transformer. From "GB" of the audio transformer carry a wire through the hole to a point about midway below the transformer, and here solder two lengths of wire, one about 8 inches, and the other about 10 inches. Continuing on from this joint, carry a wire to one side of resistance No. 4 and

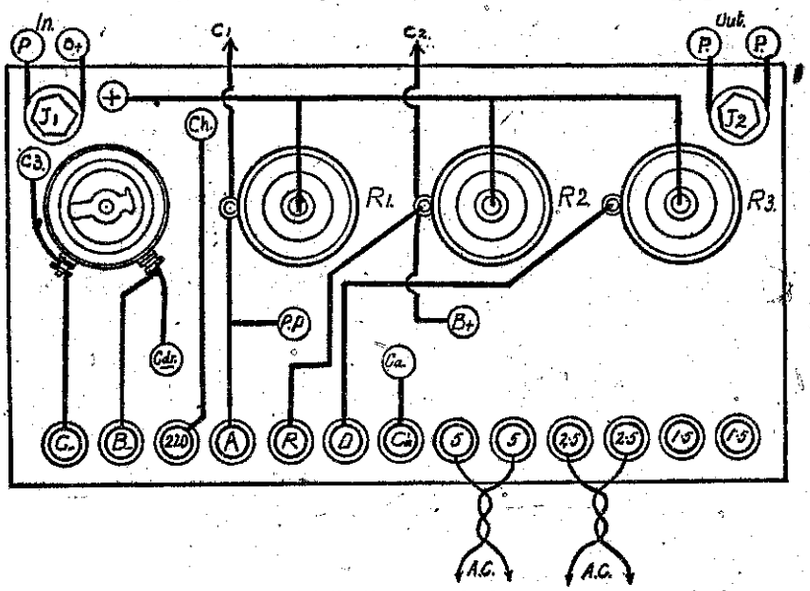


Diagram 2.—Rear of distribution panel shown in photograph 1.

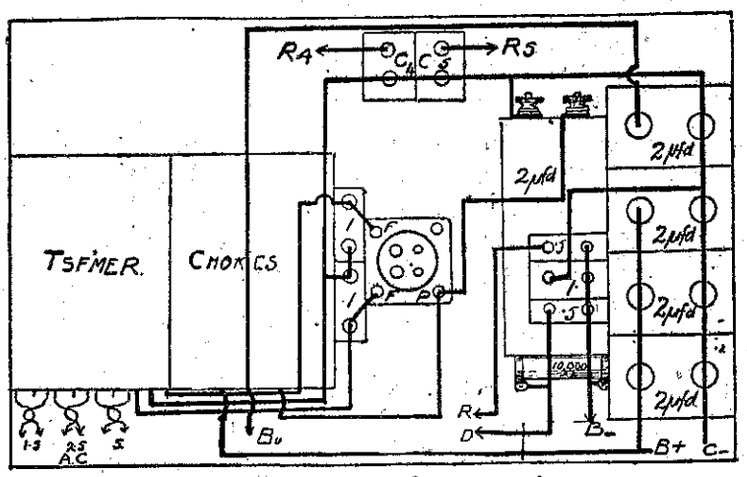


Diagram 3.—Layout of power pack.

then this to B— on the panel. This latter connection is not shown in diagram 4. Do not, however, make this connection until all the wiring is completed.

Returning to the junction, carry one wire to the centre tap of the input push-pull transformer labelled F— The longer wire is connected to one side of R5. Connect the other side of this resistance through the hole in the panel to the cathode terminal of the first audio valve socket.

Passing now to the push-pull stage, connect the two filament terminals of each of the valve sockets by separate wires. "P" of the output push-pull transformer is connected with one side of the output jack, and the other output terminal to the other side.

This baseboard will now have to be placed in position, and the following wiring made to the power pack. The connection to B— previously referred to. Now from the cathode end of R5 run a wire to the small condenser C5 and one from the free sides of R4 to C4. Connect this also with the centre tap of the 5-volt winding (or other power). If a centre tap is not provided, connect a 60 ohm centre-tapped resistance across the filament leads. This electrical centre tap will suffice for the work. From the centre tap of the output push-pull transformer (B+) make a connection with "A" on the panel. B+ of the input push-pull transformer is connected with R2 (and labelled B+) on the panel. The filament wiring which has been provided for by two lengths of flex is now connected up. The 5-volt winding being carried to the push-pull transformers and joined up with the previously existing wires between the valve filaments. The 2.5 winding goes to the first audio stage.

It will be remembered that earlier in the description, it was remarked that an extra terminal might be provided on the panel. If this has been done, connect it to the cathode.

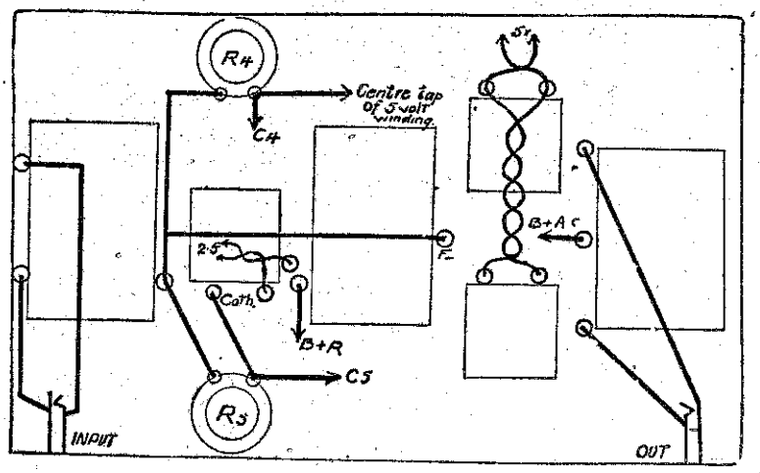


Diagram 4, showing under baseboard wiring.

The Above Board Wiring.

THE panel may now be screwed into position, and the above board wiring completed. A short wire is connected between "G" of the first audio transformer and "G" of the first valve socket, and "P" is connected with "P" of the first push-pull transformer. The terminals marked "G" of this transformer are connected with the "G's" of the UX sockets in the power stage. The "P" terminals of these are connected with the output transformer, which has already been connected to the output jack.

This completes the A.C. power amplifier, and if instructions have been carefully followed, trouble cannot arise, for the original model works perfectly. There should be practically no hum and amplification from a gramophone pick-up will be more than ample.

It need hardly be added that the valves in the push-pull stages must be perfectly balanced. Those who desire to use transformers with different filament windings from those specified, say the 4-volt type, will find the instructions apply equally well to them. Such deviations as these may be made quite well if the constructor thinks out beforehand just how his product differs from that described and makes the necessary allowances. The second push-pull transformer in some cases has five terminals. In cases such as these, the plates of the valves will be connected to "P" of the transformers. The terminals on the other side are connected with the speaker, for which there is neither positive or negative.

Where the A.C. Browning-Drake or any other receiver is to be used, connect the plate of the detector valve to one side of a plug and B+ D to the other.

226	Single	1,500 ohms
227	Single	3,000 „
171	Single	2,250 „
245	Single	1,500 „
250	Single	1,500 „
226	Two	850 „
227	Two	2,000 „
171	Push Pull	1,250 „
245	Push Pull	750 „
250	Push Pull	750 „

Radio Terminology

Standardisation Necessary

WITH the increasing popularity of the A.C. sets and the consequent ever-increasing number of resistances, there is some necessity for a standardisation of terminology. For instance, a tapped resistance may mean a resistance placed across the output of an eliminator to break down the voltage, a small resistance placed across a filament supply to provide a centre tap, or a potentiometer. This latter term is in itself very confusing. A potentiometer is a piece of apparatus consisting of a dry cell, an accumulator, switching devices, a high resistance wire several metres in length, and a variable tap. It is used for determining differences i potential, and so resistance, hence the derivation of the name—potentio-meter, a meter to measure potential difference.

The term has for some reason or other been applied to a final resistance with a variable tap, and as this potential divider, as it should be called, now almost universally receives the name of "potentiometer," we shall in future refer to it as such. It is, then, a resistance with three terminals. The two outside may be regarded as being the ends of a fixed resistance of the value of a potentiometer. The centre tap is variable, so that at any time any amount of resistance may be placed between this tap and one of the others.

A centre-tapped resistance is really a potentiometer with the moving arm fixed at the centre point. A fixed resistance will indicate an untapped resistance that cannot be varied. By a "tapped resistance" will be implied a high value resistance placed across the output of an eliminator to break down the voltage. It is sometimes referred to as a "voltage divider" or a "potential divider." A grid leak is a high-value fixed resistance that will pass very little current. and is suitable only for insertion in the grid lead of the valve. A rheostat is a very indefinite name applied to types of variable resistances. Its use in A.C. terminology serves only to confuse matters. We shall henceforth refer to it as a variable resistance.

In a recent article by "Megohm" (the anode bend detector) the term "potentiometer" was altered to read "potential divider," which, although more correct, is nevertheless rather misleading, as any tapped resistance is a potential divider.

Pacific Coast Stations

THE latest list of Pacific coast American stations to hand, dated August 10, is as follows:—

	Kilocycles
KDYL, Salt Lake	1290
KEJK, Beverley Hills	1170
KELW, Burbank	780
KFI, Los Angeles	640
KFOX, Long Beach	1250
KFQZ, Los Angeles	860
KFRC, San Francisco	610
KFSD, San Diego	600
KFVD, Culver City	710
KFWB, Holywood	950
KFWC, Pomona	1200
KGB, San Diego	1360
KGER, Long Beach	1370
KGFJ, Los Angeles	1420
KGO, Oakland	790
KGW, Portland	620
KHJ, Los Angeles	900
KHQ, Spokane	590
KMIC, Inglewood	1120
KMO, Tacoma	1340
KMTR, Hollywood	570
KNX, Hollywood	1050
KOA, Denver	830
KOL, Seattle	920
KOY, Phoenix	1390
KPLA, Los Angeles	1000
KPO, San Francisco	680
KQW, San Jose	1010
KSL, Salt Lake City	1130
KTBI, Los Angeles	1300
KTM, Santa Monica	780

Laboratory Jottings

Osram Power Valves.

Two interesting valves have been given us for test by the British General Electric Company, Wellington. They are Osram PS625 and P625A. The former is an excellent example of the 171A type of valve with the following characteristics, the valve is eminently suitable for the last stage of a medium receiver. Used in push-pull it gives very fine household strength in a suitable amplifier, such as that described in other pages of this issue.

P625A is a representative of the 245 type of valve, and is one of the first of its type to appear on the New Zealand market. It has the decided advantage of giving a volume step-up as well as being capable of handling considerable voltage swing without any trace of distortion. The writer was impressed by a very simple experiment made with a three-valve set. This set had shown itself capable of very fine performances, and it was known just what it could accomplish. The last valve was removed shortly before 3 o'clock one afternoon, and P625A substituted, the requisite 250 volts being applied to the plate. 3YA's carrier was tuned in and at 3 o'clock the chimes and the following announcements came over with wonderful strength. It was impossible to believe that this was Christchurch and not Wellington. Disbelieving that a power valve could make such a wonderful improvement, the writer replaced it by an ordinary power valve. Volume immediately dropped.

The 245 valve is enjoying wonderful popularity in the States. It is being featured in most of the newest radio receivers. Unfortunately the writer was unable to test these valves in the power amplifier. Undoubtedly they would give very fine results if a bias resister of about 750 ohms were used.

Pilot Radio Products.

ABEL SMEETON LTD., Auckland, have submitted a very comprehensive range of Pilot products. These have been given an extensive test both from the mechanical and the electrical point of view. The general conclusion is that the line is first quality. A constructor who uses these products may be certain that as far as the products themselves are concerned, trouble cannot arise, for most of the trouble encountered by constructors has its origin in defective parts. Undoubtedly the best proposition is first grade components, and Pilot are first grade.

Pilot Centra Line Condensers.

Constructed of brass plates, supported by an aluminium frame, Pilot condensers are both accurate in their movement and of good appearance. They have three terminals, two to the fixed plates, and one to the moving. This latter is connected to the frame, and this to the moving shaft by a rat-tail connection, ensuring perfect noiseless operation. The condensers are of the straight line frequency type, and are made in the following capacities:—.00016, .00025, .00035, and .0005 mfd. maximum capacity. The minimum capacity of each condenser is about .00001. By the use of a special coupler, the condensers may be ganged.

Illuminated Drum Dials.

With the modern tendency towards single drum dial control, in view, Pilot Electric Company have brought out a full range of illuminated drum dials. When mounted on a panel, the covering plate looks very much as though hand-tooled from a solid block of metal. A single artistic knob about the size of a shilling, is mounted on this, and this controls the drum. The movement is very smooth and fine. A six-volt lamp hidden from sight illuminates the dial.

Pilot Transformers.

A wide range of these is manufactured. They include inter-valve transformers, output filters and transformers, push-pull transformers, and B eliminator chokes. A special feature is that the whole winding and laminations are encased in a moisture proof bakelite case. One of the tests that these transformers have to go through is an immersion test, in which, for a period of thirty days they are immersed in water. The transformers under test were inadvertently left in the wet, and then put back into an amplifier with no loss to tone or quality. A very true over-all reproduction results through the use of these.

A Battery Eliminators.

WE have tested, with quite considerable success, an A eliminator comprising the "Wellmayde" trickle charger with one of the new type electrolytic condensers shunted across the output terminals. These condensers have a capacity of approximately 2500 mfds., and in consequence have a great smoothing effect. The A eliminator thus constructed will deliver about .35 amps of reasonably smooth A current. This is suitable for a three-valve set.

It was found that there was a slight ripple which disappeared when an audio frequency choke wound with 22 D.C.C. wire was placed in series with the positive lead from the terminals; this slightly lowered the voltage, and it was necessary to use 4-volt valves, with the six-volt tapping. A variable resistance allowed the final output to be accurately adjusted.

This small charger and the electrolytic condenser is an excellent combination for supplying power for the field windings for a 6-volt dynamic speaker, the condenser smoothes out all tendency to ripple, giving an almost perfectly silent background.

Ceco Valves.

BOND and Bond, Ltd., Auckland, have submitted to us for test types of their "Ceco" A.C. valves.

Type N27 is a valve of the indirectly heated cathode type, with the following characteristics: Heater voltage, 2.5; F. current, 1.7 amps.; plate current, 2 milliamps.; impedance, 8000 ohms; amplification factor, 8; anode voltage, 45. This type of valve which we have selected as a first audio stage, for the A.C. amplifier described this week, has been designed to eliminate hum. This may be claimed for the Ceco valve that we have tested, for in all respects, it has come up to the very high standard that has been set for it. It is interesting to note that this type of valve is coming very much into prominence in A.C. sets.

The Ceco valve is of robust construction, and almost without hum, gives distortionless reproduction.

M26: This is also an A.C. valve, but has a directly heated filament which requires 1.05 amps at 1.5 volts. With an impedance of 7400, amplification factor of 8.2, this valve compares favourably with others of its type; 135 volts are needed on the plate, with 5 volts grid bias. The directly heated type of valve is much simpler in its application to use than the 227, but there is slightly more hum. With the valves tested, hum was very indistinct, and well to the background.

J71: This valve is of the familiar 171A type, the characteristics of which are well-known to all, as a final stage power valve. J71 will be found equal to anything of its type. It can handle a wide voltage swing without trace of distortion, and does not drop volume more than any other power-valve. To obtain maximum results when using 180 volts on the plate, grid bias of 40 volts should be employed. A.C. or D.C. can be applied to the filament with equally good results.

Our test has convinced us that Ceco valves can justly claim position among first quality valves.

Radiokes Coils.

COIL winding with the amateur is usually a difficult task, and very many shirk from set-building because of this, but with the wide range of commercial coils now obtainable this need no longer be a hindrance.

Abel Smeeton, Ltd., have sent us three types of Radiokes coils for use in our circuits, and they have given every satisfaction.

Mechanically they are excellent pieces of work, wound in green double silk-covered wire and mounted by narrow strips of bakelite on the low loss principle, they are electrically perfect.

The wide range of coils allows the constructor to build all the usual types of circuits—the Neutrodyne set neutralising from the primary is probably the safest for the amateur constructor to use. The construction of a neutrodyne is, by the use of commercial coils, rendered a very simple operation.

The Browning-Drake coils have a diameter of 2½ inches, and when widely spaced, render shielding unnecessary. Neutralisation is carried out in the latest style devised by Glenn Browning, the originator of this circuit, that is, by an extra winding to the secondary. This elminates a great deal of the trouble formerly encountered in the Browning-Drake.

A set of screen grid coils enables an amateur with a little experience to construct a highly efficient screen grid receiver, using two stages R.F. In addition, full ranges of shortwave coils are manufactured and these can be used in the ordinary shortwave set.

Pilot Resistograds.

THIS is a high-value variable resistance ranging from 40 ohms to 10 megohms. This piece of apparatus is able to handle 20 watts, that is, at 200 volts it can pass 100 milliamps. This makes it highly suitable for eliminators designed to handle heavy current at high voltage. While on test, the resistograd was used in an apparatus of this type, and at 250 volts the resistograd passed 105 milliamps. It is thus perfectly suitable for all types of eliminators. As a volume control Pilot Resistograd functions perfectly.

Radio and Musical Appreciation

Stimulating Interest

RADIO is bringing about an increased study of instrumental and vocal music throughout the country, says "Wireless Weekly." The best of our artists performing frequently over the air, are inspiring many listeners to develop their own musical talents.

Evidence of this is assembled from correspondence sent by listeners-in. All kinds of requests for musical advice are made. Can you put me into touch with a good teacher of the cornet? Can an English horn be played by a girl? And other questions of a similar nature are asked.

The better known performers appearing at the broadcasting stations whose profession it is to give musical instruction find that many of their pupils are directed to them as a result of listening-in.

Also the playing of a record over the air will inspire the listener with a desire to play the same instrument as the artist of the disc. Others already adept at playing the instrument listen to the interpretations given by artists over the air and practise compositions accordingly.

Sudden waves of musical interest are often experienced after the visits of famous musicians, but seldom outside those circles which attend the Town Hall concerts. The influence of broadcasting, far wider and more permanent than this, reaches people who may possibly be unaware of the existence of visiting musicians.

It is in this direction that broadcasting exercises its greatest value as an educational medium. Without a doubt the next generation will have a much more intimate knowledge of music, not only because they are hearing more, but because many are studying it themselves.

This will not necessarily result in a greater number of professional artists to glut the musical market, but it does mean that there will be a deeper appreciation of the art, since personal study cannot help but make for greater understanding.

Here lies the true educational work of broadcasting. Organised properly it can become both entertainment for some and instruction for others. Besides this influence, its use as an educational medium in other directions falls into insignificance.

Popular Lecturettes

THE lecturette on the hair and skin recently given by a visiting English lady doctor from 2YA, Wellington, was about the most interesting heard from the big station for some weeks past. The care of the hair and skin is a subject which concerns every one of us, young and old, and as the doctor spoke in the plainest language, avoiding scientific terminology, there was not the slightest difficulty in understanding everything that was said. Lecturettes with such a popular appeal are bound to enhance the attractiveness of broadcast listening.

ELECTRIC RADIOS

In building your **Electric Radio**, you must remember that a breakdown even of a single part may have very serious consequences. For this reason, greater care in choice of parts must be exercised than formerly.

You should send immediately for our **large illustrated catalogue**, which describes an endless range of **apparatus chosen for its efficiency and reliability.**

We cordially invite inquiries for items not usually listed by us, since we will always endeavour either to obtain it for you, even if it means manufacturing it. Our factory is well equipped with modern machines, and can turn out a surprisingly large variety of apparatus.

Transformers and Chokes.

These are the **heart of the A.C. Radio.** We are making the **"Record" Transformer**, with an output of 250 volts 50 mils on the high tension side, with three filament windings—5 volts 1 amp, 2.5 volts 5 amp, 1.5 volts 5 amp. Fully enclosed in crystal enamelled case, and covered by a guarantee. 230 volts, 50 cycles **£3/10/-** Price

Any size Power Transformer, Output Transformer, Choke, etc., can be made to order. Quotations on receipt of full particulars.

Emmco Push-pull Transformers, for amplification are large oversized transformers, ensuring best tonal qualities. **£3** nput. Price

Ferranti and other makes of Transformers supplied.

Rectifiers.

Undoubtedly the best Rectifier is the **Westinghouse**, and though its price may seem high, it must be remembered that it never requires renewal, and can be used with a much simpler transformer. The HT1 Westinghouse gives 100 mils at 200 volts, and the price has been reduced from **£6/10/- to £4/10/-**. It is fully described in a **Westinghouse Booklet**, which will be posted on receipt of 3d. in stamps. New Westinghouse rectifiers include a 120-volt 20 mil price 27/6, and 180-volt 30 mil, price 48/-, but these will not be available in New Zealand for some weeks yet.

For Low Voltage Rectification—as in **Battery Chargers, "A" Eliminators, Dynamic Speaker Rectifiers**, we can supply 6-volt ½ amp at 32/6, and 6-volt 1 amp at 52/6, both in cases. **Rectifiers**, not in cases, cost 28/- for 9 volts 1 amp, and 48/- for 9 volts 2 amp. Both are available immediately. The **Raytheon**, 125 mil bulb, costs 25/-, and the Radiotron 280 30/-. A holder for either of these valves, holding them very securely, can be supplied at 1/- each.

Condensers.

There is no need here to enlarge on the **reliability** of **Hydra Condensers**—it is **unquestioned**—but attention is drawn to the following **price reductions**. The voltage given is the **test voltage**, and the **working voltage must not exceed half these figures.**

m.f.	Group 1 500-v.	Group 2 750-v.	Group 3 1000-v.	Group 4 2000-v.
	s. d.	s. d.	s. d.	s. d.
.1	2 6	3 0	3 6	7 9
.25	3 0	3 6	4 6	9 0
.5	3 3	3 9	5 6	11 6
1.	3 9	4 6	6 9	17 6
2.	4 9	6 0	8 6	25 0
4.	7 6	10 0	15 0	40 0

Buffer Condenser, Hydra. Consists of two .1 m.f. condensers, 1000-volt. A.C. **6/-** test, in one case.

Eliminator Condenser Block. Four 1 m.f., two 2 m.f., and one 8 m.f. Condensers in one compact unit. 16 m.f. total. You can buy this unit with every confidence. **36/-** Price

Hydra Condensers — Invariably Reliable.

COILS.—The Well-Mayde Patent Space Wound Coils can be supplied either in **Hammarlund-Roberts** or **Browning-Drake**, in complete set of two coils. **34/6** Price

English Bakelite Coil Forms and Bases, 6-pin, are now in stock again.

RESISTANCES.—We can supply a full range of **Variable Resistances**, including Royalty at 6/6, Royalty Heavy Duty 10/6, Emmcostads 7/6, and Clarostats at 12/6.

WHY TAKE RISKS?

GUARANTEED RADIO APPARATUS COSTS NO MORE

For 9 years we have been supplying discriminating amateurs throughout New Zealand with the **BEST IN RADIO.**

All Apparatus is expertly selected for its efficiency and reliability—yet our enormous turnover actually ensures **BETTER QUALITY AT LOWER COST.**

For fixed resistances, Vitreous enamelled are listed in our catalogue, while **De Jur Wire Wound** with adjustable sliders, will solve many problems in **Eliminators.** 1500 and 1000 ohms cost only 1/9, while 2000 cost 2/6.

A set of **Ward Leonard Resistances**, 21,000 ohms total, is offered at the reduced price of £2 per set (8).

Hum Eliminators.—Also called Balancers for AC Radios..... 7/6

Switches for AC Radios 2/6 and 3/6

Shields.—Well-Mayde, very heavy gauge aluminium 16/6

Ace, lighter gauge 9/-

Metal Cabinets made to order from heavy aluminium, either plain, or crystal enamelled.

NEWCOMBE-HAWLEY DYNAMICS

The Acid Test

is to switch instantly from a N-H Speaker to any other.

Your Musical Friends will invariably select the NEWCOMBE-HAWLEY because of its WONDERFUL FIDELITY OF TONE.

REDUCED PRICES.	N-H D6—6-volt.	£6/17/6
	N-H D80—230-volt. A.C.	£10
	Beverley Type Cabinets, extra	£3/10/-

DELIVERED FREE ANYWHERE IN NEW ZEALAND.
Magnavox Speakers same price.

ELECTRIC GRAMOPHONE ACCESSORIES.

PICK-UPS.

Webster, with Tone Arm £5/10/-
Webster, without Tone Arm £4/10/-
Pacent, with Tone Arm £4/17/6
Pacent, without Tone Arm £3/10/-
B.T.H. Latest model, with adjustable Tone Arm, inclined to give perfect Track Angle. £5
B.G.E., with Tone Arm £3/10/-

MOTORS.

B.G.E. Electric £7/15/-
G.E.C. Induction, absolutely silent £10
Garrard Spring £2/2/-, £3/3/-, £4/4/- and £8/8/-.

VOLUME CONTROLS.

In small neat case, so that it can be used at a distance from the machine if desirable. Can also be used as a volume control for your Radio, enabling just the right amount of volume to be adjusted from your set at the table. Easily fitted. **13/6**
Control only, no case **8/6**

REPRODUCERS AND TONE ARMS.

These are for ordinary gramophones. Write us for particulars of a really fine range of **Reproducers** which will bring your present machine right up-to-date.

A TRIAL will be arranged, you to be the sole judge.

Gramophone Motors of all kinds, fitted in cabinet for **Electric Reproduction**, can be built to order.

For **Picture Work**, two motors are usually built into one cabinet.

JOHNS LTD.

Chancery Street Auckland

Special Radio Bargains

Discount Up to 33 1-3 per cent.

From this Column Only.

SEND FOR COMPLETE BARGAIN LIST!

Coupon must be enclosed.

	s.	d.
Arresters, Keystone	9	0
Coils, Hammarlund Neutrodyne (3)	15	0
Condensers, .00035, .0005 .... 6/6 to	15	0
Dual ..... 16/6 to	36	0
Triple ..... 21/- to	45	0
Quadruple	60	0
Cables, Battery, Acid Proof, 5-wire	5	0
6-wire	6	0
Condensers, Sangamo .001 or .002 ..	2	0
Gramophone Pick-ups, Edison Bell	39	6
Acuston	25	0
B.G.E., with tone arm	75	0
Speakers, Exponential, Baldwin Units	112	6
Speaker Units .....15/- to	30	0
Dynamic Speakers, B.T.H. 6-volt..	150	0
N. and K. This works from a 32-volt Lighting plant	150	0
Peerless, 6-volt	150	0
Rheostats, 15 ohm.	0	9
6 ohm.	1	6
50 ohm.	2	6
Amperites and similar Resistors ..	4	6
Terminals, engraved, full set, with Formica Strip for mounting, (13) 3/- per set to	3	9

EASY TERMS ON ALL RADIO APPARATUS.

Write, stating articles required. Deposit and instalments that SUIT YOUR CONVENIENCE.

Transformers, Audio, Favourite, 3½:1, 5:1	8	6
One of each ratio for	16	0
B. G. E., 4:1, 35/-; 2:1	20	0

These very fine transformers are offered at the above absurdly low price simply because of overstock. Get in early—a similar offer occurs only very rarely. One of each ratio, 42/ the pair.

Ediswan PV5DE Valves, English Base, 6-volt	7	6
Myers Valves, all types	4	6
6 for	20	0
Tungar Bulbs, Plate connection at top, 2 amps.	20	0
Electric Motors, ¼ h.p., new, A.C. £5	0	
1-6 h.p., ditto £4	10	0
Breast Drills, ¼in. Chuck	35	0
Hand Drill, ¼in. chuck	9	0

COMPLETE RADIOS.— We have a few of various types, new and slightly shop soiled, but otherwise in perfect order. No old type sets which are so inefficient that they are not worth giving away. Write for prices.

RECORD COUPON.

Johns, Ltd.,

Box 471, Auckland.

I enclose "Record" Discount Coupon.

Please send me goods as on enclosed order, list value £.....from your Radio Bargains.

You will allow a discount from the above, as follows: Under £1, 20 per cent; £1-£5, 25 per cent.; over £5, 33 1-3 per cent.

Name .....

Address .....

Next Week's Features

1YA Features

SUNDAY evening's service will be relayed from the Pitt Street Methodist Church, the preacher being Mr. W. Walker. Following the relay, a studio concert will be presented, to which Miss Molly Atkinson and Messrs. T. Moffitt and Hartley Warburton will contribute.

ON Monday evening 1YA will not observe the usual silent day, but will relay a debate from the Auckland University Hall between the members of the Victoria College (Wellington) debating team, which is to tour U.S.A., and a team representing the Auckland University College. This should prove both an interesting and entertaining feature.

AT 7 p.m. on Tuesday Mr. George Campbell will continue his instructive talks on "Motoring," and at 7.40 p.m. Dr. A. B. Fitt, under the auspices of the W.E.A., will talk on "Why and How We Dream." The evening programme consists mainly of vocal gems from grand opera and musical comedy. Miss Alma McGruer (soprano), and Miss Beryl Smith (contralto) will sing solos and duets from "Cavalleria Rusticana," "High Jinks," and "Going Up," while Mr. Frank Sutherland's very fine bass-baritone voice will be heard in "Hear Me, Ye Winds and Waves," by Handel, among other splendid numbers.

Miss Audrey Perry, fresh from a success as Angela in the recent production of "Florodora," by the Auckland Amateur Operatic Society, will give three elocutionary numbers. The Studio Trio will again give some very fine items, and Brassin's arrangement of the Fire Music from Wagner's "The Valkerie" will be played as a pianoforte solo by Mr. Eric Waters. Another topical talk will be given by Mr. A. E. Chappell, M.A.

MR. Norman Kerr will talk again on Physical Culture at 7.40 on Wednesday evening, and a fine concert programme will follow. A combination new to the evening session will perform. Many listeners will remember the enjoyable programme given at a recent children's session by the Tudor Orchestra, led by Mr. Reginald Morgan, which will provide all the instrumental section of the programme. Their items will include gems from popular as well as classical music. The New Zealand Four will also sing further numbers from their extensive repertoire.

RECENTLY at 1YA, a novelty programme was heard, entitled "What did you do in the Great War, Daddy?" and in response to many requests, a somewhat similar evening will be given by the same combination, under the title of "Not Quite on the Western Front." Listeners are assured of a night of humour, together with some of the old songs of the Great War.

THERE will be two talks on Friday evening, one at 7 p.m., by Mr. Frank Sutherland, on Rugby Football, and the other at 7.40, on Esperanto, by Mr. W. G. E. Wheeler. During the evening session another enjoyable relay of the concert to be given by Messrs. Lewis Eady, Ltd. will be heard and will be followed by a studio programme which will include pianoforte solos and duets by Miss Kathleen O'Leary and Mr. Eric Bell, a 'cello solo by Miss Mollie Wright, and items by the Studio Trio. A singer new to 1YA will make her appearance in the person of Miss Aimee Clapham (contralto), who, besides singing solos, will be associated with the Madame Mary Towsey Quartet. Vocal solos and duets will be sung by Madame Mary Towsey, Mr. John Bree, and Mr. John McDougall.

On Saturday afternoon 1YA will rebroadcast 2YA's running description of the inter-Island Rugby football match to be played at Wellington. At 7.40, Mr. G. D. Rutter will give another of his instructive talks on Gladioli. The evening session will consist of items by the Studio Orchestra, the Bohemian Duo, Ingall's Hawaiians, and the ever-popular Asquiths.

Mr. Frank Sutherland, bass, and one of the most popular of 1YA artists.
—S. P. Andrew, photo.

Mr. W. J. (Bill) Meredith, who describes the Rugby football at Eden Park.
—S. P. Andrew, photo.

2YA Features

THE evening service of St. Paul's Pro-Cathedral will be broadcast for the first time on Sunday evening, when the preacher will be Canon Percival James, late of Auckland. Canon James is well known to Auckland listeners, the services of his church having been frequently broadcast by 1YA. Mr. Robert Parker, one of Wellington's' leading musicians, will be at the organ, and will also act as choirmaster. The recital of the Wellington Municipal Tramways Band, which plays under the conductorship of Mr. E. Franklin, will be relayed from His Majesty's Theatre, at the conclusion of the cathedral broadcast.

ON Monday evening Mr. H. C. South will give another of his interesting and informative talks on "Books—Grave and Gay." The concert session will feature items of a classical nature, the modern composers being well represented. Rubinstein's "Ukranian Suite," the "Andante" from Lalo's "Symphony Espagnole," the "French Military March" from Saint-Saens, "Suite Algerienne," and Morena's arrangement of "Brahms Memorien" will be the features of the orchestral items. The assisting artists will be Miss Myra Sawyer (soprano), Mr. John Prouse (baritone), Miss Rene Goyder (contralto), and Mr. Harry Phipps (tenor). Elocutionary items will be rendered by Miss Rose Carte, who is reciting again, by request, "The Ballad of Splendid Silence." Mr. H. Temple White will give a brief organ recital from the Taranaki Street Methodist Church, his items being Schubert's "Serenade" and "The March of the Israelites," by Costa.

Mr. G. Austin Blackie, who is considered to be one of New Zealand's finest tenor soloists, is shortly leaving for Australia, and will make his final appearance before the microphone on Monday evening. All listeners appreciate Mr. Blackie's talents, and will be delighted to hear him sing "I Know of Two Bright Eyes," and "Prelude," from Landon Ronald's "Cycle of Life."

MR. DOUGLAS STARK will make a welcome reappearance before the microphone on Tuesday evening, when he will entertain listeners with some typical "Harry Lauder" numbers. Appearing on the same programme will be Miss Jeanette Briggs and Mr. Roy Hill, who will be heard in musical comedy items and light ballad numbers. Popular songs will be featured by Miss Lily Charles, and orchestral items in keeping with the programme will be played by the orchestra. At 9.30 the usual dance programme will be broadcast.

THE representative of the Hutt Valley Horticultural Society, Mr. A. J. Nicholls, will deliver another of his series of talks on "Gardening" on Thursday evening. The Wellington Artillery Band, under the conductorship of Captain Herd, will provide the major portion of the programme for the concert session. The assisting artists will be Mrs. Eric Ewart (mezzo-soprano), Mr. L. M. Assheton Harbord

(baritone), Miss Ivy Stanton (contralto), and the D.I.C. Male Voice Choir. Miss Gracie Kerr, a well-known Wellington elocutioniste, will recite humorous numbers in her usual inimitable style. The band items comprise a selection from the opera "La Traviata," a Nautical Fantasia (repeated by request), a selection, "Beauties of Scotland," and several marches and waltzes. Bandsman G. A. Garry will play the cornet solo, "The Cornet King."

On Friday evening Mr. Walter F. Dudson, a well-known physical culturist, will give a lecturette on a subject we are all bound to be interested in sooner or later, viz., "Influenza—Its Cause and Cure." Mr. Dudson has made a thorough study of the subject, and will endeavour in simple language to give listeners some much-needed information about this all too common malady.

Friday being operatic night at 2YA a programme, featuring gems from grand and comic opera and musical comedy will be presented. The orchestra will play as an overture, a fantasia of Weber's opera, "Der Freischutz," the "Liebeslied and Liebesfreud" from "Tristan and Isolde," and selections from "Mignon" and "The Student Prince." The vocalists will be Mrs. Arnold Downer, late of Sydney, Mr. S. E. Rodger, Miss Lily Hambly, and Mr. Chas. Edwards. Mrs. Downer, who is now residing in Wellington, has sung for several of the Australian "A" class stations, and has also done a large amount of concert work in and around Sydney. For her items Mrs. Downer has chosen a solo from Offenbach's opera "La Grande Duchesse" and Siebel's aria from "Faust," "When All was Young." Mr. Rodger will sing the "Prologue" from "I Pagliacci," and Valentine's aria from "Faust," "Loving Smile of Sister Kind," "Ombra Mai Fiu," or as it is sometimes called, "Handel's Largo," and "Che Faro," from Gluck's "Orfeo ed Eurydic" will be Miss Hambley's solos. Mr. Chas. Edwards, whose work in the recent broadcast of "The Tales of Hoffman" is no doubt still in the minds of quite a number of listeners, on this occasion will sing a number from Lohr's "Garden of Kama" and the "Cobbler's Song" from "Chu Chin Chow." The dramatic recital, "The Highwayman," by Alfred Noyes (one of England's leading poets) will receive at the hands of Mr. Albert Davey sympathetic treatment. Mr. Davey will also relate some original humorous stories.

On Saturday evening a bright and entertaining programme will be presented. The orchestral items will include the overture to "Chu Chin Chow," two novelty orchestral numbers, "Haunting Humoresque," "Malta," a violin solo, "Mighty Lak' a Rose," by Mr. W. Haydock, a flute and clarionet duet by Messrs. Brown and Langtry, "Flower of Mexico," and several dance novelties. The Melodie Four will provide the vocal portion of the programme, their items comprising quartets and solos, among which will be four request numbers, "When Love Comes Calling" (a tenor solo, with violin obligato, to be sung by Mr. Frank Bryant), "The Irish Orchestra" (to be sung by Mr. R. S. Allwright), "Just a Cottage Small" (by Mr. Sam Duncan), and "Laugh, Clown Laugh" (by Mr. W. Marshall). Humour will be provided by "Ajax" of "Ajax and Bejax," who will relate some experiences of his Hebrew friend "Cohen," of telephone fame. Novelty instrumental items will be given by Mr. L. Beavis on his steel guitar.

3YA Features

THE church service on Sunday will be relayed from Knox Church, the preacher being Rev. T. W. Armour. Following the church service and preceding a rebroadcast of 2YA, Wellington, a short studio concert will be presented which will be contributed to by Miss Rose Howell and the Studio Trio.

ON Monday 3YA will relay a special programme for Dominion Day, this being the second programme given over the air by the Timaru Orchestral Society. A splendid concert of instrumental music interspersed with vocal items will be relayed, and listeners can be assured of a very pleasant evening's entertainment.

WEDNESDAY'S programme will be notable for the broadcast from the Civic Theatre, of the presentation of the cantata, "The Golden Legend" by Sir Arthur Sullivan, to be produced by the Royal Christchurch Musical Society, with full chorus and orchestra. The relay will be the Society's final rehearsal, and opening introductory comments will be given by Mr. W. H. Dixon, the conductor. The soloists for the occasion will be Madame Alyce Harley (soprano), Miss Dulcie Mitchell (contralto), Mr. J. Hadland (tenor) and Mr. Charles Clarkson (bass). At 9 p.m. a miscellaneous studio programme will be presented to which Miss Merle Miller will contribute selections from "La Boheme" and items by Rachmaninoff and Faure. Mr. Fred Penfold will sing the "Prologue" from "Pagliacci," contralto items being given by Miss Nellie Lowe, and tenor solos by Mr. Harold Prescott. The Second Movement from Mendelssohn's Overture will be played as pianoforte duet by Misses Carpenter and Stout and Miss Merle Miller and Mr. Harold Prescott will sing as a duet, a selection from Offenbach's "Tales of Hoffmann."

A LECTURE arranged by the 3YA Primary Productions Committee will be given in Thursday's news session by Mr. A. T. Montgomery, of the Department of Agriculture, his subject being "The Case for Topdressing in Canterbury." A classical programme in the evening session will feature concerted and solo vocal items by the Grand Opera Quartet, solos being rendered by members of this combination. Elocutionary numbers will be given by Miss Marion Drysdale, and the Venetian Duo will present Gaboni's "The Fisherman." Instrumental solos will be given by Mr. Harold Beck and the Christchurch Broadcasting Trio will include in their numbers the Andante Movement from Schubert's B Flat Trio.

THE programme for Friday evening is of a popular type combined with dance music. The Valencia Quartet will offer a programme of a varied and popular nature, including solos, duets and quartettes. The Instrumental Trio will present items of a bright nature, and Miss Irene Morris, a violin solo suitably chosen for this programme. Mr. George Titchener will provide the humorous portion of the programme with something new in original items. 3YA will also provide dance music in this entertainment by the Bailey-Marston Dance Orchestra, which will continue until 11 p.m.

SATURDAY being a vaudeville evening, the programme will include a variety of items. Miss Rita Lucas, a mezzo-soprano who has not been heard for some considerable time from 3YA, will again delight listeners, as also will an old favourite, Mr. Clive Hindle (baritone). The Joyous Duo, with songs at the piano will render the latest popular local hits, whilst humour will be provided by that popular pair, the Two White Crows in songs and patter. Popular character sketches will be provided by Mr. Cyril Collins and Mr. Alan Brown, both well-known in local amateur operatic circles. The Italian Instrumental Jazz continue from 10 to 11 with jazz and dance music.

Children's Sessions

AT 1YA.

TUESDAY, SEPTEMBER 24:
Dialogues and sketches from cousins, stories and birthday greetings from Uncle George.

WEDNESDAY:
Uncle Tom in happy mood, singing ditties and telling stories. New helpers at the piano and singing songs.

THURSDAY:
The little band of helpers this evening is new to the studio, they are the pupils of Miss Richardson, so prepare or a happy evening with them and Peter Pan.

FRIDAY:
Aunt Jean in charge with more of her original verses, stories and jokes. Tiny Tots giving recitations.

SATURDAY:
The clever twins Moya and Betty playing duets and solos, and Cinderella with stories, jokes and puzzles.

SUNDAY:
Children's Song Service conducted by Uncle Leo, assisted by Cousins from Howe Street Brethren Sunday School.

AT 2YA.

MONDAY, SEPTEMBER 23:
The Mouth Organ Symphony Orchestra, with merry tunes for you to-night, and Cousin Margaret, who will sing and recite some of her delightful songs and poems. Uncle Jeff will be there with song and birthday greetings.

TUESDAY:
Cousin Marjorie will sing, Uncle Jim will give birthday greetings, and Cousin Teddy and Gwen will go for a fairy trip.

THURSDAY:
A jolly programme for to-night by the pupils of Miss Edna Purdie and birthday greetings from Uncle George.

FRIDAY:
Two of Miss Marjorie Meier's pupils will play for us, Cousin Douglas and Cousin Gwen will sing, and Brother Jack with his happy song and birthday greetings, will help to pass a merry hour.

SATURDAY:
A cheery troop of boy scouts, under Mr. F. L. McKenzie, are com-

(Continued on page 35.)

Full Programmes for Next

Sunday, September 22

1YA, AUCKLAND (900 KILOCYCLES)—SUNDAY, SEPTEMBER 22.

3.0 : Afternoon session—selected studio items.
4.0 : Literary selection by the Announcer.
4.8 : Studio items.
4.30: Close down.
6.0 : Children's session conducted by Uncle Leo.
6.55: Relay of service from Pitt Street Methodist Church—Preacher: Rev. W. Walker. Choirmaster: Mr. W. Leather. Organist: Mr. E. Bickerton.
8.30 (approx.): Studio concert.
Instrumental—New Queen's Hall Orchestra, "Symphony in B Minor" (Schubert), (Columbia 02757).
Tenor—Mr. T. Moffitt, (a) "Believe Me if All" (Moore); (b) "Mary of Argyle" (traditional).
Pianoforte—Leopold Godowsky, (a) "Nocturne in E Flat" (Chopin); (b) "Nocturne in E Minor" (Chopin), (Columbia 04237/8).
Mezzo-soprano—Miss Molly Atkinson, "Forever" (Rubinstein).
Baritone—Mr. Hartley Warburton, "Largo Al Factotum" (Rossini).
Organ—Edouard Commette, "Toccata" (Gigout), (Columbia 02732).
Tenor—Mr. T. Moffitt, "Dolorosa" (Phillips).
Chorus—La Scala Chorus, Milan, "La Tempesta" (Otello"), (Verdi), (Columbia 02723).
Mezzo-soprano—Miss Molly Atkinson, (a) "O Thank Me Not" (Mallinson); (b) "Sing, Break into Song" (Mallinson).
Baritone—Mr. Hartley Warburton, "O Could I But Express in Song" (Malashkin); (b) "'Tis the Day" (Leoncavallo).
Band—Royal Italian Band, "Marcia Reale" (Gabetti), (Columbia 01182).
Close down.

2YA, WELLINGTON (720 KILOCYCLES)—SUNDAY, SEPTEMBER 22.

3.0 : Chimes.
3.1 : Selected studio items.
4.30: Close down.
6.0 : Children's song service, conducted by Uncle George.
7.0 : Relay of service from St. Paul's Pro-Cathedral, Mulgrave Street, Wellington. Preacher, Rev. Percival James. Organist and choirmaster, Mr. Robert Parker.
8.15: (approx.) Relay from His Majesty's Theatre of recital by the Wellington Municipal Tramways Band, under the conductorship of Mr. E. Franklin.
Close down.

3YA, CHRISTCHURCH (980 KILOCYCLES).—SUNDAY, SEPTEMBER 22.

3.0 : Afternoon session—selected studio items.
4.30: Close down.
5.30: Children's song service.
6.15: Hymn tunes from Studio.
6.30: Relay of service from Knox Presbyterian Church, Bealey Avenue: Preacher, Rev. T. W. Armour. Musical director, Mr. W. H. Dixon, L.R.A.M., A.R.C.M. Organist, Mr. Allan Welbrock.
7.45: (approx.)—Studio concert:
Instrumental—Berlin State Opera Orchestra, (a) "Danse De La Fee Dragee"; (b) "Danse Russe—Trepak" ("Nutcracker" Suite) (Tschaikowsky) (Parlophone E10516).
Mezzo-soprano—Miss Rose Horrell, "O Rest in the Lord" ("Elijah") (Mendelssohn).
Instrumental—Studio Trio, "Trio in B Flat—Allegro Moderato" (Schubert).
Mezzo-soprano—Miss Rose Horrell, (a) "Angels Ever Bright and Fair" (Handel); (b) "God Be With You" (Elmplad).
8.15: (approx.)—Rebroadcast of 2YA, Wellington (relay from His Majesty's Theatre of concert by the Wellington Municipal Tramways Band).
Close down.

4YA, DUNEDIN (650 KILOCYCLES).—SUNDAY, SEPTEMBER 22.

3.0 : Town Hall chimes.
3.1 : Selected gramophone items.
4.30: Close down.
5.30: Children's song service, conducted by Big Brother Bill.
6.30: Relay of service from Salvation Army Citadel, Dowling Street—Preacher, Captain A. Chandler.
8.5 : (approx.)—Relay from His Majesty's Theatre of concert by the Kaikorai Band, under the conductorship of Mr. T. J. Kirk-Burnnand.
9.15: Close down.

Monday, September 23

1YA, AUCKLAND (900 KILOCYCLES)—MONDAY, SEPTEMBER 23.

8.0 : Chimes.
8.1 : Relay from the University Hall, Auckland, of debate between the members of the Victoria College Debating team which is to tour the United States of America, and the Auckland University College Debating team.
Close down.

2YA, WELLINGTON (720 KILOCYCLES)—MONDAY, SEPTEMBER 23.

3.0 : Chimes of the G.P.O. clock.
3.1 : Selected gramophone items.
4.30 and 4.50: Sports results to hand.
5.0 : Children's session, conducted by Uncle Jeff.
6.0 : Dinner Session—"Columbia Hour":
Overture—Basle Symphony Orchestra, "Der Freischutz" (Weber) (02874-5).
6.12: Tacet.
6.15: Instrumental—J. H. Squire's Celeste Octet, (a) "The Grasshoppers' Dance" (Bucalossi); (b) "The Butterfly" (Bendix) (3608).
Musical Art Quartet, "To a Wild Rose" (McDowell) (01506).
Violin—Yvonne Curti, "Madrigale" (Simonetti) (01529).
6.27: Tacet.
6.30: Instrumental—J. H. Squire's Celeste Octet, (a) "I Love the Moon" (Rubens); (b) "Two Eyes of Grey" (McGeoch) (01213).
Instrumental—J. H. Squire's Celeste Octet, (a) "Amoureuse Valse" (Berger); (b) "Valse Bleue" (Margis) (3643).
6.42: Tacet.
6.45: Instrumental—J. H. Squire's Celeste Octet, "Valse Caprice" (Rubinstein) (02581).
'Cello—W. H. Squire's "Sarabande" (Seilzer) (04283).
Instrumental—J. H. Squire's Celeste Octet, "Perpetuum Mobile" (Weber, arrgd. Crooke) (02581).
6.57: Tacet.
7.0 : News session, market reports and sports results.
7.40: Lecturette—Mr. H. C. South, "Books—Grave and Gay."
8.0 : Chimes of the G.P.O. clock.
8.1 : Overture—Orchestra, "Bohemian Girl" (Balfe).
8.9 : Soprano—Miss Myra Sawyer, "The Tomb of an Unknown Woman" (Bantock).
8.13: Pianoforte—Miss Adelaide Long, "Waltz in E Flat" (Chopin).
8.20: Baritone—Mr. John Prouse, (a) "Pilgrim's Song" (Tschaikowsky); (b) "Don Juan's Serenade" (Tschaikowsky).
8.27: Suite—Orchestra, "Ukrainian Suite" (Rubinstein).
8.35: Recital—Miss Rose Carte, "The Ballad of Splendid Silence" (Nesbit) (by request).
8.41: 'Cello—W. H. Squire, "Ave Verum" (Mozart, arrgd. Squire) (Columbia Record 04283).
8.45: Contralto—Miss Rene Goyder, "Home Along" (Sanderson).
8.49: Tenor—Mr. Harry Phipps, (a) "Malvern Hills in Spring"; (b) "My Girl and I" ("Songs of the Malvern Hills") (Coningsby Clarke).
8.55: Violin solo with orchestral accompaniment, (Soloist, Mr. W. Haydock), "Andante" ("Symphony Espagnole") (Lalo).
9.3 : Weather report.
9.5: Relay of organ recital by Mr. H. Temple White, (a) "Serenade" (Schubert); (b) "March of the Israelites" (Costa) (by request).
9.20: Tenor—Mr. G. Austin Blackie, (a) "I Know of Two Bright Eyes" (Clutsam); (b) "Prelude" from "Cycle of Life" (Landon Ronald).
9.28: Soprano—Miss Myra Sawyer, "L'Ete" (Chaminade).
9.32: Baritone—Mr. John Prouse, (a) "Si Il Rigor" (Halevy); (b) "To Anthea" (Hatton).
9.40: Instrumental—Orchestra, "Brahms' Memorien" (Arrgd. Morena).
9.48: Humour—Miss Rose Carte, (a) "A Cheerful Visitor" (Dallas); (b) "A Telephone Conversation" (Anon.).
9.54: Tenor—Mr. Harry Phipps, "Jean" (Meade).
9.58: Contralto—Miss Rene Goyder, (a) "Boat Song" (Ware); (b) "I Heard You Go By" (Haydn Wood).
10.4 : Instrumental—Orchestra, "Marche Militaire Francaise" ("Suite Algerienne") (Saint-Saens).
10.12: Close down.

3YA, CHRISTCHURCH (980 KILOCYCLES).—MONDAY, SEPTEMBER 23.

3.0 : Afternoon session—selected gramophone items.
4.25: Sports results to hand.
5.0 : Children's session, conducted by "Scatterjoy."
6.0 : Dinner session—"Columbia Hour":
Royal Italian Band, "Marcia Reale" (Gabetti) (01182).
Court Symphony Orchestra, "In Venice" (Sellars) (896).

Week-all Stations-to Sep. 29

Cinema organ—Stanley MacDonald, "Was It a Dream?" (Coslow) (Regal G20401).
Band—Royal Italian Band, "Garibaldi's Hymn" (Olivieri) (01182).
6.12: Tacet.
6.15: Ketelbey's Concert Orchestra, "Sanctuary of the Heart" (Ketelbey) (02690).
'Cello—W. H. Squire, "Melody in F" (Popper) (04178).
6.26: Tacet.
6.30: Instrumental—W. H. Squire's Celeste Octet, "Mignon: 1. Introduction and Romance; 2. Polonaise" (Thomas) (02749).
'Cello—W. H. Squire, "Silver Threads Among the Gold" (Danks, arrgd. Squire) (04178).
6.42: Tacet.
6.45: Band of H.M. Grenadier Guards, "Turkish Patrol" (Michaelis) (4111).
Cinema organ—Stanley MacDonald, "Nicolette" (Batten) (Regal G20401).
Waltz—Jacque Jacob's Ensemble, "Vienna Life" (Strauss) (02556).
Idyll—H.M. Grenadier Guards Band, "Smithy in the Woods" (Michaelis) (4111).
6.58: Tacet.
7.0 : News session.
7.59: Relay from the Theatre Royal, Timaru, of concert by the Timaru Orchestral Society:
March—Orchestra, selected.
Overture—Orchestra, "Masaniello" (Auber).
Dance suite—Orchestra, "Three English Dances" (Quilter).
Suite—Orchestra, "Othello" (Coleridge-Taylor): 1. Dance. 2. Children's Intermezzo. 3. Funeral March. 4. The Willow Song. 5. Military March.
Overture—Orchestra, "The Magic Flute" (Mozart).
Selections—Orchestra, (a), "The Sleeping Beauty" (Tschaikowsky); (b) "Praeludium" (Jarnfeldt).
Ballet music—Orchestra, "Faust" Ballet Music (Gounod).
(Note.—The above orchestral programme will be interspersed with vocal numbers.)
Close down.

4YA, DUNEDIN (650 KILOCYCLES.)—MONDAY, SEPTEMBER 23.

3.0 : Town Hall chimes.
3.1 : Selected gramophone items.
4.25: Sports results to hand.
4.30: Close down.
6.0 : Town Hall chimes.
6.1 : Children's session, conducted by Uncle Allan.
7.0 : News session.
7.40: Lecturette by the Radio Man—"Wireless Talks—All About Your Set."
8.0 : Town Hall chimes.
8.1 : Overture—National Symphony Orchestra, "William Tell" (Rossini) (Zonophone 2969/70.
8.13: Musical play—"The Ship Beautiful" (Prentice): 1. "Along the Margin of the Sky"; 2. "Au Revoir, Little Island of Dreams." Soloists, Miss Madge Yates and Miss Lorna Smith).
8.25: Instrumental—4YA Broadcasting Trio, (a) "Ave Maria" (Schubert); (b) "Poupee Valsante" (Poldini).
8.33: Soprano—Miss Rita Holmes, "One Fine Day" ("Madame Butterfly") (Puccini).
8.37: Recital—Miss Nellie Osborn, "The Token of the Rose" (Mines).
8.42: March—Symphony Orchestra and chorus, "Carmen—March" (Bizet) (H.M.V. D1047).
8.46: Baritone—Mr. W. Ruffell, "Loving Smile of Sister Kind" ("Faust") (Gounod).
8.50: 'Cello—Mr. P. J. Palmer, "Etude Capria" (Gotterman).
8.56: Tenor—Mr. H. Drew, "Che Gelida Manina" (Puccini).
9.0 : Weather report.
9.2 : Selection—Piccadilly Orchestra, "The Waltz Dream" (Strauss) (H.M.V. (B2684).
9.8 : Soprano—Miss Rita Holmes, (a) "Waltz Song" ("Tom Jones") (German); (b) "Vissi D'Arte" ("La Tosca") (Puccini).
9.13: Instrumental—4YA Broadcasting Trio, (a) "Farewell to Cucullain" (Kreisler); (b) "Orientale" ("Kaleidoscope") (Cesar Cui).
9.23: Selection—Symphony Orchestra and chorus—"Faust—La Kermesse" (Gounod) (H.M.V. D1047).
9.27: Recitals—Miss Nellie Osborn, (a) "The Knight's Toast" (Anon.); (b) "The Emperor's Rhyme" (Milne).
9.32: Pianoforte—Mrs. Ernest Drake, "Mexican Serenade" (Mowrey).
9.36 Baritone—Mr. W. Ruffell, (a) "In Happy Moments Day by Day" ("Maritana") (Wallace); (b) "The Mariner and His Barque" ("Maritana") (Wallace).
9.43: Violin—Mr. Frank Parsons, "Kol Nidrei" (Bruch).
9.45: Tenor—Mr. Harry Drew, (a) "Song of the Toreador" (Bizet); (b) "Nirvana" (Adams).
9.54: March—Philadelphia Symphony Orchestra, "Rakoczy March" ("Damnation of Faust") (Berlioz) (H.M.V. ED7).
10.0 : Close down.

Tuesday, September 24

1YA, AUCKLAND (900 KILOCYCLES)—TUESDAY, SEPTEMBER 24.

3.0 : Afternoon session—selected studio items.
4.0 : Literary seltction by the Announcer.
4.8 : Studio items.
4.25: Sports results to hand.
5.0 : Children's session, conducted by Uncle George.
6.0 : Dinner Session—"Parlophone Hour":
Overture — Berlin State Opera Orchestra, "Mignon" (Thomas) (E10557).
Grand Symphony Orchestra, "Tales of Hoffman—Barcarolle" (Offenbach) (4061).
6.12: Tacet.
6.15: Fantasia—Edith Lorand Orchestra, "Faust" (Gounod) (E10579).
Piano—Karo; Szreter, "Fledermaus" (Strauss) (A4082).
6.27: Tacet.
6.30: Selection—Dajos Bela Orchestra, "La Tosca" (Verdi) (A4045).
Violoncello—Orabio de Castro, "Nocturne in E Flat" (Chopin) (E10581).
6.42: Tacet.
6.45: Overture—Grand Symphony Orchestra, "Fra Diavolo" (Auber) (A4022).
Grand Symphony Orchestra, "Tales of Hoffman—Entr'acte and Minuet" (Offenbach) (A4061).
6.57: Tacet.
7.0 : Talk—Mr. George Campbell, "Motoring."
7.15: News and market reports.
7.40: Talk—Dr. A. B. Fitt—"Why and How We Dream" (under the auspices of the W.E.A.).
8.0 : Chimes.
8.1 : Bass-baritone—Mr. Frank Sutherland, (a) "Hear Me, Ye Winds and Waves" (Handel); (b) "Il Mio" ("Martha") (Flotow).
8.8: Recital—Miss Audrey Perry, "How Bannerman Rode the Grey."
8.13: Soprano—Miss Alma McGruer, (a) "The Tickle Toe" ("Going Up") (Hirsch); (b) "Mother, You Know the Story" ("Cavalleria Rusticana") (Mascagni).
8.20: Instrumental—Studio Trio, (a) "Keltic Lament" (Foulds); (b) "Serenade" (Drdla).
8.29: Talk—Mr. A. B. Chappell, M.A., Topical Talk.
8.44: Vocal duets—Miss Alma McGruer and Miss Beryl Smith, (a) "Not Now, But Later" ("High Jinks") (Friml).
8.48: Pianoforte—Mr. Eric Waters, "Fire Music" from "The Valkyrie" (Wagner-Brassin).
8.53: Contralto—Miss Beryl Smith, (a) "The Touch of a Woman's Hand" ("Going Up") (Hirsch); (b) "Voce Di Donna O D'Angelo" (Ponchielli).
9.0 : Weather report.
9.3 : Bass-baritone—Mr. Frank Sutherland, "The Coolleen Bawn" ("The Lily of Killarney") (Benedict).
9.7 : Instrumental—Studio Trio, "Good News" Selection (De Sylva).
9.15: Recitals—Miss Audrey Perry, (a) "Pretty Girl,"; (b) "Misunderstood."
9.21: Vocal duet—Miss A. McGruer and Miss B. Smith, "If You Look in Her Eyes" ("Going Up" (Hirsch).
9.25: Gramophone Review—"A Commentator"—Review of Latest Recording.
10.5 : Close down.

2YA, WELLINGTON (720 KILOCYCLES)—TUESDAY, SEPTEMBER 24.

3.0 : Chimes of the G.P.O. clock.
3.1 : Selected gramophone items.
4.30 and 4.50: Sports results to hand.
5.0 : Children's session conducted by Uncle Jim.
6.0 : Dinner session—"Parlophone" Hour:
Overture—Grand Symphony Orchestra, "Zampa" (Herold) (2020).
Waltz—Dajos Bela Orchestra, "Morgenblatter" (Strauss) (A4038).
6.12: Tacet.
6.15: Orchestra of the Opera Comique, Paris, "Scenes Pittoresques" (Massenet) (A4057).
Waltz—Edith Lorand Orchestra, "Vienna Waltz" (Drdla) (E10531).

6.27: Tacet.
6.30: Waltz—Dajos Bela Orchestra, "Marien Klange" (Strauss) (A4038).
Instrumental—Dajos Bela Orchestra, "Ideale" (Tosti) (A4015).
Waltz—Edith Lorand Orchestra, "Merry Vienna" (Zishrer) (E10531).
6.42: Tacet.
6.45: Waltz—Edith Lorand Orchestra, "Song of Autumn" (Waldteufel) (E10570).
March—Queenie and David Kaili, "Hawaiian March" (Ellis) (A2372).
Valse intermezzo—Edith Lorand Orchestra, "The Flowers' Dream" (Translateur) (E10570).
Selection—H.M. Irish Guards, "The Desert Song" (Romberg) (A2433).
6.57: Tacet.
7.0 : News session—Market reports and sports results.
7.40: Lecturette—Representative Agricultural Department. "For the Man on the Land."
8.0 : Chimes of the G.P.O. clock.
8.1 : Overture—Orchestra, "Morning, Noon, and Night" (Suppe).
8.9 : Soprano—Miss Jeanette Briggs, L.A.B., "Indian Love Call" ("Rose Marie") (Friml).
8.13: Humour—Mr. Doug. Stark, "Bella" (Lauder).
8.20: Instrumental—Orchestra, "Woodland Sketches" Nos. 1, 5, and 7 (McDowell).
8.28: Tenor—Mr. W. Roy Hill, "The Frog and the Mouse" (English folk song).
8.32: Popular songs—Miss Lily Charles, (a) "On Top of the World Alone" (Whiting), (b) "Big City Blues" (Conrad).
8.39: Instrumental—Orchestra, (a) "Lost Chord" (Sullivan), (b) "Skater's Waltz" (Waldteufel).
8.47: Soprano—Miss Jeanette Briggs, L.A.B., "If I Were a Lark" (Clutsam).
8.51: Instrumental—Orchestra, repeat number.
8.59: Weather report.
9.1 : Vocal duet—Miss Jeanette Briggs and Mr. W. Roy Hill, "Mountain Lovers" (Squire).
9.5 : Humour—Mr. Doug. Stark, (a) "Tobermory Treasure" (Cairns), (b) "Lauchie McGraw" (Lauder).
9.12: Instrumental—Orchestra, "Guy d'Hardelot's Songs."
9.17: Tenor—Mr. W. Roy Hill, (a) "The Maiden Blush" (Quilter), (b) "Five Eyes" (Armstrong Gibbs).
9.22: Popular song—Miss Lily Charles, "Coquette" (Berlin).
9.26: Instrumental—Orchestra, "Air de Ballet" (Borch).
9.31: "Brunswick" Dance Programme:
Foxtrot—Hal Kemp's Orchestra, "You Wouldn't Fool Me, Would You?" (De Sylva) (4212).
Foxtrot—Harold Stern's Orchestra, "From Sunrise to Sunset" (Miller) (4251).
Foxtrot—Hal Kemp's Orchestra, "My Lucky Star" (De Sylva) (4212).
Foxtrot—Arnold Johnson's Orchestra, "Tear Drops" (Davis) (4251).
9.42: Comedienne—Zelma O'Neal, "Button Up Your Overcoat" (De Sylva) (4207).
Foxtrot—Eight Radio Stars, "My Annapolis" (Weinberg) (4272).
Foxtrot—Colonial Club Orchestra, "Hittin' the Ceiling" (Gottler) (4349).
Waltz—Eight Radio Stars, "I Found Happiness" (Rapee) (4272).
Waltz—Ray Miller's Orchestra, "My Angeline" (Wayne) (4233).
9.57: Old-time orchestra—Al Hopkins's Buckle-Busters, "Polka Medley" (Lind) (321).
Foxtrot—Red Nicholls and his Five Pennies, "On the Alamo" (Kahn) (4363).
Foxtrot—Ray Miller's Orchestra, "Cradle of Love" (Wayne) (4233).
Foxtrot—Hotel Ten Eyck Whispering Orchestra, "Then We Canoe-dle-oddle" (Woods) (4372).
Foxtrot—Al Goodman's Orchestra, "I'm Still Caring" (Vallee) (4362).
10.12: Vocal solo—Frank Luther, "Peg-leg Jack" (Robison) (4371).
Foxtrot—Hotel Ten Eyck Whispering Orchestra, "Jericho" (Robin) (4372).
Foxtrot—Al Goodman's Orchestra, "I'm Just a Vagabond Lover" (Vallee) (4362).
Waltz—Regent Club Orchestra, "Sleepy Valley" (Sterling) (4370).
10.24: Old-time orchestra—Al Hopkins's Buckle-Busters, "Marosovia" Waltz (Belcher) (321).
Organ and vibraphone—Lew White, "Mean to Me" (Turk) (4361).
Foxtrot—Colonial Club Orchestra, "Sing a Little Love Song" (Gottler) (4349).
Foxtrot—Roy Ingraham's Orchestra, "That's Living" (Ryan) (4366).
Foxtrot—Colonial Club Orchestra, "There's a Four-Leaf Clover in My Pocket" (Colwell) (4247).
10.39: Vocal solo—Frank Luther, "Barnacle Bill, the Sailor" (Robison) (4371).
Foxtrot—Six Jumping Jacks, "Oh, Baby, What a Night" (Brown) (4351).
Waltz—Castlewood Marimba Band, "Wonderful You" (Medkill) (4379)
10.51: Organ solo—Lew White, "Deep Night" (Henderson) (4361).
Foxtrot—Colonial Club Orchestra, "Oh, What a Night to Love" (Herbert) (4247).
Waltz—Regent Club Orchestra, "Evangeline" (Rose) (4379).
11.0 : Close down.

3YA, CHRISTCHURCH (980 KILOCYCLES).—TUESDAY, SEPTEMBER 24.

SILENT DAY.

4YA, DUNEDIN (650 KILOCYCLES)—TUESDAY, SEPTEMBER 24.

3.0 : Town Hall chimes.
3.1 : Selected gramophone items.
4.25: Sports results to hand.
4.30: Close down.
6.0 : Town Hall chimes.
6.1 : Children's session, conducted by Big Brother Bill.
7.0 : News session.
7.30: Lecturette by Mr. Lloyd Ross M.A., LL.B., (under the auspices of the W.E.A.)—"Drama and the Machine Age."
8.0 : Town Hall chimes.
Studio concert by the St. Kilda Band, under the conductorship of Mr. James Dixon, and assisting artists:
8.1 : Concert March—Band, "Territorials Own" (Rimmer).
8.7 : Mezzo-soprano—Miss Eileen J. Williams, (a) "Amida's Garden" (Parry); (b) "Children's Rain Song" (Mallinson).
8.13: Mandolin Band—Circlo Mandolinistico, "La Traviata—Prelude Act 1" (Verdi) (Columbia Record 02566).
8.17: Recital—Mr. J. D. Clark, "The Roman Guide" (Twain).
8.30: Humorous polka—Band, "Jolly Blacksmith" (Sackley).
8.33: Organ—Frederick Curzon, "For Old Time's Sake" (De Sylva' (Regal Record G20475).
8.42: Baritone—Mr. Arthur W. Alloo (a) "Windmill" (Nelson; (b) "Request" (Franz).
8.48: Overture—Band, "Tancredi" (Rossini).
8.57: Chorus—Mississippi Chorus—"Show Boat" (Kern) (Columbia Record 02771).
9.0 : Weather report.
9.2 : Concert March—Band. "The Conqueror" (Moorhouse).
9.9 : Mezzo-soprano—Miss Eileen J. Williams, "Connais Tu Le Pays?" ("Mignon") (Thomas).
9.12: Selection—Circlo Mandolinistico. "La Traviata—Prelude, Act. 4" (Verdi) (Columbia Record 02566).
9.21: Recital—Mr. J. D. Clark. "The Engine-Driver's Story."
9.36: Solo and chorus—Norris Smith and Mississippi Chorus, "Ol' Man River" (Kern) (Columbia Record 02771).
9.40: Waltz—Band, "Dream of Delight" (Nicholls).
9.50: Baritone—Mr. Arthur W. Alloo, "The Carpet" (Sanderson).
9.54: March—Band, "The Traveller" (Allen).
10.0 : Close down.

Wednesday, September 25

1YA, AUCKLAND (900 KILOCYCLES).—WEDNESDAY, SEPTEMBER 25.

3.0 : Afternoon session—selected studio items.
4.0 : Literary selection by the Announcer.
4.8 : Studio items.
4.25: Sports results to hand.
4.30: Close down.
5.0 : Children's session, conducted by Uncle Tom.
6.0 : Dinner session—"His Master's Voice" Hour:
Royal Opera Orchestra, "Praeludium" (Jarnefeldt) (B2618).
'Cello—Pablo Casals, "Melody in F" (Rubinstein) (DA833).
Waltz—Royal Opera Orchestra, "Eugin Onegin" (Tschaikowsky) (C1281).
Balalaika Orchestra, "Shining Moon" (Russian Folk Song) (EA48).
6.12: Tacet.
6.15: Suite—Paul Whiteman's Orchestra, "Suite of Serenades" (Herbert): 1. Spanish; 2. Chinese; 3. Cuban; 4. Oriental (EB26).
Waltz—Philadelphia Symphony Orchestra, "Tales from the Vienna Woods" (Strauss) (ED2).
6.27: Tacet.
6.30: Instrumental—Royal Opera Orchestra, "Berceuse" (Jarnefeldt) (B2618).
'Cello—Pablo Casals, "Traumerei" (Schumann) (DA833).
Male quartet—The Rounders, "Chlo-e" (Kahn) (EA402).
San Francisco Symphony Orchestra, (a) "Serenade" (Volkman); (b) "Flight of the Bumble Bee" (Rimsky-Korsakov) (ED9).
6.42: Tacet.
6.45: Chicago Symphony Orchestra, (a) "Valse Triste" (Sibelius); (b) "Funeral March of a Marionette" (Gounod) (ED5).
March—San Francisco Symphony Orchestra, "Marche Militaire" (Schubert) (ED9).
6.57: Tacet.
7.0 : News and market reports.
7.40: Talk—Mr. Norman Kerr. "Physical Culture."
8.0 : Chimes.
8.1 : Selection—Reginald Morgan's Orchestra, "Chu Chin Chow" (Norton).
8.9 : Vocal quartet—New Zealand Four, "Forget It" (Parkes).
8.13: March—Band de la Garde Republicaine de France, "Marche Indienne" (Columbia 01504).
8.16: Baritone—Mr. Eric Mannell, "When My Ships Come Sailing Home" (Dorel).
8.20: Violin—Mr. G. A. Fowler, "Hej! Haj!" (Drdla).
8.24: Vocal duet—Messrs. Simpson and Black, "The Pride of Kildare" (Parry).

8.28: Instrumental—Reginald Morgan's Orchestra, "Rubinesque" (Katzman).
8.32: Tenor—Mr. Roy Dormer, "It's a Year, Almost" (Lohr).
8.36: Chorus—Chauve Souris Company, "Round the Hay Wain" (Trdtl.) (Columbia 02525).
8.40: Saxophone—Mr. Chas. McGlashan, "Sax-o-phun" (Wiedoeft).
8.44: Song at piano—Mr. Reginald Morgan, "At Dawning" (Cadman).
8.48: Marimba—Mr. Gordon Cole, "Aloha-oe" (Lilliokalani).
8.52: Vocal quartet—New Zealand Four, "Honey Town" (Parks).
8.56: Selection—Band of H.M. Grenadier Guards, "Merrie England" (German) (Columbia 02804).
9.4: Weather report.
9.6 : Bass—Mr. Duncan Black, "Linden Lea" (Williams).
9.10: Instrumental—Reginald Morgan's Orchestra, "In a Monastery Garden" (Ketelbey).
9.18: Vocal duet—Messrs. Dormer and Mannell, "Arise, O Sun" (Day).
9.22: Chorus—Chauve Souris Company, "A Russian Barcarolle" (Varlanoff) (Columbia 02525).
9.26: Violin—Mr. G. A. Fowler, "Reverie" (Vieuxtemps).
9.30: Tenor—Mr. James Simpson, (a) "Loughareema" (Eisdell); (b) "You in a Gondola" (Clarke).
9.37: Trumpet—Mr. R. Sprowl, "Softly Awakes My Heart" ("Samson et Delilah") (Saint-Saens).
9.41: Song at piano—Mr. R. Morgan, "Until" (Sanderson).
9.45: March—Band of H.M. Grenadier Guards, "Regimental March Medley" (Columbia 02851).
9.53: Vocal quartet—New Zealand Four, "Return, Soft Gentle Evening" (Emerson).
9.57: Instrumental—Reginald Morgan's Orchestra, (a) "Broadway Melody" (Brown); (b) "You Were Meant for Me" (Brown).
10.4 : Close down.

2YA, WELLINGTON (720 KILOCYCLES)—WEDNESDAY, SEPT. 25.

SILENT DAY.

3YA, CHRISTCHUHCH (980 KILOCYCLES)—WEDNESDAY, SEPT. 25.

3.0 : Afternoon session—selected gramophone items.
4.25: Sports results to hand.
4.30: Close down.
5.0 : Children's session, conducted by "Mother Hubbard" and Uncle Frank.
6.0 : Dinner Session—"His Master's Voice" Hour:
Royal Albert Hall Orchestra, "Carmen—Prelude Act 1" (Bizet) (E461)
National Symphony Orchestra, "Sylvia Ballet—Cortege de Bacchus" (Delibes) (EB24).
Organ—Reginald Foort, "Schon Rosmarin" (Kreisler) (B2664).
6.12: Tacet.
6.15: Selection—Marek Weber's Orchestra, "La Tosca" (Puccini) (C1413).
National Symphony Orchestra, "La Traviata" Prelude (Verdi) (EB24)
6.27: Tacet.
6.30: Selection—National Symphony Orchestra, "Bohemian Girl" (Balfe) (Zonophone Record A340).
Royal Albert Hall Orchestra, "Carmen—Prelude Act 2" (Bizet) (E461)
Organ—Reginald Foort, "A Brown Bird Singing" (Haydn Wood) (B2664).
6.42: Tacet.
6.45: Selection—National Symphony Orchestra, "Aida" (Verdi) (Zonophone Record A340).
Selection—H.M. Coldstream Guards, "H.M.S. Pinafore" (Sullivan) (C1283).
6.57: Tacet.
7.0 : News session.
7.30: Addington stock market reports.
8.0 : Chimes.
8.1 : Overture—New Light Symphony Orchestra, "Merry Wives of Windsor" (Nicolai) (H.M.V. Record C1260).
Relay from the "Civic" Theatre of the grand cantata "The Golden Legend" (Sullivan), produced by the Royal Christchurch Musical Society under the conductorship of Mr. W. H. Dixon (Introductory comments by Mr. W. H. Dixon):

SOLOISTS.

Soprano: Madame Alyce Harley.
Contralto: Miss Dulcie Mitchell.
Tenor: Mr. J. Hadland.
Bass: Mr. Charles Clarkson.
Conductor: Mr. W. H. Dixon, L.R.A.M., A.R.C.M.
Hon. Secretary: Mr. H. Antill Adley.

8.55: Studio Programme:
Royal Opera Orchestra, "Faust Ballet Music" (Gounod) (H.M.V. Record C1462).
9.3 : Weather report.
9.5 : Mezzo-soprano solo—Miss L. Merle Miller, "Musetta's Song" "La Boheme") (Puccini).
9.9 : Baritone—Mr. Fred F. Penfold, "Prologue—I Pagliacci" (Leoncavallo).
9.13: Pianoforte duet—Miss Maud K. Stout and Miss Vera Carpenter, "Valse Brillante" (Moszkowski).
9.17: Contralto—Miss Nellie Lowe, (a) "Two Roses" (Gilberte); (b) "The Castillian Maid" (Lehmann).
9.22: Tenor—Mr. Harold Prescott, "Once Again" (Sullivan).
9.26: Royal Opera Orchestra, "Faust Ballet Music—5th and 6th Movements" (Gounod) (H.M.V. Record C1463).
9.30: Baritone—Mr. Fred. F. Penfold, (a) "Sing to Me, Sing" (Henley); (b) "I Would I Were a King" (Sullivan).
9.35: Pianoforte duet—Misses Vera Carpenter and Maud K. Stout, "Overture—2nd Movement" (Mendelssohn).
9.40: Mezzo-soprano—Miss L. Merle Miller, (a) "At Night" (Rachmaninoff); (b) "After a Dream" (Faure).
9.45: Tenor—Mr. Harold Prescott, "A Song of Thanksgiving" (Allitsen).
9.49: Royal Opera Orchestra, "Faust Ballet Music—7th Movement" (Gounod) (H.M.V. Record C1463).
9.53: Contralto—Miss Nellie Lowe, "A Summer Night" (Goring Thomas).
Mezzo-soprano and tenor duet,—Miss L. Merle Miller and Mr. Harold Prescott, "O Night of Love" ("Tales of Hoffman") (Offenbach).
10.0 : Selection—Band of H.M. Coldstream Guards, "Iolanthe" (Sullivan) (H.M.V. Record C1368).
10.4 : Close down.

4YA, DUNEDIN (650 KILOCYCLES—WEDNESDAY, SEPTEMBER 25.

3.0 : Town Hall chimes.
3.1 : Selected gramophone items.
4.25: Sports results to hand.
6.0 : Town Hall chimes.
6.1 : Children's session, conducted by Aunt Anita.
7.0 : News session.
8.0 : Town Hall chimes.
8.1 : Relay from the Empire Theatre—Mr. Leslie Harvey at the Christie Organ.
8.15: Special programme, provided by the Dunedin Orphans' Club's Christy Minstrels.
9.45: "Brunswick" dance programme:
Foxtrot—Colonial Club Orchestra, "Walking With Susie" (Gottler) (4347).
Foxtrot—Copley Plaza Orchestra, "Old Fashioned Lady" (Silver) (4323).
Foxtrot—Dave Rubinoff's Orchestra, "A Garden in the Rain" (Gibbons) (4344).
Foxtrot—Colonial Club Orchestra, "That's You, Baby" (Gottler) (4347).
Waltz—Dave Rubinoff's Orchestra, "Blue Hawaii" (Baer) (4344).
10.0 : Tenor—Allen McQuhae, "Mother Machree" (Young) (4332).
Foxtrot—Copley Plaza Orchestra, "Dream Mother" (Lewis) (4323).
Foxtrot—Copley Plaza Orchestra, "I Never Guessed" (Vallee) (4333).
10.9 : Comedian—Sandy MacFarlane, "My Highland Rose" (MacFarlane) (4325).
Foxtrot—Bob Haring's Orchestra, "My Cairo Love" (Zamecnik) (4316).
Foxtrot—Copley Plaza Orchestra, "Lady of the Morning" (Messenheiner) (4333).
Waltz—Bob Haring's Orchestra, "Bye and Bye, Sweetheart" (Yellen) (4316).
10.21: Accordion solo—Galla-Rini, "Sicily of Mine" (Tarantola) (4060).
Foxtrot—Colonial Club Orchestra, "Love Me or Leave Me" (Kahn) (4342).
Foxtrot—Hal Kemp's Orchestra, "The Things That Were Made for Love" (Tobias) (4307).
Foxtrot—Hal Kemp's Orchestra, "That What I Call Heaven" (Soman) (4307).
Waltz—Regent Club Orchestra, "Dear, When I Met You" (Brown) (4314).
10.36: Piano and trumpet—Lee Sims, "Caressing You" (Klages) (4339).
Foxtrot—Colonial Club Orchestra, "My Sin" (De Sylva) (4342).
Foxtrot—The Cotton Pickers, "Rampart Street Blues" (Robinson) (4325).
Foxtrot—The Cotton Pickers, "Kansas City Kitty" (Leslie) (4325).
Foxtrot—Slatz Randall's Orchestra, "I Get the Blues When it Rains" (Klauber) (4331).
Waltz—Regent Club Orchestra, "Underneath the Russian Moon" (Kendis) (4314).
Old-time orchestra—Blue Ridge Ramblers, (a) "Old Joe Clark" (trdtl.); (b) "Golden Slippers" (trdtl.) (313).
11.0 : Close down.

Thursday, September 26

1YA, AUCKLAND (900 KILOCYCLES).—THURSDAY, SEPTEMBER 26.

3.0 : Afternoon session—Relay of concert from Messrs. Lewis Eady, Ltd.
4.25: Sports results to hand.
4.30: Close down.
5.0 : Children's session, conducted by Peter Pan.
6.0 : Dinner session—"Columbia Hour":
Waltz—Symphony Orchestra, "Artist's Life" (Strauss) (02577).
Instrumental—Columbia Symphony Orchestra, "Al Fresco" (Herbert) (01092).
Foxtrot—La Nuova Orchestra, "Di Napoli" (Romani) (3066).
Band—H.M. Grenadier Guards, "La Paloma" (Yradier) (0987).

6.13: Tacet.
6.15: Instrumental—Ketelbey's Orchestra, "In a Monastery Garden" (Ketelbey) (02688).
Waltz—Jacque Jacobs' Ensemble, "Over the Waves" (Rosas) (02556).
6.27: Tacet.
6.30: Instrumental—Columbia Symphony Orchestra, "Bandinage" (Herbert) (01092).
Waltz—Royal Serbian Tambouritza Orchestra, "Kossovo" (3066).
Waltz—Symphony Orchestra, "Tales from the Vienna Woods" (Strauss) 02577).
March—H.M. Grenadier Guards Band, "Twist and Twirl" (Kottaun) (0987).
6.43: Tacet.
6.45: Waltz—Royal Philharmonic Orchestra, "Blue Danube" (Strauss) (04169).
Waltz—Jacque Jacobs Ensemble, "Espana" (Waldteufel) (02560).
6.57: Tacet.
7.0 : Book review.
7.15: News and market reports.
7.40: Talk—"New Zealand Manufactures."
8.0 : Chimes.
8.1 : Presentation of a novelty programme, "Not Quite on the Western Front."
9.30: "Columbia" dance programme:
Bass solo—Robert Easton, "Time to Go" (Weatherly) (01502).
Foxtrot—Paul Specht's Orchestra, "I Love You, I Love You, I Love You" (Firth) (01459).
Foxtrot—Vern Buck's Orchestra, "What a Girl! What a Night!" (Sanders) (01469).
9.39: Organ—Terance Casey, "I'm Lonely" (Coates) (01501).
Foxtrot—Stellar Dance Band, "In the Shadows" (Finck) (Regal G20451).
Foxtrot—Piccadilly Players, "Who Did? You Did" (Kalmar) (01492).
Waltz—Continental Novelty Quintette, "Sunlight" (Regal G20432).
9.51: Vocal duet—The Trix Sisters, "My Rock-a-bye Baby" (Leslie) (01484).
Foxtrot—Jan Garber's Orchestra, "Weary River" (Silvers) (01459).
Foxtrot—Ben Selvin's Orchestra, "If I Had You" (Shapiro) (01469).
10.0 : Bass—Robert Easton, "If Ever I Meet the Sergeant" (Wright) (01502).
Foxtrot—Stellar Dance Band, "The Song I Love" (de Sylva) (Regal G20451).
Foxtrot—Piccadilly Players, "Happy Go Lucky Bird" (Kalmar) (01492).
10.9 : Organ—Terance Casey, "Bird Songs at Eventide" (Coates) (01501).
Foxtrot—Ben Selvin's Orchestra, "If You Want the Rainbow" (Rose) (01401).
Foxtrot—California Ramblers, "You're Just a Great Big Baby Doll" (Herscher) (01365).
Waltz—Continental Novelty Quintette, "On Board" (Regal G20432).
10.21: Vocal duet—Trix Sisters, "I'm Crazy Over You" (Sherman) (01484).
Foxtrot—California Ramblers, "Bless You, Sister" (Robinson) (01365).
Waltz—The Cavaliers, "I Loved You Then As I Love You Now" (Axt) (01401).
10.30: Band—Band of the Garde Republicaine de France, "Marche Indienne" (Sellenick) (01504).
Foxtrot—Stellar Dance Band, "Heartbroken and Lonely" (Coslow) (Regal G20380).
Foxtrot—Piccadilly Band, "A Room With a View" (Coward) (01420).
10.39: Baritone—Tom Barratt, "Happy Days and Lonely Nights" (Rose) (Regal G20457).
Foxtrot—Stellar Dance Band, "I Can't Make Her Happy" (Pollack) (Regal G20380).
Waltz—Eddie Thomas' Collegians, "Moments With You" (Shilkret) (01135).
Band—Garde Republicaine de France, "Le Bombardier" (Pares) (01504).
Foxtrot—Piccadilly Band, "Try to Learn to Love" (Coward) (01420).
Waltz—Eddie Thomas' Collegians, "Moonlight on the Danube" (Gay) (01135).
Baritone—Tom Barratt, "Shout Hallelujah! 'Cause I'm Home" (Dixon) (Regal G20457).
11.0 : Close down.

2YA, WELLINGTON (720 KILOCYCLES)—THURSDAY, SEPTEMBER 26.

3.0 : Chimes of the G.P.O. clock.
3.1 : Selected gramophone items.
4.30 and 4.50: Sports results to hand.
5.0 : Children's session, conducted by Uncle George.
6.0 : Dinner Session—"His Master's Voice" Hour:
Overture—H.M. Coldstream Guards Band, "Poet and Peasant" (Suppe) (C1315).
Symphony Orchestra—"Love the Magician" (De Falla) (D1453).
6.12: Tacet.
6.15: March—United States Army Band, "Army and Marine" (Starke) (Zonophone Record EE145).
Waltz—International Novelty Quartet, "Cuckoo" (Jonasson) (Zonophone Record EE67).
Waltz—Jack Hylton's Orchestra, "Spanish Rose" (Pearson) (B5481).
Xylophone—Sam Herman, "Al Fresco" (Zonophone EE53).
6.27: Tacet.
6.30: New Light Symphony Orchestra, "In a Clock Store" (Orth) (C1308).
March—Royal Opera Orchestra, "Marche Hongroise" (Berlioz) (C1279).
Symphony Orchestra, "Spanish Dance" (De Falla) (D1453).
6.42: Tacet.
6.45: Schottische—International Novelty Quartet, "Lena" (Mewes) (Zonophone Record EE67).
Pipe organ, piano, trombone and harp—Shilkret's Rhythm Melodists, "When You're With Somebody Else" (Gilbert) (EA336).
Waltz—Jack Hylton's Orchestra, "The Angelus Was Ringing" (Damarell) (B5481).
March—United States Army Band, "American Spirit" (Buglione) (Zonophone Record EE145).
6.57: Tacet.
7.0 : News session, market reports and sports results.
7.34: Lecturette—Mr. W. J. Fergie, Publicity Branch, N.Z. Railways, "Excursions by Rail."
7.40: Lecturette—Mr. A. J. Nicholls (Representative Hutt Valley Horticultural Society)—"Gardening."
8.0 : Chimes of the G.P.O. clock.
Studio concert by the Wellington Artillery Band, under the conductorship of Captain T. Herd, V.D., and assisting artists:
8.1 : March—Band, "Tonowonda" (Nick-Brown).
Selection—Band, "La Traviata" (Verdi).
8.17: Mezzo-soprano—Mrs. Eric Ewart, "How Many a Lonely Caravan" ("A Lover in Damascus") (Woodforde-Finden).
8.21: Vocal duet—Messrs. Fancourt and Ferguson, "Rose of My Heart" (Lohr).
8.25: Serenade—Band, "The Idol of My Heart" (Stahl).
8.30: Baritone—Mr. L. M. Assheton Harbord, (a) "At Dawning" (Cadman), (b) "Elegie" (Massenet).
8.36: Humour—Miss Gracie Kerr, "An' Yet I Don't Know" (Anon.).
8.43: Waltz—International Concert Orchestra, "The Skaters" (Waldteufel) (Zonophone EF6).
8.47: Contralto—Miss Ivy Stanton, "In Questa Tomba" (Beethoven).
8.51: Nautical fanatasia—Band, "A Sailor's Memories" (Arrgd. Hawkins) (by request).
8.59: Weather report.
9.1: Mezzo-soprano—Mrs. Eric Ewart, (a) "May Dew" (Sterndale Bennett), (b) "Dawn, Gentle Flower" (Sterndale Bennett).
9.7: Choral—D.I.C. Male Voice Choir, (a) "De Ole Banjo" (Scott Gatty); (b) "Good Night" (Scott Gatty).
9.13: Waltz—Band, "Casino Tanze" (Gungl).
9.18: Baritone—Mr. L. M. Assheton Harbord, "Chorus, Gentlemen" (Lohr).
9.22: Humour—Miss Gracie Kerr, "If Life Were a Play" (Anon.).
9.28: Cornet solo—Bandsman G. A. Garry, "The Cornet King" (Greenwood).
Selection—Band, "Beauties of Scotland" (Arrgd. Newton).
9.40: Contralto—Miss Ivy Stanton, (a) "Bird of Love Divine" (Haydn Wood); (b) "I Sometimes Wonder" (Woodforde-Finden).
9.47: Organ—Chas. W. Saxby, "Ray mond" (Thomas) (Zonophone Record 5057).
9.53: Foxtrot—Band, "Oh Golly" (Parker).
March—Band, "The Spirit of Napoleon" (Adrian Hope).
10.1 : Close down.

3YA, CHRISTCHURCH (980 KILOCYCLES)—THURSDAY, SEPT. 26.

3.0 : Afternoon session—Selected gramophone items.
4.25: Sports results to hand.
4.30: Close down.
5.0 : Children's session, conducted by Uncle John.
6.0 : Dinner Session: "His Master's Voice" Hour:
Overture—National Symphony Orchestra, "Orpheus in Hades" (Offenbach) (Zonophone Record EF16).
San Francisco Symphony Orchestra, "Caprice Viennois" (Kreisler) (D1272).
6.12: Tacet.
6.15: New Light Symphony Orchestra, (a) "Spring Song" (Mendelssohn); (b) "Narcissus" (Nevin) (Zonophone EE111).
San Francisco Symphony Orchestra, "Coppelia Ballet" (Delibes) (D1272).
Violin—Fritz Kreisler, "Tango Albeniz" (Arrgd. Kreisler) (DA1009).
6.28: Tacet.
6.30: Philadelphia Symphony Orchestra, "Invitation to the Waltz" (Weber) (D1285).
San Francisco Symphony Orchestra, (a) "Serenade" (Moszkowski), (b) "Oriental" (Auber) (ED6).
6.42: Tacet.
6.45: San Francisco Symphony Orchestra, "Valse De Concert" (Glazounov) (D1492).
San Francisco Symphony Orchestra, "Liebeslied" (Kreisler) (ED6).
6.57: Tacet.
7.0 : News Session.
7.15: Lecturette arranged by the 3YA Primary Productions Committee—"The Case for Top-dressing in Canterbury" by Mr. A. T. Montgomery, Fields Division, Department of Agriculture.
8.0 : Chimes.
8.1 : Overture—Lucerne Kursaal Orchestra, "Orpheus in the Underworld" (Offenbach) (Columbia 02839).
8.9 : Vocal quartet—Grand Opera Quartet, "Early Spring" (Mendelssohn).
Mezzo-contralto solo—Miss Mavis Spiller, "Lament of Isis" (Bantock).

8.15: 'Cello—Mr. Harold Beck, "Apres Un Reve" (Faure).
8.19: Soprano and bass duet—Grand Opera Duo, "Oh, Were Thou in the Cauld Blast" (Mendelssohn).
8.23: Tenor—Mr. E. Rogers, "Onaway, Awake" (Coleridge-Taylor).
8.27: Instrumental—Christchurch Broadcasting Trio, "Andante from B Flat Trio" (Schubert).
8.36: Soprano—Madame Gower-Burns, "Humility" (Schumann).
8.40: Recital—Miss Marion Drysdale, "The Benediction" (Coppe François).
8.46: Harpsichord—Ignaz Friedman, "Rondo Alla Turca" (Mozart).
8.50: Tenor and bass duet—Venetain Duo, "The Fisherman" (Gaboni).
Bass solo—Mr. James Filerk, "I Will Not Grieve" (Schumann).
8.56: Madrid Symphony Orchestra, "Danza Espanola" No. 6 (Granados) (Columbia 02802).
9.0 : Weather report.
9.2 : Soprano and mezzo-contralto duet—Madame Gower-Burns and Miss Mavis Spiller. "The Tempting Flower" (Schumann).
Tenor solo—Mr. E. Rogers, "The Dream" (Rubinstein).
9.8 : 'Cello—Mr. Harold Beck, "Bouree" (Handel).
9.12: Mezzo-contralto solo—Miss Mavis Spiller, "The Green Ribbon" (Schubert).
9.16: Grand organ—G. T. Pattman, "Humoresque" (Dvorak) (Columbia Record 02686).
9.20: Soprano solos—Madame Gower-Burns, (a) "The Woods" (Franz); (b) "Evening" (Franz).
9.24: Instrumental—Christchurch Broadcasting Trio, (a) "Barcarolle" (Tschaikowsky); (b) "Salut D'Amour" (Elgar); (b) "Alla Danza" (Haden).
9.34: Bass—Mr. J. Filer, "Maids May Boast" (Gounod).
9.38: Recital—Miss Marion Drysdale, "Home, Sweet Home" (Anon).
9.43: Flute quartet—London Flute Quartet, "Scotch and Irish Airs" (Arrgd. Stainer) (Columbia 4153).
9.46: Soprano and tenor duet—Grand Opera Duo, "Night Hymn at Sea" (Goring Thomas).
9.54: Vocal quartet—Grand Opera Quartet, "Alas That Spring Should Vanish With the Rose' ("In a Persian Garden") (Lehmann).
9.54: March—Milan Symphony Orchestra and chorus, "Aida" Grand March (Verdi) (Columbia Record 02803).
10.2 : Close down.

4YA, DUNEDIN (650 KILOCYCLES).—THURSDAY, SEPTEMBER 26.

SILENT DAY.

Friday, September 27

1YA, AUCKLAND (900 KILOCYCLES)—FRIDAY, SEPTEMBER 27.

3.0 : Afternoon session—selected studio items.
4.0 : Literary selection by the Announcer.
4.8 : Studio items.
4.25: Sports results to hand.
4.30: Close down.
5.0 : Children's session, conducted by Aunt Jean and Nod.
6.0 : Dinner Session—"His Master's Voice" Hour:
Suite—London Symphony Orchestra, "Czar Sultan Suite" No. 3 (Rimsky-Korsakov) (D1491).
Waltz—International Concert Orchestra, "Waltz Dream" (Strauss) (Zonophone EF18).
6.12: Tacet.
6.15: Suite—New Light Symphony Orchestra, "Peer Gynt Suite" No. 2 (Grieg): 1. Ingrid's Lament; 2. Arabian Dance (C1571).
New Light Symphony Orchestra, "Prelude in G Minor" (Rachmaninoff) (Zonophone Record EF24).
6.27: Tacet.
6.30: Suite—New Light Symphony Orchestra, "Peer Gynt Suite" No. 2 (Greig): 1. Return of Peer Gynt; 2. Solveig's Song (C1572).
New Light Symphony Orchestra, "Prelude in C Sharp Minor" (Rachmaninoff) (Zonophone Record EF24).
6.45: Philadelphia Symphony Orchestra, "Danse Orientale" (Glazounoff) (E521).
Waltz—International Concert Orchestra, "Sari" (Kalman) (Zonophone EF18).
March—Philadelphia Symphony Orchestra, "March of the Caucasian Chief" (Ippolitoff-Iwanoff) (E521).
6.57: Tacet.
7.0 : Talk—Mr. Frank Sutherland, "Rugby Football."
7.15: News and market reports.
7.40: Talk—Mr. W. G. E. Wheeler, "Esperanto."
8.0 : Chimes.
8.1 : Relay of concert from Lewis Eady Hall.
8.30: Vienna Philharmonic Orchestra, "Symphony No. 8 in F Major—Tempo di Minuetto" (Beethoven) (H.M.V. D1481).
8.34: Vocal quartet—Madame Mary Towsey's Quartet, "Song of Minnetonka" (Lieurance).
8.37: Pianoforte duet—Miss Kathleen O'Leary and Mr. Eric Bell, "Marche" ("Nutcracker Suite") (Tschaikowsky).
8.41: Soprano—Madame Mary Towsey, "Se Saran Rose" (Arditi).
8.45: Instrumental—Studio Trio, "Two Minuets" (Rameau).
8.53: Baritone—Mr. John Bree, "Simon the Cellarer" (Hatton).
8.57: Pianoforte—Mr. Eric Bell, (a) "Le Papillon" (Lavalee); (b) "Country Gardens" (Grainger).
9.3 : Contralto—Miss Aimee Clapham, "Damon" (Strange).
9.6 : Weather report.
9.9 : Symphony Orchestra, "L'Amour Sorcier" (Love, the Magician) (De Falla) (H.M.V. Record O1453).
9.13: Tenor—Mr. John McDougall, "Afton Water" (Old Scottish).
9.16: 'Cello—Miss Mollie Wright, "Traumerei" (Schumann).
9.20: Vocal duet—Madame Mary Towsey and Mr. J. Bree, "O Wert Thou in the Cauld Blast" (Mendelssohn).
9.23: Pianoforte—Miss K. O'Leary, (a) "Playera" (Granados); (b) "Capriccio" (Scarlatti).
9.29: Soprano—Madame Mary Towsey, "The Dewdrops Glitter" (Rubinstein).
9.33: Instrumental—Studio Trio, "Trio in C Minor Op. 66—Finale" (Mendelssohn).
9.39: Baritone—Mr. J. Bree, "To the Forest" (Tschaikowsky).
9.43: Chicago Symphony Orchestra, "Slavonic Dance in G Minor" (Dvorak) (H.M.V. D1432).
9.47: Contralto—Miss A. Clapham "My Ships" (Barratt).
9.51: Pianoforte duet—Miss K. 'Leary and Mr. E. Bell, "Hungary" (Moszkowski).
9.55: Vocal quartet—Madame Mary Towsey's quartet, "Sympathy" (Friml).
9.59: Symphony Orchestra, "La Vida Breve" (Spanish Dance" (De Falla) (H.M.V. Record D1453).
10.3 : Close down.

2YA, WELLINGTON (720 KILOCYCLES)—FRIDAY, SEPTEMBER 27.

3.0 : Chimes of the G.P.O. clock.
3.1 : Selected gramophone items.
4.30 and 4.50: Sports results to hand.
5.0 : Children's session, conducted by Big Brother Jack.
6.0 : Dinner Session—"His Master's Voice" Hour:
Selection—New Mayfair Orchestra, "Lilac Time" (Schubert—Clutsam) (C1457).
Royal Opera Orchestra, "Carmen Ballet No. 1" (Bizet) (C1424).
6.12: Tacet.
6.15: National Symphony Orchestra, "William Tell" overture (Rossini) (Zonophone Record 2969-70).
6.27: Tacet.
6.30: Royal Opera Orchestra, "Sylvia Ballet—Pizzicato and Procession of Bacchus" (Delibes) (C1418).
Royal Opera Orchestra. "Carmen Ballet No. 2" (Bizet) (C1424).
6.42: Tacet.
6.45: Detroit Symphony Orchestra. "Spanish Rhapsody" (Chabrier) (E522).
Philadelphia Symphony Orchestra, "Nocturne No. 2—Fetes" (Debussy) (E507).
6.57: Tacet.
7.0 : News session, market reports and sports results.
7.40: Lecturette—Mr. Walter F. Dudson, Dietitian and Physical Culturist, "Influenza—Its Cause and Cure."
8.0 : Chimes of the G.P.O. clock.
8.1 : Overture—Orchestra, "Freischutz Fantasia" (Weber).
8.9 : Mezzo-soprano—Mrs. Arnold Downer, "Chronique De La Gazette De Hollande" ("La Grande Duchesse") (Offenbach).
8.13: Saxophone—Rudy Wiedoeft, "Saxophun" (Wiedoeft) (Columbia Redeor 4037).
8.17: Baritone—Mr. S. E. Rodger, "Prologue—I Pagliacci" (Leoncavallo).
8.21: Instrumental—Orchestra, "St. Agnes' Eve" (Coleridge-Taylor).
8.32: Recital—Mr. Albert Davey, "The Highwayman" (Noyes).
8.39: Violin—Efrem Zimbalist, "Liebeslied—Old Vienna Waltz" (Kreisler) (Columbia 04221).
8.43: Contralto—Miss Lily Hambley, "Che Faro" ("Orfeo and Eurydice") (Gluck).
8.47: Tenor—Mr. Chas. Edwards, "This Passion is But an Ember" ("Garden of Kama") (Lohr).
8.51: Selection—Orchestra, "Mignon" (Arrgd. Finck).
8.59: Weather report.
9.1 : Mezzo-soprano—Mrs. Arnold Downer, "When All Was Young" ("Faust") (Gounod).
9.5 : Chorus—Columbia Vocal Gem Chorus, "No, No, Nanette" (Youmans) (Columbia 9072).
9.13: Baritone—Mr. S. E. Rodger, "Loving Smile of Sister Kind" ("Faust") (Gounod).
9.17: Instrumental—Orchestra. "Liebeslied" and "Liebesfreud" ("Tristan and Isolde") (Wagner).
9.27: Humour—Mr. Albert Davey, Short Stories" (Original).
9.34: Violin—Efrem Zimbalist, "Zapateado" (Sarasate) (Columbia 04221).
9.38: Contralto—Miss Lily Hambley, "Ombra Mai Fu" ("Xerxes") (Handel)
9.42: Saxophone—Rudy Wiedoeft, "La Cinquantaine" (Arrgd. Wiedoeft) (Columbia 4037).
9.46: Tenor—Mr. Chas. Edwards, "The Cobbler's Song" ("Chu Chin Chow") (Norton).
9.50: Selection—Orchestra, "The Student Prince" (Romberg).
10.0 : Close down.

3YA, CHRISTCHURCH (980 KILOCYCLES)—FRIDAY, SEPTEMBER 27.

3.0 : Afternoon session—Selected gramophone items.
4.25: Sports results to hand.
4.30: Close down.
5.0 : Children's session, conducted by "Storyman."

R.C.A. Developed Screen-Grid Radiotrons, then the Screen-Grid Circuit

AND NOW THE AMAZING NEW SCREEN GRID

R.C.A. RADIOLAS 44 and 46

The new RCA Screen-Grid Radiotron—a very remarkable advance in valve design—has made possible the construction of a simplified Radiola receiver of amazingly high efficiency.

This new Radiotron of great amplifying power has been for years under test and development. A special circuit had to be devised to make full use of its remarkable capabilities.

The same RCA engineers who developed the valve, and then the circuit, have now designed Radiolas 44 and 46 to make the most efficient use of the Screen-Grid Radiotron in radio receivers operated with alternating current.

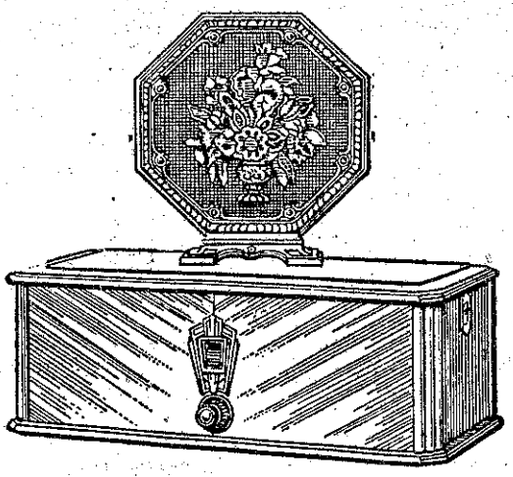
The new Radiolas utilise only five valves—three of which are Screen-Grid Radiotrons. There is also employed a new power-amplifying Radiotron, with capacity for much greater volume without distortion.

The beauty of tone achieved in these new Radiolas has never before been possible in receiving sets employing so few valves. The full rich tones of the bass register are a revelation in radio reproduction.

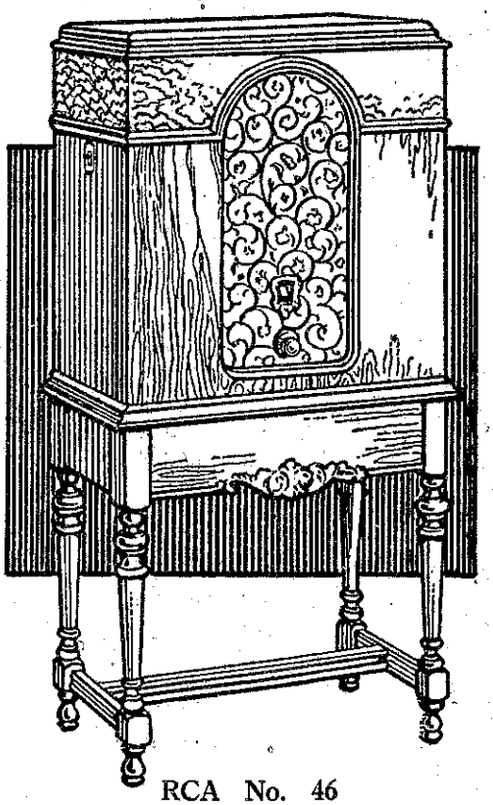
Radiola 44 (table model) is in a compact, two-tone walnut veneer cabinet of graceful design. The console model, Radiola 46, makes use of the finest of all reproducers, the famous RCA Electro-Dynamic Speaker, an integral part of the assembly.

Among the interesting refinements in the new instruments are the concentric, or "two-in-one" tuning and volume control, the special switch to maintain high quality of reproduction for both distant and local stations, and the selector dial graduated for kilocycles, with readings magnified on an illuminated window.

Again—all the world's knowledge of radio in these newest RCA Radiolas—the product of the world's greatest radio research laboratories.



RCA No. 44



RCA No. 46

RCA RADIOLA

Made by the Makers of the Radiotron

Amalgamated Wireless (Australasia) Ltd.

BOX 830, WELLINGTON.

6.0 : Dinner session—"Parlophone Hour":
Waltzes—Dajos Bela Orchestra, (a) "Sulamith" (Hansen-Milde); (b) "Mignonette" (Nicholls) (E10571).
Dajos Bela Orchestra, "Eldgaffeln" (Landen) (A4009).
6.12: Tacet.
6.15: Frank Westfield's Orchestra, "Classica" (arrgd. Tilsley) (A2195).
Organ—Sigmund Krumgold, "Indian Love Call" (Friml) (A2339).
Waltz—Dajos Bela Orchestra, "You, Only You" (Arnold) (E10592).
6.27: Tacet.
6.30: Selection—Raie Da Costa Ensemble, "Funny Face" (Gershwin) (A4074).
Waltz—Dajos Bela Orchestra, "The Sphinx" (Popy) (E10592).
6.42: Tacet.
6.45: Orchestra Mascotte, (a) "The Flowers' Dream" (Translateur); (b) "Whispering of the Flowers" (Von Blon) (A2559).
Organ—Sigmund Krumgold, "Gypsy Love Song" (Herbert) (A2339).
Dajos Bela Orchestra, "Electric Girl" (Helmburgh-Holmes) (A4009).
6.58: Tacet.
7.0 : News session.
8.0 : Chimes.
8.1 : Overture—Rebroadcast of 2YA, Wellington.
8.7 : Vocal quartet, followed by soprano solo—Valencia Quartet and Mrs. Lucy O'Brien, (a) "The Village Blacksmith" (Weiss); (b) "I Don't Suppose" (Trotere).
8.14: Instrumental—Studio Trio, "Three Spanish Pieces": (1) "Spanish Dance" (Moszkowski); (2) "Serenade" (Glazenouff); (3) "Bolero" (Arbos).
8.24: Baritone—Mr. E. J. Johnson, "The Little Irish Girl" (Lohr).
8.28: Dance music—Bailey-Marston Dance Orchestra, (a) "Don't Be Like That" (Clarke); (b) "The Desert Song" (Romberg).
8.36 Contralto—Miss Mary Taylor, "Husheen" (Needham).
8.40: Violin and guitar—Giulietta Morino, "Harlequin's Serenade" (Drigo) (Zonophone EE134).
8.43: Humour—Mr. George Titchener, "Would You Mind Passing the Salt?" (Brooks).
8.48: Violin—Miss Irene Morris, "Souvenir" (Adlington).
8.52: Tenor—Mr T. G. Rogers, "Secret Tears" (St. Quentin).
8.56: Duologue—John Henry and Blossom, "Joe Murgatroyd's Letter" (Henry) (H.M.V. B2930).
9.2 : Weather report.
9.4 : Dance music—Bailey-Marston Dance Orchestra, (a) "Louise" (Robbin); (b) "On Top of the World Alone" (Robbin).
9.11: Soprano—Mrs. Lucy O'Brien, "Prelude" ("The Cycle of Life") (Landon Ronald)
Tenor and baritone duet—Toledo Duo, "Love and War" (Cook).
9.18: Dance music—Bailey-Marston Dance Orchestra, (a) "Here Comes the Show Boat" (Kern); (b) "Nothing To Do But Think of You" (Bernard).
9.26: Contralto—Miss Mary Taylor, "The Glory of the Sea" (Sanderson).
9.30: Vocal quartet—Valencia Quartet, "The Hunt is Up" (Balfour Gardiner).
9.34: Dance music—Bailey-Marston Dance Orchestra, (a) "Unfortunate Blues" (Winston); (b) "I'm Bringing a Red, Red Rose" (Donaldson).
9.42: Tenor—Mr T. G. Rogers, "Laurette" (Gayne).
9.46: Humour—Mr. Geo. Titchener, "I Think I Shall Sleep Well To-night" (Gilbert Wells).
9.51: Wurlitzer organ—Reginald Foort, "Sally of My Dreams" (Kernell) (H.M.V. B2960)
9.54: Baritone solo, followed by vocal quartet—Mr. E. J. Johnson and Valencia Quartet, (a) "The Yeoman's Wedding Song" (Poniatowski); (b) "O Hush Thee, My Baby" (Sullivan).
10.0 : Dance music by the Bailey-Marston Dance Orchestra until 11 p.m.; "One Alone" (Romberg), "Ten Little Miles from Town" (Kahn), "Sally of My Dreams" (Kernell), "Glad Rag Doll" (Agar), "Laughing Marionette" (Collins), "Wedding of the Painted Doll" (Brown), "You Were Meant for Me" (Brown), "Broadway Melody" (Brown), "Old Man Sunshine" (Warren), "Dream Mother" (Burke), "Cuckoo" (Robinson), "Onward to Oregan" (Leslie), "The One That I Love Loves Me" (Turk), "I Kiss Your Hand, Madame" (Erwin).
11.0 : Close down.

4YA, DUNEDIN (650 KILOCYCLES)—FRIDAY, SEPTEMBER 27.

3.0 : Town Hall chimes.
3.1 : Selected gramophone items.
3.15: Lecturette on "Fashions" by Miss Buccleuch of the D.S.A. Ltd.
3.30: Gramophone selections.
4.25: Sports results to hand.
4.30: Close down.
6.0 : Town Hall chimes.
6.1 : Children's session, conducted by Aunt Sheila.
7.0 : News session.
8.0 : Chimes.
8.1 : Overture—Band of H.M. Coldstream Guards, "Suite Francaise" (Foulds) (H.M.V. B2751/2).
8.13: Bass—Mr. E. G. Bond, (a) "Hybrias the Cretal" (Elliott); (b) "Myself when Young" (Lehmann).
8.20: Instrumental—4YA Broadcasting Trio, (a) "Waltz" from "Serenade" (Tschaikowsky); (b) "Autumn and Winter" (Glazonouv).
8.30: Contralto—Miss Gwenda Burt, (a) "Homing" (del Riego); (b) "Husheen" (Needham).
8.35: 'Cello—Mr. P. J. Palmer, "Allegro Appassionata" (Saint-Saens).
8.41: Soprano—Miss Muriel Eagar, "Sing, Sweet Bird" (Ganz).
8.46: Pianoforte—Mrs. Ernest Drake, "Hexentanz" (McDowell).
8.50: Suite—Philadelphia Symphony Orchestra, "Nutcracker Suite" (Tschaikowsky) (H.M.V. D1214).
8.58: Weather report.
9.0 : Bass—Mr. E. G. Bond, "Give a Man a Horse He Can Ride" (O'Hara).
9.4 : Part song—Anderson's Bay Glee Club, "Pack Clouds Away" (Lloyd).
9.8 : Instrumental—4YA Broadcasting Trio, (a) "Dreams of Love" (Liszt); (b) "Hungarian Dance" (Brahms).
9.18: Part song—Anderson's Bay Glee Club, "Hymn to Music" (Buck).
9.25: Contralto—Miss Gwenda Burt, "A Prayer to Our Lady" (Ford).
9.28: Violin—Mr. Frank Parsons, "Caprice No. 14" (Pagonini).
9.32: Part song—Anderson's Bay Glee Club, "Night, Lovely Night" (Berger).
9.36: Soprano—Miss Muriel Eagar, (a) "Charming Chloe" (German); (b) "When the Roses Bloom" (Reichardt).
9.41: String quartet—Budapest String Quartet, "Quartet in E Flat—Canzonetta" (Mendelssohn) (H.M.V. D1423).
9.45: March and chorus—Anderson's Bay Glee Club, "Hail, Gift of Song" ("Tannhauser") (Wagner).
Part song—Anderson's Bay Glee Club, "Song of the Vikings" (Faning).
9.54: San Francisco Symphony Orchestra, "Marche Militaire" (Schubert) (H.M.V. ED9).
10.0 : Close down.

Saturday, September 28

1YA, AUCKLAND (900 KILOCYCLES)—SATURDAY, SEPTEMBER 28.

2.45: Rebroadcast of representative Rugby football match at Wellington—North versus South Island.
4.30: (approx.) Close down.
5.0 : Children's session, conducted by Cinderella.
6.0 : Dinner session—"Columbia Hour":
March—National Military Band, "National Emblem" (Bagley) (01153).
'Cello—W. H. Squire, "The Broken Melody" (Van Biene) (04180).
Instrumental—Albert Sandler's Orchestra, "I Kiss Your Hand, Madame" (Erwin) (01467).
Kinema organ—G. T. Pattman, "Cherie" Waltz (Valentine) (01344).
6.12: Tacet.
6.15: Selection—Court Symphony Orchestra, "The Gondoliers" (Sullivan) (079).
Instrumental—Paul Whiteman's Orchestra, "Gypsy" (Gilbert) (07505).
6.27: Tacet.
6.30: Instrumental—Albert Sandler's Orchestra, "Chalita" (Schertzinger) (01467).
Marimbas—Padilla Marimba Serenaders, "Paree" (Padilla) (Regal G20344).
Pianoforte—Gil Dech, "Sometimes I'm Happy" (Youmans) (01205).
Royal Serbian Tambauritza Orchestra, "Serbian Melody" (01490).
6.42: Tacet.
6.45: Intermezzo—Ketelbey's Orchestra, "Bells Across the Meadows" (Ketelbey) (02695).
Marimbas—Rio Marimba Serenaders, "Dolores" Waltz (Waldteufel) (Regal G20344).
Kinema organ—G. T. Pattman, "Worryin'" Waltz (Fairman) (01344).
March—National Military Band, "Stars and Stripes" (Sousa) (01153).
6.57: Tacet.
7.0 : News and market reports.
7.40: Talk—Mr. G. D. Rutter, "Gladioli."
8.0 : Chimes.
8.1 : Overture—Orchestra, "La Burlesque" (Suppe).
8.11: Chorus—Mississippi Chorus, "Show Boat" (Kern) (Columbia 02771).
8.15: Hawaiian—Ingall's Hawaiians, (a) "Dream Kiss" (Herbert); (b) "On Hilo Bay" (Cunna).
8.23: Vocal novelty—Bohemian Duo, (a) "Glad Rag Doll" (Ager); (b) "A Precious Little Thing Called Love" (Coots).
8.31: Instrumental—Studio Orchestra, (a) "Caprice" (Moszkowski); (b) "The Dance" (Rossini).
8.39: Novelty—The Asquiths, Thirty Minutes Drawingroom Entertainment.
8.59: Pianoforte—Norman Long, "Overture 1929" (Carlton, arrgd. Long), (Columbia 01533).
9.2 : Weather report.
9.5 : Hawaiian—Ingall's Hawaiian's, (a) "Goodbye, My Felini" (Dyson); (b) "Hawaian Lament" (Traditional).
9.13: Negro spirituals—Fisk University Jubilee Singers, (a) "Little David"; "Ezekiel Saw the Wheel" (Regal G20421).
9.21: Instrumental—Studio Orchestra, "Hibernia Fantasia" (Atkins).
9.30: Vocal—Bohemian Dua, (a) "A Little Town Called Home, Sweet Home" (Dixon); (b) "Me and the Man in the Moon" (Manaco).
9.38: Hawaian—Ingall's Hawaiians, (a) "Sweet Hawaiian Girl" (Derry); (b) "Director March" (Traditional).
9.46: Bass with chorus—Norris Smith and Mississippi Chorus, "Ol' Man River" (Kern) (Columbia 02771).
9.50: Selection—Studio Orchestra, "On with the Dance" (Coward-Braham).

10.0 : "His Master's Voice" Dance Programme:
Foxtrot—Arcadians' Dance Orchestra, "Bluebird, Sing Me a Song" (Davis) (Zonophone 5201).
Foxtrot—Bert Firman's Dance Orchestra, "'Cause I'm in Love" (Donaldson) (Zonophone EE123).
Foxtrot—Jack Hylton's Orchestra, "Forty-Seven Ginger-Headed Sailors" (Sarony) (EA448).
10.10: Tenor—Franklyn Baur, "At Dawning" (Cadman) (Zonophone 5204).
Foxtrot—Bert Firman's Orchestra, "I'm a Broken-Hearted Blackbird" (Fields) (Zonophone EE123).
Foxtrot—All Star Orchestra, "There's a Rainbow 'Round by Shoulder" (Olson) (EA436).
Waltz—Arcadians Dance Orchestra, "Nicolette" (Batten) (Zonophone 5201).
10.22: Male chorus—"Over There" Medley (EB33).
Hawaiian—Hilo Hawaiian Orchestra, (a) "Kawaihau Waltz" (Keal lakai); (b) "My Hula Love" (B2799).
Male voices—Salon Group, "Sonny Boy" (Jolson) (EB35).
10.31: Bass-baritone—Peter Dawson, "Lorraine, Lorraine, Loree" (Capel) (B2759).
Wurlitzer—Jesse Crawford, "A Dream" (Bartlett) (EA488).
Foxtrot—All Star Orchestra, "She Didn't Say Yes" (Strong) (EA436).
Waltz—Warings Pennsylvanians, "Just Another Night" (Donaldson) (EA462).
10.43: Male voices—Salon Group, "Jeannine, I Dream of Lilac Time" (Gilbert) (EB35).
Wurlitzer organ—Jesse Crawford, "Amapola" (Poppy) (Lacalle) (EA488).
Foxtrot—Warings Pennsylvanians, "I'm Sorry, Sally" (Kahn) (EA462).
Waltz—Arcadians Dance Orchestra, "Couldn't You Have Waited?" (Mitchell) (Zonophone 5215).
10.55: Male trio—Melody Three, "Pals, Just Pals" (Dreyer) (Zonophone EE133).
Wurlitzer organ—Reginald Foort, "Just Like a Darby and Joan" (Gilbert) (B2775).
Foxtrot—Arcadians Dance Orchestra, "Juanita" (Flynn) (Zonophone 5215).
11.0 : Close down.

2YA, WELLINGTON (720 KILOCYCLES)—SATURDAY, SEPTEMBER 28.

3.0 : Chimes of the G.P.O. clock.
3.1 : Relay description of football match from Athletic Park.
5.0 : Children's session, conducted by Uncle Toby and Aunt Gwen.
6.0 : Dinner Session—"Columbia" Hour:
Medley—H.M. Grenadier Guards Band, "Sir Harry Lauder" medley (Lauder) (02750).
Waltz—Symphony Orchestra, "Doctrinen" (Strauss) (02529).
6.12: Tacet.
6.15: Pianoforte—Gil Dech, "Wedding of the Painted Doll" (Freed) (01549).
Pianoforte—Constance Mering, "So Dear" (Caesar) (01224).
Waltz Medley—Eddie Thomas' Collegians, (02904).
Saxophone—Rudy Wiedoeft, "Minuet" (Beethoven) (01176).
6.28: Tacet.
6.30: Mandolin Band—Circlo Mandolinistico, "La Traviata—Prelude Acts 1 and 4" (Verdi) (02566).
Waltz—Symphony Orchestra, "When the Lemons Bloom" (Strauss) (02529).
6.42: Tacet.
6.45: Musical Art Quartet, "Mighty Lak a Rose" (Nevin) (01506).
Saxophone—Rudy Wiedoeft, "Valse Mazanetta" (Wiedoeft) (01176).
Pianoforte—Gil Dech, "I Kiss Your Hand, Madame" (Erwin) (01549).
Eddie Thomas' Collegians, "Beautiful Ohio" (Earl) (02904).
6.57: Tacet.
7.0 : News session, market reports and sports results.
8.0 : Chimes of the G.P.O. clock.
8.1 : Overture—Orchestra, 'Chu Chin Chow" (Norton).
8.9 : Vocal quartet—Melodie Four, "Little Tommy Went A'Fishing" (Macey)
8.13: Steel guitar—Mr. L. Beavis, (a) "Sailing Along to Hawaii" (Bories); (b) "Aloha Land" (Herzer).
8.20: Tenor solo with violin obligato—Mr. Frank Bryant, "Love Came Calling" (Zamecnik) (by request).
8.24: Instrumental—Orchestra, (a) "Haunting Humoresque" (Arrgd. Black); (b) "Naila" (Arrgd. Lange).
8.32: Humour—Ajax, "Cohen at Wembley" (Hayman).
8.39: Organ—Reginald Foort, (a) "The Desert Song" (Romberg); (b) "Riff Song" (Romberg) (H.M.V. Record B2463).
8.45: Baritone—Mr. R. S. Allwright, "The Irish Orchestra" (Tovey) (by request).
8.49: Vocal quartet—Melodie Four, "Lay My Head Beneath a Rose" (Falkenstein) (by request).
8.53: Instrumental—Orchestra, Request Number.
9.1 : Weather report.
9.3 : Tenor—Mr. Sam Duncan, "Just a Cottage Small" (Hanley) (by request).
9.7 : Popular songs—Lupe Velez, (a) "Mi Amado" (My Sweetheart) (Warren); (b) "Where is the Song of Songs for Me?" (Berlin) (H.M.V. Record EA535).
9.15: Violin solo with orchestral accompaniment (soloist, Mr. W. Haydock)—"Mighty Lak a Rose" (Nevin).
Flute and clarinet duet—Messrs. Brown and Langtry, "Flower of Mexico" (Curtis).
9.22: Humour—Ajax, "More Cohen" (Hayman).
9.30: Steel guitar—Mr. L. Beavis, (a) "Red Wing" (Mills); (b) "Hilo March" (Trdtl.).
9.37: Bass—Mr. W. W. Marshall, "Laugh, Clown, Laugh" (Fiorito) (by request).
9.41: Accordion—Pietro, (a) "La Petite Tonkinoise" (Scotti); (b) "Tres Jolie" (Waldteufel) (Zonophone EE157).
9.47: Vocal quartet—Melodie Four, Request Number.
9.51: Instrumental—Orchestra, Dance Novelties:
10.0 : "His Master's Voice" Dance Programme:
Medley waltz—Troubadours, "Popular Songs of Yesterday" (EB33).
Foxtrot—Nat Shilkret's Orchestra, "Dusky Stevedore" (Razaf) (RA452).
Foxtrot—Shilkret's Orchestra, "Just a Sweetheart" (Shilkret) (EA464).
Foxtrot—Shilkret's Orchestra, "When Sweet Susie Goes Steppin' By" (Kaufman) (EA452).
10.13: Tenor—Leslie James, "Roses of Yesterday" (Berlin) (Zonophone EE122).
Hawaiian—Hilo Hawaiian Orchestra, "Honolulu Sweetheart of Mine" (Davis) (EA415).
Waltz—Troubadours, "Was It Love?" (Caesar) (EA464).
Foxtrot—Goldkettes' Orchestra. "That's What Put The Sweet in Home Sweet Home" (Lowry) (EA487).
10.25: Tenor—Barrington Hooper, "For You Alone" (Geehl) (Zonophone Record 5204).
Foxtrot—Goldkettes' Orchestra, "Sweethearts on Parade" (Lombardo) (EA487).
Waltz—Troubadours, "Another Kiss" (Schertzinger) (EA489).
Foxtrot—Jack Hylton's Orchestra, "In the Woodshed She Said She Would" (Johnson) (EA480).
10.36: Male trio—Melody Three, "Remember Me to Mary" (Green) (Zonophone Record EE133).
Foxtrot—Shilkret's Orchestra, "Jimmy Valentine" (Madden) (EA475).
Selection—New Mayfair Orchestra, "This Year of Grace" (Coward) (EB37).
10.48: Bass—Paul Robeson, "Plantation Songs" (C1585).
Foxtrot—Rhythm Band, "Teach Me to Dance Like Grandma" (Coward) (EA471).
Foxtrot—Shilkret's Orchestra, "Gotta Be Good" (Schertzinger) (EA489).
Foxtrot—Rhythm Band, "A Room With a View" (Coward) (EA471).
Foxtrot—Jack Hylton's Orchestra, "In the Shadows" (Finck) (EA480).
11.0 : Close down.

3YA, CHRISTCHURCH (980 KILOCYCLES).—SATURDAY, SEPT. 28.

3.0 : Afternoon session—selected gramophone items.
4.25: Sports results to hand.
4.30: Close down.
5.0 : Children's session, conducted by Aunt Pat and Peterkin.
6.0 : Dinner session—"Columbia Hour":
March—H.M. Grenadier Guards, "Martial Moments" (arrgd. Winter) (065).
Waltz—Eddie Thomas' Collegians, "Missouri Waltz" (Logan) (02553).
6.12: Tacet.
6.15: Violin and wurlitzer organ—Marrnello, "Evening in the Desert" (Hermite) (Regal G20420).
Hawaiian—South Sea Islanders, "Dreamy Hilo Bay" (Heagney) (01162).
March—Columbia Symphony Orchestra, "March of the Toys" (Herbert) (02651).
Pianoforte—Percy Grainger, "Molly on the Shore" (Grainger) (03575).
6.26: Tacet.
6.30: Waltz—Eddie Thomas' Collegians, "Till We Meet Again" (Whiting) (02553).
Waltz—Eddie Thomas' Collegians, "Beautiful Ohio" (Earl) (02651).
Piccolo duet—Jean and Pierre Gennin, "Rippling Streams" (Gennin) (02575).
6.41: Tacet.
6.45: Violin and organ—Marrnello, "Once" (Saunders) (Regal G20420).
Xylophone—W. W. Bennett, "Gee Whiz" (Byron) (02575).
Hawaiian—South Sea Islanders, "Lei Lani" (Heagney) (01162).
Denza Dance Band, "In the Shadows" (Finck) (Regal G20451).
6.58: Tacet.
7.0 : News session.
7.30: Sports results.
8.0 : Chimes.
8.1 : Overture—Rebroadcast of 2YA, Wellington.
8.8 : Mezzo-soprano—Miss Rita Lucas, "The Love Pipes of June" (Day).
8.12: Xylo-Rimba Orchestra, "My Sweetheart" Waltz (Nelson) (Regal G20328).
8.15: Ten minutes of drollery—The Two White Crows in singing and patter.
8.25: Instrumental—Italian Jazz Trio, "La Paloma" (MS).
8.29: Baritone—Mr. Clive Hindle, (a) "Four Jolly Sailormen" (German); (b) "Beware of the Maidens" (Day).
8.35: Selection—Ray Starita's Ambassadors Band, "The Five O'Clock Girl" (Kalmar) (Columbia 02886).

8.43: Sketch—Messrs. Cyril Collins and Alan Brown, "Mrs. Henn Looks In" (Herbert) (Cast, Mrs. Henn, Mr. Alan Brown. Mrs. Hash, Mr. Cyril Collins).
8.53: Instrumental—Italian Jazz Trio, "Miserere" ("Il Trovatore") (Verdi).
8.57: Happy song at piano with ukelele—The Joyous Pair, (a) "Blue Hawaii" (Blair); (b) "Broadway Melody" (Lacio).
9.2 : Weather report.
9.4 : Waltzes—(a) Gil Dech's Syncopators, "I'll Always Be in Love With You"; (b) Stellar Dance Band, "Marie" (Columbia 01250, and Regal G20486).
9.10: Mezzo-soprano solos—Miss Rita Lucas, (a) "Fiddler, Come Play For Me" (Phillips); (b) "Dreamland Rose" (Phillips).
9.16: Instrumental—Italian Jazz Trio, "Intermezzo" ("Cavalleria Rusticana") (Mascagni).
9.20: Baritone—Mr. Clive Hindle, "Captain Mac" (Sanderson).
9.24: Tango—Mark Hopkins' Hotel Orchestra, "Senorita" (Weeks) (Columbia 01584).
9.27: Ten minutes more of songs and patter by the Two White Crows.
9.37: Dance music—Italian Jazz Trio, (a) "Nothing"; (b) "Jeannine" (own arrangement).
9.45: Sketch—Messrs. Cyril Collins and Alan Brown, "Dinner for Two" (French) (Cast, The Major, Mr. Cyril Collins. The Colonel, Mr. Alan Brown).
9.55: Songs at piano with ukelele—Joyous Pair, (a) "Carolina Moon" (Davis); (b) "Honey" (Writing).
10.2 : Dance music—Italian Jazz Trio, (a) "Constantinople"; (b) "The Girl Friend" (own arrangement).
Dance music by the Italian Jazz Trio until 11 p.m.
11.0 : Close down.

4YA, DUNEDIN (650 KILOCYCLES)—SATURDAY, SEPTEMBER 28.

3.0 : Town Hall chimes.
3.1 : Selected gramophone recital.
4.25: Sports results to hand.
4.30: Close down.
6.0 : Town Hall chimes.
6.1 : Children's session, conducted by Big Brother Bill.
7.0 : News session.
8.0 : Relay of 3YA, Christchurch.
10.0 : "His Master's Voice" Dance Programme:
Symphony Orchestra, (a) "Love, the Magician" (De Falla); (b) "Spanish Dance" (De Falla) (D1453).
Male quartet—The Revellers, "Oh, Lucindy" (Hollingsworth) (EA430).
Foxtrot—International Orchestra, "Shine On, Harvest Moon" (Norworth) (EA407).
Waltz—The Troubadours, "Some Day, Somewhere" (Pollack) (EA421).
10.17: Male quartet—National Cavaliers, "Beautiful" (Gillespie) (EA430).
Foxtrot—Hamp's Kentucky Serenaders, "Blue Grass" (de Sylva) (EA407).
Foxtrot—Geo. Olsen's Music, "Who?" (Harbach) (EA79).
Waltz—The Troubadours, "Neapolitan Nights" (Kerr) (EA421).
10.30: Tenor—Jno. McCormack, "The Far Away Bells" (Gordon) (DA914).
Waltz—Hilo Orchestra, "Lou'siana Lullaby" (Zoeller) (EA374).
Hawaiian—Hilo Hawaiian Orchestra, "Hawaiian Nights" (Roberts) (EA310).
Foxtrot—Hilo Orchestra, "My Bird of Paradise" (Berlin) (EA374).
Violin and kinema organ—Elsie Southgate, "I Hear You Calling Me" (Marshall) (Zonophone 5109).
Foxtrot—Statler Pennsylvanians, "Happy-Go-Lucky Lane" (Lewis) (EA353).
Foxtrot—Geo. Olsen's Music, "Sunny" (Harbach) (EA79).
10.53: Vocal with guitar—Harry McClintock, "The Big Rock Candy Mountains" (McClintock) (Zonophone EE125).
Foxtrot—Harry Reser's Banjo Boys, "Down South" (Myddleton) (EA353).
11.0 : Close down.

Sunday, September 29

1YA, AUCKLAND (900 KILOCYCLES).—SUNDAY, SEPTEMBER 29.

2.45: Relay from the Town Hall of 77th Anniversary of Beresford Street Congregational Church Sunday School.
6.0 : Children's session, conducted by Uncle Leo.
6.55: Relay from the Town Hall of the 77th Anniversary of Beresford Street Congregational Church Sunday School: Preacher, Rev. Lionel Fletcher. Organist, Mr. Arthur Cherry. Pianist, Miss Thelma Gordon. Conductor, Mr. William Gemmell.
8.30: approx.)—Studio concert:
San Francisco Symphony Orchestra, "A Midsummer Night's Dream" (Mendelssohn) (H.M.V. D1626/7).
Contralto—Miss Madge Clague, (a) "Sunday" (Brahms); (b) "Love Song" (Brahms).
Pianoforte—Miss Hazell Rainey, "Rhapsodie" Op. 79 (Brahms).
Recital—Mr. C. Paine, (a) "Play Up and Play the Game"; (b) "The Robber."
'Cello—Lauri Kennedy, "Old Scotch Melody" (arrgd. Kennedy) (H.M.V. C1618).
Contralto—Miss Madge Clague—"Serenade" (Schubert).
Pianoforte—Miss Hazell Rainey, "Etude in F Sharp" (Arensky).
Recital—Mr. C. Paine, "Young Fellow, My Lad."
Band—Creatores Band, (a) "Lead, Kindly Light" (Dykes); (b) "Onward Christian Soldiers" (Sullivan) (H.M.V. EB40).
9.30: Close down.

2YA, WELLINGTON (720 KILOCYCLES)—SUNDAY, SEPTEMBER 29.

3.0 : Afternoon session.
4.30: Close down.
6.0 : Children's song service, conducted by Uncle George.
7.0 : Relay of service from The Terrace Congregational Church—Preacher: Rev. C. Wickham; organist and choirmaster: Mr. H. E. Brusey.
8.15 (approx.): Relay from Grand Opera House of recital by the Port Nicholson Silver Band under the conductorship of Mr. J. J. Drew.
Close down.

3YA, CHRISTCHURCH (980 KILOCYCLES)—SUNDAY, SEPT. 29.

3.0 : Afternoon session—Selected studio items.
4.30: Close down.
5.30: Children's song service provided by the children of the Methodist Sunday Schools.
6.15: Hymn chimes from studio.
6.30: Relay of service from St. Alban's Methodist Church, Rugby Street.—Preacher: Rev. L. B. Neale. Organist: Miss Clarice Bell, L.A.B. Musical Director: Mr. W. S. Simpson.
7.45 (approx.): Studio Concert:
New Light Symphony Orchestra, "Cavalleria Rusticana—Intermezzo" (Mascagni) (H.M.V. Record B2377).
Mezzo-contralto solos—Miss Margaret Lorimer, (a) "A Roundel of Rest" (Cyril Scott); (b) "Only the River Running By" (Hopkins)
Baritone—Mr. Theo. Turner, (a) "When Song is Sweeet" (Sans-Souci); (b) "The Arrow and the Song" (Balfe).
Violin, 'cello, flute and harp—Florentine Quartet, "Torna a Surriento" (de Curtis) (Zonophone Record EE79).
Mezzo-contralto solos—Miss Margaret Lorimer, (a) "Sanctuary" (Hewitt); (b) "I Shall Not Pass Again This Way" (Effinger).
Baritone—Mr. Theo. Turner, "Thanks Be To God" (Dickson).
Salon Orchestra, "Serenade" (Toselli) (H.M.V. Record EA358).
8.15 (approx.): Rebroadcast of 2YA, Wellington (relay from the Grand Opera House, Wellington, of concert by the Port Nicholson Silver Band under the conductorship of Mr. J. J. Drew).
Close down.

4YA, DUNEDIN (650 KILOCYCLES)—SUNDAY, SEPTEMBER 29.

3.0 : Town Hall chimes.
3.1 : Selected gramophone items.
4.30: Close down.
5.30: Children's song service, conducted by Big Brother Bill.
6.30: Relay of service from St. Andrew Street Church of Christ. Preacher, Pastor W. D. More. Organist, Miss Stokes.
8.5 : (approx.) Relay from His Majesty's Theatre of concert by the Dunedin Tramways Band, under the conductorship of Mr. C. Morgan.
9.15: Close down.

Children's Session

(Continued from page 23.)

ing to-night from the Lower Hutt. Uncle Toby and Aunt Gwen will be here too with messages for the little folk.

SUNDAY:

The Children's Song Service will be conducted by Uncle George, assisted by the Petone Church of Christ, under Mr. Thomas.

AT 3YA.

MONDAY, SEPTEMBER 23:

Where do you think we are all off to to-night with Scatterjoy? Why, away to the homes of Precious Stones! You may be sure that you will always hear something interesting on Monday nights. And the Melody Maids with ukuleles providing the music on the way.

WEDNESDAY:

Mother Hubbard with songs so sweet, and Uncle Frank with stories so neat, fill this bedtime hour with happiness—and then, Sweet Sleep!

THURSDAY:

Oh, Uncle John and the children from Sydenham School making a happy and jolly band, who will please you so that you wish they would stay, and not go.

FRIDAY:

Storyman is bringing some little helpers to-night—who are they? Why, Cousins Yvonne, Minnie, and Gordon, with song, story, and music for all.

SATURDAY:

Peterkin and Aunt Pat down on the cottonfields of Georgia—banjoists, fiddlers, coon songs, and plantation fun. Listen in and hear all the fun.

SUNDAY:

Children's Song Service, conducted by the Rev. Rugby Pratt, and hymns sung by the Methodist Sunday School.

The Thousands that Listen

IMAGINATION, says "Wireless Weekly," is a fine possession, and is a tremendous attribute in the enjoyment of life, but it sometimes leads one astray, especially where the visualisation of the unseen audience is concerned. This fact is frequently brought to mind when we hear bed-time story-tellers speak of the tremendous thrill they get out of speaking to an audience of hundreds of thousands scattered over the globe. The thought of the thousands of loudspeakers in thousands of homes each reproducing every inflection of the speaker's voice seems to stimulate even further imaginative exaggerations. The thought of millions (favourite comparative) naturally follows, especially if the short-waves are being used. But that millions, or in Australia, even hundreds of thousands listen is a pretty well exploded idea.

A radio event is a momentary flash. It lasts but half an hour or an hour and that is its weakness. That and the fact that it depends largely on newspaper announcement for the public to know that it will happen. An event like the Southern Cross transmission, of course, receives considerable prominence from the newspapers and as a result many thousands may listen. But for events of less importance and interest a more diligent search is required to find mention, with the result that fewer people listen.

However, the belief that hundreds of thousands are listening to one's voice is a pardonable vanity. After all, why should not the speaker glow with the thought that his audience is a vast one? It stirs him to greater effort—to the greater enjoyment of those who are listening—and produces a pleasurable sensation to himself. It pleases him and hurts no one. And, of course, the audience is large. It is only a matter of degree.

Trade Developments

Rodgers Batteryless Radio

OF this popular line of A.C. receivers there are a wide variety of models, but all maintain a distinctiveness particular to their line. The consoles offer a wide choice of original designs, and are an asset to the furnishing of any room.

The set itself is a very fine one, embodying as it does the five pronged A.C. valve. Rodgers have manufactured their own valves, and have long chosen the cathode type for all stages except the last. Here the valve is suited to the purpose, but the Rodgers No. 15 or 245 type is most popular. This valve has been fully discussed elsewhere in this number. Another feature is the automatic voltage control which maintains uniform voltage on the filaments of the valves—and this is essential. A gramophone pick up can be easily added, and the audio stage of the receiver converted into an amplifier.

A distinctive feature is a regeneration system which, as those who are familiar with circuit design will know, increases both sensitivity and selectivity.

The line of receivers has been designed in Canada, and is manufactured at Toronto. A. R. Harris and Company, Christchurch, are the N.Z. agents.

Australian Programmes

TO mark the change from the former regime to its own control, the Australian Broadcasting Company, on taking over the service recently instituted programmes of very high calibre. Listeners in Australia were glad to note the improvement, but the more reflective amongst them have for some time felt that the cost involved in maintaining the initial standard set was heavy, and likely to be followed by a period of retrenchment, in order to recoup the heavy outlay that was being incurred. That there is solid ground for this feeling, which has been growing for some time, is evidenced by a brief cabled message from Melbourne which is to the effect that Mr. Stuart-Doyle, chairman of directors of the Australian Broadcasting Company, in giving evidence before the Arbitration Court, admitted that on the present basis of super-programmes the operating company was losing between £10,000 and £15,000 a year. Obviously the company will not continue at that rate, and retrenchment may be expected to enable the loss to be recouped. There are some who have felt that, while it was human for the new company to mark its advent by a series of super-programmes, these have been continued for too long a period, and the more reasonable policy would have been to have reverted earlier to a standard of programmes within the means of the operating company.

The A.C. Browning-Drake

R.F. and Detector Unit

(By the Technical Editor)

Accompanying is the R.F. and detector stages of the A.C. Browning-Drake. The audio stages have been omitted, because the writer considers that the constructor will be well advised to build up the A.C. amplifier and get it working before attempting the detector and radio stages. A.C. construction is simple, and providing instructions are followed carefully, no difficulties will be encountered, but most constructors do otherwise, and then the trouble starts.

THE name "Browning-Drake" needs little introduction. It is a class name given to those receivers which embody the invention of Glen H. Browning and his associate, Drake, two Americans who first developed mathematically, and then practically, the conception of a primary slot wound with fine wire, the impedance of which is balanced against the impedance of the preceding radio frequency valve. The original circuit was a 4-valve D.C. A radio stage was added, and latterly the coils have been adapted so that the screen grid valve can be incorporated, but in this it loses its individuality. Further improvements have been made in the method of neutralising, split primary, an addition to the secondary winding and parallel feed to the R.F. stages have proved themselves great improvements, but all these have taken some time to perfect, and have very rarely been combined in one set. The A.C. Browning-Drake, the last of its kind, incorporates all the advances made by the models which have preceded it. Its sensitivity equals that of the 4-R.F. B.D., while tone by the addition of the push-pull amplifier, is improved considerably. The receiver, unless used with a wavetrap, is notoriously unselective. Single dial control has been added, not because of its greater efficiency, but because of its marked simplicity. Shielding is another adaptation which, although not essential, simplifies wiring to a remarkable degree, as a glance at the lay-out of the completed receiver will show.

The writer has selected the moving-coil tickler, not because he considers it an improvement on the condenser control (for in many ways the latter is to be preferred) but because the greater number of owners of Browning-Drakes who wish to convert their sets will have on hand these coils. Moreover, it fits better. However, full explanation is given whereby capacity reaction may be employed.

The 227 type of valve is necessary in any detector stage, in all A.C. sets, and it has been selected for the radio stage because there is no possibility of A.C. hum. By a slight adaptation, the 226 may be used as a radio valve.

Making the Coils.

OBTAIN about 10in. of 2½-inch tubing, either cardboard or bakelite. Wind on 84 turns of 24 gauge D.C.C. wire or 68 of D.S.C., in each case without spacing. Other gauges of wire may be used if the constructor has them on hand. The numbers of turns for these can be obtained from the table. At the 18th turn pierce the former and, making a loop in the wire, pass it through and secure another piece of wire on to this, preferably of heavier gauge. This will be the aerial tapping.

Having completed the aerial coil, leave a small space, and proceed with the wiring of the regenaformer. This will comprise 65 turns of 24 gauge D.C.C. wire, or 57 turns of D.S.C. If capacity reaction is to be employed tap the coil at the 15th turn from the secondary proper. Wind a further 26 turns on the end of this coil, tapping it as before at the end of the secondary winding proper. Separate both coils with a sharp knife. The primary for this regenaformer is jumble wound and placed under the first turn of the secondary coil. It comprises 14 turns of 30 guage D.S.C. wire. There are three typical ways of making this coil, the diameter in every case being such that the coil can be slipped inside the end of the secondary without leaving an appreciable space between the two coils, though there must be proper insulation between them, otherwise a "short" of the B potential may result. The three methods are shown in a diagram. One is a bunch of turns of the requisite diameter, bound together in places with twine. The second method is to build up a slotted former of cardboard, the slot round the periphery measuring barely 3-16in. each way. The third method is to turn a similar former out of wood. Rotating ticklers are close-wound upon a short former of small dimensions; the turns should not be spaced on ticklers. There is no need to endeavour to make the tickler as large as can be rotated in the end of the secondary. A small tickler with a few more turns to compensate will give even better results.

Bring out all the connections and secure them by small brass bolts at one end and label them: Aerial Coil—Top G; bottom, E; tapping A. Regenaformers Secondary tap G; bottom B—; tapping N. Primary—Input P; output B—, and join to both E's.

Any convenient method of mounting may be employed, the diagram suggests an easy method. Another very simple method is to secure to the end opposite to that carrying the terminals, two or three brackets from a meccano set. To one of these brackets should be secured the "E" end of the aerial coil, while on the regenaformer both E's go to a bracket and so to the shield. This connection is shown quite clearly in the theoretical diagram.

For those who do not feel confident or who have not the time and patience to construct their own tuning coils, there are very many commercially-made Browning-Drake outfits. These have been specially designed so as to suit the 201A type of valve, and as the 227 is the A.C. version of this valve, the primaries of these are of the right impedance.

Some difficulty may be encountered in neutralizing the type of commercial coil employing the additional to secondary winding method. In these "N" must be disregarded and a fresh tap made as described. Again, some commercial coils require the 0005 condenser first according to the size of the coil. That with the larger secondary winding requires the smaller condenser. It is immaterial which condenser comes first, but the coil must suit.—See table.

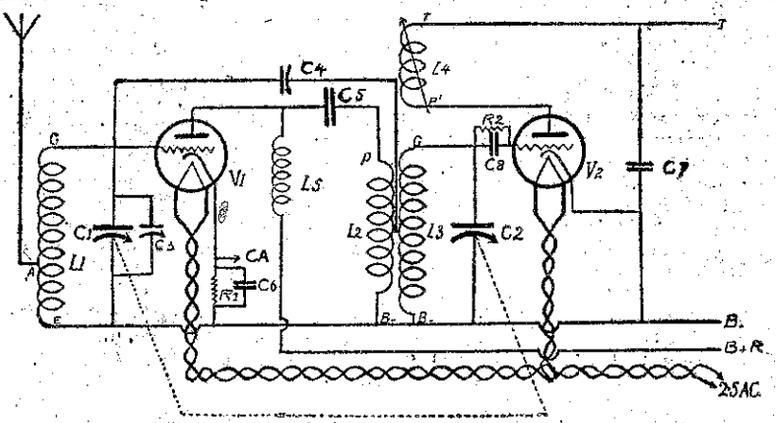


Figure 1.
Theoretical diagram of radio and detector stages of A.C. Browning Drake.

Mounting the Components.

FOR the panel a piece of ebonite or formica undoubtedly makes the finest job. The constructor who does feel disposed to buying a suitable panel may make quite an excellent one out of a piece of three-ply which has been immersed in a solution made by dissolving old gramophone records in methylated spirits. Another way is to spray with duco.

The lay-out of the panel is very simple, but owing to the variance in the sizes of drum dials and components, it is almost impossible to give definite measurements. In the cartoon of each dial, there is found a template which indicates quite clearly where each cut is to be made. This should be pasted on to the centre of the dial, so that when fixed into position the moving vanes of the condensers will not touch the baseboard. This means that the spindle on which the condensers are mounted should be at least two inches from the baseboard.

Three other mountings remain for

the panel, the balancing condenser, the tickler, and the volume control. This latter (not shown in diagram) may be placed anywhere on panel to give balance, and be connected to cathode and grid of detector or B— and grid of R.F. If a condenser is used in control reaction, some little trouble will be experienced in fitting it so as to clear the tuning condenser. Reference to the diagram shows the position of the various knobs.

The Baseboard Mounting.

OBTAIN a piece of 15in. x 10in. x ¼in. timber or three-ply, shellac it well, and secure to the under surface two small strips sufficient to raise it from the ground. This is to permit sub-baseboard wiring. Mount the drum dial and shield boxes and find out where to drill spindle for condensers, tickler, volume control and balancing condenser. Dismantle and drill. Replace shields and mount condensers. In all probability it will be necessary on one of these condensers to shift the projecting shaft through to the other side. This condition will be determined if the constructor finds that he cannot put on one condenser because it appears back to front. Arrange them so that the plates will move outwards from the panel, and downwards to the baseboard.

To shift the shaft of the condenser loosen the two screws that appear on the side of the moving plates opposite the half on which they are secured. Now determine the lay-out of the rest of the shield boxes. Mount coils and valve sockets so that G of each will be as near as possible to the valve sockets. The sockets are nearer the front to allow the condensers to clear coils of the variable condensers.

Mount the neutralising condenser on the floor or side, as the type may require. If to be mounted on the side drill a very large hole and place mica washers over thread to prevent any portion earthing. In this manner the

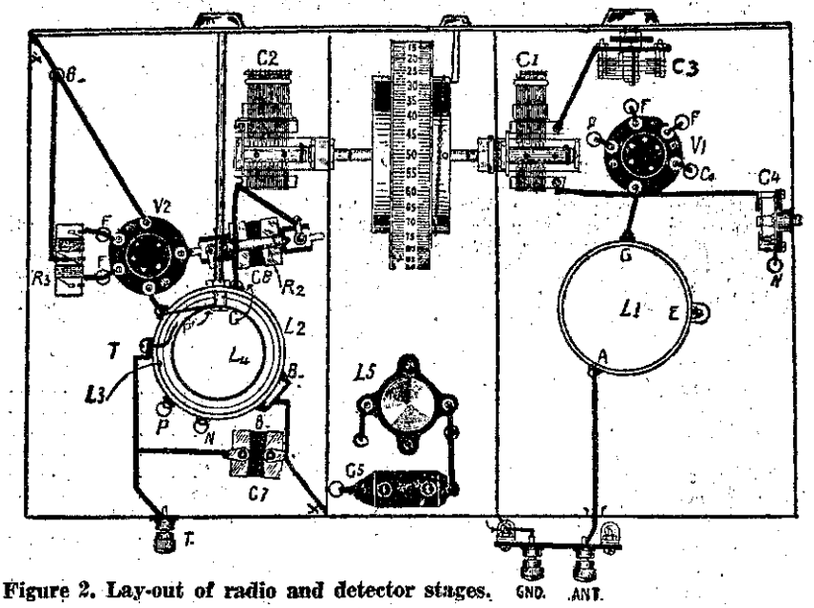


Figure 2. Lay-out of radio and detector stages.

contents of each box may be fastened into position. Keep coils as near the centre as possible. Screw each firmly to the bottom of the shield. It may be necessary to drill the baseboard a little in order to allow the heads of the nuts to settle down without putting the shield box off the level. Mount the R.F.C. and the 1 mfd. by-pass condenser at the back of the dial between the two shields.

The Wiring.

FROM the top of the aerial coil G run wire to the fixed plates of each of the .0005 condenser, the neutralising condenser, and to "G" of the valve socket. By securing the tuning and balancing condensers to the shield the moving plates are automatically connected with the shield which should be connected to the earth terminal. A soldered joint cannot be made if aluminium shields are used, so slip a washer underneath one of the corners of the box shields and connect this to the terminal. The aerial is brought in to the tapping and the moving plates of both balancing and tuning condensers connected.

Drill a hole through shield and baseboard near the legs of the socket marked "F," "Ca," and "P." From the "P" terminal take a connection underneath the baseboard to the radio frequency choke and to one side of the the by-pass condenser (C5). The other side of the by-pass condenser goes to the free terminal of the primary (P). The other side, it will be remembered, is connected to the secondary and shield (B— to B— to B×). The shields are automatically connected by the spindle of the drum dial. Join fixed plates of neutralising condenser N to N of regenaformer by an under baseboard connection.

Take the "G" terminal of regenaformer and connect it to the fixed plates of the C2 condenser and to one side of the grid leak (R2) and condenser (C8). The other side of this is connected with the valve socket "G." Keep this grid leak and condenser clear from the shields by mounting it on the valve socket or on a sheet of mica. The plate of the valve is connected with one side of the tickler (P1), the other side (T) to the 001 fixed condenser (7) and to a piece of flexible wire or terminal (T). Connect the detector cathode and the other side C7 each to the shield. Take a piece of twin flexible wire and connect the two filaments underneath the

baseboard, and from one of the sockets connect to a long lead of twin flex; The battery cable is connected thus; one wire to the L5, another to the cathode of the R.F. valve, two to the dial light and one to the shield (B—). Connect to the eliminator or power pack as follows:—Lead from L5 to B + 130 or variable, cathode to the terminal that was placed on the panel of the amplifier labelled "cathode." In other words, it is connected with the cathode of the amplifying valve which is connected to a series resister and a by-pass condenser to earth.—See theoretical diagram for alternate connection. The dial light is connected to appropriate voltages, usually 5, and the valves to either 4 or 2.5. If they are 227 they will require 2.5. Other indirectly heated valves require 4 volts.

Neutralising.

EVERYTHING is now ready for a try-out. Connect one lug of a pair of phones to free terminal of tickler and the other lug to B+ detector, turn the current on and move the reaction condenser over until a plop is heard. This will indicate that the set is oscillating. If it does not oscillate, look for faulty wiring, bad connections, or wires that have dropped off. If the A.C. amplifier has been constructed and is working examine the inside connections to the terminals to see if all is intact.

To neutralise, tune in a station about the frequency of 1YA and advance reaction until the set oscillates. Move neutralising condenser until it stops. Readjust until a point is found when further advancing the neutralising condenser will not prevent oscillation. The set is now neutralised.

List of Components.

Variable condensers: .00035 (C1), .0005 (C2), 7-plate balancing (C3).
Two box shields, standard size (9 x 6 x 5).
Grid leak, 1.5 megohms (R2).
B.D. Tuning Coils (L1, 2, 3 and 4), or 3lb. 22 gauge D.C.C. (or D.S.C.) wire.
4 Yards 30 gauge D.S.C. wire for primary.
Radio frequency choke (L5).
Resistance, 0-10,000 ohms, variable.
Battery cable.
Two terminals.
Neutralising condenser (C4).
Fixed condensers: .00025 (C8), .001 (C7), 1m.f.d. (C5), (to withstand 200 volts working).
Single drum dial with pilot light.

The Diagram.

THESE are mainly self explanatory. It will be noticed double provision has been made in diagram 1 for bias to cathode. Either can be used, not both. Either take CA to cathode of amplifier or insert a resistance of 3,000 ohms (R1) and a by-pass condenser 1 m.f.d. (C6) as shown.

If there is a tendency to hum, connect a centre-tapped resistance of about 40 ohms (R3) across the filament of the detector, earthing the centre tap. This connection must be from dead centre. C8 and R2 can be arranged so that it can be cleared by the moving vanes of C2. The letter X denotes a connection to the shield by a washer under the corner support.

A small circle indicates a hole in the floor of the shield.

It is hoped to publish photographs next week.

Aerial and Secondary Coils for Browning Drake.

2½-inch former.

Condenser.	Guage.	Covering.	Turns.	Inductance.
.0005	18	d.c.c.	85	200mh.
„	20	„	78	„
„	22	„	73	„
„	24	„	65	„
	26	„	56	„
„	18	d.s.c.	88	„
	20	„	75	„
	22	„	68	„
	24	„	57	„
.00035	18	d.c.c.	108	
„	20	„	100	250mh.
	22	„	90	„
	24	„	84	„
„	18	d.s.c.	104	„
	20	„	85	„
„	22	„	78	„
	24	„	68	„
.00025	22	d.c.c.	112	250
	24	„	105	„
	26	„	94	„
	20	d.s.c.	112	„
	22	„	100	„
	24	„	72	„
	26	„	46	„
	28	„	33	„

To find number of turns for a three-inch former, divide by 1.3. For a two-inch former multiply by 1.3.

Competition for Radio Set Builders

Good Prizes Offered

SOME weeks ago the Radio Society of Christchurch decided to hold a set-building competition for members. At a meeting held last Thursday night it was decided to invite the general public to participate in the competition, and two classes were set aside for that purpose.

Class 1: Broadcast receivers having one or more valves.

Class 2: Shortwave receivers having any number of valves.

There will be a first and second and possibly a third prize in each class. Prizes, which will be of a valuable nature, will be donated by the society, the trade, and individuals.

CONDITIONS.

Machines entered must be completely assembled by the entrant and a certificate that it is his own work must accompany each receiver.

Entries cannot be received from persons in or connected with the trade.

Any person wishing to enter a receiver should write to

The Hon. Secretary,
Radio Society of Christchurch,
198A St. Asaph Street,
Christchurch.

Stating:

Full name and address of entrant.
Class of machine (broadcast or shortwave) it is desired to enter.
Age, if under 21.
Occupation.

Persons may enter for both classes should they so desire. Entries must be accompanied by a postal note or money order for 5s., which will be refunded when the machine is entered. The last date for receiving entries is WEDNESDAY, SEPTEMBER 26.

Receivers must be received at the Society's rooms, 198A St. Asaph Street, on Thursday, October 31, between 7.30 p.m. and 10 p.m., where a committee will give a receipt to the entrant and refund the deposit.

The machines will be judged by a committee of experts appointed by the society and the trade. The names of the judges will be announced at a later date, but will probably include amongst others Messrs. A. McLennan, B.E., and C. R. Russell, M.Sc. The decision of the judges will be final.

NOTES.

It is not necessary or desirable for competitors to bring batteries and speakers with their machines.

Machines assembled from kits are eligible. "All-wave" receivers are eligible in either class.

A member of the Society has offered a special prize of a set of Mullard valves to the competitor (in either class) using English or Australian parts throughout his receiver.

IF you are suffering from a thin and "reedy" distortion for which you are unable to account, remember that this is often caused by H.F. getting into the L.F. side.

GENERALLY speaking, an antenna under the roof is much better than an antenna wound round the picture rail.

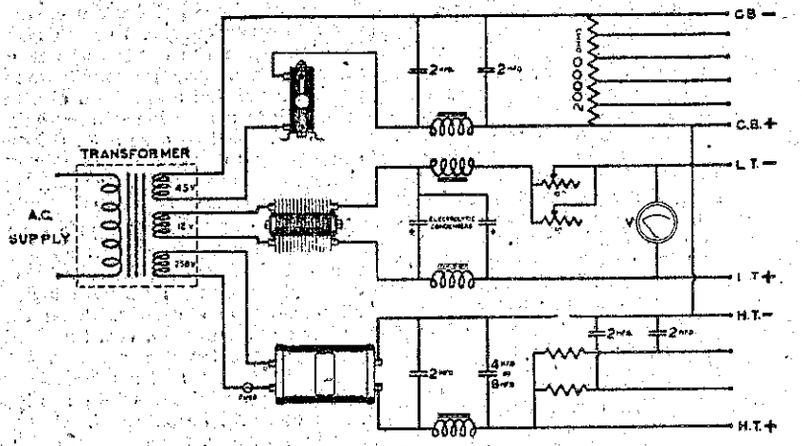
A B and C Battery Eliminators

Electrification by Easiest Method

FOR the set owner who does not desire to rebuild his set, the construction or purchasing an A.B.C. eliminator will probably appeal. This type of eliminator is quite an effective way of changing over to the A.C. mains for current.

"A" eliminators have for some time had very many drawbacks, but they have been now brought very near to perfection, and good results can accrue by their use. The eliminator consists of the following parts. A transformer that will step down from the A.C. mains to 10 volts supplying about 3 amps. of current; an electrolytic condenser or other big capacity smoothing condenser; an audio frequency choke wound with wire sufficiently heavy to supply enough current for the set, and a rectifier which will likewise pass enough current. This latter may be of the metallic type, electrolytic or valve. The electrolytic rectifier although economical in its first cost, is otherwise unsatisfactory. The dry rectifiers have had great popularity recently, and are proving themselves very efficient. They are slightly dearer in the first cost, but are well worth installing. Valve rectification still remains very popular, although after a certain period of use the filaments burn out.

By reference to the diagram, it will be seen that the "A" battery eliminator is very similar to the "B" eliminator, but is constructed with very much heavier wire. By efficient smoothing, very little hum will result. If it is required to further break down the current, resistances which will pass sufficient current must be put in series with the positive lead. The diagram shows a method of bringing this about by using the ordinary 30 ohm variable rheostats.



A.B.C. eliminator, using metallic rectifiers.

"B" eliminators are readily procurable and very easily made, although their manufacture requires a little care and plenty of patience. Their construction has been fully described in the "Radio Listeners Guide," and this has been supplemented by further articles in the "Radio Record." Grid bias may be obtained by a resistance at the end of the "B" supply, or by a separate bias unit. Such a unit was described in our issue of July 12, 1929 (Vol. III., No. 1). A workable "A" eliminator may be constructed by shunting the output terminal of a battery charger with an electrolytic condenser and connecting the positive lead with a choke such as has been described. This reduces the voltage, and unless tapping is higher than 6 volts is provided, 4 volt valves only can be used.

RADIO DIRECTORY

What to Buy and Where

CITIES

AERIAL MASTS	Domestic Radio Co., Ltd., 300 Queen Street, Auckland.
ALTONA & HAMMARLUND-ROBERTS SETS.	Johns, Ltd. Chancery Street, Auckland.
ATWATER-KENT RADIO ..	Frank Wiseman, Ltd. 170-172 Queen Street, Auckland.
BURGESS RADIO BATTERIES,	All Radio Dealers.
CROSLEY RADIO	Abel, Smeeton, Ltd., 27-29 Customs St. E., Auckland.
CROSLEY RADIO RECEIVERS	G. G. Macquarrie, Ltd., 120 Willis Street, Wellington.
CROSLEY RADIO	Abel, Smeeton, Ltd. Rep.: G. MOSES, James Street, Whangarei.
DAYTON All-Electric Radio ...	Superadio, Ltd., 147 Queen Street, Auckland.
EMMCO RADIO PRODUCTS	Johns, Ltd., Chancery St., Auckland.
EMMCO RADIO PRODUCTS	Thos. Ballinger & Co., Ltd., Victoria St., Wellington.
EMMCO RADIO PRODUCTS	L. B. Scott, Ltd., Worcester St., Christchurch.
KING RADIO RECEIVERS ...	F. J. W. Fear & Co., 63 Willis Street, Wellington.
LISSEN RADIO PARTS AND KITS	All Radio Dealers.
LOUDSPEAKER AND TRANSFORMER REPAIRS	A. E. Strange, 404 Worcester Street, Christchurch.
MAJESTIC RADIO RECEIVERS	Kirkcaldie & Stains, Chief Wellington Agents, Lambton Quay.
MULLARD VALVES	All Radio Dealers.
PILOT 1930 PARTS AND KITS, ETC.	Abel, Smeeton, Ltd., 27-29 Customs Street East, Auckland.
PILOT 1930 PARTS—PILOT SUPER WASP KITS, GILFILLAN, KELLOGG and ATWATER KENT SETS	Harrington's, N.Z., Ltd., 138-140 Queen St., Auckland. 40-42 Willis St., Wellington.
RADIOLA RECEIVERS	Chas. Bennett, Ltd., 619 Colombo Street, Christchurch.
RADIOLA RECEIVERS and Expert Radiola Service.	Farmers' Trading Co., Ltd., Hobson Street. Auckland.
RADIO REPAIRS AND SERVICE	E. G. Shipley, 185 Manchester Street, Christchurch
AIR COLUMN SPEAKERS	Royds-Howard Co., 553 Colombo Street, Christchurch.

COUNTRY TOWNS

CROSLEY RADIO	J. C. Davidson, Main Street, Pahiatua
CROSLEY SETS	Abel, Smeeton, Ltd. Rep.: C. Ruscoe, 409 Devon Street, New Plymouth.
CROSLEY RADIO	D. A. Morrison & Co., Victoria Avenue, Wanganui.
MAJESTIC, ATWATER-KENT AND RADIOLA ELECTRIC SETS	Radio House, Hamilton. G. S. Anchor, Manager.
PHILIPS VALVES AND APPARATUS	All Good Radio Dealers.

How the Socket Power has Helped Radio

A.C. v. D.C. Operation

(By W. M. DAWSON M.I.W.T., A.M.I.R.E.)

WHEN comparing present-day radio receiving sets with those of 15 years ago it is interesting to note that nowadays a set requires more sources of current. Though at first this may seem a retrogressive step in reality these conditions are due to the character of radio reception.

The energy received by an aerial is extraordinarily small even in the neighbourhood of a powerful transmitter. It is therefore remarkable that not only can a transmitter be successfully received over thousands of miles, but that such reception can be amplified to loudspeaker strength.

It is most difficult to measure the amount of energy which is induced in a receiving aerial, and what small energy there is can only be indicated by the most sensitive instruments.

The volume produced by the loudspeaker, which is sometimes so powerful that there is vibration, is not the direct result of the power in the receiving aerial, but is due to power derived from other sources, e.g., "B" battery or power unit.

For about 15 years, amplification was not possible, as the radio valve, as it is now known, had not been invented. In these times the received energy was the only source of power from which audible signals could be obtained, and therefore reception by telephones only was possible.

The reason why reception can now be amplified to any desired strength must not be attributed solely to the fact that transmission efficiency has improved, but to the development of receiving apparatus which enables a considerable amount of energy to be freed by the use of local sources of current supply.

These auxiliary sources supply the current for heating the valve filaments and also the voltage which is applied to the plate or anode of the valve. First dry cells or accumulators were used for both current supplies, i.e., one or more accumulators for the filament and dry cells for the plate.

These two sources supply energy for loudspeaker reproduction, and it goes without saying that the greater the amount of current used, and provided the valves are of the correct type, the greater may be the volume.

An accumulator, especially when only of one or two cells, provides an excellent and constant source of current if it is kept fully charged. Recharging, however, has one drawback. Some accumulators are very heavy, and are therefore difficult to transport to a charging station, and in addition there is the danger of leakage of acid. One way out of this is to charge the batteries where they are used, and to do this energy will be required. Provided electric mains are available the necessary current supply can be derived from them.

The first problem to be considered is that an accumulator must be charged with direct current. In most cases the mains supply is alternating current, which cannot be used for accumulator charging without its first being converted or rectified to direct current. Direct current is also necessary for other purposes in radio work.

Rectifiers, Mechanical and Otherwise.

THERE are various methods whereby alternating current can be converted into direct current. While we do not intend to discuss them all fully it is necessary to give a few details.

By mechanical rectifiers is meant apparatus which converts alternating current into direct current by means of moving parts. In the first place there are rotary convertors, small machines with a rotating armature which are fed with alternating current. The direction of the current is kept constant by means of brushes which make contact with the commutator. For charging accumulators as would be used in the usual type of receiving installation these machines are not used as they are too complicated, too expensive, and too heavy. Besides convertors, there are alternating current motors which are provided with interruptors by which the current can be rectified. These motors also have a rotating movement.

Finally, the current can also be rectified by a vibrating metal spring. If the vibration of the spring synchronises with the periodicity of the alternating current such current can be interrupted so that only one phase passes into circuit. As a matter of fact, there are rectifiers which work on this principle. A transformer (a safety device to prevent short-circuiting should the contact fail), a rheostat, and an ammeter are absolutely necessary.

It is of great importance that the ammeter be of the moving coil type, as otherwise the charging current cannot be tested correctly.

Vibrating rectifiers have various drawbacks which have resulted in this type almost disappearing from the market. Such a rectifier is not by any means silent in operation, and in addition adjustment is rather difficult, often requiring readjustment through alterations of frequency, heating, etc. Sudden alterations in alternating current frequency often occur when cables short circuit give rise to fusing or sparking of the contacts.

Chemical Rectifiers.

CHEMICAL rectifiers are based on the principle that certain elements only allow the current to pass in one direction when the electrodes are correctly selected. As an example we may mention a pointed aluminium electrode inserted into a solution of ammoniumphosphate. In this case a transformer is necessary to reduce the supply voltage and an ammeter and rheostat (or tap switch) cannot be dispensed with.

A rectifier of the electrolytic type is the so-called colloid rectifier, consisting of a colloidal silver deposit in concentrated sulphuric acid with a silver and nickel iron electrode. This rectifier has one advantage, viz., that in this electrolyte the losses are small. Less heat is developed, and a much smaller quantity is sufficient, while a higher output can still be obtained. A drawback is, however, the uncertain life of the cells and unreliable working.

The simplest types of rectifiers are those of the third class, such as Mercury vapour, and rectifiers with oxide coated filament. Both types are based on the principle that a glowing surface emits negative electrons which are attracted by a positive potential and cause a current of electrons (that is, an electric current) from the glowing surface to the point of positive potential. No current can possibly pass in the opposite direction.

The dry copper oxide rectifier has recently received some prominence. Its chemical action is not fully understood, but it may be taken as being electrolytic in character; the two rectifying surfaces being respectively a metal and an oxide of copper held in close contact by means of a bolt.

The resistance to the passage of current in one direction being considerably greater than in the other rectification can be made to take place.

The Mercury Arc.

WITH mercury arc rectifiers the glowing surface consists of a quantity of mercury on which a so-called cathode spot appears when a lighting arc is introduced between a higher electrode. Conditions of working are high vacuum and an excitation of the arc by a contact between electrode and mercury surface.

The difficulty is, however, that the drop in voltage in the arc between electrode and mercury is very large, viz., about 30 volts, and that a minimum current intensity of a few amperes is necessary to maintain the arc. Therefore, the mercury arc rectifier is not suitable for the charging of small accumulators.

Thermionic Rectifiers.

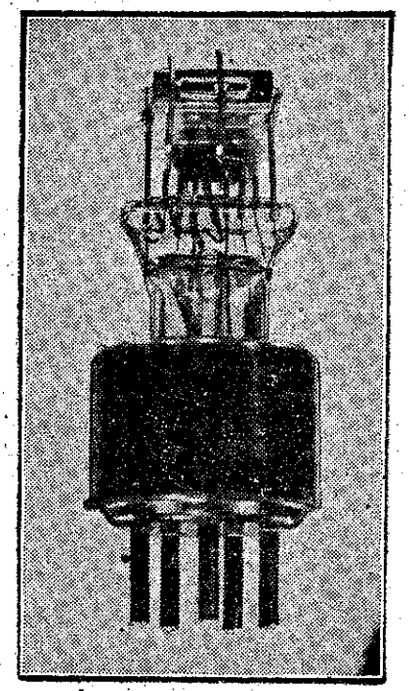
A VERY favourable solution is found in rectifiers with oxide-coated filament where the negative stream of electrons is obtained by a filament. Even small current intensities can be obtained, and the drop in voltage between the filament and auxiliary electrode is small. If such a filament and electrode are placed in a bulb we have a rectifying valve. The bulb must be evacuated of air and then filled with gas (argon) or vapour (mercury) under low pressure.

In the first case the voltage-drop in the valve is larger, but the valve can be used for the rectifying of higher voltages. In the second case a rectifying valve is created which is very suitable for the charging of small accumulators.

In order to use such a valve in combination with A.C. mains a transformer is necessary, which not only steps down the voltage necessary for feeding the rectifying valve filament, but which also enables adjustment of the current voltage for the second electrode (the plate) or anode to obtain the charging current.

A special quality of rectifying valves is that once the filament is first set glowing they can work without further filament feeding. The collision of the positive gasions against the filament releases such an amount of heat that the filament remains glowing. This experience has, however, no practical use, as the current consumption of the filament is but small, and only a very small saving can be obtained, and on the other hand the risk of overcharging the filament is very great (concentration of emission).

Rectifiers with oxide-coated filament have proved to be most suitable for the charging of accumulators. Philips manufacture many types for 1.3, 3 and



The innards of an indirect'y-heated A.C. valve. The thick piece of metal that can be seen passing through the centre of the grid is the cathode.

6-amp charging currents, while for anode or H.T. accumulators and for the slow charging of filament current accumulators, 100 milliampere rectifiers have been placed on the market by many manufacturers. Practice has shown that this continuous charging is in no way detrimental to the life or efficiency of the battery.

Filament-rectifiers have the advantage that they can be easily handled, and are absolutely reliable and proof against short circuit. Therefore, they can be charged overnight without any supervision. The fact that filament rectifiers can work a long time without supervision or cost or upkeep makes them ideal for use with electric clock installation, signal devices, switching purposes, etc. Of course, pure direct current is not obtained, but a pulsating direct current which, with the rectifier type, 450 contains 100 impulses per sec., and with the small rectifier type 1017, 50 impulses per sec. This is the reason why an accumulator as used for a radio receiving set cannot be substituted by such a rectifier. In this case filament feeding could not be effected with direct current, but instead there would be a pulsating current which would cause hum by the periodic change in emission of the electrons.

However well a filament rectifier might work in this connection there is no advantage in this method by feeding the filament with alternating current (the number of pulsations being equally high. This is a problem which entails further consideration.

"B" Supply.

AS a second source of current for the radio receiving set we mentioned plate feeding or anode current. In the early days of the valve a battery of dry cells was always used for anode voltage. The first types of receiving valves only required an anode voltage of about 80 volts, and a plate current of 1 or 2 milliamps only.

With modern radio reception strong loudspeaker reproduction is required for which 3 or more valves are necessary. Therefore, there is need for a last stage valve, requiring an anode voltage of 150 volts, and a plate current of about 10 mA, the latter depending upon the correct negative grid voltage applied. When one considers that the other valves of a receiving set, together take a plate current of 6 to 10 mA, it will be evident that a modern 5-valve receiving apparatus takes an anode current of some 20 mA. With such a current supply the life of the "B" battery is considerably reduced. Moreover, the voltage of the battery becomes exhausted, volume decreases very much, and in addition parasitic noises are heard as cells become defective.

From this it may be deduced that a modern radio receiving set intended for loudspeaker reproduction cannot be satisfactorily fed with an anode battery except for short laboratory tests or demonstrations.

An accumulator can be used for plate feeding, but as such a battery consists, however, of about 80 cells, it is rather a bulky object, which cannot be handled very easily. A short circuit in the set can damage this battery and various other parts of the apparatus.

When the difficulties of "B" batteries were realised, attempts were made to obtain plate current from A.C. supply, with the result that high tension supply units came into being.

In these high tension supply units a

rectifying valve is nearly always used. This valve generally is a two-electrode valve, with heated filament. With a valve which has a filament and an anode it is evident that when the filament is heated it will emit negative electrons.

Characteristics of Power Units.

VOLTAGE depends on the current derived, and the internal resistance of the rectifying valve. This must be low with respect to the external resistance (Philips 373, valve about 300 ohms at 4 volts).

Tests for "ripple" (hum) have been made when high tension supply units are used and compared with "B" battery supply, and also tests for induction by lighting supply (reception test of Daventry). Everything depends on the smoothing condensers and choking coils for the current derivation and voltage. (With a certain percentage ripple.)

Alternating Current Valves.

THE simplicity of working connected with high tension supply units brought about the idea that filament current could also be derived from the alternating current supply. There were however, many drawbacks. The filaments of radio valves at present are very thin, and this being so their heating properties are very small.

It therefore follows that when a filament is fed with alternating current the filament oscillates with the same frequency as the alternating current supply, that is to say, a maximum and a minimum are obtained twice during each cycle. The emission, therefore, shows the same fluctuation and a hum is clearly audible in the telephones when filament current is so applied.

This drawback can be overcome by applying sufficient heat to the filaments. This will cause a much higher filament current consumption, but as they are not fed by an accumulator it matters very little. The feeding transformer must supply more current, it is true, but indicated in watts the increase is practically negligible.

This, however, is not the only difficulty. The alternating current voltages passed to the grid of a radio valve must circulate in the grid circuit. This grid circuit consists of resistances, capacities, self-induction or combinations. These generally are connected on one side to the grid of the valve and on the other side (generally negative) to the filament. If this is done with a valve where the filament is fed by alternating currents, one will realise that the potential of the filament is not constant with respect to the grid, but instead, a variable one, corresponding with the frequency of the alternating current. For this reason this side of the filament alternatively has a positive and a negative potential with respect to the grid, and this causes alterations in the anode current which is audible as hum.

In order to avoid this the filament must be shunted by a resistance of which the centre is connected to the grid circuit. This can be accomplished by means of the sliding contact on a potentiometer, or the transformer used must have the centre of the secondary winding tapped.

If sufficient precautions are taken that those parts carrying alternating current (transformers, filament current mains, etc.) cannot cause induction, good results can be obtained in this way with amplifying valves. Even ordinary power valves can be used on a modest scale in low-frequency amplifiers. At present better types have been developed in the D105 and D143 with a filament current of .65 amps., and the E series as well as other specialised valves.

The greatest difficulties, however, are caused by feeding the detector valve with alternating current. The working of the grid condenser with leak resistance to obtain rectification renders the valve still more sensitive to the influence of alternating currents and the capacitive charges of the grid with respect to the end of the filament, more especially when reaction coupling is applied which causes a hum as the result of anode current oscillations produced as stated above. The methods for dealing with this trouble are not at all sufficient, and only when a new principle is used (separate heating) has it become possible to construct a detector valve which works absolutely free of hum with alternating current.

The emission of electrons is not obtained by a filament but by a separate tubular surface which is indirectly heated by a filament fed with alternating current. This filament is connected to an alternating current voltage of 2.5 volts, and consumes 1.5 amps. Valves of this class are the 227, H102T, and F215. This latter has the same characteristic as H415, while the former and second are 201H type.

Connection to the grid circuit is, of course, not by means of the filament, but by the electron emitting cathode which has no electric contact with the filament. For connection to the grid circuit a connection is provided with the cathode (on the cap).

These alternating current valves provide a solution of the problem of filament current supply, and when replacing the negative grid voltage battery by a resistance, shunt a condenser in the anode circuit, or, still better, use a small high-tension supply unit.

The modern trend is towards the use of indirectly-heated valves in all sockets of the receiver but the last, it being found satisfactory to feed the ordinary D.C. valve from an A.C. filament source when the valve is not followed by a further amplifying stage, i.e., on the "power" or output socket of the receiver.

Due to uniformity of electron emission all along the cathode and other reasons which are rather technical to be of general interest in these columns, it is possible to design and manufacture independently-heated A.C. valves having characteristics far surpassing the best possible from a directly-heated filament valve, i.e., battery-operated type.

Valve Characteristics.

THERE are three main factors or characteristics which serve to indicate the "goodness" of a valve.

The first of these is the "amplification factor" of the valve, giving some indication of the voltage gain of the valve, i.e., how many signal volts may be expected in the plate circuit from one volt applied to the grid.

The next factor is plate impedance, which indicates how much of the valve opposes the setting-up of the desired signal currents variation on its plate circuit. The impedance normally should be low.

Generally speaking, a high amplification factor is desirable, but this is usually accompanied by a rise in impedance, the latter disadvantage offsetting the former advantage, so that these two factors must be jointly considered to arrive at a true estimate of the merit of the valve. This characteristic is known as "slope," or "mutual conductance." It is usually expressed in "milliamperes per volt" and gives valuable information as to the number of milliamperes of signal current released in the plate circuit of the valve for each volt of applied signal grid potential.

Thus the steeper the slope of the valve, i.e., the greater the M.A.'s per volt, the more effective it is.

To indicate the enormous advances made in A.C. valve manufacture we may compare a modern example with the D.C. general purpose quarter ampere valve.

	D.C.	A.C.
Amplification factor	8	24
Impedance	10,000	8,000
Slope	0.8	3.0

From these figures it is readily seen that it is possible to design an A.C. set not merely a "convenient" set in that it eliminates battery troubles, but a definitely superior set to one battery operated.

The initial troubles experienced in the manufacture of A.C. valves have been overcome by at least the leading manufacturers, so that there is now no reason why the modern A.C. valve should not last practically as long as its D.C. brother.

The first general purpose A.C. valves (directly heated) gave trouble due to an "opening" of the filament circuit because of a manufacturing trouble experienced in getting the "pinch" of the filament support to bite deeply enough through the oxide coating of the filament to maintain good permanent contact with the metal beneath.

The earlier indirectly heated valves, as used in the detector sockets of the first American A.C. receivers, had a distressing habit of burning out after a very short life. This was wont to take place just inside the insulating thimble of the cathode.

Both of these troubles have now been overcome, and the reader need not hesitate to "go A.C." on account of short-lived valves, provided, of course, that he buys a high-grade receiver in which the necessary protection demanded for A.C. valves has been taken into serious account by the designer.

The use of receivers deriving all their power requirements from the A.C. mains has greatly helped along the development of "real" power valves. When operating from battery supply the use of a "real" power valve imposed such a drain on the financial resources of the average user—due to incessant and expensive battery renewals—that the use of valves suitable for giving really big volume without distortion became prohibitive.

All this is changed with A.C., operation, because even the largest "combination" sets draw quite a small amount of "power" from the house supply mains, and we need no longer starve the speaker on account of prohibitive running costs. We can thus enjoy realistic volume, and our thanks are largely due to A.C. operation.

In the early stages of A.C. development it was only feasible to make large sets for A.C. operation, but there are now on the New Zealand market completely A.C. operated receivers as small as two valves, of moderate price, and completely satisfactory operation.

The use of A.C. has then conferred the following benefits on the radio user. It has provided excellent battery substitutes and charging aids by which the user may, with his existing D.C. set, enjoy better reception with less maintenance worry.

It has provided means whereby the D.C. set may be modernised for complete battery elimination, and at the same time improved in results. It has enabled better sets to be built, and these to be completely operated from an A.C. power source. It has made possible realistic volume and tonal quality hitherto impracticable, and last, but decidedly not least, it has reduced radio operation costs.

Hence it is hardly necessary to remark that A.C. operation of radio receivers has definitely come to stay, and represents one of the greatest advances that have been made in radio of recent years.

Australian Stations

NEWS comes from Sydney that station 2BL, Sydney, is the first of the A class Australian stations to have a new transmitter, and this is now being built. This will give 2BL an aerial power of 5000 watts, which means an increase of nearly three times the present power of that station. There is also a suggestion to move the transmitting station of 2BL further away from Sydney as, owing to its greater power, city residents will experience some difficulty in tuning it out, if desired, to hear 2FC, Sydney, without interference.

From D.C. to A.C. Operation

Complete Details of the Change Over

(By "PENTODE")

NO ONE can fail to notice the increasing tendency towards the total A.C. mains' operation, not only in the public favour but also by the percentage of these types of receivers produced by manufacturers during the last six months. One can purchase battery-operated sets at a ridiculously cheap figure, the same machines but a few months ago, being well in the fore. However, in many localities, especially where the electric power is not installed, receivers depending upon battery power are necessary and so it can never be stated that battery sets will get out of date.

There are quite a number of listeners, who, having battery sets, would sooner be in the possession of an A.C. receiver but do not feel like disposing of their instrument and buying one of the latest products. They feel, and rightly so, that they cannot demand a fair price for their old sets as practically 75 per cent. of the money they paid would be lost in the deal.

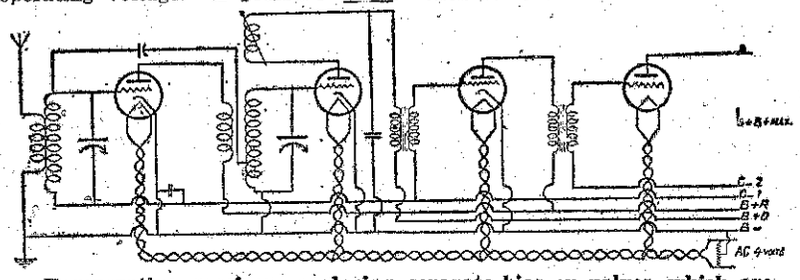
Then, why not convert it into an A.C.-operated set oneself? To those experimenters who have thought of doing so the following article will prove interesting and helpful. Also, to those who have not thought of changing over or who consider that A.C.-operated receivers are in any way inferior to those using batteries, the following comparisons show that the favourable points are all on the side of the sets using mains' power.

Consider first of all the battery problem. It is well known that really true reproduction cannot be obtained unless high anode voltages are used. At least 135 volts are necessary for the operation of even the smallest of power valves. This means the price of three standard or heavy duty B batteries straight away. But this is not all. The big rub comes when, after a few months' use they want renewing. But before this dreaded time comes, the batteries have been getting lower and lower and for half the time they are in use the actual voltage is below normal and the set is not giving out its maximum power. This is a big point in favour of A.C.-operated sets, in which the B voltage is constant and always to such a voltage that the power valves are being fed to deliver their best. On the question of actual upkeep, it is interesting to note that electricity used for power work is but 2d. per unit, whereas an equivalent amount of electricity if purchased in the form of the standard 45-volt block works out at about £10 per unit. Count this as several points in favour of A.C. mains!

Consider the valves themselves. Those designed to operate from A.C. as a means of liberating a controllable electron stream can be made far more efficient, both mechanically and from an electrical point of view. Better characteristics are available. Microphonic valves are a thing practically unheard of when using the heater type of valve.

Receivers can be built as one unit without a host of batteries and wires, which, however tidy cannot be called an ornament. One of the great drawbacks in the past has been an interfering hum, but with a carefully designed receiver and power unit no hum should be audible more than a few inches from the speaker. So that, taken all round, A.C. sets greatly outweigh in every detail their brother battery receivers.

Now let us compare the different types of valves that can use raw alternating current on their filament. First comes that known as the 226 type. This is a three electrode valve which has a thick filament whose temperature does not vary greatly with changes in the operating voltage. A pressure of 1.5 volts is necessary and from 1 to 1.5 ampres is consumed, depending upon the make of valve. In use these valves are connected up as any direct current valve; except that the grid return is connected to either a centre tapping on the transformer or the centre tap of a potentiometer connected directly across the filament terminals. As in all receivers using A.C. valves, the filament leads have to be of heavy gauge wire to carry the current and the filament wires in all cases are twisted to reduce their fields.



Regenerative receiver employing separate bias on valves, which are supplied by a four-volt winding.

Next comes the heater type of valve. Instead of the filament itself being heated to liberate electrons, the filament in the 227, or heater type of valve, is made use of to heat an independent cathode, which is generally in the form of a tube surrounding the filament and coated with thorium oxide. This cathode then takes the place of the filament in the more well-known triode. In order to keep the filament proper at earth potential the cathode is usually connected to the centre tap of the filament transformer or potentiometer.

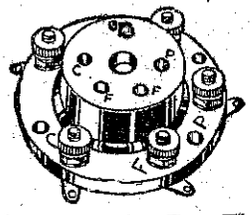
The filament voltage for the heater type of valve varies with different makes. The American standard is at 2½ volts, while the European standard appears to be fixed at 4 volts applied to the heater filament, and transformers are available for either type of valve.

The final stage of a multivalve receiver usually employs any of the well-known power valves with raw alternating current used on the filament similar to the 226 type. No appreciable hum is introduced by this method.

It is safe to prophesy that in the near future A.C. sets will be designed to use valves throughout of one filament voltage. Already the new power valve type, 245, is available, which uses a 2.5 volts filament, and this can be used in sets in which the heater type valve using the same voltages is used in previous stages. Similarly in European method, the four-volt heater valve can be used in conjunction with the 4-volt power valves already available, and the same filament winding on the transformer is used for any and all stages. It will be appreciated when it is stated that it is fatal to make the mistake of plugging a 226 type valve in the last socket of an A.C. receiver, where a filament voltage of 6 is provided.

In cases where the constructors think of converting their sets, the use of either the 2.5-volt or 4-volt type of valve is strongly advisable, not only from the point of expense, but also from the ease in converting.

The discussion until the present has been from the point of view of A.C. filament supply. There are other batteries—namely, the "B" and "C," that have to be considered and eliminated before a set can be said to be A.C. operated. As there are so many different types of "B" and "C" eliminator units on the market, a method which at once suggests itself would be to use one of these in conjunction with a filament heating transformer. An article dealing with the construction and application of a "B" and "C" eliminator would be too long here, so it will be assumed that the listener intends installing the "B" and "C" unit and adapting his set for the use of A.C. valves, using the same filament voltage throughout.



A Valve Socket for Four-Element Valves.

It has been stated that transformers are available for either type of heater valve and it must be first decided upon as to which valves are to be used. If the listener so desires a filament heating transformer can be constructed. Valuable information on this subject will be found in the "Radio Listeners' Guide." Care must be taken to have heavy enough secondary wire to carry the high current necessary. As an example a four-valve receiver using four 227 type of valves has a current consumption of 4 x 1.75 amperes equals 7 amperes, and the secondary would have to be wound with 12 s.w.g. wire. Using the four-volt series of valves which consume .9 amps. each, the total current would be less and a secondary winding of 16 s.w.g. would suffice. However the construction of transformers is outside the scope of this article, and the writer simply suggests that a tranformer of correct secondary capabilities is desirable, leaving the type or make to the reader's choice.

CONSIDER the wiring diagram for a minute. This is the theoretical circuit of a Browning Drake whose filaments operate from A.C. using the indirectly heated filaments. One or two outstanding points will be noted. In the first place the radio frequency valve has been given a negative grid bias. This is advisable, not only from a point of view of "B" consumption, but also for the sake of selectivity. A bypass condenser of .5 or 1 mfd. capacity bypasses all high frequency, making the receiver more stable in operation. When using indirectly heated valves the valve of the grid leak resistance, although not critical, can be of a lower resistance than usual. A valve of 1 megohm is quite suitable. In each case the cathode of the valve has been connected to earth and the potentiometer shown on the right is advisable as a hum control.

Only one circuit is given, but other circuits such as the neutrodyne, etc., can be arranged along similar lines. The last audio valve it will be noted employs an ordinary three-electrode valve. In the case of the 227 type of valve taking 2.5 volts filament voltage, either a similar 227 indirectly heated or one of the new 245 types of power valves can be used. If the four-volt series are decided upon it is not difficult to procure a four-volt power or super-power valve.

A FEW hints as to the actual conversion from the existing batteries to A.C. operation would perhaps be advisable. Most of the standard A.C. valves employ special five-pin bases and existing sockets will have to be changed for these except the last audio stage, which still retains the standard U.X. type. A diagram of the different connections on the five-pin base is given, and when wiring it will be found advisable to employ twisted heavy flex for the filament leads. The cathodes in all cases are connected together and treated as the A— wire in the old D.C. set.

When using A.C. valves the old method of using filament rheostats for volume control is unsuitable. No filament resistance should be used and as a suggestion the position of the rheostat can be taken by a potentiometer or volume control, which in

(Continued on Page 45.)

High Resistance Connections.

THE volume rheostat of "License Number 27807" has to be turned full on to get passable reception, when suddenly the volume rushes up very strongly and the rheostat has to be turned down again.

A.: It appears as though either in the speaker cord or in the receiver itself there is a high resistance connection, which at all times allows a certain amount of current to pass. When the resistance breaks down or is broken down and everything comes up normal. We suggest that the correspondent takes his speaker cord, and while the set is in operation, pulls it about to see if anything happens. If it does replace the cord. Take a piece of stick and move different wires about, likewise looking for its effect. Examine the valve springs to see that tight connections are being made. If any resistances are in the circuit, examine them as carefully as possible, and test them by the 'phones and cell method. Likewise test transformers and condensers.

Crystal and Amplifier.

WOULD it be possible to add another amplifying valve to Pentode's crystal and amplifier to work from the A.C. mains? Asks "L.B." (Christchurch).

A.: Yes, but the circuit would need several fundamental alterations. It will require a separate article, and this will appear in a future issue.

2. Would it be possible to add a detector valve using an accumulator for the filament and getting a plate current from the A.C. set?

A.: Yes, but we will need to describe this apparatus more fully.

Aerial Trouble.

A.S. (Wellington) has a crystal set which works a loud speaker, and thinking to still further better his reception, erected a high aerial. Contrary to expectations, this aerial weakened reception.

A.: The correspondent has omitted the vital point from his question. He has not stated the direction of either his old or his new aerial. On the surface it would appear as though the old aerial were directional to the station, whereas the new one is not. This would weaken reception considerably.

Coil Specifications.

G.H. (Otahuhu) has made the 2RF Browning-Drake, but has not had success. He is intending to make a few alterations including throttle control. He asks also for more coil particulars.

A.: See the specification for the All-Electric Browning-Drake published in this issue for coil specifications.

2. Am I right in joining the tickler coil to the top of the tuning coil, so that the plate lead of the tickler coil is joined to the moving plates of the grid condenser?

A.: In condenser control reaction, where both coils are continuous, the common lead goes to the filament negative or cathode and B negative. The end of the tickler coil goes to the moving plates of the reaction condenser, the fixed plates of which go to the plate lead, which goes to the transformer. B plus connects as usual.

R.F. Booster.

S.W. (Northcote) has constructed an R.F. screen grid booster, which he cannot get to function properly, as the circuit is a straightforward one, it would appear that it would be almost impossible to track the trouble without putting instruments on it. We can suspect only the R.F. choke, which, if defective, would by-pass all signals to earth. A broken-down condenser would likewise cause trouble. The coil which is small to limit the field and thus prevent interaction, appears rather unsatisfactory. A binocular or toroid would be more effective.

Various Points.

A.F. (Ohura) asks: 1. Should the Lead-in wire be insulated?

A.: If uninsulated there is a great possibility of short-circuiting with such earth objects as a wet wall, guy-ropes, roof, etc. It is far preferable to keep these leads insulated.

2. Could you give me information about the Stewart Warner No. 315?

A.: Communicate with the Stewart Warner factory representatives, Hope Gibbons Building, Dixon Street, Wellington.

3. What is the charging rate of radio batteries?

A.: They vary according to the amp. hour capacity of the batteries. A small single cell may be charged at half an amp, whereas a 100-amp. hour battery could be charged up to 5 amps.

4. Is the "Northern Primary Battery" made by Seaman's suitable for charging accumulators?

A.: We doubt it, but for further information about this battery, communicate with Cory-Wright and Salmon, Box 1650, Auckland.

Transformer for Small Set.

I HAVE heard that a bell-ringing transformer can be used for a small A battery eliminator, writes "E.H." (Wellington). Is this so; if not, could you describe a suitable transformer for this purpose?

A.: It would be suitable if made to handle a great amount of current. The voltage tappings would not correspond with any well-known make of valve. Small transformers can be purchased which should have a secondary that will deliver four amps. or more. It is doubtful that the bell-ringing transformer will suit the purpose.

2. Why are small capacity condensers used in short-wave sets?

A.: Small capacity condensers are used in order to separate the stations on high-frequency by a reasonable space. Where a degree of the dial means the movement of a very little capacity, stations can be put farther apart than when, as in the broadcast band, movement means a great deal of capacity. Furthermore, the efficiency of a circuit is governed by the relation L/CR, where L is induction, C is capacity, and R is resistance; so that it is advisable to keep capacity as low as possible, and inductance (coils) as high as possible. The larger the condenser, the smaller the coil.

A.C. Amplifier.

G.T.H. (Christchurch) asks if the transformer described by Pentode for his crystal and valve set to work from A.C. mains would supply enough current for a .06 valve in the first socket, and a .15 power valve in the last.

A.: A .06 D.C. valve in the first audio stage could not be fed with A.C. current. A separate amplifier would have to be constructed, and this will be described in a forthcoming issue. Your further queries will also be covered by this article.

Static on a Crystal.

ONCE or twice a week, writes G.E.E., Lower Hutt, I get a noise like static coming through my loudspeaker, which I am working directly from a crystal set. It is only momentary.

A.: It may be a power noise, and, although this is unlikely, it is not impossible. You may have a loose connection, or something may be loose within the speaker. The speaker cord may be defective, and again it may be interference through another set.

2. Can you suggest a better horn speaker than the one I am using? I can hear this one all over the room, and even through the house.

A.: You are evidently getting very good results. It would be difficult to suggest a better speaker, although a very sensitive cone may give louder signals.

3. With regard to your third query, the fees vary, the minimum being about half a guinea an item.

2RF B-D.

I AM intending to construct the 2RF B-D, writes "J.W." (Timaru), and I want one or two points cleared up. 1. The shields "Radio Record" standard size are to be placed on a copper sheet, and the wires soldered to it. Can I remove the aluminium bottoms and mount my shields on this copper? The wires can then be soldered through it.

A.: Yes, drill the copper base so as to take the screws in the uprights of the shield supports. They can then be mounted quite conveniently in the manner you suggest.

2. As I am building a separate amplifier, would I put the condenser controlling reaction on the right-hand side of the detector shield?

A.: Yes. Variation is possible in lay-out, as long as grid and plate wires are kept short and free from one another and coil interaction prevented.

3. What was the difference between the lay-out and theoretical of the 2RF B-D in the "Guide"? I cannot see any.

A.: The difference did not occur in all the issues. The bias on the second radio valve is positive, that is, it is connected to the "A"+ instead of "A" —. The correct connection is shown in the lay-out diagram.

4. Will the transformers used in my four-valve B-D be all right in the five-valve B-D? Yes.

5. I cannot get the linen diaphragm to work properly. The tone is very metallic.

A.: Is there a tension of the reed of the unit? If this is so, it will have to be lengthened by the edition of a tap and coupling. Straining the unit will pull the reed over to one side, and cause the metallic tone you speak of. We regret that we cannot undertake testing, but a local dealer will do it for you.

Impedaformers Versus Transformers.

I HAVE an impedance coupled receiver. Would these be more suitable than transformers?

A.: If your set is two radio, one detector, and two audios, then you could change over to transformers with advantage, but if there are three audio stages, the addition of transformers would cause audio howls, and other troubles. The only way three audio stages can be operated successfully is with push-pull in the last stage.

Carrier Whistle.

HOW is it, asks J.C.C. (Fiji), that I can get strong carrier whistles, but cannot tune in the stations?

A.: The carrier of any station is always very much stronger than its modulations, and although this can be heterodyned with a set causing sometimes a very strong whistle, it is impossible to get the modulations owing to the weakness. This explains why Morse transmission carries further than telephony.

Speaker Terminals.

WHY have Philips loudspeakers three terminals?

A.: By changing a connection, the impedance of the last valve can be more nearly matched than with one terminal. Move the connections to the speaker from one to the other, until the best result is obtained. This will probably be with one of the red terminals.

Converting a Set to All Wave.

HOW could I convert my 6-valve factory-made neutrodyne into an all-wave set?

A.: Don't attempt it. Obtain a short-wave adapter and plug into the detector socket. Your aerial is a good one.

Transformer Designs.

CAN you design for me a transformer to give the following characteristics, writes Q.R.A. (Rotorua)? Input 110 volts A.C., output 5, and 8 volts A.C., 1½ amps., 200 volts and 100 milliamps.

A.: See "Listeners' Guide," latest edition, page 55." The following are the characteristics:—Core, 1¼in. x 1¼in.; primary, 28 gauge, 535 turns; secondary, 26 turns of 18 gauge for a 5-volt wiring, 44 turns of 18 gauge for the 8 volt turning, 1100 turns, 32 SWG, to give the 200 volts winding. If the rectifier has a high resistance, a few more turns will have to be added. For a valve rectifier the number of turns would be about 1042.

A Battery Charger.

I CAN get only a slight hum from my A battery charger, writes A.J. (Tauranga). I am using 280 valve and rectifier.

A.: The 280 rectifier will deliver only .1 of an amp. Use Philips 328.

Use of an Adapter.

CAN a short wave adapter be used with a small all-electric receiver? asks J.M. (Kelburn).

A.: Not satisfactorily. This receiver is designed purely for local reception, and has not a strong enough audio side for your requirements.

2. Can a wave trap be used to get other stations?

A.: Not with any satisfaction.

Converting a Set

(Continued from page 43.)

this case consists of a variable high resistance shunted across the aerial coil. The valve of this resistance can be 1 megohm. As a reminder to those who have not had previous experience of indirectly heated valves, the cathodes take quite 30 seconds to warm up, so that when first trying out do not be discouraged if nothing happens when first switching on.

Short-Wave

(Continued from page 48.)

talk was just audible on the same wavelength after PCJ had closed down—possibly 2XAF.

Another voice was just audible on about 46.6 metres at R2. Static was bad.

At 5.45 a.m. GBX, 100 per cent. readable, was calling 2ME, but apparently could not make contact. Later, when they were conversing, 2ME appeared to be poorly received in England, and, at that time, not audible here, though they were R9 a little later.

The German was very clear and steady at R9 from 6.30 a.m. It was all talk up till 8 a.m. What sounded like a political meeting was being relayed. Cheers and shouts often greeted the speaker, while one person—apparently near the "mike," often signified his approval, or otherwise, by a loud, shrill whistle.

2ME, R9, with severe fading, and GBX, R6, static bad, were heard about 6.45 p.m.

W6XN at 7 p.m. was R5, with rapid fade.

Morse QRM was bad at times on the same wave.

At 10.30 p.m. on about 24.2 metres at R3, weather and market reports were heard. Prices were given in sterling. A call was not heard, but think it was a harmonic of an Australian station.

RFM, R9, with talk.

5SW was tried at 11 p.m. Just before the hour, the tuning whistle could be picked up, but talk was much too weak to understand.

The Screen-Grid Valve

Lecture to Radio Society

AT the recent monthly meeting of the Amateur Radio Society Mr. L. Wright gave an interesting and instructive lecture on the screen-grid valve. In order to be more readily understood when he came to the action of this latest type of R.F. valve, Mr. Wright led up to the subject by explaining briefly the various types of valves and their shortcomings when used in the R.F. stage. The lecture started with methods practised years ago when R.F. amplification was considered to be useless. Certainly in those days practically no amplification per stage was obtained, the reason being that in order to prevent the valves from oscillating resistances had to be introduced, which completely damped any amplification obtained. Screening was introduced many years ago to prevent interaction between the various coils and leads, but this only partly cured the trouble. It was realised that the small capacity between the various electrodes of the valve was quite sufficient to cause instability. No genuine solution was available until the neutrodyne method was introduced, in which the valve capacity was neutralised by an equal and opposite capacity working directly against the capacity inside the valve. This is the method still used on most commercial receivers. Even this has its drawbacks, as Mr. Wright explained. To neutralise a receiver on its lower wavelength reduces the efficiency on the higher wavelengths. Yet another method of stabilising was mentioned, in which a non-inductive resistance of 600 to 800 ohms, is introduced in series with the grid lead. This method, again, is still used by many manufacturers. About two years ago Capt. Round in England put an idea into practice. A fourth electrode or second grid was introduced between the control grid and the plate. This grid, although giving a positive potential, was used to reduce the capacity between the control grid and plate. The result was the well-known S625 type of valve. In appearance it is of tubular shape, with the connections of the electrodes coming out at either end. Before discussing the various circuits adaptable to this valve, Mr. Wright explained, with the help of actual valves, the construction and advantages of later types of the screen-grid valve. These were adaptable to the standard four-pin American and English sockets, and can be incorporated in existing sets by making minor alterations to wiring, etc.

As the valve had a very high impedance the tuned anode method of coupling was the only one to be used if the maximum amplification per stage was to be obtained. Unfortunately a tuned anode circuit is not ultra-selective, and to minimise this disadvantage a circuit is available on which the plate circuit of the screen-grid valve and the grid circuit of the succeeding valve were tuned. This constitutes the well-known band-pass filter or tuned plate tuned grid coupling. There were one or two points that Mr. Wright stressed most strongly. In order to get the very most from a screen-grid valve all inductances must be of low-loss construction and perfectly screened. Poor screening, if not resulting in instability, gives poorer quality and is a sure method of introducing background noises. This absence of background hiss is one of the main advantages to be obtained when using the screen-grid valve, and it can easily be marred by introducing feedbacks due to poor screening.

Grid Bias for A.C. Receivers

Three Distinct Methods

BY "CATHODE"

THE problem of providing grid-bias for the now popular a.c.-operated receiver is one that at some time or other has exercised the minds of most designers. The simplicity and the technical advantages of deriving bias from dry batteries are largely discounted by the popular prejudice against what is regarded as a compromise, and indeed there is much to be said for the elimination of a battery whose modest dimensions render it apt to be forgotten, and whose unnoticed failure involves also the probable failure of an expensive set of valves.

As to the possible methods of biasing without batteries, there seem to be three methods which may be adopted, one of these methods, as wi be explained, being capable of a number of modifications, while one provides bias for the last stage only, leaving the previous stages to b biased by one of the other two methods or by batteries.

Separate Rectifier Filter.

THE three methods are:—

(1) Employing a separate rectifier-filter combination similar to that commonly employed for plate-current, or B supply, but connected in reverse; that is to say, the terminal which would ordinarily be used for supplying plate current at maximum potential is connected to the filament circuit of the receiver, while the various negative biases are tapped off at suitable intervals along a potential divider connected across the output. Fig. 1 illustrates the arrangement, also showing the method of by-passing with condensers and series resistances to avoid back coupling. This method of securing grid-bias is one that can be thoroughly recommended, its principal drawback being the expense involved in providing the additional rectifier and filter; another slight drawback is that, in the absence of a very high resistance voltmeter, it is difficult to determine with any accuracy just what negative voltages are available at the various tappings.

A Variation.

METHOD two is really a variant of the above, but, since its expense renders it practicable only in high-power work where bias voltages of the order of 100 or more are required for power valves of the UX250 or LS6A type, it will not be treated in detail. The separate rectifier and filter of Method 1 is here used to provide plate current for all stages but the last, for which it still provides grid bias. This is accomplished by connecting the filaments of all stages but the last to the negative end of the small separate rectifier-filter, the transformer winding for feeding the filaments of the last stage, however, being very highly insulated and connected to the positive terminal of the separate rectifier-filter. It will be clear that bias for the last stage can be obtained by tapping the resistance a suitable distance down from the positive terminal, while plate supply for the previous stages is secured by tapping, the same resistance at suitable distances up from the negative terminal; in certain circumstances the same tapping would be C— for the last stage and B+ for the prior stages.

Technically, this system is ideal for high-power work, but it suffers from two slight disadvantages: firstly, expense, and secondly, the output voltage of the separate rectifier-filter is added to that of the big rectifier-filter for the last stage, the combined voltage requiring some care in handling. Further, of course, the problem of providing bias for the prior stages still requires to be dealt with; the third method might well be made use of for this, however.

Bias through Voltage Drop.

THE third method, however, whatever may be its claims technically, certainly heads the list so far as popularity is concerned. Practically all the commercial A.C. receivers use it in one or other of its modifications. Briefly expressed, it consists in utilising the drop in voltage occasioned by the passage of the "B" current through a suitable resistance to provide negative bias; the "B" voltage is lowered by whatever maximum negative bias is required, so that the rectifier-filter combination has to be rated to deliver a voltage that much higher than would otherwise be necessary.

Considering the diagram of a conventional unit for supplying B and C current to an A.C. receiver employing a 171 type valve in the power stage (see figure 2), it will be seen that if the centre taps of the filament windings for all valves are connected to the point marked —B, the whole of the plate current drawn by the receiver passes through that portion of the tapped resistance between the points marked —B and —40 volts.

The method employed to determine the value of the resistance required to produce any given voltage drop (and consequent bias) is a simple application of Ohm's Law. In its common form:

$$I = \frac{E}{R}$$

it is not very convenient for our purpose, so we multiply through to turn it to the form

$$R = \frac{E}{I}$$

We wish to obtain in the first instance 6 volts negative bias for a group of 226 type valves, and we will assume that a measurement (or a calculation) of the total "B" current (including the few milliamps that are "wasted" by passing right through the tapped resistance) shows its value to be 48.9 milliamps or .0489 amps. Knowing that the resistance required is found by dividing the m.f. in volts by the current in amperes, we put

$$R = \frac{6}{.0489} = 123 \text{ ohms.}$$

So that to secure the six volts bias required we must put a resistance of 123 ohms between the point marked —B (and to which the filaments are connected) and that marked —6 volts. To obtain the additional 34 volts negative bias to make the required total of 40 volts negative we require

$$\frac{34}{.0489}$$

or 695 ohms resistance between the points marked —6 volts and —40 volts.

But it is not essential that the whole of the plate current should pass through one resistance in this manner and, in fact, there will be less chance of undesirable interaction if this is not the case, (incidentally, an A.C. circuit embodying the 226 type of valve in R.F. and first audio). Fig. 3 shows in a practical manner the method of biasing a receiver employing a 171 or similar type valve in the last stage, an indirectly heated type 227 or similar detector, and a number of type 226 valves, of which only two are shown. It will be seen that here R4, connected between the filament centre-tap of the 226 valves (obtained by the centre-tapped resistance) and B—, is virtually in parallel with R5, which similarly bridges the centre tap of the 171 filament and B—. Thus, in calculating the value of R4, the total plate current of the 226 type valves only would be taken into consideration, while the basis of calculation for R5 would be the plate current of a single 171 type valve.

The Cathode Valve.

THE introduction of the indirectly heated cathode valve renders it possible to go still further in the

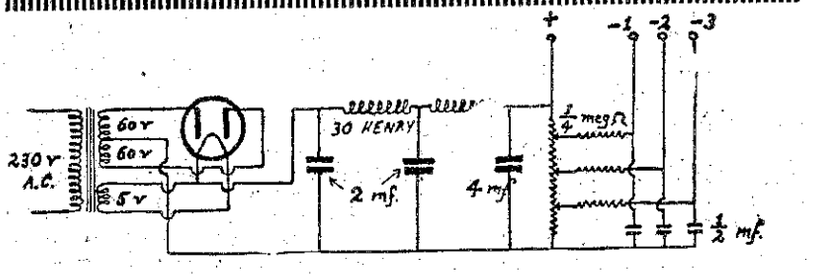


FIG. 1.—Diagram of Unit for supplying Grid-bias for an A.C.-operated or other Receiver.

Terminal marked + is connected to negative of B supply and to centre — taps of all filaments of receiver valves.

Terminal marked —1 supplies bias for high-frequency amplifying valves.

Terminal marked —2 supplies bias for audio-frequency amplifying stage.

Terminal marked —3 provides high bias for power stage employing 171 or similar valves.

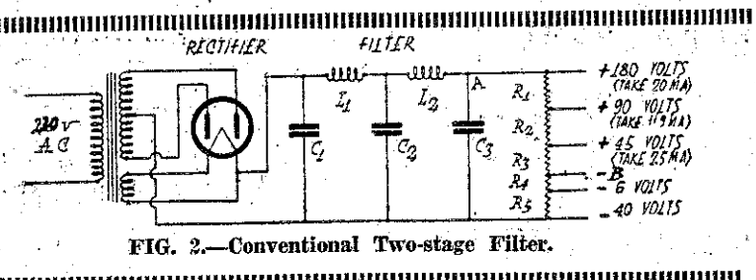


FIG. 2.—Conventional Two-stage Filter.

direction of having a separate biasing resistor for each valve, an aim which the writer heartily approves as reducing any possibility of interaction. As there is no connection between the cathode and the transformer, there is no obstacle to providing a separate path between cathode and "B—" for each valve, and the insertion of a suitable resistance in each such path will automatically provide bias. Regarding the respective merits of methods 1 and 3, the writer is not prepared to make any statement except that both are successfully used by different manufacturers, and either is capable, is a proper design is adopted, of giving every satisfaction in the hands of the amateur constructor.

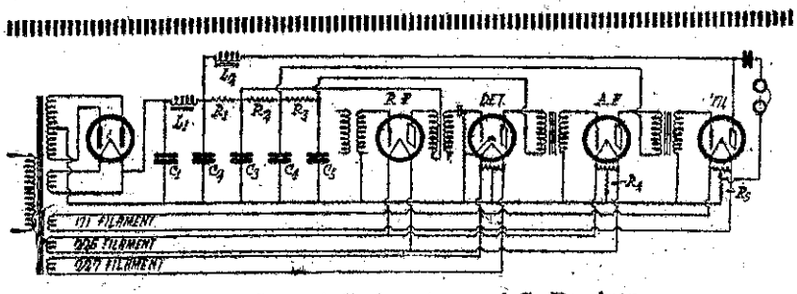


FIG. 3.—Current System to an A.C. Receiver.

For Sale or Exchange.

See page 48 for column of casual advertisements.

Hum Control and Bias.

Problems of A.C.

IN the early days of A.C. valves the question of the reduction of hum and grid bias was a difficult one. If alternating current is applied to the filament of a D.C. valve, the fluctuations in temperature cause fluctuations in the plate current. This results in A.C. hum. The development of the 226 valve with a broad strong filament to a very great extent overcame this, particularly so when the centre tap of the A.C. winding was connected with earth. This means that the difference in potential between the centre tap and the two extremes of the winding was direcly proportional to the numbers of turns on either side of this tap. If this tap is not directly in the centre, it can be seen that there is an element unbalanced in the valve, and as the grid is also at earth potential, A.C. hum is the result.

To overcome this, the centre tap must be at the exact centre of the winding, and when the transformer is amateur wound there is a possibility that the halves of the windings will not be perfectly balanced. Where this is the case a centre tap of resistance of almost any value providing it is reasonably low (40-400ohms) may be shunted across the winding and the centre tap connected with the ground. Were a variable resistance used, it may be varied so that all hum is eliminated. Commercially-made transformers rarely require this potential divider (potentiometer) across them, as the centre tap has been made with the greatest of precision.

When grid bias is required, the procedure is much the same, except that a resistance is placed in series with the centre tap. The resistance is of a predetermined value, and will pass a definite amount of current, so that according to Ohm's law there will be a definite difference in potential between the end that is connected with the ground, and that connected with the centre tap. Thus the grid which is connected directly to the ground is still an earth potential, but the filament, although the P.D. existing between either leg is directly proportional to the windings, yet the difference between this and the ground can be varied by the resistance value. In this manner the filament is made positive to the same extent that in D.C. operation the grid is made negative.

The principle in the indirectly heated cathode type of valve has been explained in another article. The grid bias proposition remains the same. A resistance is placed in series which makes the cathode positive in relation to the grid. A centre tap with this latter type of valve is rarely necessary, though where hum cannot be reduced otherwise, the centre tap connected with the earth may improve matters.

Summing up then, the usual cause of hum is an unbalanced filament brought about by the centre tap not being connected to the electrical centre of a filament winding.

Short-Wave Expansion

THE commercial demand in the United States for permission to construct and operate short-wave radio stations is widespread. Radio companies, telegraph companies, Press Associations, oil prospecting concerns, Government bureaus, aeroplane operating enterprises, public utility co-operations and even apple-growers in the Far West are among the diversified industries that have applied to the Radio Commission for short-wave licenses.

Nor is this agitation for the construction of short-wave stations confined to the United States. Practically every country in the world is hastening to erect commercial stations using the high-frequency channels. Canada, France, Germany and Brazil and many other countries are increasingly making use of short waves for a variety of communicating purposes.

The World at Our Doorstep.

"AS we go to press (writes the "Radio News," America) an interesting demonstration has just been given of what the broadcast listener may look forward to later in the year. The services of thanksgiving for the return to health of King George, held in Westminster Abbey, London, on July 7, was broadcast by the British Broadcasting Corporation.

"Simultaneously, the broadcast was put on the air by Station 5SW, the powerful short-wave transmitter at Chelmsford.

"The programme, picked up on short waves by the National Broadcasting Company here, was rebroadcast by 68 stations associated with the N.B.C. claim.

"Listeners in the eastern part of the country were deprived of the major part of the programme, however, by an SOS signal from the s.s. Prince George (an odd coincidence of names), which was in collision with a coastguard cutter off Boston. This forced the powerful coastal broadcasters to shut down; though the remainder of the chain continued to retransmit the programme from Chelmsford.

"As an additional thrill, toward the close of the special broadcast, the N.B.C. picked up Station VK2ME, at Sydney, Australia. So that within a few moments, listeners in New York at approximately 6.45 on a Sunday morning heard a voice speaking in London at 11.45 of the same morning, and immediately afterward a voice speaking in Sydney, where it was 10.45 in the evening of the same date. Since the day, in New York, was one of sweltering heat, we wonder how many listeners realised that what to them was the dawn of a hot day, was, in Sydney, close to midnight of a midwinter's night?

"The foregoing item, in the light of previous announcements of co-operation between the British Broadcasting Corporation and our own National Broadcasting Company, promise much for the immediate future."

Short-wave Stations at Java.

IN view of the extended use made of the Holland-Dutch East Indies public telephone service, new transmitters have been brought into operation.

PLF, Bandoeng, works daily between 1 a.m. and 4 a.m. (New Zealand time) on a wavelength of 17 metres, and to cope with the traffic is being assisted by PLE on 15.74 metres, and the new station PLG on 18.8 metres. A fourth transmitter, PLR, on 27 metres, will eventually take over the entire night service. Most of these transmissions can be picked up in Great Britain.

A search should be made toward 11.30 p.m. (New Zealand time), when previous to the opening of the public service, gramophone records are transmitted as a test.

The Schneider Cup.

THE broadcast of the Schneider Cup race by 5SW was the only item of outstanding interest heard during the past week. Not expecting strong signals from the Chelmsford short-wave station at the time of the race, I was agreeably surprised to hear as much as I did.

Tuning in 5SW at 12.15 a.m. on the Sunday morning, their carrier was about R3 strength, but had not started transmitting. A howler was there, but went off before talk commenced. Soon after this the announcer gave the names of the competitors, numbers allotted to them, descriptions of the machines, etc. This, although weak, was about 50 per cent. readable. About 12.38 a.m. the roar of a 'plane was heard passing the "mike"; this was, I believe, the first lap of the first machines. From then 'planes were heard passing at frequent intervals, with the statement as to its number, which lap, time for lap and average miles per hour.

Readability varied; at times for several minutes this would be 100 per cent.; then it would decrease, and odd words be inaudible.

Strength, although weak all through, went off soon after 2 a.m., and by 2.30 a.m. only odd words were readable, not enough to understand what was said.

It was disappointing, after waiting so long and late, not to be able to follow the racing to the finish. Still, it was worth waiting up for, to get all that was to be heard.

A correspondent in Greymouth (Mr. W. R. J. Smythe) says in reference to the above: 'And from 12.30 till 3 this morning the Schneider Cup race—all received at splendid strength and quite worth waiting up for."

AN acknowledgment has been received from the National Broadcasting Company, Inc., New York, in reply to a report of station W3XL heard on June 25. Particulars were asked for as regards when they would be transmitting, wavelength, power, etc. The only particulars given are the following: "W3XL operates on a frequency of 49.83 metres, 6020 k.c."

THE General Electric Company, Schenectady, New York, were testing with another shortwave transmitter on last Friday, Saturday and Sunday, September 6, 7, and 8. This was operating on a frequency of 8650 k.c., or 34.68 metres. The call, W2XAC. There is a little doubt about the last letter. Christchurch and Otago correspondents say it is C, one local friend B, and another G. I tried several, each call sounding different, as far as the last letter was concerned, C being the favourite, can stand till something definite is heard.

Mr. S. B. Ekensteen, Christchurch, has sent along a long list of stations heard by him, 125 in all. This includes both long and shortwave stations on an "all-wave" set. Fine business.

Saturday, September 7.

5SW was better than usual. Big Ben came through at R7. A film criticism following was 100 per cent. readable. The speaker had the same opinion of the American accent that has been expressed in our local Press recently.

Columbia records filled the interval till the next talk, which was called "American Industrial Conditions." Readability was not so good later. At 6.15 a.m. a special "plantation programme" commenced.

PCJ was excellent at from R8, increasing to R9. A special talk to French listeners in Sahara was given.

Konigswusterhausen commenced at 6.32 a.m. with what appeared a relayed programme of music. Very good at R8.

GBX and VK2ME were both R8 with their regular duplex test.

PCJ during their afternoon transmission was spoilt by severe static. When closing, the announcer said. "The sun is now shining, the factory whistles are blowing—after six hours on the air I am going to have 40 winks."

KDKA with music from the William Penn Hotel was R7.

W2XAD, 19.5 metres, W2XAF, 31.4 metres, and W2XAC, 31.68 metres, all stations of the General Electric at Schenectady, were heard. 2XAD was the best at first, but went off in strength, when the latter, the new station, was the best. Volume was about the same as 2XAF, but was much more clear.

K2RM was tuned in at 9.40 p.m., when they were describing what I took to be a game of baseball. Strength R8. Static and surging bad. Later they were transmitting music, when strength had increased to R9.

PCK, on 16.3 metres, at 12 p.m., were heard calling, "Here is Kootwijk" and later were working duplex with a weak station on about 16.5 metres, one of the Java transmitters I expect.

5SW reported earlier in these notes.

Sunday, September 8.

DID not listen much—too tired after late night.

W6XN were transmitting the programme from KGO. They were only R7-8 at their best, not nearly so strong as a few weeks ago.

KDKA also were weak. Baseball scores at 2.45 p.m. were received at R5.

W2XAD were, as usual, quite clear, but not with the same punch. W2XAF and W2XAC, with messages and music for Commander Byrd and his party were both R8, the latter being the best tone.

Monday, September 9.

THE German's carrier was on at 6.30 a.m., but they were late in starting. Orchestral music was received later at good strength. 2ME and GBX during the early evening were R9 and R6 respectively. Both 100 per cent. readable. RFM, talk as usual at R9.

Tuesday, September 10.

5SW was again very good. After "Big Ben," Mr. Desmond McCarthy gave his regular book criticism. This was easy 100 per cent. readable at R8. Reception was perfect except for a slight gush.

At 5.48 a.m. some familiar nursery rhymes were heard—gramophone record.

From 5.55 a.m. Major James was heard in his second talk on "Old London" on "How 17th Century London Faced Disaster." This was a very interesting talk, well received.

Songs at the piano were heard later. A concert was relayed from the Queen's Hall from 6.30 a.m. The artists' names were given. Reception was not so clear at this time. GBX and 2ME were both R7, the English station being the easiest to copy.

The German is not quite so strong at 6.30 a.m. now. R8 to start, decreasing to R6 by 7.30 a.m. Reception was quite clear.

W6XN at 6.30 p.m. was R4-5, very unsteady. Talk about 75 per cent. readable. Reception poor. GBX and 2ME were both gushy but 100 per cent. readable.

W2XAF was tuned in at 9.45 p.m., when records were being transmitted.

Volume R9, static being bad. Their wavelength was slightly higher than usual, being given as 31.58 metres, 9500 k.c. (regular wavelength 31.4 metres).

This, it was stated, was a test programme for their listeners in Japan.

Wednesday, September 11.

5SW was not worth listening to. Strength R8, very gushy, not readable.

GBX was R7, 100 per cent. readable, talking to Mr. Farmer, of 2ME. Could not hear the Sydney station.

"Achtung-Konigswusterhausen," etc., was heard at 6.30 a.m. at R9. Talk only was heard all through up till 8 a.m.

2ME was very loud, with bad surging.

GBX was patchy, readability varying from 100 per cent. to very poor.

ZL2AX, Palmerston North, on 81 metres, was testing with gramophone records.

ZL2BE, Hastings, also with records, and calling Western Australia. Both were well received.

Thursday, September 12.

5SW was again poor. Rapid fading spoilt reception.

GBX, R7, rapid fade; not readable at first, but improved slightly. 2ME comes on later at R9. W6XN was only just audible.

The German was very good, with a varied programme of organ, orchestral and vocal items. R9 at 6.30 a.m., decreasing to R8-7 by 8 a.m.

2ME at 6.45 p.m. was extra loud. GBX was gushy at R8, but 100 per cent. readable.

RFM, R9, with his everlasting talk.

Friday, September 13.

5SW again very poor. A ripple and gushes spoilt reception. At times talk was about 50 per cent. readable with careful listening.

PCJ was also gushy at first at R9-8, but improved later. Volume increased to R9, decreasing again to R8 by 7.30, when they signed off. Some very weak

(Continued on Page 45.)

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