
The N.Z.

RADIO TIMES

and

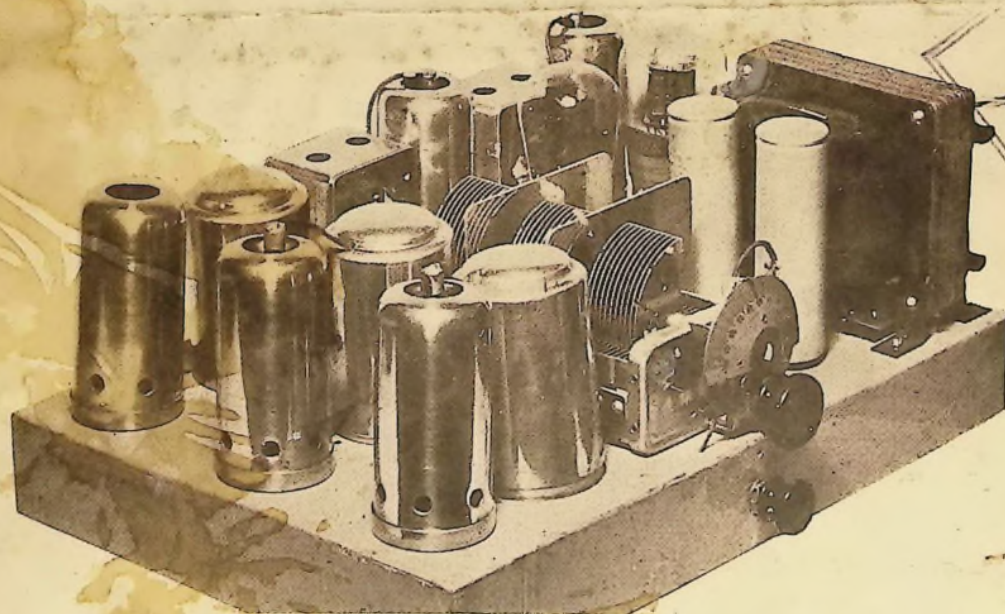
TRADERS' DIGEST

Vol. 1 No. 7
October 1st, 1932

(Inc. The RADIO LOG)

9^D

Build this simple
Superheterodyne



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and Trader's Digest

(inc. Radio Log)

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Vol. 1, No. 7

Editorial Notes

RADIO CONSTRUCTION.

IT was once thought that the modern electric set had killed radio construction, and certainly for a while it received a serious setback, but it is now definitely on the upgrade. With the co-operation of the trade, which is making available power-packs and coils at a remarkably low price, the constructor is now in the position to build a set which will be equal to anything he can buy, and at a much less cost. But cost is not the main consideration with the constructor—it is his hobby.

Radio construction is the first step toward entering the radio profession, and if this progresses as it appears to be doing, it will be one of the soundest in existence. Although to obtain a thorough knowledge of radio and to be able to design sets requires a knowledge of fundamentals, ordinary radio construction, including that of modern sets, such as the "Simplicity Superheterodyne" and the "Modern Five," does not require expert knowledge or experience. Constructors do not always appreciate this point, and with an inadequate knowledge of fundamentals set about altering the design of the set or of designing their own. While such practice has much in its favour—for it brings the constructor face to face with realities—it will lead to trouble eventually, and the constructor will not get half the fun out of radio that he should.

One needs intelligence, certainly, and one must learn how to use a soldering iron. Given these two factors, anyone can construct a set which has been adequately described and is well illustrated. We hope our three sets this month fulfill these requirements, and prove of interest to the radio constructor and experimenter.

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NOVEMBER ISSUE.

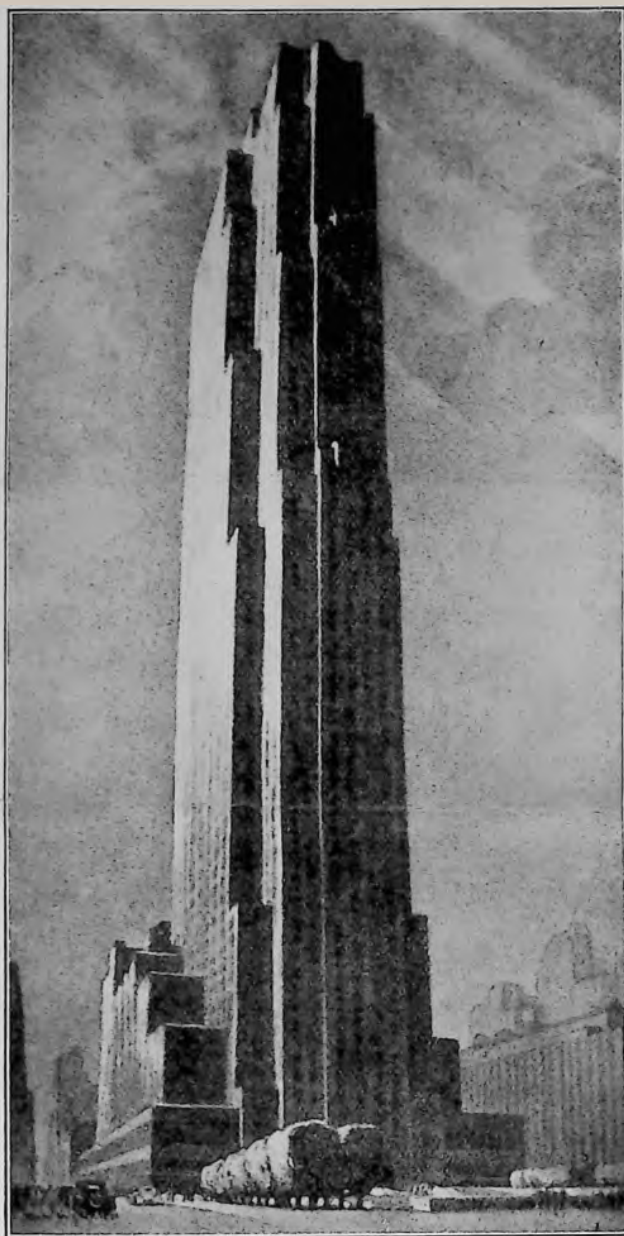
Special Short-Wave Issue.

"Short-Wave Club" Two (Battery)

"Cathode Special Five" (A.C.)

Another 6-pin Set.

"Eagle" Four (A.C.)



The Central Tower Building, seventy stories and 836 feet in height, viewed from Forty-ninth Street and Fifth Avenue, is like a monument to the power of radio.

JUST as the British Broadcasting Corporation are operating from one gigantic building, so the National Broadcasting Company of America plans to work from "Radio City," a group of magnificent buildings in the heart of New York.

The buildings will occupy three blocks, from Forty-eighth to Fifty-first Streets, between Fifth and Sixth Avenues.

America's Radio City

Gigantic block of buildings
to house studios
of the N.B.C.

These great skyscrapers will house an entertainment, musical and radio broadcast centre of unsurpassed size and grandeur. The Central Tower Building, seventy floors and 836 feet in height, is designed to house the studios and offices, the total rentable area being in the vicinity of 2,000,000 square feet.

Due to the large spans necessary in a building designed to house broadcast studios, it will be obvious that it is impracticable to support such a tower seventy stories high directly over the studios. Therefore a section of the building devoted to studios has been designed in the tower floors just behind the tower, with a maximum height of twelve stories. The studios have been placed so as to avoid absolutely interference with the mass of steel which supports the weight of the tower. The offices will occupy the fourth to eighth floors in the main tower, adjacent to the studios and served by the regular office lifts.

In planning this project, it has been estimated that 27 studios, and 5 audition rooms and other apartment rooms will be necessary. To house these studios and offices 500,000 square feet will be needed—the studios alone requiring 370,000 square feet. In designing this layout, specific fundamental principles underlying the engineering and traffic problems of broadcast studios have been adhered to. The studio on the 9th floor is planned to be the largest in the world, having a height of three stories. The studios are systematically placed with the entrances opening into a large foyer which provides the communications for the artists, performers, and musicians.

THE main lobby and the main studio elevators occupy that part of the building which falls directly beneath the mass of the tower, as within this area the steel is necessarily heavy and large spans cannot be provided. The building directly over the studios themselves is but twelve stories in height.

Previously, in designing studio layouts wherein the studios were all on the same level, the engineers and production staff, together with the control rooms and main control room, have been centrally situated, but in "Radio City" the main control room, the main apparatus and equipment room, power supply, and offices of the operating staff, production staff, and traffic department, have all been centralised on the sixth floor. Ready access can be obtained

from this floor to the three studio floors by means of lifts incorporated for the sole use of the operating and production staffs. On each of the studio floors these lifts open into private corridors which communicate directly with the individual control and monitoring booths of each studio. They are so laid out that at no time is it necessary for any of the production staff to enter upon the communicating corridors and the lobbies provided exclusively for the artists, performers, and musicians.

Artists and performers coming from the main studio lifts can, at a glance, see the entrances to all studios on the floor, and a point of control for each floor is placed directly in front of the lift lobby, thus giving ready ingress and egress to contributors from one studio to another through the main foyer, without crossing the communication corridors of the engineering and production staffs.

It is anticipated that several thousand people will be present in the studio block at the same time, and for this reason a serious traffic problem arose, the solution of which has been explained.

A logical question no doubt arises as to why so many studios are required for the operation of a dual network broadcast system such as is now operated by the NBC, when it is necessary to keep only two programmes on the air simultaneously. Statistics show that four hours of rehearsal are required for every hour of actual broadcasting. This means that when one studio is on the air, four others are being occupied by rehearsals, and a sixth is in preparation for the following programme.

In network broadcasting it is frequently necessary to split networks and transmit four programmes simultaneously, which further complicates the studio problem. With this explanation, and allowing for the natural growth of the industry, it can readily be appreciated that the 27 studios planned for "Radio City" are not too numerous, as might appear at first.

On the ninth floor are a number of small studios, specially designed to handle speakers and small productions. In view of the increasing number of child artists, a special reception and lounge room has been provided for them, together with a suitably arranged studio for children's productions. The largest studio of the group, has floor dimensions of 80 x 130 feet, with an average ceiling height of 35 feet, and is equipped with a balcony on the tenth floor which will seat some three hundred visitors.

THE second largest studio is constructed for the presentation of drama and other productions, which require a stage and a local audience. When television reaches a point where its operation is comparable to the making of motion pictures, these two studios should prove invaluable because of the large floor area available.

Paramount in the design of all studios is the sound insulation, and a system of soundproofing, such that the walls, floors, and ceiling of each studio will be floated free from the building structure. This will also apply to control rooms and other apartment rooms. Without such an insulating system it would be impractical to build studios in steel buildings, as the steel framework provides an excellent transmission system for sound and mechanical vibrations.

Second in importance is air conditioning, without which windowless studios would be useless. The air conditioning plant designed for the NBC studios, when complete, will probably be the largest and most complicated of its kind in the world. The cost of this machinery alone is estimated at £200,000. Obviously, special precautions will have to be taken with this air conditioning plant to prevent the transmission of sound from one studio to another through ventilating ducts and the control of noise generated in the ventilating machinery itself.

Special streamline air supply outlets have been designed

to reduce the air rush in the studios. In some instances the air will be completely changed in the studios eight times an hour. This calls for the handling of large volumes of conditioned air, and still further complicates the problem of noise from air rush.

The system of decoration to obtain proper psychological effect on the artists has been studied together with the co-ordination of this decoration with the acoustical treatment of the studios. It will be in such a form that the time period of a studio may be varied at the will of the studio staff, by the control of the mechanical operation of acoustical units from a switchboard in the monitoring booth. In anticipation of television, all studios will be electrically shielded and provided with suitable lighting facilities, to illuminate scenery for the proper operation of television cameras.

It may be noticed that nothing has been mentioned regarding the technical apparatus provided. This is because up to the present no specific details have been given by those concerned in that branch of the construction.

This gigantic task, to a great extent completed, is the outcome of more than fifteen months' work on the part of the engineering staff of NBC, in co-operation with the architects and engineers of John Rockefeller.



An aerial view of the three buildings which will comprise the N.B.C. Studios and offices as they compare in height with surrounding New York skyscrapers. The tall building is the Central Tower.

Round New Zealand

with

The Private Stations No. 7

1ZQ AUCKLAND

1ZQ in a Nutshell

Situation: Atwaters Piano Co., Civic Square, Auckland.

Owners: Mr. Roy Keith and Atwaters Piano Co.

Announcer and Operator: Mr. Roy Keith.

President, 1ZQ Club: Dr. Pettit.
Frequency: 1180 k.c. (254.1 metres).

Power: 45 watts output, 100% modulation.

Schedule: Week nights, except Friday, 8-10.30 p.m.; Sunday, 4-6 p.m., 7.30 to 10 p.m.

ON June 19, 1922, Mr. Keith gave the first attempt at broadcasting a wireless concert. There, of course, were few listeners, but there are quite a number who still remember these early broadcasts. The call used was 2CW, and the station was located in Hawera, Taranaki. With the forming of the first Broadcasting Regulations in 1923 the call 2CW was changed to 2RK (Mr. Keith's initials), which was used for some time until the Post and Telegraph Department assigned the call 2BZ, by which the station was known during the time Mr. Keith broadcast from Hawera. Although the power used up to this time was only 5 watts, the station was heard all over New Zealand and also in some parts of Australia.

The plant, which, of course, was a simple affair at the start, was rebuilt several times until a broadcast transmitter of the De Forest make was obtained from The Forest Radio Co. of Wellington shortly after that company opened the original 2YB, which used the same model. This gave rise to some confusion, as the calls 1YD and 1YB were often mistaken for each other. To distinguish between the two in 1927, the call was changed to 1YQ.

In July of 1926 the request session was started, and it has gradually increased in popularity until the number of requests over the telephone each request session amounts to an average of 250 rings, as many as three rings a minute having been taken on two telephones during the request period. It is interesting to note that requests

have come from all parts of the North Island by letter.

In 1925 Mr. Keith removed from Hawera to Auckland and the station was established at Mount Albert, the call being changed to 1AL. In 1926 it was decided by the Post and Telegraph Department that all broadcast stations had to have Y calls, and the call was changed to 1YD. In

1928 the station was rebuilt and various modifications incorporated, 100 per cent. modulation being used for the first time in New Zealand. It was also at this time that the Post and Telegraph Department decided that all private broadcasting stations were to have Z calls, and 1ZQ, the call which you all know so well, was assigned.



Mr. Roy Keith.

Mr. Keith is one of the few old-timers in broadcasting, and through careful study of listeners' requirements has built up one of the most popular services in Auckland. He has been broadcasting for 10 years, and something may be judged of the popularity of 1ZQ when it is realised that when the station was closed by the Post and Telegraph Department in 1931 a petition of over 100,000 signatures were presented to Parliament for the re-opening of the station.

During the past 10 years Mr. Keith has used 7 station calls.

In 1930 the station was removed to Messrs. H. L. White's buildings in Karangahape Road, where it operated for some time. In 1931 the Radio 1ZQ Club was formed, and here again Mr. Keith led the way in being the first to start the club idea in Auckland. In March of this year Mr. Keith moved the station to the building of the Atwater Piano Co., Civic Square, that company having acquired an interest in the station. It being known as Atwater's and Keith's. The studio and operating room are on the first floor; the aerial running from this building to the Civic Theatre.

In July of this year the request session was started, and it has gradually grown in popularity until now several hundred listeners communicate with the station regularly in respect to this session.

NEXT MONTH 2ZO PALMERSTON NORTH

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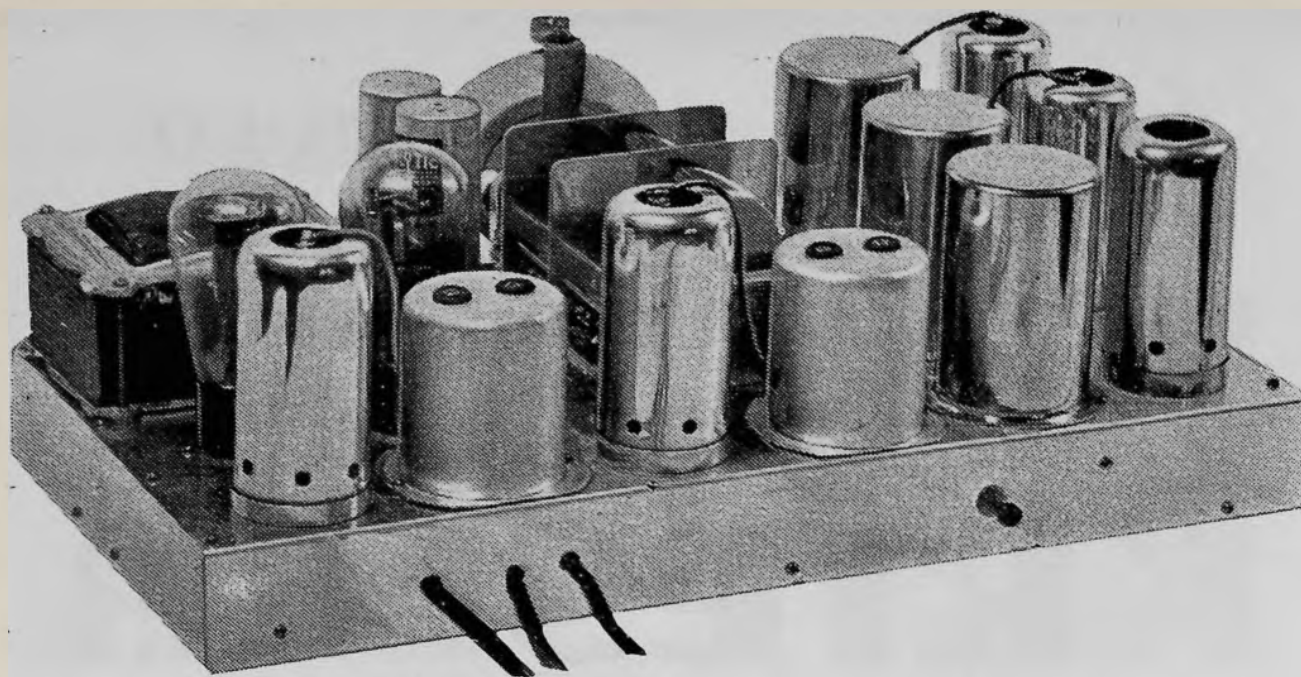
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“Simplicity” Superheterodyne

A 7 Valve Simple Superhet. Which Can Be Built For Low Cost By An Inexperienced Constructor

THIS is the first really simple superheterodyne we have described, and it is simple only because very complete arrangements have been made for the supplying of the coil and condenser kits. Admittedly there are arguments why we should describe fully this part of the set, but then there are very strong arguments why we should not—principally because of the cost. When it is considered that coils and a condenser gang can be obtained for less than £5, and the chances of one being able to line up his own intermediate frequency coils without an oscillator and vacuum tube voltmeter are very remote, readers will agree that we have done the right thing in refraining from publishing the coil particulars.

Furthermore, if the set is not balanced, it will be a very ready oscillator, and as such would not be permitted by the Post and Telegraph Department. With the coil and condenser kit already supplied, the task of assembling the superheterodyne and getting it to work is a very simple one indeed. The constructor who follows our instructions implicitly will find no difficulty, and for a very modest sum, should be able to assemble a modern superheterodyne that will vie with any of the commercial jobs of the same type for supremacy.

The Parts List.

Let us look over the list of parts to commence with.

The chassis should be obtained ready punched, the dimensions of the different holes being given in the layout diagram.

Of the resistances R2, 3, 4, 6, 8 and 9 should be of the carbon variety, preferably those with pigtailed. R5 is a 15,000 ohms voltage divider capable of dissipating 50 watts. R11, 25 watts.

Specifications

Seven valves including the rectifier.

235 R.F. and intermediate, 224 mixer, and detector.

227 oscillator, 247 output and 280 rectifier.

Single-dial control with tone control.

Volume control acts simultaneously on aerial coupling and bias of 235.

Uses commercial coil kit.

It is not necessary that the moving shafts of the two potentiometers be insulated from the chassis. The condensers are of the pigtail type, some types of these being tubular, and others flat. Constructors will find that these are very much easier to work than the older type with terminals. Furthermore there is less liability of the pigtail touching the chassis.

Wafer sockets are employed throughout, UX type being used for all valves, and the UX for providing a connection with the speaker. Two of the three insulated bushes are used to convey the power flex through the chassis, and the other to provide the outlet for the aerial and the earth wires, which are not brought to terminals as was done in certain types of sets.

In order to comply with the wiring regulations the flex should be of the three-core type, red, black and another colour, the other colour being connected with the chassis, the other two with the primary.

Of the electrolytic condensers, one must be such that it is easily insulated from the chassis. The casing of the other is earthed direct.

The power transformer should deliver about 375 volts full wave, two 2.5 volt windings, and one 5 volt winding for the rectifier.

Performance.

In introducing a new set one must always be modest about its performance, but experience has shown that this set is equal, both for selectivity and sensitivity, to anything of its type we have heard. The American stations can be brought in at good strength with a reasonable aerial, while even the notorious 2YA could be kept to within 20 or 25 kilocycles, and there were no repeat points, which are troublesome in home-built supers.

The Circuit.

The circuit is quite a standard one, comprising an r.f. stage, oscillator, mixer, i.f. second detector and pentode output. The method of controlling volume allows for a loosening of the aerial coupling, when the bias on the r.f. and i.f. valves is varied by the potentiometer R1. In order that the bias will not be too far reduced on these two valves, R4 is employed. The .25 meg. resistance R12 may not be necessary, but if the set shows any tendency to instability it can be employed to advantage.

Mounting of Components.

As your base will be already drilled, this will not present any difficulty. Do not, however, mount the triple gang condenser, until you have decided what type of vernier dial you are going to employ. Some of these take up more space than others, and can cause quite a lot of trouble if they are put on as an afterthought. Mount condensers and dial simultaneously, but it is not a bad plan to remove the dial after having

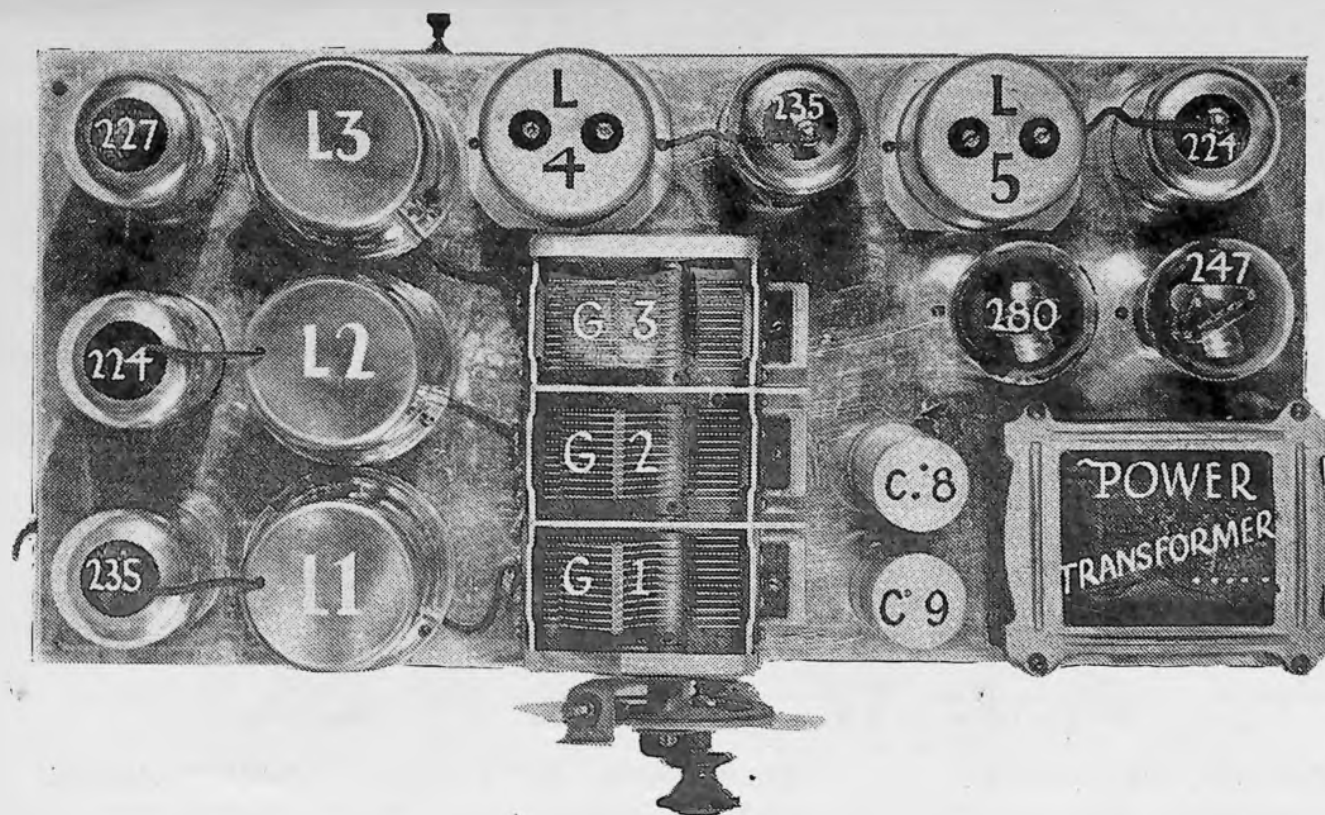
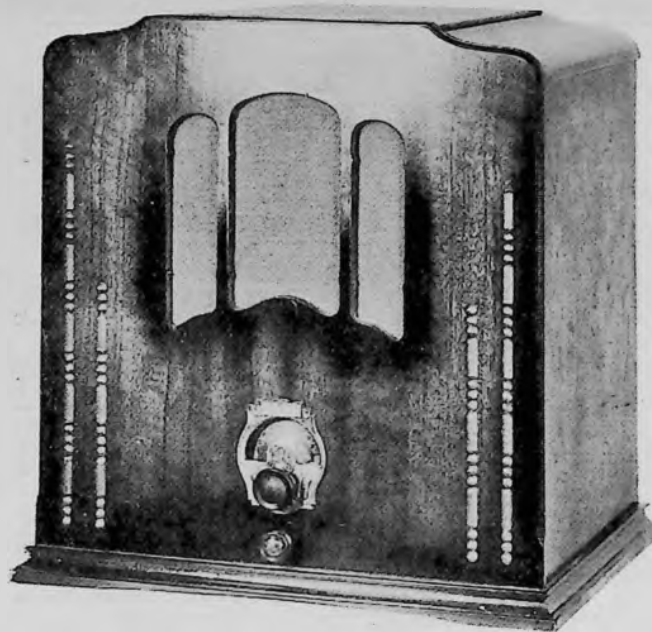
mounted the unit, as it is very fragile and the set will probably be handled a good deal on the reverse side.

Looking at the set from the front, the tone control is on the left and the volume control on the right. Neither spindle is insulated from the chassis.

The valves and valve shield are arranged systematically on the left of the triple gang condenser in this order: R.f. mixer, oscillator. The intermedi-

ate valve and the second detector are along the back, with the intermediate coils between them. The power transformer should be mounted with the lugs for connection with the various windings facing the window which is in the chassis. Of the two electrolytic condensers, which are mounted between the power transformer and the triple gang, the one nearer the front is insulated from the base.

A view of the completed set in an attractive cabinet. The tone control is not shown.



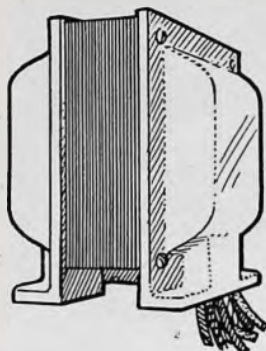
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R1, 1 Watmel W/W Pot	7 0
R2 Eerie, 10,000-ohm., 1 watt Resistor	1 3
R3 Eerie, 100,000-ohm., 1 watt Resistor	1 3
R4 Eerie, 200-ohm.	1 3
R6 Eerie, 25,000-ohm.	1 3
R8 and R12, 250,000	each 1 3
R9, 2-meg.	1 3
1 Sovereign, 20-ohm. C.T. Resistor	1 3
R11, 400-ohm., 100 M/A Resistor, Kriesler	1 0
1 KRIESLER FOUNDATION KIT, comprising L1, 2, 3, 4, and 5, C1, 2, 3 (ganged) Coil Shields, Knob Padded Condenser. Accuracy Guaranteed.	Complete £4/17/6
R7 Sovereign, 10,000 Potentiometer	6 0
1 Condenser, TCC Tubular	1 4
C1, 4, 8, 10, .25 TCC Tubulars	each 1 4
C5, .02 TCC	1 6
C6, .00025 STC.	1 0
C7, .001 STC.	1 0
7 Wafer Sockets, 6ux, 1uy	each 0 6
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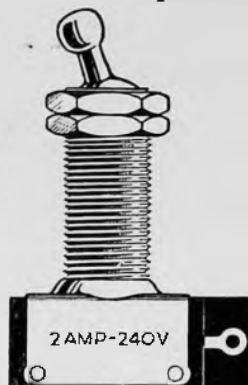
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1 3-Gang Formo Condenser, with incorporated Drum Dial	£1 15 0
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2 Sovereign 1,000-ohm. Spaghetti Resistors	each 0 9
1 Sovereign 50,000-ohm. Spaghetti Resistor	1 6
1 Sovereign 2-meg. Pigtail Grid Leak	0 9
1 Sovereign ½-meg. Pigtail Grid Leak	0 9
1 Sovereign 400-ohm. Potentiometer	2 0
1 Eerie 10,000 Carbon Resistor	1 3
1 Eerie 100,000 Carbon Resistor	1 3
1 Graham Farish, 500-ohm., "Ohmite"	2 6
1 Graham Farish .0002 Grid Condenser	0 9
1 Graham Farish .0001 Grid Condenser	0 9
3 S.T.C. 2-MFD. Condensers	each 3 3
2 S.T.C. 1-MFD. Condensers	each 2 3
1 S.T.C. .01-MFD. Condensers	each 1 6
4 TCC .25-MFD. Condensers, "Tubular"	each 1 4
1 Lotus Differential Condenser	4 0
1 Goltone Switch	0 10
1 Wearite Rheostat	2 6
1 Battery Cable	3 0
Wire, Nuts, Bolts, Lugs, etc.	1 6
3 Coil Shield, 3 Valve Shields	each 1 6
1 Special Output Choke	17 6
2 Francois Terminals	each 0 6

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In the above baseboard plan the dotted line within the circles and rectangles indicate the holes which are punched in the base, through which must be taken the connections to the coils.

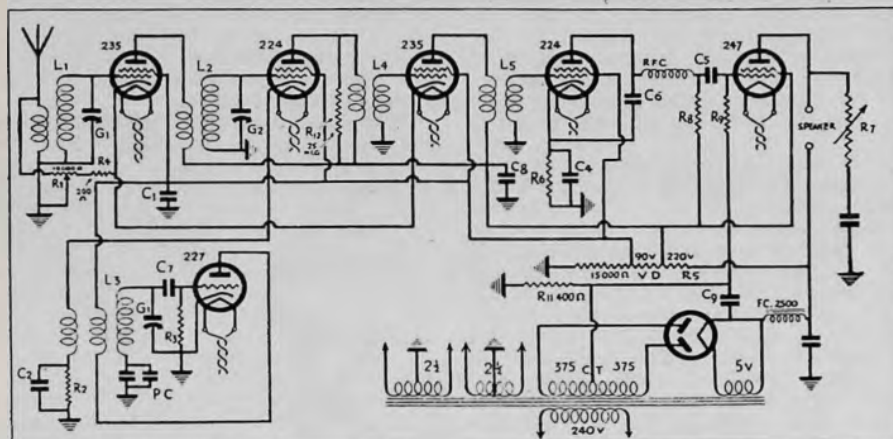
The Under Baseboard Components.

The majority of these are soldered into position, the exceptions being the main voltage divider, the tone control condenser, and the padding condenser.

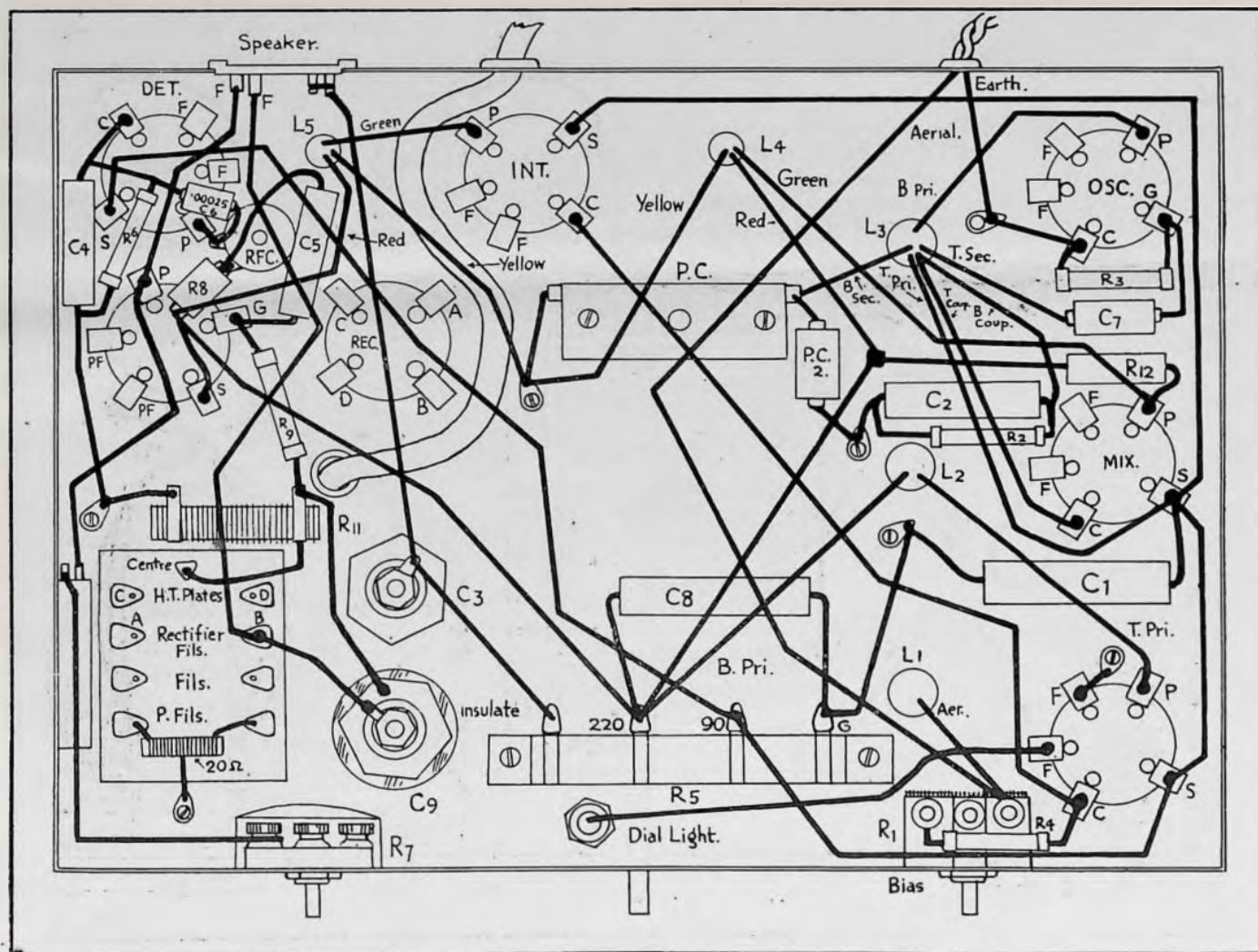
condenser, and the padding condenser C (semi-variable) and PC2 (fixed, 0.005) have to be wired in parallel as is shown in the layout diagram. The bottom of the secondary coil in L3 is connected via the padding condenser PC to earth.

Wiring.

This is easily the most difficult task and it requires considerable care, particularly with respect to the coil connections. Here are the instructions as briefly as possible.



The circuit of this modern superheterodyne is thoroughly modern, yet is simple withall.

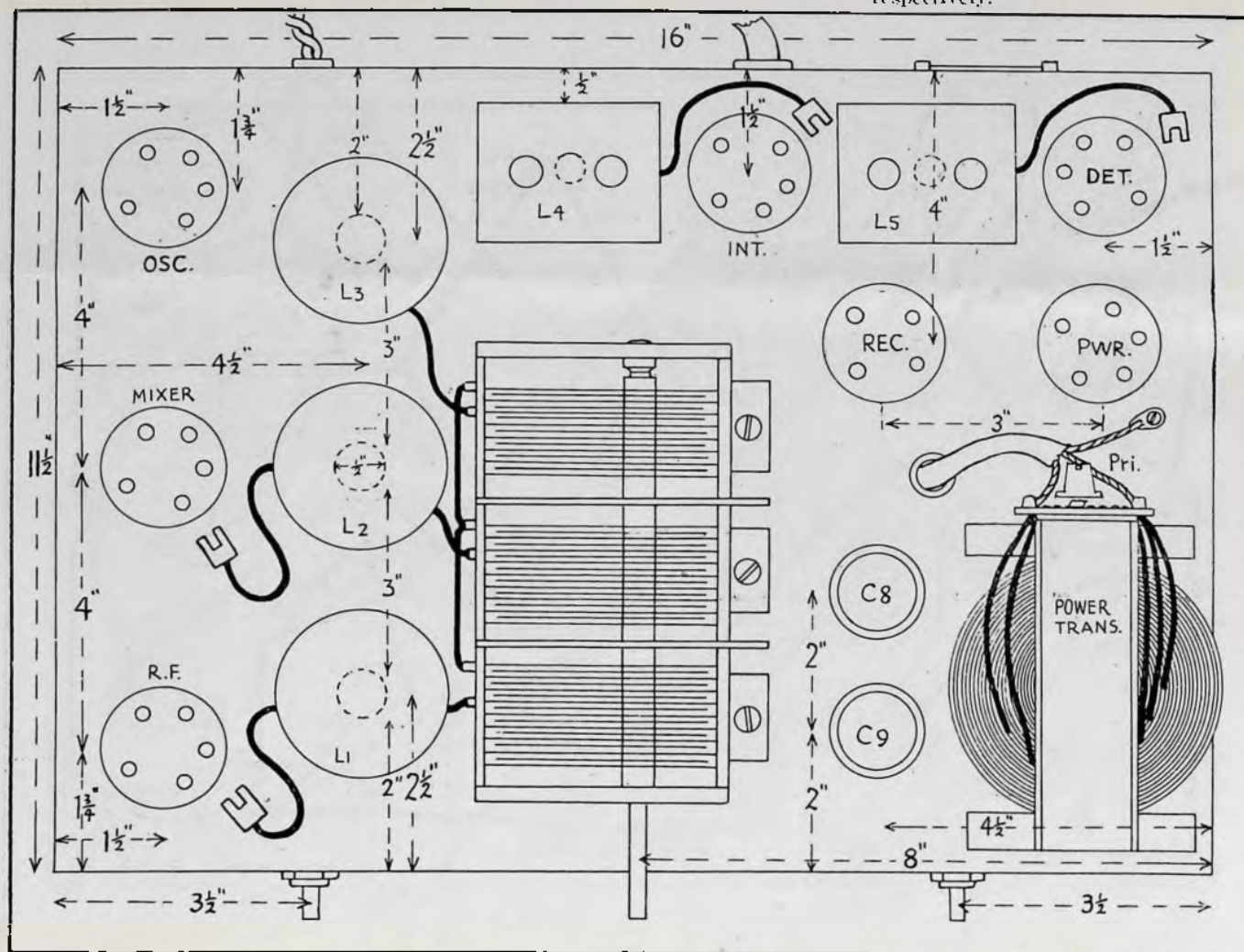


The lower diagram depicts the underneath wiring; to see where the wires go hold the page to the light.

Coil L3 is the oscillator, and calls for extreme care. There is the usual secondary of enamelled wire, the top of which is connected in the same

Watching carefully the direction of rotation, it is fairly easy to find the bottom of the top winding and separate it from the top of the bottom winding. That is where a mistake could be made readily. Having clearly satisfied oneself as to which is which, the leads are then connected thus—bottom to bottom coil (primary) to the plate of the oscillator (227); top of bottom winding to one of the mixer screen to pick up a potential of some 75-90 volts. Bottom of top winding (coupling coil) through a 10,000-ohm (R2) resistor to earth with a by-pass condenser. (C2. across it. Top of top winding runs to the cathode of the mixer (224). Another important lead is from the bottom of the secondary (enamelled wire). This does not run

Next wire the valve filaments, which wiring is not shown in the diagram, principally because it is perfectly straight forward and its incorporation would complicate the diagram. Probably on your power transformer will be provided two sets of 2.5 windings, one of which will be connected with the filament of the pentode valve, all the other filaments being wired in parallel from the remaining winding. The five-volt rectifier supply is taken to the rectifier only and the high tension supply is likewise twisted and taken to the plate and grid terminals respectively.





Get a Kick Out of Owning this Amazing **Kriesler** RADIO KIT..

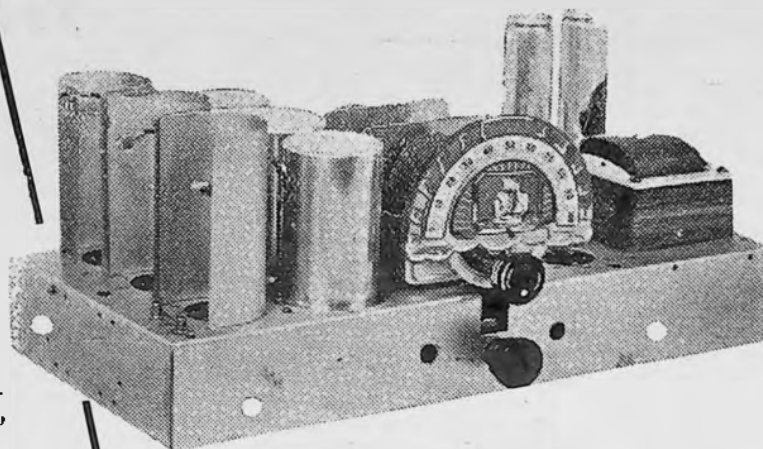
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The method of wiring the filaments is to obtain twisted flex, or twist together two pieces of insulated wire and then cut to the required length. A wire, it does not matter which, goes on each of the filament pins, and then both pick up the nearest valve, providing it is to be on the same circuit.

The valve nearest the power transformer—the i.f.—is connected both with the power transformer and with the detector filament. The best plan when doing the wiring is to do it systematically, commencing at the point of origin of supply—i.e., on one side of the 5-volt rectifier winding on the powerpack. A connection is taken from here to the centre pin on the electrolytic condenser, which is insulated from the shield. The other electrode of this condenser connects with the biasing resistance and R9, the red-bodied resistor, in the grid circuit of the pentode valve. From the resistor a connection is run to the negative centre tap to the high voltage centre tap on the transformer.

Wire R11 into position, taking a fairly stiff wire on to the frame and then go ahead with the wiring of its associate circuit.

In soldering a group of components together, put all those going to a common point together at the one time. Twist them, if necessary, and then run in the solder. Take the other end then to the various points to which they have to go.

To adjust the superheterodyne, get all the trimmers (on the condenser gang) half-way open and open the condensers fully, or nearly so, and pick up a station on a low wavelength. Run over the trimmers until the station comes in at its loudest point. Turn back the volume control and keep the volume at a reasonable level. After the set is lined up, it is possible then to get off the station altogether and trim entirely on the static and general noise level. Get the gang trimmers all set for the low wavelength without touching the paddler, then swing over to the other end of the dial above 2FC and adjust the paddler for maximum noise and static. If the paddler does not pull in the signals rock the dial to and fro a little at the same time, so that you get a peak spot in the paddler adjustment somewhere about the middle. Having then set the paddler, swing back to the low wavelengths, and run over the gang trimmers again, but don't touch the paddler. Remember, the paddler is for the long wavelengths (low frequencies), and the ordinary trimmers for the lower wavelengths (higher frequencies).

Intermediate Adjusters.

The most important point about the whole job is the adjustment of the intermediate transformers, L4 and L5. On the tops of the cans of these two units there are two adjusting nuts, but for a start they must not be touched. When the intermediate coils are being mounted the greatest care must be taken to see that no leads are broken, coil

List of Parts.

- 1 Foundation Kit, comprising coils, variable condensers, padders, coil shields and knobs. L1, L2, L3, L4, L5, G1, 2, 3 (Ganged) PC.
- Aluminium chassis, 16 x 11½ x 2.
- R1 10,000 ohms w.w. potentiometer.
- R2 10,000 ohms 1 watt resistor.
- R3 100,000 ohms 1 watt resistor.
- R4 200 ohms 1 watt resistor.
- R5 15,000 ohms voltage divider.
- R6 25,000 ohms 1 watt resistor.
- R8 250,000 ohms 1 watt resistor.
- R9 2 Megohms.
- 20 Ohms C.T. resistor. (If power, filament not centre tapped).
- R11 400 ohms heavy duty resistor.
- R12 ½-megohm 1 watt resistor (optional).
- Tone control 10,000 ohms potentiometer (R7) and .1 condenser.
- Four pigtail condensers .25 mfd. (C1, C2, C4, C8).
- C5 .02 fixed condenser.
- C6 .00025 fixed condensers.
- C7 .001.
- 6 UY and 2UX wafer sockets.
- 2 Dozen bolts and nuts, necessary wire and solder lugs.
- 3 Insulated bushes.
- Power flex, 2 terminals.
- 1 Full vision dial.
- 5 Valve shields.
- Valves: 1 280, 1 227, 2 224, 2 235, 1 247.
- 1 dynamic speaker, 2,500 ohms field to suit 247 output valve.
- 1 power transformer.
- 2 8mfd. electrolytic condensers (C3, C9).

positions altered, or in any way damaged. However, after the set has been assembled and adjusted to perfection in every other way, it is then possible for the home builder to try his hand at trimming the intermediates.

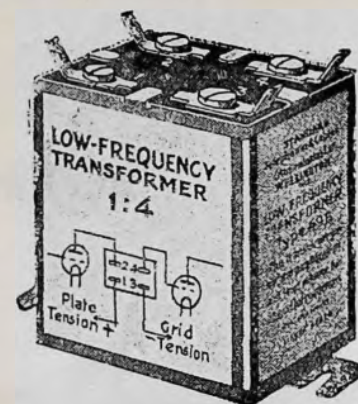
Under no circumstances must any adjuster be turned more than an eighth of a turn at a time.

An eighth of a turn one way or another may increase signal strength from some very far distant station, but great care must be exercised to ensure that the original adjustment of the trimmers is not lost.

We would even suggest that the trimmers be marked so that they can be returned to normal setting at any time. It is about 100 to 1 odds that the trimmers will not need any adjustment, and if adjustment is made it must be done with great care, as there is a chance that a far distant station will fade in and out and entirely upset the operator's judgment of whether he is increasing the signal strength.

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THE demand for automobile radio in the States is increasing rapidly, and many dealers are finding it a much-welcomed addition to their business. A compact and powerful trouble-free set, deriving all power from the car battery, has made its appearance and is finding a very ready market. It is simple to instal, and what is more, every proper installation is a recommendation and advertisement for future business. This field in New Zealand has as yet scarcely been touched, probably because our stations are of comparatively low power and are few and far between. However, when the Broadcasting Commission's recent recommendations are brought into force, this new avenue of increasing sales should be well worth watching.



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The "1932 Outspan Four"

The Rolls-Royce of Battery Sets

THE 1932 "Outspan" receiver which we are about to describe is the result of many weeks' experimentation in an effort to design an ultra-modern battery set, which would give maximum dx results with a minimum number of valves and controls.

The popularity of a receiver among constructors, who are usually very critical, is, after all, the final test of a receiver's capabilities. The original "Outspan Five," which was described about eighteen months ago, has been built by hundreds of constructors and is undoubtedly one of the most popular battery sets we have ever designed. Taking this circuit as a basis, then, we have modified it to bring it into line with up-to-date ideas, and the result is the 1932 "Outspan," a set which is capable of such amazing performances that we are certain that it will outdo even its predecessor.

Up-to-date Features.

AND now to run over a few of the attractive features of the circuit. In the first place, constructors will be glad to know that the three tuning condensers have been ganged, and ganged successfully. This has been accomplished by using a screen-grid valve as detector. This valve, unlike the triode, has such minute inter-electrode capacity that negligible damping is thrown across the detector tuning circuit, with the result that efficient ganging of this stage, with preceding r.f. stages, can be accomplished. The following tests will show how simple, yet accurate, the process of ganging has become. The set was lined up in the ordinary way when tuned to a distant station about the middle of the dial. Further adjustments to the trimmers when the set was tuned to stations at either end of the dial resulted in no further improvement in signal strength. It was even found that if the set was lined up at either end of the dial the ganging held splendidly right to the other end. Reaction, which is applied on the plate of the screen-grid detector, is very smooth, and has absolutely no noticeable influence on the ganging.

Another excellent feature is the provision of automatic bias on the r.f. valves and the pentode. This has several important advantages. Firstly, there are no bias batteries to worry about; secondly, as the voltage in the B battery drops, so the bias drops accordingly, and distortion is not introduced;

A powerful, modern four-valve battery set, comprising two stages of screen-grid r.f., screen grid detector, pentode output. Incorporates single-dial tuning, ensuring ease of operation, and employs reaction, giving maximum sensitivity. Adjustable automatic bias on r.f. valves and pentode. "B" consumption, 10-12 mls., "A" consumption, .8 amp.

and, thirdly, any required bias can be placed on the r.f. valves. This in itself is an excellent feature as screen-grid valves usually give best results when a negative bias of about .8 or 1 volt is applied. It will be noticed that bias on the r.f. valves has a marked beneficial effect on both selectivity and sensitivity, especially if valves of a high amplification factor are used.

Again, in accordance with modern practice, there is only one B+ tapping, all the different voltages required for different portions of the set being obtained by breaking down resistances. An additional advantage of this scheme is that adequate decoupling is afforded. We found the set to be surprisingly stable, so much so that even when a set of the new 822 Osram valves, which have the enormously high amplification factor of 350, were placed in the set, no trace of instability could be found. This in spite of the fact that the makers themselves recommend that because of the high amplification fac-

tor, and the risk of instability, this type of valve should be used with a set employing only one stage of r.f. It was noticed, by the way, when using this type of valve, that appreciable bias was required for maximum sensitivity, and it had to be adjusted carefully.

Like the "Outspan Five," when operating the set on local stations, the volume control rheostat on the filaments of the two r.f. valves, may be turned right off, and the aerial taken to the detector, thus effecting an appreciable saving in A and B current—an important point with country listeners.

The pentode employed is the new Osram PT2, a high-efficiency valve which, though it takes only 6-7 mls., will deliver an output of 250 milliwatts. The measured total B drain of the entire set, using the valves specified, is only 12 mls.—an astonishingly low figure for such a set. The A drain is about .8 of an amp. Of course, other makes of valves may be employed, with equally good results, but the B drain will be appreciably higher.

The set has been designed for use with three 45 volt "B" batteries, connected in series to give 135 volts. Though the set will work quite satisfactorily with a "B" voltage varying from anything from 110-150, it will be found that anything much below 135 means a serious drop in efficiency, as it does with all battery sets of this type, and that anything above is not justified by the very slight improvement in sensitivity.

Outstanding Dx Capabilities.

AND now for the most important item from the constructor's point of view—the set's performance. This

Parts List.

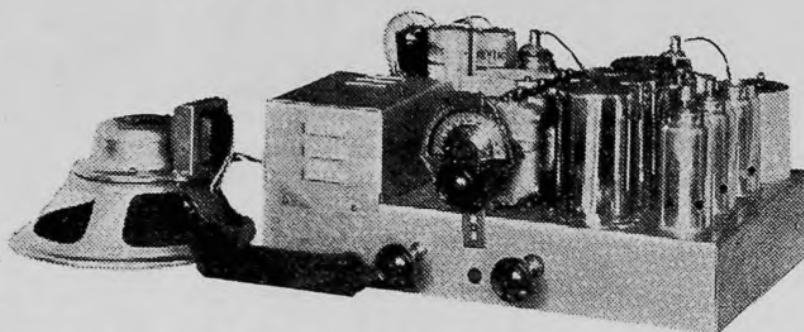
- | | |
|---|---|
| 1 Base. | 1 100,000 ohms resistor (grid leak type). |
| 6 UX sockets, wafer type. | 1 15 ohms rheostat. |
| 1 UY socket, wafer type. | 1 400 ohm potentiometer. |
| 1 set of coils, as described. | 3 2 mfd fixed condensers. |
| 1—3-gang condenser and dial, Capacity .0005 mfd. | 2 1 mfd. fixed condensers. |
| 3 r.f. chokes. | 4 .25 mfd. fixed condensers. |
| 2 1000 ohms spaghetti, pigtail, or carbon type resistors. | 2 .01 mfd. fixed condensers. |
| 1 10,000 ohms spaghetti, pigtail, or carbon type resistors. | 1 .0002 mfd. fixed condensers. |
| 1 5000 ohms spaghetti, pigtail, or carbon type resistors. | 2 .001 mfd. fixed condensers (flat type). |
| 1 50,000 ohms spaghetti, pigtail, or carbon type resistors. | 1 .0001 mfd. grid condenser. |
| 1 500 ohms spaghetti, pigtail, or carbon type resistors. | 1 .0002 mfd. differential condenser. |
| 1 2 megohms resistor (grid leak type). | 1 on/off switch. |
| 1 .5 megohms resistor (grid leak type). | 1 battery cable, 4 wire. |
| | Wire, nuts, and bolts. |
| | 3-coil shields. |
| | 3-valve shields. |
| | 1 output choke. |
| | Aerial and earth terminals. |

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is little short of amazing. Despite the fact that it uses one less valve than the "Outspan Five," and that the tuning stages are gauged, we believe that it is definitely more sensitive than that set.

The set was first tested out on dx at about a quarter to twelve on a week night, when all the New Zealand stations were off the air. It was tested in the middle of the city, on an aerial of average height of not more than 18ft., and with an indifferent earth, and yet with the reaction control set almost at minimum, a single run round the dial brought in over 30 Australians, and several Japanese, all of them over strength R4 on the speaker, and the majority at R7-8. At first it was thought that the night must have been an exceptionally good one for dx, but tests on subsequent nights revealed that this performance is quite usual.

The Components.

AND now for a chat about the components. As may be seen from the above-baseboard diagram, a three-gang condenser block, with the tuning dial

between the second r.f. condenser and the detector condenser, was used. This was merely because it was the most convenient at hand. Almost any type may be used, with very little alteration to the layout. For the sake of compactness, and shortness of wiring, an inch and a quarter coil formers, with two and a half inch coil screen cans were employed. These cans, together with those shielding the valves, may be obtained anywhere.

To facilitate experimental work the coils were wound on formers which were slipped over valve-bases turned down on a lathe so that they would slip inside the former. For those who prefer to use the new tripod coil formers, or even ordinary formers mounted on angle brackets, the substitution could quite simply be made. For the constructor new to the game, however, we recommend the valve base formers, as the coils can be separately constructed from the diagrams which are so clear that no one could make a mistake, and used in conjunction with valve bases which are very simply wired up. We will say more about the coils later.

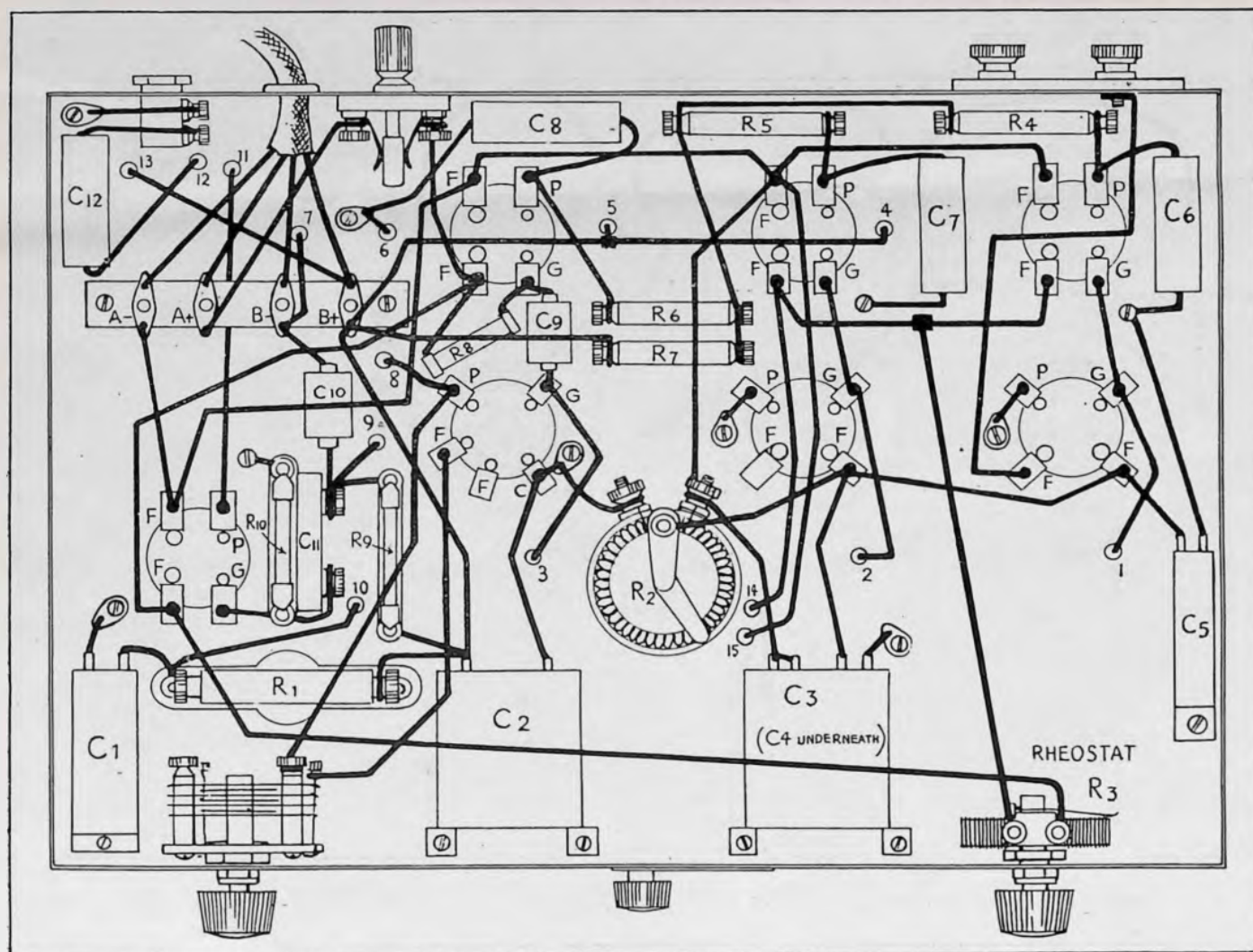
In several instances we have employed the new tubular type of fixed condenser. These are more compact than the flat type, and do not have to be mounted on the baseboard. In general high grade carbon resistors were used, though these may be substituted by the pigtail or spaghetti type. Wafer type valve sockets were employed, as they are simpler to mount and wire than the other type.

The only component at all out of the ordinary is the pentode output choke. This is the "Radio Times" standard, of which full details are given later in the article. This choke, which is designed to carry up to 50 milliamps and is therefore suitable for almost any

The Under-Baseboard Diagram

C1—2 mfd.; C2—2 mfd.; C3—1 mfd.; C4—2 mfd.; C5—1 mfd.; C6—.25 mfd.; C7—.25 mfd.; C8—.25 mfd.; C9—.0001 mfd.; C10—.0002 mfd.; C11—.01 mfd.; C12—.25 mfd.

R1—5000 ohms.; R2—100 ohms. ptr.; R3—15 ohms. rheo.; R4—1000 ohms.; R5—1000 ohms.; R6—50,000 ohms.; R7—10,000 ohms.; R8—2 megohms.; R9—1 megohm.; R10—.5 megohms.



type of valve, may be wound by the constructor, or bought ready made from dealers who have built them to our specifications. Better still, if one of the new pentode speakers, which incorporate specially matched output transformers, is used, no output choke or filter device will be needed. In this case both the choke and the .25 mfd. condenser between one side of the speaker and the choke tapings may be dispensed with.

Building the Set.

THE first thing to do is to assemble all the required components. These are shown in a table on this page, and each should be ticked off as purchased. When the list is complete, construction may be commenced.

The first job is the bending and drilling of the panel. Eighteen gauge aluminium should be used to give reasonable rigidity. The baseboard may be purchased ready bent and drilled, and with the valve and coil sockets mounted in their correct positions.

Now proceed to mount all the above

and under-baseboard components. The positioning of these is clearly shown in the two layout sketches, and no difficulty at all should be experienced.

Winding the Coils.

NOW lay the baseboard aside and commence winding the three coils. Full details of these, with connections to the valve bases clearly shown, are given in the accompanying sketch.

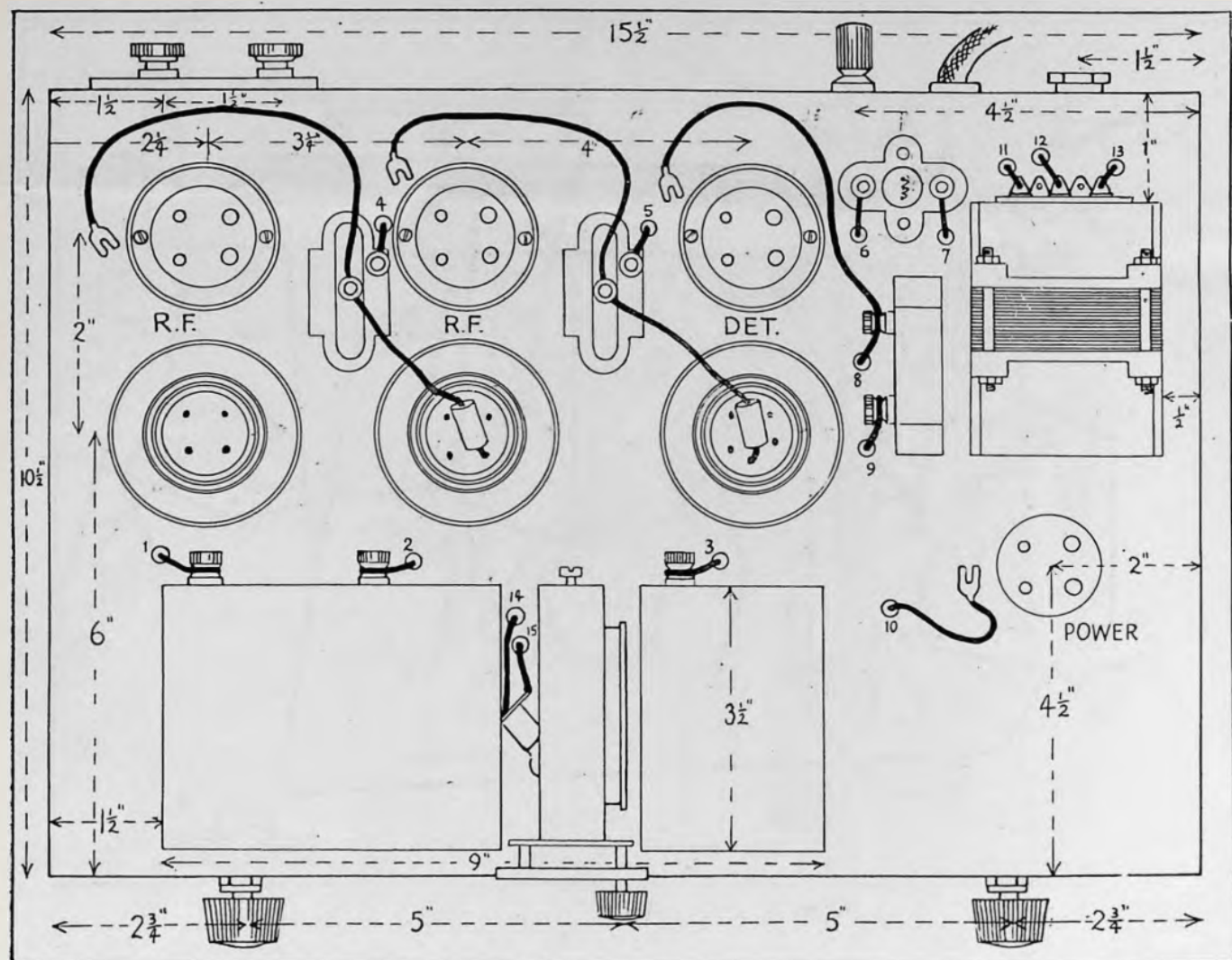
All coils are wound on 1½ in. former, which slips over a valve base turned down to make a tight fit. It is then either riveted or glued into position. Alternatively the coils may be wound on the new tripod coil formers, or on ordinary 1½ in. coil formers mounted on angle brackets. After tuning down the valve bases, cut off the top ebonite portion, leaving a little over a ½ in. so that the former may be glued or riveted to it.

Now commence winding the secondary of the first r.f. coil. Make two small holes near the bottom of the former and anchor the wire securely, leaving sufficient to pass through the

valve pin. Carefully wind on 100 turns of 32 d.s.c. wire and then make two further holes close to the last turn, and again anchor the wire securely, not forgetting to leave sufficient for connection purposes.

Now for the primary. This may be wound either on a wooden former whose external diameter equals the internal diameter of the secondary former. Recess the centre portion slightly to take the primary winding, which consists of a single close-wound layer of 24 turns of 36 d.s.c. Alternatively the primary may be wound on inch cardboard or composition former and then slipped loosely inside. The ends are anchored in a similar manner to that employed for the secondary.

Now mount the secondary former on the valve base and secure it into position with glue or brads, passing the two ends of the winding down through their respective valve pins, as shown in the diagram. Pull them fairly tight, soldering them into position, cutting off all surplus. Now slip the primary inside and pass this end through, and secure similarly. The



To see where all these wires go, hold this page to the light.

valve pins should now be filed clean of surplus solder.

The next coil is wound in exactly the same manner and connections are exactly the same except that from the right-hand filament pin (see diagram) a wire is taken to one side of a .001 mfd. fixed condenser. The compact flat type is preferable. The other side of this fixed condenser goes to the plate of the first r.f. valve through a hole in the coil screening can.

The procedure for winding the next coil is slightly different in that a five-pin valve base is used. The reaction winding should be put on after the secondary, leaving about a 1-in. space between. The connections to the valve base are clearly shown in the diagram. The coils are now complete.

Wiring the Set.

NOW commence wiring the set. Follow the theoretical diagram closely and check your connections by the above and below baseboard layout sketches. In the unlikely event of there being any discrepancy between the theoretical and the layout diagrams, always follow the theoretical.

When drilling holes through the base to pass wires through, never leave the edges in a jagged condition. They can be quite easily smoothed out by rotating a much larger drill a few times without any pressure in the already drilled hole.

On completion of the wiring, test it by giving each connection a few slight tugs with a pair of pliers, to ensure that no dry joints have been made. After carefully rechecking the wiring, the set is ready to test out.

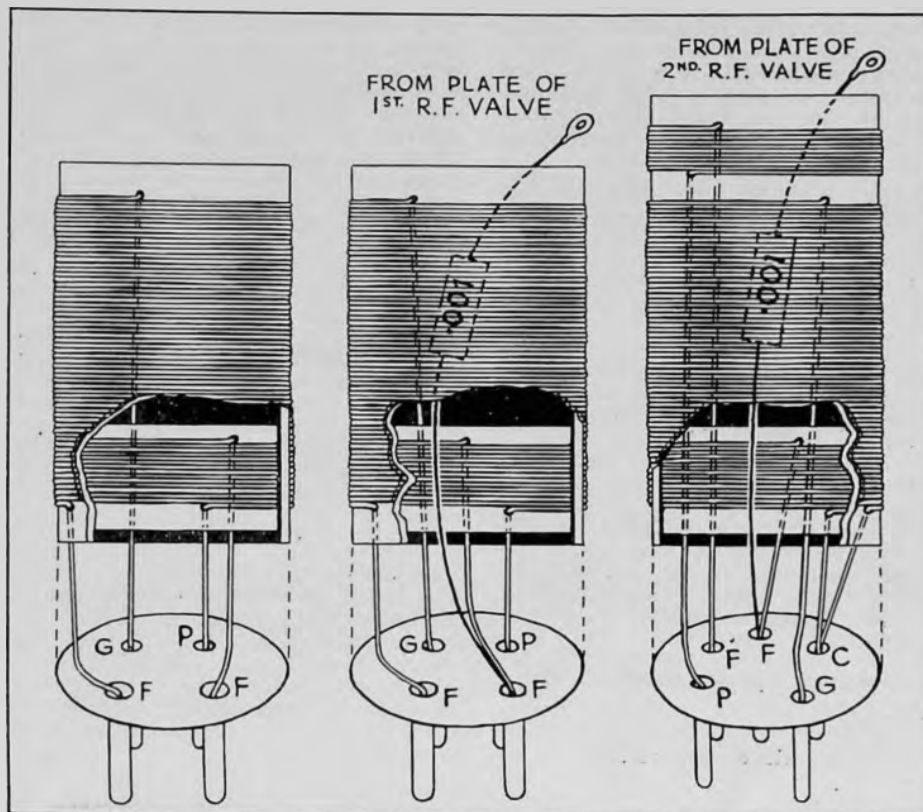
Insert a fuse bulb rated at not more than 60 mils into the fuse socket, and the insert coils and valves, making the necessary flex connections to each of them. Connect up the speaker, "A" and "B" batteries, aerial and earth, and the set is ready for operation.

Turn the filament rheostat on full, advance the reaction control, and see if the set goes smoothly into oscillation. If it does not, examine the set to see if it is operating normally otherwise. If so, try reversing coil connections to the reaction condenser. If the set still does not oscillate, carefully recheck all wiring. If it is in order, then the only solution is the substitution of a reaction condenser of larger capacity (about .00027 mfd.) or the winding on of several more reaction turns. This, however, should not be necessary.

Constructional Pointers.

The fuse shown in the layout diagram, but not the theoretical, is optional, though we strongly advise its inclusion. It is wired in, as shown, between B— and earth. Do not use an ordinary torch bulb, as these take such a high current and their inclusion is worse than useless. Use a 60 mils (or less) fuse bulb.

The dial light, which is also shown in the layout diagram, but not the the-



oretical, is again optional, but its inclusion is an advantage. Again, it is better to use here a 60 mils fuse bulb, as the drain on the "A" battery is negligible. Torch bulbs, however, usually are rated at .25 to .3 of an amp, an appreciable and unnecessary drain on the "A" battery.

Though one is shown in the circuit diagram for the sake of clarity, no aerial switch to lead the aerial to the detector is incorporated, as the risk of instability with additional wiring in the r.f. portion of the set is too great. However, those who wish to use the set on local station and thus save current, can proceed this way: On the end of the aerial solder a .0001 mfd. pigtail type fixed condenser. To the other side of the condenser solder a crocodile clip and then insulate the whole thing carefully with insulating tape. The aerial may now be clipped either on to the aerial terminal, when the four valves are in use, or on to the top terminal of the second r.f. choke (i.e., top of detector primary), when only the detector and pentode are in use. Note that this condenser must be included or high voltage will be sent into the aerial.

The four-wire battery cable is taken to an ebonite distribution strip, secured underneath the baseboard (as shown in layout diagrams) by two long bolts.

The on/off switch, the jack, the rheostat, and, of course, the aerial, must be well insulated from the metal baseboard. In the case of the differential condenser, however, insulation is un-

necessary, as the rotor must be earthed.

Before mounting components see that all terminals on them are secure. Nothing is more exasperating after having mounted components than to have to take them off again to tighten up loose terminals.

The pigtail type of condenser, specified for coupling the r.f. stages, is marked in millimicrofarads, so do not think you are getting the wrong capacity when, on ordering a .001 mfd. condenser you are supplied with one marked 1000; 1000 millimicrofarads equals .001 mfd. While on the question of purchasing your components, it is always advisable to see that the various resistors are tested for accuracy, if possible. Appreciable discrepancies would quite likely be the cause of poor results.

For wiring, we recommend 20 gauge tinned copper wire with spaghetti covering. It solders easily and is a pleasure to work with.

When soldering flex leads to the coupling condensers inside the r.f. coil leave them sufficiently long to enable them to be passed easily through the holes at the top of the screen can. Any surplus can be cut off afterwards.

We do not advise constructors new to the game to attempt to use American valves with the layout specified. The plate and grid connections for English and American types of screen grid valves are directly opposite, and so a serious modification of the layout would be necessary if American valves were employed.

Any constructors desiring to use dif-

ferent type valves from those specified are invited to write to us for the various values of resistors, which in some cases will be appreciably different. Also, if different value variable condensers are used, the coil particulars will be supplied on application.

Make all connections between the fixed vanes of the variable condensers and the grid connections of the coils as short and as straight as possible. The dimensions of the baseboard are 10½ in. wide by 15½ in. long by 2½ in. deep.

Clock Details.

FOR those who wish to wind their own chokes, details are as follow:

The core limbs are built up of ½ in. material, the core itself having a square cross-section. The window is approx. 1 in. x ½ in. and the air-gap about 3-6 in.; 6300 turns of No. 36 s.w.g. enamelled are required for the winding, which is tapped at ⅓, ⅔, and ⅞ of the number of turns (i.e. at 1575, 3150 and 4725 turns). The taps must be well insulated where they are brought out.

Lining Up the Receiver.

Assuming that the set is now working correctly, our next job is to line up the variable condensers. Tune in

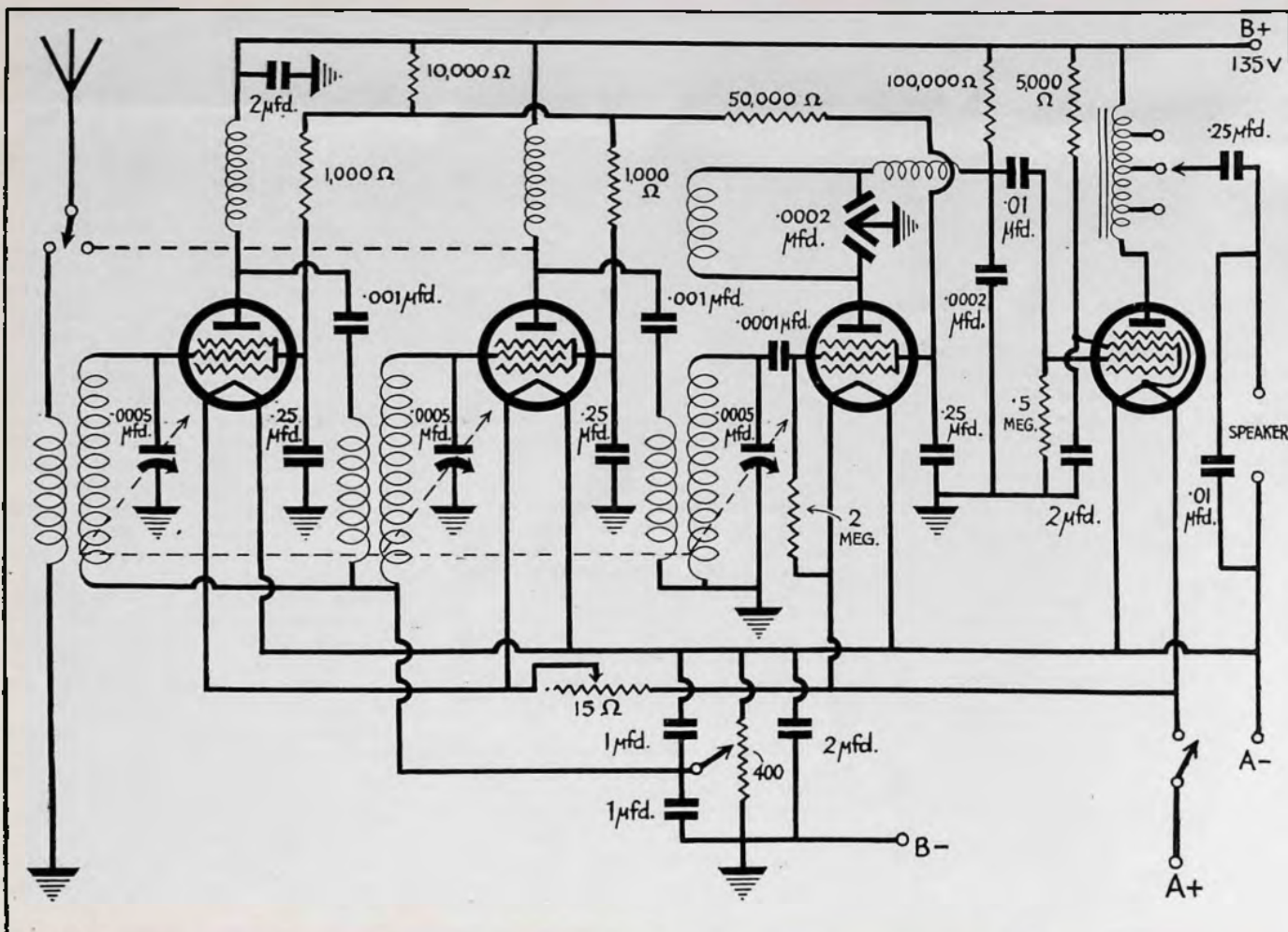
to a fairly weak station at about the middle of the dial—say 1YA or 2BL. With a long wooden screwdriver, which may be shaped out of a meat skewer, carefully adjust the trimmer of the first r.f. condenser, rotating it backwards and forward until a point at maximum volume is found. Leave this and proceed to the next, going through the same operation. Repeat this with the third. Now repeat the whole process again. When the definite peak is found on each trimmer, adjust carefully and the condensers may be regarded as matched. If one of the trimmers, however, screws fully in or fully out without reaching peak in volume, screw the other two an equal amount in the opposite direction and then re-adjust the third. After a little experimenting, however, the constructor will soon see how trimming is carried out.

Conclusion.

In conclusion, we would like to state that if any difficulty is encountered in the building, or operating, of this set, the technical department of both the "Radio Times" and "Radio Record" will be only too pleased to assist constructors to secure results. We would also appreciate reports on this set's performance.

A Dyer's Equipment

MR. J. C. STAPLETON believes in getting things done, as evidenced by his pile of QSL's and Ekko stamps! Receiver is a five-valve a.c. commercially made, three 224 screen-grids and one 245. The set is a combination radio-gramophone. Aerial, single 40ft. pole with 75ft. of wire direct to receiver. Earth, modified "Pierce." The total log for GMC is 138 stations, which includes 45 Americans, 43 Aussies, 38 New Zealand, 9 Japs, KZRM, Radio Bangkok, and Radio Bombay. Latest logging, WJZ, New York, and XER. The receiver, of well-known Australian make, is the only model of its kind in Christchurch. Mr. Stapleton is at present tracking down an amateur transmitter who at times can be received on the dial everywhere. His erratic code has been traced to Beckenham. This person has annoyed Christchurch dyers for a long time, who, thinking it was a ship, did nothing but vent their feelings in the papers. The hunt is getting hotter every week, and GMC has proved to be a great boon to the club. Following this will appear monthly details of stations 29MC, 52MC, 6MC, 2MC, 3MC, 1MC, 45MC, 53MC, 25MC, not necessarily in that order.



The Modern Five

Uses 58 and 57 Valves

CONSTRUCTION with the new valves does not present any new problems other than a little more careful by-passing and shielding. We set about making this receiver with a minimum of each, and the circuit we have evolved should not prove any more expensive than one of the same type using the old valves. Our model, while more sensitive than a four-valve set, using the older valves, was not unstable and could be operated at all frequencies without oscillation troubles.

It will be observed that the new valves require a circuit very little different from the conventional. Very small coils which must be shielded carefully are employed. The shields for the valves are of special design, and these only should be used for best results. A different system has been used in the audio section. Not that the change is essential with a set of this type, but it presents something new for the constructor to try. It will be observed that the field of the speaker is placed in the negative return and all the current taken by the set must pass through it; consequently there will be a drop of approximately 100 volts across this field. By the arrangement

Specifications.

Four amplifying valves—two 58 r.f., 57 detector, 47 output, 80 rectifier. Bias obtained by voltage drop across speaker field, which is in negative return.

Coil Specifications for Modern Five.

Condenser Gang .0005.
Formers, 1 inch.
Wire, 30 s.w.g. enamel.
Secondaries, 130 turns.
Primaries, 30 turns.
Aerial, 25 turns.
Primary wound over bottom of secondaries.

of two resistances, R10 and R11, a potential any degree more negative than earth can be arrived at, and the grid return of the pentode valve taken to this point. The resistances given are correct for the pentode in this particular set.

R5 and R6 together make up the grid resistance of the pentode valve. Decoupling is achieved by splitting the

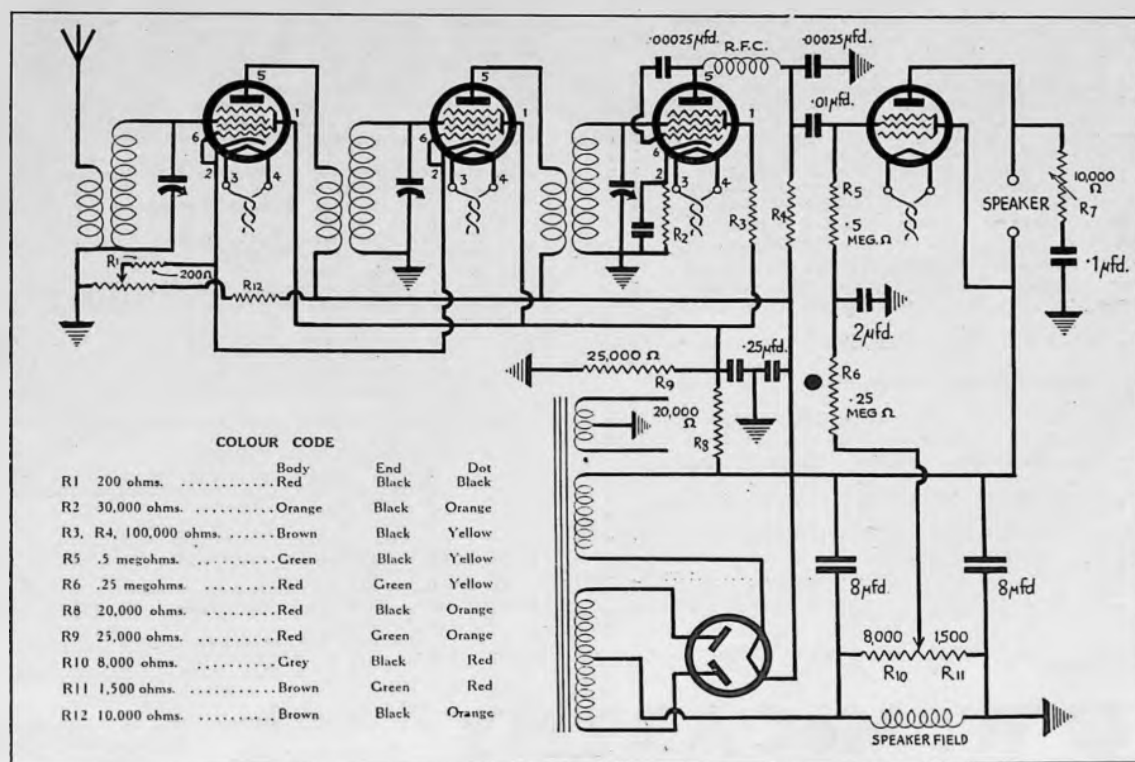
resistance and inserting a 2 mfd. condenser. Additional by-passing is used in the detector stage on either side of the r.f. choke.

Apart from these considerations the circuit is perfectly conventional.

The Assembly.

Let us now get to work and build the set. Purchase your base already punched, aluminium or black metal being quite satisfactory. Screw into position the valve sockets, electrolytic condensers, ganged condensers, coils and power transformer, in that order. On the underneath side fit the two variable resistances (shafts in contact with the base), the r.f. choke, which is fastened by one of the bolts which holds one of the coils in position, the two 2 mfd. condensers (if these are lugless, they can be glued into position), bushings and the terminals. The earth terminal should make contact with the chassis and the aerial terminal must be insulated from it.

Wire the filaments first, making certain that all leads are twisted. Five volts go to the rectifier, which is distinct from all other filament connections, these being on the one winding.



If two windings are available, put the power filament separate as shown in diagram with the centre tap connected to the chassis. On the six-pin valves the filaments will be parallel with the left-hand edge of the chassis looking from underneath, and nearest to it. On your sockets they will be numbered 3, and 4.

A word here about the numbering. Certain types of sockets are numbered for connection when used for above baseboard mounting and will not be correct when used in the manner shown in this set. Follow the connections as shown in the diagram and do not go by the numbering on the socket, e.g., if your base is in such a position that the underside is facing you, and the two potentiometers are uppermost, three six-pin sockets will be on the left-hand side and the terminals will be thus: the two on the extreme left are the filaments. The top pin the plate. The next pin round to the right is the screen, the next is the suppressor grid, which is tied to its neighbour, the cathode.

The Wiring.

Now proceed with the wiring as follows:—

High voltage centre tapped to the insulated 8 mfd. electrolytic condenser, this point also joining the 5000 ohms carbon resistor. Twist the free pigtail round the pigtail of the 500 ohms resistor and solder this to a pigtail of the .25 mfd. resistor. The free end of the 500 ohms resistor is now taken to a convenient point on the chassis. The other end of the .25 megohms resistor is twisted round the pigtail of the .5 megohms resistor, and this common point to a 2 mfd. condenser. The other end is soldered on to the grid terminal of the pentode valve, on to which also is joined the pigtail from the .01 condenser, the other side of which is connected with the r.f. choke, and with one end of the 100,000 ohms resistor, which is connected with the screening grid of the pentode.

Next wire the chain of resistances, comprising R8 and R9. These are joined as were the first two, one end being connected to the chassis and the other end to the free terminal on the

insulated 8 mfd. condenser, which point is also connected with one side of the rectifier filament supply, with the centre pin of the next condenser, the screening grid on the pentode, with the two r.f. coils. The other side of the r.f. primaries is connected with the plate terminals of the two r.f. valves. Note that a pigtail resistor is connected between one side of the 10,000 ohms potentiometer and the cathode of the first r.f. The connections at the detector socket may need amplifying. The plate of the detector is connected to the free side of the r.f. choke. Also to one side of a .00025 condenser which is connected across the socket to the cathode on the other side. This point is also connected to one side of a .25 mfd. condenser, which is connected to earth, and shown in the diagram as the bolt which holds the r.f. choke to the chassis. Also connected to this bolt is one end of a 30,000 ohms resistor and another .00025 condenser, the other side of which is connected with that side of the choke which connects with the .01 coupling condenser.

The screen-grid is connected to one

Build these Modern Sets

The "Modern Five"

LIST OF PARTS

Punched Base, 15 x 10 x 2 1/4, punched as indicated in the diagram	s. d.
Triple Gang .0005 Condenser, with trimmers	5 0
Vernier Dial, Crowe Manufacturers' Type, with Fancy Escutcheon	30 0
3 Special Coils and Coil Shields, at 7/6 each	22 6
3 Valve Shields for the new six-pin valves, at 1/9 each	5 3
Power Transformer, full-wave, to deliver 370 volts, 2 amps. and 2.5 volts, "Radiokes" 5 amps.	32 6
2-8 mfd. 400 volt d.c. Working Electrolytic Condensers, at 10/-, Sprague Dry	20 0
3-6 pin sub-baseboard Mounting Sockets, at 1/- ea., "Eby"	3 0
1-5 pin sub-baseboard Mounting Sockets, at 1/- ea., "Eby"	1 0
2-4 pin sub-baseboard Mounting Sockets, at 1/- ea., "Eby"	2 0
1-200 ohms resistance (carbon), Wire Wound Aerovox	1 6
1-30,000 ohms resistance (carbon), Dubilier Metallized	1 3
3-100,000 ohms resistance (carbon), Dubilier Metallized	3 9
1-10,000 ohms resistance (carbon), Dubilier Metallized	1 3
1-.25 megohms resistance (carbon), Dubilier Metallized	1 3
1-.5 megohms resistance (carbon), Dubilier Metallized	1 3
1-25,000 ohms resistance (carbon), Dubilier Metallized	1 3
1-5,000 ohms resistance (carbon), Dubilier Metallized	1 3
1-500 ohms resistance (carbon), Dubilier Metallized	1 3
1-10,000 ohms Tone Control Potentiometer; Frost Carbon Type	5 0
1-10,000 ohms Bias Control Potentiometer; Frost W. Wound Type	6 0
5-.25 mfd. Condensers, with pigtail; Bond Tubular Type, at 2/6	12 6
1-.1 mfd. Condenser, with pigtail; Bond Tubular Type	2 0
1-.01 mfd. Condenser, with pigtail; Bond Tubular Type	2 0
2-2 mfd. Flat Condensers, Dubilier "Bakelite" Cased, 200v. W.	4 0
2 Insulated Terminals; 1 with bushing to insulate it from shield	0 9
2 Bushings to conduct power flex through shield, at 3d. each	0 6
1-20 ohms C.T. Resistance (if centre tap is not provided on power transformer)	2 6
Roll of Glazite or Quickwire	1 0
1 yard of Twisted Flex to carry 2 amps.	0 9
Nuts and Bolts	2 6
Valves: 2-58, 13/- ea.; 1-57, 13/- ea.; 1-47, 13/-; 1-80, 10/- National Union	62 0

"Seven-Valve Super"

LIST OF PARTS

1 Radio Frequency Choke (Belast Band)	s. d.
1 Foundation Kit, comprising Coils, Variable Condensers, Padders, Coil Shields and Knobs; L1, L2, L3, L4, L5, G1, 2, 3 (ganged), PC.	83 6
1 Aluminium Chassis, 16 x 11 1/2 x 2, made up to shape	7 0
R1-10,000 ohms W.W. Potentiometer, Frost Manufacturers' Type	6 0
R2-10,000 ohms 1 watt Resistor, Dubilier Metallized	1 3
R3-100,000 ohms 1 watt Resistor, Dubilier Metallized	1 3
R4-200,000 ohms 1 watt Resistor, Dubilier Metallized	1 3
R5-15,000 ohms Voltage Divider, Renrade (Australia)	4 9
R6-25,000 ohms 1 watt Resistor, Dubilier Metallized	1 3
R8-250,000 ohms 1 watt Resistor, Dubilier Metallized	1 3
R9-2 meg., Dubilier Metallized	1 3
R10-20 ohms C.T. Resistor, Frost or Aerovox W.W.	2 6
R11-400 ohms Extra Heavy Duty Resistor, Aerovox W.W.	1 6
R12-1/4 meg. ohm 1 watt Resistor (optional), Dubilier Metallized	1 3
Tone Control (optional) 10,000 ohm Potentiometer, and 1 Condenser; complete unit	8 0
C1, 2, 3 and 4 .25 mfd. Tubular Condensers (or flat pig-tails), Bond at 2/6	10 0
C5, .02 Fixed Condenser, Bond Mfrs. Type	2 0
C6, .00025 Fixed Condenser, Dubilier Mica	2 6
C7, .001, Dubilier Mica	2 6
6 UY and 1 UX Wafer Sockets, Eby Wafer Type, at 1/-	7 0
2 dozen Bolts and Nuts, necessary Wire and Solder Lugs, approx. 3/6	3 6
3 Insulated Bushes, with screwed back-nuts, at 2d. each	0 6
Power Flex, 3 yards at 9d. per yard	2 3
2 Terminals, Insulated, at 2d. each	0 4
1 Full-vision Dial, Crowe Manufacturers' Type, with fancy escutcheon	10 0
5 Valve Shields, complete with base plate and grid clip, at 1/6 each	7 6
Valves (All National Union Valves).—	
1-280, at 10/-	10 0
1-227, at 10/-	10 0
2-224A, at 13/-	21 6
2-235, at 13/-	21 6
1-247, at 13/-	13 0
1 7/8 in. Cone Dynamic Speaker; 2,500 ohms field to suit 247 output valve	80 0
1 Power Transformer, Radiokes (Australia)	39 6
2 eight mfd. Electrolytic Condensers (C8, C9), Sprague Dry, at 10/- each	20 0
Complete Kit, with and without valves—	
£16 0 0—Price With Valves.	
£12 10 0—Price Without Valves.	

A. & W. MCCARTHY 144 Stuart Street **DUNEDIN**

P.O. Box 382

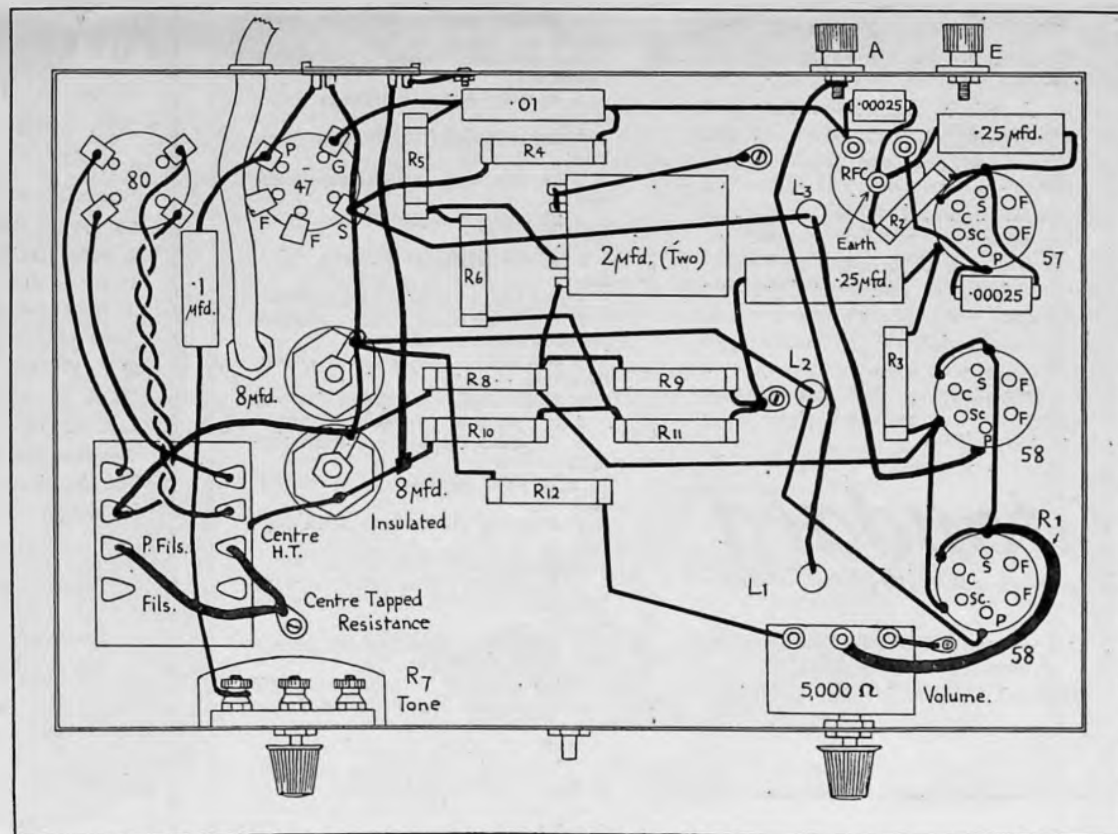
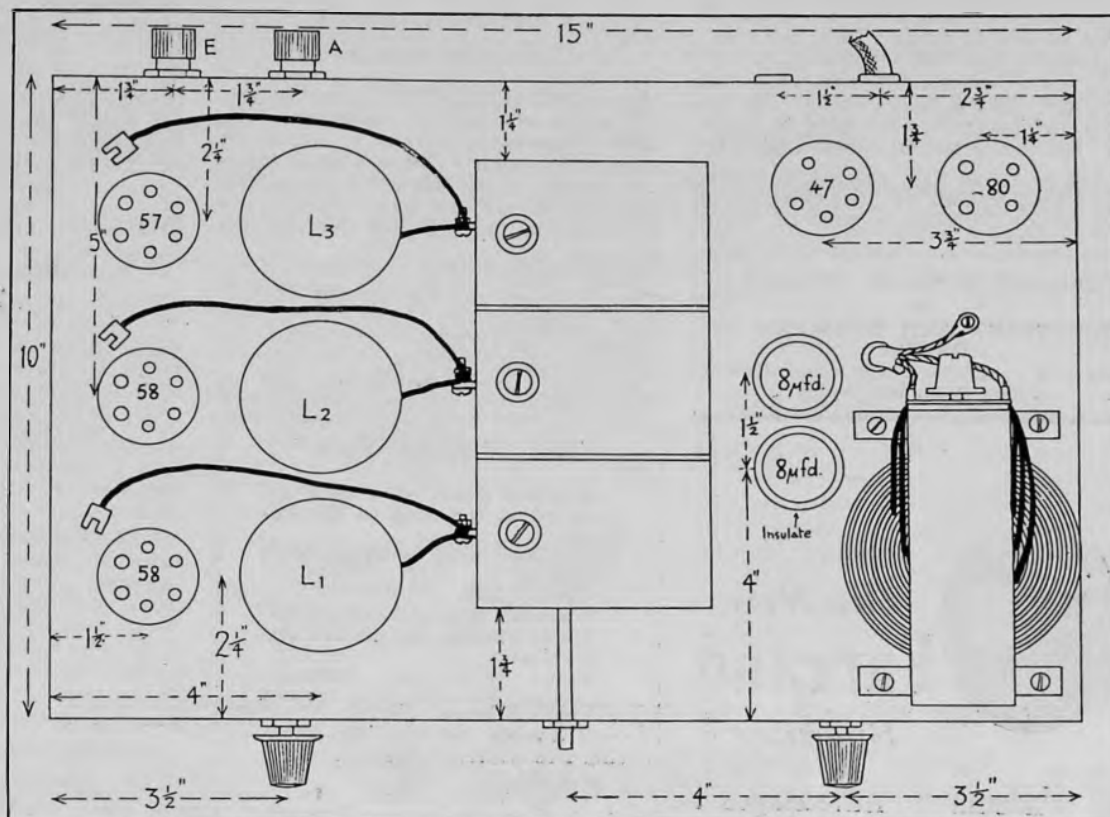
side of R8. the brown-bolted resistance, the other side of which is connected with the screening grid of the second r.f. valve. This is bypassed by means of a condenser to the common earth point where the bank of resistances is connected.

The aerial is connected first to one side of the potentiometer, the moving pin of which is automatically earthed by being connected with the chassis.

In connecting the tone control see that the moving arm is likewise earthed. You will find that this variation of the tone control makes wiring much easier than by insulating the bush and connecting it directly across the speaker, while the results are the same.

The speaker is very simply connected. The four-pin speaker socket is mounted in the middle of the turned down part at the back of the set. The filament connections go to the two points indicated—one to the metal part of the chassis and the other to the bushed 8 mfd. condenser. The filament and grid pin go to the plate of the pentode and the high voltage supply respectively. Provision is thus made for a speaker with a special pentode output transformer.

When the wiring is completed place the vernier dial in position and try the set. If it refuses to go, a mistake has probably been made in the wiring. Check first the connections to the



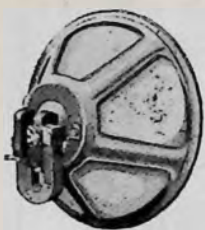
six-pin sockets, for it is very easy to make a mistake in this direction. Second, make certain that those parts which should be bushed from the chassis are properly insulated, e.g., one of the 8 mfd. condensers, and the aerial terminal. Third, that parts of the resistors which are not intended to touch the chassis are not in contact with it.

It will be found that the set is rather broad in operation, and for this reason a short aerial should be used in cities.

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in

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RADIO."

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Has Undeniable Advantages!

So great has been the demand for the New Standard Improved Farrand Inductor Loud-speaker that stocks have been completely sold out. Another big shipment has arrived, however, and deliveries will now be made with the quickest despatch. While any delay is regretted, the great demand which caused it is the strongest possible support of the contention of leading radio engineers that the Inductor Dynamic is destined to supplant other types more completely than the Cone-type Speaker replaced the Horn-type a few seasons ago. Full information is contained in pamphlet distributed to all dealers. Ask for a free copy.

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Shifting Wavebands Correspondent's Experiments

A CORRESPONDENT acting on my advice shunted his condensers with .0001 condensers having a switch in series with each so to be able to operate the set in its original form. The idea, briefly, for this was as follows:—

Original Setting	Dial No.	58	70	95	100	—	—
New Setting.	using 3/.0001 condensers	15	49	82.5	85	90	95

The "Modern Five."

Punched panel. 15 x 10 x 2½, punched as indicated in the diagram.

Triple gang .0005 condenser, with trimmers.

Vernier dial.

3 special coils and coil shields.

3 Valve shields for the new six-pin valves.

Power transformer, fullwave, to deliver 370 volts, 2 amps and 2.5 volts 5 amps.

2 8 mfd. 400 volt, d.c. working electrolytic condensers.

3 6-pin wafer sockets.

1 5-pin wafer sockets.

2 4-pin sub-baseboard mounting sockets.

1 200 ohms resistance (carbon).

1 30,000 ohms resistance (carbon).

2. 100,000 ohms resistance (carbon).

1 10,000 ohms resistance (carbon).

1 .25 megohms resistance (carbon).

1 .5 megohms resistance (carbon).

1 25,000 ohms resistance (carbon).

1 1,500 ohms resistance (carbon).

1 200 ohms resistance (carbon).

1 10,000 ohms tone control potentiometer.

1 500 ohms bias control potentiometer.

1 8,000 ohm resistance (carbon).

1 20,000 ohm resistance (carbon).

4 .25 mfd. condensers with pig-tail.

1 .1 mfd. condensers with pig-tail.

1 .01 mfd. condensers with pig-tail.

2 2mfd. flat condensers.

2 Insulated terminals; 1 with bushing to insulate it from shield.

2 Bushings to conduct power flex through shield.

1 20 ohms C.T. resistance (if centre tap is not provided on power transformer).

Roll of glazite or quickwire.

1 Yard of twisted flex to carry 2 amps. Nuts and bolts.

Valves: 2 —58; 1 57; 1 —47; 1 —80.

These condensers are inserted in a convenient position above the tuning condensers, attached to the wood frame holding the panel. Operating the set with the switch open for tuning the set without the 3/.0001 condensers, I get an increase in signal strength, having to reduce powerpack voltage on New Zealand A stations and A class Australian stations.—DX25MC.

Success of Aerial Tuner Satisfied Constructor

SINCE the publication of an aerial tuner in "The Record," 34MC and 52MC have constructed the "Aid to DX," as specified, with fine results. Personally, I found it remarkable.

Having adjusted the tuning condenser trimmers at 1200 k.c. and 700 k.c., I connected my aerial tuner in the lead to the set. The dial simply became alive with signals!

The adjustment of the slider is very critical below 300 metres, a slight movement tuning out one station and bringing in another. It is really worth while digging out the old crystal set, if of slider type, and trying it. Then swamp the Editor of "The Times" with your reports.—28MC.

Questions and Answers in Radio

All Booksellers and Dealers 1/6
or Box 1032, Wellington, 1/7, posted.

Power Transformer

230 volt, 50 M.A. 220 volt, 50 M.A.
5 volt, 2 amps., 5 volt, 2.25 amps.

35/-

30 Henry Choke, 50 M.A.	15/-
2 Mfd. DUBILIER Cond.	4/-
1 Mfd. DUBILIER Con.	3/-
.5 Mfd. DUBILIER Cond.	3/-
.0003 Mfd. DUBILIER Con.	2/-
R.F. DUBILIER CHOKE	4/6
.25 & 2 meg. LEAKS, each	1/6
UX & UY Wafer Sockets	1/3
600 and 750 ohm. Resistors	1/6
100,000 ohm. Spaghetti Resistors	2/6

Transformers Rewound.

Servicing of Sets is our
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A. E. STRANGE
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CHRISTCHURCH.

N.Z. Short-Wave Club

I UNDERSTAND that the Empire station is to open officially by sending greetings to the world on Christmas Eve, but about the middle of October they will most likely be heard testing with the new transmitter. There is an old saying that England loses every battle but the last. Though it may be slow, it will be sure, and I venture to predict that the British Empire will eventually lead the way in radio. True, there are a number of very powerful stations in other countries, but just look back on the scientists and experimenters who made radio possible: find out where they hail from, put all these inventions together—the steam engine, X-rays, etc.—and we will see what part we will take in the picture (television pictures as well). Then think of the world-known experimental short-wave stations of Australia and Canada and it will be seen that we are catching up.

NOW, nearer home. New Zealand is in a unique position for overseas reception. All you readers who are jealous of the man who wins the competitions are unconsciously making

history in radio by means of your reports. When the romance of radio is fully written, by this I mean when we get television and ultra-short-wave, and they in their turn are every-day affairs, more than passing mention will surely be made of those who patiently searched the ether and faithfully reported what they heard and just how they heard it. For, if there were no listeners to report, it would be useless to have transmitting stations.

TELEVISION sets are for sale in the United States and elsewhere, but the time is not yet; my informant has just returned from San Francisco. An engineer on an overseas steamer who has been a radio enthusiast for years is surprised because we use valve base coils; he had never heard of them in England. Most of his listening is done on a one-valve set, but he is going to experiment with a circuit I sent him.

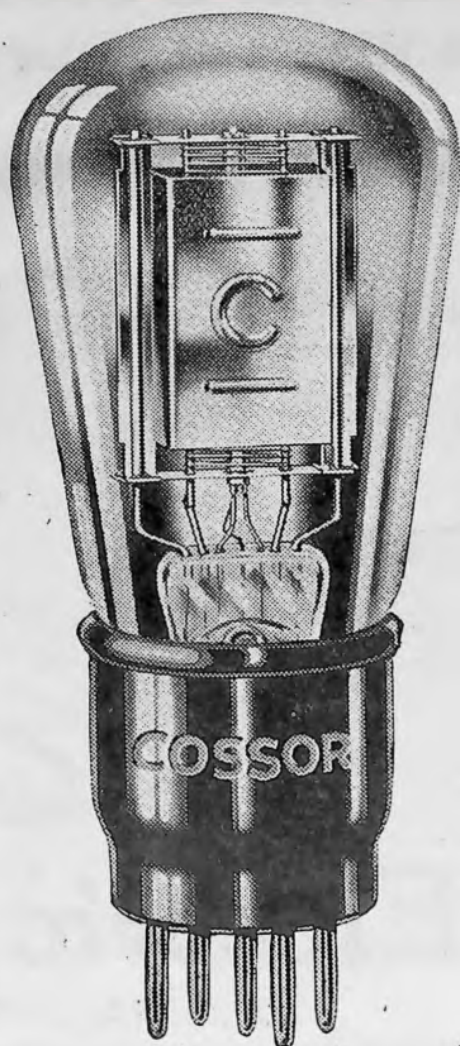
I AM quite sure that all readers will sympathise with the sufferers of the recent floods and the disturbances at Wairoa, many of our fellow listeners being hard hit, and we hope that they will soon be able to take up the game again.

BUSINESS is very brisk with me here at present; there is no time for nervous breakdown, as I have a very large family to attend to, and it is growing every day. I think I will have to take a night's holiday and see just exactly what there is in this short-wave hobby.

NEW postal regulations add more to my address, which is: A. B. McDonagh, Secretary, New Zealand Short-wave Club, 4 Queen Street, Wellington, E.I.—Kia ora, everybody. yours fraternally, MAC.

Catalogues Reviewed

MCCARTHY'S Radio Catalogue, together with its supplementary issue, has just arrived. These booklets illustrate, in an attractive manner, radio sets and parts, electric novelties, and tools, showing throughout the remarkable range and quality of their stock. Catalogues are obtainable from A. and W. McCarthy, Stuart Street, Dunedin, and Dee Street, Invercargill.



A CONSISTENT PERFORMER

Note the Mica Bridge

Cossor Valves for Both A.C. and Battery Receivers are noted for their consistently high standard of performance and exceptionally long life.

Fitted with Cossor Mica Bridge — an original development in valve construction introduced by the Cossor research laboratories—each electrode remains firmly anchored in its correct position and cannot be disturbed even by a hard knock. This feature ensures tremendous strength and uniformity during the life of the valve.

There is a Cossor valve for every holder in your set. From all radio dealers.

Now At Greatly Reduced Prices

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ALL BRITISH VALVES

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Operated by experts who buy highest quality goods to suit New Zealand conditions—at prices that leave nothing to be desired—can bring these super-value sets and parts to you.

Lamp House value means something solid—in smaller initial outlay, expert advice and freedom from faults in operation, because quality is here!

The Amazing "Super Seven"

- 1—Kriesler Foundation Kit, comprising Coils, Variable Condensers, Padders, Coil Shields and Knobs—L1, L2, L3, L4, L5, G1, 2, 3 (ganged) P.C., Cat. No. 52R1321 Kit £4/17/6
- 1—Aluminium Chassis, 16 x 11½ x 2, s. d. Cat. No. 52 x 1 each 8 6
- R1—10,000 ohms Potentiometers (W.W.) Cat. No. 52P1235 each 5 6
- R2—10,000 ohms 1 Watt Resistor, Cat. No. 52 x 2 each 1 6
- R3—100,000 ohms 1 Watt Resistor, Cat. No. 52 x 3 each 1 6
- R4—200 ohm 1 Watt Resistor, Cat. No. 52 x 4 each 1 6
- R5—15,000 ohm, Voltage Divider, Cat. No. 52R327 each 6 0
- R6—25,000 ohms, 1 Watt Resistor, Cat. No. 52 x 5 each 1 6
- R8—250,000 ohms 1 Watt Resistor, Cat. No. 52 x 6 each 1 6
- R9—2 Megohms Grid Leaks, Cat. No. 52G172 each 1 3
- R10—20 ohms C.T. Resistor, Cat. No. 52R179 each 1 3
- R11—400 ohms Heavy Duty Resistor, Cat. No. 52 x 7 each 3 0
- R12—¼ Megohm 1 Watt Resistor (optional), Cat. No. 52 x 8 each 1 6
- R7—Tone Control (optional), 10,000 ohms Potentiometer, Cat. No. 52P1235 each 5 6
- 1 Condenser, Cat. No. 52CW82 each 2 8
- Six Condensers .25 M.F.D. (C1—4, C8, C10) Cat. No. 52 x 9 each 1/9
- C5—.02 Fixed Condensers, Cat. No. 52C1146 each 1 6
- C6—.00025 Fixed Condensers, Cat. No. 52 x 10 each 1 0
- C7—.001 Fixed Condensers, Cat. No. 52C249 each 1 3
- 6—UY Wafer Sockets, Cat. No. 52S1258 each 0 7½
- 1—UX Wafer Sockets, Cat. No. 52S1257 each 0 7½
- 2 Dozen Bolts and Nuts, necessary wire and solder lugs Lot 2 3
- 3 Insulated Bushes, Cat. No. 52 x 11 each 0 3
- Power Flex, 6 feet, Cat. No. 52 x 12 lot 1 6
- 2 Terminals, insulated top, Cat. No. 52 x T65 each 0 4
- 1 Telsen Disc Drive Dial, Cat. No. 52DW184 each 1 9
- 5 Valve Shields, Cat. No. 52S1265 each 1 6
- Valves—1, 280 Philips, Radiotron or Osram 10 0
1. 227 Philips, Radiotron or Osram 10 0
2. 224A Philips, Radiotron or Osram each 13 0
2. 235 Philips, Radiotron or Osram each 13 0
1. 247 Philips, Radiotron or Osram 13 6
- 1—9-inch Cone Dynamic Speaker, "Jubilee" 2500 ohms field to suit 247 output valves, Cat. No. 52S1090 each 37 6
- 1 Power Transformer, Cat. No. 52 x 13 ea. 35 0
- 2 8 M.F.D. Electrolytic Condensers, Cat. No. 52C1086 each 5 9
- SPECIAL OFFER—Complete Kit of Parts for the Seven-Valve Super, including Valves & Jubilee De Luxe Speaker Cat. No. 52 x 14 the kit £14/10/-**

PARTS TO For This M

Only the Lamp House can offer low prices for these sets. I parts required, and every part selected and approved for the purpose.

Only the Best is Good Enough for the Vitals of Your Set!

We buy the best—sell it in tip-top condition and always stand behind our dealings with you. Your satisfaction is our constant, and high aim!

Oxford Transformer

These Transformers are made especially for us, and we would appreciate the opportunity of quoting you for your Transformer.



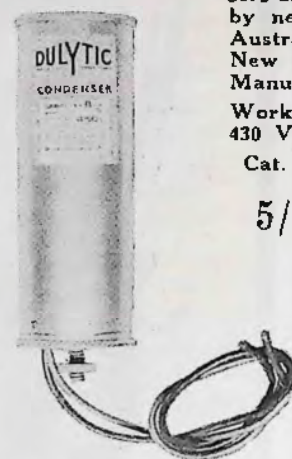
Dulytic Electrolytic Condenser

These 8Mfd. Electrolytic Condensers are being used by nearly all the Australian and New Zealand set Manufacturers.

Working Voltage, 430 Volts.

Cat. No. 52C1086.

5/9 each



The Electric Lamp

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For such good quality parts at
remember, we have got all the
t: listed has been carefully se-
rticular circuit mentioned.



Jubilee De Luxe Speaker

Specified for the "Super Seven," "The
Modern Five," "The Kriesler Mechanised
Five," and many other sets.

Jubilee Speakers can be safely used with
all modern A.C. Sets. 52S1090.

37/6 each

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Lamp House buying permits you to return any part on the
slightest hint of fault within 7 days and get your money back.
You select knowing that you get a 'fair deal.'

GUARANTEE: We guarantee to refund your money in full
should any good be in any way unsuitable and are returned
within seven days.

'Outspan 1932'

Leads the Field

	s.	d.
1—Base, Cat. No. 52 x 28	1	0
6—Sockets, Wafer Type, U.X. Cat. No. 52S1257	each	0 7½
1—Socket, Wafer Type, U.Y., Cat. No. 521258	each	0 7½
1—3 Gang Condenser, Cat. No. 52C1252	ea.	28 6
1—Telsen Disc Drive Dial, Cat. No. 52DW184	each	6 9
3—R.F. Chokes Telsen, Cat. No. 52CW75	each	3 0
2—1000 Spaghetti Resistance Telsen, Cat. No. 52R807	each	0 9
1—10,000 Spaghetti Resistance Telsen, Cat. No. 52R811	each	1 6
1—5,000 Spaghetti Resistance Telsen, Cat. No. 52R809	each	1 3
1—50,000 Spaghetti Resistance Telsen, Cat. No. 52R815	each	2 3
1—2 Meg. Resistor, Cat. No. 52G172	each	1 3
1—5 Meg. Resistor, Cat. No. 52R197	each	1 6
1—100,000 ohm Resistor, Cat. No. 52R194	ea	1 6
1—15 ohm Rheostat, Cat. No. 52X29	each	3 0
1—400 ohm Potentiometers, Cat. No. 52P587	3	6
2—2 M.F.D. Condensers, Cat. No. 52X30	ea	3 3
2—1 M.F.D. Condensers, Cat. No. 52 x 31	ea	2 3
4—25 M.F.D. Condensers, Cat. No. 52 x 9	each	1 9
2—001 Condensers, Cat. No. 52CW96	each	0 9
1—002 Condensers, Cat. No. 52CW92	ea	0 9
1—500 ohm Resistor, Cat. No. 52 x 40	each	1 3
1—0002 Differential Condensers (Ormond) Cat. No. 42C300	each	5 3
1—01 Fixed Condenser, Cat. No. 52 x 41	1	6
1—Switch (Ormond), Cat. No. 52S961	each	1 6
1—0001 Grid Condensers, Cat. No. 52CW91	0	9
1—Battery Cable, 4 Wire, Cat. No. 52 x 32	2	6
Wire, Nuts and Bolts	lot	2 0
3 Coil Shields, Cat. No. 52S1266	each	1 6
3 Valve Shields, Cat. No. 52S1265	each	1 6
Aerial and Earth Terminals, Cat. No. 52T65	each	0 4
1 Panel, Cat. No. 52 x 35	each	3 6
1 Set Coils, as specified, Cat. No. 52 x 33	set	11 6
3 Screen Grid Valves (Osram Philips or Mullard)	each	22 0
1 Pentode Valve (Osram, Philips or Mullard)	each	20 0

SPECIAL OFFER—Complete Kit of Parts
for "1932 Outspan," including Philips
Valves, Cat. No. 52 x 34 kit £9/10/-
Without Valves, Cat. No. 52 x 35 kit £5/17/6

"Modern Five"

A Wonder Set

Punched Panel, 15 x 10 x 2½, punched as indicated in diagram, Cat. No. 52 x 15	each	9 6
Triple Gang .0005 Condenser, with trimmers, Cat. No. 52C1252	each	28 6
Vernier Dials Ormond Dual Indicator, Cat. No. 52D597	each	6 6
3 Special Coils, Cat. No. 52 x 16	set	10 6
3 Coil Shields, Cat. No. 42S1266	each	1 6
3 Valve Shields for the New Six-Pin Valves, Cat. No. 52 x 17	each	1 6
Power Transformer, Cat. No. 52 x 18	each	35 0
2—8 M.F.D. 400 Volt D.C. Working Electrolytic Condensers, Cat. No. 52C1086	each	5 9
2—6 Pin Sub-baseboard Mounting Sockets Cat. No. 52S1259	each	0 7½
1—5 Pin Sub-baseboard Mounting Sockets Cat. No. 52S1258	each	0 7½
2—4 Pin Sub-baseboard Mounting Sockets Cat. No. 52S1257	each	0 7½
1—200 ohm Resistance, Cat. No. 52 x 4	ea.	1 6
1—30,000 ohm Resistance, Cat. No. 52 x 19	1	6
2—100,000 ohm Resistance, Cat. No. 52 x 3	each	1 6
1—15,000 ohm Resistance, Cat. No. 52 x 20	1	6
1—25 megohms Resistance, Cat. No. 52 x 8	1	6
1—5 megohms Resistance, Cat. No. 52 x 21	1	6
1—25,000 ohm Resistance, Cat. No. 52 x 5	1	6
1—8,000 ohm Resistance, Cat. No. 52 x 22	1	6
1—10,000 ohm Tone Control Potentiometer Cat. No. 52P1235	each	5 6
1—15,000 ohm Bias Control Potentiometer Cat. No. 52P1234	each	5 5
5—25 M.F.D. Condensers, Cat. No. 52 x 9	each	1 9
1—1 M.F.D. Condensers, Cat. No. 52 x 24	1	9
1—01 M.F.D. Condensers, Cat. No. 52 x 25	1	9
2—2 M.F.D. Condensers, Cat. No. 52C1173	each	3 3
2—Insulated Terminals, Cat. No. 52T65	each	0 4
2 Bushings to conduct power flex through shield, Cat. No. 52 x 11	each	0 3
1—20 ohm C.T. Resistance, Cat. No. 52R179	2	3
Roll of Gazite, Cat. No. 52W72	per coil	0 6
1 Yard of twisted Flex, to carry 2 Amps Cat. No. 52 x 26	lot	0 3
Nuts and Bolts	lot	1 6
Valves: 2—58 Philips or Radiotron	each	16 6
1—57 Philips or Radiotron	each	16 6
1—247 Philips or Radiotron	each	13 6
1—280 Philips or Radiotron	each	19 0
1 "Jubilee" De Luxe Moving Coil Speaker, Cat. No. 52S1090	each	37 6

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or Radiotron Valves and "Jubilee" De
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Using the Soldering Iron

Some Practical Advice by "Handyman"

AN endless amount of expense can be saved in a household by an elementary knowledge of the art of soldering. To many, soldering sounds too much like skilled mechanics to worry about. But, believe me, soldering is so simple if one is equipped with modern tools that it is surprising that more use is not made in the household of this particularly useful pastime.

Soldering, of course, is the uniting together of two pieces of metal. Broken kitchen utensils, pots and pans, electric wire for bell circuits or wireless use, model making, lighting and starting equipment for motor-cars are just a few of the many jobs which an amateur solderer can do with a slight knowledge.

You want to know first of all which metals can be soldered and which cannot. Metals that can be soldered are copper, bronze, zinc, tinplate and most other common metals, but not pewter, aluminium or cast or wrought iron.

The whole secret of the art of good soldering is cleanliness. And in order to obtain the cleanest form of heat you must find the cleanest heating agent. This rules out coal fires and gas and introduces electricity. Electricity is clean and, what is also important, the heat is constant and the temperature does not vary.

A word about solder. Solder is an alloy of lead and tin, and can be bought by weight.

In addition to solder a flux is required in order to assist in the fusion of the solder to the metal surfaces. The flux also forms a film covering the heated metal surfaces, without which a layer of oxide would form, due to the fact that the heated metal readily combines with the oxygen in the air, which would be sufficient to cause failure.

You can obtain what is called resin cored solder from most electrical shops: this is a combination of resin flux and solder, and is ideal for domestic use. Resin cored solder consists of a tube of lead alloy with a resin filling which melts out when the solder is heated and acts as a flux.

The handiness of this form of solder simplifies operations considerably.

An electric soldering iron may be obtained at most electrical stores. In choosing one you should be guided by the amount of current it will consume, how long it takes to heat up, and whether it can be used on the voltage of your electricity supply system.

A type to be recommended is one which consumes about the same current as an average lamp, say 60 watts, and which can be plugged into a lamp-holder: this will give you fifteen hours' use for the price of one unit of electricity. Such an iron should heat up in about four to five minutes.

As I have said before, the best results are obtained by cleanliness.

Carefully clean each metal part along the edge and on the surface where contact is required. This can be done either by filing with a fine file or scraping with a knife, care being taken not to touch the metal surfaces with the fingers, or to lay metal parts on a bench with the prepared surfaces in contact with the bench.

Next comes the important process of tinning, if the metal parts are not already tinned. This is done by placing the hot iron on the metal so that the metal becomes hot. If resin-cored solder is used press this lightly against the lower end of the bit of the iron. This will cause the flux to flow over the surface of the metal, to be followed by the molten solder.

Do not use too much solder. It is a good plan to take a perfectly clean rag and quickly wipe the surface whilst the solder is still hot, cleaning away all surplus metal which is liable to leave an uneven surface. After tinning, lay the iron along the joint lightly avoiding unnecessary pressure. The solder is again pressed against the end of the bit, and the bit is so held in position that the solder runs from the edge on the joint. Allow the solder time to set, and the job is done. After you have switched off the current don't forget to wipe the iron with a clean rag. It will then be ready for the next job.

WHERE it is difficult to erect an efficient outdoor aerial, and particularly in cases where dx reception is not an essential requirement, it will be found that the wiring of a battery-operated electric bell system often makes a surprisingly good aerial. Make this connection through a small semi-variable condenser between the nearest point on the wiring (generally a bell-push) and the aerial terminal.

* * * * *

AN excellent axiom to remember when endeavouring to track down a fault in a receiver is that the grid circuit of every valve, a.c. or d.c., and irrespective of its use in a set, must be completed to its cathode or filament through a path conducted to d.c. current. It is not enough that the circuit should be completed through a condenser. Unless a parallel leakage path is provided a charge will accumulate on the condenser and the circuit will become choked and practically inoperative. Hence, when searching for faults, unless continuity is shown, between grid and cathode terminals of the valve holder, it can be assumed quite definitely that something is wrong with the circuit.

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The "Link Three"

Part 2: The Power Pack

By "Megohm"

IF the constructor desires to build his own power-pack and incorporate it in the receiver, the aluminium chassis must be extended at the back to a total depth of not less than 14 inches. This allows a strip 4 inches wide across the back to accommodate the transformer and two chokes, the smoothing condensers being placed under the chassis, held in place by seccotine. There is room for the 280 full-wave rectifier at the back of the condenser tank, as shown by a dotted circle in the complete plan.

The alternating current traverses the transformer, primary winding, giving

a step-up or down in the voltage produced by other windings, and this induced voltage depends upon the number of turns of wire comprising any particular secondary winding. Thus to produce a high voltage there must be hundreds or thousands of turns of wire, while a few volts will be produced with perhaps 30 turns or less. If a secondary winding is provided with the same number of turns as the primary, plus a small percentage for conversion losses, the voltage given will be equal to that of the primary, and there will be no step-up or down.

The cross-sectional area of the stallo core determines the number of turns required to produce each volt in a secondary winding. This is known as the "turns per volt," and is obtained by dividing the mains voltage (usually 230) into the number of turns on the primary winding. If the number comes out at say 10, then 100 turns will produce 10 volts, and so on, but at least five per cent. must be added for losses, and more again if the current to be drawn is heavy in proportion to the gauge of the wire used, as in filament windings.

This brief outline of the effect of the turns of wire on a power transformer is given for the benefit of those who are not familiar with the subject, and they may also be referred to the "Listeners' Guide," which gives a large amount of information on these matters.

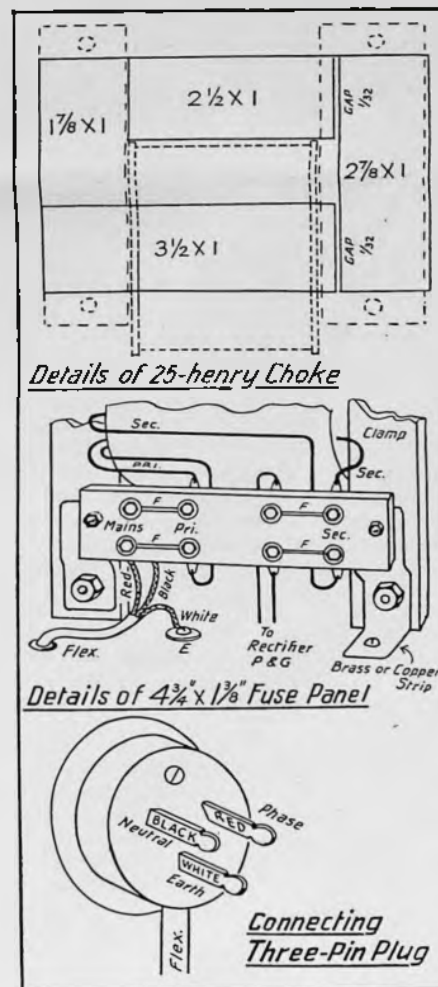
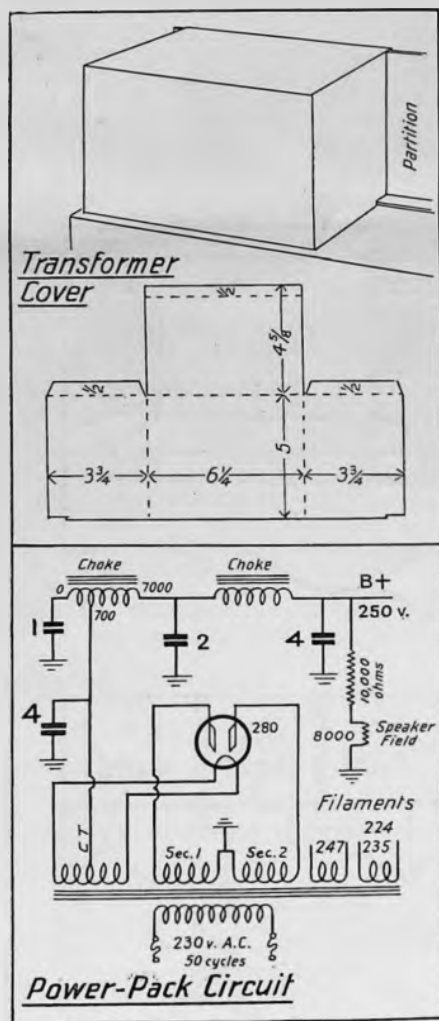
The power-pack as described is well suited to supply any short-wave or broadcast receiver with high-tension current up to 70 or 80 m.a., or up to 100 m.a., with consequent voltage drop, which could be compensated for by extra secondary turns. The final smoothing condenser should then be 8 mfd., and for more than four valves an additional filament winding would be advisable, and on account of extra bulk the stallo should be cut to fit after winding.

For a power-pack quite separate from the receiver, the chassis should be 12 by 5, which would allow room for the 280 against one end of the transformer, about two inches away from its position behind the condensers.

With a separate power-pack the filament leads must be kept of low resistance, or the voltage will drop. For more than two valves it is a good plan to use "twin" flex as a single wire, so that the resistance is halved.

Current from the a.c. mains enters by cab-tire flex, which must not exceed 10 feet in length, and should have three conductors if there is a three-pin point for the supply. In such case the white-covered wire is connected to the chassis, and the other two to the fuse panel on the transformer. Holes are made near the corner of the chassis and provided with ebonite bushes; the object of these holes is to prevent undue tension being placed upon the fuse panel by a pull of the flex.

An aluminium partition is placed across the chassis four inches from the back, and is made from a 12 by 3 in. piece, with a half-inch flange for fixing, leaving the height at 5 inches.



The Power Transformer.

A TRANSFORMER with good "regulation," that is, capable of giving 60 or 70 m.a. without appreciable drop in the high voltage, is necessary if a dynamic speaker field is to be run by a "bleed" current of 10 to 15 m.a. The labour is practically the same, and the cost very little extra to construct a transformer and chokes well up to their work, and capable of running a larger receiver.

The stallo for the transformer is $1\frac{1}{2}$ in. wide, built to full $1\frac{1}{2}$ thick. Two sizes are to be cut, $4\frac{1}{2}$ in. and 2 in. respectively, a pile $2\frac{1}{2}$ in. high of each, or 160 pieces each size. Shellac these after cutting. The spool ends are $2\frac{1}{2}$ in. square, with "tunnel" a good $1\frac{1}{2}$ square, and length $3\frac{1}{2}$ in. outside. The centre of the spool may be several turns of manilla paper, the ends being slipped over and secured with secotine liberally applied on the inside corner, after which three layers of empire cloth are put on. Strips of thin brown or other paper are then cut the width of inside of spool, about a dozen pieces 7 inches long, one to go between each primary layer.

Next is the primary winding of 1150 turns of 26 s.w.g. enamelled wire, averaging 146 turns per layer, so there will be eight layers, over which is a layer of paper, two empire, another paper, and then follows the high voltage secondary.

One method is to put on 3040 turns in a continuous layer winding, with a tap at the 1520th turn. A better method is to put the two portions of the secondary on in two half-width sections, with paper strips barely $1\frac{1}{2}$ in. wide, so that $\frac{1}{2}$ in. space is left in the centre, with 1520 turns in each section. Wind one section complete, then turn the spindle around in the jig so that the right-hand end is now the left, and proceed to wind exactly as for the first section. The beginning of each connects to the fuse panel, and the end of each is connected to an earthing wire attached to the chassis. Cover the windings with insulation. This will give 250 volts smoothed and rectified.

Filament windings are now put on, using 18 enamelled or d.c.c. wire. For the 280 rectifier filament, 5 volts, 29 turns, with a centre-tap at the 15th turn. Thin but well insulated wire, as this carries the high voltage supply to the chokes.

For the 247, 14 turns are required, and for the 224 and 235 also 14 turns, but so that another two valves may be added without altering the transformer, it is recommended that two 18 wires be wound on together, joined at both ends to act as one, or alternatively, 14 turns of single 18 wire may be used, so that in either case up to about 10 amps. may be drawn. For a 14-volt heater 22 turns would be correct. A final evening for the windings is a layer of black adhesive tape.

Clamps for the transformer are of $\frac{1}{2}$ in. iron strip $1\frac{1}{2}$ wide, four pieces cut $4\frac{1}{2}$ long and drilled at each end, centre of $\frac{1}{2}$ in. holes $3\frac{1}{2}$ apart. Iron carriage bolts 2 in. long may be used for clamping, four being required.

Be sure to place a strip of thin card between each clamp and the core, so that there is no metallic contact, and keep the clamping screws from touching the core. Earth the core by stuffing a wad of tin foil (tape covering) between one of the clamping screws and the core, with a copper wire embedded in the foil and connected to the chassis; this must only be done at one point.

The Fuse Panel.

A FUSE-PANEL as illustrated must be placed on the transformer. Fuses are made of the previously-mentioned tin foil, cut 1-8 in. wide for the mains and 1-16 in. for the high voltage, as a protection to the windings. A solder-tag is slipped under the head of each bolt, except the two at the left-hand end, and a washer is placed on each bolt to hold the ends of the fuses.

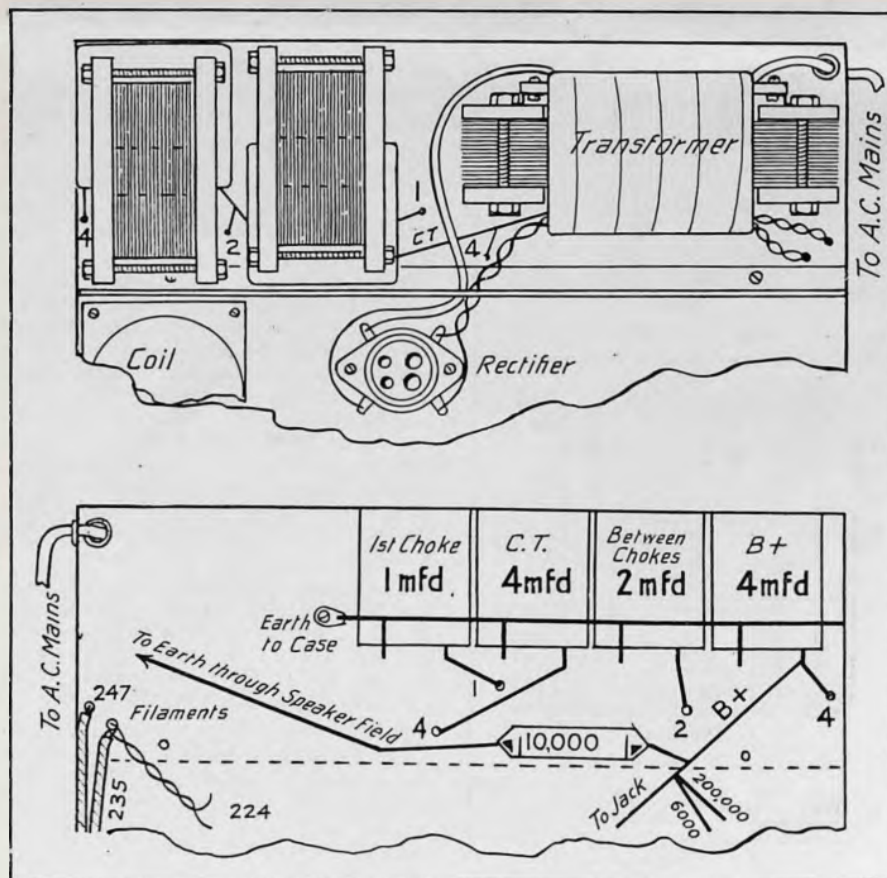
The flex from the mains is secured to the bolts by twisting round under a washer, as it is inadvisable to solder flex carrying the main supply. The ebonite panel is held in place by being bolted at each end to a strip of copper held under the clamping nut, and

extended downward and drilled for bolting to the chassis.

The regulations stipulate that a power transformer shall be enclosed in a metal case, and a simple means of providing this is illustrated; the cover is also an advantage from the fact that it isolates the magnetic field of the transformer. The cover can be cut as shown from a piece of 26 copper sheet measuring $13\frac{1}{2}$ x 9 $5\frac{1}{8}$ inches, bent at right-angles on the dotted lines. One-eighth inch is allowed to clear the thickness of the partition, and about $\frac{1}{4}$ in. is bent down to hook over the partition, thus holding the cover in place. Make the cover to fit your chassis, rather than follow exactly the dimensions given.

The Smoothing Chokes.

ONE-INCH stallo is used for the cores, and need not be treated with shellac. Two identical chokes are required, except that one of them has a "10 per cent. tap" at 700 turns from one end of the 7000 turns of 32 enameled wire. The spool is $2\frac{1}{2}$ in. long outside, with ends 2 $3\frac{1}{8}$ in. square, with "tunnel" a good inch square. Put on two layers of empire cloth before running in the turns without layering, but avoiding too much crossing, as it wastes room. It is wise to use heavier wire for the lead-outs, also covering with spaghetti. Cover the turns with adhesive tape.



These chokes will have a d.c. resistance of 367 ohms each, and an inductance of 25 henrys at reasonable load. With 30 m.a. passing 11 volts will be dropped, and with 50 m.a. 18 volts each.

The clamps may be of wood, 3-8in. thick, one inch wide at one end, and 1 1/4in. at the gap end; the length will be 3 1/2in. minimum, drilled 3-16in. for threaded brass rod.

The stalloys are laid with the joints brick-wise on three parts, but the end section outside the gaps is one pile on 2 7-8in. long. A piece of card 1-3/2in. thick is put in to form the "gap." Of the four sizes of stalloys a one-inch pile of each is required, cut from 20 3ft. lengths. A pile of each 2in. high for two chokes.

Earth the cores as specified for the transformer.

Change of Connections.

FEW alterations from the under-chassis diagrams will be required, but all filaments will now be supplied from the power-pack direct, thus dispensing with the inlet sockets. The two balances may be placed across the 247 and 224 filaments respectively.

The B+ wire may now run direct from the 4 mfd. condenser to the jack or output transformer primary, and branch on the way to the necessary connection, whilst the 235 screen connection may now be made to the jack.

One of the electrolytic 8 mfd. condensers may replace the 4 mfd. shown in the B+ position, 4 mfd. being the minimum permissible in this position, whilst 4 mfd. is the maximum permissible after the rectifier, and should therefore not be exceeded.

If an output transformer is not used, points A and B shown in the theoretical diagram are connected to the jack instead of to the primary as shown.

Loud Speakers.

AS already mentioned, an output transformer must be provided if one is not incorporated in the speaker.

A popular speaker at the present time is the 5 1/2in. dynamic with a field winding of 8000 ohms resistance. If one end of this field coil is connected to B+ 250 volts with a wire-wound resistance in series, and the other end of the field to earth, less than 14 m.a. will be drawn, and the speaker will give high-grade reproduction.

The power-pack circuit includes this connection, which may be left out if not required. With a lower voltage, less current will pass through the speaker field unless the 10,000 ohm resistance is reduced.

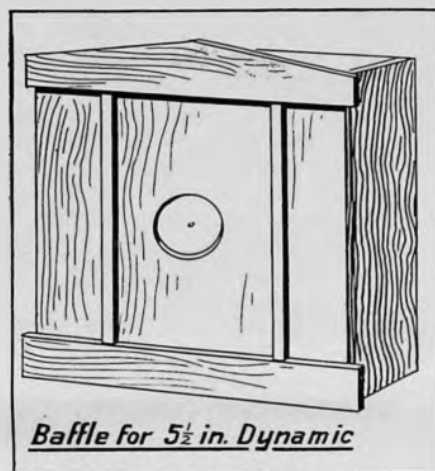
This type of speaker requires a suitable baffle to do it justice, and therefore one was designed to suit. With this baffle local reception leaves little to be desired in the way of quality, when the foregoing receiver is used with it. Deep notes are well amplified, and give the necessary body to the music.

Made of one-inch O.B. rimu, the sizes should be adhered to, but many amateur cabinetmakers will doubtless improve on the exterior embellishments.

The laboratory model was put together with 2in. wire nails, but the strips of 3-8 timber across top and bottom are held away from the body of the speaker by small squares of felt, so that there is no chance of rattle. The two upright strips are 1x3-8in., and are nailed on with squares of felt where nailed. Their purpose is to cover joints. All joints are closed with strips of brown paper pasted inside the baffle.

The one-inch dressed timber for the box portion consists of two pieces 27x5 1/2in. for the sides and two 25 1/4x5 1/2in. for the top and bottom. The filling-in for the front is obvious, the same timber being used. The front could be made of heavy 3-ply if stiffened with transverse strips at the back, above and below the unit.

The central hole is 5 1/2in. diameter. Shellac or stain makes a good finish.



Coils for the Link 3

J.E.M. (Auckland): Your proposed alteration of the "Link Three" should be quite satisfactory for short-wave operation. Of course, we have not tried this hook-up and cannot guarantee results. You understand it would not be as good as a circuit specially designed for all-wave use, but it should nevertheless give you good results. The following are the coil particulars for the "Link Three":—

Band Pass Coils.

Former 1 1/4in. 30 gauge enamelled wire. Secondaries, each 80 turns, close wound. Number 1 coil is tapped at 45 from the top. This is the aerial connection. The link coil comprises 15 turns wound on the same former 1/4in. from the bottom. It is in series with 15 turns bunch wound, separated by about 1-8in.

Detector Coil.

Former 1 1/4in. 30 gauge enamelled wire. Secondary 80 turns. Reaction 15 turns spaced as for the link coil in series with 20 turns bunch wound. Primary 36 turns jumble wound, 36-40 gauge enamelled wire, to fit inside the secondary in line with the bottom turn. It is brought out either to fixtures marked primary or to flexible leads about 3in. long.

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The RADIO TRADERS' DIGEST

(Supplement to the N. Z. RADIO TIMES)

Up to the present, the servicing angle of the radio trade has been neglected, many firms looking upon servicing as a necessary evil—more evil than necessary. In older-established countries, servicing has been looked upon as a very necessary and profitable channel for the dealer. Following up one's sales not only provides a continuous avenue of income, but it also leaves your customer satisfied, and this should be the primary aim of every dealer. But servicing—good servicing—needs the employment of men who are more than glorified amateurs. The serviceman needs first, a knowledge of fundamentals; second, ability to apply this knowledge to the problems with which he will be confronted; third, speed and tact. That servicing in New Zealand is beginning to be recognised is indicated by the tendency for servicemen to band together for their mutual benefit. In three of the centres are to be found (or will shortly be found) such groups of servicemen. The fact that at a recent meeting in Wellington nearly 100 persons professionally engaged in radio, or deeply interested in the science, attended a lecture on a technical subject, indicates the necessity for co-operation. Never before have we known such a big radio attendance at a lecture on technicalities.

* * * * *

In Auckland, interest centres about another organisation for radio servicemen, while in Christchurch a branch of the New Zealand Radio Institute will shortly be formed, and it is certain that these organisations will do a great deal to establish radio servicing on the footing that it should be. It behoves dealers to recognise competent servicemen, not as necessary hangers-on, but as men who are capable of building and maintaining their businesses. Every worthwhile selling organisation should

have behind it a competent service department for the purpose, as the Americans would say, "of keeping the set sold."

* * * * *

THE new season's trend in British radio was illustrated at the National Radio Exhibition at Olympia, London. Sensitivity and selectivity have been strikingly improved, while self-contained table apparatus and pedestal sets are now universal, and generally embody dynamic speakers. Superhets, at really competitive figures are included in the majority of leading firm's programmes, and what is probably more important, prices are, on the average, 20 per cent. below last year's figures.

"Above all this there is one strikingly important factor from the overseas buyer's point of view. For the first time since broadcasting began, the home industry is likely to produce a quantity of merchandise closely approaching the potential requirements of the market. Of more effect in retarding the growth of Britain's radio trade export business than possibly anything else has been the inability of the industry to meet the enormous peak demands of the home public, in spite of the rapid expansion and courageous sinking of both earned profits and fresh capital into new factories and plant every year. In 1931 the market could have absorbed nearly 1,750,000 sets, and the production fell short of that by roughly half a million. This year the demand will be nearer two millions. But still better preparations to meet it have been made by every producing unit. Supplies will be more liquid and capital and stock will be turned over more rapidly, and in consequence there will be a greater quantity of material available with less delay to consumers in markets other than our own.

"British makers are devoting more care and attention to the prob-

lems of overseas marketing than ever before. They are certainly moving fairly slowly, but they realise the value of steady and sure progress in this direction of consolidating goodwill as they go along.

"They are confident that their overseas friends will find an increased measure of advantage in watching still more closely the British industries progress."

Such is the prospect of the British industry as outlined in the "Wireless Export Gramophone and Radio Trader." All those who are associated with the trade know the limitations of the British article, and of British methods. Whether or not the British will be able to rise above the competition at home, Australia, and in America, is another problem. They will need not only a revision in the technique of their manufacture, but they will also need to improve immensely their marketing methods. It seems that if the British set is to make a place on the New Zealand market, very big alterations will have to be effected.

* * * * *

WHILE the depression to a large extent is making radio more popular in that people cannot afford the more expensive types of amusement, it is forcing the price of radios and radio components down to the limit. A short time ago there was a substantial margin of profit and the dealer could afford to throw in an aerial and perhaps replace a valve or two should they go out in a few months. But now conditions are different. There is not the margin of profit that there was, and it is very hard indeed to convince a customer who has laid out £20 or £30 on a set that, when the valves burn out in a month or two he must replace them at his own cost. But it must be done if the dealer is to remain in the trade. The days of free valve replacement and free servicing are past.

Radio Regulations

Further Interpretations

Q.: Are all interpretations issued prior to June last regarding radio cancelled?

A.: No, only those which may conflict with the new regulations.

Q.: Is it the intention to make the new issue of regulations retrospective?

A.: See Regulations 4, 5, and 6.

Q.: Where fuses are incorporated in radio sets are these to be eliminated?

A.: No, see also rulings in Interpretation Circulars No. 35, page 7, and No. 38, page 2.

Q.: Are radio sets permitted to be fed from lighting sockets irrespective of existing loading conditions?

A.: No, the loading must comply with Electrical Wiring Regulation 71.

Regulation 3.

Q.: Is it necessary to earth the frames of battery chargers and eliminators in all cases, and is the earth used for radio reception purposes considered to be suitable for this purpose?

A.: For earthing, see Electrical Wiring Regulation 252 (n) and (o). For dual use of radio reception earth see Interpretation Circular No. 29, dated 17/6/30.

Regulations 8 and 13.

Q.: Regulations 8 and 13 appear to be contradictory in view of the definition of "connected."

A.: These are not contradictory, but complementary, and mean that a double-wound transformer on the set may be supplied through an auto-transformer.

Regulation 15.

Q.: Do the regulations permit the use of a voltage reducing resistor in the primary circuit of electric radio sets?

A.: Yes.

Regulation 16.

Q.: What is the position where a 230/110 volts double-wound transformer is used external to the set, the primary side being connected to the supply by means of a polarised plug and socket and the connection between the transformer and the set being made also by means of a polarised plug and socket? In this case, according to Regulation 16, the switch may still be left on the set and yet the radio set may be switched off by means of the switch on the set, and the transformer be left alive all the time.

A.: This does not conflict with the regulations, and appears to be no different from a bell-ringing transformer which is in circuit all the time.

Regulations 16 and 17.

Q.: Are supply authorities expected to dismantle radio sets to ascertain whether the switch on the set is located in the live conductor?

A.: The method of locating the position of the switch is left to the discretion of the supply authority.

Q.: It appears that where radio sets are fed from bayonet lampholders the switch on the set is to be dismantled or short-circuited. Is it the intention to apply these conditions to vacuum cleaners, portable standard lamps, etc.?

A.: No, the regulation applies to radio sets only.

Regulation 19.

Q.: Are twin-twisted flexible cords permitted for connecting radio sets to the supply?

A.: Yes, provided they otherwise comply with the regulations. See circular letter dated 3/12/31 entitled "Flexible Cords for All-Electric Radio Sets."

Q.: Is there any regulation to prevent flexible cords being taken through doorways, walls, ceilings, etc., to supply radio sets (or any other appliance) situated in a different room from where the supply is taken?

A.: See reply to question on Regulation 117 in Interpretation Circular No. 51.

Q.: In circular letter 26/218/10 of September 28, 1931, dispensation was given for the use of flexible cords coloured other than red and black until existing stocks are exhausted.

Radio Regulation 19 (1) now calls for red and black flexible cords, and Regulations 4, 5, and 6 make 19 retrospective. Does this mean that after having required a great number of consumers to have their flexibles changed from twisted to composite, which in the majority of cases was coloured other than red and black, it is now necessary to compel them to change once more to flexibles coloured red and black in accordance with the regulations?

If such non-regulation, flexible cords need not be changed on sets installed prior to the Radio Wiring Regulations coming into force, will it be in order to allow composite flexible cords to remain on old sets, whereas in many cases it is not coloured at all, or only by means of tracers?

A.: The dispensation was given to use up any existing stocks of the flexible cords listed in the circular letter, and there is no need to have them altered while they remain in good condition.

Regulation 21.

Q.: Does a porcelain connector now comply with this requirement?

A.: No. The couplings and connectors referred to are those of the plug and socket type.

Regulation 22.

Q.: Will it comply with the regulations if a radio set is supplied by means of a flexible cord connected to an existing ceiling rose. The cord being taken through the cover of the ceiling rose and attached to the ceiling by means of insulated screw hooks and terminating in a non-reversible socket into which the flexible cord from the set is plugged?

A.: Yes, provided not more than two flexible cords are taken from an ordinary ceiling rose, but the use of a wall socket is preferable.

Q.: Are persons who are not registered wiremen or engineers or persons who hold a special license to install and service radio sets allowed to wind their own power transformers and other electrical apparatus appertaining to mains-operated radio sets?

A.: Yes, but the apparatus must comply with the Electrical Wiring Regulations and the Radio Wiring Regulations.

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Official Organ of the New Zealand Radio Institute

ALLAN WEBSTER, President.

CHAS. RUSCOE, Vice-President.

COLIN W. SMITH, B.A.,

Secretary, Box 1134, Wellington.

DURING the past month the Radio Institute has been very much alive, with the result that, at the last meeting, approximately 40 members and associates were elected. The movement has grown so strong that it is very likely a branch will be started in Christchurch within the next month.

The monthly meeting was held on Thursday, September 29, in Messrs. Nimmo's Concert Hall, Wellington and the attendance was larger than any yet, there being present almost 100 members, associates, and other technicians not associated with the Institute.

The secretary, in his report, stated that during the month he had been in Auckland, Christchurch and Dunedin, and in each centre had seen some of those directly connected with the Institute and others interested. He was pleased to be able to report that considerable interest in these centres was being shown in the Institute, particularly in Christchurch, where the movement was very strong.

The technical committee met early in the month to consider the recommendation of the last meeting that a handbook on the regulations be printed. On consultation with the secretary of the Electrical Federation it was decided that, as the regulations may at some not very far distant date be overhauled, and also, as the publication of interpretations would involve a tremendous amount of specialised work, it would not be practicable to go ahead with the publication of a book.

The committee met again on August 28 to consider the applications for membership, and their recommendations were placed before the meeting on the 29th. The committee also considered two suggestions which had come forward. One was from Mr. E. W. Barringer, of Palmerston North, drawing attention to the fact that a good many amateurs were making power transformers which were a real danger, and suggesting that the Institute should take up the question of having these adequately tested before being allowed to go on the mains, or that they should be made or certified by certificated men. The technical committee, while agreeing that the suggestion had weight, thought it would be politic to hold over such action until the Institute was stronger. The question would be held over for the time being, to come up again later on.

A further suggestion from Mr. S. Heghinbotham, of Waverley, was that circumspect advertising in a Dominion-wide weekly, to let the radio public

know that the Institute stands for more efficient service, should be also considered. The committee agreed that the suggestion was a good one, and decided that action along the lines suggested by Mr. Heghinbotham be taken in the near future.

The routine work at the general meeting occupied only a few minutes and consisted mainly in the moving of a notice of motion that at the next general meeting a motion to the effect that "there shall be a vice-president in each of those centres where there are sufficient members to form a branch of the Institute, such vice-presidents to be elected by the members attending a special meeting called for the purpose," should be put. The mover was Mr. F. Duggan, seconded S. Green.

The following were then elected members of the Institute:—

C. H. Brown, Wellington.
Chas. Taylor, jun., Mataura.
R. A. Phillips, Dunedin.
W. H. Porter, Arapuni.
A. J. Howarth, Dunedin.
P. J. Warwick, Wellington.
D. W. Buchanan, Ashburton.
C. R. Russell, Christchurch.
R. A. McLennan, Christchurch.
Ernest Kofoed, Wellington.
Allan E. McPhee, Wellington.
E. Undrill, Christchurch.

The following were elected associates:—

D. W. M. Tapp, Rotorua.
J. Burns, jun., Wyndham.
A. N. Walker, Christchurch.
A. H. M. Grubb, Gore.
R. G. Richardson, Frankton Junction.
T. H. Smiley, Shannon.
C. J. Fleming, Hinnera.
F. Vincent, Christchurch.
B. McLean, Feilding.
F. W. Sellens, Wellington.
J. W. Toup-Nicolas, Ward.
E. B. Borham, Palmerston North.
A. L. Ford, Opunake.
L. G. Wilson, Auckland.
J. M. O. Walker, Wellington.
W. G. R. Harry, Carterton.
M. Stewart, Feilding.
N. Hardie, Martinborough.
A. V. Svendsen, Feilding.
H. W. Lacey, Stratford.
J. E. Bevin, Gore.
E. C. Morrin, Pukekohe.
A. H. Henley, Westport.
J. A. Leyden, Winton.
F. J. King, Lower Hutt.
F. Nicholls, Wellington.
K. S. Irvine, Wellington.

Functions of the Institute.

The main feature of the evening's meeting was a lecture by Mr. C. E.

Johnson, Associate I.R.E., on "The New Valves." Introducing him, the president, Mr. Alan Webster, reviewed the functions of the Institute, stating that full membership thereof was available to those who had passed the Radio Serviceman's Examination or had an electrician's license together with the P.M.G.'s first-class certificate, 1929, or full membership of the Institute of Radio Engineers. Together with these qualifications a man had to show that he was professionally engaged in radio and had a comprehensive technical knowledge. As far as the associates were concerned, this grade was open to anyone interested in radio.

The Institute wished to foster the study of radio, and for this reason was arranging for a series of lectures which would be of interest to both members and associates. To-night a public invitation had been given, in order that those who might wish to join up as associates could see what they would get for their money.

The New Valves.

Mr. C. E. Johnson's lecture on "The New Valves" was one which was appreciated both by those who have a considerable knowledge of radio and also those who were studying fundamental theory.

Mr. Johnson started at the very beginning with the diode, explaining how there were two bodies, an electron-emitting one and an electron-attracting one. He spoke of the regulation of electrons being controlled first by the filament temperature and secondly by the plate potential. Going on to space charge, he pointed out the effect the raising of the plate voltage, and also the introduction of other electrodes, had on this.

Speaking of rectification, Mr. Johnson drew parallels between the 80 and 82 valves, and explained very concisely how both acted as a rectifier. The 82 was a better valve, from the point of view of regulation and supply, than the 80. He went on to explain how the terms "amplification factor," "mutual conductance," "a.c. impedance and resistance" of a valve were computed. Detection and amplification were also dealt with, including the various systems of A and B class amplification. This led up to the 243 valve, which, with two grids, could be used in either position. By a very clear illustration he pointed out how the screen and plate of a screen-grid valve mutually affected one another, and outlined the limitations of the s.g. valve. A certain improvement had taken place, and an r.f. pentode and improved multi-mu valve had recently been developed. These were the 57 and 58 respectively.

Mr. Johnson's talk was couched in terms so that anyone could follow it, and he got down to fundamentals, explaining why the new elements had been added and what their effect was upon the operation of the valves. Very few, it is felt, left the lecture not knowing considerably more about the fundamental operations of the valves than they did before.

OUR SERVICE DEPARTMENT

Our Service Department aims to help the radio serviceman by the publication of items we think will interest him. We invite radio servicemen to forward any points on radio servicing that they think will be of interest to their fellow-readers, and in this connection we offer a monthly prize of 10/6 to the case which, in our opinion, is the most interesting. They need not be unusual cases and may be only examples of some elementary fault found by the serviceman in a receiver. We reserve the right to publish any others sent in, without making further payment. Address: "Radio Times" Service Department, Box 1032, Wellington. The prize this month has been awarded to "Megger" (Auckland).

Winning Entry

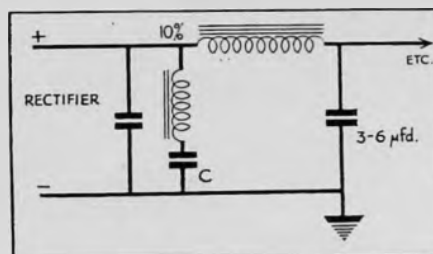
IT was an old "windjammer," one of those six-valve 201A class of set, neutralised by grid suppressors, and possessing a "distortionless" resistance capacity coupled audio amplifier. We must say this much for it, once it was modern, for it had three condensers on one gang and two balancers. It had served many a long year, and wiled away many hours of loneliness, but of late it had been going wrong. A local serviceman had overhauled it, put in a transformer in place of the last r.c.c. stage. It went all right for a while, but after some crackling broke down, and was sent down to me for repair. Out came the grid leak resistances and on to the megger. Yes, as I thought, they were of all values, one branded at .5 showed 6 and 7, so they all came out and were replaced by carbon pigtail type resistances. Still, only scratchy reproduction. An ohmmeter across the primary of the transformer—as I thought, it had broken down. Out it came and in went a new one. Still no better results. It must be one of the coupling condensers, and the megger went on to them. One showed 7 megohms and the other infinity, so the former was pulled out and a new one put in, but results were no better. And so the megger went on to almost every component in the r.f. and audio stages without result.

The primary and the secondary of the new transformer showed the right reading, but when the megger was put from primary to secondary there was a reading. Certainly about 7 megohms, but enough to cause the trouble. Fancy that—a new transformer having a high resistance breakdown between primary and secondary. Too bad, and out it came. But when it was put on the test bench the test showed infinity—now we were getting near the trouble.

Some of the components were mounted above the baseboard and others underneath. The sockets were of the wafer type and fastened to the baseboard by steel rivets which had been lacquered over, but the lacquer was thin, and in mounting the transformer had allowed a high resistance connection to take place between them and the frame of the transformer, with the result that there was a certain leakage between the plate of the valve to the grid of the following valve. I placed a piece of mica underneath the transformer, screwed it into position, and away she went, all under full sail, better even than she had done in all her pristine glory.—Megger (Auckland).

10 Per Cent. Filter Choke

THERE seems to be some misapprehension as to the principles and application of the 10 per cent. choke filter system as exemplified in the last two issues of the "New Zealand Radio Guide and Call Book." Referring to the diagram on page 111 of the 1932 edition, it will be seen that a 4 microfarad condenser has been placed across the 10 per cent. tap to earth. Now the effect of this condenser is completely to nullify the advantage of the 10 per cent. tap, which can be represented better thus:



The 10 per cent. portion of the choke and the series condenser 'C' form an "acceptor" circuit for 50 cycles, and the effect of placing a 4 microfarad condenser (shown on the left) across the 10 per cent. tap can be readily seen.

With regard to the condenser 'C', actual tests on various power packs have shown that the optimum value for this condenser under average conditions is 4 microfarad. However, this value can easily be determined by experiment.

It should be borne in mind that the voltage obtained from a 10 per cent. choke filter arrangement is somewhat lower than that obtained with the conventional condenser input, as the latter becomes virtually inductive. For this reason such circuits should be particularly applicable to the new mercury-vapour rectifiers for which inductive filter inputs are recommended.—S. Rubenstein, Assoc.I.R.E.

Autodyne Trouble

BETWEEN 1500 and 900 kilocycles reception on a certain superheterodyne is all that could be desired, but as the dial was rotated past 900 toward 350 k.c. it would immediately become dead. On the surface it appeared as though the rotor plate had been shorting against the stators, but after separating the plates carefully (and what is more trying to one's eyesight) the writer discovered that this was not the trouble. The valves were changed and it was noticed that when a different

valve was plugged into the detector oscillator socket two or three more degrees were gained on the tuning dial, this test indicating that the trouble lay in this portion of the set.

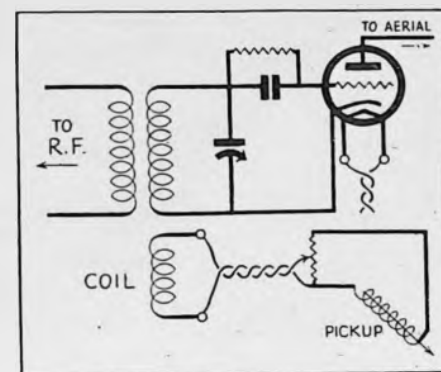
Subsequently it was found that a resistor supplying the screen-voltage to the 224 being used for the combination purpose had broken down. Evidently with the increased screen voltage, which was somewhere in the vicinity of 200 volts, the intermediate frequency of the receiver would not function beyond 900 k.c. A 25,000 ohms resistance with a 1/2 watt rating solved the problem, putting the correct screen voltage of 90 volts on the valve and thus restoring the correct intermediate frequency of 175 k.c.—Dudley T. Houston (Timaru).

A Peculiar Case of Distortion

I WAS called to service a set troubled with occasional distortion, particularly noticed on 720 k.c., but on rotating the dial it disappeared. It came in loudest where 2YA should be. Rotating the dial brought 2YA in on 630 k.c. Turning the dial in the reverse direction brought it in on 730 k.c., and distorted on 720. The trouble after much work with the analyser proved to be that the dial was loose on the shaft of the condensers, and there was a lot of backlash, which prevented the scale from reading correctly, and, not being tuned to resonance, distortion resulted.—Ohmo.

Connecting a Pickup

TRY this method of connecting a pickup; at all events it is easy. Make a coil about five turns that will slip either inside or pass over the detector coil of the set. The hook-up is as shown in the diagram. I have often used this method when trying out a pickup in an old set with open coils.—Ohmo.



RADIO UNITS

Solutions to Problems on Ohms Law

FOLLOWING are the solutions to problems raised last month. A slide rule has been used for computations, with the result that these results are not accurate to a fine degree. Decimals generally are correct to the first place.

Answer 1:—

$$\text{Filament Current} = 3 \times .06 + .1 = .28 \text{ amps.}$$

$$\text{Required drop} = 2v.$$

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

$$= \frac{2}{.28}$$

$$= 7.14 \text{ ohms.}$$

Answer 2:—

$$\text{Wire required for extension} = 2 \times 50\text{ft.} = 100\text{ft.}$$

$$\text{Resistance} = 3.15 \text{ ohms (31.49 ohms per 100ft.)}$$

$$\text{Resistance of output transformer} = 50 \text{ ohms.}$$

$$\text{Total } R = 50 + 3.15 = 53.15 \text{ ohms.}$$

$$\text{Current} = 30 \text{ m/as.}$$

$$\text{Drop} = \frac{30}{1000} \times 53.15$$

$$= 1.5945 \text{ volts.}$$

$$\text{Available on plate} = 250 - 1.6 \text{ volts} = 248.4 \text{ volts.}$$

Answer 3:—

$$(a) \text{ Voltage required} = 250 + 20 \text{ (bias) + drop through field.}$$

$$= 270 + \left(\frac{2500 \times 60}{1000} = 150 \right)$$

$$= 420 \times 2 \text{ (full wave)}$$

$$= 840 \text{ volts.}$$

$$(b) \text{ Current flowing 1st section} = 60 - 40 \text{ m/as.} = 20 \text{ m/as.}$$

$$\text{Drop} = 250 - 180 = 70 \text{ volts.}$$

$$R = \frac{70}{20} \times 1000 = 3500 \text{ ohms.}$$

$$\text{Current flowing second section}$$

$$= 20 - 10 = 10 \text{ m/as.}$$

$$\text{Drop} = 180 - 80 = 100 \text{ volts.}$$

$$R = \frac{100}{10} \times 1000 = 10,000 \text{ ohms.}$$

$$\text{Drop third section} = 10 - 5 = 5 \text{ m/as.}$$

$$\text{Drop} = 80 \text{ volts.}$$

$$R = \frac{80}{5} \times 1000 = 16,000 \text{ ohms.}$$

$$\text{Total } c - d = 3500 + 10,000 + 16,000 \text{ ohms.}$$

$$= 29,500 \text{ ohms.}$$

$$(c) \text{ Bias } E = 20v, I = 60 \text{ m/as.}$$

$$R = \frac{20}{60} \times 1000 = 333.3 \text{ ohms.}$$

Answer 4:—

$$\text{Current taken by plates} = 3 \times 5 = 15 \text{ m/as.}$$

$$\text{Current taken by screens} = 3 \text{ m/as.}$$

$$\text{Bleed} = 10 \text{ m/as.}$$

$$\text{Total current in first section} = 15 + 3 + 10 = 28 \text{ m/as.}$$

$$\text{Drop} = 250 - 180 = 70 \text{ volts.}$$

$$\text{Therefore } R = 2500 \text{ ohms.}$$

$$\text{Current in second section}$$

$$= 3 + 10 = 13 \text{ m/as.}$$

$$\text{Drop} = 105 \text{ volts.}$$

$$R = \frac{105}{13} \times 1000 = 8000 \text{ ohms.}$$

$$\text{Current in third section}$$

$$= 10 \text{ m/as.}$$

$$\text{Drop} = 75 \text{ volts.}$$

$$R = \frac{75}{10} \times 1000 = 7500 \text{ ohms.}$$

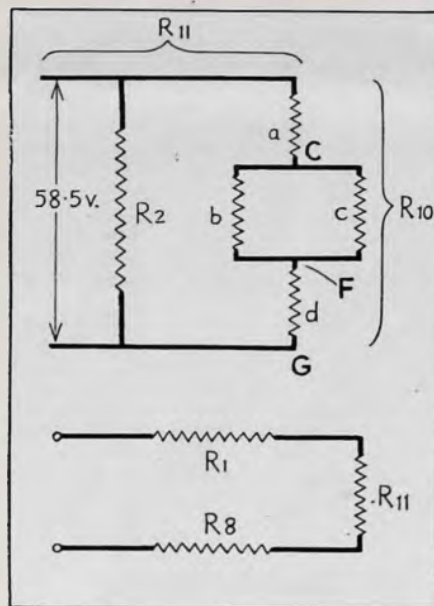
Power rating:—

$$P = I^2 R.$$

$$(1) = (.028)^2 \times 2500 = 1.96 \text{ w. (2)}$$

$$(2) = (.013)^2 \times 8000 = 1.35 \text{ w. (1)} \frac{1}{2}$$

$$(3) = (.01)^2 \times 7500 = .75 \text{ w. (1)}$$



Answer 5:—

$$P = I^2 R.$$

$$I = \sqrt{P/R}.$$

$$I = \sqrt{1/75}.$$

$$= \sqrt{\frac{1}{75.00}}$$

$$= \sqrt{.01}$$

$$= .1 \text{ amp.}$$

$$= 100 \text{ m/as.}$$

Answer 6:—

Problem comes down to three resistances in series (lower diagram):—

$$R_1 = 10,000 \text{ ohms.}$$

R_2 is again equal to two networks as in the upper diagram.

Diagram 2.

$$R_2 = 2000 \text{ ohms.}$$

$$R_{10} = 3000 + \left(\frac{8,000,000}{6,000} \right)$$

$$+ 300 \text{ ohms.}$$

$$= 3000 + 1333.3 + 300 \text{ ohms.}$$

$$= 4633.3 \text{ ohms.}$$

$$\text{Therefore } R_2 = 2000 \times 4633.3$$

$$= 1390 \text{ ohms.}$$

$$R' = \frac{25,000 \times 500}{25500} \text{ ohms.}$$

$$= 500 \text{ ohms approx.}$$

$$\text{Total } R' R'' R'''$$

$$= 10,000 + 1390 + 500 \text{ ohms}$$

$$= 11890 \text{ ohms}$$

$$C = \frac{500}{11890} \times 1000 \text{ m/as.}$$

$$= 42 \text{ m/as.}$$

$$\text{Current through } R' = 42 \text{ m/as.}$$

$$\text{Current through } R''$$

The simplest way is to find the pressure across its terminals and apply Ohms law.

R'' is in parallel with R'' and is part of R'' .

Voltage dropped across R'' is voltage dropped across R'' .

$$\text{Drop} = 1390 \times 42 \text{ volts} \div 1000$$

$$= 58.5 \text{ volts}$$

$$\text{Current through } R''$$

$$= \frac{58.5}{2,000}$$

$$= 29.25 \text{ m/as.}$$

Current through R'' can likewise be computed from pressure.

R'' is in three sections, as follows:

3,000 ohms 1333.3 ohms and 300 ohms

Total current flowing

$$= \frac{58.5}{4633.3}$$

$$= 12.6 \text{ m/as.}$$

Note current through

$$R'' = 29.3 \text{ m/as.}$$

$$R'' = 12.6 \text{ m/as.}$$

$$R'' = 41.9 \text{ m/as.}$$

Actually 42 m/as. flow, but .1 has been dropped in computations and can safely be ignored.

Drop through R'' a

$$= 3,000 \times 12.6 \div 1000 = 37.8.$$

Drop through R'' b

$$= 4633.3 \times 12.6 \div 1000 = 16.8$$

$$\text{Drop through } R'' c = 3.8 \text{ volts}$$

$$\text{Total} = 58.4 \text{ volts}$$

(Approximately .1 volt has been lost in computation.)

Pressure from C to F = 16.8 volts

$$\text{Current through } R''$$

$$= \frac{16.8}{2,000}$$

$$= 8.4 \text{ m/as.}$$

Current through R''

$R'' + R'' = R''$, which drops 21 volts

$$C = \frac{21}{25,000} \times 1000 \text{ m/as.}$$

$$= .8 \text{ m/as.}$$

Power Ratings. $P = I_p R$

$$R_1 = (0.042)^2 \times 10,000$$

$$= 17.6 \text{ watts.}$$

$$R_2 = (0.038)^2 \times 300$$

$$= .02 \text{ watts.}$$

$$R_7 = (0.042)^2 \times 500$$

$$= .88 \text{ watts.}$$

$$R_7 \text{ actually} = (0.0412)^2 \times 500$$

$$= .85 \text{ watts.}$$

(b) E is shown C in the diagram.

(1) $E F = 16.8 \text{ volts.}$
 $F G = 3.8 \text{ volts.}$

(2) Therefore $E G = 20.6 \text{ volts.}$

Answer 7:—

7. Assuming 5-volt valves.

$$\text{Total current} = .06 \times 4 + .20$$

$$= .5 \text{ amps.}$$

$$\text{Resistance of valves} = E/I = \frac{5}{.5}$$

$$= 10 \text{ ohms.}$$

$$\text{Rheostat} = \frac{1}{.5} = \times 2 \text{ ohms.}$$

Answer 8:—

There is nothing to indicate the drop through the output choke, which is only in the plate circuit of the last valve, so total voltage is:

$$\text{Field} = \frac{2500 \times 45}{1000}$$

$$= 112.5 \text{ volts.}$$

$$\text{Valve} = 250 \text{ volts.}$$

$$\text{Bias} = 16.5 \text{ volts.}$$

$$\text{Rectifier} = 5 \text{ volts.}$$

$$\text{Total} = 384 \text{ volts.}$$

If the 100-ohm choke is included,

$$100 \times .45$$

$$\text{then drop} = \frac{1000}{45} \text{ volts}$$

$$= 4.5 \text{ volts.}$$

and added to 384 volts = 388.5 volts.

Station Equipment 74A

ONE of the most enthusiastic dxers in Auckland city area is Mr. C. G. Mellor, 74A. Mr. Mellor's station is situated 9 miles from the city, in Glen Eden, and consists of both broadcast and short-wave equipment. The broadcast is as follows:—6-valve H.C. mantle model. Aerial, inverted L type, 30 feet high, 20 feet flat top, with 25-foot lead-in. Up to date has logged 80 stations, including 6 Yanks, 7 Japs, 1 Manilan. G.R.M. is not bad in his district. Short-wave set consists of 3 201A's battery and power operated. Uses loudspeaker with most hams. Distant stations include G58W, W8XAL, W3XAL, W9XF, Radio Saigon, FYA, Paris, Java, and Japanese, also 2ME, 3ME, 2ZX. 74A is at present studying for ham's exam, and hopes to be on the air after Christmas on C.W. So look out for him.—116A.

Radio Interference

THE following official communication has been received from the secretary of the New Zealand Electrical Federation:—

"I have received the following letter from the Chief Electrical Engineer:—

"At the meeting of the Regulations Advisory Committee held on 23rd instant, the representatives of the Post and Telegraph Department made a suggestion to the committee that the Public Works Department approach the New Zealand Electrical Federation and request it to circularise its members with a view to ascertaining from their respective principals in Great Britain and other countries what steps have been taken by manufacturers of industrial and domestic appliances in those countries to render their products "non-radio interfering."

"Furthermore, if their respective principals are in a position to supply "non-radio interfering" apparatus, would members of the federation specify this requirement when ordering stocks?

"The committee was of the opinion that this department should take action along the lines indicated."

"On behalf of the radio section of the federation I have to request your co-operation in this matter."

"C. G. CAMP,
 "Assistant Secretary."

Expert Designers specify



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for all good sets

The reasons are well known. The Ferranti has no superior in performance. It is a job that signifies thoughtful design, careful manufacture, searching tests and "class" from start to finish.

Give your set the best chance. Fit a Ferranti Transformer.

Made by FERRANTI Ltd., Hollinwood, Lancashire, England.

If your dealer is not stocked get him to write to the N.Z. Agents.

Leaflets on any Ferranti Components free on request.

N.Z. Agents: **ARTHUR D. RILEY & CO. LTD.** Wellington and Auckland

Parts Gaining Ground Fewer Complete Sets Imported

RETURN showing particulars of the Imports of Apparatus peculiar to Wireless into New Zealand during the month of August, 1932.

Wireless Receiving Sets Mounted in Cabinets.

Country of Origin	Auckland No.	Auckland £	Wgton. No.	Wgton. £	Lytteln. No.	Lytteln. £	Dunedin No.	Dunedin £	Other Ports No.	Other Ports £	Totals No.	Totals £
United Kingdom	—	less 10	27	72	—	—	4	47	—	—	31	100
Australia	13	100	77	757	3	29	1	18	—	—	94	904
Netherlands	—	—	3	19	—	—	—	—	—	—	3	19
U.S.A.	728	5368	790	4418	195	910	360	2225	—	—	2082	12921
Totals	741	5458	897	5260	198	939	374	2290	—	—	2210	13953
Totals, Aug. 1931	—	8010	—	10238	—	3552	—	1746	—	203	—	18740

Wireless Telephony, other Apparatus Peculiar Thereto.

United Kingdom	241	1243	36	—	—	1540
Canada	3	—	71	—	—	74
Australia	2370	3770	88	—	67	6205
Austria	—	153	—	—	—	153
Belgium	—	3	—	—	—	3
Czechoslovakia	less 4	—	—	—	—	less 4
Netherlands	—	396	—	—	—	396
U.S.A.	3432	5295	581	658	19	9085
Totals	6062	10860	776	658	86	18442
Totals, Aug. 1931	1861	7700	1123	587	19	11290

"Limited License"

ACCORDING to the instructions issued with the radio serviceman's "limited license," the holder can do the following:—

1. The installation and connecting of any earthing conductor used for any radio apparatus.

2. The connecting of a flexible cord to any radio apparatus, or to any plug-top, ceiling rose, or other connector used between the fixed wiring and such apparatus.

3. The replacement of any flexible cord used for supplying electrical energy to any radio apparatus and used between the fixed wiring and such apparatus.

4. The replacement of a fuse-link on any sub-circuit used to supply electrical energy to any radio apparatus.

5. The removal and/or replacement of any radio apparatus as a whole or in part, and which is connected to the fixed wiring by means of a flexible cord.

Note.—(1) If the installation of a set involves wiring work the electrical supply authority must be notified. (2) Before the set is connected to the supply it must be inspected by the electrical supply authority and permission obtained to make the connection whether or not wiring work has been done.



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THE RADIO LOG

Official Organ
of
the
D. X. CLUB

WITH a view to placing before dxers the proposed Club constitution, the Editor of the "Radio Times" visited the principal cities and explained the various clauses. In brief it proposes:

1. To establish an Advisory Board of four dxers, together with a permanent chairman who is on the editorial staff of the official organ.

2. To introduce the district scheme suggested in last month's "Radio Times."

3. To impose an entrance fee of 2/6 (as now paid), together with a yearly fee of 1/-, which is payable to district headquarters.

The advantages of the constitution are principally that the branch clubs will have a definite parent organisation to which to refer; secondly, that members will be controlled by a representative body; and third, that the Club will have a definite standing, i.e., it will be a real Club.

Any number of branches may be formed within the districts, provided the constitution and branch executives have the power to fix certain other annual charges, payable by those attending branch meetings. This is in addition to the 1/- flat rate which is payable by all members of the Club.

THE Editor was delighted to have the opportunity of meeting so many members of the Club. He had the opportunity of discussing with dxers the various problems which confront them, and received many valuable suggestions, many of which will be put into operation in the near future. Criticism there was, in a few cases it was destructive, but all advanced in a very good spirit. The Editor was also interested to see the way in which the various branch clubs have organised themselves. They have working committees, with able chairmen, and much of the progress of the Club has been due to these hard-working committees. In each of the centres the Club has gone about tackling some aspect of radio listening, and all members of that branch are enthusiastically applying themselves to the tasks they have in hand.

THE Editor feels that some mention should be given to the Southland branch, as it seems the executive is conducting the meet-

ings along the lines intended when the branch scheme was commenced. The "business" occupies very little portion of the meeting, and consists merely of the reading of the minutes and short discussions on any correspondence that may be in hand. The rest of the evening is more or less informal—dxers say what stations they have received, what time they are receiving them, and generally talk dx. The secretary obtains from each one a list of the stations he has been hearing, and asks everyone to give a short account of his dx during the month. This has accounted for a very close-knit friendship between the members of the branch, and it seems that they are on the right track toward making progress. The Editor understands that a somewhat similar system is being put into operation in Dunedin.

Twice Congratulations



Stan. Robson (1S).

By popular vote elected president of the N.Z. Dx Club, and by his own free will resigning from the bachelor's society. Mr. Robson was recently married to Miss M. F. Milne (54S).

Best wishes from all the boys, Stan.

THE executive work of the branches should be left to the committee. They are the people responsible for the organisation, and for the hatching of new ideas for their branches. The time at general meetings should not be taken up by lengthy discussions regarding the Club organisation, or any other "business." The meetings should be informal, and dxers should concentrate more on exchanging experiences and news than passing strong resolutions and motions. Such is far from being the spirit of dx. Make your meetings friendly and informal, and you will find that the Club will make progress in your district. The Editor does not mean by this that the branch should be haphazardly conducted. When the constitution is adopted, copies of it will be sent out to all branches and they must follow its rules. Furthermore, they will have to draw up their own local set of rules, but by no means must the original aim of the Club be lost sight of.

IT is the intention of Headquarters to issue certificates through district headquarters for stations received; i.e., a dxer with 100 stations will send his verifications to his district headquarters, who will check them over and issue him with a certificate. Similarly, there will be another for each additional fifty.

IN this respect the very vexed question of what will constitute a verification and what stations will be eligible, must come up. Some of the branches (Continued next page.)

desire that all stations, New Zealand included, should count for this competition, but on conferring with other branches, the Editor is of the opinion that New Zealand stations should not be included. Here are the reasons:

1. Dx means distance, and that cannot apply to New Zealand stations.

2. The ridiculousness of writing to the YA stations for a verification is apparent, while the same thing applies to writing to a "B" station in your own town for a card. Clearly those reports are of no use to those stations, and the club by encouraging its members to write to stations under those conditions is only fostering the spirit of wall-papering, and not true dxing.

3. Listeners in the centre of New Zealand have a decided advantage over the others.

4. If the New Zealand stations are inundated with requests for cards from people in New Zealand there will come a time when they will close down on issuing cards—for they are expensive and the club will have done itself harm. Headquarters has been in touch with several owners of "B" stations, and they are told that a very large number of letters from listeners, obviously wanting cards only, are received, and they are complaining of the expense to which the club is putting them. Headquarters from this point of view can see the position in a different light from that of most dxers, and if any of the branches are including the New Zealand stations in their own competitions, such is against the ruling of headquarters, who are very anxious that the club shall not be turned into a "wall-paper society." We feel, however, that the majority of dxers see this point of view and appreciate its reason.

ALL Australian stations will be included in the competition. Certainly some of the stations are far easier to receive than some New Zealand stations are in certain parts of the country, but the difficulty is deciding which Australian station shall be included and which left out. For this reason all will be included. Whether those bearing the words "daylight reception" will count as an extra station or not will be for the Advisory Board to deal with when elected.

BRANCHES wishing to participate in the competition should signify their wishes to headquarters, who will have the certificates printed with their own names upon them, and they will be signed by the branch chairman (or president) and secretary. A handsome certificate is in the course of preparation, and we hope to be able to reproduce an illustration of it in next month's "Radio Times."

Questions and Answers in Radio
All Booksellers and Dealers 1/6
or Box 1032, Wellington, 1/7, posted.

Notes and News from the Centres

Auckland

(By 116A.).

AUCKLAND dxers met again on Wednesday, September 7, at their headquarters in Atwaters Piano Coy's premises. We were pleased to welcome two new members, Messrs. Clarke and Snook. The main subject of the evening was the proposed constitution, which it was felt covered all the necessary points. Interference was next dealt with. Messrs.

Club Notes

THE notes on these pages are supplied by the district secretaries of the club. Members in each district are asked to keep in touch with their secretary who, in most cases, arranges periodical meetings.

New members should make themselves known to their secretary without delay.

Secretaries please note that all club notes must be in by the 20th of each month.

District Secretaries.

Auckland—R. J. O. Kerr, 116A, 22 Liffington Road, Remuera.
Waikato—J. M. Wetherell, 46A, Queen Street, Cambridge.
Poverty Bay—G. H. Stewart, 23HB, 151 Gladstone Rd., Gisborne.
Hawke's Bay—G. A. Lys, 2HB, 912 Dufferin Street, Hastings.
Taranaki—L. M. Anderson, 32T, Rotokare, New Plymouth.
Wairarapa—H. F. Adcock, 27W, 39 Opaki Rd., Masterton.
Wanganui—L. C. Armstrong, 29W, 35 Jellies Street, Wanganui East.
Manawatu—C. E. Trenkner, 31W, Rongotea.
Wellington—D. Bouverie, 51W, 57 Endeavour St., Lyall Bay.
Nelson—W. J. Walsh, 18 Vanguard St., Nelson, 20N.
Westland—Stanley McCullum, 23WT, 43 Alexander St., Greymouth.
Marlborough-Canterbury—E. W. Watson, 28MC, 37 Chancellor Street, Shirley.
Otago—H. W. Natta, 90OT, 41 Richardson St., St. Kilda, Dunedin.
Southland—S. Robson, 18, 100 Islington Street, Invercargill.
United States—Ralph Schiller, 40 Hawthorne, N.J.
Victoria—Robert J. Richardson, DX90, 97 Vere St., Collingwood, Victoria, Australia.

DX Club Districts.

Otago	122
Auckland	187
Wellington	150
Marlborough-Canterbury	120
Hawke's Bay	95
Southland	61
Nelson	26
Westland	32
Taranaki	43
Overseas	14
Headquarters	2
Total	861

Waikato

(By 46A.).

ON September 1, a very interesting talk was given by Mr. Caten, of the Cambridge Electric Power Board, on the subject of power interference. The attendance was very disappointing, but nevertheless the lecture was thoroughly enjoyed by the few present. Mr. Caten has kindly consented to give us further talks on other technical subjects. It is to be hoped that members will turn up in full force.

Reception of overseas stations has considerably improved. Quite a number of low-powered Americans have been reported, including KFWL, KFBH, WPG, WXYZ, WACO and WFIW. The latter was heard at fair strength on the 11th at 7.15 p.m.

The Europeans are coming in at excellent strength, the best being Prague, 1RO Rome, Göteborg, Sweden, Heilsburg, Germany, and Bratislava, Chinese and Japanese stations are being received at good volume; the best of these being COMK, XGY, COHB and NOPY (China), and JOAK, JOIK, JOFK, and JOIK.

Latest verifications reported are from KFOX, KTAB, and WOV, WHAS and WPG.

Recently I have been experimenting with a long aerial, and results have not come up to my expectations. It consists of 450 feet of copper ribbon from a Ford magneto, 50 feet high at the far end, and 25 feet high at the near end. The present outfit is an Outspan five, and my log to date is 226 stations, with about 100 verified. I would be glad to hear from any dxer using this set in order to compare notes, etc.

Finally I would urge all members to write me, giving reception notes, latest loggings, etc., as it is only by this means that we can understand each other, and so keep the club going. Remember our motto: "One for all and all for one."—J. M. Weatherell.

Poverty Bay

(23HB.)

MORE dxers than usual attended the last meeting. The radio inspector, Mr. Coman, delivered a very interesting address on "Power Interference," and offered to give another talk on different lines at another meeting.

It was decided to hold a local competition for the best verification received during the month of September, for which a certificate will be awarded. Local dxers are requested to have their entry in by the next general meeting (October 4) or as soon after as possible.

Members expressed their approval of the district scheme and advisory board of four members. It was decided that the branch club purchase the official badges for president and secretary, these badges to remain the property of the club, and each official to return his badge on vacating office.



How about these for the youngest dxers? Their father is a member of the club, and they are enthusiastic assistants who talk at the wrong time. Peter has greater "Radio Knowledge" than his mother, talking of pen'odes a n d screen-grid conversatio nally, though "condemser" docs, occasionally, s o u n d rather funny.

Reception in Gisborne has been fair during September, but power-leaks are as prevalent as ever.

38H.B. informs me that KFFE, Oklahoma City, is increasing power to 10 k.w., and will be off the air until the middle of the month. The American station on this frequency at present is WLHI.

According to a verification received by 60H.B., KVOO will shortly be installing a new transmitter with a 25 k.w. output. This station will no doubt be heard much better here then.

Does any dxer listen to the relays of grand opera from the Theatre Royal in Melbourne? Generally about half the Australian A's relay these, and one can nearly always find a good station to which to listen. The last two operas I heard were "La Traviata" and "Carmen," the relay of the latter being excellent. The microphones seemed to have been placed exactly in the correct positions. However, heavy static marred reception. "La Traviata" came over on a clear night, but fading with distortion was rather bad. The microphones did not seem to be placed so well on this occasion.

I have experimented with earthing the free end of my aerial both directly to earth and also through a fixed condenser, and found that signals decreased in both cases. However, the added piece of aerial wire appeared to increase the volume.

On a verification from WFLA received by 50H.B. was an "ekko" stamp with the letters WFHL. Can any dxer explain this?—G. H. Stewart.

Hawke's Bay

(By 2HB.)

DX has gone a little flat lately, but still is not so bad. Judging by letters received Europeans are coming in well. Prague, Heilsberg, Bratislava, Göteborg, and Moscow are reported, and as far as U.S.A. is good. Members report verification to hand from KWKH, WKBF, KQW, WLAC, and KTM. KWKH sent one member a very practical souvenir in the form of a log-book containing maps of U.S.A., Canada, and the world, together with a comprehensive list of world stations.

During the month the Japanese stations have been coming in at a good volume. The Chinese station on 680 kc. comes in and blots out the Jap. underneath (one way of getting the best of them, eh?). The dx programme from 2ZM on the 25th was poor, as is also 4ZP when on tests.

2ZI is now off the air, owing to the 44 hours a week programme from 2ZIH. 2ZL is now on the air, Thursday, from approximately 7.30 till 10.15 p.m.

The "wireless query" session from 2CH on Tuesday and Thursday at 8.30 is very interesting, some helpful data being given. Regarding 3IIE's proposal for district H.Q., this branch thinks it a sound one, and will support it.

Unfortunately at the meeting in Hastings the talk to be given on television was subject to a hitch, with the result that it will be given at the meeting on October 10.

At the dx meeting held in Napier on September 15, only a small number were present, but an enjoyable time was spent discussing dx and the radio station log book. All were agreed it was a most useful book for the dxer.

Hawke's Bay wishes to offer its congratulations to Mr. S. Robson on being elected president of the club.—G. A. Lys.

Taranaki

(By 32T.)

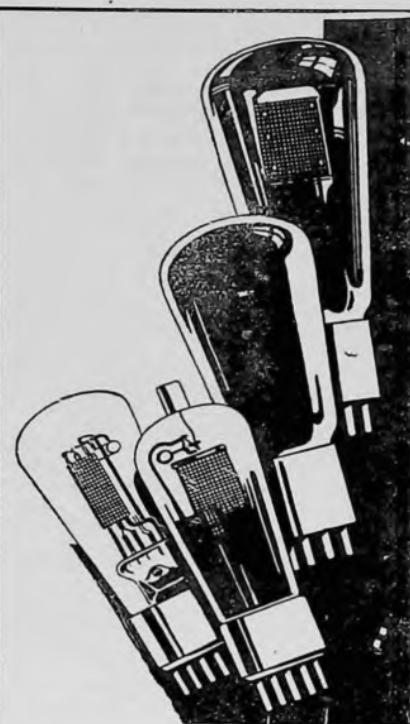
RECEPTION has been fair, but not exceptional, with several Europeans showing up slightly better. The Japanese have been coming in very strongly of late, showing great improvement.

What is wrong with Taranaki dx enthusiasts? Don't let everybody think we are dead up this way—snap out of it. Try to attend meetings and let the world know we have a live club here.—L. M. Anderson.

Wanganui

(By 29W.)

OUR meeting was held at my residence last Wednesday night, the attendance being very poor, but enthusiastic. We decided to hold the next meeting in town, as it was thought that the attendance would improve if it was held in a more central locality. Two of the members generously offered to assist with the expenses of the hall until we get settled. Up till now the club members have not been asked to contribute anything toward the secretary's expenses. So roll up, Wanganui dxers, it is up to you to keep the club in action. Watch the "Record" for particulars of the next meeting. Apparently this town is badly situated for reception, as no reports were made, with the exception of the Chinese station on 680 kc. One member heard him ask for



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reports. The address was given as station NEQA, Central Broadcasting Co., Shanghai. We were in agreement that headquarters should be left as they are. Latest verifications to hand are 2KO, Newcastle, and 3AK, Melbourne. Both replied within a fortnight. The latest joke in Wanganui is: "Can I sell you a dog?" "What sort of dog?" "A dxhound."—L. C. Armstrong.

Manawatu

(By 91W.)

DX enthusiasm in this district seems to become more apparent at each meeting.

Regarding the suggestion which we recently circularised to all branches, it seems quite evident that this was unnecessary, as the last issue of the "Times" was certainly an improvement, as also are recent "Records." Dxs are urged to forward as much information pertaining to general dx as possible to H.Q.'s for publication, as only by co-operating with H.Q.'s in this matter can we hope to bring the "Record" up to standard again.

Following the lead by the Dunedin branch in holding local competitions, it was decided to conduct a monthly competition for the greatest number of verifications (N.Z. stations included) received from the date of the last meeting to the succeeding one.

Dx conditions, as a whole, have been very favourable during the month, and in some cases dxers have reported that exceptional reception has been experienced.

Verifications have been coming in very slowly, however, the only ones reported in this district being KFRU, KTM, KTBS, WKBE, WOAL, KELW, XER, 2CH, 2UE, 4RO, 3HA, 2ZM, and Muhlacker (Germany).

The old non-reply lister, KTM, can now be eliminated, as without a doubt he is now received promptly. Dxs who have experienced trouble in 1931 and early in 1932 can be assured of a reply if they now report.

Australians on this branch's non-reply list are 2KV, 4GR, 7LA, 6KG, and 5DN. This latter station is not worth bothering, as he absolutely ignores all letters. One of our members has reported five times without success.

The Europeans have been very consistent, and in a few weeks' time some very interesting verifications should be to hand. 12W, our chairman, has recently posted a pile of letters, almost nine inches high, to foreign countries.

N. Jenkins (Musterton) appears to be a reliable source of information and, judging by some of the verifications he receives, must possess an interesting log. His statement that Europeans are received at their best in the spring is readily endorsed.

The Japs. are also being received at remarkable strength, at present JOAK (590 k.c.), a seldom-heard one, being R6-7, and at times reaching full speaker strength. Considerable doubt seems to exist regarding some of the Japanese stations' correct frequencies. Could not H.Q.'s arrange to have an authentic list published?

Americans are very loud, but QSA varies, and consequently during the month several good ones have been lost. A 100-watt, operating on 1870 k.c., can be heard almost every night, but wait is

he? KFI reached the same strength at 2YA, who was operated on full volume on the 7th.

Ralph T.—When are we going to hear more of your wonder set?

Wairarapa

(By 27W.)

RECEPTION during the past month has been very patchy; some days reception has been excellent, and then again other days have been blank of anything approaching dx. Static has also been very bad. The early morning Europeans have been coming in very well, Prague, Heilsberg, Vienna, Muhlacker, Sottens, Rome, Wilno, being the best. One morning twenty were heard at strength from R3-R7. The Americans have been only fair with me. KFI, WTAM, WENR, KGO, WOAL, KNN, KRLD being, in order of strength, the best.

The Australian B's come in here better than the A's, but not so steady: 2UE and 2UW are very good. Japanese stations are very weak here until late at night. JOAK and JOHK are the best. I would appreciate any details of other Wairarapa members dxing.

If any dxer is interested in slow Morse, I would be pleased to transmit.

I would appreciate reports on my amateur radio station, ZL2MM.

Now, Wairarapa radio enthusiasts, join the Dx Club and make this section equal to any in New Zealand. When we have more members here, I will quickly arrange a meeting. Will be glad to see any dxer in the shop.—H. F. Adcock.

Wellington

(By 51W.)

HELLO, Dxs! Kei te pewhea koe.

Dxs. Our second meeting over. A success. The club constitution was read by Mr. Earl Read, of H.Q., and without any obstacles was carried and accepted unanimously. The interference question was raised, and after very careful consideration it was decided to leave the matter in H.Q.'s hands. One and all agreed that time and patience are the only rem-

edy. Immediately a solution is forthcoming the club will be duly notified.

The Dx Competition: Several branches have been commenting upon and criticising the rules. H.Q. started the competition and generously donated the cup. Under these circumstances is not H.Q. entitled to stipulate whatever rules it may thing fit? Now, my lads, carry on, and leave out the growls. Personally, I would bar all New Zealand stations and Australians. After all, dxing to my way of thinking is tuning in stations further away.

Some of our listeners here complain of 2YA's "blatting" on the dial where it is not required. This may be due to the raising of the power. One of our members (a Mrs. Fearn) would like to know of a good earth system. Can any dxer assist her? This lady's equipment consists of an all-wave set, and she has certainly the "knack" of obtaining the utmost from it.

For the benefit of dxers, 149W. (Mr. Kelly) has forwarded to me the following concerning EAQ, Madrid:—This station may be tuned in at 7 a.m. till 7.30 a.m., as well as 11.30 to 12.30. Mr. Kelly's outfit is a "Night Owl Three," and he speaks highly of it. He would like to communicate with any dxer with the same outfit to compare notes, etc.

How to improve those distant stations from R2-QSA2, to R4-QSA4 (conditions permitting, of course) is by this simple means. What simple means?

Conditions here of late have been bad. KFI fading badly. The usual Americans may be still heard—WFAA, WTAM, KHI, KMTR, KNN, KSL, KGO, KPO, and KGER. Japs. are weak and not reliable. Here are some Europeans that dxers may tackle: Beromunster (Schweizerischer Landessender), 459 m., 60 k.w.; Radio-Suisse Romande (Sottens), 403 m., 25 k.w.; Milan, 331.5, 7 k.w.; Genoa, 312.8 m., 10 k.w.; Trieste, 247.7 m., 10 k.w.

If unusual noise arises in your set take off the aerial before blaming your set. If the noise disappears with the aerial detached it must come from outside, and if noise still persists it may be the set.—"Bob" (Lyall Bay).



A Musical Production being Rehearsed in 2BL Studio.

Nelson

(By 20 N.)

WE had a good attendance at our last meeting. In your letter you asked for a list of officials, and also the opinion of this branch's idea of Dunedin's plan to shift headquarters. Well, all at the meeting scoffed at the Dunedin idea, so that's that. Now, in regard to the committee, we formed a fairly large one, as one or two of us consider that we should have more members in this district, and by forming a large committee we would have more members working with this

end in view. Mr. Hunt, who was elected president, has been a keen driver for a number of years now, and it was through him that we were able to get a room to hold the meeting in. You will note from the list that the committee are from different parts of the district. This should help towards getting more members. You mention in one of your letters about some members growing and wanting to know where the 2/6 membership fee goes to. Personally I consider that it should be 2/6 annually. However, I don't suppose there will be a great lot more agree with me. I have been informed that Mr. Fraser, the winner of

the Battery Cup, is going to give up dying. If this happens it will be a pity, as he would have been a great help to us. Would it be possible to give me an idea how many people whose names I sent you filled in the form. Although they all promised to, I have an idea that a few did not.

THERE was a good attendance of members at the last meeting. It was decided to hold future meetings on the second Friday in each month. A great deal of interest was displayed in verifications presented by 12N and 17N. At the next meeting Mr. Cooper, radio engineer, will give a short talk on valve characteristics. In putting down a Pierce earth, I found that instead of running all the wires to one block, if the pipes were joined together by short pieces of wire, and the last wire run direct to the set, much better results were obtained. Letters from members have been conspicuous by their absence. There would be some excuse if members were writing direct to the "Times," but they are not even doing that. 14N to-day reports hearing 18 Europeans one morning this week. Nelson being the centre of New Zealand, should be an ideal place for dxing, providing static was a little less consistent. Well, Nelson dxers, do not forget that the next meeting will be held in Harley Street on Friday, October 7, and also remember that the post office will always deliver letters to 18 Vanguard Street, Nelson.—W. J. Welsh.

Stations Heard During The Month

Auckland.

WCCO, KSTP, KCMB, JOIK, JOKK, JOSK, JOPK, JOLK, XGY, NGT,
XOPP, GEC, VUB, VUC, VEL.

Waikato

KMTR, KTM, KFDV, KHQ, KJR, KGW, KFII, KOIL, KTRA, KMBC,
KSCJ, KRJA, KTAJ, KFL, KFDL, KGO, KOMO, KMYI, KFBF, KWKL,
KSTU, KGBR, KGBB, KFAC, KPRC, KFXN, KSSJ, KPSP, KRON, KXX,
KPHS, KTVB, KEMV, KGTI, KPRC, KPSD, KQDA, KFMW, KTRC,
KEN, KENE, KQW, KTVL, KTAJ, KOL, KDB, KGB, KGR, KZRM,
KEN, KYW, WGN, WSAI, WTCO, WHK, WACO, WWOV, WRBC, WLAP,
WTAQ, WLAC, WKY, WXYZ, WAOL, WFIW, WTCI, WTAM, WENR, WBBW,
WMAQ, WDOX, WSPA, WFAA, XEN, XGY, XOPP, XED, XEP, XHPI, COAK,
COBE, JOAK, JOFK, JOHK, JOIK, OKR, ZTC, IRO, VIKRG, VK3LT, VK7CW,
VQ2UX, VK2BV, VK2ZD, VK4KZ, VK2UR, VK2BK, Hildsburg, Prague, Vienna,
LWOW, Poland, Muhlabach, Bratislava, Goteborg, Bruo, Hornby, Moscow,
Stalin, Beromunster, Stockholm, Sweden.

Hawke's Bay.

KFEO, KPCA, KDYL, KGP, KGMB, KGA, KOIL, KOIN, KFWJ, KLN, KYW, KFBI, KFSG, KMTR, KV00, KPRC, KMTT, KTRH, ~~KJ3~~, KWTN, KFDV, KPOX, WSM, WMAQ, WFIW, WDSU, WCCO, WRHM, WMBI, WRVA, WABC, WTAM, COMK, XGAI, HSPJ, XEB, NEW, JODK, JOFK.

Wangzani.

KGO, KFI, KGO, WGR, KTAB, KFSD, KNX, KIX, WLS-WENR, KMTB, KGU, KELA-W, KTM, KGW, KHQ, FOL, WLW, WSM, WFAA, WGN, WABO, WBOO, KHJ, KFWB, KFVY, KTHS-KRLD, KFRC, KMOV, WCCO, KROW, KWTI, XER-XBF, KOIN, KJR, WMAQ, WFAF, KONO, WSB-KMMJ, KFNE, WTAM, WBZ, JOFK, JOOK, JONK, JOSK, JORK, JOJK, JOFK, JOHK, JOJK, JOOK, JOPK, JOCK, JOBK, JOLK, JOAK, JOAK (twins), COHE, NGY, HSTP, KZRM, JOKK, TLO, ZBW, ZTC, ZTD, ZTI, KFAC, KFOK, KSTP, KMPC, KVOO, KGMB, KGA, KGB, KDIY, KSL, KEX, WBEM, Katowice, Goteburg, Moscow, Toulouse, Strasbourg, Hielburg, Muhlbacher, Bucharest, IRO, Rome, Prague, OKR, Bratislava, SBA, Stockholm, Brussels No. 1, Poste-Parisian, Milan, Algiers, and Graz.

Manawatu.

KGW, KFI, KPSD, KHQ, KMTR, XBR-XEF, KTBS, KGO, WABC,
KOA, KSTP, KFWB, KOIN, KJR, KSN, KYL, KPIX, WO, WML, KMAX,
KRLD, KEW, WENT, XEF, KIII, KLS, KSL, KFAC, KOIL, KGBR, KNEC,
KBR, KINT, KILW, KWK, KX, KXII, KXII, KXII, KXII, KXII, KXII,
KBYD, WWO, WWO, WBAF, WTC, WRUN, WOW, KTAT, KJR, KWK,
KGA, WCAE, WDDO, WHAS, KZRM, KSO, XGAI, XGY, GER, XG04 (?)
JOHK, JOCK, JOAK, JOAK (L 7-8, 590), JOPK, JOIK, JOIK, JOGK, JOBK,
JSAK, JORK, RSPI, VIB, VIO, VTL, INR (530), OKR, Hiedsburg, Vienna,
ZTI, LYOV, Graz, EAJ7, EA113, ITO, IRO, Tonhouse, Strasbourg, Bordeaux,
NIR, PTT, Bucharest, Budapest, Katowice.

Wairarapa.

KFI, KGO, KPO, KGU, KXN, KRLD, WENR, WTAM, WOAI, WBEM,
JOAK, JOBK, JOFK, JOHK, JOIK, Heilsberg, Sutrens, Muhlacher, Rome,
Wilno, Vienna, Brussels, Prague.

Canterbury.

KNOX, WTAM, WENR, KGO, KTBI, KGA, KDYL, WCCO, WLW, WGN,
KPT, KPO, KMTR, WJJD, KSTP, KFOK, KOA, KYW, KZRM, KFAC, KEWL,
KGH, KJR, KPRC, KTAB, KTM, KPBD, WFAA, WGY, XEF, WRBM, KTHL,
KNX, KEN, KEX, KLA, KSL, WABC, WDAG, KGMB, KGGF, KFYD, HSPB,
KLWB, KPBD, KDB, WFLA, WKBW, WBT, XEFD, JOLK, JOIK,
JOOK, JOKK, JOAK, JOBK, JOJK, JOHK, JOGK, JOJK, JOBK, JOGK, NQOA,
Bucharest, Budapest, Paris Heidsberg, Bateberg, Stuttgart, Toulon, Mulbacher.
Rome, Bratislava, Bremen, Sottens, Helsinki, Madrid, Warsaw, Portugal,
Lille, Barcelona, Harby (Sweden).

Southland.

KFL, KMOX, KRIL, KNX, KMTX, KHD, KPBC, KGW, KTAB, KPO,
KMPP, KGH, KTM, KELW, KGO, KOA, KLN, KTKA, KIL, KOMO, KPEL,
KPRC, KOIN, KFWB, KROW, KPWT, KPVI, KYW, KXN, KYA,
KPOX, KOIL, KOL, KFBZ, KDYL, KPAC, KGBI, KBCA, KGB, WGBL,
KGRS, KGA, KJR, KSTP, KDB, WTH, WENR, WTAM, WFAP, WMAQ,
WABC, WLV, WOD, WACO, WISU, WWJ, WCCO, WFLA, WGY,
WGN, WOAI, WLAC, XEW, XER, XEP, CFBN, WCKY, XGY, XGAA, XITE,
COMK, COIB, GEC, ZBW, Sudsvaal, Brussels No. 1, Brussels No. 2,
Prague, Langenburg, Lyons, Odessa, Moscow, Bernmunster, Bucharest, Saffons,
Toulouse, Levov, Algiers, Muhlacher, London National, Bordeaux, Goteborg,
Hochly, Stockholm, Breslan, Rome, Turin, Trieste, Genoa, Milan, Paris,
Hilversum, Copenhagen, Bratislava, Bonn, Prague No. 2, Limoges, Barcelona,
Heilsberg, Calcutta, Bombay, Lahore, Colombo, HSPI, HS7P, KZRM.

Canterbury

(By 28 MC.)

RECEPTION has greatly improved during August and September. 88 MC reports hearing KFAC, Los Angeles on 1300 kilocycles, strongest at 5.30 p.m. Incidentally, KFAC is the voice of the "Los Angeles Evening Herald and Express." KFAC gives out the latest political news every Saturday night (Sunday here), at 7.30 p.m. (their time). The "Globe Trotter," the radio voice of the "Evening Herald and Express" and Hearst Metrotone News, can be heard daily at 10.40 a.m., 12 noon, 3.40 p.m., and 6 p.m., with the latest news. 88 MC's latest loggings are KYW, Chicago, KFAC, and KFWI, San Francisco. All dxers report the disappearance of the Mexican stations.

The Japanese are coming in well, especially JOHK, Sendai, and JOAK.

The Europeans have been coming in with good volume, the best being SSB, Göteborg, Sweden; Heilsberg, Germany; OK R, Bratislava; EAJ7 Madrid; Bucharest, Rumania. 62MC reports hearing KDB.

Some fine organ music is heard from KFI—nothing like it over here. 3AH, Melbourne, is noted for its excellent orchestral music. An enterprising VK "B" station was heard broadcasting the speeches of the Olympic teams per medium of magnetic recording on a reel of wires. Very clear, too.

It may be news to some dxers that anti-prohibition songs are barred from the N.B.C. network. The announcer of N.B.C. network is Frank Singiser.

Jimmy Greer and his famous orchestra opened in the Biltmore Gardens on August 1.

Donald Novis, famous tenor of KFI, is still heard over the N.B.C. chain.

Will Rogers, talkie star, is doing radio work.

England is planning a network of stations in association with N.B.C. network.

Spain is also planning a network of stations. Portugal, not to be outdone, is erecting a 20-kilowatt transmitter, capable of being boosted up to 100 kilowatts. This station will be completed before the end of 1932. Portable ultra-short wave radiophone transmitters are the vogue in U.S.A. for relay work.

Germany is considering a change to Government control of radio stations.

Amateur radio in U.S.A. was officially 20 years old on August 13. There are over 30,000 amateurs.

I have the wavelengths of several U.S.A. stations transmitting television and sound. Some of these stations operate between 143 and 193 metres. The pictures sound like the Morse code. Full particulars on application.

NGOA has been heard here on 680 k.c. at great strength.

Well, cheerio. 53's to all secretaries. The branch meets on October 12, at 7.45 p.m., at the Radio Society Rooms, 91 Cashel Street (Tisdall's Building). Keep that date clear.—Eric W. Watson.

Otago

(By 960T.)

THE fifth general meeting of the Otago branch was held on September 15. Attendance again was very good, there being present 32 enthusiastic members. Also present were the president of the New Zealand club (Mr. Robson) and the editor of the "Radio Times" (Mr. Smith).

The proposed constitution for the New Zealand DX Club was read and discussed, all points in doubt being fully ex-

plained by Mr. Smith. We all thank you for your visit, Mr. Editor, and feel sure that a constitution along the lines proposed by you will be well worth while.

The following is contributed by 510T, and is his logging for two week-ends when old man static must have been very good to him and decided to stay quiet: KMBR was heard signing off at 5.30 p.m.; also 3100-watters WJTL was on until 7.15 until KMAC spoilt him. WMBH was on until about 8 p.m. KFJZ was on a test programme the next night, September 4 and early September 5. VK7CW, VK2UX, VK2BY, VK2ZD, VK4ZK, VK2WR, and VK2EK were logged without much trouble. Has anyone identified the powerful Chinese station on 680 k.c.? I have repeatedly taken his call as HGOA and have heard Shanghai and Hong-Kong mentioned, and have quite a few items ready to send when I find out who he is.

September 10, KSEL, CFCF were logged; also heard KGIW, KLN, WREN, KGNF, KMJ and KDB, and all the usual ones at good strength, with little static. September 11 KXA and WGBF were logged; the latter completes what I have been trying to do since first starting dxing, that is to log at least one North American station on every channel, that is every 10 k.c. I have now every American station on 17 of the channels, and hope to have two more cleaned up next mail.

DX190T has received his verification back from WSFA, which stated that his was the second report they have had. (Good luck, Bill, now chase those 100-watters.)

Europeans are now coming in at good strength, one member informing me that he has heard 25. Personally I have not yet heard any (too early in the morning for me). Those reported to be the best are: Heilsburg, 1RO, Prague, Brno and Muhlacker.

The committee has decided to inaugurate a branch competition for members. This competition is held monthly, and we expect that all branch members will enter, so at the next monthly meeting bring along your log and see if you can win a place. I have a few copies of the conditions and rules for this competition, and branch members can have same on application.

I am still trying to log 4RO (28MC), but with my old T.R.P. do not think there is much hope.

Now, all you district dxers, how about some notes? It is essential that I have them by the fifteenth of each month; so don't forget to send them in, they would be very much appreciated.

Last, but not least, congratulations, Mr. Robson, on your win in the presidential election, and I trust that you will meet with every success in your new office.—H. W. Natta.

Southland

(By 1S.)

THE last month has probably been the most interesting we have had during the year. New loggings from all over the world are reported. One curious thing I have noticed during the past two weeks is that while a number of the high-powered Americans have been coming in louder than ever, the smaller power ones are weak in comparison. The following have been loud enough to be of entertainment value: KMOX, KFI, WTIC, KGO, KPO, KOA, WBBM, WTAM, KRLD, and

WLW. Trampcar interference has been worse than ever, while power leaks are giving trouble all over Invercargill. The following new loggings are reported: KFKA, KPRC, WWJ, WTIC, KRLD, WFAF, WCCO, WMAQ, KOB, CFCN, WACO, WGY, KOMO, KYM, and WABC.

Eastern stations have been excellent, and those "night owls" who have stayed up for "all-nighters" have been well rewarded. One member, for instance, started one evening at 1 a.m., and till 7.30 a.m. was busy logging new stations, there always being at least five stations at good volume, while between 4.30 and 7.30 a.m. 30 Europeans were heard. European stations are coming through at good volume, but, to me, do not appear to be so good as last year. The best are: Rome, Bucharest, Prague, Bordeaux, Paris, Milan, Breslau, Hilversum, Brno, Hornby, Toulouse, Beromunster, and Turin.

New verifications received by members are: Calcutta, Turin, Muhlacker, WCKY, WSMB, WTIC, WBBM, WFAA, KFAC, KFVD, KPCB, KTM, KTHS, and KFJF.

KPCB have been using a temporary transmitter, and expect to have their new one on the air by the end of September.

KFJF are off the air at present, but will be on the air again with a new 5 kw. transmitter toward the beginning of October. Both these stations will appreciate reports.

CFCN operates on 985 kc., with a power of 10 kw. They are on from 7.30 a.m. till about 11 p.m. each evening, with the exception of Friday night, when they close at 12 p.m. (Mountain Standard Time).—S. Robson.

Victoria

(By 9.0.)

I HAVE succeeded in getting station 2CW, Sydney, to give New Zealand dxers half an hour's special broadcast on October 15, from 11.30 p.m.-12 midnight, Australian East Time, that is, from 1 a.m. to 1.30 a.m. N.Z.T. 2CW promise a good time, and they are going to give us plenty of humorous interludes, and also a few greetings, etc. Tell all the New Zealand dxers to send good reports to 2CW, and then they will be able to see that we do really appreciate the broadcast. Also tell each report must have a 2d. stamp for a verification. If there are enough reports sent in I will ask a few others to give a special broadcast for us. 3KZ, on 222 metres, will be going till 1 a.m., so I guess they will stop me from getting 2UW.

[2UW, Sydney, wavelength 267 metres, power 1500 watts, 1125 kilocycles. Address: Paling's Buildings, 16 Ash Street Sydney, N.S.W.]

THE dx conditions over this way are greatly improved. Last week I logged a new station, 6PR, and that makes my log now read 100. Heard 7UY on August 28 broadcasting a special dx programme for N.Z.D.X.C. I want to thank those who have sent me letters. I appreciate it, and will answer as soon as possible. Would some kind dxer in the MC district see if he can help DX52MC with his set? It has gone "phut"! I tried the Zepp aerial, but could not notice any improvement; many use it on the s.w. bands with good results. 5CK has been coming in on the speaker here lately, very steadily, and without fading, about QSA4, R7, 2FC, 2BL and 6PR have all been received well lately; their strength is improving. 3UP here is very poor; I have to press the set

to get them full speaker strength, all the other locals—3UZ, 3AW, 3KZ—being full speaker and very good. 3LO and 3AR are not good at any time. GPR has increased power to 1000 watts aerial. 5DN has a new transmitter, so improvements from these stations should be noticed. VK3RG recently passed a comment on the report forms, saying they were very good and could be copied by many who send in reports.

Did you hear 7UY give us a session on August 28? I received a surprise when I heard 7UY say that it was the N.Z.-D.N.C. programme. I have something definite on 7UY—7UY, North Western Tasmanian Broadcasters, Ltd., Ulverstone, Tas.; frequency, 1460 k.c. (205.5 m.); power, 200 watts a.c.

I am building a 3-valve set, using a S.G.R.F. detector and 1 audio. I am going to use this set for phone work only and I have it nearly ready.

I see that 5DN has a new transmitter, also a new station at Queensland. 4MB, Maryborough, 1050 k.c., 238 m.; power, 50 w.

I hear that 6WF is getting a 15-kilowatt transmitter, but I'm not certain yet.—Bob, 9.0.

West Australia

(By 100).

ALL stations mentioned in the following lists have been genuinely received and logged, although up to the present I only possess 6 QSL cards, 3 local, 2 New Zealand amateur, and one from PCJ, Holland. I expect that radio people in New Zealand are troubled by electrical machinery interference. If such is the case, they have my deepest sympathy, as interferences of this kind are a nightmare to me in this town, and I understand that most towns with d.c. supply systems are likewise troubled. This interference limits my dx reception, I think, 50 per cent., as I can locate station after station, but am unable to understand the words spoken, as I have to detune to such an extent to reduce the interference that the station is lost. Another form of interference I have, and of which I have never heard another listener complain, is motor-cars. My set is about 40 feet from the street, and when tuned to short-waves, I can hear every motor-car that passes, by the electrical interference it causes, completely drowning any reception for the moment, so you will agree that my dx life is not a very happy one.—H. Stephens (100), West Australia.

Lists of Stations Logged.

Short-wave: ZLW (24.4 m.), 2ME (28 m.), GBP (25 m.), 7LO, Nairobi (49 m.), W2XAF (31 m.), VK3ME (31.55 m.), HSTJ (37.6 m.).

Dx amateurs on Morse, 41-metre wave-band: W1BC, W2ANZ, W3ACJ, W4PE, W5AHK, W6AM, W7AQJ, W8ADN, W9DQ, KA1SR, KA1CO, AU1KAB, AU1GA, PK3BQ, PK1TR, OM2TG, J3C1, J1EE, N2G.

New Zealand amateurs on the 41 and 80 wave-bands (Perth time): July 3, 5.25 p.m., ZL3BV, QSA5, RS, 80 m., calling CQ; July 3, 4.12 p.m., ZL4CK, QSA4, R5, 80 m., calling CQ; July 3, 4.29 p.m., ZL2BF, QSA 3, R5, 80 m., calling ZL2FL; p.m., ZL1AR, QSA4, R6, July 3, 7.35 p.m., ZL2AX, QSA3, R5, 80 m., calling Phone; July 12, 6.10 p.m., ZL1HC, QSA3, R4, 80 m., calling CQ; July 16, 5.10 p.m., ZL1AR, QSA4, R6, 41 m., calling CQ; July 16, 5.19 p.m., ZL3BD, QSA5, R6, 80 m., calling ZL1GR; July 17, 5.40 p.m., ZL3DC, QSA4, R5, 80 m., calling ZL1GZ.

WTIC Hartford

An Interesting Brochure



The Hill Billies Quartet—Popular performers from WTIC.

I RECENTLY received a booklet from WTIC, Hartford, together with a letter in which it is stated that the station receives a fair amount of mail from New Zealand, but recently, for some reason, they have not received as much as they did formerly. Mail comes regularly from Australia, the Hawaiian Islands and Alaska. The power is 50 kilowatts—sufficient to despatch their programmes as far as Australia on the west, and the British Isles, France, Germany, and even South Africa on the east.—S. Robson 18 (Invercargill.)

In the brochure is reproduced photographs of the executives, the studio staff and the principal artists. A technical description of the station is included. Of the station they say that the transmitter serves as a model after which the engineers patterned the new regional station of the Italian Government in Rome, the most powerful and best known station in the Old World.

The studios are located in the heart of Hartford: the transmission plant on a 200-acre tract on the summit of Talcott Mountain in Avon, ten miles from the city. Housed in a commodious building covering more than 3000 square feet of ground, the transmitter occupies a large room 2000 feet square in area. An equal area is required for the floor below for the associated power equipment. Connecting the down-town studios to the Talcott transmitter, are nearly 150 tons of privately leased telephone cable, which is submitted to constant testing to ensure reliability of service and fidelity to tone. Twelve months ago "QST," the official organ of the American Relay League, qualified the WTIC transmitter as "America's most modern broadcasting station."

Here are a few facts concerning the station: The programmes have been

heard in every State in the U.S.A., and every province of Canada. They have been received as far west as Australia, and as far east as Chateau Thierry, France; as far north as Wrangell Island in the Arctic Circle north of Siberia, and as far south as Chile.

WTIC was the first station to transmit a musical appreciation course for children, and the first to broadcast a programme from a travelling aeroplane. Both these innovations were introduced by the Connecticut station in 1926.

A circle with a radius of 300 miles drawn round the WTIC transmitter would include an area which contains one-fourth of the population of the nation, controls one-third of its wealth, and owns one-third of its thirteen and a half million receivers.

It is operated by the Travelers' Broadcasting Service Corporation on behalf of its owners, The Travelers Insurance Company, U.S.A.

WPG, Atlanta

WPG, in a letter to Mr. J. W. Sullivan (91A), states that the programme heard by him was that provided by Noble Sissle's Dance Orchestra broadcasting from the Park Central Hotel in New York City. It is stated that during the past five weeks about five reports have been received from New Zealand. A folder of the station, in which the following facts are mentioned, is included.

The station operates on 1100 k.c., with a power of 5 kilowatts, using crystal control, 100 per cent. modulation. The station, which has been in operation since 1923, is situated in Atlanta on the Atlantic seaboard, the studios being located in Atlanta City's new Convention Hall and Auditorium.

Why American Stations are Deleted Strict Watch on Offenders

DXERS have often noticed that American stations go off the air seemingly without warning. The following account from "Index" relates why some 40 stations were ordered off the air last year.

Two dozen broadcasting stations in various parts of the country were ordered off the air by the Federal Radio Commission during 1931. About a dozen new stations were authorized to be constructed out of a thousand or more applications, most of them local low-power affairs in communities regarded as not receiving adequate radio service. The new year found exactly 608 stations under license in the United States, a rather substantial decrease from the peak of 733 when the Commission took over the regulation of the American ether five years ago.

Led by Major-General Charles McK. Saltzman, its chairman, an unrelenting foe of the "bad actors" of radio, the Commission during 1931 embarked upon a "clean-up" of the broadcast wavelengths designed to free them of the technically inefficient and those deemed to be failing to meet their public service obligations. By some the Commission's new belligerent policy is regarded as an arbitrary usurpation of its authority under the law, while others look upon it as a wholesome thing for radio in that it may keep broadcasting in the hands of trustworthy and public-minded enterprisers.

If it has done nothing else, the Commission's policy has placed almost all broadcasters on their mettle to guard against inefficient operation and insufficiencies in their service to the public.

Weeding the Inefficient.

KGEF, Los Angeles, formerly operated by the Rev. Robert P. Shuler, militant pastor, now running for Senatorship, appealed to the United States Supreme Court on the free speech issue. In the meantime, however, it had to remain silent, having failed to secure relief from the lower courts. WMAK, Buffalo, was ordered off for failure to meet certain technical standards.

The Brinkley station at Milford, Kansas, lost its license only to lead its owner, Dr. John R. Brinkley, to go to Mexico and build a 75,000-watt station (XER) there to serve the American audience. Station KTNT, Muscatine, Iowa, was taken off the air because it was being used as a "personal monthpiece."

Clearing Wave for WCKY.

Ordered silenced also were WMBJ, Pittsburgh, the Rev. Spraul station, which failed on appeal and whose time was given a 100-watter, WWSW; WJAZ, Chicago, the Zenith Radio Corporation, whose time was allocated WCKY, Covington, Ky.; KFQW, Seattle, which failed on appeal; WIBR, Steubenville, Ohio, found to be operating contrary to regulations; WMAF, Round Hills, Mass., whose owner practically surrendered his license voluntarily; WMAV, St. Louis, a church station that had used another station's transmitter and possessed only "phantom" call letters; KZM, Hayward, Calif., for technical reasons; KFHA, Gunnison, Col.; WBBB, Boston, and KPNS, Pasadena, Calif. The last-named is one of the few newspaper-

Special Programme

A CORRESPONDENT from Australia advises that 2CW will give an N.Z. DX Club special half-hour programme on October 16 at 1 a.m. to 1.30 a.m. N.Z. St. T. A humorous programme will be rendered, and if a 2d. stamp is sent 2CW will answer reports. The station operates on 267 metres (1125 k.c.), power 1500 watts.

owned stations to leave the air; it did not appeal from a Commission decision deleting it for inadequate technical equipment.

Station KFQC, Holy City, Calif., for poor service was silenced.

The Commission also refused to license KPFW, Los Angeles, planned as a high-power educational station, when its promoters revealed that they had insufficient support for its authorized construction. Two stations which gave up the ghost voluntarily were WSSH, Boston, a church station which surrendered its time to WAAB, in the same city, for the consideration of specified periods on the air, and KFII, Juneau, Alaska, which could not stand the strain of continued operation.

Ordered off the air were WIBO and WPOC, Chicago, whose time was allocated WJKS, Gary, Ind., because Illinois is over quota in radio facilities and Indiana under quota; WCHI, Chicago, operating under a Chicago court's order staying a Commission decision based on its alleged broadcasts of questionable medical advice; WNJ, Newark, and WKBO, Jersey City, whose

time was ordered turned over to WHOM, Jersey City, because of the latter's alleged superior service; WLBX, Long Island City, for failure to provide public service; and WMBA, Newport, R.I., for poor technical and programme showing.

All the appealing stations have a chance to retain their licenses if the courts so rule. So have a dozen or more other stations cited for inefficient operation or other causes, whose operators must appear at hearings before the Commission to show cause why their licenses should be renewed. Many of the latter group have improved their equipment or service and will undoubtedly win renewals, even though they are now operating in durance.

Consolidations Help Reduce.

There were a number of consolidations during the year which took a few more stations off the air. WGBC, Memphis, merged with WNNR, Memphis; WHDL, Minneapolis, with WIGY, Minneapolis; and WISJ, Madison, Wis., with WIBA, Madison. Early in the year the Commission authorized WUSO, Springfield, Ohio, and WFJC, Akron, to merge and form WGAR, Cleveland, now on the air with 1000 watts. Most of the stations that felt the Commission's ire during 1931 are in the low power category, only WIBO, Chicago, having as much as 5000 watts.

Secretarial Duties Of What Do They Consist?

ONE of our secretaries writes in more or less humorous vein drawing attention to the fact that most secretaries have a pretty hard time. What about it, committees? Get together and help the secretary.

SECRETARIES are receiving much hard criticism just now. What are their duties? To answer letters from Mr. X, who wants to know the new station on did 60 of his "super" set; to keep the branch books; answer all correspondence; send regular reports to "R.T."; arrange meetings and chase after keys for rooms; make the acquaintance of every new member; he is expected to be home (and up!) from 6 a.m. to midnight for the convenience of callers; and to be generally at the beck and call of all prospective members. Now, I ask you, what time have they left for DX?

If local members fail to send in dx reports, then the notes are "dry." But don't blame the secretary—blame yourself for not sending him a monthly report and list of "stations heard."

Hundreds of Queries Answered in

"QUESTIONS AND ANSWERS IN RADIO."

Price 1/6. All booksellers and dealers, or Box 1032, Wellington.



Answers to Correspondents.

N. J. (Masterton): Would KMIC, KMCS, and KRKD count as three different stations? It is really the same station with the call changed. The same applies to KFKB and KFB1. Milford, Kansas. Also, would Hawaii be counted as a separate country from U.S.A.?

A.: The same station with a changed call, unless under exceptional circumstances, counts only as the one station. Similarly, stations on chain programmes cannot be counted. Hawaii is included with United States.

* * * * *

Correspondents Wanted.

I HAVE just received a letter from Mr. Harold F. Logan, 17 Park Road, Truro, Nova Scotia, a member of the Transcontinental DX Club, who asks for New Zealand dxers to write to him. Mr. Logan has a log of 316 stations, so some interesting information to dxers could be had from him.—DX 29MC.

* * * * *

South Americans Heard.

I HAVE just received two verifications. CX26 on 285.7 m., 500 watts. Montevideo, Uruguay; and LR5, 830 k.c., 500 watts, Buenos Aires, Argentine. They run a special English programme every Wednesday night from 9 o'clock till midnight, but owing to recent radio regulations announce in Spanish. This later station will increase its power shortly to 25 kilowatts, and it is installing a new English transmitter. They are very proud to be the first in Argentina to use an English transmitter, and they hope to have it ready for testing early in November.—A. Greening (Inglewood).

* * * * *

Earthing the Aerial.

THREE months ago I increased the length of my aerial from 110 feet to 280 feet, earthing the loose end, and the sensitivity of the set has been increased, stations coming in appreciably stronger. The selectivity of the set has not been affected. Previous to making the alterations to the aerial I found difficulty in picking up 1YA, 3YA at 4YA during the day, but now they come in as I want them.

Since lengthening and earthing the aerial I have been able to pick up 4ZR, Inglethwaite, on his Sunday morning transmission, 10 a.m. to 12 noon, and hearing several items, I sent him a report on June 19, which he verified in a few days. His output is 6 watts. The early morning stations come in

better also. On September 8, between 5.15 and 6.15 a.m., I heard 16 stations, and this time last year, when my set was new, I could get only about eight or nine at the most. My set is an eight-valve superheterodyne.—13OW, Marton.

* * * * *

Arrangement of Postage.

IN your September issue H.B. writes complaining that various Australian stations have not verified his reports. This has troubled me also, and I am at a loss for a solution. On several occasions stamped addressed envelopes were unsuccessful in bringing a reply, and finally I discovered that New Zealand postage is useless in Australia. Could not some arrangement be made between postal services whereby dxers would be able to purchase a special stamp for their use?

I would esteem it a special favour if some of our leading dxers could tell us how they surmount these obstacles.—22N.

* * * * *

A Remarkable Earth and Aerial System.

AFTER much experimenting with aerials and earths, we have hit on a novel system. Our aerial is 65ft. long, coming at an angle from the top of a 52ft. mast direct to the set. The earth comprises 60ft. of aerial wire buried about 6 inches deep, and running directly beneath the aerial past the foot of the mast. The distant end of the aerial is connected by an almost vertical wire to the earth wire from the set.

Reception is appreciably improved. Signal strength is decreased slightly, so that the volume control must be opened a shade more. Interference noises are almost eliminated. This gives a much higher signal to noise ratio. Selectivity is improved. The best example of this is given by 2SM and 3TR. These stations, since we have used this system, come in clearly, side by side, without the slightest heterodyning. I have also been able to sort out 2GN from the mess around 1400 kc.

I have heard 6PR, 5PI, 3TR, 2GN, 2WG, and 7UV, as well as 13 Japs, on the same night.

I can even hear KFI, although 4YA is operating on 645 kc. This is not due to better atmospheric conditions, as we connected and disconnected the distant end of the aerial from the earth wire at will, and noticed a marked difference. Can any reader give a reason for this phenomenon?—64MC, Christchurch.

Hints to New-Chums.

ALTHOUGH a new-chum to radio, I have taken a keen interest in all DX matters. Most of the stations I have heard have given their calls, but for Japs, Europeans and Mexicans I follow "The Radio Call Book," which is very helpful. Then keep an eye on the clock and the notes in the "Radio Record" and "Times."

Here are a few stations I have logged, which are suitable for other new-chums to try for:—

America: KTMR, KFSD, KFI, KPO, WJW, KMPC, WGN, KGU, WJZ, WBBM, KTM, KGO, WJR, WFFA, WCCO, KOA, WABC, WENR, KHJ, KFWB, KTHS, KNN, KMOX, KSL, WOAI, WREN, KFOX, KGEF, KGB, KGER, KGA. All received between 5 p.m. and 8 p.m., N.Z.T.

Manila: KZIM, KGMB.

Mexico: XER.

Japanese: JOOK, KOJK, JOBK, JOAK, JOHK, JOPK, JOCK, JOIK, JOFK. Heard between 9 p.m. and 12 midnight.

I earthed the free end of the aerial as suggested by a reader of the "Times," and was amazed at the increase in volume, reduction in static, and other interference.

I am now after those elusive foreigners with renewed determination. "Omsk," Whakatane, cannot get 2FC during the day; try about 1 p.m., because I can pick him up occasionally at that time.

I have not joined the DX Club yet, but will be among its ranks shortly.—"Lorenzo," Taranaki.

* * * * *

Notes in Passing.

WE, in Southland, had pleasure in welcoming Mr. Colin Smith on September 16. It was a great pleasure for all of us to meet him, and we all hope he enjoyed his all too short visit to this city. Dxers owe him a debt of gratitude for the amount of work he has done in preparing the constitution for the club. I have no doubt but that, owing to his tour of the branches, the club will go ahead faster than ever.

I also had the pleasure of being present at the special meeting held in Dunedin, and regret that I had so little time in which to make dxers' acquaintance. However, I hope to meet them all again shortly, and hope to spend more time among them.

This may appear amusing to dxers in good localities. Quite a little stir was made when one of the members produced a verification from KFCB, the first 100-watter to be verified, as far as I am aware, from the United States.

WTIC in a most interesting letter sent to me stated that they were not receiving so many reports from New Zealand as they did a few years ago. They also sent me a booklet of their station, some pamphlets, and an ekko stamp. I heard WTIC on August 28, when they stated they would appreciate reports.

Turin, as a verification, forwarded

me a copy of their weekly programme paper of the week I reported on. I logged a new Eastern station on 1020 kc., which may be heard at 3 a.m. broadcasting music and language similar to Chinese. The following Eastern stations give their call in English GEC, ZBW, COHB, NGOA, COMK, and NGY. Breslau has now apparently increased its power, as it is one of the most regularly heard European stations.—S. Robson (18).

* * * * *

Identifying Stations.

I HAVE found that the Chinese stations, NGY Hanchow (980 k.c.), NGZ Nanking (1070 k.c.), COHB Harbin (670 k.c.), and NGT Tientsin (1060 k.c.) can be heard from about 12.30 a.m. to 2 a.m. GEC Tientsin (1000 k.c.) and KRC Shanghai (870 k.c.) are heard on good nights only. Quite a number of dx-ers have been mistaking HSP1 Bangkok, Siam (850 k.c.) for VUB Bombay, India (840 k.c.). These two stations can be easily identified as VUB does not use a gong or chimes. For their call they say "Bombay calling." VUB's hours of broadcast are daily from 5.30 p.m. to 11 p.m. (Indian S.T.). On Sundays they close at 10.30 p.m. Indian standard time is 5½ hours ahead of G.M.T. HSP1 Bangkok uses a gong, and their call. The address of VUB is Radio House, Apollo Bunder, Bombay. The address of VUC Calcutta (810 k.c.) is 1 Garstin Place, Calcutta. To those who can't get a reply from KZRM Manila, try addressing your letters to B. H. Silen, Broadcast Manager, Station KZRM, the Insular Building, Manila.

VPB Colombo, Ceylon (700 k.c.) can be heard from 1 a.m. to 4.15 a.m. or 4.30 a.m. This station often has dance music before closing. At other times they close with a news bulletin.

All communications to VPB should be addressed to "The Chief Engineer, Broadcasting Office, Torrington Square, Colombo." The Japanese always announce their call letters only, before signing off at about 12.25 a.m. every morning. However, some of the smaller-powered stations keep on till 1.30 a.m. or after. JONK Nagano, JFAK Taikoku, and JOLK Fukuoka are three of the stations on later than the rest.—N. Jenkins, Masterton.

* * * * *

Private Messages From WMI.

I HAVE heard quite a number of Japanese stations, and waited a long time in order to get their calls. How may they be verified, as the items cannot be given seeing they are announced in Japanese?

The following letter was received from WMI:—"The stations of this system give commercial telephone service of a private nature to the people. For this reason no record is kept of the matter transmitted, and we cannot verify reception of the stations involved."

WSXK writes that he is working in conjunction with KDKA, and ordinarily carries the same programme.

To date, starting from the beginning of the month, I have logged items, dates, times, etc., of 152 stations. Where is this new station 2KA?—GJHB and 92HB.

* * * * *

Stations Not Verifying.

REGARDING blacklisting certain broadcasting stations I hope this will be viewed from all angles before arriving at any decision. "Black" to my idea is an ugly word to use, and if there is a list to be published I would prefer to call it a "no reply" list. From time to time we see in the notes mention of stations that have not replied, and I think if a correct tally was taken of these, numerically they would not amount to many.

One of the most discussed stations has been KTM, and in my case I received a prompt reply and an Ekko stamp from them, although my report was not a good one, and I did not enclose a reply coupon. There are many other members who have had equal results, and I think it would be absurd to put a station like this on a "black" list.

Is the Round the World Dx Club still alive, and what work are they supposed to be doing? It appears to me that the N.Z. Dx Club should be working closer together with them; they should be able to supply much information on the matter in question.

Of all the American stations written

to, I consider the percentage of non replies is very small.—B. Webber (Stratford).

* * * * *

KDKA and WSXK.

I HAVE just received a verification from WSXK (KDKA), and in my letter to them stated that the special test transmissions (WSXAR) were very consistent and clear, and far better than their s.w., which frequently faded.

They were interested in the report comparing s.w. and broadcast programmes. As regarded the test programmes given periodically they could not definitely give the power used, as the latter varies according to the object of the test. The call during experimental programmes is WSXAR, and they inform me that the licensed power of the station is 400 kilowatts—a power so far unused.—S.T.T., Wellington.

* * * * *

EVERY home constructor should have a long-bladed screwdriver with a round handle. Not only is it much easier to work with, but it enables one to make adjustments to internal portions of the set which otherwise might be inaccessible. To prevent accidental shorts, which are often expensive, the blade, including the metal ferrule, should be carefully wrapped with insulated tape or sticking plaster, wound on to within half an inch of the end of the blade.

IT'S TIME YOU CONSIDERED YOUR FUTURE

Choose a worth-while career - consider one that is going to place you above the average.

The Radio Profession is offering to-day, jobs that other professions can never in this age equal.

Travel as a wireless operator - stay in town as an engineer.

Write or call in to see Mr. C. F. Johnson, A.M.I.R.E., our principal, and let him map out your career.

JOHNSON'S WIRELESS and RADIO SCHOOL

8-10 BRANDON STREET - WELLINGTON

Amended QRAs and DX Calls

New Zealand.

- 1YA**—Radio Broadcasting Board, Karangahape Road, Auckland, 820 k.c., 365.6 m., 500 watts. Operates almost continually between 10 a.m. and 10 p.m., weekdays; and until 11 p.m. on Tuesdays and Wednesdays. Saturdays, 3-11 p.m.; Sundays, 2-10 p.m.
- 12M**—W. Rogers, Massey Road, Manurewa, 1260 k.c., 238 m., 17 watts. Mon., 9-11.30 a.m., 2-5 p.m.; 7.30 to 10 p.m.; Tues. to Sat., 9-11.30 a.m. Sun. and holidays, 10 a.m. to noon; 1-3 p.m.; 4.30 to 6; 8.30-11.30 p.m.
- 22B**—T. H. Boston, 116 Wellesley Road, Napier, 1290 k.c., 232.4 m., 7.5 watts. Mon., Thurs and Sats., 6-7 p.m.; Sun., 10.30 a.m.-12 noon.
- 22H**—G. B. Hansen and Co., 59 Latham Street, Napier, 1290 k.c., 232.4 m., 65 watts. Mon., Tues., Fri., noon-2 p.m.; 7-10.30 p.m.; Wed., noon-2 p.m.; 6.20-10.30 p.m., Thurs., noon-2 p.m.; Sat., 10 a.m.-5 p.m.; 7-11 p.m., Sun., noon-3 p.m.; 6.20-10 p.m.
- 22I**—Sutcliffe, Ltd., Hastings. Station closed.
- 22J**—C. T. C. Hands, 229 Gladstone Road, Gisborne, 1150 k.c., 260.9 m., 20 watts. Mon., 2.30-4.30 p.m.; 7-8 p.m.; Tues., 12 noon-1.30 p.m.; 7-8 p.m.; Wed., noon-1.30 p.m.; 7-8 p.m.; 8.15-10 p.m.; Thurs., 7-8 p.m.; Fri., 4-5.15 p.m.; 7-8 p.m.; 8.15-10 p.m.; Sat., 2.30-4.30 p.m.; 7-8 p.m.
- 22L**—Lockyer's Radio Stores, Ltd., 815 Lawrence Street, Hastings, 1400 k.c., 214.2 m., 20 watts. Mon. to Fri., 9.30 a.m.-11.45 a.m.; Thurs., 6.30-10 p.m.
- 22R**—N. D. Braithwaite, Begg and Co's Bldg., Trafalgar Street, Nelson, 1360 k.c., 220.4 m., 50 watts. Mon., Tues., Thurs., 12-2 p.m.; 5-11 p.m.; Wed., 12-2 p.m.; 5-10 p.m.; Sat., till midnight; Fri., 12-2 p.m.; 5-10 p.m.; Sun., 6-10 p.m.
- 32E**—Schaefer's Garage Bldg. Service, Mackay Street, Greymouth, 1300 k.c., 230.0 m., 50 watts. Mon. and Wed., 12.30-1.30 p.m.; Fri., noon-2 p.m.; Sat., 9.15-11 p.m.
- 32R**—Greymouth Radio Society, Bright Street, Cobden, Greymouth, 1300 k.c., 230.0 m., 80 watts. Mon. and Wed., 7-9 a.m.; 6-10 p.m.; Tues. and Thurs., 7-9 a.m.; 6-6.30 p.m.; 7-10 p.m.; Fri., 7-9 a.m.; 6-10 p.m.; Sat., 7-9 a.m.; 3-5 p.m.; 6-6.30, 7-9 p.m.; Sun., noon-1.30 p.m.; 3-9 p.m.
- 42R**—Renton and Clark, Clyde Street, Balclutha, 1340 k.c., 224 m., 4 watts. Thurs. 8-11 p.m.; Fri., 2-3 p.m.; Sun., 10 a.m. to noon; 6-8.30 p.m.

Australian Stations

- 2WG**—Riverina Broadcasting Co., 16 Fitzmaurice Street, Wagga, 1155 k.c., 260 m., 50 watts aerial. 8.30-11.30, nightly. No Sunday transmission.
- 4MB**—Maryborough Broadcasting Co., Wynnes' Station, Maryborough, 1060 k.c., 283 m., 50 watts aerial. Schedule not yet to hand.
- 4RO**—Rockhampton Broadcasting Co., Studios, Rockhampton, 1230 k.c., 222.56 m., 250 watts. 7.30 to 11.30 p.m., weekdays.
- 7UV**—Ulverstone, Tasmania, 1480 k.c. (203 m.), approx. 200 watts. Testing.*

*Particulars of this station have been supplied by members.

American Stations.

- WHOM**—Jersey City, N.J., 1450 k.c., 206.8 m., 250 watts.
- KSOO**—Sioux Falls, S.Dak., 1110 k.c., 270.1 m., 1 k.w.
- WBT**—Charlotte, N.C., 1080 k.c., 277.6 m., 25 k.w.
- WHA**—Madison, Wis., 940 k.c., 319 m., 1 k.w.
- WVL**—New Orleans, La., 850 k.c., 352.7 m., 5 k.w.
- CRGW**—Toronto, Ont., 840 k.c., 356.9 m., 5 k.w.
- KXA**—Seattle, Wash., 760 k.c., 394.5 m., 250 w.
- HGU**—Honolulu, Hawaii, 750 k.c., 399.8 m., 2.5 k.w.
- WSM**—Nashville, Tenn., 650 k.c., 461.3 m., 50 k.w.
- KMO**—Fresno, Calif., 580 k.c., 516.9 m., 500 w.
- KVI**—Tacoma, Wash., 570 k.c., 526 m., 500 w.
- WDEV**—Waterbury, Vt., 550 k.c., 545.2 m., 500 w.

Amateurs.

- ZL1CG**—W. A. Scarborough, 18 Norwich Street, Auckland.
- ZL1HZ**—J. Dodds, jun., Raynor's Road, Huntly.
- ZL2CR**—R. J. H. Scott, River Terrace, Waipukurau.
- ZL2MK**—J. A. Adams, Huntville.
- ZL2MN**—H. P. Adcock, 39 Opaki Road, Masterton.
- ZL2MN**—L. E. Pole, 206 Queen Street, Masterton.
- ZL2MO**—R. W. Johnston, 16 Dalgan Street, Wanganui.
- ZL2MP**—W. H. Powell, 4 Wilkie Street, Wanganui.
- ZL2MQ**—P. G. Crook, 102 Maclean Street, Hastings.
- ZL2MR**—D. I. Blair, Te Floro.
- ZL2MS**—L. H. Thomasen, Rewa.
- ZL3FF**—P. T. Hainsworth, 51 Fitzgerald Avenue, Christchurch.
- ZL4DA**—L. A. Halcrow, 42 Orbell Street, Dunedin.

The DX Club.

Additional Southland Members.

- 43S**—McKillop, 41 Lees Street, Invercargill.
- 58S**—R. L. Small, Box 16, Mataura.
- 60S**—N. Sutherland.
- 61S**—R. Browallie, Box 106, Gore.

Otago Members.

- 106OT**—Huntly, J. R., 78 Russell Street, Dunedin.
- 107OT**—Bouch, W., 39 Meadow Street, Dunedin.
- 108OT**—Smart, W., Peter Street, Dunedin.
- 109OT**—Tolmie, E., 44 Magdala Street, Dunedin.

Westland.

- 1Wd**—E. J. Crabbe, P.W. Office, Tiroora, via Westport. (4NW)
- 2Wd**—A. W. Henley, Box 20, Westport. (6NW)
- 3Wd**—W. Malpass, Pitt St., Runanga, nr. Greymouth. (7NW)
- 4Wd**—W. Flannigan, Kane Street, Millerton. (8NW)
- 5Wd**—A. W. Keown, Runanga, Greymouth. (9NW)
- 6Wd**—R. Glen, Brunerton, West Coast. (10NW)
- 7Wd**—W. Hampson, Brallie Street, Blackball. (11NW)
- 8Wd**—L. Eager, Sale Street, Hokitika. (12NW)
- 9Wd**—F. Freitas, Box 46 Hokitika. (14NW)
- 10Wd**—J. McMillan, Rotomahana, Otira Line, West Coast. (18NW)
- 11Wd**—J. C. Holmes, c/o Newiman Bros., Westport. (20NW)
- 12Wd**—A. Burt, c/o Wm. Burt, Millerton. (21NW)
- 13Wd**—H. B. Watkins, Stockton Mine, via Westport. (23NW)
- 14Wd**—I. Bird, Box 67, G.P.O., Westport. (25NW)
- 15Wd**—K. Vallance, Rotomahana, Otira Line, Westland. (26NW)
- 16Wd**—L. Havill, Hoiterangi, Hokitika. (27NW)
- 17Wd**—J. R. Leitch, Box 147, Greymouth. (31NW)
- 18Wd**—J. Leitch, Box 14, Greymouth. (32NW)
- 19Wd**—J. H. Smith, Ross, Westland.
- 20Wd**—F. J. Hevelldt, Ross, Westland.
- 21Wd**—W. Gunn, c/o Duncan and McLean, Ltd., Box 137, Greymouth. (34NW)
- 22Wd**—C. P. Hendricksen, Burnett Face, Dennistown. (38NW)
- 23Wd**—S. McCallum, 43 Alexander Street, Greymouth. (40NW)
- 24Wd**—W. F. Johnston, c/o P.W.D., Greymouth. (42NW)
- 25Wd**—H. Rattray, P.O. Box 145, Greymouth. (43NW)
- 26Wd**—G. Stapleton, Hampden Street, Hokitika. (44NW)
- 27Wd**—A. E. Golding, Granity, D.H.S., Westport. (48NW)
- 28Wd**—R. J. Batwell, P.O. Box 143, Greymouth. (49NW)
- 29Wd**—K. McKay, Box 6, Ross. (50NW)
- 30Wd**—P. H. Crough, Upper Kakatahi. (52NW)
- 31Wd**—D. Hildebrand, Seddon Terrace, Runanga, West Coast.
- 32Wd**—G. V. Key, Davie Street, Hokitika.

Changes of Address.

- 1FM**—J. E. B. Wain, Karikati.
- 1GL**—J. E. Talbot, 57 Haupapa Street, Rotorua.
- 1HG**—A. R. St. Clair, 28 Cheltenham Road, Devonport.
- 1HR**—L. W. Goodwin, 309a Railway Settlement, Paeroa.
- 2CD**—F. A. McNeill, 16 Badfield Terrace, Wellington.
- 2DZ**—H. M. Griffiths, Tokomaru.
- 2FM**—J. G. Hogan, 105 Coromandel Street, Wellington.
- 2GG**—C. H. Brown, 31 Ira Street, Wellington.
- 2GM**—G. T. King, 25 Ava Street, Petone.
- 2LW**—H. McLennan, Khadallah Road, Johnsonville.
- 2ME**—M. R. Parsons, 7 Rakau Road, Hataitai, church.
- 14A**—Coombes, B., Public Works No. 3 Camp, Arohena.
- 13HB**—Wilson, J. H., 1 Raglan Street, Port Alford.
- 32HE**—Hayes, E. J. B., c/o Box 3, Taradale.
- 54HE**—Studd, G. C., 22 Waterloo Street, Dannevirke.
- 53HB**—Berry, W. L., 7911B, Moungahau, J.
- 62MC**—Emerson, A. L., 74 George St., New Brighton, Christchurch.
- 81MC**—Shepherd, R. H., 29 Tones Road, Papamoi, Christchurch.
- 24MC**—Hill, W. C. R., Grady Street, Mayfield, Glenheim.
- 89W**—Geo. Vining, 6 Alan Street, Palmerston North.
- 54S**—Mrs. Robson, 110 Islington Street, Invercargill.

Addresses Wanted.

- 66MC**, Arthur Bergman; **14MC**, Clifford Jowett; **18MC**, L. J. Morgan; **11MC**, C. J. Curline; **83MC**, C. S. Colard; **60S**, N. Sutherland.

New Members.

- 185A**—Bowman, R. J., Herekino.
- 183A**—Davies, Master G., Fourth Avenue, Cameron Rd., Tauranga.
- 186A**—Gilbert, R., Butter Factory, Motukaraka, N. Auckland.
- 182A**—Ion, B., 6 St. Andrew's Road, Epsom, Auckland.
- 181A**—Jones, C. E., 8 Kowhai Terrace, Epsom.
- 187A**—Marshall, Wm., Valley Road, Hikurangi.
- 189A**—McLelland, L. C., Ohaeawai, Auckland.
- 147W**—Collinson, D. M., 19 Kaihi Road, Hataitai.
- 150W**—Carr, Frank, 21 Lowther Street, Wanganui.
- 146W**—Holmes, W., 14 Ngata Street, Palmerston North.
- 149W**—Kelly, Ambrose, 18 Orana Street, Eastbourne.
- 148W**—Shenahan, R., 1 Alice Street, Lower Hutt.
- 145W**—Walker, G. J. V., P.O., Levin.
- 91HB**—Boyd, G., Main Road, Clive, Hawke's Bay.
- 92HB**—Boyd, Mrs., Main Road, Clive, Hawke's Bay.
- 86HB**—Fairley, Raoul, 74 Tennyson Street, Napier.
- 88HB**—Livingstone, A., 62 Awapuni Road, Gisborne.
- 90HB**—Mackenzie, A. D., Seinde House, Boys' High School, Napier.
- 93HB**—Potham, A. C., 511 French Street, Hastings.
- 94HB**—Redshaw, D., 96 Nelson Crescent, Napier.

41T.—Powell, W. G., Patunga, Taumarunui.
 42T.—Rayner, J. W., Kakahi, King Country.
 26N.—Gadd, S. J., High Street, Motueka.
 21Wd.—Hildebrand, Douglas, Seddon Terrace, Rungata, W. Coast.
 32Wd.—Key, Geo. V., Davis Street, Hokitika.
 126MC.—Jotti, Jack V., 216 Preston's Road, Marshland, Christchurch.
 123MC.—Elliot, N. G., 136A King Street, Sydenham, Christchurch.
 124MC.—Hicks, F., 709 North Road, Belfast.
 128MC.—Hinks, E. J., 21 James Street, Timaru.

127MC.—Manchester, M. C., c/o Union Bank of Aus., Ltd., Christchurch.
 125MC.—Robb, C. M., 105 Bealey Avenue Christchurch.
 12800t.—Richard H., c/o Mrs. Ruthven, Kildare St., Waikanae, Dunedin.
 120.—Jyson, W. J., 72 Cambridge Avenue, Hamilton, Ontario, Canada.
 130.—Thompson, Jackson, W., 535 Hess St., Bethlehem, Penn., U.S.A.

EUROPEAN STATIONS

Budapest No. 1 Lakthey (Hungary)	545	550	18.5
Sundsvall (Sweden) (Relays Stockholm)	544	542	10
Munich (Germany)	503	543	1.5
Palermo (Italy)	571	525	3
Riga (Latvia)	571	525	15
Vicuna (Rosenhugel) (Austria)	580	517	15
Brussels No. 1, Velthem (Belgium) (French Programme)	580	509	15
Astrakhan, RV35 (Russia)	590	508	10
Nijni Novgorod, RV42 (Russia)	598	501.7	10
Florence, IF1 (Italy)	599	500.8	20
Trondheim (Norway)	605	495.8	1.2
Prague, No. 1 (Czechoslovakia)	614	488.6	120
Dufa, RV22 (Russia)	617	486.2	10
North Regional (Manchester)	625	480	50
Ivanovo-Vosnessensk, RV33 (Russia)	625	480	10
Langenberg (Germany)	635	472.4	60
Lyons la Doua, PTT (France)	644	465.8	1.5
Beromünster (Schweizerischer Landessender) (Switzerland)	653	459.4	60
Salamanca, EAJ22 (Spain)	662	453.2	1
Odessa, RV13 (Russia)	666.7	450.4	4
Rome, IRO (Short-wave Station, 2RO on 25.4 m.)	680	441.2	50
Stockholm (Sweden)	689	435.4	55
Belgrade (Yugoslavia)	696	431	2.5
Madrid, EAJ7 (Union Radio) (after 7.0 p.m.)	707	424.3	2
Madrid, EAJ2 (Radio Espana) (up to 7.0 p.m.)	707	424.3	1.3
Moscow, Imini Stalina (Russia)	707	424.3	100
Berlin, No. 1, Witzleben (Germany)	716	419	1.5
Rabat (Morocco)	720.5	414.4	6
Dublin (Irish Free State)	725	413	1.2
Madrid, EAJ7 (Spain)	730	410.9	1.3
Katowice (Poland)	734	408.7	16
Sottens (Radio Suisse Romande) (Switzerland)	743	403.8	25
Midland Regional	752	398.9	25
Bucharest (Rumania)	761	394.2	12
Frankfurt-a-M. (Germany)	770	389.6	1.5
Archangel, RV36 (Russia)	770	389.6	10
Radio-Toulouse (France)	779	385.1	8
Stalino, RV26 (Russia)	779	385.1	10
Lwow (Lemberg) (Poland)	788	381	14
Seville, EAJ5 (Union Radio) (Spain)	790	379.7	1
Scottish Regional (Falkirk)	797	376.4	30
Hamburg (Germany)	806	372.2	1.5
Helsinki (Finland)	815	368.1	13.2
Polzano (Italy)	815	368.1	1
Kharkov, RV20 (Russia)	815	368.1	10
Bergen (Norway)	824	364.1	1
Algiers (Algeria)	825	363.6	13
Muhlacker (Stuttgart) (Germany)	832	360.6	60

London Regional (Brookmans Park)	843	355.9	50
Graz (Austria) (Relays Vienna)	852	352.1	7
Barcelona, EAJ1 (Spain)	860	348.8	7.6
Leningrad, RV70 (Russia)	860	348.8	10
Strasbourg, PTT (France)	868	345.2	11.5
Brno (Brum) (Czechoslovakia)	878	341.7	35
Brussels II, Velthem (Belgium), (Flemish Programme)	888	337.8	15
Poznan (Poland)	897	334.4	1.35
Milan (Italy)	905	331.4	7
Poste Parisien (France)	914	328.2	60
Breslau (Germany)	923	325	1.5
Göteborg (Sweden), (Relays Stockholm)	932	321.9	10
Naples, INA (Italy)	941	318.7	1.5
Marseilles, PTT (France)	950	315.6	1.6
Cracow (Poland)	959	312.6	1.7
Genoa, IGE (Italy)	959	312.6	10
Cardiff	968	309.8	1
Bordeaux-Lafayette, PTT (France)	986	304	13
North National (Manchester)	995	301	50
Tallinn (Esthonia)	1004	298	11
Hilversum (Holland), (Up to 4.40 p.m.)	1013	295	7
Hilversum (Holland), (After 4.40 p.m.)	1013	295	20
(Exchanges wavelengths with Huizen every three months.)			
Kosice (Czechoslovakia)	1022	293	2.6
Vitpuri (Viborg), (Finland), (Relays Helsinki)	1031	291	13.2
British Relay Stations	1040	288	—
Bratislava (Czechoslovakia)	1076	278	13.5
Hellberg (Germany), (Relays Königsberg)	1085	276	60
Turin (Italy)	1096	274	7
Rennes, PTT (France)	1105	271	1.3
Minsk, RV10 (Russia)	1105	271	10
Valencia (Spain)	1121	268	8
Lille, PTT (France)	1128.5	265.6	1.3
Moravská-Ostrava (Czechoslovakia)	1137	263.7	11.2
London National (Brookmans Park)	1147	261	50
Leipzig (Germany)	1157	259	2
Hörby (Sweden), (Relays Stockholm)	1167	257	10
Główny (Germany), (Relays Breslau)	1185	253	5
Barcelona, EAJ15 (Assoc.Nat.) (Spain)	1193	251	7
Almeria, EAJ18 (Spain)	1193	251	1
Prague, No. 2 (Czechoslovakia) (Temporary)	1202	249	—
Trieste (Italy)	1211	247.6	10
Cassel (Germany), (Relays Frankfurt)	1220	245.8	0.25
Nürnberg (Germany), (Relays Munich)	1256	239	2
Cork (Irish Free State)	1337	224.4	1
Pecamp, Radio-Normandie (France)	1345	223	10
Warsaw, No. 2 (Poland)	1400	214.4	10

JAPANESE STATIONS

JOOK—Kyoto, 660 k.c., 313 m., 300 w., Relay.
 JOAK—Tokyo, Honsbu, 570 k.c., 345 m., 10 k.w. Main.
 308 k.c., 590 m., 10 k.w.
 JOIK—Hiroshima, Honsbu, 850 k.c., 352 m., 10 k.w.
 JOIK—Sapporo, Hokkaido, 830 k.c., 361 m., 10 k.w. Regional.
 JOCK—Nagoya, Honsbu, 810 k.c., 370 m., 10 k.w. Regional.
 JOIG—Kumamoto, Kyushu, 790 k.c., 380 m., 10 k.w. Regional.
 JOPI—Shizuoka, 770 k.c., 385 m., 500 w., Relay.
 JOIK—Sendai, Honsbu, 770 k.c., 380 m., 10 k.w. Regional.
 JOAK—Daizen, 760 k.c., 395 m., 500 w.
 JOHK—Osaka, Honsbu, 750 k.c., 400 m., 10 k.w. Main.
 JOKR—Kokura, 735 k.c., 408 m., 1 k.w. Relay.

JORK—Kochi, 720 k.c., 417 m., 500 w., Relay.
 JOJK—Kanazawa, 710 k.c., 423 m., 3 k.w. Relay.
 JOJK—Okayama, 700 k.c., 429 m., 500 w. Relay.
 JOBK—Kefjo, 650 k.c., 435 m., 1 k.w.
 JOLK—Fukuoka, 630 k.c., 447 m., 500 w. Relay.
 JOVK—Takodate, 680 k.c., 441 m., 500 w. Relay.
 JFAK—Taihoku, Formosa, 670 k.c., 448 m., 10 k.w.
 JOCK—Akita, 645 k.c., 465 m., 300 w. Relay.
 JONK—Nagano, 635 k.c., 472 m., 500 w. Relay.
 JOIK—Mitsue, 625 k.c., 480 m., 500 w. Relay.
 JOJK—Niigata, 625 k.c., 480 m., 500 w. Relay.

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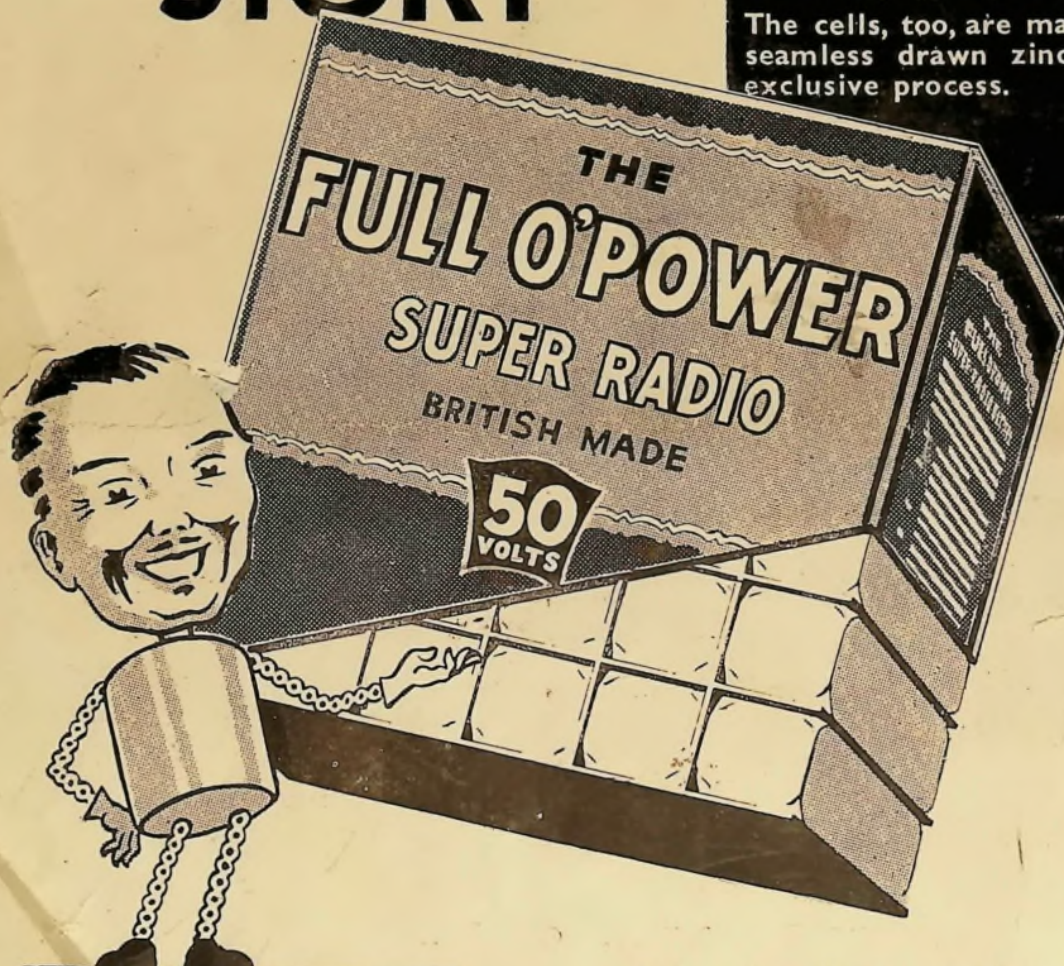
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