

Crystal and two-valve Amplifier--Britain and American Overheard--Growing Interest in Maori Pageant



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Melbourne Examines the Fading Problem by Measuring Signal Strength

Victoria has its fading problem just as has every broadcasting station, and some areas are particularly bad. The following article will give New Zealand listeners a glimpse of her problem, and of the facts in connection with transmission which are being discovered by the steady measurements of signals over the area surrounding 3LO.

By R. O. CHERRY, M.Sc., RESEARCH PHYSICIST, UNIVERSITY OF MELBOURNE.

FURTHER measurements of the intensity of the broadcast signals of 3LO, Melbourne, have been made in order to discover what service listeners-in are receiving, and in order to elucidate the transmission of wireless signals. Incidentally, information is obtained by such measurements of the efficiency of the broadcasting station at Braybrook. The writer published recently a pamphlet containing an account of the measurements which he had made of signal intensity of 3LO up to a distance of eight miles from the broadcasting station. More sensitive measuring apparatus has been devised and the measurements have been extended up to 30 miles from Braybrook, and some readings have been taken up to a distance of 60 miles from the sending aerial.

Several mathematical theories of the transmission of wireless waves over the surface of the earth have been developed, and it is from the results of measurements at distances up to 50 or 70 miles that tests of the validity of these theories can be obtained. Such measurements will help to elucidate, too, the cause of fading of wireless signals, a natural phenomena which causes serious trouble to listeners-in situated in parts of Victoria remote from Melbourne when receiving metropolitan stations.

The service which listeners-in are receiving from 3LO, and how it compares with standards laid down by the experts of the British Broadcasting Corporation and of the Radio Corporation of America will be first discussed, and following that the question of the transmission of the wireless waves will be referred to. Before taking up these matters a word may be said about the method of measurement used. In the measurements up to 8 miles from the station a measuring apparatus consisting of a loop condenser and valve voltmeter was used. In these tests this simple apparatus has been made more sensitive without being made very much more elaborate. The great advantage of the apparatus is its portability, and all the observations which have required the writer to travel some 1500 miles have been obtained using a motor-cycle. The loop used is collapsible, and it and the rest of the

apparatus can be carried on the motor-cycle.

More elaborate signal intensity measuring apparatus are generally used, such as that of the Weston Telephone Co., which has recently been purchased by the Research Laboratory of the Postmaster-General's Department, but this apparatus requires a special motor-car for its transport.

The simpler apparatus used by the writer is able to detect the signal from 4QG, Brisbane, and observe, too, the fading of that signal. Although it is not intended at present to study the problems of transmission at these very great distances, it is interesting to find that a simple apparatus costing but a small fraction of the larger instrument will do the same work. It has the additional advantage that, being very simply constructed, there is practically nothing to go wrong.

In order to judge the nature of the service given by a broadcasting station to listeners-in, certain arbitrary standards have been laid down which have been taken as fairly representative of conditions prevailing in both Great Britain and America. In the previous paper by the writer, standards laid down by the Radio Corporation of America were quoted, and it is interesting to find that essentially the same figures are found to be necessary for English conditions. Since the question of these standards is all important from the listener-in's point of view, we will quote Captain Eckersley's figures, as they appeared in the "Wireless World and Radio Review":—

1. Field strengths of 30 to 100 millivolts/metre. Practically a "wipe out" area as far as other stations are concerned.

2. Field strengths of 10 to 30 millivolts/metre. An "A" service area. The listener-in practically assured of an uninterrupted service, however near—within limits—to a source of electrical disturbance.

3. Field strengths of 5 to 10 millivolts/metre. A "B" service area. Assuming a good aerial, crystal reception is satisfactory. There may be slight interference.

4. Field strengths of 2.5 to 5 millivolts/metre. A "C" service area. Interference begins to present a serious problem.

5. Field strengths below 2.5 millivolts/metre. Reception becomes unsatisfactory.

As these figures will not mean much to many readers, we will translate them into corresponding distances from the station 3LO.

The "wipe out" area will extend about 10 miles from Braybrook and will include all the western and northern suburbs of Melbourne and most of the inner suburbs to the east, as far as Elsternwick, Armadale, Kew, and Ivanhoe.

An "A" service area, i.e., an uninterrupted service, will extend from 10 miles to 20 or 25 miles, according to direction. The following towns are about the limit of this area:—Little

River, Bacchus Marsh, Wallan, Ringwood, Dandenong, and Mornington.

The "B" service area in which there is satisfactory service on a crystal set with a good aerial is further out than has yet been fully investigated, but from the readings already taken we may say that an area within 30 or 40 miles' radius will be given this type of service. Since about 70 per cent. of the population of the State live within this area, it appears that the broadcasting station is giving a service where crystal reception can be generally satisfactory to the major portion of the population.

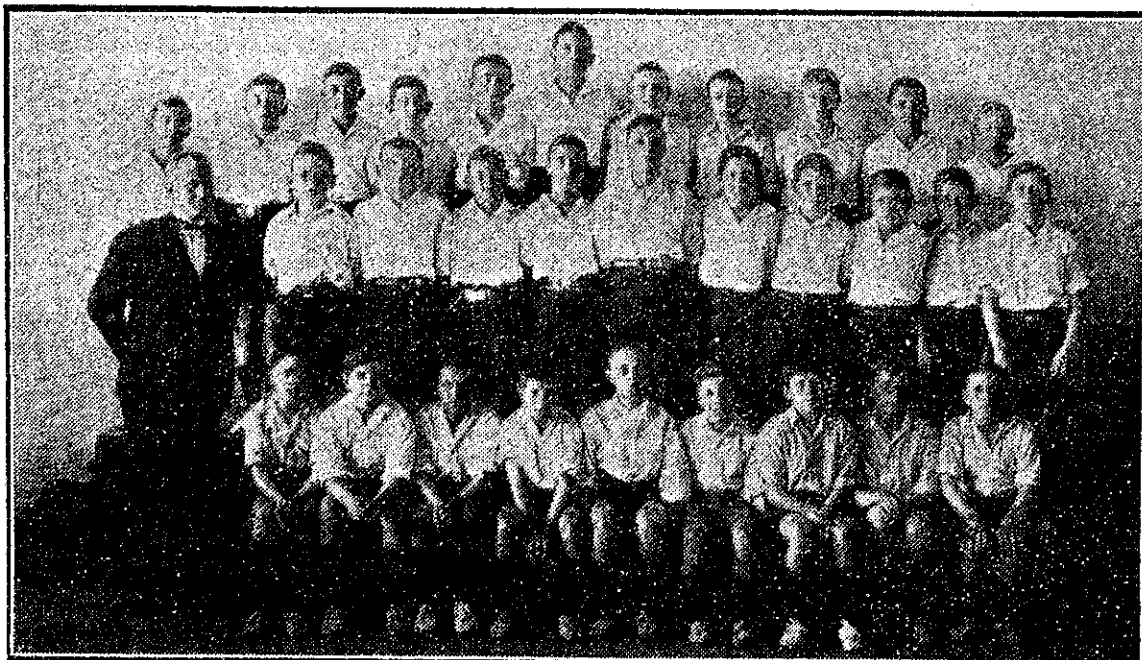
The boundaries of the "C" service area will probably be indefinite since hills and mountains are encountered to the west, north, and east of Melbourne within 30 miles. These will have the effect of disturbing the normal distribution of field strength, introducing local peculiarities.

As mentioned above, these standards are based on Continental and American experience, and it is assumed that such standards will also apply to Australia.

Comparison of these distances with those for stations in other parts of the world, brings out the fact that the area giving a satisfactory service is very large for a station rated at 5 kilowatts. This result was to be expected from the first series of readings.

One new and important fact that has come out of the work so far completed is the peculiar effect that hills have on the field strength distribution. From a number of observations, it appears that at the top of the hill the field strength is much greater than it is on the level ground at the base of the hill. In one case, the ratio was nearly 2.1 on a hill 300 feet high, and effects of the same order of magnitude have been observed elsewhere. The theory of this effect is far from complete and more observations will be necessary before the full details have been examined. This "hill effect," as we may call it, plays an important part in determining the nature of the service given to the listeners-in since the ground rises steadily to the west, north, and east of Melbourne, causing a natural increase in field strength over that normally expected. From the observations already taken, it appears that it is not merely the height of the hill that determines the increase in field strength but also its outlook in the direction from which the wireless signals are coming. Thus at Studley Park, at the top of a steep slope facing in the direction of Braybrook, the field strength is proportionately 25 per cent. stronger than it is at the top of Queen's College tower, 100 feet high, standing on ground higher itself than Studley Park.

Further work on these points is proceeding.



The Bayfield Boys' Choir, winners at the Auckland Competitions, 1927, who have sung from 1XA with much success.

—Tornquist, photo.

With Dealer and Customer

Getting Together To Solve Radio Problems

RADIO dealers of experience are looking forward to a first-class boom in radio throughout New Zealand during the ensuing winter. It is in winter that radio comes into its own. The summer months possess so many counter-attractions that broadcasting has to struggle against odds. The warm summer evenings entice people out of doors, and many folk will go to theatres and concerts in the summer, whereas in winter they prefer to remain in the comfort of their homes. Then it is that broadcasting provides a delightful diversion, means of entertainment, hobby—or call it what you will. The wise dealer will now put on his thinking-cap, and decide what stocks he will require. Past seasons offer a good basis when he is drawing up his buying plans. It is poor policy to be caught short on some lines, and the dealer must now exercise good judgment unless he is to have cause for regret. Strange though it may appear, practically all New Zealand has experienced famines in some lines during past winters. The trouble is due, sometimes to the wholesale houses not sending forward their orders soon enough, and consequent late delivery leaves the retail trade high and dry. Some lines of eliminator valves have been sold out lately, just to cite one instance.

A BRINGER OF BUSINESS.

A GOOD opportunity is offered some of the larger radio houses in the cities of New Zealand to advertise that they will give absolutely free advice on all radio troubles, by personal interview.

The experience gained in the answering of correspondents' questions, and where special conditions make it necessary by letter, the questions sent in by harassed set-builders, show that some method of personal contact with the inquirer is often desirable. This is due to two things. Firstly, the querist does not always possess sufficient technical knowledge adequately to state his troubles; and, secondly, many who wish to avail themselves of technical advice find great difficulty in writing sufficient data upon which the extent of the trouble can be based.

The personal interview is the most expeditious and satisfactory means of helping the radio public, and a radio house which employs an efficient man will find a steady increase of business by adopting this plan. Some radio

dealers in the United States are doing a roaring trade through giving personal free advice to the listening-in public. Here's a good bringer of business.

Radio reception for many listeners is spoiled by trifling maladjustments of the receiver. This state of affairs is usually very easily remedied, but the set owner is often puzzled to determine the location of the trouble. If he were encouraged to call at a dealer's for free advice he would gladly avail himself of the offer.

CORRECT NEUTRALISATION.

NO doubt exists in the minds of experienced listeners that much of the "howling" valve nuisance is due to neutrodyne or Browning-Drake sets which are incorrectly neutralised. It behoves every radio dealer to see that each neutrodyne or Browning-Drake set which he sells is correctly neutralised with the valves he sells with the set. Some neutrodynes have arrived in New Zealand with their neutralising condensers soldered in position so that they will "stay put." Now, this is clearly an error of judgment upon the part of the makers, for it is well known that owing to the system of mass production valves of the same make and type vary in characteristics. Therefore if a set is correctly neutralised under test in the factory it is not probably that it will be properly neutralised when it is sold in New Zealand with a different set of valves in it. Before a set is finally handed over to a purchaser the dealer should see that it is correctly neutralised, and he should also warn the purchaser not to change the positions of the valves. Some buyers are intelligent enough to be shown how to neutralise their sets if through some emergency it has been found necessary to place different valves in the radio-frequency stages. It is doubtless true, however, that the majority of those neutrodynes or Browning-Drakes which create the "howling" valve nuisance are home-built.

AVOID TECHNICAL TERMS.

AS a plain matter of common-sense radio dealers and their salesmen should rigidly avoid the use of technical terms when discussing their goods with a prospective buyer who admits he is a complete novice. Some of the most experienced men in the radio business are the worst offenders in this respect. There is nothing more likely to put a possible buyer off purchasing than to be inflicted with a long string of incomprehensible terms which are meaningless jargon, confusing and calculated to give the impression that radio is a highly technical affair necessitating deep study and abnormal ability.

ity. To a novice, radio talk should be readily understandable. There is really nothing necessary for a beginner to understand which cannot be couched in the plainest terms. An "expert" whose thoughts habitually run along highly technical lines should climb down from his pedestal, put himself in the place of his prospective customer and speak in the "baby" language of radio. It will mean no loss of dignity to him, and will capture a customer. The other day a city radio shop was the scene of an incident which bears out the above. The salesman was informed by the novice that he "knew nothing about radio." The salesman produced a radio set and then cut loose on "neutralising condensers," "anode potential," "C battery bias," etc., etc. After listening to about ten minutes' flood of this sort of oratory the would-be purchaser meekly asked, "What do you mean by the 'A battery'?"

CIRCUIT DIAGRAMS.

GOOD business methods should prompt radio dealers who sell "kits" to provide a circuit diagram with each. Many a purchaser of Browning Drake kits has been disappointed on opening up the parcel at home to find that the makers have not enclosed a diagram of the Browning Drake circuit. A "block" of the Browning Drake circuit can be made for a few shillings and some hundreds of prints from the "block" would cost a few shillings more. If the trader is disinclined to give the printed diagram of the circuit free to each purchaser of a kit he will find that no buyer will refuse to pay sixpence for the print. Those who stock kits whose turnover is not big enough to warrant the cost of a "block" and printing of the diagram could, instead, have a well-drawn diagram on view in their shops so that "kit" purchasers could draw their own copy of the diagram. Such details as these are invaluable aids to business popularity, which means goodwill and incidentally profit to the dealer.

OUTPUT UNITS.

NO conscientious radio dealer will sell a set with more than 90 volts B battery without advising the purchaser to use an output unit between the loudspeaker and the radio set. One of the finest and probably largest loudspeakers yet sold in Wellington had the wiring in the coils burnt out through excessive B battery voltage. The loudspeaker unit is now an absolutely necessary for horn-type as well as the cone-type loudspeaker. The output unit prevents the voltage from the B battery passing through the coils in the loudspeaker. One maker contends: "Just as fuses are placed in an electric circuit to prevent undue load being carried by the conductors, so should a filter circuit of an output unit be an integral part of every radio set, in order that only the useful speech currents reach the loudspeaker. Such an addition is a refinement which becomes an absolute necessity with a cone loudspeaker, or if a super-power valve is used in the last stage."

SOLDERING WARNINGS.

THE serviceman should exercise great care in attending to his customer's set. Faulty soldering will destroy or permanently weaken a paper condenser very quickly. Acid soldering flux or paste should never be used, as the slightest trace of acid may result in chemical action which will weaken the condenser. Condensers should not be allowed to become too hot from the soldering iron, and they should also be kept cool and well ventilated while in operation. They should not be operated at a heat beyond 110 deg. F., as the leakage mounts rapidly with the increase in temperature, and this in turn reduces the resistance, and therefore passes more current through the condenser. A little precaution will prevent many breakdowns.

WIDE RANGE OF PARTS.

MENTION has already been made in these columns to the advisability of radio dealers stocking the widest range of parts and accessories. "Last week," "Angus" (Lower Hutt) writes, "I went into one of the big Wellington radio houses to purchase nearly £4 worth of radio goods, but as one of the items was not stocked, I went round to the firm in the next street and bought my whole outfit there. My order obviously was not large, but what I would like to emphasise, is that the second shop I went to had a small crowd standing at the counter, while there was not a customer in the shop of the first company. I expressed my surprise at the busy state of affairs in the second shop to a friend I met there. His reply was, 'Well, these people stock a wide range, and the public have become accustomed to being sure of getting what they want here.' Comment is superfluous!"

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SEMI-PERMANENT CRYSTALS.

THIS New Zealand market now appears to be plentifully supplied with semi-permanent crystals, and several of these lines are strikingly efficient. Some makers do not include the necessary brackets for mounting these semi-permanent crystals. Retailers should stock suitable brackets for the crystals, as purchasers are not infrequently disinclined to buy an incomplete article. Anyone who has employed the better class of semi-permanent crystal detector would never go back to the less costly catwhisker type.

THE QUESTION OF SERVICE.

Fair business principles commend the practice of charging for the erection of aerials, testing old sets at the premises of their owners, etc., etc. Nevertheless, in New Zealand servicing is not a lucrative department. The manager of a big American radio company recently stated:—

"For the last two years we have been working to make our service department self-sustaining. We have calls for about every sort of radio service it is possible to think of. The work of the department includes installing new sets, remodelling old ones, replacing batteries and tubes, putting in extension cords for speakers, hooking up socket power units and trickle chargers, and trouble shooting of all kinds. We have all of the many demands for free service which other stores have, and possibly a few more every month. "In one way our store is similar to stores in smaller cities in that we have

a large number of steady buyers rather than selling to transient trade which buys once and doesn't come in the store again for years after, if ever. Competition, particularly in the matter of free service, is keen. To sell a certain customer a set, we are all apt to extend our usual term of free service much longer than we can afford to."

ABOUT AERIALS.

NEW ZEALAND radio traders will find that many of their customers have exceedingly crude ideas about aerials. They should be informed that an indoor aerial is usually satisfactory for local stations and eliminates much static and interference. It also gives greater selectivity than an outdoor aerial. However, an outdoor aerial gives range and volume, and therefore should be used for getting distant stations. If the aerial is only a few feet above the roof of the building, the height of the building has little advantageous effect. It is therefore advisable that the aerial should be as high above the roof as possible. All connections outside the house should be soldered to prevent corrosion. The lead-in wire should make as direct a line as possible from the aerial to the set. If the total length of the aerial and the lead-in wire from the aerial to the set is greater than 100 feet the selectivity of the set may be diminished. Loop aerials can only be used with sets which are designed for them, excepting, of course, neutrodynes, which may be successfully operated on an indoor loop, although an indoor aerial gives better results than the loop.

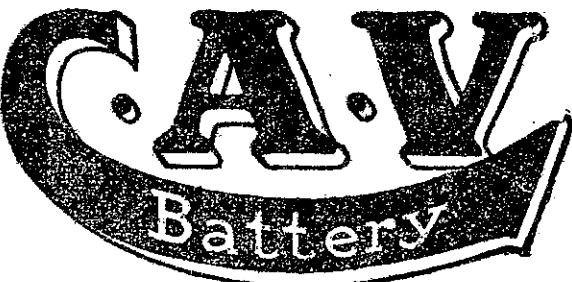
Correct C. Battery

Go into the shops of many New Zealand radio dealers and ask what amount of C battery is required by one of the popular makes of valves, and the dealer will look at you nonplussed. The time has arrived when every set employing audio frequency requires a grid-biasing battery. The following valve table should be cut out and kept handy by every dealer:—

Model.	Use.	Circuit requirements.	Amplifier B battery voltage.	Amplifier C battery voltage.
WD-11	Detector or amplifier	Transformer coupling	90	4½
WX-12	Detector or amplifier	Transformer coupling	135	10½
UX-112Aa	Detector or amplifier	Transformer coupling	90	4½
UV-199	Detector or amplifier	Transformer coupling	135	9
UX-199	Detector or amplifier	Transformer coupling	90	4½
UX-200A	Detector amplifier	Transf. or resist. coupling	Following	UX-200A characteristics apply only for detector connection
UX-201A	Detector or amplifier	Transformer coupling	90	4½
UX-222	Radio freq. amplifier	Special shielding	135	1½
UX-222	Audio freq. amplifier	Special shielding	180	1½
UX-226	Amplifier	Transformer coupling	90	6
UX-227	Detector A-C heater type	Transformer coupling	135	9
UX-240	Detector or amplifier	Resistance coupling	135	1½
UX-112Aa	Power amplifier	No. L.S.C. required	135	9
UX-120	Power amplifier	No. L.S.C. required	135	10½
UX-171Aa	Power amplifier	L.S.C. except at 90 v.	90	16½
UX-210	Power amplifier	L.S.C.	135	27
			180	40
			250	18*
			300	22½*
			350	27*
			400	31½*
			425	35*

The UX-210 valve requires a filament of 7.5.

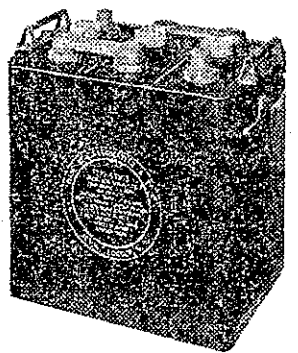
L.S.C. equals loudspeaker coupling of either choke coil and by-pass condenser or output transformer of 1 to 1, or step-down ratio, recommended where- ever plate current (D.C.) exceeds 10 milliamperes. The device known as a "siftron" serves the purpose adequately.



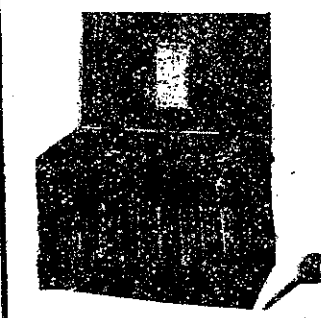
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How to Design and Erect a Successful Aerial

Practical application of principles and theories

By "M.I.R.E."

IN last week's issue of this column a discussion was commenced on the question of the design of aerial systems, and it was shown that certain factors of design were theoretically ideal. In this issue the question of the practical application of the principles discussed will be treated. Briefly, the ideal arrangement was shown to be one in which the aerial was as high as possible from a geometrical point of view in order that the electrical height (which is less than the former) should be as great a value as possible. The length of flat-top portion was shown to be a function of tuning rather than receptivity and the sensitivity of L and T designs of aerials insofar as their directional properties are concerned, were dealt with, the T aerial being shown to be uni-directional in receptivity, while the L aerial was found to be directional in a line from the down-lead end.

AN OBVIOUS COURSE.

Now these considerations are theoretical, especially in the case of the height, because the question where space is limited is, what is the best arrangement permissible in terms of the limitations. Very few people are inclined to go in for elaborate arrangements, especially when, as was stressed in our last issue, an elaborate aerial and a 4-valve set, and a modest aerial and a 5-valve set, will give the same results.

There might be a temptation to erect a forty-foot mast, but if a thirty-foot tree is available there is an obvious course to pursue—an extra valve is cheaper than a mast.

SOLVING THE PROBLEM.

Either in town or country the problem of aerial erection is best solved by selecting the two highest points on the property, such that the distance between them plus the length of the down lead does not exceed 150 feet. As far as possible, the whole length of the wire should be in the same horizontal direction, that is to say, if the flat-

top portion of the aerial is erected north and south, the lead-down and in-wires should come straight down and not point in any other direction, east and west for instance, especially if the down-leads are of a length comparable to that of the flat-top. Again it is not good practice to bring the down-leads in an aerial of the design back at an acute angle with respect to the horizontal portion, but the leads should be taken from the flat-top portion either at the centre (thus making a T aerial) or else at such a position as to enable the leads to be dropped vertically to the lead-in tube.

There are all manner of wierd notions in existence regarding the necessity of preserving symmetry of design of aerials in order to obtain balanced flow of currents, but although there is some method in the madness due to interesting phenomena called "reflections," these notions should be forgotten. The preservation of symmetry is neither here nor there when it comes to practical results.

AVOID ACUTE ANGLES.

Before leaving the question, however, it would be desirable to clear up definitely another point much debated amongst laymen (and amongst many people who ought to know better as well, incidentally) and that is, that the down-leads should always be brought down from the higher end of the flat-top, where the flat-top portion is not horizontal (that is, parallel with the ground). Remember the necessity to avoid an acute angle of down-lead to flat-top, so that if such a condition is going to result it would probably be better to use a wire as vertical as possible with the bottom end connected to the lead-in tube and receiver. When an acute angle occurs, although increased, effective, or electrical height is forthcoming, the actual receptivity of the aerial system is reduced, because of the fact that the currents picked up in the downleads, due to ether waves, tend to counter those picked up in the flat-top. If the angle of downlead to flat-top lies between 0 and 80 degrees this will happen to an increasing degree, as the angle becomes more acute. Thus two wires joined at one end (i.e., in series),

and running parallel to one another, should be entirely non-receptive, and this happens in practice.

MULTIPLE WIRE AERIALS.

Reverting to the question of the resistance of an aerial and the necessity to keep any losses at an absolute minimum, it was mentioned in our last issue that it is theoretically desirable to have a number of wires joined in parallel in both the flat-top portion, as well as the down-leads, in order to keep down resistance, and thereby avoid loss of signal strength.

Here, again, practice decides that a single wire is sufficient for reception, at any rate. As a matter of fact, the reason that multiple wire aerials came into being was because ships used them in order to be able to transmit efficiently on 600 metres wavelength. The average height and distance between masts of ships called for a standard design of tuning arrangement on a ship's set, and in order to meet this the number of wires in an aerial was varied according to mast dimensions. Invariably men-o-war used many wires in "squirrelcage" form to cope with the high powers of their transmitters.

To-day we see the majority of merchant ships with only one wire for transmission and reception, owing to new and more flexible designs of tuning arrangements. Here, again, the addition of some amplification in the shape of an extra valve will make one wire aerial perform with the efficiency of a four-wire aerial of a greater height.

A VEXED QUESTION.

The question of the insulation of an aerial is a vexed one. Why should an aerial wire be left bare, and yet kept insulated from masts, stays, etc.? Why does an aerial wire still work if the wire is covered all over with insulation? It is unnecessary to retrace the ground covered in last week's discussion, but it was pointed out that ether waves, in "cutting across" the wires of an aerial, set up electrical currents, which represent the energy to work the receiver.

Now, aether waves are capable of penetrating all insulators without hindrance, but when they strike substances which are conductors they give up their energy in the form of currents. Hence an aerial made of insulated wire is no different to a bare wire, because the aether waves ignore the insulation completely.

However, it is necessary to preserve the currents induced in the wire intact, in order to make full use of them, and the aerial is, therefore, well insulated to prevent their escape to earth, except through the receiver.

Aerials are very often seen with the flat-top portion composed of bare wire, and the down-leads of insulated wire, the impression being that the flat-top portion of the aerial does the picking-up, and the down-leads are for the purpose of carrying the results into the receiver. In view of the preceding explanations, it will be seen that this idea is very wide of the mark, as the down-leads are effective pick-ups, and form part of the active system of the aerial.

PAWNSHOP ADVERTISEMENT.

The practice has grown of fixing a metal ball to an aerial with the object of sometimes increasing the pick-up of the aerial, reduction of static, reduction of interference, etc. The only actual effect is to make an aerial look like an advertisement for a pawnshop. The metal ball increases the capacity slightly, has no material effect in reducing the resistance, its effect on static and interference is nil, and difference in pick-up is only noticeable where the ball is fixed to the top of a mast (without any flat-top) and a wire is brought down to the receiver. With or without the ball, slightly increased results will be noticeable with a local transmitting station when the ball is in circuit. There are many people who will recount wonderful results with these gadgets. The politest way of disposing of such claims is to say that they do not fit in with observed results measured with scientific instruments. Factors governing reception are so varied and legion in number that it is a very difficult thing to say definitely just what improvement

may take place due to some alteration of aerial system. The actual improvement, if any is noted, may be due to something quite different.

Without complicated measuring instruments it is impossible to make comparison of results, because ideas of signal strength cannot be carried in the head even for five minutes to justify a statement of other than very definite alterations.

Reverting to the directive characteristics of L aerials, unless the flat-top portion is at least ten times the height of the downleads there is no marked result. To get really definite results a wire 160 to 150 feet long about a foot or two above the earth is necessary. The Beveridge aerial used by the Transatlantic receiving stations on the American seaboard have a flat-top of over ten miles at a height of 80 feet! These are used on wavelengths approximating 14,000 metres. Directional effects may be often noticed with standard designs of L aerials, but the results are invariably due to either shielding or reradiation from close-by objects, such as buildings, trees, wire fences, etc. An aerial 100 feet long and 20 feet high would show no appreciable directive results if erected in an open paddock. This is not to say that it is inadvisable to erect an aerial east and west with the downleads from the western end if Australian reception is to be concentrated. The advantage gained is worth going after, because every little bit helps.

Here, again, an extra valve will be worth half a dozen directional aerials!

Summed up, then, an aerial should be as high as possible, have no acute angles of down lead with respect to flat-tops, have a short lead from lead-in tube to set, and set to earth connection, and the resistance should be as low as possible.

In practice, however, a compromise will usually have to be effected by making the best of the advantages offering in the shape of trees, etc., but the easiest method is to do the best possible and save worry by bringing a six-valve set in place of the proposed five.

WHY SOME HOME-BUILT SETS FAIL

CAUSES OF UNSATISFACTORY CONDITIONS

I don't like to be too direct in my accusations. In fact (writes "X.Y.Z." in the Melbourne "Listener-in"), I don't like to make accusations at all, and would much prefer to have any of my statements falling into this category termed as assertions.

Nevertheless, there is a question in my mind which has been there ever since I began experimenting with radio many years ago, and it has never been answered. In vain, I have tried to seek the information desired, only to be sidetracked in the end, until I found it necessary to arrive at my own conclusion in the matter, which conclusion is as follows:—

Ever since the early days of the crystal set and the single valve, we have had radio authors. And ever since the advent of radio authors we have had "distance records" which poor, ordinary mortals tried to equal or beat with but little success.

Times innumerable I have casually glanced through a story describing a new circuit or receiver, and, invariably, when I reached that part of the article dealing with "What it Has Done," I became sold through the prospect of receiving interstate stations every night in the week, and sometimes in the afternoon as well.

Now, as I said in the beginning, I don't like to make accusations, but doesn't it seem queer that the designer and author of the story on the "Blank" circuit plus a very few of the builders of this set incorporating the circuit, are the only ones to receive stations "thousands of miles away," while the majority of people who build the set do well to receive broadcasters within a 250-mile radius? It did to me, I know; but never having been able to secure a satisfactory explanation to the question, I set about to learn what I could for myself, and, as a result, I found both contracting parties to be equally to blame, though neither of them suspected that guilt rested on their spotless characters.

STUDYING THE FAN.

Let us view for a moment the actions of the set builder. In the majority of cases the investigator will find him to be a more or less regular "circuit fan." This type of addict is one, like yourself, who, when he sees a new circuit, immediately sets about to "throw it together" and see what it can do.

The first step followed by the "circuit fan" is casually to glance over the list of parts and to summarise what is needed to build the set. One look and he discards at least 50 per cent. of the apparatus listed.

"Two audio transformers," he reads.

"I have a couple of old ones home that will be good enough for a trial," he concludes.

"A five-megohm grid leak is what they specify for the detector. Huh! I don't suppose it would make much difference if I used that old two-megohm grid leak that I have laying around somewhere. They specify two .00035 mfd. variable condensers for tuning the antenna and detector circuits. Well, I can use those old .00035's if I take off a few turns from the coils. And there's another thing, the coils they used are wound on two-inch tubing. That old four-inch cardboard tubing I have at home will serve the purpose just as well if I leave off a few more turns.

"Gosh, this set uses four .5 mfd. by-pass condensers. Those things don't mean much, anyhow, and, besides, it's only a test I'm making, so I guess I can do without them, as well as without the radio frequency choke coil in the plate circuit of the detector valve. As far as rheostats are concerned, I won't have to use them in this test. I'll put six volts directly across the filaments; it ought to work just as well."

So friend hurries home that night and spreads all his apparatus on a broad board, and begins to wire the set with No. 28 wire, or worse.

We might be able to cut the tip off little Johnny's nose and still be able to recognise him, but when we twist his ears, blacken his face, cross his eyes and pull all his teeth, the poor child will find little maternal comfort by saying, "Well, mamma, here I am." And so it is with a radio set. We can take a few liberties and get away with it, but when we start redesigning it, it naturally follows that we have an entirely different set. A set with a hundred links that must be ironed out, and which, even after the flattening process, may be far from desirable.

Let us review just what our friend has done to change the characteristics of the set to such a remarkable degree. First, the use of the old audio transformers in place of the modern type will naturally result in inferior quality. Second, he substituted a two-megohm grid leak for the five-megohm grid leak which was specified. If you know anything at all about radio receiving sets, you will appreciate the importance of the grid leak and, particularly with the regenerative receiver, the rather critical requirements in the matter of the resistance value of this unit. In some of the more unstable regenerative receivers of bygone days, reception from a distant station could be destroyed entirely, merely by changing the value of the grid leak. Thus we find that the set builder, simply by making this substitution, has detracted at least 5 per cent. from the efficiency of the circuit as described.

MAKES DRASTIC CHANGE.

In his next substitution, he performs an operation upon the vitals of the receiver—the radio frequency tuning and neutralising system. In the first place, let us suppose that the receiver called for a detector tuning coil, comprising a primary and a secondary wound on a 2-inch former, the latter coil consisting of 75 turns of a certain size of wire, tapped at the sixteenth turn for neutralisation purposes. The set-builder makes a few comparative calculations and decides that sixty turns would be about right for the .00035 condenser. He then compensates for the fact that he is using a larger diameter tubing and does a little more calculating, reducing the number of turns on the secondary to thirty. However, in many instances, he fails to take note of the fact that the tap for neutralisation must also be changed, and instead of changing the specifications in this respect, he places his tap at the sixteenth turn as originally specified.

He makes his next mistake in eliminating the by-pass condensers, which, despite his belief, do play an important part in the operation of the receiver, though their effect may not be noticeable to the ear on reception from

local stations. His elimination of the choke coil in this particular circuit is fatal, for regeneration is accomplished by feed-back through a midjet condenser, which instrument is generally useless without assistance from the choke-coil in forcing back the radio frequency currents into the grid circuit.

In summation of all the substitutions we find the following:—First, the quality of reproduction in the receiver thus "thrown together" is terrible; second, the detector is not functioning at maximum efficiency due to improper value of the grid leak; third, the radio frequency stage is either unbalanced, resulting in squealing, or overbalanced, resulting in weak signals—both conditions being due to improper neutralisation; fourth, unstabilisation, due to failure to by-pass stray radio frequency currents, and, finally, lack of sensitivity is brought about through absence of regeneration in the detector circuit and incorrect grid biasing because of the absence of proper filament control.

AUTHOR TO BLAME, TOO.

However, the designer and author is not entirely without blame for the condition mentioned in the outset of this article. The design and perfection of the receiver he describes may have taken him anywhere from a week to more than a year, and the time elapsed between its completion and the writing of the story describing its construction may be considered, during which period it is quite possible that the receiver or copies of it have been tested many different times, and in many different locations.

Making allowances for the enthusiasm of the designer and author, it is easy to see that he would naturally credit all feats performed by a receiver incorporating his circuit to the system which is of his own invention or sign. Perhaps he does not fully take into consideration the location in which the receiver has been tested. Let us assume that three or four receivers incorporating a new circuit are distributed to various locations for test prior to the description of set for benefit of the public. One of the sets will probably be kept in, say, Melbourne, while another might be sent to a friend residing in, say, Sydney, certain sections of which are notable for their reception of distant stations.

The third set may be sent to a friend in Mildura, where stations to the north and south are easily received, while the fourth set might possibly find a testing place in Gippsland.

TESTS LAST WEEKS.

Let us assume that the test extends over a period of several weeks, during which time the receivers in the outlying districts are piling up some very enviable distance records. When the tests are completed, it is only natural that the designer of the set should combine all the reports of distant reception and credit his receiver with these performances. In the broader sense, however, the circuit is not entirely responsible for the reception it is credited with, since the locations in which the tests were made played a very important part. For greatest accuracy, it might be more equitable when mentioning records made by receiving sets incorporating new circuits to specify the particular location in which the test was made, the time of day and the comparative performances of other receivers, the characteristics of which are more generally known to the average fan.

Thus, we find that both parties are contributors to the disappointments that sometimes follow the building of a new receiver. In analysing my own actions, as well as those of other fans, I have gained a pretty fair idea of the set builder's position, and in fairness to all concerned I am sure that the builders are far more to blame than the designer, since the latter's error, if there is one, lies only in a slight over-enthusiasm, while the builder not only often disregards the carefully planned specifications set forth in the story, but in many cases may be accused of carelessness in building the set.

Radio experiments conducted under the direction of Professor N. I. Adams Jr., of Sloan Laboratory, Yale University, U.S.A., disclose the possibility of using a pair of matched piezo-electric crystals to control two or more broadcasting stations so that they can operate simultaneously on the same wavelength without producing heterodyne howls. This system, Professor Adams believes, may enable networks to use one wave and clear many channels, making it unnecessary to eliminate 300 broadcasters, as has been proposed by Federal Commissioner Pickard.

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A. J. HEIGHWAY,
Managing Editor,
"The N.Z. Radio Record,"

P.O. Box 1032.
Dominion Buildings, Mercer Street, Wellington.

WELLINGTON, JANUARY 27, 1928.

THE WONDERS OF WIRELESS.

The advances made in the technical perfection of radio have followed so closely upon the heels of one another that the capacity for wonder has become almost satiated, and one is prepared to accept everything as it comes as inevitable and in the due order of things. From this attitude there is required some little incident to thrust the real wonder home to the mind of the immense progress being made while we carry on our daily work. Such a thought-provoking incident is revealed this week by Mr. Sellens, the well-known Wellington short-wave enthusiast, in his record of having heard, on Saturday morning, a telephonic conversation between Britain and America so clearly as to follow the sense and text of the conversation. The feat of hearing either station concerned separately is no new one, and amateurs in New Zealand have already conversed with both countries. But there is something in the incident of New Zealand, twelve thousand miles from Britain, quietly listening to the very words of converse with America, which grips the imagination. The wireless telephonic service between U.S.A. and England has been operative for some time and there is now talk of extending the direct service from the United States to European countries. The beam service for commercial purposes has proved so efficient as to imperil the old cable services, and some combination and compromise for mutual good seems the obvious outcome. So far New Zealand's volume of business has not induced beam development, but a co-ordination of the services indicated would open to us the facilities and advantages of the Australian beam station. The world is hastening on all sides towards closer associations and quicker communications. The new service may be resisted in some parts by entrenched interests and may not at first receive that welcome that it should, but there will be no gainsaying the demand for progress. All aspects of radio in their quickened service to the public demand consideration; those semi-public bodies who, as yet, are loath to open to the newcomer those facilities which the Press, the first servant of the public, at first won tardily, and now hold as a privileged right, will inevitably yield to the public desires, and through radio the public will have at command the resources of the world for the speedy transmission of thought and the acquisition of news. Television, too, is coming, and with it the wonders of wireless would seem, for the moment, to be exhausted—unless then begins the big scale transmission of electrical energy without wires? Where will the end be?

RENEW LICENSES NOW

AVOID THE APRIL RUSH

SPECIAL FACILITIES OFFERED.

It is not generally known that arising out of last year's experience, and the congestion that was created after March 31st in the renewal of licenses, the Postal Authorities have arranged that radio listeners' licenses may be renewed from now on. This enables listeners to avoid the rush and delay that otherwise would take place if all waited till the expiry of their licenses at March 31.

Already, a number of listeners are taking advantage of this service, and "getting in early" by arranging their licenses for the year 1928-29. This is a very wise procedure.

Listeners, who are taking out new licences in the period between now and March 31, can also arrange for the payment of the license for the period 1928-29. This is a definite advantage as all motorists and others who have experienced the inevitable congestion attending the renewal of period licenses, know. The Department is to be congratulated upon this business-like course, which should certainly be a material help to the public.

Dealers in their contact with listeners, can help their clients and the Postal Authorities, too, by passing on this news and recommending early attention to the matter of next year's license. Some dealers make the practice of attending to the license on behalf of their clients, and this is a course certainly to be commended. It is practised by motor car firms, as they have found from experience that it is a courtesy appreciated by their clients. Time is a valuable factor with most people, and the provision of a supply of forms on dealers' counters and if necessary, slight assistance by them in the filling in of the required details and subsequent attention on behalf of their clients to the payment of the license, is a facility that is appreciated. The absence of such attention on the part of some dealers, leads, in many cases, to neglect on the part of a listener to take out a license for some months with a large number of people, this obviously means a considerable loss of revenue to the Broadcasting Company, and a consequent restriction of their ability to give listeners service. In the general interests of radio, therefore, it is important for it to be made easy for the public to pay license fee and for the radio trade to co-operate in the collection of those fees.

ARCHITECTURE

An interesting series of lectures on architecture is being given from 2YA by Mr. Stanley W. Fearn, A.R.I.B.A., F.N.Z.I.A., M.I.S.E. Mr. Fearn was born at Woodford, Essex, England, in May, 1887, and was educated at Woodford College and Bancrofts School,



Woodford. He commenced the study of architecture in London as an articled pupil in the office of Mr. F. Lindus Forge, and emigrated to New Zealand in July, 1911, was engaged as chief assistant to Messrs. Hoggard and Prouse, and has since been practising in Wellington, with the exception of the war period. Mr. Fearn acted for two years as chairman of the Wellington branch of the New Zealand Institute of Architects, and is a member of the council of that body. He also trained Mr. A. D. Connel, the first colonial to win the Rome Scholarship in Architecture. He was recently awarded the Atkins gold medal for architectural design, the award being made by a Jury of Award appointed in London by the Royal Institute of British Architects. This is the first time this medal has been awarded. He has carried out work all over New Zealand, including (in conjunction with Mr. S. Natusch) the Wellington court at the New Zealand and South Seas Exhibition.

Listening-in on the Old World

ENGLISH-AMERICAN CONVERSATION OVERHEARD

The remarkable experience of listeners-in on a two-way telephone conversation between England and America was enjoyed by Mr. F. W. Sellens on Saturday evening last. The conversation could be reasonably followed by Mr. Sellens—as is described in the accompanying notes—and the feat must be regarded as outstanding.

Mr. Sellens in his weekly report says:—

I have received advice from Messrs. Philips, lamps that PCJJ will be testing on their old wavelength of 30.2 metres on Wednesday and Friday morning from 6.30 till 9.30 a.m., New Zealand summer-time. This will be too late for good reception this time of the year. New Zealand and Aussie amateurs on short-wave telephony are still conspicuous by their absence, except an odd one or two.

On Saturday afternoon KDKA was heard, but was very faint. During the evening RPN put on some very fine music. KDKA and 2XAF were both weak on Sunday afternoon, the former being the best, but spoilt by morse interference. 3AJ, Rangiora, was testing, and RPN was on the air in the evening. Monday morning at 7 o'clock found 3LO, Melbourne, giving their usual weekly test programme. KDKA was also heard early transmitting musical items from their studio. This station has been heard on several Monday mornings recently, so they are evidently transmitting on 26 metres early every Sunday afternoon, Eastern standard time. 2LG, Goulburn, Victoria, and RPN, were heard during the evening.

RPN was the only short-wave station heard on Tuesday evening.

On Wednesday morning I was well repaid for getting up early, receiving music from the four corners of the globe. ANE, Java, on 31.86 metres, was the best yet, both in volume, modulation, and steadiness. The programme consisted of gramophone records and talks in Dutch, also some announcement in very good English. As on a previous occasion, he read a long list of persons who had sent reports. He also said that the next transmission would be to-morrow on 15.93 metres, at 6.40 till 7.40, G.M.T.

Another station (Dutch, I think), on about 42 metres, was tuned in at fair 'phone strength, but too mushy to understand much. Once he said in English, "Here is short-wave station —," but I missed the name or call letters. He finished about 6.15 a.m.

A little later, on about 22 metres, a voice was heard saying, "I don't really know the name of that myself," in a Yankee tongue, but was too weak just then to get any more. I then discovered 5SW was on the air, saying "Good-night, 2XAD," and then something about next Friday, apparently in reference to a talk I had not heard—but I am after them on Saturday morning. After saying good-night, he says, "As we say in England—Cheerio," followed by a hearty laugh. They then went off the air. I then went back to the station on 22 metres and found it to be 2XAD at much better volume, and giving musical items, but not any reference to 5SW.

PCJJ was forgotten till 7 a.m., when they were heard, but very weak. At 7.30 Big Ben was heard on the 'speaker with 3 of audio through 5SW, followed by "London calling" and "We will continue our talks on —," but could not understand any more.

COLOSSAL BROADCAST

AUDIENCE OF THIRTY MILLIONS.

Early last month the New York "Times" announced "A quadrilateral hook-up whose four corners are to be New York, Chicago, Hollywood, Cal., and New Orleans will 'unite the entire nation in one radio studio,' at which more than 30,000,000 persons will listen in next January 4, according to M. H. Aylesworth, President of the National Broadcasting Company.

"At that time Will Rogers, acting as master of ceremonies in Hollywood, will introduce Al Jolson in New Orleans, Fred Stone in Chicago, and Paul Whiteman and his orchestra in New York. The nation-broad programme will utilise the National Broadcasting Company and the American Telephone and Telegraph Company facilities and will serve to introduce the advertising of new automobiles.

From 7.50 till 8.20 p.m. Wednesday evening I got the previously announced transmission from ANF on 15.93 metres, music and a lecture being heard at good 'phone strength, but very unsteady and hard to hold on account of body capacity due to such high frequency. This is the shortest wave station I have heard on telephony. 2AP Wairoa was heard later in the evening.

On Thursday evening 4AF Gore; 2AP Wairoa; RPN Russia, and 4NW (Queensland, testing with 2BL, Wellington, New Zealand. (Not in my call book.)

ANF was heard again on Friday morning from about 5.45 a.m., quite good, but not so loud as Wednesday. They closed down about 7 a.m., after their usual programme of music, talks and request for reports.

An announcement was made that the next transmission would be from ANH on 15.93 metres on Saturday, January 21 from 12.40 till 14.40 G.M.T.

The foreign (thought to be Dutch) station on about 42 metres was again heard, some music this time, but too weak and mushy to get their call.

PCJJ started at 6.30 a.m., but was too weak to understand any announcements. At 7.30 the carrier only was just available.

Big Ben was heard very faintly at 7.30 a.m. through 5SW, but nothing further, except very faint talk.

On Saturday morning I found 5SW and 2XAD carrying out a two-way telephony test from about 6 a.m. Only odd words could be heard at first, but by 6.15 a.m. most of the English side of the conversation could be heard and parts of the American by listening to 5SW. Tuning to 2XAD, the reverse was the case, but signals were the stronger from England i.e. quite fair 'phone. The following is a sample of the talk from the English side: "At Big Ben a microphone is inside a football and stays there all the time." "How are you getting on with PCJJ these days?" (Answer not heard.) "This circuit is as good as the Rugby circuit has ever been." "I am going to put out a call some day—CQ, ABC. Ha! Ha!"

Then came something about "Wednesdays and Fridays programmes from you to us." "Can you give me any idea of the power you are using at 2XAD?" The reply was asked to be repeated, as 5SW could not get him at first, but I think he said, "7 Kilowatts." Another time he (the Englishman) was reading a report of reception from 2XAD spread over a period—"Signals strong, fading, slow and regular, modulation good, lady talking in studio, etc., etc."

The queried foreign station on 42 metres was good 'phone strength again this morning, but still too mushy to get call.

P.S.—It appears this week that it is a case of "the early bird catching the worm." The most interesting reception being in the early morning.

"The huge network is termed the greatest mechanical achievement in radio telephony. Its cost will be more than 1,000 dollars (£200) a minute for the hour's amusement. The fees of the four artists amount to more than 25,000 dollars (£5,000), the telephonic and mechanical facilities are costing more than 35,000 dollars (£7,000), and the station time is estimated roughly at 7,600 dollars (£1,520), according to the announcement. The total cost is believed to be the largest amount ever spent for a radio entertainment.

"Thirty-three stations are to be linked up for the programme which will be accomplished by special telephonic circuits using 12,000 miles of telephone wires.

"Three transcontinental circuits are to be used. One will serve the broadcasting stations, the second will transmit the contributions of the four performers to New York where they will be transmitted to the broadcasting station circuit. The third circuit will be for emergency purposes in case the weather affects the second."

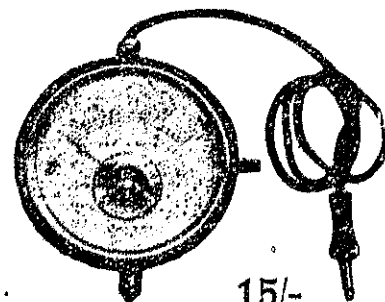
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NEW RECEIVING TUBE

GREAT FUTURE PREDICTED

TESTS UNDER WEIGH.

(By "Modulator.")

A new type of receiving tube has just been placed on the market which, if the prophets are correct, is destined to perform wonders in the field of radio frequency amplification.

This tube is called the VX 222 and differs from other usual types of tubes in so far as it has four electrodes. The usual grid filament and plate are present but in addition there is a double grid which entirely shields the plate. On account of this arrangement it is called a "shield grid" tube. It should be noted that the term to be used is not "shielded grid." It is shield grid on shielded plate.

The tube fits the conventional VX socket but the terminal connections to the grid in the 201A type connects to the shield grid in the 222 type. The control grid in the case of the new tube is brought out to a metal cap on the top of the glass bulb.

The main feature of the new tube is the low grid-plate capacity which renders it highly suitable for use as a radio frequency amplifier.

The 201A tube has a capacity of 10-15 micro-microfarads which, if oscillation is to be prevented, requires neutralisation.

The 222 tube, however, has a capacity of only 0.278 micro-microfarads, or about one five-hundredth of the capacity of the 201A.

When used as a radio frequency amplifier, a voltage gain of 200-250 has been obtained on the longer wave lengths, and 40-45 on broadcast wave-lengths, as against 8-10 with a 201A.

The filament voltage required is 3.3v at a current of 1.32 amperes. A negative bias is required on the control grid it is convenient to light the filament from a 6-volt supply through a rheostat and utilise the voltage drop over portion of the rheostat to obtain this necessary bias.

It is stated that one 222 tube used in a suitably designed circuit should give results as good as a superheterodyne using old type tubes.

In order to take full advantage of the properties of the new tube it is necessary for it to be well screened from outside influences. For this purpose metal cups can be obtained which slip entirely over the tube leaving only the metal cap at the top of the tube protruding.

One of these tubes was used as a short wave radio frequency amplifier on the recent occasion when WGV, Schenectady, rebroadcast the short wave transmission of 2FC, Sydney, and on short wave the new tube is said to bring in long distance stations like locals.

The writer is the proud possessor of one of these tubes—probably the first and only one in New Zealand—and is at present making up a stage of radio frequency amplification for use with his short wave timer. If results come up to expectations, we shall probably arrange for a further description of the apparatus.

THE CAUSE OF FADING

A REMARKABLE PHENOMENON.

The "radio roof," an ionised region in the upper atmosphere that causes radio concerts to wax and wane, is about 160 miles above the earth during daylight, and as night falls the level of the "roof" climbs as high as 400 miles, according to observations described recently at New York by H. A. Heising of the Bell Telephone Laboratories, who reported the findings at a meeting of the Institute of Radio Engineers.

He said measurements of waves between 57 and 111 metres in length revealed that the invisible ceiling rises at a rate of about six miles a minute and falls at the rate of twenty miles a minute. This unstable surface in the sky acts as a mirror and causes the ethereal signals to fade.

CANCER ON THE LIP AND TONGUE IS ON THE INCREASE.

So says Wm. J. Mayo, Surgeon, Rochester, who attributes the cause to the habit of smoking.

Smokers be warned before it is too late. It is so easy to stop smoking. ANTI-BACO is a thoroughly effective remedy, absolutely harmless. ANTI-BACO takes away the craving and rebuilds the system already damaged by Nicotine Poison.

Write to-day for descriptive booklet and wonderful testimonials.

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43 WILLIS ST., WELLINGTON.

Get Ready for Maori Pageant on February 6

KEEN INTEREST BEING TAKEN IN MEMORABLE EVENING.

Advices received from many quarters indicate that keen anticipation is being directed towards the evenings of February 6 and 7, when the Maori Radio Pageant descriptive of the full life of the Maoris in New Zealand will be given in six phases. We hear on all sides of parties being arranged to listen at friends' houses, and we know of one enterprising country dealer who has hired a hall for the purpose of giving the greatest pleasure to the greatest number. The success which met the previous broadcast of Maori songs and voices—that from Otaki College—assures listeners of an evening of outstanding delight. There will be solid backing of history and literary knowledge on this evening which will, we assure listeners, be memorable indeed. The programme on February 6 will extend from 8 p.m. to 10.30 p.m., and on February 7 will be repeated, starting at 11 p.m. and continuing till 1.30 a.m. for the 'special benefit of overseas listeners. We understand there is a likelihood of some Australian stations rebroadcasting the programme, the start of which corresponds with 8.30 p.m. Sydney time. New Zealand residents in Australia will thus receive an unexpected contact with their homeland, while the Dominion as a whole will be brought prominently and interestingly before the Australian and Oceanic public.

Our issue of next week, February 3, will contain full details of the programme, and in addition special photographs and letterpress relative to the evening. The issue will be of a souvenir character, for which we anticipate an extra demand. Orders for extra copies that may be required should be placed early. Some of the photographs that will be used are especially historic and comprehensive.

BILLING ELECTRONS

"The times at which multiple reflections occurred, indicating that the layer was parallel with the earth's surface, were always times during which the level was rising," said Mr. Heising. "It would appear as though a great mass of electrons are tossed about into the atmosphere rather quickly, and that as a result the level drops with accompanying turbulence. Immediately thereafter repulsion by the negative charge on the earth causes the entire mass to rise and the unevenness to vanish. After the mass of electrons has moved upward for a few minutes the disposition approaches uniformity in a horizontal direction, and we get the phenomenon of reflection."

THE "RADIO ROOF."

It was found that during the day the strength of the sixty-seven-metre signal depends, to some extent, upon the height of the "radio roof," as it affects both the angle at which the radiation must leave the vertical aerial and the actual length of the path traversed by the waves. Increased height of the "roof" lengthens the path and increases the angle at which the waves leave the aerial. This reduces the signal strength.

"The short-wave lengths—longer than fifty metres—usually have fairly uniform transmission during hours of darkness," said Mr. Heising. "They do not show the falling-off in strength after midnight that is generally experienced with still shorter waves."

One effect of the earth's magnetic field is to reduce enormously the absorption that occurs on waves from 200 to 10,000 metres. It has been found that the influence of the magnetic field on absorption of waves under 100 metres is small. Mr. Heising said the locations of regions of the atmosphere where absorption of radio waves occur can be deduced reasonably well from knowledge of the atmosphere's structure.

RADIO PICTURES

BROADCASTING COMMENCES.

Radio station WOR at Kearny, New Jersey, U.S.A., is preparing to broadcast pictures to radio set owners soon after the first of the year, John Poppele, its chief engineer, said in New York early last month.

"We have been approached by representatives of Austin G. Cooley, inventor of the radio-picture transmitter and receiving equipment, for the use of our station for development work," said Mr. Poppele. "We have consented to be of what service we can because we are intensely interested in the progress of television and photo-radio. The pictures will be radiated in the mornings up to 11 o'clock, so that the experiments will not conflict with WOR's regular programmes. We have both a 5-kilowatt and a 500-watt transmitter, and we may use the latter because it sends a good signal strength throughout the metropolitan area. The pictures will be sent on WOR's wave of 423 metres or 710 kilocycles.

TESTS IN PROGRESS.

"It will be no trick to connect the picture devices with the regular broadcast transmitter. Mr. Cooley has also developed a receiver. We hope to begin the tests shortly after the first of January."

Latest reports from Great Britain regarding the experiments being conducted there in developing an Empire broadcasting service indicate that the British Broadcasting Corporation is still very lukewarm in its endeavours to provide regular programmes for Dominion listeners. In spite of the success which was achieved in the initial stages of the tests from the short-wave station 5SW on 23 metres, the wave-length of this station will shortly be altered to 40 metres.

The Lawn Tennis Broadcast

One of the most successful sporting broadcasts made by any station in New Zealand for some time past was that given by 2YA in connection with the international lawn tennis match at Miramar between France and New Zealand. The attendance of the public to see these stars in action was very large, and severely taxed the accommodation provided. In addition to those on the ground, a very large circle of listeners enjoyed the thrills of the play by means of the broadcast description, and were thus able to visualise the thrills of the play. It is undoubted that, not only will the visit of the French stars benefit this sport throughout New Zealand, but that the broadcast description in itself, will contribute very definitely to that outcome. No more conclusive argument could be given of the help that broadcasting can give a sport than this experience. No comparison can be made between the merit of seeing the tennis match and of hearing a description of it, but where one is unable to see a match, interest necessarily follows a description, and further, those who have enjoyed the description will certainly make every effort to see subsequent exhibitions of high-class games.

The description was very capably done by Mr. C. F. Williams, being better on the second day than on the first when the announcer endeavoured to conquer the noise of the crowd by speaking more loudly into the microphone. A feature of microphone success is that the voice must be kept down all the time—an even, steady emphasis giving best results.

GAS FOR H.T. SUPPLY

EXPERIMENTS IN PROGRESS.

The chief trouble of most valve users is the high-tension, or B, battery. Nowadays, with valves that are heated with an absurdly small current, the old, heavy and objectionable accumulator has almost disappeared, and with it the constant nuisance of recharging. Instead we have a two, four or six-volt accumulator of very small dimensions that will light the valves for perhaps a month. But the high-tension battery is still, for many people, a big problem.

One of the best solutions so far is the rectifying device which takes electricity from the house lighting mains, rectifies and transforms it, and then passes it to the receiver for application to the anodes of the valves. This instrument (battery eliminator) consumes very little electricity indeed, and is in many ways a successful solution of the problem, but unfortunately there are still people who have no electricity supply in their homes and cannot, therefore, make use of the device. Experiments are now being conducted with an instrument that may enable listeners to obtain adequate B battery supply from gas. The principle on which the device works is thermo-electric. Two electrodes of dissimilar metal are placed in a gas flame, and a potential difference is created from which a current of electricity is obtained suitable for heating the valve filaments.

A Melbourne amateur transmitter writes in the Melbourne "Listener In": "There are rumours travelling round amongst the hams that the average short wave receiver does not respond to signals as well on 20 metres as it does higher up, and from my results and experiments on from 5 to 10 metres I can quite believe it.

"For those who are trouble hunting down there I would suggest that the best thing to do is to start off with moving coil reaction and a home-made tuning condenser. This condenser need only consist of two plates of standard size, one fixed and the other soldered to a piece of quarter-inch diam brass rod. This rod can then be mounted in bakelite bearings, and a pictorial connection be taken direct from the rod to the filament lead from the grid coil.

"By doing this the losses from metal end plates and had connections between plates will be eliminated, while there can be no losses in a reaction condenser if one is not used. This only leaves the grid condenser and leak to be dealt with, and the trial of several of each will soon show which is the best. The coils will be found to give the greatest signal strength when about two and a half inches in diameter.

ADVICE ON CRYSTALS

GALENA POPULAR.

If you go into a wireless shop and ask bravely for a crystal for your receiver, the assistant will immediately ask you what kind you require, says a writer in "Modern Wireless." If you say, "What kind do you keep?" he will reel off a list of names as long as your arm. Some of these names you will recognise as those of mineral substances with which you are already acquainted, such as silicon, galena, copper pyrites, iron pyrites, etc. You will find, however, that many of them have such names as hertzite, lionite, permatite, electronite, markonite, and what-not. If you are not experienced in using crystals you can do worse than choose one of the crystals with a fancy name, for they are practically all specially treated galena, itself, a very good rectifying substance. The special crystals are greatly superior to ordinary galena in one very important point—the number of sensitive spots to be found on their surface.

Sensitive Spots.

If you take an ordinary cubical crystal of galena you will find that it is very bright and shiny and smooth. On the smooth surface you will be able to find two or three exceedingly sensitive places, but they will take a good deal of finding. The specially treated crystals, on the contrary, are sensitive on practically every part of their surface. If you examine such a crystal under the microscope, using a low power, you will see that the surface, consists of a very large number of tiny crystals, and as each of these tiny crystals has one or two sensitive spots on its surface, you can easily see why the whole substance must have a very large number of sensitive places.

The Whisker.

There is a great deal in the proper choice of the cat-whisker. By the way, I wonder who was responsible for the peculiar term? I don't see why the fine wire we use for making contact with the surface of a crystal should be called a cat-whisker any more than a pig's bristle or a dog's hair. However, there it is. The name is stuck fast in wireless literature and cannot be removed even by force. This cat-whisker must be of metal, and it is advisable that the wire of which it is made should be as fine as possible. The end of the wire which touches the crystal surface must be kept quite bright, as such metals as copper and brass oxidise or have some other film deposited upon their surface from atmospheric action. If we are to retain our crystal detector at its maximum sensitiveness, we must occasionally keep this surface bright by clipping off the ends of the wire.

Try Gold Wire.

If you take my advice you will buy a gold wire cat-whisker. These are very cheap, as the gold is only 9-carat, and being fine very little of the material is used. This cat-whisker costs about 4d. to 6d., and has the great advantage of keeping bright at its point for very long periods, if not indefinitely. A thick cat-whisker will often miss the most sensitive points on the surface of the crystal, while a thin one will ferret out many which otherwise you would not notice. Thick whiskers can be improved by sharpening the point with a file.

To hundreds of thousands of listeners the name "loudspeaker" is so familiar that it arouses little interest. Yet, when a new instrument is made a name must be found for it. The late Alfred Graham, inventor of the prototype of the loudspeaker, first called it the "Loudspeaking Telephone," and later, in 1893, changed to "Loud Talking Apparatus." In 1894, Mr. Graham made the acquaintance of Professor McKendrick, of Glasgow University, who became associated with him in several subsequent experiments. Professor McKendrick, in his lectures, invariably referred to the instruments designed by Mr. Graham (who, by the way, originated the firm which produces the Amplion Loudspeaker) as "Electrical" or "Telephonic" Loudspeakers, and thus to a Scotsman belongs the credit for coining the almost universally used expression "loudspeaker," though in America the term "table talker" is sometimes used.

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From the Woman's Point of View.

By VERITY.

TO-DAY AND TO-MORROW

They Say:

By the Marama returned many well-known people, among them Miss M. Hanham, whom Dunedin welcomes home after an absence of nearly two years. Gifted in many branches of artistic achievement, Miss Hanham has taught music at "Tona," Havelock North, and "Archerfield," Dunedin, specialising in part-singing, which has become so important a feature in musical training, the performance of her pupils making an extremely favourable impression on Lord Jellicoe when he visited the latter well-known college. After exhaustive study in various arts and crafts, including the latest modes and methods in artistic jewellery, Miss Hanham visited many parts of England, and, in company with Dr. and Mrs. Erickson (Adelaide), went over to Norway, that visionary Mecca that tingers the imagination of so many stay-at-homes. It is good to know that, after her wanderings, Miss Hanham still finds New Zealand a fair and pleasant place; and it is hoped that students of the arts may have the advantage of her experience, skill, and amazing versatility.

Miss Rachel Mandl (West Coast) is enjoying a prolonged stay abroad, after several months in London. Paris she found delightful, but most of all she enjoyed her long anticipated visit to relatives in Vienna. She is planning a week or so at Nice, after which she will begin to think of the return journey to New Zealand.

Clockwork Wireless.

There has recently been put into use at the Lambeth Hospital, London, what is probably the most wonderful wireless installation of any hospital in the world. All the buildings within the hospital are connected with the central set, and entertainments given at the hospital can be enjoyed by all the inmates, besides the broadcast programme from London and Daventry. The control of the set is automatic, and almost the only attention needed is once a fortnight, when two clocks must be wound up. At present there are 67 loudspeakers and four hundred pairs of headphones, but the equipment can be increased to eighty loudspeakers and two thousand pairs of headphones without unduly taxing the set.

Backchat From the Corpse.

An American preacher was delivering a funeral oration, in the course of which he remarked that the deceased was happy—far happier than he was on earth.

A woman in the congregation then announced that she had been in spiritual communication with the dead, and that this was not correct.

"I have delivered two thousand five hundred and thirty-six funeral orations," remarked the preacher, "and this is the first time I've had any back-chat from the corpse."

Pavlova's Shoes.

Surely one of the quaintest business contracts in existence must be that which binds a certain shoemaker of Milan to send, every fortnight, two dozen pairs of baller shoes to Pavlova. At one time the famous Russian dancer used to rely on being kept supplied with the dainty footwear so necessary for her stage work without making a definite arrangement with any shoemaker. It thus happened that on occasions she found herself practically without any shoes! Rather than face the risk of being without ballet shoes fit to dance in, Pavlova decided to adopt a strictly business-like method of ensuring an adequate supply, and two dozen pairs are despatched to her from Milan fortnightly in whatever part of the world she may be.

Giving Him Air.

It is difficult to find a new joke about Aberdonians. Perhaps the newest concerns a man who fainted in an Aberdeen street. A crowd gathered, and one man in it said, "Gie him air." As the crowd turned away another was heard to say, "Gie him the air yourself."



MISS MARY SHAW, A.R.A.M.

Miss Shaw is a member of a quartet at 3YA, in which also are Miss Nellie Lowe, Mr. A. G. Thompson, B.A., and Mr. T. G. Rogers. She is a singer with English training and broadcasting experience, and her advent into radio at Christchurch will be welcomed by listeners. Her next appearance at 3YA will be on Wednesday.

WOMAN AND HER HOME

Dressed Tomatoes.

Six medium-sized tomatoes, 1 small cold boiled potato, 1 small cucumber, 1 tablespoon mayonnaise, 1 teaspoon chopped parsley, pepper, salt, and vinegar. Cut a round about the size of a shilling from the stem end of the tomato, remove the core without breaking the skin, and sprinkle inside a little salt, pepper, and vinegar. Cut up the potato into small pieces, also the cucumber into thin pieces; mix them together with the parsley, pepper, salt, and mayonnaise, and with these fill the tomato. Smothe over with a little mayonnaise, and serve on a lace paper or folded napkin.—Miss Marion Christian, 2YA.

Home-made Cloudy Household Ammonia.

Ammonia, one pint; methylated spirit, quarter-pint; borax, 2oz.; powdered castile soap, 1oz.; hot water, one quart.

Dissolve the borax and soap in the water; when cool add the ammonia and spirit; perfume, if desired, by adding a quarter of an ounce each of oil of rosemary and oil of citronelle.

Salad Dressing.

For a good ordinary salad cream the following recipe is a reliable one:—1 raw yolk of egg, 4 tablespoons oil, cream, or cream and oil together, 1½ tablespoons vinegar, ½ teaspoon made mustard, salt as required. Mix the yolk of egg and mustard, add the oil, cream, and vinegar alternately, and (especially the vinegar) in small quantities, and rub together well between each addition, or it will not thicken properly.—Miss Marian Christian, 2YA.

Keeping Pianos in Condition.

When a piano must be left in a closed house for any length of time, especially near the seaside, there is no better way to preserve it, as I have proved by experience, than to lay newspapers around the wires and over the keys; in fact, wrap the instrument in newspaper in every way possible. Over all place a heavy woollen covering. The tuner will find your piano in better condition after the winter in which it had thus been protected.

American Pickle.

To eight quarts of cold water add 7lb. of salt, 10oz. of saltpetre, 1lb. dark treacle. Mix all well together and let it stand for 24 hours. It will then be ready to receive beef, pork, or tongue.

This pickle possesses many advantages; the principal one is that the meat never gets too hard or too salt. It will keep good from two to six months, according to the quantity of meat cured in it. A scam rises which should be skimmed off from time to time.

Lincoln Sandwiches.

Cut thinly some brown and white bread and spread with butter. Cut cold boiled tongue and gruyere cheese in thin slices. Arrange the tongue on the white bread; over the tongue place the brown bread, over the brown bread the gruyere cheese, then repeat. Put under a weight for several hours. Serve them cut crosswise in thin slices. If sandwiches are wrapped in a serviette dipped in hot water and wrung nearly dry they will keep fresh for hours.

Hasty-Tasty Soup.

Break an egg into a breakfast cup; beat up lightly with a fork, add one teaspoonful of Bovril and fill up with boiling water. Result—a cup of very nourishing and delicious soup. This recipe is the result of war-time experience.

A Hair-Washing Hint.

When washing hair, put a tablespoonful of vinegar in the rinsing water. This takes all the soap out and improves the colour, and is especially good for very greasy hair.

How to Shell Brazil Nuts.

Place nuts in a moderate oven until warm. If the shells are then cracked, the nuts will come out whole and the skins can be easily loosened.

The Letters of Annabel Lee

My dear Elisabeth:

Evadne came and went this week, after her tour abroad, in a blue and green suit of travel, an Arlenish Green Hat, and earrings of jade that suited well her slender oval face and expression of sparkling vivacity. Also I had the opportunity of welcoming Mrs. H., who made an effective passage down the gangway garbed in a suit of stockinette, cleverly dissembled to a slight roughness of surface and markings skilful and deceitful enough to achieve a close resemblance to the hard-worked epidermis of the domestic calf, the charm of which age cannot wither nor custom stale.

I am told that, even after Bond Street, our dressing is quite admirable in taste and modishness, except that we have not yet widened our hat brims, particularly in front. Very distinctive are the clothes secured by Evadne, who on a shallow purse, aided by a taste that is unerring, does wonderful things. Particularly was I charmed with a mole coat of fur, of a chic and slenderness remarkable, and a cheapness that made me sigh. Much she has to tell of English hospitality, of royal gracious welcoming of a stranger in a strange land; of English homes entrancingly oak beamed and stately of staircase, and gardens primrose-starred and thick with daffodils. Interested in many things, particularly the cause of education, she was impressed by a school in a very poor district, where hundreds of children in the slum area are well and truly trained in the art of music as well as in more utilitarian subjects. The singing of these children showed a quality of joyfulness, an exactitude of method, and beauty of modulation, admirably attained by one who is a master in musicianly knowledge and understanding of child psychology. Evadne was taken to hear a concert of the trained voices of two thousand children who sang with remarkable beauty and appeal; and also was told that these youthful followers of the muse sang for the wireless, and, from the impression gained of their melodious achievement and charming articulation, I found myself envying possessors of wireless sets in London.

Do you observe the waistline creeps up and up and up? On the humming thoroughfare, plain and

pretty maidens are wearing brief skirts ruffled to somewhere very near the human waist. In panic I watch the steady ascent, for to me, and to many, the long line is sartorial salvation. A figure that is Junoesque, a limb that is perfect, is adaptive; but imperfection clings to a mode that is merciful, and short legs look better, move better, create a more successful illusion with a not too clearly indicated waist. On conveying myself to an early exhibition of the autumn modes, I find that true and tried ally, the ensemble of navy blue, much to the fore in several attractive silken creations, one with a beguiling hint of powder blue introduced unexpectedly and with success; another boasting a jumper of comfort and elegance, with rose and blue and green stripes that, curiously enough, although they go round and round as insistently as those on a vulgar beer barrel, by a strange skill have the effect of lessening, and not augmenting, that bugbear of modern matron and maid, incipient avoirdupois.

In these days of demolished conventions, grotesque smears and splashes of colour that we are told represent intimate emotion, staccato exclamations of an ugliness and exasperation unexampled, which are looked upon as inspired by devotees of the cult, it is interesting to be informed by that arch-priest of high brows, Mr. Osbert Sitwell, that the standard of beauty remains lofty; he being of the considered opinion that, matched against the beauties of preceding ages, those of the present day can more than hold their own, the tendency to uniformity being unable to eradicate the stamp of individual loveliness. Quite often he sees faces that in the next few years will assuredly launch a thousand ships. It is encouraging to be assured by this very superior, though sincere, lover of Art (particularly on the Sitwell-esque plane) that there is loveliness now just as in the days of Romney, Gainsborough and Helen of Troy. Mr. Sitwell's wife is a very beautiful and uncommon type, if we are to judge from a group of photographs which are the work of a 22-year old artist, who is responsible also for an astounding portrait of the Sitwell sister, a poseuse par excellence, who has elected to be portrayed in "lying in state," and succeeds in making a

quite triumphant study of a corpse, which common, everyday word, one feels, would be painful and disconcerting to the subject of the picture, the possessor of remarkable intellectual beauty and many gifts and graces, from which the saving salt of humour obviously has been omitted.

Mr. Arnold Bennett is somewhat unpopular for the moment, owing to the doubtful taste of his strictures concerning the absence of the Royal Family from the funeral service of the veteran novelist and poet, whose ashes lie in Westminster Abbey, while his heart remains, as always, in the country he loved and immortalised. Mr. Bennett's admirable and buoyant novel "Mr. Prohawk" has been dramatised and is running successfully in London; the principal actor making up with extreme similitude as a replica of Mr. Bennett himself. Quite an idea this, for the lovers of the limelight, the Margots of this world, of whom there are many, both small and great. It is only necessary to write a play, beg, borrow or pay an actor to make up in your own image; and behold, before you will pirouette, or strut, or glide yourself as you long to be. If you are lucky, that is to say, and pick your actor carefully; there being always the off chance that we might "see ourselves as others see us", an even more interesting experience, and as humbling, possibly, as to hear frank personal comments repeated by a kind and candid friend.

An intriguing idea has been advanced by a courageous citizen of the under world concerning the always interesting subject of the holy estate. This brave lady thinks and hopes that one day, matrimony will be preceded by a trial trip, a preliminary canter, so to speak, over the meadows of romantic experience, which, one surmises, would be apt to become a little battered en route, as the merry men and maids went their rocky way, making short work of those dull, but necessary, bulwarks of convention, created for the bettering up of average morality, which is inclined to be wobbly, and not for those unfaltering, bright, bohemian spirits that in our optimistic moments we imagine ourselves to be, and in reality very seldom are. In any case, as always, the way of the pioneer remains hard.

Yours
ANNABEL LEE.

She Knew.

A dear old lady of 50 was taken by her daughter to the London Pavilion. Half-way through she inquired, "What is this piece, dear?"

"One Dam Thing After Another," replied the daughter.

"Yes, indeed it is," the dear old lady replied, "I see that; but what is it called?"

Narrow-Mindedness.

The park orator was vigorously denouncing a rival speaker. "He's so narrow minded," he concluded, "that he could look through a pin-hole with both eyes at once."

Monologue, Also Epilogue.

"A monologue," says my tame cynic, "is a conversation between one who has just returned from a visit to the Continent and one who hasn't."

Why the Pictures Are Popular.

My tame cynic says he likes to go to the pictures for the sheer pleasure of seeing a woman open her mouth without making a sound.

Signs of the Times.

It used to take two sheep to clothe a woman; one silkworm can do it now.—"A Textile Worker."

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Some Features of Next Week's Programmes

1YA NOTES

With piano and banjo, the Morton Duo will entertain at 1YA on Tuesday. A jazz medley and popular selections will be played.

Singing with Madame Ainsley and Miss Marjorie Fair next Tuesday will be Mr. Robert Peter and Mr. M. B. Ballance. Some favourite old songs will be sung, and there will also be a scene from "Faust."

On Wednesday the Hazell-Sutherland Duo will make its first appearance at 1YA. Miss Hazell is an Australian of note, and Mr. Frank Sutherland is one of the most popular baritones in Auckland. The duo's items on Wednesday evening will intersperse the items given by the Municipal Band at its concert in Albert Park. Besides duets, solos will be sung.

The Waitakere Ranges, to which Auckland looks with thirsty and longing eyes when the dry, hot summers are in full swing, will be the subject of a talk by Mr. Headlam Greenhow on Thursday. Auckland derives its water supply from the Waitakere Ranges, and the locality, being of high altitude and close to the city, is a popular resort.

Mr. Curzon Rich, a fine entertainer at the piano, will give a sketch, "Songs and Singers," with a monologue, "Baby's Asleep." These two turns at 1YA on Thursday are sure to please listeners.

There are a lot of good songs to be sung at 1YA on Thursday by Miss Mina Caldwell, Miss Ormiston, Mr. Clinton Williams, and Mr. Birrell O'Malley. They comprise popular and favourite songs.

Commencing their programme with "Carry Me Back to Old Virginia," the Waikato Quartet sings its way through a long and varied entertainment on Friday evening. The personnel of the quartet is: Mrs. C. Towsey, Miss L. Solomon, Mr. James Simpson, and Mr. D. Wrathall. Duets and solos will be sung as well as quartets.

Two specially fine items on Friday should be solos by Mrs. Towsey, for whom Miss Lalla Hemus will play violin obligatos. These solos will be "Elegie" (Massenet) and "When All Was Young" ("Faust").

Mr. J. F. Montague is staging very attractive radio turns at 1YA. Next Friday one of his items will be a one-act play, a "Change of Mind," in which his associate will be the talented Miss Lynda Murphy. Mr. Montague will also give "The Soldier's Cards," and that fine piece, "Not Understood," by the New Zealand poet, Tom Bracken. Miss Murphy will also be heard in "Musical Sketches."

Saturday's concert will be a regular "Saturday Nighter," provided by the Lyric Trio and Miss Alma McGruer, Ingall's Hawaiians, and Mr. Claude Howley's dance orchestra, "The Internationals."

Following on the broadcast of the service at St. Matthew's Cathedral, where the Rev. Canon Grant Cowen will be the preacher, the St. Andrew's Quartet will give a special studio concert, assisted by the Bosworth-Hemus-Towsey Trio.

"THE SNAPPY THREE"

All listeners-in will be delighted to know that 1YA has secured the services of that accomplished combination, "The Snappy Three," on a six months contract. "The Snappy Three," for some time known as "The Masked Trio," under which name they first came into the limelight, are now recognised as being amongst the best entertainers of their kind in Auckland.

Miss Beryl Poulton, the lady of the trio, is highly accomplished, being a clever and finished pianiste, as well as the possessor of a charming mezzo voice. Mr. Arthur Prentice, the tenor, has a very pleasing voice, which would be missed very much out of the harmony. Mr. A. Birch, the light baritone, although unable to read music, does very well in all work with the trio.

All the members of this combination are old members of the Auckland Amateur Operatic Society, Miss Poulton having played a leading part in the last year's production. The happy personality, so essential to stage artists, is possessed in full by the members mentioned, and the snappy manner in which they render new and popular numbers makes their success assured. They have appeared at the Majestic Theatre, Princess and Tivoli, Prince Edward, and several suburban theatres, with great success. The "Snappy Three" have been very generous in charity work.

When here with the Gilbert and Sullivan Opera Company, Mr. Gustave

Slapofski, the well-known musical conductor, was present at a hearing of the "Snappy Three," and highly commended these three young people on their work.

2YA NOTES

A very acceptable bill of fare has been arranged for Monday evening's concert. The concerted numbers have been well chosen, including as they do such vocal gems as "Softly Fall the Shades of Evening," a composition by Hatton, characterised throughout by the beauty of its harmony, and "That Little World is Mine."

"Genevieve" (by Offenbach). Mr. Frank Skinner will give "Mignon"—Mr. Arthur Coe "The English Rose," Mr. Ray Kemp "My Song is of the Sturdy North," and Mr. Len Barnes "She is far from the Land." A delightful programme by four good artists.

The instrumental side of what promises to be a very pleasing programme will be provided by the Wellington Municipal Tramways Band.

On Friday, February 3, the Ariel Singers will again be heard from 2YA. In light vein, their programme includes Moskowski's popular "Serenade," arranged as a trio, and the humorous quartette "Pickled Pork." Further bright, but more classical num-

originality. As previously announced, the Melodie Four will at each appearance present a four-part arrangement of one of the latest popular songs, and on this occasion the song to be featured will be "So Blue." This song, which has been specially arranged, is particularly well suited for harmonising, and the treatment of it by the Melodie Four leaves nothing to be desired. Other concerted items will also be given in addition to solo numbers by the members of the quartette. "The Lass with the Delicate Air," a song written for the tenors of olden days, is now, too seldom if ever, heard in that voice. Mr. S. Duncan will, however, on the above date sing this charming old song, which suits his lyric tenor voice to perfection.

Captain Hamilton Nimmo, chairman of the New Zealand Big Game Angling Club, will on Thursday speak of the exciting sport to be had in the far north.

On Friday there will be the usual weekly lecturette on Imperial affairs. All these lecturettes are timed for 9 p.m.

At 7.40 p.m. on Thursday Mr. Black will commence a series of talks on the scenic attractions of New Zealand.

Mr. H. C. South, who has just retired from the presidency of the New Zealand Booksellers' Association, having returned to Wellington after his Christmas vacation, is to resume his interesting series of broadcast lecturettes at 2YA on Tuesday, 31st inst. His lecture on that evening will be given at 7.40, and thereafter, at fortnightly intervals, at 9 p.m., as heretofore. Listeners in all parts of the Dominion have expressed warm appreciation of Mr. South's work.

3YA NOTES

The usual bright type of programme associated with the Beckenham Male Quartet will be given on Monday evening. Their concerted items, many of them arranged by themselves, have a topical atmosphere which takes the listeners' fancy. Two of the quartets to be sung on Monday will be "The Rosary" and "The Long Day Closes."

Not heard for a very long time has been "The Viking Song," by Stephen Adams, to be sung by Mr. R. S. Jackson (bass) on Monday evening.

Miss Gwen Shepherd, the well-known Wellington entertainer, is now on a visit to Christchurch and will be heard from 3YA on Monday. Her items will be: "Atoms" and "The Story of a Bulldog."

A miscellaneous programme will be presented by Mr. A. G. Thompson's quartet on Wednesday evening. "The Late Player" and "I Know of Two Bright Eyes" will be sung by Mr. Thompson, while Mr. T. G. Rogers's solos will be "Soft and Pure" (from the opera "Martha") and "I Hear You Calling Me" (this latter by special request). The two male singers of the quartet will also be associated in the duet "Awake," the well-known song.

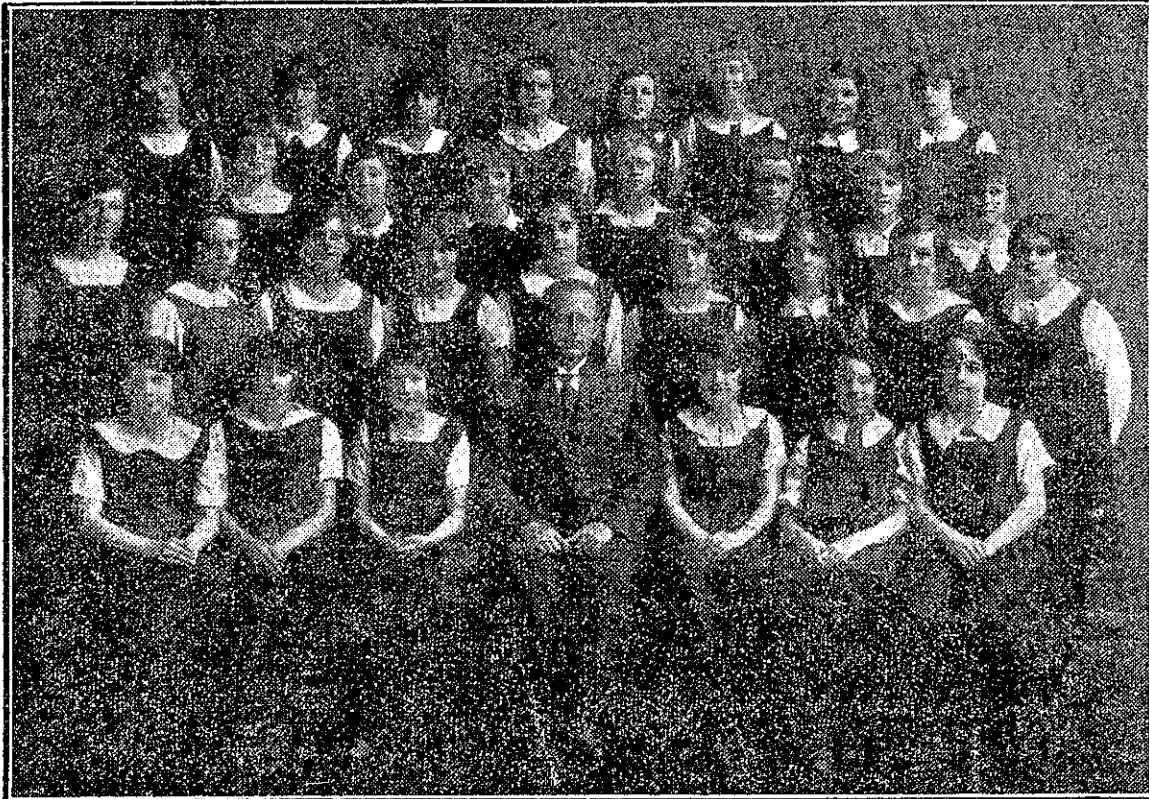
One of the greatest vocal triumphs which Miss Nellie Lowe has achieved since she has been singing for 3YA was her recent rendition of "Danny Boy." The requests for an encore which she received, and which the station received, are the reason for the song appearing opposite the name of Miss Lowe on Wednesday's programme. This very popular singer will also render "Still As the Night" and "In the Chimney Corner." Miss Lowe will also be associated with Miss Mary Shaw, A.R.A.M., in the duet "Arise, Oh Sun." Miss Shaw will sing the solos "The Camel's Hump," "Alleluia," and "Spring Sorrow."

New to radio, but an experienced elocutionist, Mr. H. R. Wilkinson will recite at 3YA on Wednesday four varied selections by well-known writers.

A programme well worth hearing by all who are fond of the old masters will be given by the Madame Gower-Burns Grand Operatic Quartet on Thursday evening. Many of the songs chosen are very rarely sung, and a feast of delightful music can be expected. The programme comprises solos, duets, and quartets.

Madame Gower-Burns will sing "Batti Batti" (Mozart), "Solekka's Second Song" (Schubert), a duet with Mr. Renwick, Mendelssohn's "Greeting," and a duet with Miss Jessie King, "The Templing Flower" (Schubert). She will also, of course, share in the quartets "Departure" (Mendelssohn) and "Haste Thee, Nymph" (Handel), in which Mr. Prescott will be the tenor soloist.

(Continued on page 11.)



Bayfield Girls' Choir, with Mr. Hayson, their conductor. Their services from 1YA are much appreciated.

—Tornquist, photo.

By special request, Mr. Renshaw will sing, "Annabel Lee," a song in which, as listeners will know, his rich tenor voice is heard to full advantage. Miss Nora Greene, an established radio favourite, is bracketed for two delightful contralto solos, "The Smoking Room" and "The Night Nursery," two vocal gems from "The Little White House." Two rousing nautical ballads will constitute Mr. Wilbur Davies' contribution to the programme, and his fine bass voice may be relied upon to do full justice to "The Diver" and "The Sailor's Paradise." Nautical also, but in another vein, will be Mrs. Amy Dunn's soprano solo, "O Restless Sea." Mrs. Dunn will also sing "Serenata."

With the duet "Parted," and a third popular quartet—altogether an attractive programme, to which, by the way, Mr. Lad. Haywood, with his Italian mandolin will add a pleasing touch of variety.

On Tuesday, January 31, the Orpheus Quartet will conclude the first month of the New Year with a sparkling programme. "Stars of the Summer Night" by Hatton, the well-known writer of old-time quartets, is a beautiful serenade. "She Sleeps, my Lady Sleeps" is a popular number requiring no commendation. Another quaint Negro melody, "Little Cotton Dolly," will be presented. These three numbers are always acceptable. The trio for soprano, alto and tenor, "Pure Ray of Light," by Baker, is a song to the beautiful star whose beams are like an angel's wand.

Mrs. Harris and Mr. Coe will sing the ever popular number "A Paradise for Two," from "The Maid of the Mountains." The solo numbers are, as usual, of a high order, the principal numbers being the baritone solo, "Oh Could I but Express in Song" (by the modern Russian composer Malashkin), and "Softly Awakes My Heart," from "Samson and Delilah." In this number Delilah is still using her wiles on Samson, and this time she succeeds, for Samson finishes with a passionate outburst "I Love Thee." He is then captured by the Philistines on whose behalf Delilah has been working. Supplementing this pleasing vocal programme will be an organ recital by Mr. Temple White.

The Clarion Male Quartet will give four quartets on Thursday, February 2. "The Winter Song," by Ballard, is a "song by the fire—pass the pipes—pass the bowls." "Little Billee" is the humorous story of two sailors and the cabin boy who are all starving, and the sailors make up their mind to eat Little Billee, but their attempts are frustrated by the timely arrival of a ship. "Evening," by de Call, is a delightful number, and "Who Sails With Drake," a fine breezy song of the sea. Messrs. Kemp and Barnes will sing "Gendarmes" duet from Sers by modern British composers will

also be presented—R. Vaughan Williams, Bantock and Cyril Scott.

Constructive criticism, suggestions or requests as to their work, will be gladly acknowledged by the Ariel Singers from time to time (C/o. Radio Broadcasting Company of N.Z., Ltd., Wellington). Their next recital will be on Sunday, February 12.



MR. LESLIE ANDERSON, ELOCUTIONIST.

Mr. Leslie Anderson, one of Wellington's prominent elocutionists, is often heard over the air from station 2YA.

Mr. Anderson is leaving on the 20th to further his studies in Sydney, and will be again heard on his return.

Mr. and Mrs. Will Bailey, of Wanganui, the accomplished elocutionists and entertainers, will add variety to an attractive programme. They are scheduled for two appearances during the evening, and their work is sure to be cordially appreciated.

The programme which will be presented by the Melodie Four at 2YA on Saturday, February 4, should be a popular one with listeners-in of all tastes the items having been chosen with a view to providing variety and

In association with the Melodie Four, Mr. Billy Hart with his inimitable "Songs at the Piano," and Mr. Walpole in another of his humorous "orations," will add materially to the gaiety of the evening.

For this Sunday's concert the Renshaw Quartet has departed from its usual custom of devoting the whole programme to sacred music, although some of the items will be of that description.

The fine reputation which this talented combination of artists so quickly made will be fully maintained in all the numbers presented. The concerted work comprises the beautiful quartets, "Friend of the Friendless" and "When Evening's Twilight," while the fine rich voices of Mr. Renshaw and Mr. Davies will blend to perfection in that wonderful duet composed by Gordon Temple, "Under the Desert Star." Mrs. Amy Dunn is to sing "Thank God for a Garden," this ballad being eminently suited to her pure soprano voice, while Miss Nora Greene will again delight with "The Blind Ploughman," which she has often been requested to sing since it was last broadcast by her.

LECTURES AT 2YA

Some very interesting lecturettes are scheduled for next week at 2YA.

On Monday evening the Rev. John Gibson will illustrate with excerpts a talk on the beauty of the poets.

On Tuesday Mr. A. J. Dry will conclude his interesting talks on the whaling industry of New Zealand, dealing more particularly with its financial results.

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NOTES AND COMMENTS

(By "Switch.")

In many areas in New Zealand there are persistent complaints of interference by electric-line leakages. The thing is rapidly coming to a head, and the listeners' societies should concentrate upon some solution of the difficulty. The main obstacle seems to be the actual discovery of the point from whence the interference originates. Power Board engineers know full well that these leakages are evidence of trouble, occasioning electric losses and inefficiency. If the committee of any listeners' league can definitely place the source of the trouble, the Power Boards may be relied upon to have it rectified. Therefore, what appears to be the most expeditious method of combating the trouble on the part of listeners' leagues is to devise some sure-fire means of locating its source. This is something to place before a national conference of the listeners' leagues.

Power line leakages have proved as elusive as the will-o'-the-wisp in the Wellington district. From what one can gather a most diligent search, with the aid of motor-cars and portable loop sets, by competent radio men, including a qualified electrical engineer, proved ineffectual. The baffling part of the whole thing is that the trouble originates at one point and then radiates along the lines for many miles. Therefore the pursuit has been for the greatest point of intensity, but even this foiled the pursuers.

The unsatisfactory reception of Australian stations is perturbing not a few recent purchasers of high-priced receiving sets. These novices should remember that, owing to "daylight saving" in New Zealand, it is still daylight, at present, in Australia when the clocks in the Dominion show 10.30 p.m. The effect of daylight should, by now, be well known even to novices, and they cannot reasonably expect good reception from Australia until after 11.30 p.m.

"Anode" (Hastings) writes that he is thinking of purchasing a set for reception of the Australian stations, but is disgusted with the results he has observed when visiting the homes of neighbouring listeners. "Anode" will find a vast improvement in the reception of the Australian stations within about six weeks, when the period of the operation of "daylight saving" terminates.

"Imperialist" (Carterton) sends a chatty little letter urging the advantages of trade within the Empire. He proposes to order a high-class receiving set from England, and asks whether the English sets are suitable for New Zealand conditions. My friend should first ask the manufacturers to send a schematic diagram of the circuit of the set, as many English circuits are prohibited in New Zealand, owing to their tendency to energise the aerial unduly, thus causing interference with other listeners. "Switch" also advises "Imperialist" to ascertain the wavelengths to which the set will tune. More than one private importer has burnt his fingers, so to speak, through landing a set with a prohibited circuit, which had to be altered at a heavy expense. "Switch" has also seen a costly English set which could not tune below 300 metres.

The other day "Switch" heard a discussion on the prices of radio sets in England. It was contended by one person that the English sets of high-class standard were sold at less than half the price of the American sets out here. "Switch" has looked into the matter, and finds that the prices at home are not at all low, and to the cost must be added freight and incidental expenses. A fairly good five-valve set in England is sold at £25, in addition to which one has to pay extra for the batteries, loudspeaker, aerial, and Marconi royalties, the last-mentioned amounting to about £3. To these items must be added freight, insurance, wharf charges, cartage, etc.

Anyone contemplating the importation of his receiving set may experience the annoyance of a lengthy delivery if he sends to the United States. "Switch" received a complaint last week from a Taranaki listener who remitted the price of a set to an American manufacturing corporation of good repute. After waiting four months for a reply, which did not come, the listener wrote a strongly-worded complaint to the manufacturers. Ten weeks later he received a reply from the corporation apologising for the delay, and stating that his letter and money-order had been accidentally pigeon-holed! Another three months elapsed before the set arrived in New Zealand! This is not an isolated instance of this sort of treatment by American radio companies. A Wellington man wrote twice in seven months without receiving a reply to his order and money-order. Only after he went to the expense of cabling that he proposed to take legal action did he receive an apologetic letter. Ten weeks more elapsed before the set arrived. Apparently it had never been factory-tested, and the importer had to pay over £3 for having faulty jacks and a "dud" valve socket replaced!

Sunday, January 29th

1YA AUCKLAND (333 METRES)—SUNDAY, JANUARY 29.

- 3 p.m.: Afternoon session—Selected Studio items.
4.0: A literary selection, by Mr. Culford Bell.
4.30: Close down.
6.0: Children's song service, conducted by Uncle Leo, assisted by cousins from the Beresford Street Sunday School.
6.55: Relay of evening service from Beresford Street Congregational Church. Preacher, Rev. Lionel Fletcher.
8.15: Vocal quartet—The St. Andrew's Quartet, "O Lord Most Holy."
8.19: Soprano solo—Mrs. Richards, "Angels Ever Bright and Fair" (Handel).
8.24: Tenor solo—Mr. Robert Peter, "How Many Hired Servants?" (Sullivan).
8.29: Instrumental trio—The Bosworth-Hemus-Towsey Trio, "Trio in A Minor, Allegro Scherzando, Andantino con Moto" (Gade).
8.41: Contralto solo—Miss Phyllis Gribben, "O Rest in the Lord" (Mendelssohn).
8.46: Vocal duet—Messrs. Peter and Colledge, "Watchman, What of the Night?" (Sargent).
8.51: Instrumental trio—The Bosworth-Hemus-Towsey Trio, "Trio in A Minor, Larghetto con Moto, Finale Allegro" (Gade).
9.1: Bass solo—Mr. Arthur Colledge, "Pro Peccates" (Rossini).
9.6: Vocal quartet—St. Andrew's Quartet, (a) "God is a Spirit" (Stern-dale-Bennett); (b) "The Peace of God" (Gounod).
9.14: A thought.
9.16: God Save the King.

2YA WELLINGTON (420 METRES)—SUNDAY, JANUARY 29.

- 6 p.m.: Children's service, conducted by Uncle Ernest.
6.55: Relay of evening service from The Terrace Congregational Church. Preacher, Rev. E. R. Weeks. Choral director, Mr. Len. Barnes; organist, Mr. Harry Brusey.
8.30 (approx.): Studio concert.
Tenor solo—Mr. Roy Hill, "The Living God" (O'Hara).
Quartet—Symons-Ellwood String Quartet, "Scherzo, F Major Quartet" (Beethoven).
Quartet—Ariel Singers, "God So Loved the World" (Stainer).
Instrumental Quartet—Symons-Ellwood String Quartet, "Finale, F Major Quartet" (Beethoven).
Bass solo—Mr. J. M. Caldwell, "Hear Me, Ye Winds and Waves" from "Scipio" (Handel).
Instrumental quartet—Symons-Ellwood String Quartet, "Minuetto" (Dittersdorf).
Soprano solo—Miss Jeanette Briggs, selected.
Instrumental quartet—Symons-Ellwood String Quartet, "Bourée" (Bach).
Quartet—Ariel Singers, "The Builder" (Cadman).

3YA CHRISTCHURCH (306 METRES)—SUNDAY, JANUARY 29.

- 5.45 p.m.: Children's song service, by Uncle Sam, assisted by children from the Linwood Congregational Sunday School.
7.15: Relay of evening service from the Church of Christ, Moorhouse Avenue. Preacher, Rev. Howard Earle; organist, Miss E. Hepburn; choir-master, Mr. H. Ames.
Solo—Mr. P. T. Thompson, "Where'er You Walk" (Handel).
Anthem—The choir, "O Worship the Lord" (J.W.K.).
8.15: After service the following concert will be given from 3YA Studio:—
Soprano solos—Miss Marjory Miller, A.T.C.L., (a) "Teach Me How to Pray" (Williams); (b) "When the Grey of the Sky" (Sterling).
8.22: Cornet solo—Mr. Fred. Fox, "For All Eternity" (Mascheroni).
8.26: Baritone solos—Mr. F. R. Hawker, (a) "For You Alone" (Geehl); (b) "The Song of the Torrent" (Mallinson).
8.33: Flute solos—Mr. W. Hay, (a) "Romance" (Freund Fritz), (Mascagni); (b) "Sylvia" (Pizzicati), (Delibes).
8.40: Soprano solo—Miss Marjory Miller, A.T.C.L., "The Rosary" (Nevin).
8.44: Cornet solos—Mr. Fred Fox, (a) "Rule, Britannia" (arr. Hartmann); (b) "The Lost Chord" (Sullivan).
8.52: Baritone solo—Mr. F. R. Hawker, "Blow, Blow, Thou Winter Wind" (Sargeant).
8.56: Flute solo—Mr. W. Hay, "Chant du Soir" (Speelman).
God Save the King.

4YA DUNEDIN (463 METRES)—SUNDAY, JANUARY 29.

- 5.45 p.m.: Children's song service, conducted by Big Brother Bill, assisted by the Choristers of St. Paul's Cathedral.
7.0: Relay of evening service from St. Paul's Cathedral (Anglican). Preacher, Rev. Canon Nevill.
8.10: Studio concert.
9.10: Close down.

Monday, January 30th

1YA AUCKLAND (333 METRES)—MONDAY, JANUARY 30.

- 11.45 a.m.: Relay of Takapuna Jockey Club's summer meeting from Takapuna Racecourse.
5.45 p.m.: Close down.

2YA WELLINGTON (420 METRES)—MONDAY, JANUARY 30.

- 2.30 p.m.: Relay of Plunket Shield cricket match—Auckland v. Wellington—from Basin Reserve, Mr. A. Varney announcing. Interspersed with selected gramophone items and lecturette by Mrs. M. Thomas, of Kirkcaldie and Stains, Ltd., on "Fashions."
6.0: Children's hour—Aunt Jo. Gramophone selection. Aunt Jo sends birthday greetings. Songs, sketches, duets. An hour's general fun and Aunt Barry's talk to little women.
7.0: News session, market reports, and sports results.
8.0: Chimes of the General Post Office clock, Wellington.
8.5: Overture—Selections from "The Rose" (arr. Myddleton).
8.5: Quartet—The William Renshaw Quartet, "May Day" (Muller).
8.9: Flute solo—Mr. L. W. Rothwell, "Papillon" (Kohler).
8.14: Bass solo—Mr. Wilbur Davies, "The Diver" (Loder).
8.19: Instrumental trio—Symons-Ellwood-Short Trio, "First and Second Movements from Trio in E Flat" (Beethoven).
8.29: Soprano solo—Mrs. Amy Dunn, "O Restless Sea" (White).
8.33: Recital—Miss Mavis Rolls, "Butterflies" (Warwick).
8.38: Violin solo—Miss Ava Symons, "Sicilienne and Rigaudon" (Francoeur-Kreisler).
8.43: Tenor solo—Mr. William Renshaw, "Annabel Lee" (Leslie).
8.48: Italian mandolin—Mr. Lad Haywood, (a) "Moonlight" (Tolhurst); (b) "Chanson Joyeuse" (Espoff).
8.53: Contralto solos—Miss Nora Greene, (a) "The Smoking Room" (Arundale); (b) "The Night Nursery" (Arundale).
9.0: Weather forecast.
9.2: Lecturette—Rev. John Gibson Smith, "Beauty of the Poets."
9.14: Vocal quartet—The William Renshaw Quartet, "Softly Falls the Shades of Evening" (Hatton).
9.18: Instrumental trio—Symons-Ellwood-Short Trio, "Third and Fourth Movements, Trio in E Flat" (Beethoven).
9.28: Bass solo—Mr. Wilbur Davies, "The Sailor's Paradise" (Richards).
9.32: Violin solo—Miss Ava Symons, "Liebesfreud" (Kreisler).
9.36: Vocal duet—Miss Nora Greene and Mr. William Renshaw, "Parted" (Tosti).
9.40: Flute solo—Mr. L. W. Rothwell, "Am Waldesback" (Wetzer).
9.45: Humorous recital—Miss Mavis Rolls, "There's a Fair on the Green" (Dean); "Lilac Time" (Noyes).
9.51: Soprano solo—Mrs. Amy Dunn, "Serenata" (Toselli).
9.55: Italian mandolin—Mr. Lad Haywood, "Nocturne, Op. 64, No. 3" (Bergmuller).
9.58: Vocal quartet—The William Renshaw Quartet, "That Little World is Mine" (Deppen).
10.0: God Save the King.

3YA CHRISTCHURCH (306 METRES)—MONDAY, JANUARY 30.

- 3 p.m.: Afternoon session—Selected Studio items.
4.30: Close down.
6.0: Children's hour—Uncle Jack. Bedtime stories and birthday greetings.
7.15: News and reports.
8.0: Chimes. Relay of orchestral selections from Strand Picture Theatre Orchestra, under the direction of Mr. Harry Ellwood.
8.15: Studio concert, by Band of the 1st Canterbury Regiment Infantry Band, under the direction of Lieutenant C. H. Hoskin, 3YA artists assisting.
March—The Band, "Evertonian" (Greenwood).
8.19: Vocal quartet—Beckenham Male Quartet, "An Evening Lullaby" (Shaw).
8.22: Bass solo—Mr. F. S. Jackson, "The Viking's Song" (Adams).
8.26: Fantasia—The Band, "Sons of the Sea" (Rimmer).
8.31: Musical monologue—Miss Gwen Shepherd, "Atoms".
8.36: Valse—The Band, "Sunshine and Roses" (Bordogni).
8.41: Vocal quartet—Beckenham Male Quartet, (a) "Bright Sword of Liberty" (Von Weber); (b) "Old Mother Hubbard" (Wheeler).
8.48: March—The Band, "The Rustic Bridge" (Gibbwin).
8.52: Tenor solo—Mr. W. H. Odell, "Tis the Day" (Leoncavallo).
8.56: Vocal quartet—Beckenham Male Quartet, "The Rosary" (Nevin).
8.59: Weather forecast.
9.0: Relay of orchestral selections from Strand Theatre.
9.15: Selection—The Band, "Crown of Scottish Song" (Round).
9.21: Tenor solo—Mr. E. R. Pitman, "Sweet, Early Violets" (Bingham).
9.24: Vocal quartet—Beckenham Male Quartet, "The Long Day Closes" (Sullivan).
9.28: March—The Band, "Fernando" (Greenwood).
9.34: Baritone solo—Mr. K. G. Archer, "A Devonshire Wedding" (Phillips).
9.38: Cornet solo—Soloist and Band, "Where My Caravan has Rested" (Lohr).
9.43: Recital—Miss Gwen Shepherd, "The Story of a Bulldog" (Anon.).
9.48: Vocal quartet—Beckenham Male Quartet, "Months and Months and Months" (Tabrar).
9.52: Overture—The Band, "Silver Star" (Greenwood).
9.57: Vocal quartet—Beckenham Male Quartet, "Topical Chorus" (M.S.).
10.1: March—The Band, "The Great Little Army" (Alford).
10.5: God Save the King.

4YA DUNEDIN (463 METRES)—MONDAY, JANUARY 30.

SILENT DAY.

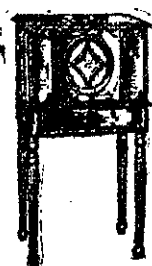
Tuesday, January 31st

1YA AUCKLAND (333 METRES)—TUESDAY, JANUARY 31.

- 3 p.m.: Afternoon session—Selected Studio items.
4.0: Literary selection, by Mr. Culford Bell.
4.30: Close down.
6.0: Children's hour—Uncle Leo.
7.15: Talk on "Elements Required to Maintain Growth of Plant Life," by Mr. H. H. Edwards.
7.30: News and reports.
8.0: Chimes.
8.1: Relay of orchestral overture from Majestic Theatre Orchestra, under the direction of Mr. Whiteford-Waugh, conductor.
8.11: Baritone solo—Mr. James De Montalk, "Two Grenadiers" (Schumann).
8.16: Pianoforte and banjo duo—The Morton Duo, "Jazz Medley."
8.21: Soprano solos—Miss Marjory Fair, (a) "To a Miniature" (Brahe); (b) "A Birthday" (Cowen).
8.29: Instrumental trio—Bosworth-Hemus-Towsey Trio, "Trio, Op. 21, Allegro Molto" (Dvorak).
8.38: Tenor solo—Mr. Robert Peter, "Red Devon by the Sea" (Coningsby-Clarke).

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Week - All Stations - to Feb. 5

—Copyright—

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- 8.43: Violin solo—Ina Bosworth, "Legende" (Wieniawski).
 8.47: Contralto solo—Madame Irene Ainsley, "Gavotte" from "Mignon" (Thomas).
 8.52: Talk on "The League of Nations," by Dr. Belshaw.
 9.6: Weather forecast.
 9.8: Instrumental trio—Bosworth-Hemus-Towsey Trio, "Serenade to the Moon" (Essipoff).
 9.14: Baritone solo—Mr. J. De Montalk, "Yeomen of England" (German).
 9.18: Banjo and pianoforte duo—Morton Duo, "Popular Selection."
 9.23: Relay of orchestral entr'acte from Majestic Theatre.
 9.33: Tenor solo—Mr. R. Peter, "Afton Water" (Hume).
 9.38: Instrumental trio—Bosworth-Hemus-Towsey Trio, "Trio, Op. 21, Adagio Molto e Mesto" (Dvorak).
 Garden scene from "Faust" (Gounod). The garden scene takes place in the third act of the opera. The scene opens in Marguerite's garden. Siebel comes with flowers for Marguerite. Faust enters and rhapsodises about the humble dwelling-place of Marguerite. Mephistopheles places a casket of jewels alongside Siebel's modest bouquet. Marguerite enters, thinking of the handsome stranger she has met in the market-place. Finding the gems, she is frightened, then fascinated as the bright stones sparkle and flash. Marguerite's old nurse, Martha, arrives, and is overcome at the contents of the casket. Then it is that she gives her love to Faust.
 Faust, Mr. Robert Peter.
 Mephistopheles, Mr. J. De Montalk.
 Marguerite, Miss Marjory Fair.
 Martha, Madame Irene Ainsley.
 9.46: Aria—Madame Irene Ainsley, "The Flower Song."
 9.50: Aria—Mr. Robert Peter, "All Hail Thou Dwelling."
 9.54: Aria—Miss Marjory Fair, "The Jewel Song."
 9.58: Aria—Mr. J. De Montalk, "Invocation."
 10.2: Duet—Madame Ainsley and Mr. De Montalk.
 10.6: Quartet—Ainsley Quartet.
 10.10: Duet—Miss M. Fair and Mr. R. Peter, "The Hour is Late."
 10.14: A thought.
 10.15: God Save the King.

2YA WELLINGTON (420 METRES)—TUESDAY, JANUARY 31.

- 2.30 p.m.: Relay of Plunket Shield cricket match—Auckland v. Wellington—from Basin Reserve, Mr. A. Varney announcing.
 Interspersed with selected gramophone items and lecturette by representative of Turnbull and Jones, Ltd., on "Electric Cooking."
 6.0: Children's hour—Uncle Jasper, assisted by the musical comedians, Uncle Hargreaves and Pedler (accordion, mouth-organ, baritone, concertina). Songs and stories by Uncle Jasper.
 7.0: News session, market reports, and sports results.
 7.40: Lecturette—"Books: Grave and Gay," by Mr. H. C. South.
 8.0: Chimes of the General Post Office clock, Wellington.
 8.1: Overture—"Plantation Songs Fantasia" (Clutsam).
 8.5: Tenor solo—Mr. Arthur Coe, "Mignonette" (Brahe).
 8.10: Vocal quartet—The Orpheus Quartet, "Stars of the Summer Night" (Hatton).
 8.14: Instrumental trio—Symons-Ellwood-Short Trio, "Adagio from B Major Trio" (Brahms).
 8.24: Recital—Miss Violet Wilson, "Death of Minnehaha" (Longfellow).
 8.30: Hawaiian guitars—Berthold and Bent, (a) "Drifting and Dreaming" (M.S.); (b) "Honolulu Song Bird" (M.S.).
 8.38: Contralto solo—Miss Lily Mackie, "Maidens, Beware Ye" (Wilson).
 8.43: Vocal trio—Mrs. Alice Harris, Miss Lily Mackie, and Mr. Arthur Coe, "Pure Ray of Light" (Baker).
 8.47: Cello solos—Mr. Geo. Ellwood, (a) "Andante" (Sammatine); (b) "Minuetto" (Gluck).
 8.53: Vocal quartet—Mr. Len. Barnes and Orpheus Quartet, "Down by Dat Ribber" (Scott-Gatty).
 8.57: Weather forecast.
 8.58: Lecturette—Mr. A. J. Dry, "The Financial Results of Whaling in New Zealand."
 9.12: Organ recital—Mr. H. Temple White, (a) "Allegro Pomposo" (West); (b) "Romance" (Zitterburt); (c) "Triumphal March" from "Aida" (Verdi).
 9.24: Soprano solo—Mrs. Alice Harris, "Japanese Love Song" (Brahe).
 9.27: Instrumental trio—Symons-Ellwood-Short Trio, "Scherzo and Finale, D Minor Trio" (Arensky).
 9.37: Humorous recital—Miss Violet Wilson, "Intensely Utter" (Anon.).
 9.41: Vocal duet—Mrs. Alice Harris and Mr. Arthur Coe, "Paradise for Two" (Tate).
 9.45: Hawaiian guitars—Berthold and Bent, (a) "Honolulu Dreams"; (b) "Let us Waltz."
 9.53: Baritone solo—Mr. Len. Barnes, "Oh, Could I But Express in Song" (Malashkin).
 9.56: Vocal quartet—The Orpheus Quartet, "Little Cottar Dolly" (White).
 10.0: God Save the King.

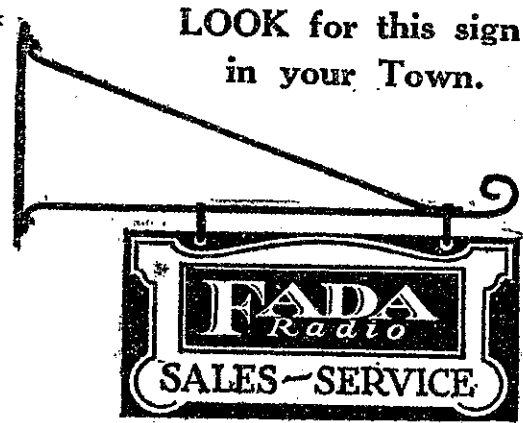
3YA CHRISTCHURCH (306 METRES)—TUESDAY, JANUARY 31.

SILENT DAY.

4YA DUNEDIN (463 METRES)—TUESDAY, JANUARY 31.

- 3 p.m.: Afternoon session—Selected Studio items.
 Town Hall chimes.
 3.1: His Master's Voice recital.
 3.30: Social notes, sporting news.
 3.35: Studio music.

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- 4.0: Address on "Domestic Uses of Electricity," by a representative of Turnbull and Jones, Ltd.
 4.15: His Master's Voice recital.
 4.30: Close down.
 6.0: Children's hour—Big Brother Bill and some young entertainers.
 7.15: News session.
 7.30: Address.
 8.0: Town Hall chimes. Concert by the Kaikorai Band, under the direction of Mr. E. Franklin, also assisting artists.
 8.1: March—Kaikorai Band, "Twentieth Century" (Hume).
 8.5: Overture—Kaikorai Band, "Raymond" (Thomas).
 8.15: Light vocal solos—Mr. Percy James, (a) "The Bassoon" (Griffiths); (b) "At Sundown" (Donaldson).
 8.22: Humorous recital—Miss Anita Winkel, "It May Be Life."
 8.27: Waltz—Kaikorai Band, "Passing of Salome" (Joyce).
 8.37: Tenor solo—Mr. Alfred Wahmsley, "I Seek for Thee in Every Flower."
 8.42: Recital—Mr. J. B. McConnell, "His First Long Trousers."
 8.48: Selection—Kaikorai Band, "Pirates of Penzance" (Sullivan).
 8.58: Baritone solos—Mr. Reg. Richards, (a) "The Blind Ploughman" (Clarke); (b) "Can't Remember" (Goatley).
 9.4: Monologue—Miss Anita Winkel, "Earthenware."
 9.10: March—Kaikorai Band, "Vanished Army" (Alford).
 9.15: Light vocal solo—Mr. Percy James, "Eight Bars Rest" (Griffiths).
 9.19: Recital—Mr. J. B. McConnell, "Hullo" (Foss).
 9.23: Descriptive piece—Kaikorai Band, "Wee McGregor" (Campbell).
 9.33: Tenor solos—Mr. Alfred Wahmsley, (a) "Duna" (McGill); (b) "When Other Lips" (Balfie).
 9.40: Humorous recital—Miss Anita Winkel, "A Bath in the Backblocks."
 9.45: Anthem—Kaikorai Band, "Great and Glorious is Thy Name" (Mozart).
 9.53: Baritone solo—Mr. Reg. Richards, "To a Miniature" (Brahe).
 9.57: Recital—Mr. J. B. McConnell, "Wot Vur Do 'E Luv Oi" (Chevalier).
 10.1: March—Kaikorai Band, "Old Comrades" (Teike).
 10.5: God Save the King.

Wednesday, February 1st

1YA AUCKLAND (333 METRES)—WEDNESDAY, FEBRUARY 1.

- 3 p.m.: Afternoon session—Selected Studio items.
 4.0: Literary selection, by Mr. Cufford Bell.
 4.30: Close down.
 6.0: Children's hour—Uncle Tom, Pip and Squeak will give musical ditties, humorous items and jokes. Letters and birthday greetings.
 7.15: News and reports.
 7.45: Talk on "Physical Culture," by Mr. Norman Kerr.
 8.0: Chimes.
 8.1: Relay of Municipal Band concert from Albert Park, under the direction of Mr. Christopher Smith, bandmaster, assisted by the Hazell-Sutherland Duo, who will intersperse the band programme with the following items:—
 Contralto solos—Miss Phyllis Hazell, (a) "Heartsease"; (b) "Feast of Lanterns" (Bantock).
 Baritone solos—Mr. Frank Sutherland, (a) "Ship of Golden Dreams" (Sanderson); (b) "King Charles" (White).
 Vocal duets—Hazell-Sutherland Duo, (a) "In Springtime" (West); (b) "I Did Not Know" (Trotter).
 10.0: A thought.
 10.2: God Save the King.

2YA WELLINGTON (420 METRES)—WEDNESDAY, FEBRUARY 1.

SILENT DAY.

3YA CHRISTCHURCH (306 METRES)—WEDNESDAY, FEBRUARY 1.

- 3 p.m.: Afternoon session—Selected Studio items.
 4.30: Close down.
 6.0: Children's hour—Uncle Peter and Mother Hubbard. Bedtime stories, songs, and birthday greetings.
 7.15: Addington stock market reports.
 7.30: News and reports.
 8.0: Chimes. Relay of orchestral selections from Grand Picture Theatre Orchestra, under the direction of Mrs. Black.
 8.15: Tenor and baritone duet—Messrs. T. G. Rogers and A. G. Thompson, "Awake" (Pelissier).
 8.19: Soprano solos—Miss Mary Shaw, A.R.C.M., (a) "The Camel's Hump" (German); (b) "Alleluia" (Morris).
 8.25: Instrumental trio—Christchurch Broadcasting Trio, "Allegro and Moderato from Trio, Op. 181" (Gurlitt).
 8.33: Contralto solo—Miss Nellie Lowe, "Still as the Night" (Lengnick).
 8.36: Recitals—Mr. H. R. Wilkinson, (a) "The Thousandth Man" (Kipling); (b) "Jim" (Belloc).
 8.44: Tenor solo—Mr. T. G. Rogers, "Soft and Pure" from "Martha" (Flotow).
 8.48: Violin solo—Miss Irene Morris, "Meditation" (Massenet).
 8.53: Baritone solo—Mr. A. G. Thompson, "The Lute Player" (Allitsen).
 8.57: Weather forecast.
 9.0: Relay of orchestral selections from Grand Theatre.
 9.15: Soprano and contralto duet—Misses Mary Shaw, A.R.C.M., and Nellie Lowe, "Arise, O Sun!" (Day).
 9.18: Tenor solo—Mr. T. G. Rogers, "I Hear You Calling Me" (Marshall).
 9.22: Instrumental trio—Christchurch Broadcasting Trio, (a) "Minuet" (Boccherini); (b) "Laguna Lullaby" (Hope); (c) "Waltz, Op. 71, No. 6" (Coleridge-Taylor).
 9.32: Soprano solos—Miss Mary Shaw, A.R.C.M., (a) "Spring Sorrow" (Ireland); (b) "If There Were Dreams to Sell" (Ireland).
 9.38: Recital—Mr. H. R. Wilkinson, (a) "A Soldier's Reminiscences" (Lee); (b) "The Geebung Polo Club" (Patterson).
 9.45: Baritone solo—Mr. A. G. Thompson, "I Know of Two Bright Eyes" from "Songs of the Turkish Hills" (Clutsam).
 9.48: Contralto solos—Miss Nellie Lowe, (a) "In the Chimney Corner" (Cowen); (b) "Danny Boy" (Weatherley).
 9.54: Violin solos—Miss Irene Morris, "Tandstick" (Sitt).
 9.58: Final chorus—Misses Mary Shaw, Nellie Lowe, Messrs. T. G. Rogers, and A. G. Thompson, "Happy and Light" from "Bohemian Girl" (Balfie).
 God Save the King.

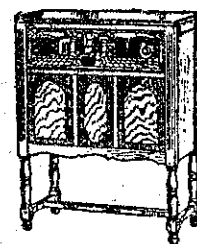
4YA DUNEDIN (463 METRES)—WEDNESDAY, FEBRUARY 1.

SILENT DAY.

Thursday, February 2nd

1YA AUCKLAND (333 METRES)—THURSDAY, FEBRUARY 2.

- 3 p.m.: Afternoon session—Selected Studio items.
 4.0: Literary selection, by Mr. Cufford Bell.
 4.30: Close down.
 6.0: Children's hour—Peter Pan.
 7.15: News and reports—Book review.
 8.0: Chimes.
 8.1: Relay of orchestral overture from Strand Theatre Orchestra, under the direction of Eve Bentley.
 8.12: Baritone solos—Mr. Clinton Williams, (a) "Sigh No More" (Aikin); (b) "Come to the Fair" (Enoch).
 8.19: Soprano solo—Miss Christina Ormiston, "Waters of Minnetonka" (Lieurance).
 8.24: Instrumental trio—Bosworth-Hemus-Towsey Trio, "Trio No. 3, Allegro" (Reinecke).
 8.30: Lecturette—Mr. Headlam Greenhow, "The Waitakere Ranges."
 8.42: Tenor solos—Mr. Birrell O'Malley; (a) "The Eagle"; (b) "Trees."
 8.49: Contralto solos—Miss Mina Caldwell, (a) "Invitation" (Dodd); (b) "The Lotus Flower" (Schumann).
 8.54: Weather forecast.
 8.55: Vocal duets—The Bohemian Duo, selected.
 9.2: Relay of orchestral selections from Strand Theatre Orchestra.



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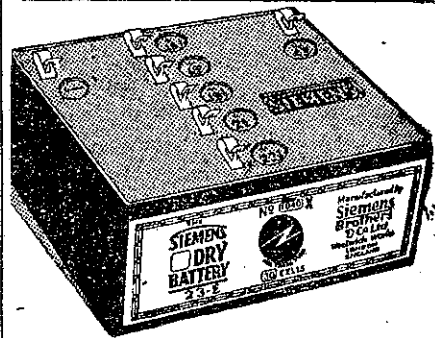
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The Adelaide station, 5CL, employed four microphones perched on the Town Hall on New Year's Eve to relay the celebrations at midnight. One microphone picked up the street sounds, one for the band music, one for the carols by the Y.M.C. Choir, and the fourth the announcer describing the events.

If one imports a set from abroad he is faced with the question of service. When a set is bought in New Zealand the trader gives full service if there is any trouble in the set not due to any fault of the purchaser. "Switch" knows of two private persons who imported their own sets, found that the shaking-up they had received in steam-er transit had caused internal derangement in their sets, not noticeable until an attempt was made to operate them. As the sets had been taken delivery of and then carried by rail, the importers were unable to establish an insurance claim. By the time they had paid for a radio mechanic to put the sets right, the importers found they could have bought better sets in New Zealand at less total cost.

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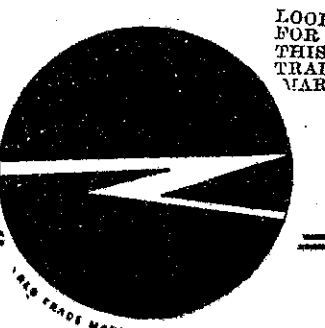
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Programmes Continued

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- 9.12: Baritone solo—Mr. Clinton Williams, "The Cheery Philosopher" (Lidgley).
 9.16: Instrumental trio—Bosworth-Hemus-Towsey Trio, "Ballet Music" from "Rosamunde" (Schubert).
 9.20: Soprano solos—Miss Christina Ormiston, (a) "Last Rose of Summer" from "Martha" (Flotow); (b) selected.
 9.27: Piano sketch and monologue—Mr. Curzon Rich, (a) "Singers and Songs" (Harris); (b) "Baby's Asleep" (M.S.).
 9.36: Tenor solo—Mr. B. O'Malley, "Flower Song" from "Carmen" (Bizet).
 9.40: Pianoforte solo—Mr. Cyril Towsey, "Impromptu in A Flat" (Schubert).
 9.44: Contralto solos—Miss M. Caldwell, (a) "Caro Mio Ben" (Gaivani); (b) "For a Dream's Sake" (Cowen).
 9.51: Instrumental trio—Bosworth-Hemus-Towsey Trio, "Trio No. 3, Andante and Finale" (Reinecke).
 10.1: Vocal duos—The Bohemian Duo, selected.
 10.6: A thought.
 10.8: God Save the King.

2YA WELLINGTON (420 METRES)—THURSDAY, FEBRUARY 2.

- 3 p.m.: Afternoon session—Selected Studio items.
 Chimes of the General Post Office clock, Wellington.
 3.1: Selected gramophone items.
 5.0: Close down.
 6.0: Uncle Sandy and his famous birthday rhymes. Songs, jokes, stories, and music. A joyous hour from 2YA.
 7.0: News session, market reports, and sports results.
 8.0: Chimes of the General Post Office clock, Wellington.
 8.1: March—Wellington Municipal Tramways Band, "Action Front" (Blankenburg).
 8.6: Vocal quartet—The Clarian Quartet, "Winter Song" (Bullard).
 8.10: Overture—Wellington Municipal Tramways Band, "La Flandre" (Bouillon).
 8.17: Baritone solo—Mr. Len. Barnes, "She is Far from the Land" (Lambert).
 8.22: Suite—Wellington Municipal Tramways Band, "D'Apres Mille et une Nuits" (Korsakov).
 8.32: Tenor solo—Mr. Frank Skinner, "Mignon" (D'Hardelot).
 8.37: Waltz—Wellington Municipal Tramways Band, "Fair Rosamond" (Robinson).
 8.43: Vocal quartet—The Clarian Quartet, "Evening" (De Call).
 8.47: Selection—Wellington Municipal Tramways Band, "Opera Bouquet, No. 1" (Bidgood).
 8.55: Vocal duet—Messrs. Ray Kemp and Len. Barnes, "The Gendarmes" (Offenbach).
 8.59: Weather forecast.
 9.1: Lecture—Captain Hamilton Nimmo, chairman, New Zealand Deep Sea Angling Club, "Big Game Fishing in the Far North."
 9.17: Tenor solo—Mr. Arthur Coe, "The English Rose" (German).
 9.21: Descriptive march—Wellington Municipal Tramways Band, "Jamie's Patrol" (Dacre).
 9.27: Vocal quartet—The Clarian Quartet, "Little Billee" (Boughton).
 9.31: Minuet—Wellington Municipal Tramways Band, "Minuet in G" (Beethoven).
 9.36: Baritone solo—Mr. Ray Kemp, "My Song is of the Sturdy North" (German).
 9.40: Suite—Wellington Municipal Tramways Band, "1001 Nights" (Korsakov).
 9.50: Vocal quartet—The Clarian Quartet, "Who Sails With Drake?" (Candish).
 9.54: March—Wellington Municipal Tramways Band, "Boulder City" (Ord Hume).
 10.0: God Save the King.

3YA CHRISTCHURCH (306 METRES)—THURSDAY, FEBRUARY 2.

- 3 p.m.: Afternoon session—Selected Studio items.
 4.30: Close down.
 6.0: Children's hour—Chuckie and Aunt Pat. Bedtime stories, birthday greetings and songs.
 7.15: News and reports.
 7.30: Talk—Mr. R. J. G. Collins, of Christchurch Philatelic Society, "The Stamps of New Zealand."
 8.0: Chimes. Relay of orchestral selections from Everybody's Picture Theatre Orchestra, under the direction of Mr. Albert Bidgood.
 8.15: Contralto and tenor duet—Miss Jessie King and Mr. Harold Prescott, "On Wings of Music" (Mendelssohn).
 8.20: Baritone solo—Mr. Bernard Rennell, "Song of the Vagabond" (Vaughan-Williams).
 8.24: Pianoforte solo—Miss Lucy Fullwood, "Polonaise" (MacDowell).
 8.29: Soprano solo—Madame Gower-Burns, "Batti Batti" (Mozart).
 8.33: Instrumental trio—Christchurch Broadcasting Trio, "Adagio and Scherzando from Trio, Op. 181" (Gurlitt).
 8.41: Contralto solos—Miss Jessie King, (a) "The Praise of God" (Beethoven); (b) "To Music" (Schubert).
 8.47: Soprano and baritone duet—Madame Gower-Burns and Mr. Bernard Rennell, "Greeting" (Mendelssohn).
 8.51: Recital—Miss Naare Hooper, L.T.C.L., "Comedy and Tragedy" (Gilbert).
 8.56: Tenor solo—Mr. Harold Prescott, "Serenade" (Schubert).
 8.59: Weather forecast.
 9.0: Relay of orchestral selections from Everybody's Theatre.
 9.15: Soprano solo—Madame Gower-Burns, "Suleika's Second Song" (Schubert).
 9.18: Soprano and contralto duet—Madame Gower-Burns and Miss Jessie King, "The Tempting Flower" (Schumann).
 9.21: Tenor solos—Mr. Harold Prescott, (a) "Thou'rt Like a Lovely Flower" (Schumann); (b) "Sunday" (Brahms).
 9.25: Pianoforte solos—Miss Lucy Fullwood, (a) "Idyll" (Sibelius); (b) "Santasiestucke" ("Hunting Song"), (Garde).
 9.31: Baritone solo—Mr. Bernard Rennell, "I Will Not Grieve" (Schumann).
 9.34: Contralto solos—Miss Jessie King, (a) "Devotion" (Schumann); (b) "The Green Hat" (Schumann).
 9.38: Instrumental trio—Christchurch Broadcasting Trio, (a) "Minuet in G" (Beethoven); (b) "Grave" (Henriques); (c) "Scherzo" (Schubert).

Recently 5CL, Adelaide, broadcast sounds from several different parts of the city. The first broadcast took place from the City Market, in New Adelaide. Mr. W. C. Smallcombe, well known to listeners as Uncle Radio, first of all described the market, after which the various vendors' cries were heard. A relay was later carried out from both Rundle and King William Streets, where the noises of the busy Friday night traffic were plainly heard. Much fun was caused when Uncle Radio asked an Italian vendor of statues to describe one of the statues he had for sale. When asked what one statue represented, the Italian answered in broken English, "Twenty-two and sex!"

The finest and most reliable radio sets in the world are being retailed in New Zealand, and as a rule they are sold in the Dominion with a full guarantee that they will operate efficiently. If they fail to perform satisfactorily, free service is given until they conform with the guarantee. It is, therefore, unwise of a private buyer to attempt to import his own set, in view of the risk of delay in delivery, extra cost for service if the set fails to operate successfully, and the failure of much-boomed sets to come up to expectations when tried out under New Zealand conditions.

One of the most interesting results of an analysis of British broadcast programmes is that it has shown that the amount of time spent in broadcasting talks amounts to 20.83 per cent. of the total time the stations are working. Music occupies 62.2 per cent. of the total time, drama 1.6 per cent., special features, such as the "stunts" undertaken from time to time 1.67 per cent., religious services 4.18 per cent., the children's hour 7.4 per cent., and miscellaneous items 2.06 per cent. of the time. The time spent in broadcasting classical music represents 10.02 per cent. of the total transmission time. Light orchestral music and comic opera occupies 11.83 per cent., popular music 26.53 per cent., dance music 12.5 per cent., and gramophone music 1.27 per cent. of the time. Of the total time devoted to talks, news bulletins occupy about one-quarter, and practically the whole of the remainder is given to the broadcasting of educational talks.

From the biting cold of a typical winter Christmas Eve in London the chimes of Big Ben were waited over the ether to the congenial heat of an Australian summer night when the special Christmas Eve programme transmitted by the British Station 5SW Chelmsford, was picked up and rebroadcast by the big Australian Station 8LO Melbourne. Although Christmas carols were not, unfortunately, included in the programme, the other items were clearly heard, whilst the striking of the hour of 4 o'clock by Big Ben as rebroadcast by 3LO Melbourne, was heard throughout Australia, New Zealand, and the South Seas just as distinctly as the familiar sound could be heard in London. Listeners did not mind sitting up until 2 a.m. Christmas morning in Australia to hear Big Ben strike 4 p.m. on Christmas Eve in London.

Although the majority of factory-made portable sets are expensive and fairly elaborate, mainly because they are intended for use without an aerial, an efficient camping-out or seaside "bach" outfit can generally be improvised from one's own receiver. There is very little difficulty in providing an aerial when one is camping, or staying at a holiday house. Two trees, or fairly long props can easily be used to support a single wire, about 100ft. in length, and a piece of wire lying in a creek, an iron rod driven into the ground, a wire fence, or even a wire-lying along the ground under the aerial will give good service as "an earth." A coil of about 200ft. of No. 14 gauge wire will provide ample material for making the aerial and earth equipment for the receiver.

The three stages of amplification can seldom be used after the two transformer coupled stages as the result would be distorted signals without an appreciable increase in volume. If you are desirous of obtaining greater volume from your set, use a three-stage resistance amplifier after the first transformer coupled stage in the receiver. The stages should be equipped with valves having suitable characteristics to render their efficient operation in the various positions. The last stage should be equipped with a suitable power valve, which will require a very high plate potential before maximum amplification can be obtained, and correct grid-bias.

The inventor of the neutrodyne receiving circuit does not advocate the use of regeneration in this circuit. Capacity reaction, however, can be added. A condenser of 0.00035 mfd. will tune the reaction coil, which is one of approximately 30 turns and placed at a distance of about one inch from the grid end of the second neutrodyne. The distance between the base of each neutrodyne should be no less than 6in. apart. The "A" battery can be connected either way. The filament ballasts and rheostats are usually connected in the filament negative lead. In any case it is advisable to control the temperature of the detector valve with a rheostat, as there is a certain amount of feedback.

- 9.42: Tenor solo and vocal quartet—Mr. Harold Prescott, Madame Gower-Burns, Miss Jessie King and Mr. Bernard Rennell (bass), "Haste, Thee, Nymph" (Handel).
 9.46: Recitals—Miss Naare Hooper, L.T.C.L., (a) "Song of the Trees" (Colborne-Veel); (b) "Grave-diggers' Scene" from "Hamlet" (Shakespeare).
 9.54: Vocal quartet—Madame Gower-Burns, Miss Jessie King, Messrs. H. Prescott and B. Rennell, "Departure" (Mendelssohn).
 God Save the King.

4YA DUNEDIN (463 METRES)—THURSDAY, FEBRUARY 2.

- 7 p.m. Town Hall chimes.
 7.1: Request gramophone concert.
 7.30: News session.
 8.0: Town Hall chimes.
 8.1: Relay of light orchestral music, from the Octagon Theatre Orchestra, under the direction of Mr. L. D. Austin.
 8.11: Baritone solo—Mr. F. M. Tuohy, "Ave Maria" (Kahu).
 8.15: Piano solo—Miss Alice Wilson, F.T.C.L., "First Movement, Sonata, Op. 31" (Beethoven).
 8.21: Contralto solos—Miss Winnie McPeak, (a) "I Heard You Singing" (Coates); (b) "O, Lovely Night," with cello obbligato (Coates).
 8.27: Cello solo—Mr. Malcolm Robilliard, "Chanson Triste" (Tschalkowsky).
 8.32: Bass solo—Mr. E. G. Bond, "Up from Somerset" (Sanderson).
 8.36: Orchestral music, relayed from Octagon Theatre.
 8.46: Soprano solo—Miss Rita Holmes, "My Dreamland Rose" (Phillips).
 8.50: Humorous address—Pastor W. D. More.
 9.5: Pianoforte solo—Miss Alice Wilson, "Valse No. 1 in E Flat Major" (Chopin).
 9.10: Baritone solos—Mr. F. M. Tuohy, (a) "The Banjo Song"; (b) "Mine Enemy."
 9.16: Cello solo—Mr. Malcolm Robilliard, "O, Star of Eve" from "Tannhauser" (Wagner).
 9.21: Soprano solos—Miss Rita Holmes, (a) "Serenade" (Gounod); (b) "Sing, Sing, Blackbird" (Phillips).
 9.27: Pianoforte solo—Miss Alice Wilson, "Waltz" (Friedman-Carter).
 9.32: Bass solos—Mr. E. G. Bond, (a) "The Fishermen of England" (Phillips); (b) "Yeoman's Wedding Song" (Poniatowski).
 9.39: Cello solo—Mr. Malcolm Robilliard, "Intermezzo" from "Cavalleria Rusticana" (Mascagni).
 9.42: Contralto solo—Miss Winnie McPeak, "Homing" (Del Rio).
 9.46: Relay of orchestral selections from the Octagon Theatre.
 10.0: God Save the King.

Friday, February 3rd

1YA AUCKLAND (333 METRES)—FRIDAY, FEBRUARY 3.

- 3 p.m.: Afternoon session—Selected Studio items.
 4.0: Literary selection, by Mr. Culford Bell.
 4.30: Close down.
 6.0: Children's hour—Nod. Bedtime stories, songs, letters, and birthdays. Mr. Faigan will give a talk on literature.
 7.15: Talk on "Motoring," by Mr. Geo. Campbell.
 7.30: News and reports.
 8.0: Chimes.
 8.1: Relay of orchestral overture from Princess Theatre Orchestra, under the direction of Mr. Howard Moody.
 8.16: Vocal quartet—The Waiata Quartet, "Carry Me Back to Old Virginia" (Bland).
 8.20: Cornet solo—Mr. Fred. Bowes, "Zelda" (Code).
 8.25: Baritone solo—Mr. Dudley Wrathall, "Harlequin" (Sanderson).
 8.30: Instrumental trio—Bosworth-Hemus-Towsey Trio, "Trio No. 7, Allegro Moderato" (Haydn).
 8.40: Mezzo-soprano solo—Mrs. Cyril Towsey, "Elegie" (Massenet), with violin obbligato, by Miss Lalla Hemus.
 8.44: One-act play—Miss Lynda Murphy and Mr. J. F. Montague, "A Change of Mind."
 8.54: Tenor solo—Mr. James Simpson, "Where'er You Walk" (Handel).
 8.58: Weather forecast.
 9.0: Relay of orchestral selections from Princess Theatre.
 9.5: Soprano solo—Miss Lola Solomon, selected.
 9.9: Humorous recital—Miss Lynda Murphy, musical sketches.
 9.14: Instrumental trio—The Bosworth-Hemus-Towsey Trio, (a) "Children's Song" (Hollander); (b) "Rigaudon" (Raff).
 9.22: Baritone solo—Mr. Dudley Wrathall, "If You Would Love Me" (McDermid).
 9.26: Cornet solos—Mr. F. Bowes, (a) "Dream of Love" (Millar); (b) "The Lost Chord" (Sullivan).
 9.32: Vocal duet—Miss Lola Solomon and Mrs. Cyril Towsey, "Quis est Homo" (Rossini).
 9.36: Instrumental trio—Bosworth-Hemus-Towsey Trio, "Trio No. 7, Andante and Rondo Presto" (Haydn).
 9.46: Recital—Mr. J. F. Montague, (a) "The Soldier's Cards"; (b) "Not Understood" (Bracken).
 9.52: Tenor solo—Mr. J. Simpson, "A Memory" (Park).
 9.55: Mezzo-soprano solo—Mrs. Cyril Towsey, "When All Was Young" from "Faust" (Gounod), with cello obbligato by Miss Lalla Hemus.
 9.59: Cello solo—Miss Lalla Hemus, selected.
 10.3: Vocal quartet—Waiata Quartet, "The Long Day Closes."
 10.7: A thought.
 10.9: God Save the King.

2YA WELLINGTON (420 METRES)—FRIDAY, FEBRUARY 3.

- 3 p.m.: Afternoon session—Selected Studio items.
 Chimes of the General Post Office clock, Wellington.
 3.1: Selected gramophone items.
 3.30: Lecture—Miss Christian, of the Wellington Gas Company, "Gas Cooking."
 3.45: Selected gramophone items.
 5.0: Close down.
 6.0: Children's hour—Uncle Ernest, assisted by a merry party of youngsters. Humorous sketches, songs, birthday greetings, novelties for young and old.
 7.0: News session, market reports, and sports results.
 7.40: Lecture—Mr. D. G. Paris, "Athletics."
 8.0: Chimes of the General Post Office clock, Wellington.
 8.1: Overture—Further selections from "The Rose" (arr. Myddleton).
 8.5: Vocal quartet—Ariel Singers, "The Cruisken Lawn" (Irish air—Bantock).
 8.9: Recital—Mr. Eric North, "In Praise of the Horse" (Caine).
 8.15: Soprano solos—Miss Jeanette Briggs, (a) "Blackbird's Song" (Scott); (b) "The Robin" (White).
 8.20: Instrumental trio—Symons-Ellwood-Short Trio, "Allegro and Andante from D Minor Trio" (Reissiger).
 8.32: Duet—Miss N. Coster and Mr. Roy Hill, "Home to Our Mountains" from "Il Trovatore" (Verdi).
 8.37: Fifteen-minute entertainment—Mr. and Mrs. J. William Bailey, vocal, "Sing, Sing, Blackbird" (Phillips). Some humour, Mr. J. W. Bailey. Child impersonations, Mrs. J. W. Bailey, (a) "Go Away, Crocodile"; (b) "Naughty Words."
 8.52: Pianoforte solo—Mr. Gordon Short, "Polonaise in E" (Liszt).
 8.56: Trio and humorous quartet—The Ariel Singers, (a) "Serenade" (Moscowski); (b) "Pickled Pork" (Aylward).
 9.1: Weather forecast.
 9.2: Lecture—Editor-Announcer, "Imperial Affairs."
 9.14: Tenor solo—Mr. Roy Hill, "The Roadside Fire" from "Song of Travel" (Williams).
 9.18: Instrumental trio—Symons-Ellwood-Short Trio, "Capriccio and Finale from D Minor Trio" (Reissiger).
 9.26: Vocal duet—Misses J. Briggs and N. Coster, "Morning" (Lane).
 9.30: Humorous recitals—Mr. Eric North, (a) "A Lament" (Gordon); (b) "The Ballad of the Early Worm" from "Punch."
 9.37: Bass solo—Mr. J. M. Caldwell, "A Rollicking Rolling Stone" (Fishery).
 9.40: Mezzo-contralto solo—Miss N. Coster, "The Little Damozel" (Novello).

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 AUCKLAND

Programmes Continued

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- 9.43: Fifteen minutes' entertainment—Mr. and Mrs. J. William Bailey, "Impersonations of People I Have Met," Mr. Bailey; sketch, "The Cure," The Baileys.
 9.58: Vocal quartet—The Ariel Singers, "Tally Ho!" (Wheeler).
 10.0: God Save the King.

3YA CHRISTCHURCH (306 METRES)—FRIDAY, FEBRUARY 3.

- 3 p.m.: Afternoon session—Selected Studio items.
 4.30: Close down.
 6.0: Children's session—Big Brother. Bedtime stories, birthday greetings, and songs.
 7.15: News and reports.
 7.30: Talk—Mr. James Drummond, F.L.S., F.Z.S., "New Zealand's Strangest Bird—the Kiwi."
 8.0: Chimes. Relay of orchestral selections from Crystal Palace Theatre Orchestra, under the direction of Mr. A. J. Bunz.
 8.20: Banjo solo—Mr. Jack Marshall, "When the Red, Red Robin" (Wood).
 8.15: Vocal quartets—The Melodious Four, (a) "The Fruits of Love" (Woodgate); (b) "How Sweet the Moonlight" (Callcott).
 8.24: Tenor solo—Mr. Russell Sumner, "Glorious Devon" (German).
 8.28: Recital—Miss Maiona Juriss, A.T.C.L., (a) "How I Became Engaged" (Dickens); (b) "The Ruling Passion" (Switer).
 8.35: Soprano and contralto duet—Miss Frances Hamerton, L.A.B., and Miss Belle Renaut, "Dream Pedlary" (Gibbs).
 8.38: Vibraphone solo—Mr. Jack Marshall, selected.
 8.42: Soprano solos—Miss Frances Hamerton, L.A.B., (a) "The Garden Wind" (Fenner); (b) "I Heard a Piper Piping" (Peterkin).
 8.47: Recital—Miss Maiona Juriss, A.T.C.L., "The Face Upon the Floor" (D'Arcy).
 8.52: Contralto solos—Miss Belle Renaut, (a) "The Dustman" (Brahms); (b) "Off to Market, Johnny" (Humphries).
 8.59: Weather forecast.
 9.0: Relay of orchestral selections from Crystal Palace Theatre.
 9.15: Baritone solo—Mr. T. D. Williams, "The Wanderer" (Schubert).
 9.20: Jazz dance music—Lyndon Christie's Dance Orchestra, "I Can't Get Over a Girl Like You" (Broomes).
 9.25: Soprano solo—Miss Frances Hamerton, "Pretty Ring Time" (Warlock).
 9.29: Jazz dance music—Lyndon Christie's Dance Orchestra, "Muddy Waters" (De Rose).
 9.34: Tenor solos—Mr. Russell Sumner, (a) "Like to the Damask Rose" (Elgar); (b) "Bomby Mary of Argyll" (Nelson).
 9.40: Jazz dance music—Lyndon Christie's Dance Orchestra, "Deed I Do" (Hirsch and Rose).
 9.45: Baritone recitative and aria—Mr. T. D. Williams, (a) "I Rage, I Melt, I Burn" (Handel); (b) "O, Ruddier than the Cherry" (Handel).
 9.49: Jazz dance music—Lyndon Christie's Dance Orchestra, "Just Once Again" (Donaldson and Ash).
 9.54: Contralto solo—Miss Belle Renaut, "The Monkey's Carol" (Stanford).
 9.57: Jazz dance music—Lyndon Christie's Dance Orchestra, "Russian Lullaby" (Berlin).
 10.2: Vocal quartet—The Melodious Four, "You Swear to be Good and True" (Cellier).
 10.6: Jazz dance music—Lyndon Christie's Dance Orchestra, "Hello! Swanee, Hello!" (Coslow and Brett).
 10.14: Lyndon Christie's Dance Orchestra—Dance music until 11 p.m.
 God Save the King.

4YA DUNEDIN (463 METRES)—FRIDAY, FEBRUARY 3.

- 3 p.m.: Town Hall chimes.
 3.1: His Master's Voice recital.
 3.30: Talk on "Fashions," by a representative of the D.S.A.
 3.45: Instrumental music from the Savoy.
 4.0: Studio music.
 4.15: His Master's Voice recital.
 4.30: Close down.
 6.0: Town Hall chimes. Children's hour—Big Brother Bill, assisted by youthful entertainers.
 7.15: News session.
 7.30: Address by Mr. H. E. Bellhouse, "League of Nations and a War-less World."
 8.0: Town Hall chimes.
 8.1: Tenor solo—Mr. L. E. Dalley, "Silent Noon" (Williams).
 8.5: Pianoforte solo—Miss A. D. Allan, "Sur le Lac" (Livens).
 8.10: Bass solo—Mr. J. B. Macpherson, "Leaning" (Bennett).
 8.14: Recital—Miss Sheila Neilson, "Hilda Spinning."
 8.20: Soprano solos—Miss Roma Buss, (a) "Only the River Running By" (Hopkins); (b) "Asher of Roses" (Woodman).
 8.27: Pianoforte solo—Miss A. D. Allan, "Flying Moments" (Livens).
 8.32: Mezzo-soprano solos—Miss C. M. Law, (a) "Bird With a Broken Wing" (Golson); (b) "The Star" (Roger).
 8.38: Recital—Miss Sheila Neilson, "Over the Telephone."
 8.44: Tenor solos—Mr. L. E. Dalley, (a) "O, Could I But Express in Song" (Malaskin); (b) "Morning" (Speaks).
 8.50: Pianoforte solo—Miss A. D. Allan, "Les Sylphes" (Bachmann).
 9.0: Bass solos—Mr. J. B. Macpherson, (a) "Myself When Young" (Lehmann); (b) "Prince Ivan's Song" (Allitsen).
 9.7: Monologue—Miss Sheila Neilson, "Little Jean."
 9.15: Dance music from the Savoy.
 10.0: God Save the King.

Saturday, February 4th

1YA AUCKLAND (333 METRES)—SATURDAY, FEBRUARY 4.

- 3 p.m.: Afternoon session—Selected Studio items.
 4.0: Literary selection, by Mr. Cuford Bell.
 4.30: Close down.
 6.0: Children's hour—Cinderella, bedtime stories, songs, letters, and birthdays. Mr. Faigan will give a talk on literature.
 7.15: News and sports results.
 8.0: Chimes.
 8.1: Relay of orchestral overture from Rialto Theatre Orchestra, under the direction of Mr. Henry C. Engel, conductor.
 8.14: Concerted number—Lyric Trio and Miss Alma McGruer, "The Way of the World" (Parkes).
 8.18: Bass solo—Mr. Ernest Thomas, "Stone Cracker John" (Coates).
 8.23: Hawaiian instrumentalists—Ingall's Hawaiian Instrumentalists, (a) "Colonel Bogey March"; (b) "Drifting and Dreaming."
 8.30: Soprano solo—Miss Alma McGruer, "Mussetta's Song" ("La Boheme"), (Puccini).
 8.34: Vocal duet—Messrs. Richards and Thomas, "The Ballad Singers" (Newton).
 8.38: Hawaiian instrumentalists—Ingall's Hawaiian Instrumentalists, "Wild-flower."
 8.44: Elocution—Mr. Alan McElwain, "Merry Moments."
 8.50: Tenor solo—Mr. H. Richards, "Castilian Lament" (Del Riego).
 8.54: Hawaiian instrumentalists—Ingall's Hawaiian Instrumentalists, (a) "Pua Carnation"; (b) "Sweet Hawaiian Girl of Mine."
 9.2: Weather forecast.
 9.3: Relay of orchestral interlude from Rialto Theatre Orchestra.
 9.16: Soprano solo—Miss Alma McGruer, "Sometime in Summer" (Wiloughby).
 9.21: Concerted number—Lyric Trio and Miss Alma McGruer, "Curly-headed Baby" (Clutsam).
 9.26: Relay of dance music from Dixieland Cabaret by the Internationals, under the direction of Mr. Clyde Howley, conductor.
 11.0: A thought.
 11.2: God Save the King.

2YA WELLINGTON (420 METRES)—SATURDAY, FEBRUARY 4.

- 3 p.m.: Afternoon session—Selected Studio items.
 Chimes of the General Post Office clock, Wellington.
 3.1: Selected gramophone items.
 5.0: Close down.
 6.0: Children's hour—Aunt Gwen and Aunt Dot bring their merry surprise party for you. Songs, recitations, and instrumental numbers.
 7.0: News session, market reports, and sports results.
 8.0: Chimes of the General Post Office clock, Wellington.

Although Cairo, Egypt, is a good distance away from most of the European stations, a Mr. W. Day, of that city, has, with his eight-valve super-het., received the following broadcast stations:—Radio, Paris, Darenty, Moscow, Constantinople, Berlin (1250 metres), Vienna (577 metres), Berlin (566 metres), Budapest, Munich, Vienna, Aberdeen, Zurich, Bonruemouth, Berlin, Langenburg, Rome, Bruun, Frankfurt, Berne, Hamburg, Toulouse, Manchester, Stuttgart, Madrid, Leipzig, London, Graz, Prague, Barcelona, Naples, Milan, Breslau, Newcastle.

Many Australian listeners were curious to know why the fifth Empire programme broadcast from 2FC, Sydney, was not relayed by the B.B.C. London, as the reception was not sufficiently satisfactory to warrant this. The explanation is simple. When it was decided that the B.B.C. would relay the programme from 2FC Sydney at Christmas time, they were asked to provide a similar programme for reception in Australia. Tests were carried out and 2FC was advised by the engineers of Amalgamated Wireless that the best time to send a programme to London was between midnight and 2 a.m. to be received in England between 2 p.m. and 4 p.m. the previous afternoon. The programme 2FC gave on boxing morning for reception in London on Christmas Day was set down for this time, but the B.B.C. advised at the last moment that they could not relay the programme until four hours later, which of course meant that the reception would be unsatisfactory, and to keep faith with the Commonwealth Band and the artists that had been arranged for the programme was given between 4 and 5 a.m. on Monday morning, but its reception in England was not satisfactory.

Radio "B" and "C" batteries that are partly run down can be temporarily pepped up by drilling a series of small holes into the battery and then filling the holes with a solution composed of either sal-ammoniac, vinegar, or diluted sulphuric acid. The battery should be allowed to stand idle for several hours before using, after which additional acid should be added. The holes can be plugged up with sealing wax or soft soap.

Russia has instituted a number of public broadcast receiving stations, through which concerts are heard by the people. Mexico has experimented with the same idea. Probably our friend R.F.N. Siberia, is heard through public loudspeakers over wide areas in that country.

Many of us will recall the well-known school book story of how the brave little Hollander, on discovering a hole in one of the dykes, and realising the danger to life should the water widen the break, placed his hand over the hole until help arrived and the damage was repaired. Recently in Brisbane a member of 4QG's staff agreed to emulate the brave little Hollander, but in this case the trouble was a part of 4QG's intricate plant. The part became loose, causing a howl in the transmission, and to adjust matters it might have been necessary to close down for a few minutes, but the member of the staff placed his finger on the affected part, keeping it there for fully an hour until the station closed down, allowing the programme to proceed uninterruptedly.

Recently the number of licensed broadcast listeners in the State of Queensland totalled 25,200. Queensland is rather a sparsely populated State, so the above figures evidence a wholesome interest in broadcasting. A letter is to hand from "Sylvia" (Hataitai), as follows:—

Mr. Gerald Marcuse, the English amateur (2NM), will be transmitting on 32.5 metres until April 1, 1928, probably dropping down to 28 metres at a later date. His schedule will be 6.00 on Tuesday and Sunday mornings, and on Sunday evenings from 18.00 to 20.00 G.M.T.

Germany has twenty-three broadcasting stations in twenty-one cities. All of the stations are owned by the postal service. License fees from receiving sets pay expenses.

Experiments in wireless reception on a moving train are being repeated on the Warsaw-Zyradow lines. The experiments will be made with the apparatus on a far distant train. If these experiments prove successful, other trains are likely to be equipped with receiving apparatus.

2FC, Sydney, have a truly novel "turn" by two gentlemen, "Flotsam" and "Jetsam" who enter into discussions, sometimes considerably heated, on the topics of the day. These discussions, sometimes considerably heated, develop into arguments and the dialogues are frequently most mirth-provoking. One rejoices vigorously at anything new in broadcast entertainment.

In a letter addressed to a 2BL announcer, Mr. Donald Wright, of San Pedro, California, inter alia, states:—"I have a DX radio den where I invite people to listen in to 2YA, Wellington, New Zealand, who is coming in good." Mr. Wright remarks that the broadcast stations in this part of the world "are better made than U.S.A. stations, or the air is better; they sure do come in."

- 8.1: Overture—"Wine, Women, and Song Waltz" (Strauss).
 8.5: Vocal quartet—Melodie Four, "Lovely Night" (Abt).
 8.9: Humorous recital—"Monty on 'Empire Spirit'" (Hayes).
 8.14: Baritone solo—Mr. R. S. Allwright, "Song of the Clock" (Burchell).
 8.18: Instrumental trio—Symons-Ellwood-Short Trio, "First and Second Movements from Sonata No. 2" (Handel).
 8.26: Tenor solo—Mr. S. Duncan, "The Lass With the Delicate Air" (Arne).
 8.30: Song at piano—Mr. Billy Hart, "Russian Lullaby" (Berlin).
 8.34: Humorous recital—Mr. R. Walpole, "Nonsense—Present and Future."
 8.39: Vocal duet—Melodie Four, "Blue Skies" (arr. F. Crowther).
 8.44: Instrumental trio—Symons-Ellwood-Short Trio, "Finale from Second Sonata" (Handel).
 8.52: Tenor solo—Mr. Frank Bryant, "There's a Song Down Every Roadway."
 8.56: Song at piano—Mr. Billy Hart, "Me and My Shadow" (Jolson).
 9.0: Weather forecast.
 9.1: Vocal duet—Messrs. S. Duncan and R. S. Allwright, "The Fishermen" (Gabussi).
 9.5: Selected dance and jazz items.
 11.0: Close down.

3YA CHRISTCHURCH (306 METRES)—SATURDAY, FEBRUARY 4.

- 6 p.m.: Children's session—Uncle Sam and Aunt May, bedtime stories, birthday greetings, etc.
 7.15: News and reports.
 7.30: Sports results.
 8.0: Chimes. Relay of orchestral selections from Liberty Theatre Orchestra, under the direction of Mr. Ernest Jamieson.
 8.15: Contralto solos—Miss Christina Green, (a) "Oh, No, John" (Vaughan Williams); (b) "Dashing Away With the Smoothing Iron" (Vaughan Williams).
 8.19: Pianoforte novelites—Mr. Ivan Perrin, extemporisation from (a) "L'Ess Than the Dust" ("Indian Love Lyrics"), (Finden); (b) "Flap-perette."
 8.25: Vocal duet—Miss Mabel Thomas and Mr. David McGill, "Lovely Maid in the Moonlight" (from "La Boheme"), (Puccini).
 8.29: Instrumental trio—Christchurch Broadcasting Trio, three movements from "A Major Trio," (a) "Allegro," (b) "Andante," (c) "Finale" (Bohm).
 8.41: Happy songs at the piano—Misses Muriel Johns and Dorothy Johnson, (a) "Hello, Swanee, Hello" (Coslow and Britt); (b) "I Wonder How I Look When I'm Asleep" (De Sylva).
 8.47: Baritone solos—Mr. Cyril Rishworth, (a) "Muleteer of Malaga" (Trotter); (b) "Love Lily" (Thomson).
 8.53: Elocution—Mr. J. P. Darragh, "Tale of a Dog."
 8.56: Tenor solo—Mr. David McGill, "Angels Guard Thee" (Godard).
 8.59: Weather forecast and late news.
 9.0: Relay of orchestral selections from Liberty Theatre.
 9.15: Vocal duet—Miss Mabel Thomas and Mr. David McGill, selected.
 9.19: Instrumental trio—Christchurch Broadcasting Trio, (a) "Salut D'Amour" (Elgar); (b) "Air de Ballet" (Adam).
 9.28: Contralto solo—Miss Christina Green, "The Silver Ring" (Chaminade).
 9.31: Pianoforte novelites—Mr. Ivan Perrin, (a) "Wannaloo" (Perrin and Marston Bates); (b) "Medley of Popular Numbers."
 9.37: Soprano solo—Miss Mabel Thomas, "Spargi d'Amaro Pianto" from "Lucia di Lammermoor" (Donizetti).
 9.41: Instrumental trio—Christchurch Broadcasting Trio, (a) "Air" (Bach); (b) "Minuet" (Shield).
 9.50: Baritone solos—Mr. Cyril Rishworth, (a) "Lady Mine" (Lohr); (b) "In the Heather, My Lads" (Lohr).
 9.56: Happy songs at the piano—Misses Muriel Johns and Dorothy Johnson, (a) "Me and My Shadow" (Jolson); (b) "Stepping on the Worries" (McLaughlin).
 10.2: Tenor solo—Mr. David McGill, "E Lucevan la Stella" from "Tosca" (Puccini).
 10.6: Soprano solo—Miss Mabel Thomas, "Kathleen Mavourneen" (Crouch).
 10.10: Elocution—Mr. J. P. Darragh, "Cohen Rings His Tailor."
 10.15: Relay of dance music from Caladonian Hall, by kind permission of the Canterbury Caledonian Society and Mr. Reg. Stillwell. Music supplied by Jackson's Orchestra.
 God Save the King.

4YA DUNEDIN (463 METRES)—SATURDAY, FEBRUARY 4.

- 7.15 p.m.: News session.
 7.30: Address on "Interior Decoration," by Miss Marguerite Puechegud.
 8.0: Town Hall chimes.
 8.1: Relay of orchestral music from the Empire Theatre Orchestra, under the direction of Mr. Chas. Parnell.
 8.11: Contralto solos—Miss Irene Hornblow, L.R.A.M., (a) "The Unforeseen" (Scott); (b) "Sweet and Low" (Barnby).
 8.18: Flute solo—Mr. J. Stewart, "Vogelsang" (Popp).
 8.24: Cornet solo—Mr. Geo. Christie, "Silver Showers" (Rimmer).
 8.34: Baritone solo—Mr. Arthur Lungley, "Irish Immigrant."
 8.39: Violin solo—Mr. A. R. Watson, "Salut d'Amour" (Elgar).
 8.44: Relay of orchestral music from the Empire Theatre.
 8.54: Soprano solos—Miss Florence Sumner, (a) "Good Night" (Franz); (b) "Ah! How Pleasant to Love" (Purcell).
 9.0: Flute solo—Mr. J. Stewart, "Thais" (Massenet).
 9.10: Tenor solo—Mr. R. A. Mitchell, "Amie Laurie" (arr. Lehmann).
 9.15: Cornet solo—Mr. George Christie, "I Hear You Calling Me" (Marshall).
 9.19: Contralto solo—Miss Irene Hornblow, "Lullaby" (Scott).
 9.23: Violin solo—Mr. A. R. Watson, "Aria" (Manhire).
 9.28: Baritone solos—Mr. Arthur Lungley, (a) "Requiem" (Homer); (b) "Inter Nos" (Macfadyen).
 9.34: Flute solo—Mr. J. Stewart, "Fausta" (Rummell).
 9.40: Soprano solo—Miss Florence Sumner, "Guiding Light" (Rosa).
 9.44: Cornet solo—Mr. George Christie, "Zelda" (Code).
 9.49: Tenor solos—Mr. R. A. Mitchell, (a) "Youth" (Allitsen); (b) "Parted" (Tosti).
 9.55: Violin solo—Mr. A. R. Watson, "Berceuse de Jocelyn" (Godard).
 10.0: God Save the King.

Sunday, February 5th

1YA AUCKLAND (333 METRES)—SUNDAY, FEBRUARY 5.

- 3 p.m.: Afternoon session—Selected Studio items.
 4.0: Literary selection—Mr. Cuford Bell.
 4.30: Close down.
 6.0: Children's hour—Uncle Leo; song service conducted by Uncle Leo, assisted by cousins from the Beresford Street Sunday School Choir.
 6.55: Relay of church service from St. Matthew's Church. Preacher, Rev. Canon Grant Cowan; organist, Mr. W. Philpott.
 Special concert from Studio.
 8.30: Vocal quartet—St. Andrew's Quartet, "Rock of Ages."
 8.34: Bass solo—Mr. Arthur Colledge, "Light in Darkness" (Cowan).
 8.38: Vocal duet—Mrs. Richards and Miss Phyllis Gribben, "O, Lovely Peace" (Handel).
 8.42: Instrumental trio—Bosworth-Hemus-Towsey Trio, "Scherzo and Finale, Trio, Op. 21" (Dvorak).
 8.52: Tenor solo—Mr. Robert Peter, "The Soft Southern Breeze" (Barnby).
 8.56: Vocal quartet—St. Andrew's Quartet, "Call to Remembrance."
 9.1: Instrumental trio—Bosworth-Hemus-Towsey Trio, "Peer Gynt Suite" (Greig).
 9.12: Contralto solo—Miss Phyllis Gribben, "O, Divine Redeemer" (Gounod).
 9.17: Vocal quartet—St. Andrew's Quartet, "At Even, ere the Sun was Set" (Turner).
 9.21: A thought.
 9.23: God Save the King.

2YA WELLINGTON (420 METRES)—SUNDAY, FEBRUARY 5.

- 6 p.m.: Children's session, conducted by Uncle Ernest.
 6.55: Relay of evening service from St. Gerard's Redemptorist Church, Hawker Street, Wellington. Order of service:—Organ solo, "Andante from Fourth Organ Sonata" (Mendelssohn); Rosary with choral responses; Antiphone, "Ave Regina" (Witska); sermon, Mtoets, "Ave Maria Stella" (Carso), "Sweet Sacrament Divine" (Rev. F. Stanfield), "Cast Thy Burden" (Mendelssohn); organ solo, "Parane,"

(Continued on page 14.)

Crystal Receiver and Two-stage Amplifier

Perfect Reception of Local Station on the Loudspeaker

(By "Megohm")

SEVERAL requests have been received from novices for complete instructions dealing with the assembly of a crystal set with two amplifying valves, and the following is accordingly presented. Very fine reception of the local station is assured with a carborundum fixed crystal and an amplifier such as this. Some listeners are receiving concerts on the headphones from long distances with such a set, but there is no guarantee for long distance, as much depends upon the location of the receiver. This set is primarily to give full loud-speaker volume from a near station, and with good components and reasonable care in construction, will give volume and quality equal to many expensive valve sets, and indeed will excel many in quality of tone.

Those who are best satisfied with real music from the local station, combined with a minimum amount of attention, will find this set very well suited to their needs. Many listeners, no doubt, who have previously listened-in with headphones and a crystal, will find it an opportune time to convert the set into something larger and more entertaining, so far as the whole family is concerned.

Explanation will be given as fully as possible so that the new constructor, who is handy with tools, may successfully build his first set.

The materials and components to be purchased are as follows approximate prices being given.

MATERIALS REQUIRED.

3-16in. Ebonite Panel, 14 by 6ins	7	6
Variable Condenser, .0005..	14	0
Dial for same	1	3
Carborundum Cartridge Crystal	7	6
Ferranti AF3 Transformer..	27	6
Audio Transformer, large, good make, 5 to 1 ratio	17	6
Rheostat, 30 ohms	3	6
2 Valve holders, American ..	4	6
8 Terminals	2	0
3 Pin Terminals for panel...	1	0
2 Sockets, 1 Pin	1	0
1lb. 20's enamelled wire...	1	3
Baseboard, connecting wire, screws, etc	5	0
	£4	13 2

PANEL AND BASEBOARD

The panel is best made of ebonite, though some constructors now use three-ply wood for the purpose. Ebonite or formica imparts a smart appearance to any set, and is well worth the extra cost, especially on account of the high insulating properties. The length of the panel must equal that of the baseboard, which is conveniently 14 inches, though it could be slightly less at the expense of unnecessarily crowding the components. Fourteen inches wide and six inches high, then, is to be the size of the panel.

The baseboard is constructed of 3in. rimu, 14 by 7 inches, with a 1 by 3in. strip projecting along under the front edge and a similar strip under each end to serve as battens. A small diagram is given of the method of screwing the panel to the front edge of baseboard with strip underneath finishing flush at the front. The woodwork may be polished up with shellac dissolved in methylated spirits and rubbed on with a cotton rag.

The question of providing a cover or cabinet or not, is left to the wishes of the constructor.

TUNING ARRANGEMENTS.

The aerial tuning condenser should have a maximum capacity of .0005 microfarads, and a tuning-coil to suit this will have 54 turns of 20's standard wire gauge enamelled wire, either wound with turns close together on a 2in. diameter cardboard or ebonite tube, or wound with a slight space between each turn and supported only by strips of celluloid, as has been described in this column several times recently. If the set is not specially for long-distance work the close winding will be quite suitable.

Those who already have a crystal set and wish to dismantle it, may have a suitable coil ready for use. The coil is placed behind the condenser, not less than an inch away.

ing, the wire cut with six inches to spare, then threaded down through one hole and out through the next. This finishes the operation of making the coil.

In connection with the aerial tuning coil, the best results are not always obtained by connecting the aerial to the top of the coil, and it is a good idea at the outset to try connection the aerial terminal to, say, the 18th turn from the bottom or earth end. The crystal connection may also be tried at this point instead of at the top. The condenser must, in every case, be connected to the extreme ends of the coil. The above idea is more important if it is proposed to attempt long-distance reception.

DRILLING THE PANEL.

Few holes are required in the panel. The various parts should be placed in about the position shown.

is attached that plugs into either of the sockets 1 and 2. The object of this is to provide a switch so that the crystal alone can be used when desired.

To use the crystal the plug is inserted in the socket marked C on panel, and 'phones or speaker are connected to panel terminals 4 and 5. When not required, the A battery may be turned off at the rheostats, and the B battery it a dry one, by removing the wander-plug.

Holes for the three panel terminals are drilled not less than 1 1/2 inches apart.

Having made the baseboard and drilled the panel, the latter may be screwed in position by four half-inch brass screws in the holes along the bottom edge. Brass and not iron screws must be used in all radio work. It is a good idea to arrange

ranti) are now screwed in place and between them are screwed down the two valve holders, noting carefully the position for the connections P, G, and positive (plus) and negative (minus). Constructors are recommended to adopt American valve holders only, because British and other valves can all be obtained with Yankee bases, but if British holders are adopted, American valves cannot be used without an adaptor or the changing of the holder to one of the American type. The Klossner UX is suitable for amplifiers, but requires the connections soldering.

Along the back of the baseboard there is a strip of ebonite one inch wide, about eight inches long, holding six terminals. These strips should be raised above the baseboard by a small block of wood where the holding-screws are placed. Sometimes it is possible to purchase such strips with the terminals ready in place, otherwise it must be made. A similar strip 3 1/2ins. long holds the terminals for aerial (A) and earth (E) connections.

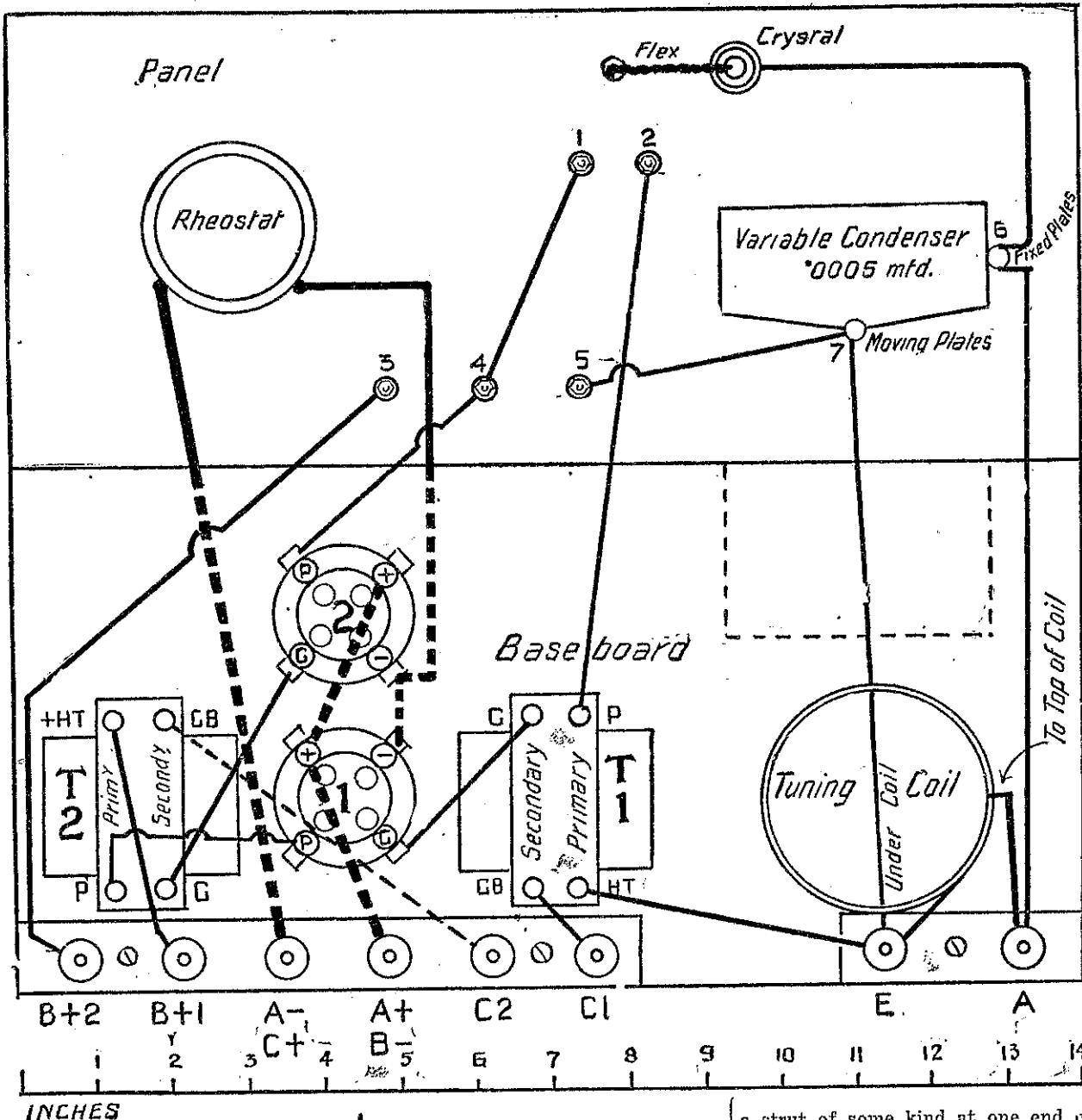
Audio transformers vary as to the way in which the terminals are marked, but the Ferranti are as shown on the diagram. Some are marked "IP, IS, OP, OS," standing for "in primary, in secondary, out primary, out secondary." In the case of the first transformer (T1) however, it is marked, the two primary terminals connect to socket 2 and the earth terminal respectively.

WIRING-UP.

All is now ready for making the various connections, which may be made with square bus-bar wire or with tinned 18's round wire. The whole of this receiver may be wired up without soldering, unless the valve holders are of a pattern without terminals, in which case no attempt must be made to dispense with soldering. A pair of round-nosed pliers will be required in order to neatly twist a circular loop at the ends of each wire to be connected. This loop is then slipped over the top or bottom screw thread of the terminal and secured by the head or nut, as the case may be.

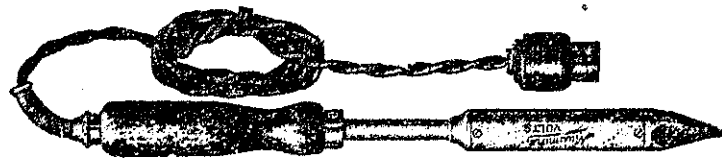
Commencing at the crystal, which will be a carborundum cartridge, if minimum trouble is desired, a loop is made on the end of the connecting wire, slipped over the thread, which is then placed in hole in panel and secured outside by the nut. The wire now continues to the outer end of the condenser and a loop is made to go over the screw thread connecting to the fixed plates. This having been secured by the nut, the wire continues to the back of the board and is bent downwards to be cut off and looped to the underside of A terminal, and at the same time the wire from the top end of the coil is cut off and the end well cleaned to loop over the same terminal, the nut then being screwed on very tightly.

A wire is now run from the back of panel terminal 5 to the moving plate connection of condenser, then continues under the coil or round the inner side, keeping it low, to loop round the E terminal under strip, and continue to one of the primary connections of transformer 1. The lower end of the tuning-coil is now connected to the E terminal and the securing nut tightly fastened, when the ebonite strip may be finally fixed



With regard to height, the condenser and rheostat centres should be just about half way. The condenser spindle should not be less than three inches from the nearest end, but the pattern of condenser will decide the position, which must be fixed before the position of the crystal can be determined, as the latter must be placed to clear the vanes of the condenser when they are at minimum position, or full out. A template is usually provided with condensers as

a strut of some kind at one end of the panel to assist in holding it upright. A short strip of wood can be cut at an angle at each end, screwed to the baseboard and the panel through a hole in the ebonite near the condenser. This having been done, components not already in the panel can be put into place. The two transformers T1 and T2 (Fer-



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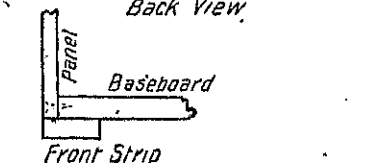
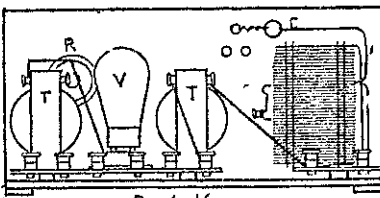
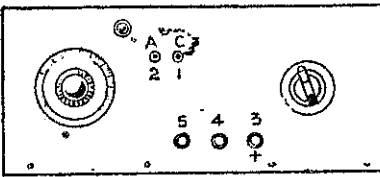
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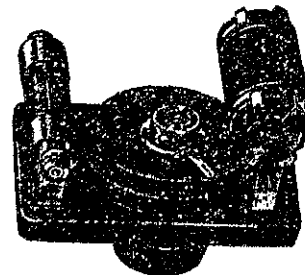


a guide to drilling in correct position the holes required for fixing. The Igranite rheostats have an outside indicator plate that serves as a gauge for drilling the fixing holes. The positions marked 1 and 2 at back of panel indicate two sockets that are let into the panel, and from the back of the crystal near by, a piece of flexible covered wire leads out through a hole in the panel. To the other end of the flex a split pin

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in place. This wiring is shown on the back view of receiver, as well as on the full wiring diagram. Other wiring could not be clearly shown on the small back view, which is only intended to show the position of components.

There are six connections to be made to terminals on the ebonite strip, and the most convenient method would be to cut off all wires sufficiently long and at the last make all connections to the strip at the same time.

Now run a wire from socket 1 on panel, round the back screw of terminal 4, and on to P or plate connection of valve holder 2. From G or grid connection of this holder (run a wire to G or grid connection (secondary) of transformer 2, the wire standing up clear of others, and clear of both valves. Now one secondary of transformer 1 connects to the end terminal on strip and the other to G or grid of first valve. P of this valve-holder is connected to P of transformer 2 and this wire must rise over the top of grid wire at least one inch. The other primary connection of transformer 2 runs to the positive B1 on strip, and should keep to the outside of the other wires, and not between P and G as shown. The last connection of the second transformer is GB to C2 terminal. This and all other wires shown dotted should be passed under the board, holes being drilled in a suitable position. From terminal 3 on panel a wire is run to positive B2 round the side of transformer as shown. The transformers may be placed an inch or so further from the ebonite strip than is actually shown, but T1 should be kept nearly two inches from either tuning-coil or condenser.

Transformers marked "IP, IS," etc., are connected as follows:—IP to positive B battery, OP to plate of preceding valve, IS to grid-bias, or C battery, OS to grid of next valve. This will not refer to the primary (IP, OP) of the first transformer, which will be connected, as shown, to E and socket.

The filament, or A battery, wiring is now to be carried out, the wires to pass under the board where shown dotted. From one side of the rheostat, a wire runs to the negative connection of both valve holders. The positive of each holder is connected together, and in this case the wire may be passed up through a hole in board to positive of holder 1, looped to the terminal or soldered, then passed down through the hole to continue to positive A terminal, this and the next wire to be kept close to the under side of board to allow grid bias wire to cross with a good space between it and filament wires. It is an advantage for wires under the board to be insulated. The remaining connection is from the other side of the rheostat to negative A terminal.

There is the short piece of flexible wire to be attached to the rear end of crystal cartridge, passed through hole in panel and attached to the split pin by twisting the bare wire round the screw and securing with the nut provided.

The C1 and C2 terminals connect to the negative taps of grid bias, or C battery, and in the event of only one C voltage being used, both these terminals would be permanently connected by a short-piece of wire, only one wire then would run to C battery negative. C positive is connected to the same terminal as the negative of A battery.

If only one B battery voltage is used, positive 1 and 2 would be connected together by a short wire or "jumper," and only one wire would connect to B positive, whilst in either case negative B connects to the same terminal as positive A battery.

VALVES AND BATTERIES

Up to the present stage, every receiver built from these specifications should be practically identical, but now we come to the choice of valves, and to some extent the valves to be used depend upon the battery power that is to be available, so the battery question must be settled first.

If dry batteries only are used good results will be obtained, but the amount of volume will be rather less than is consistently obtained from wet batteries. The advantage of dry batteries is an apparent financial gain, but the gain is only in first outlay, as the continual instalments paid for renewals will in time equal the amount that would be laid out on wet batteries.

For dry-battery operation valves requiring not more than 4 volts on the filament should be used. This will allow the employment of three dry-cells giving 1½ volts each, or a total of 4½ volts when connected "in series." Whilst the cells are new, the extra voltage is kept down by the rheostat, and this matter should be carefully attended to, as any excess voltage on dull emitter valves shortens their life, though with ordinary care there is little chance of trouble.

For dry-cell working then, the most suitable valves would be a pair of UX199's (4 volts), or a UX199 in first stage followed by a UX120 in the second both these valves taking the same filament voltage. In the Mullard series, two PM2's (2 volts, requiring only two dry-cells), or two PM3's (4 volts), or a PM3 followed by a PM4 (4 volts). In the Philips series, two B205's (2 volts, 2 dry-cells), or a pair of B406's (4 volts), or an A409 (4 volts) followed by a B406.

On the above valves grid-bias will be from 1½ to 3 volts on the first stage, and when the B battery voltage is the same on both stages with the same valves, will be the same on each. When a higher B voltage is used in the second valve, grid-bias will be from 4½ to 6 volts in most cases, so that a grid-bias battery capable of giving 6 volts will suffice. Exact particulars regarding grid-bias are supplied in leaflets packed with the valves. Many people are inclined to dispense with grid-bias, but for the small cost of the battery it is worth while, for two good reasons. Firstly, correct grid-bias improves the tone of the amplifier, and secondly, its use lessens the drain upon the B battery, making it last longer, which is important when dry batteries are in use. There is no actual current taken from the grid-bias battery, so that it will run for many months without need for renewal.

WITH A ACCUMULATORS

In the case of adopting accumulators for the A supply, whether the B battery is dry or not, the position is improved. Listeners who have to take accumulators some distance to be re-charged, may keep down the consumption of current by using the economical valves mentioned above for dry-cell use. Where the accumulators can be quickly replenished, there is less need to study consumption so carefully. The four-volt valves mentioned above are quite suitable for use with two of the small glass-container "Exide" type of accumulators which are not at all expensive to buy, will run two valves with a charge once a fortnight, at small cost. Three such cells will run 6-volt valves, but some valves of this voltage require a good amount of current (expressed in amperes) which would cause the accumulators to need charging too frequently, unless an accumulator of large capacity (30 to 60 ampere hours) were employed. The small Exide cells are rated at 10 ampere-hours which means that they will supply one am-

pere for 10 hours, but as some of the valves quoted above only require one-tenth ampere or less, the time an accumulator will last is greatly extended. It is not good to run an accumulator until it will give no more current, but appoint a regular period for recharging when about three-quarters of the total capacity has been used.

A four or six-volt accumulator of thirty or more ampere-hours capacity would suit this amplifier very well, voltage according to the valves to be used. Very good results are obtained on four-volt valves.

Where a "wet" B battery, that is an accumulator, is to be used, full advantage may be taken of the use of a good power-valve in the first stage, and a super-power in the second, the latter requiring a plate voltage of anything from 120 to 170 volts to give full efficiency.

SIX-VOLT VALVES.

The valves usually classed as "six-volt" require a 6-volt accumulator supply, but the actual voltage required by the filament is considerably less than six volts, and usually from 5 to 5½ volts.

The UX201A may be used in both stages, or may be followed by a UX112 or UX 171 in the last stage, if a wet B battery is employed. The PM6 may be used in both stages, or followed by a PM 256 power valve with B accumulator. A Philips A609, followed by a B605, would be a good combination. Two de Forest D401A's may be used, or in the second stage a D412 or D471.

CHOOSING VALVES.

In selecting valves for dry-cell work the filament voltage must not be more than four volts. Regarding the B battery supply, the plate current is what must be studied, and this is measured in "milliamps," or thousandths of an ampere. The more milliamps taken, the shorter time will the B battery last. The higher the B voltage, the more milliamps will be passed. An ordinary general-purpose or small power-valve will take from one to three milliamps at 60 to 75 volts, and such consumption is suited to a dry battery. Super-power valves require a high B voltage and will consume as much as 20 milliamps, which would soon exhaust a dry battery, and that is the reason why they cannot be used. In the "Record" of January 13, there was a list of characteristics of the three leading makes of valves. This should be cut out and kept for reference by every constructor.

B BATTERY VOLTAGE.

Amplifiers will stand any voltage up to 100 or 120, but the higher the voltage, the greater the drain on the battery, so that if dry batteries are used, moderation is best, so that 60 or 90 volts will be very suitable.

OPERATION.

The operation of this receiver is very simple. With the batteries connected to their proper terminals, and the aerial and earth connections made, the rheostat is used to turn on the amplifier filaments, the rheostats only being turned a small amount at first. The loud-speaker is connected to the two right-hand terminals on the panel and the plug, or split pin, is placed in the socket marked A. Now turn the tuning knob or dial slowly until maximum volume is heard, then turn the rheostat slowly a short space further to find the point where greatest volume is obtained. Let the rheostat remain fixed at that point, as any increase is unnecessary. The aerial tuning will practically remain always the same for the local station, and will not require frequent adjusting.

The positive or marked 'phone or speaker cord must always be connected to terminal 3 on panel, which should be marked.

The numbers are not intended to be marked on panel, but the sockets A and C should be so marked.

It should be noted that resistance-coupling amplification cannot follow immediately after a crystal, as this method relies upon impulses from the plate of a preceding valve.

Probably the majority of constructors will run this amplifier with dry cells, and quite good results will be obtained. Where high B voltages are used with a super-power valve in the last stage, an output filter or output transformer is necessary to protect the speaker wind-

ings. This is also a good addition even when only moderate power is used. Next week an article will deal with this matter in connection with amplifiers generally.

In order to provide for all requirements, two voltages are included for both B and C batteries. If only one voltage is used for either of these, positive B1 and positive B2 are connected together by a short bit of wire, and the B battery connected to one of the terminals, or C1 and C2 (both negative) are both connected together in the same way for one voltage.

Constructors should watch the next issues for further details in reply to queries.

Next week there is to be a short resume of the Browning-Drake receiver, and in that constructors will find details of the construction of space-wound coils.

ANSWERS TO CORRESPONDENTS

R. W. (Hawke's Bay).—Best to make your kit up as recommended by the makers, then you will not be likely to have any trouble. When you have got used to the correct working, and know what it is capable of, then you will be able to try alterations and judge of their value.

"Radiobug" (Nelson).—A loudspeaker would not be sufficiently sensitive for testing condenser capacity.

W. McN. (Greymouth).—One of the wavelengths on which you receive 4YA is a "harmonic." Harmonics are simply sub-multiples of the fundamental wavelength. The wavelength of 4YA is 463 metres, and the second harmonic is found by dividing this by two, giving 231.5 metres. To determine the fourth harmonic divide by four, the sixth, divide by six, and so on.

Increasing your detector voltage from 10½ to 22½ may be an advantage, but you yourself can judge best by the result, especially as no details are given. The higher voltage will certainly not harm the valve.

THE "UMBRELLA" AERIAL

USEFUL IN CRAMPED QUARTERS.

A Christchurch reader sends the result of experiments with an "umbrella" aerial. This type of aerial is by no means new, but has generally given place to the single-wire flat-top aerial with two poles. Our correspondent points out that for listeners with limited backyard space this type of aerial will give good results.

The principle is to erect only one pole, but this is to be as high as possible, even 50 or 60 feet. At the top a post office pattern insulator is fixed, and to this are attached four wires, all soldered together. These wires act as both stays and aerial, and a few feet above the ground an insulator is inserted in each, and just above the insulator a lead-in is taken from one of the wires.

Not every listener would care to have the responsibility of a 60-foot pole in cramped quarters, and unless a really good spread can be secured for the stays it is safer to reduce the height to get a safe angle. Poles thirty feet or over in height should have stays half-way up as well as at the top, and over forty feet it is safer to have two intermediate sets of stays, unless the pole is strong and almost self-supporting.

NOTES

DOUBLE-GRID VALVES.

Philips Laboratories turn out four patterns of double-grid receiving valves. The A141 requires a filament voltage not exceeding 1.8 volts, the A241 maximum 2 volts, A341 maximum 3.3 volts, and A441 a maximum of 4 volts on the filament. They all work on the low filament current of 0.06 amp. They can be used as amplifiers or detectors, the latter only requiring a plate voltage of 2 to 4 volts. A filament rheostat of not less than 12 ohms is required. These valves were on sale in Wellington over twelve months ago, but do not appear, so far, to have received proper recognition. A shipment has now arrived.

THE GRAVITY DANIEL CELL.

Several correspondents constructing this cell have written stating that when the weak sulphuric acid solution has been put in there has been violent action on the zinc. Whilst this action should not be unduly violent, it must be there, for the object of the sulphuric acid to "start" the cell is to act upon the zinc, so that the acid solution is turned to zinc sulphate, the required solution for the working of the cell.

The zinc sulphate forms a layer of its own above the solution of copper sulphate lower down, and the object of keeping the zinc a shallow or flatish shape is to ensure it not reaching down to the copper sulphate solution. Normal voltage should not be expected until the "starting" is complete, and the cells have settled down.

Another way of starting the cells is to place ready-made zinc sulphate solution in them, instead of the weak acid.

A HANDY RESISTANCE UNIT.

An extremely compact and handy resistance-coupling unit was handed to "Megohm" for testing purposes. This unit, the product of the Philips Laboratories, is in keeping with their many other excellent and well-known products. The chief thing looked for from an audio amplifier is tone, combined with reasonable volume. Tone cannot be measured with a meter, so the unit was simply dropped into the first audio stage of a Browning-Drake, and its excellence was apparent at once. The writer is at present engaged in finding out the very best way of improving the first audio in this set, and this unit can certainly be recommended to replace with advantage any transformer of doubtful pedigree. The unit is provided with four terminals, just like a transformer, and simply connects to the same four wires. The retail price is 25s.

A high-amplification detector and increased plate voltage is necessary for best results.

BRITISH RADIO GOODS

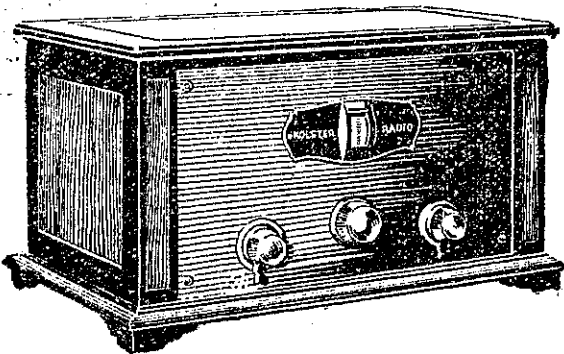
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Programmes Continued

(CONTINUED FROM PAGE 14.)

16th century (Bryd). Benediction. Motets, "O Salutaris Hostia" (Elgar), "O Sacrum Convivium" (Farrant), "Tantum Ergo" (Verdusson), "Divine Praises" (Oakes), "Adoremus and Laudate Dominum" (Allegri); chorus, "Sanctus" (Weber); organ solo, "Finale Grand March from Aida" (Verdi). Conductor, Mr. Frank J. Oakes; organ, Mr. Henry Mount.

8.30 (approx.): Studio concert:—
Vocal quartet—The William Renshaw Quartet, "Friend of the Friendless" (Wheeler).
Instrumental quartet—Symons-Ellwood-String Quartet, "Allegro and Dumka from Quintet" (Dvorak), (with assistance of Mr. Gordon Short).
Bass solo—Mr. Wilbur Davies, "The King's Minstrel" (Pinsuti).
Soprano solo—Mrs. Amy Dunn, "Thank God for a Garden" (Dei Riego).
Instrumental quartet—Symons-Ellwood String Quartet, "Largo from Quartet in E Major" (Haydn).
Tenor solos—Mr. William Renshaw, (a) "I Know of Two Bright Eyes" (Clutsam); (b) "Jane" (Barker).
Contralto solos—Miss Nora Greene, (a) "To Music" (Schubert); (b) "The Blind Ploughman" (Clarke).
Vocal duet—Mr. William Renshaw and Mr. Wilbur Davies, "Under the Desert Star" (Temple).
Instrumental quartet—Symons-Ellwood String Quartet, "Serenade" (Widor).
Vocal quartet—The William Renshaw Quartet, "When Evening's Twilight" (Hatton).

3YA CHRISTCHURCH (306 METRES)—SUNDAY, FEBRUARY 5.

5.45 p.m.: Children's song service from 3YA Studio by Uncle Sam, assisted by New Brighton Methodist Sunday School.
7.0: Relay of evening service from Trinity Congregational Church. Preacher, Rev. D. Gardner Miller.
The following after-service concert will be given from 3YA Studio by Derry's Military Band, under the conductorship of Mr. E. C. Derry.
8.15: Grand Coronation Waltz—The Band, "La Prophete" (Meyerbeer).
8.20: Morceau—The Band, "Salut d'Amour" (Elgar).
8.25: Baritone solo—Mr. C. L. Richards, "The Lord Is My Light" (Allitsen).
8.29: Grand overture—The Band, "1812" (Tschalkowsky).
8.45: Piccolo solo—Bandsman Hutton, "Through the Air" (August).
8.50: Baritone solo—Mr. C. L. Richards, "Droop Not, Young Lover" (Handel).
8.54: Overture—The Band, "William Tell" (Rossini).
9.8: Characteristic intermezzo—The Band, "In a Monastery Garden" (Ketelby).
God Save the King.

4YA DUNEDIN (403 METRES)—SUNDAY, FEBRUARY 5.

5.45 p.m.: Children's song service, conducted by Big Brother Bill.
7.0: Relay of evening service from the St. Andrew's Street Church of Christ. Preacher, Pastor W. D. More; choirmaster, Mr. W. Hickey; organist, Miss E. Stokes.
8.10: Studio concert.
9.10: Close down.

Programme Features

(CONTINUED FROM PAGE 14.)

Selections have been made from Beethoven and Schumann by Miss Jessie King for her solos, and as a duet with Mr. Prescott "On Wings of Music" will be sung.

Mr. Rennell will sing "I Will Not Grieve" (Schumann) and "The Song of the Vagabond." The latter is a composition by Mr. Vaughan Williams, in which the time changes every two bars.

Mr. Harold Prescott's solos will be Schubert's well-known "Serenade," "Sunday" (Brahms), and "Thou Art Like a Lovely Flower."

Pianoforte solos appropriate to the programme will be played by Miss Lucy Fullwood.

"The Song of the Trees," written by a Christchurch lady, Miss Colborne Veal, will be recited by Miss Naare Hooper, L.T.C.L., at 3YA on Thursday. Other of her items will be that choice piece of droll humour, the "Gravediggers' Scene" from "Hamlet," and Gilbert's "Comedy and Tragedy."

Mr. Lyndon Christie's orchestra will supply the music for a special dance programme on Friday evening. The various dances will be interspersed with vocal items from the studio by the Melodious Four and Miss Maiona Juris.

The Melodious Four will provide a miscellaneous programme on Friday evening. Miss Frances Hamerton, L.A.B., will be singing some dainty little solos very rarely sung except in chamber concerts. Miss Renaut's solos will be of a different stamp, such as "The Dustman," and "Off to Market, Johnnie." Mr. Sumner will vary his contributions from rollicking songs to popular airs and classics. Mr. T. D. Williams will sing Schubert's "The Wanderer" and Handel's recitative and aria "I rage, I melt, I burn," leading up to the solo "Ruddier than the Cherry."

In addition to the regular Saturday night contributors who provide such bright entertainments, Miss Christina Green, L.R.A.M., will be singing next week-end. Miss Green is the music mistress at Archerfield Girls' School, Dunedin. She received her training in Britain as a pupil of Mr. Dale Smith and Mr. Evelyn Howard Jones. Miss Green has chosen three songs which will give an indication of her ability, "Oh No, John," "Dashing Away with the Smoothing Iron" and "The Silver Ring."

Among the improvisations, medleys and piano novelties which will be played by Mr. Ivan Perrin on Saturday evening will be a piece entitled "Wanaloa," composed by Mr. Perrin and Mr. Marston Bate, the well-known cellist.

Miss Mabel Thomas and Mr. David McGill will next Saturday sing excerpts from Grand Opera—"La Boheme," "Lucia di Lammermoor," and "Tosca." Miss Thomas will also sing the old favourite "Kathleen Mavourneen."

The Misses Johns and Johnson with their happy songs, Mr. Cyril Rishworth's good baritone solos, and Mr. J. P. Darragh's humorous recitations, will help to make Saturday's programme a success.

Mr. James Drummond, F.L.S., F.Z.S., the well-known writer on natural history subjects, who some time ago gave a most interesting talk on the Tuatara Lizard, will on Friday speak on "New Zealand's Strangest Bird—the Kiwi."

TRIO MUSIC AT 3YA

Gurlitt is known for his simple flow of melody. His trios are written in a light and easily assimilated style. Next week the Christchurch Broadcasting Trio will play this composer's Trio, Op. 181,

consisting of the four movements: Allegretto; Moderato; Adagio and Allegretto Scherzando.

A group of three pieces by Frank Bridge, the celebrated English composer, will consist of a Russian Waltz, Hornpipe and Marche Militaire, while the ever popular Bolshoi will be represented by his Trio in A Major.

Other numbers of interest will be two Minuets—Beethoven's celebrated one in G, and the other by Boccherini, which might be characterised not inaptly in lines from W. E. Henley's "Ballade of Antique Dances":

"The tinkling clavichord o'erflows
With contrapuntal quirks and licks;
And, with all measure and repose,
Through figures grave as royal shows,
With noble airs and piquettes
They move in minuets."

Elgar's "Salut d'Amour," Adam's graceful "Air de Ballet," the celebrated Air by Bach, Schubert's Scherzo, "La Coquette" by Translaten, and the much loved "Prize Song" from Wagner's "Meistersinger," all combine to make attractive programmes.

Miss Irene Morris will contribute as violin soli a lively Tangstuck by Hans Sitt, and Massenet's beautiful "Meditation" from "Thais," while two bright and graceful numbers, "L'Agreeable" (Marias) and Hugo Becker's "Minuet," will be the cello solos to be played by Mr. Harold Beck.

4YA NOTES

The Kaiikorai Band, under the conductorship of Mr. E. Franklin, has a fine programme arranged for Tuesday evening. Several well known numbers will be heard, including the "Raymond" overture, Archbold Joyce's popular waltz, "The Passing of Salome," a selection from "The Pirates of Penzance," also a descriptive piece which was very popular in Dunedin when played by the Argyle Band during the exhibition, "Wee McGregor," and the ever-popular march "Old Comrades."

In addition to the numbers by the band some first-class talent will be presented on Tuesday. Light vocal numbers will be featured by Mr. Percy James. This is Mr. James's first appearance before the microphone, although he is one of the best known men in Dunedin, and a comedian who has had many years of stage experience. Humorous elocutionary numbers will be contributed by Miss Anita Winkel and Mr. J. M. McConnell. Mr. McConnell will recite in his inimitable manner that delightful little number, "His First Long Trousers." Some particularly pleasing numbers have been chosen by Mr. Alfred Walmsley, tenor, and everyone who hears his rendering of "I Seek for Thee in Every Flower," will indeed receive a treat. Mr. Reg. Richards, leading baritone, will sing, among other numbers, "The Blind Ploughman."

The programme for Thursday evening will be most interesting, being of a really high class standard, and presented by artists of the front rank in Dunedin. Baritone solos by Mr. F. M. Tuohy, contralto numbers by Miss Winnie McPeak, soprano songs by Miss Rita Holmes, and bass solos by Mr. E. C. Bond, will comprise the vocal section. A brilliant pianist, Miss Alice Wilson, F.T.C.L., will play the First Movement of Beethoven's "Sonata Op. 31," and other works. Mr. Malcolm Robilliard will contribute cello solos, and through the evening at intervals orchestral numbers, under the conductorship of Mr. L. D. Austin, will be relayed from the Octagon Theatre.

Pastor W. D. More is on Thursday's programme with a humorous address.

A talk on the prevailing fashions by a representative of the D.S.A. will be heard from 4YA on Friday afternoon at 3.30 p.m., and instrumental music from the Savoy will also be heard.

The Rev. H. B. Bellhouse, chairman of the Dunedin branch of the League of Nations Union, will be at the microphone at 7.30 on Friday evening, to speak on "The League of Nations—and a Warless World."

On Friday evening there will be a high-class programme by several of the most talented artists in Dunedin. Miss Roma Buss (soprano), Miss C. M. Law (mezzo-soprano), Mr. L. E. Dalley, and Mr. J. B. Macpherson (bass) will provide the singing numbers, while elocutionary items will be rendered by Miss Sheila Neilson, and piano solos by one of our most brilliant pianists, Miss Maisie Macdonald, F.T.C.L.

Lovers of dance music may look forward to hearing the latest popular numbers, relayed from the Savoy, at the close of the studio concert on Friday evening.

On Saturday again a most attractive programme will be heard, several notable performers taking part, comprising Miss Irene Hornblow, L.R.A.M. (contralto), Miss Florence Sumner (soprano), Mr. R. A. Mitchell (tenor), Mr. Arthur Lunghy (baritone), Mr. J. Stewart (flautist), Mr. George Christie (cornetist), and Mr. A. R. Watson (violinist).

B. M. Webster, special assistant to the United States Attorney General and counsel for the Federal Radio Commission, said in Washington, U.S.A., last month, that no case was pending in the courts challenging the constitutionality of the Federal Radio Act. Justice Hitz of the Supreme Court of the District of Columbia has dismissed the case of Station WMSG, the Madison Square Broadcasting Company, which protested last summer against an allocation by the commission, and which was the first case filed with a view to testing the new law. The dismissal, said Webster, was unopposed. Station WLG, of New York, which appealed from the commission's decision denying its application for a special wavelength and power withdrew its suit.

Summertime Issue

COUNTRY OPINION CONDEMNATORY

A further batch of letters is available this week on the question of summertime. While some write in support, the weight of correspondence from those affected by the working of summertime seems so far to be against it.

Blot it out Quickly.

G. A. M. Johnston (Iltrick): I notice you ask our opinion of "Daylight Saving." In reply it is useless to the man on the land, bad for the children's health through lack of sleep and it has practically ruined the reception of wireless during daylight, and spoiled distant reception except late at night. Blot it out quickly.

Boiling Oil for Mr. Sidey.

A. D. McDonald (Kaihere): Your issue of 18th inst., contains a very good representation of what "Sidey's" time means in the South Island. Here is a little from a farmer on the Hau-raki Plains. We, like all dairy-farmers, rise with the sun and keep on till sundown which means 8 p.m. At 6 p.m. the children's session begins and therefore the majority of country children are still doing their little jobs or milking, it being well before sundown. At 7.15 comes the news and information, all of which is missed by the still-working farmer. It may be pointed out by our city cousins that we could milk earlier at night. In this case I should like to invite them to work in the heat and dust; not to mention flies, of the early afternoon. Besides missing the part already mentioned we have to wait till 9 p.m. before we can get 3YA or 2YA with any volume. Your Otago correspondent is certainly right when he says that Dunedin made a mistake in producing Mr. Sidey. When it was first proposed to raise a subscription for some cup or shield in honour of Mr. Sidey, "Once Stung" wrote to the editor of the "New Zealand Herald" saying that he was in Victoria when Daylight Saving was tried. He recommended that New Zealand should wait and see if Daylight Saving was such a blessing and that instead of receiving honour he may be boiled in oil. The oil is ready and boiling!! I hope that I have shown how Mr. Sidey has taken the interest out of wireless, and that you may receive other letters of like nature from abler pens than mine. P.S.—Church services are evidently not good for country folk. We do not hear them now.

Converted by Experience.

J. B. Saunders (Hawera): I am sorry to see the "Radio Record" lending itself to a campaign against "Sidey" time. Your Southland correspondent has my sympathy; but does he find the reception better at 10 p.m. than at 8 p.m.? From my own experience the difference is practically nil—the New Zealand stations coming as good at 8 p.m. as at 10 p.m. The Australian stations are, of course, too late to listen to, but in any case they seldom come good enough to listen to in summer. I was up till 2.30 listening to 2YA last week, and I tried Australia several times, and I did not find any improvement at the latest hour. In regard to Daylight Saving, I was quite indifferent to it before it was tried out; now I am a warm supporter. I have a large garden and keep bees as a side line, and the extra hour of daylight after I get home from work has made a wonderful difference. I may say I have been a radio listener for over three years, and know that I am not losing much by not listening to Australia for three months and am quite content to wait for the other nine months to hear them, when it is not so profitable to be out of doors.

Another Southland View.

A. Powell (Waikiki): As a subscriber to "Radio Record," I have read a number of letters from listeners—some of praise; some otherwise—and I would like to criticise your article on Sidey's Time. My advice is, give a service from 4YA equal to 3YA, and then count the monthly 2s. 6d. you will receive from this district. 4YA, as far as I am concerned, is a washout. Often at night it is hard to pick up at all. But let me add that, for a short-wave log, Dunedin (4YA) is the one. I have some six or seven readings there, and they are shorter than the 463 wave, and steadier. I quite agree that "Sidey's Time" and Radio are not as one, but I have often heard 8 o'clock chimes from 2BI, since its advent, and never heard 2YA before 8.45 to much advantage. I would like to add a few words of praise for the broadcast fare we have been receiving, especially from 3YA, the "best" of the issue, it can be picked up any night at 8 o'clock with ease and is sadly missed on Tuesdays, of course. The volume is all that can be desired, and if you want to hear sports results or any other item of interest, 3YA is there. We all like the announcer from "Singing in," until "Good-night," his voice is splendid and greatly appreciated here. To be fair, I must add that 1YA and 2YA are splendid also, but are not as reliable as 3YA, not being available so early. The relay announcer describing the scenes in Auckland on New Year's eve was very good indeed, his description not having one dull moment. I always look forward to "Record" every week. It is a very nice paper for any radio fan, the constructional notes being very fine. Looking forward to the time when our big voice will be 4YA, and wishing the company every success in the future.

A Dunedin Supporter.

"Good Sidey Proposition" (Dunedin): I do not often write, but am compelled to compare my experience with radio in "summertime" against that of "A.R." in last week's "Record." Like him, I live in the country (on the hills above Dunedin). At this minute the sun is still shining (8.35 p.m.), and I have both Christchurch (240 miles) and Wellington (400 miles) coming in so strong that if I turn on more than 4 strength of four valves I shall wake the baby in the next room. A lady is singing plainly in Auckland, audible at half strength on the four valves, and baby wakening at full strength. I didn't spend £50 on my set, like "A.R." and his 19 friends. Mine, a five-valve, was slightly less than that, so I can only think "A.R.'s" purchase was not good value, or else all those 20 sets of batteries must be run down badly. Does "A.R." forget, when complaining of the small number of radio men in Otago and Southland, that the inhabitants of these two districts are mostly Scotchmen who look after their bawbees instead of spending them on luxuries as fast as they collect them. Let "A.R." be patient, in time radio will be as essential as a piano in the house to be classed respectable. Now as to summertime. The idea of it, I take it, was not to inconvenience 40,000 radio men, but to benefit a million New Zealanders, and I consider it is a benefit getting an extra hour of evening daylight for outdoor recreation (I don't work on that extra hour, like most cockies are doing.) Although enthusiastic and appreciative of radio, it is not the only interest in my life, and besides, summer time does not affect my radio reception one iota when I want to turn it on. Certainly I grant it affects

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reception from Australia, unless one sits up an hour later, but that was not the idea of summertime to lose the hour's sleep. But in winter time, when Aussie is available from 5 p.m. onwards with me, who wants to hear melodies from across the Tasman when as good, and often better, programmes are at hand in New Zealand. Aussie's and America's use in radio, to my mind, is to be able to swank to assembled friends and to compile a big log. I suggest you invite a p.c. referendum for and against summer-time of "Radio Record" subscribers, and I venture to predict a majority of replies will be in favour of continuance. The only fault I have to find with New Zealand radio, there is no music to lull me to sleep for my usual Sunday afternoon nap. Only this afternoon we were talking of that Sunday afternoon concert at Christchurch some months ago, when a friend wanted me to turn radio on.

Old Conditions Preferred.

W. P. Baker (Russell): Regarding the article in this week's "Radio Record" asking country listeners-in for their opinion regarding "Sidey" time—we certainly do not want a repetition of the present conditions. We miss a great deal in the way of news items and items of real interest to country listeners that are broadcast during the seven to eight evening session, and will gladly welcome the winter months for the return of the old conditions. Unless we stay up until about 11 o'clock we do not hear Australian stations, and for business people that is far too late to wait for a concert, no matter how good it may be. There are several owners of sets in this town who are not in favour of the present conditions. We greatly appreciate your "Radio Record," and wish the Broadcasting Company every success during the coming year.

SILENCE FOR S O S

BROADCASTING CEASES.

Radio broadcasters in the New York district were lauded recently by Commander A. V. Lamphier, District Communication Superintendent of the Third Naval District, for going off the air quickly when several SOS calls came from the sea in the previous few weeks, especially when the submarine S-4 sank.

"It is imperative that the broadcasting stations in the East sign off immediately when an SOS call is flashed, although some listeners apparently do not understand why they should be deprived of entertainment when the SOS is on the 600-meter wave, above the broadcast band," said Commander Lamphier. "It is obvious that the call from a vessel in distress may come a long distance and be very weak. In such a case it is necessary to have absolute silence so that what may be the last message from a partly disabled transmitter may be successfully intercepted. Again, it may be that the ship's aerial is partly carried away and the wave be so altered that it will be received on one of the wave lengths utilised by broadcasting stations; that is, between 200 and 550 metres."

IMMORTAL RADIO WAVES

"TOO FAR FETCHED."

Most radio men in New York declined to comment recently upon the prediction of experts of the British Marconi Company who were quoted in newspapers as saying that voices of famous men who have spoken over the radio were still wandering in the ether and might be picked up a hundred years hence. They said they considered it "too far fetched."

DE FOREST SPEAKS.

Dr. Lee de Forest, inventor of the radio valve, was willing, however, to discuss the theory. He said:

"Approximately one-fiftieth of the original power radiated from a radio station is available, after the signal passes twice around the globe, which is about as many times as a signal has encircled the earth and then had sufficient strength to be recorded. In one second the original signal strength is reduced to about one-thousandth of its original power."

"Theoretically," he continued, "the waves exist forever and circulate continuously around the earth, providing they do not escape through the 'radio roof,' or Heaviside layer; then even a Marconi engineer could not get them back."

In just the same way the waves on the ocean exist forever, but they are too small to be seen or detected. It follows that the splash made by Noah's ark when it slid off Mount Ararat is still in existence. It seems to me to be a bit preposterous for the Marconi engineers to say that radio waves may be detected even a few minutes after their utterance."

A broadcast listener, writing to the Melbourne "Argus," says: "The 'A' class broadcasting stations do not give us half enough good gramophone music. BLO has a beautiful instrument, which is seldom heard. BAR gives us more than BLO, but not enough. Why not eliminate mediocre local vocal music and give us the world's artists instead? The change would be appreciated." "Switch" has always thought that a good gramophone record is infinitely better than an item by a mediocre amateur.

GERMANY'S LATEST

WORLD'S GREATEST STATION.

Germany's new 120,000 watt broadcasting station, said to be the most powerful in the world, was opened for service on December 20. With an aerial current of twenty-two amperes, all parts of the globe should be able to hear the new Zeesen Station, which is operating on a wave length of 1250 metres, according to electrical engineers in Berlin.

The station is one of Germany's outstanding engineering feats of the year. The masts are nearly 700 feet high and support a five-strand aerial 920 feet long. The transmitters are three-phase, high frequency, and operate ten and twenty thousand watt valves. In the last phase there are six water-cooled valves of twenty thousand watts each, connected in parallel, giving a total of 120 thousand watts.

THE COOLING SYSTEM.

A cooling system with a surface of 300 square yards uses about 4000 gallons of water. In addition there is an air-cooling system with an exhaust of 50,000 cubic yards hourly. Zeesen is connected with several other German broadcast stations by wire, enabling the same programme to be broadcast simultaneously without appreciable loss. Concerts and other programmes from Berlin are carried by wire a distance of fifteen miles to Zeesen.

SYSTEM OF EARTHING.

One feature which has given to the station special efficiency, engineers assert, is the system of earthing, which is obtained with a gigantic finely woven net of copper mesh buried forty feet under the surface. Germany desired to possess the world's greatest broadcast station to permit Germans throughout the world to enjoy in their native tongue music and lectures, and in addition to obtain the interest of all the nations of the world in the fatherland.

RADIO'S BIRTHDAY

SEVEN WONDERFUL YEARS.

Radio broadcasting celebrated its seventh birthday in America on November 2, 1927. Before the armistice had celebrated its first anniversary station KDKA Pittsburgh was on the air with its first broadcast. If that same programme were broadcast to-day not a listener would endure more than a few seconds, yet it was great in its day. To-day there are more than 600 broadcasting stations in America and every civilized country in the world has its quota. It is estimated that there are approximately 7,000,000 receiving sets in America and this number will be enhanced by an output of almost 2,000,000 sets per year.

GREAT PROSPECTS.

In fourteen years it is predicted that a set will have been built for every home in America. Since the inception of this broadcasting station, less than a decade ago radio has become an infant prodigy. There is every reason, from indications to believe that the radio business for this year, 1927-28, will be more than 600,000,000 dollars.

A child is supposed to reach the age of reason at seven. The radio child was among the cognoscanti long before this age was reached. From that crude programme from Pittsburgh, broadcast seven years ago, there is in America to-day the chain system tying up every quarter of the country and disseminating programmes that were not even thought would be possible. Considerable contrast is also evidenced by the set.

At the time of the first programme there were but amateur and roughly constructed sets and the reception was so indistinct that the morning papers were referred to to enlighten the listener.

Accuracy in the location of holes when drilling a panel can be considerably increased by the use of a centre punch in locating the holes. Use a very light tack hammer and a sharp centre punch. Only a slight tap is needed to form an impression at the exact centre of the location of a hole. This serves as a starting point for the twist drill, which is used later. Best results will be found if the centre punch is held in a vertical rather than a slanting position, since in the latter position there is a possibility of the point skidding and marring the surface of the panel. It is best to place the panel on a sheet of paper when laying out the location of holes, since there is a possibility of the panel becoming scratched if it is placed on a table top without any protective covering.

The tone quality of the average receiver may be improved to a very noticeable degree by the addition of an extra loudspeaker connected in series with the one being used. If only a cone speaker is used, the addition of a good type of horn speaker, connected in series with it, is advisable, and vice versa. The cone is usually an excellent reproducer of the lower frequency or bass notes. The use of a cone speaker alone does not always permit a full register of both high and low notes. With the addition of a horn type of speaker, which has the ability of reproducing the higher frequency notes to an excellent degree, a quality of music will be added which is sometimes lacking in the use of a cone type of speaker alone. To hook up the speakers in series, connect the black cord of one to the red cord of the other, and attach the remaining terminals to the normal loudspeaker terminals of the receiving set.

The Children's Corner

By "ARIEL"

CHILDREN'S SESSION AT 2YA

Lucky little Radioland! Again two new uncles at 2YA will entertain you on Monday. Such an hour of fun they have in store. They will be assisted by juvenile talent, who will provide songs, sketches, and duets.

Uncle Jasper's special hour on Tuesday. What tricks he has in the box for you all! Great fun. He has a merry little train of followers who love making Radioland laugh.

On Thursday you will have Uncle Sandy, who turns all things to rhyme. An excellent hour is assured with Uncle Sandy in the leading role. He, too, is well supported by his little nieces and nephews.

Uncle Ernest, always the children's friend, will gather a happy little circle around him for his hour on Friday. Once again, Aunts Gwen and Dot will find general amusement for the kiddies. Listen-in, everyone, on Saturday.

WHO WOULD?

O if I had a caravan I'd roam from dawn till dark;
I'd sleep inside my gipsy house, then get up with the lark,
And gather sticks and make a fire to boil the breakfast tea;
O, if I had a caravan how jolly it would be!

I'd throw my shoes and socks away and never wear a hat,
I'd live on chunks of bread and cheese and lovely things like that,
I'd drive along the country lanes and never go to school—
Of course, I'd wash, a little bit, but always in a pool.

And when we came to towns I'd lean across my little door
And watch the tidy children there—they'd envy me, I'm sure,
For who'd wear hats or choose to have their hair all brushed and curled,
If they might own a caravan and ride across the world?

AUNTS & UNCLES

This poem about Uncles and Aunts was written by Uncle Tom, of 1YA.

There's Tiger Lea at the Zoo,
In his den he prances,
At 1YA there's a Leo too,
The Uncle of our fancies,
All the Radio little Misses,
Send him lots and lots of kisses,
What a wondrous luck that his is,
Under the circumstances.

Uncle Nod looks very glum
Under the circumstances,
He's really lost his friend, Tom Thumb,
Of him there are no traces,
Is his name just "Nod" for keeps,
Or does he nod when he sleeps,
For poor Tom Thumb he daily weeps—
Very sad circumstances!

Cinderella she's our Aunt,
Because of circumstances,
Do without her—no, we can't,
Under any circumstances.
At the Prince's party she was there,
For horses she had a nice pair,
If she saw one now she'd jump on a chair,
And squeal at circumstances.

So give three cheers, and one cheer more,
Under the circumstances,
For Radio poets all galore,
Rhyming circumstances,
For Radio poets all galore,
Rhyming circumstances:
A splendid try at making verse,
Some were funny, some were terse,
For trying sure they're none the worse,
Hurrah for circumstances!

This is the response it called forth from Zena and Shirley Roscoe, Edendale North.

Our Uncle Leo is a lark,
Under the circumstances,
He often like a dog does bark,
In telling circumstances.
His tales of Skipper boy and such,
Other tales we like so much—
Poor Skipper's death our hearts did touch,
Under the circumstances.

Now Uncle Tom he is a cod,
Not fishy circumstances:
We like him next to dear old Nod,
Under the circumstances.
His singing we like very well,
And stories that he us does tell:
He plays the whistles like a bell,
Such tuneful circumstances.

Dear Uncle Joe has gone away,
Sorry circumstances!
His writing was so bad they say,
Under the circumstances.
We hope he's not too far away,
And that he'll come again some day.
So Peter Pan can with us stay,
Upholding circumstances.

Cinderella I fancy that,
Under the circumstances,
She wears a silver dress and hat,
Over the circumstances.
With shoes of gold and stockings white,
Upon her head a star so bright,
While round her shines a golden light
To dazzle circumstances.

LISTENING TO TO-MORROW

England has been listening to Australia again, and this thought came to them as they listened on Monday's news on a Sunday night: "The first newspapers gave the news a week old. When the telegraph came the news was yesterday's. With the evening papers we took to-day's news home. Now wireless gives us to-morrow's news."

The world is surely moving.

HIS LAST S O S

A striking example of the difference wireless telephony has made to sailors is shown by the story of the French steamer Svbil.

This ship of 2338 tons was about 160 miles south of the Canaries when she was stricken with a terrible misfortune. One after another the crew went down with malignant coast fever. In a short time she was drifting helplessly without steam. The wireless operator sat in his chair sending out S O S calls till he collapsed in front of the apparatus.

Luckily his last call was picked up by the Spanish steam-trawler Louis, whose reply was heard just before the Svbil's wireless man went down.

The Louis hastened to the rescue, and found that only the captain and three men were still able to move. Volunteers went on board, and the plague-stricken ship was safely brought to Las Palmas.

But for wireless the Svbil might have drifted to shipwreck, and no one would have known why she disappeared.

THE NIGHT.

By Wilfrid Thorley.
I'm sorry when the sun is gone
From this good earth we play upon,
But that he lifts, as he goes by,
The curtain of the wide blue sky.

For then I see the pearl-stream run
In beauty fairer than the sun,
And shooting stars, as though God's tree
Shook with glad angels in their glee,

And all the boughs, with laughter blown,
Dropped blossom after blossom down.

JUMBLED ENGLISH TOWNS

These are some well-known English towns when they are straightened out. Can you find out what they are?

DEHIFSFLE
FILXAAH
NOCLINL
RADVONL
BEPLAY
SENLAWCET
HAXMCRB

Solution next week.

RIDDLES

Q. Why is a postage stamp a most unfortunate thing?

A. Though it sticks to its duties to the letter it gets its face disfigured, its head punched, and a good licking.

Q. To whom does the greatest man take off his hat?

A. To his hair-dresser.

Q. What are the most unfortunate ships?

A. Hardships.

Q. Why did the garden fence?

A. Because it saw the water butt.

Q. Why did the penny stamp?

A. Because the three-penny bit.

Q. When did the coal scuttle?

A. When it saw the chimney sweep.

LIMERICKS

RAINPROOF.

A contented old duck remarked,

"Quack,"

I'm supplied with an oil for my back.

So whenever there's rain

I've no cause to complain,

For I'm wearing a natural mac.

NIGHTMARE.

A tortoise who'd been hibernating

Complained "It was most irritating

That my dreams should all run

On a pastime I shun,

And shall never attempt—figure-skating!"

A SAD FATE.

Some sardines whose home was the sea

Swam about in a shoal—twenty-three.

Now they live in a tin

Where they can't move a fin,

For they're packed just as tight as can be!

JUST NONSENSE

No Improvement.

Lily: "I've just come from the beauty parlour."

Grace: "They were shut, I suppose." Charlie's mother went upstairs after he was in bed to kiss him "Good-night."

She found his eyes were closed and he had all the appearance of being asleep. Then in a drowsy tone and evidently in earnest he said:

"Guess, mamma, whether I'se asleep or awake."

Saving Time.

Mother: "Were you good at the party?"

Six-year-old: "Yes."

Mother: "You didn't ask twice for anything at the table?"

Six-year-old: "No, I didn't. I asked once, and they didn't hear me, so I helped myself."

A Shocking Mistake.

Emigration Agent: "Are you a mechanic?"

Indignant Emigrant: "No, I'm a Macphairson!"

Such Fine Legs Too!

Tommy (who has just been given a bulldog pup for a birthday present): "Oh, mother, do you think Toby ought to be so near the fire? Just look at his legs; it's warping them!"

Realm of Fancy.

"Now, Johnny," said the schoolmaster during an examination in geography, "what is the axis of the earth?"

"The axis of the earth," said Johnny proudly, "is an imaginary line which passes from one pole to the other, and on which the earth revolves."

"Very good," exclaimed the teacher.

"Now, could you hang clothes on that line, Johnny?"

"Yes, sir," was the reply.

"Indeed," said the examiner, a little disconcerted, "and what sort of clothes?"

"Imaginary clothes, sir."

In Miniature.

"Oh, mother, may I go to the fancy-dress ball to-morrow as a milkmaid?"

"No; you are too small."

"Then may I go as a condensed milkmaid?"

Not Such a Fool!

Indignant passenger in the train (shouting to Highland porter as the train moves off): "Hi, porter, you fool! Why isn't my luggage in the train?"

Porter (with suitcase in his hand): "What's the fule? Yer luggage isn't aae daft aa yersel. Ye're in th' wrang train!"

The "Moust"—Ache.

Mary: "Mummie, is 'moust' another word for 'tummy'?"

Mother: "There is no such word, darling."

Mary: "But I am always reading about people who have moust-aches."

Wood Turned Into Metal.

If a light wood is transposed, The letters put another way, A heavy metal is disclosed, Now, what's that metal? Can you say?

Answer: Lead (lead).

Those who have me not do not wish for me; those who have me do not wish to lose me; those who win me have me no longer—A lawsuit.

A Duet.

"I am told that you have twin baby brothers now," a lady said to a little boy. "Do they cry much?"

"They do!" said the boy in disgust. "Why, each one cries so loud that you can't hear the other!"

The Boy With the Donkey Cart.

"Hallo, my lad, would you like to drive me round the park in that?"

"Yes, but I don't think the harness would fit you!"

SOME TRICKS TO TRY

Here are a few tricks to amuse yourselves with when there's nothing else to do.

A MATCH TRICK.

This is called "The Hanging of a Highwayman," and all you need is a pocket knife and a box of matches. This is how it is done:—

Break off a third of a good strong wooden match, and from the larger piece left make the merry highwayman by splitting the broken end to make legs. The match-head, of course, is the victim's head. To make the gallows, bend another match to right angles the careful not to break it quite through, and fix it in a hole which you must make in a matchbox. The matchbox itself is the platform.

Now stand the highwayman firmly on his feet under the gallows, and with another match light the two heads, which should be touching. These will fuse together, and after a while the gallows will straighten up, lifting the poor highwayman well into the air. This nearly always works well.

THE OBSTINATE CARD.

Take an ordinary visiting card and bend the two ends just a little and stand it on these two edges on a table. Now try to blow it completely over, and you will be surprised to find how difficult it is. The secret lies in blowing not at or under the card at all, but straight downwards on to the table about eight inches away from the card. Try this and see.

"The Daily Dozen" for Physical Fitness

The following article is a summary of three talks on physical culture given by Mr. J. D. Baybutt from 3YA Christchurch. Many listeners who appreciated those talks have desired illustrations of the exercises given, and these are now given. The exercises are only a selection, and can be used by men or women, and will be found particularly valuable for those beginning systematic exercise. They are easy for that purpose.

ONE of the most prominent features of modern life is the remarkable drift of people to the towns, and their consequent complex and sedentary existence. The normal result of such a life is a tendency towards poor physique, as the organs of circulation, respiration, digestion, and excretion become impaired because of that inactivity. These organs are expected to cope with certain demands. If the demands we make on them be too small or too large, disorders ensue and our life processes proceed at a lowered pitch, and as the muscles are the power by which they work, the only means of stimulating the organs to proper function is by muscular exercise. Special systematic exercise, then, will increase to the correct amount the demands which should be made on the body, and so overcome the dangers or defects of our sedentary life—a life which is contrary to that for which the body was designed.

WHAT PHYSICAL CULTURE REQUIRES.

First of all it requires a determined effort of will to take regular and systematic exercise. Five to ten minutes a day should be spent at home in this form of exercise, and as procrastination is one of the most marked characteristics of human nature, the tendency is to take our "daily dozen" only at odd times instead of regularly.

No apparatus is required, and the old form of chest developers and the heavy bar-bells, while serving a useful purpose when used correctly and at the right time, should never take the place of the free standing exercises such as those illustrated here.

WHEN TO TAKE THIS EXERCISE.

The best time is in the morning, immediately after rising from bed. The chief object of home exercise is to tone-up one's system. On waking in the morning, few of us feel at our best, and we need to brush away the cobwebs of a night's sleep and set ourselves up for the day. If we take proper exercise immediately after rising, this object will be achieved and the effect will be one of a feeling of physical buoyancy with which to face the day.

If morning exercise is not practicable, the enthusiast will find will find some convenient time during the day, or just before going to bed at night. Do not, though, take exercise too soon after a meal—one and a half to two hours at least should elapse.

Some people find that exercise before bed at night brings about sleeplessness. This, however, will pass, as the nerves get steadier and stronger with the exercise.

No developmental effect should be sought for with this kind of exercise. It is purely a "setting-up" effect that is to be aimed at, and no very vigorous or intense effort should be made.

THE ARRANGEMENT OF THE EXERCISES.

These exercises have been selected to give good results, and should be taken in the order shown. They are not in any way final, and many modifications can well be made. But they form a foundation for a system, and will prove of value.

The first principle of "setting-up" exercise is that a steady, complete, rhythmical respiration must be co-ordinated with the larger movements of every exercise. In ordinary breathing the whole of the cells of the lungs are not used, and even those which are used are not expanded to their fullest extent. Full expansion of these cells occurs only during the extraordinary breathing, when the lungs are filled to their utmost capacity. This is a most important effect, and is the chief factor in bringing about the beneficial results of "brushing away the cobwebs" already mentioned.

HOW TO BREATHE CORRECTLY.

Breathing is largely under the control of the will, and so correct breathing can be gained by practice. We should always aim at expanding the lower part of the chest, where the cross-section is greatest. The lower ribs should be expanded sideways, and so as to get some degree of vertical expansion as well. The trunk should be stretched upwards. This allows the whole of the lungs to be filled. When exhaling, let the ribs and breastbone sink inwards and downwards, and the upper part of the trunk downwards.

The most common fault in deep breathing is that of drawing in the abdomen and arching the chest, with the shoulders forced down and back. Nor is it of use trying to draw in a large amount of air by sucking or sniffing through the nose. Correct breathing is almost noiseless, and if any effort is made, the nostrils tend to close slightly and no added benefits are obtained.



Fig. I—First exercise.



Fig. II—Second exercise.



Fig. III—Third exercise.

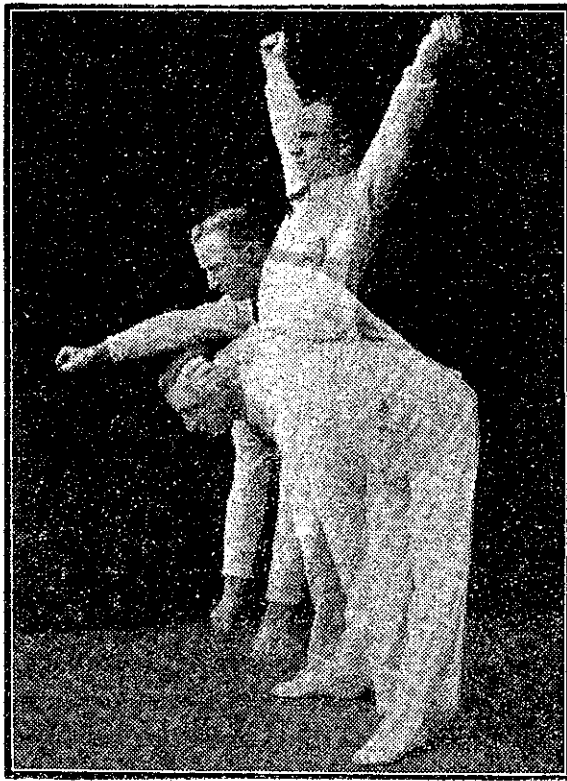


Fig. IV—Fourth exercise. Full explanations of the movements involved in these exercises are given in the text of the accompanying article.

The illustrations accompanying Mr. Baybutt's article have been kindly supplied by Messrs. Standish and Preece, photographers, Christchurch.



Fig. V—Fifth exercise.

When deep breathing is combined with muscular exercise, it is much easier to breathe correctly than when trying just a formal breathing exercise.

THE PROGRAMME TO FOLLOW.

Paste the photographs illustrating the exercises in a prominent place so that the illustrations can be followed while exercising.

Wear as little clothing as possible, and all garments loose.

Begin to exercise without delay after rising from bed.

Have the windows wide open and stand in front of them, so as to inhale the fresh air.

No pause of length should be made between exercises or a chill may result.

Do not exercise so vigorously that a pause is necessary to give yourself a rest. Gradually work up to more vigorous effort as more practice is gained, and this progress will show the results of the exercise.

After exercise, a short, brisk rub, then the usual bath or shower.

SOME GENERAL HEALTH RULES.

Drink plenty of fresh water daily. Rise regularly at the same time each day.

Take the "Daily Dozen" (these exercises) after rising.

Have meals at regular hours and masticate the food thoroughly.

Give the body plenty of rest by having seven to eight hours' sleep every night.



Fig. VI—Sixth exercise.

TABLE OF EXERCISES.

First Exercise.—Fig. I.

1. Rise slowly on toes and raise arms forwards to position shown—inhaling.
2. Lower heels slowly and lower arms—exhaling.

Second Exercise.—Fig. II.

1. Lunge forward (alternate legs) and raise arms forwards and sideways to position shown—inhaling.
2. Bring foot in and lower arms forwards and downwards—exhaling.

Third Exercise.—Fig. III.

1. Start from position shown. Bend trunk to right and bring left hand under armpit with right arm stretched down (reverse to photo.)—inhaling.
2. Bend trunk to left, similar movement with arms—exhaling.

Fourth Exercise.—Fig. IV.

1. Commence in bottom position—trunk forward bend, feet apart.
2. Raise trunk and arms (through middle position) to upright position—inhaling.
3. Lower trunk forwards and downwards and turn hands and lower arms behind body to starting position—exhaling.

Fifth Exercise.—Fig. V.

1. Raise knee—inhaling.
2. Lower knee—exhaling.

(Alternate legs.—Modify by raising leg forward, straight from hip. Hold arms forward in line with shoulders and bring foot to meet hand.)

Sixth Exercise.—Fig. VI.

1. Trunk circling.
2. Circle trunk on hips—forwards, sideways, backwards, sideways, forwards—inhaling.
3. Circle trunk again—exhaling.

Seventh Exercise.—Fig. I.

1. Repeat first exercise to finish table.

General Instructions.

- Make all movements strong.
- Combine arm movements with trunk movements.
- Full and deep breathing in every exercise.
- Stretch chest fully in exercises I, II, IV, and VII.
- Exercises III, V, and VI to be done both slowly and quickly.

RADIO IN SUMMER

MANY HAPPY HOURS.

Now that we New Zealanders have summer with us, radio enthusiasts find an additional way of indulging their hobby. In winter, they sit over the fire and listen-in, but now that the time of the year calls to the open air, radio plays a new part.

You find a radio set on a yacht or a motor-launch, the aerial hung between the masts. Or perhaps, the latest loop aerial is employed, being merely a few turns of wire round a frame a couple of feet in diameter. Perhaps even a battery for the set is dispensed with, the picnickers using the battery of the launch.

RADIO AT SEASIDE.

At seaside cottages and in the week-end camps radio sets are beginning to appear. Some are the specially designed portables, which with batteries and aerial complete, are packed in a case about the size of a typewriter. These are highly efficient receivers, but many listeners who do not care to purchase a special set for carrying about, simply take their ordinary set with them, rig up an aerial from a convenient tree, and enjoy the pleasure of an open-air dance to radio music as received from a convenient station.

Many a pleasant hour is being spent this summer in a bush or seaside camp with the help of a radio set, although there is usually some person in the party who wants to keep the set going until the Australian stations close, despite the protests of the early birds, who wish to have a night's rest before an early start in the morning.

"Six million homes in the United States are now equipped with radio sets, while 21,000,000 homes are yet to be supplied before the saturation point is reached," Frank A. Arnold of New York, director of development of the National Broadcasting Company, said recently.

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