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VOL. 5. No. 3.

FRIDAY, NOVEMBER 14,



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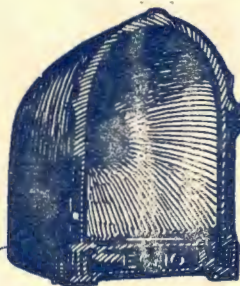
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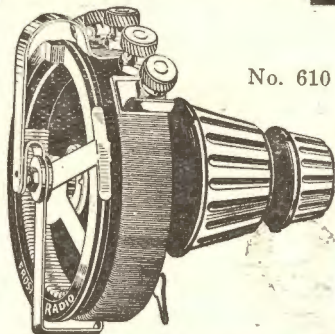
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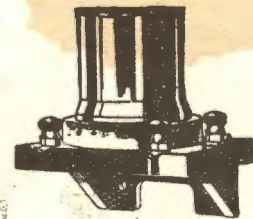
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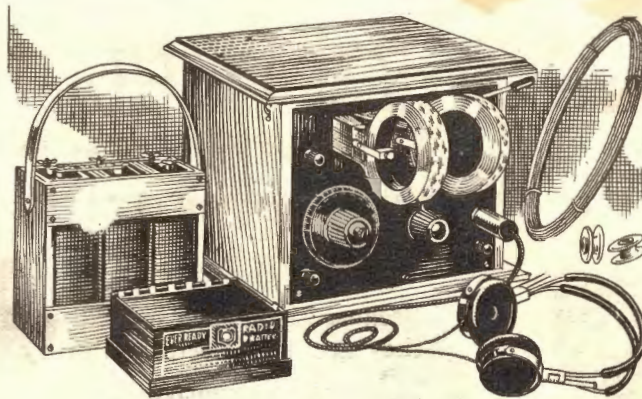
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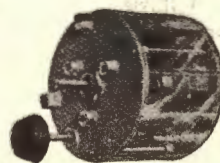
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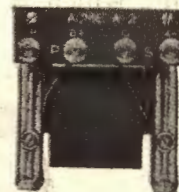
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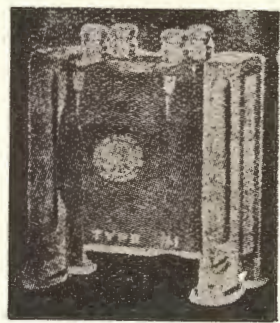
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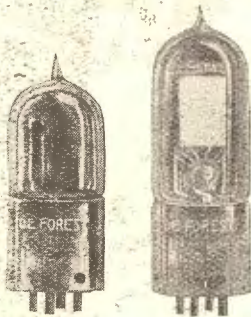
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VOL. 5. No. 3.

FRIDAY, NOVEMBER 14, 1924.

CONTENTS:		Page
EDITORIAL		12
WIRELESS INSTITUTE		14
HIGH POWER STATIONS		16
VALVE NOISES		17
RADIO IN THE ANTIPODES		20
LOCATING TROUBLE IN RECEIVERS		23
INTERSTATE NOTES		25
A THREE VALVE RECEIVING SET		27
ROUND THE CLUBS		34

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

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EDITORIAL

Over the Pond.

WELL, we've done it, at least Victoria has done it. 3BQ has established two way contact with 6AHP (U.S.A.) and to Max Howden we extend the glad hand, together with the proverbial hearty congratulations. Every Australian transmitter will join with us in assuring 3BQ that he has put up some remarkably good work. And now all eyes are turned towards England. If only we can overcome that daylight stretch between here and New Zealand, or the 2000 miles of desert lying to the west we shall be there.

While extending bouquets to 3BQ, in the same breath we are moved to offer our sympathy to 2CM, because, had it not been for trouble unexpectedly cropping up, undoubtedly 2CM, and incidentally N.S.W., would have been the first over. This is how it happened. For about a fortnight, a very pronounced inductive effect in the form of a loud and continuous hum has been playing havoc with D.X. reception at 2CM, and unfortunately its worst effect was noticed on 75 metres; it could be fairly well tuned out above 80 metres, and below 70. At 6.30 p.m., 2CM, who had been working 4AA for some time, received a phone message from 2DS as follows: "6AHP calling you. Says your signals QSA and wants you to call him." 2CM accordingly got down to 75 metres, but his sole greeting was the roar of induction. Reception being hopeless, he closed down. About one hour later 3BQ got across.

When we went to press 2CM was fitting out a special loop receiver for his car, with the intention of touring the Strathfield district nocturnally in an endeavour to locate the source of the trouble.

That "I'll-do-it-if-it-takes-all-summer" look in his eye convinces us that 3BQ will not long be in possession of that record—in fact we are tipping something startling before long. Watch 2CM.

We have with us the consulting electrical engineer, the consulting mechanical engineer and so on, but until recently the science of wireless in Australia has not produced an individual whose profession was that of consulting radio engineer.

However, Sydney can now boast that the first consulting radio engineer in Australia has now established business in this city.

It has come as no surprise to a large number of us that Mr. Charles Maclurcan has at last entered the professional side of wireless in a consulting capacity. There is very little need to dwell upon Mr. Maclurcan's achievements in the past as the name of his station, 2CM, is known not only all over Australasia, but in other parts of the world. With the vast amount of accumulated knowledge gained during his many years' experience in Wireless, there can be no doubt whatever that he is well fitted for this particular capacity.

WE were more than pleased to receive a visit from Kingsley Love and Ross Hull, of Melbourne, while they were across here from the cold regions. They say you can always tell a Melbourne man by his sleet-proof whiskers, but we found this theory disproved in the case of these two experimenters. Between long periods devoted to silent but eloquent admiration of our 'Arbour, they filled in time in a series of onslaughts upon the lairs of some of our leading transmitters and were full of praise for the hospitality that has been shown them by the crowd here. They returned to Melbourne armed with much valuable information upon the situation here, and with an insight into conditions affecting N.S.W. experimenters. By the way we emphatically deny the rumour that Mr. Love told us Victoria is nine months behind New South Wales in wireless matters.

Another welcome visitor was Lionel T. Swain (2CS) Newcastle, who breezed in, full of enthusiasm for the friendly and cheery spirit shown him by those he had met in Sydney. Incidentally, 2CS mentioned that a lot of QSL cards have been re-addressed to him from other parts of N.S.W. His correct address is "Eastwood," 49 Everton Street, Hamilton, Newcastle.

THE LEICHHARDT AND DISTRICT RADIO SOCIETY.

On Tuesday, November 4th, members of the Leichhardt and District Radio Society held their 25th monthly business meeting at the club-room 176 Johnston St., Annandale.

Much important business was dealt with, including the adoption of the minutes of the meetings of delegates of clubs and societies affiliated with the Wireless Institute of Australia, held on September 9 and October 7, the amending of the Society's rules to permit of the admission of honorary members, and the re-arrangement of the syllabus to permit of the conducting of a competition amongst members of the Society.

With regard to the last mentioned matter, it has been decided to combine the two lectures on radio frequency amplification and audio frequency amplification set down for November 25th and December 16th respectively, and this combined lecture was then set down for November 11th instead. It will be followed on November 18th by a "Sale and Exchange evening, and on November 25th, the 8th lecture of Syllabus No. 2 will be delivered by Mr. Fox, who will deal with the subject of "Batteries."

The competition itself will take the form of the writing of short papers by members, the subject to be on any matter connected with wireless and each paper not to exceed such a length whereby a greater period than ten minutes will be occupied in the reading of it. Papers must be in the hands of the Hon. Secretary not later than December 2, and the winning entry as well as a number of others considered to be more or less meritorious, will be read at the meeting to be held on December 9th.

The prize will be the sum of one guinea donated by "Wireless Weekly," and the editor of that journal, Mr. A. W. Watt, has been requested to act as judge. Members are very enthusiastic over the idea, and a large number of entries are anticipated.

The Society holds its meetings at the club-room, 176 Johnston St., Annandale, every Tuesday evening commencing at 8 p.m., and inquiries should be addressed to the Hon. Secretary, Mr. W. J. Zech, 145 Booth St., Annandale.

CAMPSIE AND DISTRICT RADIO CLUB

A meeting of the Campsie and District Radio Club was held at the Club-room, Beamish Street, Campsie, on Wednesday, 5th November, at 8 p.m.

With many willing hands at work, a Reflex receiver was soon on the way, and was completed and in operation twenty minutes later.

Although the set was of the "isolated" apparatus pattern, it proved to be an eye-opener to many

owning sets of the three and four valve types. With an "Amplion" loud speaker, music from 2FC and 2BL was too loud to be comfortable in a large room and members preferred to listen in the street outside.

Although of great strength, the music was not in the least distorted, and it is certain that similar sets will soon be in operation in the district.

The meeting closed at 10.30 p.m., when the set was dismantled; time, 2 minutes.

Improvements suggested by members will be added to a similar set next meeting.

All interested in the above club should get in touch with the Hon. Secretary, E. R. Mawson, Wonga St., Campsie.

Correspondence

(To the Editor)

Sir,—On Saturday, 25th October, I tuned in on one valve detector a station, call sign 2XA, calling 2BK, N.S.W. He was also asking reports from Interstate concerning reception of his transmission. He was audible all over the room, that is six feet from the phones, on one valve. Will you please publish this in your valuable magazine and also particulars of who and where this station is situated. I see by your magazine that 2XA is logged by amateurs as New Zealand.

Yours etc.,

F. SCHUMAN.

Renown Avenue, Punchbowl.

(No record of 2XA—Editor.)

(To the Editor)

Sir,—I hope I am not wearying you with the continued reporting of the audibility of my set when neither phones or loud speaker or any such apparatus is either connected to or adjacent to same. Last night the static was bad, and therefore I got my usual enjoyment for a while by tuning in without aerial, etc., 2FC was first tuned in without aerial, and then without aerial and earth, 2BL was tuned in first without aerial and then without earth or lead in wire. 2FC was then tuned in again without earth, aerial or lead in wire, 3LO was put through the same performance. I then intended to work 3LO on the loud speaker so replaced the earth and aerial, and tuned in on the headphones, but on withdrawing the phone plug to insert the loud speaker was surprised to find

(Continued on Page 15, Col. 2.)

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Wireless Institute of Australia

N.S.W.

Div. Inc.



Incorporating the Affiliated Societies and The Australian Radio Relay League

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NEW SOUTH WALES DIVISION.

THE main item of interest during the past week was the Executive Council Meeting at which the question of experimental licenses was particularly considered. This matter, which has been causing a good deal of anxiety in certain quarters has been taken up very seriously by the New South Wales Division of the Institute, and it is gratifying to know that the position is very much clearer than it was. By special invitation, Mr. W. T. S. Crawford, Radio Inspector, was present at the Executive Council Meeting, representing Mr. J. Malone, Chief Manager for Wireless and Telegraphs, Messrs. H. Kingsley-Love and Ross A. Hull, President and Vice-President of the Victorian Division were also present, and thus the meeting was fully representative of the various interests. Much could be said as to the various points which were raised, but it would serve no useful purpose to go over the ground in detail. It will be a source of gratification, however, to know that the authorities have expressed a very sympathetic attitude towards the genuine experimenter.

Mr. Crawford, in his remarks, stated definitely that the authorities have the interest of the genuine experimenter at heart. He explained that numbers of experimental licenses had been issued in the past simply because there is no other classification for them. The position with the new regulations was that the broadcast listeners' license gives equal or greater facilities for working than was given by the old experimental receiving license. He also stated definitely that no application for a transmitting license would be turned down if it were genuine. The view was expressed by those present that it was quite a reasonable attitude to take up when the authorities demand some evidence of experimental work when the time comes for a renewal of the license. It should not be hard to produce this evidence as careful experimenters naturally kept a log, not only of the various signals received but also of the work they have been doing.

As the outcome of this certain Council recommendations will be forwarded to the authorities, and it is confidently expected that the position will be much clearer in the future than it has been in the past. Future developments will be reported in these columns as occasion arises.

Notice of Removal.

A short while ago the record of the activities of the Institute was given in these columns and the growth of the Institute particularly in the last few months were emphasised. Further evidence is now furnished by the fact that the present quarters are to be vacated at the beginning of December and the headquarters will be moved to larger and in every respect more convenient offices in the Royal Society's House, 5 Elizabeth St., Sydney. This represents a forward move and indicates the expansion of the Institute's activities. The fact that this move has been found necessary is also an indication of the growing popularity of the New South Wales Division of the Institute. The postal address will be as heretofore, Box 3120, G.P.O., Sydney, and the telephone number will still be B 2235.

Q. R. M.

Messrs. Love and Hull, of the Victorian Division of the Institute, have returned to Melbourne. During their stay here they visited many of the experimental stations, and the impressions they received of the Sydney stations, leaves no doubt as to the efficiency and workmanship of the experimenters in New South Wales.

At the last Executive meeting Mr. G. Maxwell Cutts was unanimously elected as Assistant Hon. Secretary to the New South Wales Division of the Wireless Institute of Australia. At the same meeting Mr. W. L. Carter was unanimously elected as Assistant Hon. Treasurer for the same Division.

Mr. L. T. Swain of the Wireless Society of Newcastle, is in Sydney. We extend our congratulations to him as at the Second Annual General meeting held on Wednesday, November 5th, Mr. Swain was elected President of the Society. He put in a lot of hard work during his period of

VALVE NOISES

By SQUEAL.

WHEN unpleasant noises issue from your loud speaker and tend to spoil the evening's entertainment, look for the cause by the aid of the following. A multi-valve set comprising a number of valves arranged in series so that the output of one is linked to the input of the next provides one of the most sensitive receivers known to wireless science. Carefully tuned to a given wave length it will seize upon and build up into audibility the tiniest "wisp" of signal energy transmitted across thousands of miles of intervening space.

Unfortunately, this very quality of extreme sensitivity renders it peculiarly difficult to shield from the effects either of interfering signals or of those vagrant movements of electricity which are known as atmospheric disturbances or "strays."

With a crystal receiver, on the other hand, relatively little disturbance of this kind is experienced, even when working directly on an open aerial. In the first place, the crystal is not sufficiently sensitive to respond to any but a small proportion of the multitudinous disturbances that continually infest the ether, and in the second place the crystal cannot "oscillate" so that individual C.W. or undamped signals (of whatever strength) remain inaudible.

The effect of using a multi-valve set on an open aerial is something like that of applying a powerful microscope to an apparently inoffensive drop of water. In the one case, a new world is suddenly made visible containing many forms of animation—mostly unpleasant. In the other case a new unpleasant range of "ether" effects is rendered audible.

The problem of eliminating such interference is one that has long occupied the time and ingenuity of wireless enthusiasts. Even in the early days of new science the clash of conflicting signals and the constant noisy impact of atmospheric strays were a constant handicap to clear reception. The trouble has grown even more serious with the advent of the modern ultra-sensitive valve set. Meanwhile the discovery of a perfectly selective receiving circuit has still to be made.

So far as the amateur is concerned, the only practicable method of lessening this annoyance lies in the use of a closed circuit carefully tuned to the

desired frequency and loosely coupled to the aerial circuit. Under these conditions, if the aerial is shock-impulsed even by powerful jamming signals the amount of the undesired energy that succeeds in getting across the gap of the loose coupling is considerably diminished. If the source of trouble arises from some station nearby it is also advisable to insert a rejector circuit in the aerial itself. Such a circuit consists of a "loop" having inductance and capacity in the two branches which are tuned to the interfering frequency. This opposes so high an impedance to the undesired signals that they are choked back or prevented from flowing to earth, and so leave the receiving circuit unaffected.

Atmospherics or "strays" striking the receiving aerial set it momentarily into forced vibration. As the resulting oscillations are highly damped (i.e., they are not persistent), much of the effect is similarly lost across a loose coupled secondary circuit.

Various other methods have been devised for "limiting" the strength with which such "strays" are received in the telephones, but none is sufficiently simple or efficacious to win favour with amateurs generally. Balancing circuit in which crystals or valves are set in opposition so as to neutralise the effect of "static" shocks are well known, but are troublesome to adjust and seldom efficient in actual practice.

Apart from the extraneous "noises" due to its extra sensitivity, a multi-valve set is also subject to internal disturbances that arise partly from the peculiar amplifying action of the valve, and partly from the facility with which small quantities of energy are transferred from one circuit to another.

It must be remembered that the currents received and amplified by a valve are of exceedingly high frequency, alternating at the rate of many thousands of times per second. Such currents can pass across a small condenser with almost the same facility with which an ordinary direct current flows through a metal conductor.

The physical dimensions of the grid, plate, and filament of each valve are sufficient to make these electrodes act as condensers of small capacity across which some of the high-frequency energy applied to the grid circuit is frequently transferred to the plate circuit and vice versa.

This action is quite separate and independent of the ordinary "coupling" due to the electron stream between the filament and plate. At the same time the leakage from one circuit to the other and back again gives rise to retro-active effects which are similar, on a small scale, to those obtained by means of the ordinary back-coupling between grid and plate coils when "reaction" is employed. The initial leakages therefore grow until they set one or more of the associated valve circuits into persistent oscillation. This in turn "heterodynes" with other of the inherent oscillations, and is heard as a prolonged "howl" or "squeak" in the phones. Where several valves are used in series, internal noises of this kind are frequently generated when no deliberate back-coupling or "re-action" coil is used on the set. For instance it is quite possible to set up a vehement howl simply by disconnecting one of the transformer leads, particularly the input lead from the plate.

Another cause of howling is frequently due to a faulty grid condenser or leak. Under certain circumstances the accumulated grid potential will discharge in intermittent pulses through a faulty condenser. The frequency of the discharge is either of an audible frequency itself or else results in setting some associated circuit into oscillation at a frequency which will combine with the signal frequency so as to give rise to a heterodyne "squeal."

Again, on the low-frequency side, where iron-cored transformers are used, the varying currents in their passage through the coils may create eddy currents and hysteresis effects which are also capable of causing undesired noises. This defect does not, however, often arise with the modern type of transformer wound on coils of laminated "stalloy" metal. Finally there is the kind of howling that arises when back-coupling or "reaction" is deliberately employed, and when the reaction coils are brought sufficiently close together to throw the set into powerful oscillation. This is a pernicious habit, particularly when working on the broadcast band, and is, in fact forbidden by terms of the particular set in question, but it causes his receiving aerial to be energised and transformed into a miniature transmitter. The energy so radiated "interferes" with every other receiver in the vicinity of "heterodyning" with the broadcast carrier wave, and causing those malignant squeals and "Banshee wails" which so often afflict the ears of innocent crystal and valve users alike.

Incidentally once a receiving set is oscillating it brings into the telephones every available C.W.

signal which is capable of heterodyning with it to produce an audible note.

So long as the oscillations produced on a valve receiver are exactly the same frequency as the carrier wave of the signals being received no "Howl" will necessarily be heard by the operator himself, although telephony reception is never so clear when the receiving set is oscillating as when it is set below this point. If however the reaction coupling is still further tightened, the generated oscillations are thrown slightly out of tune with the incoming signal oscillations, and the characteristic and loathsome heterodyne "howl" is the result.

The remedy for this sort of noise is simple. Never close the reaction coupling to the point where "self-oscillation" sets in. There are many signs of this condition. First and foremost, your own reception becomes "fuzzy" or blurred even if you are not warned off by an appalling shriek in your own phones. Secondly, one can usually detect a slight and rather soft "bump" in the phones just at the moment when the point of self-oscillation is reached. Thirdly, a characteristic click is produced by touching the aerial terminal during self-oscillation.

The particular remedy for any specific variety of the "internal" noises that may arise from stray energy losses is more difficult to lay down. Sometimes the trouble is due to one cause and sometimes to another. So far as magnetic leakage is concerned this can often be remedied by enclosing the low frequency transformers in a box lined with tin foil, or by using equivalent metallic screening.

A fixed condenser of two microfarads shunted across the high tension battery will sometimes stop oscillation noises by preventing the internal resistance of the battery from acting as a coupling between the various inter-valve transformers. Here it should be stated that crackling noises sometimes arose from the H.T. battery being run down and requiring renewal.

Trouble has been known to occur from energy leakage across a shiny ebonite surface. If the ebonite base plate looks suspiciously shiny it should be roughened with sandpaper.

In multi-valve sets of four valves or over a separate filament control is desirable for each valve. Excessive filament current is a frequent cause of oscillation. Similarly excessive plate voltage or an unsuitable normal grid potential must be avoided. If the normal grid potential is made more positive, either by potentiometer control or by the insertion of a grid cell, the resulting grid current may provide relief from minor oscillations, although it

means a waste of energy. On the other hand, by throwing the grid more negative, the valve is taken off the straight line part of its characteristic curve, and any stray energy transferred from one circuit to another is not subjected to the same degree of amplification and is therefore less likely to build up into persistent oscillation. Obviously of course this implies a corresponding loss in the amplification of the received signals.

Finally, each set requires a certain amount of skill in handling which can only come with experience of its peculiarities. This is by no means so difficult a matter as might appear. No set in existence will be troubled by all the possible defects set out above—any more than one particular individual can be afflicted by all the diseases to be found in a medical test book.

A HORNLESS LOUD SPEAKER

Although much research work has taken place with the object of obtaining the perfect loud speaker horn, the Sterling Telephone and Electric Co. Ltd., have attacked the problem of acoustics at an entirely different angle. The result of their experimental work is combined in the new Primax Loud Speaker in which amplification which is produced by means of a very large diaphragm which is coupled directly to the vibrating diaphragm of the electromagnetic receiving system.

Constructed of parchment material, the large diaphragm is extremely light and the effective surface is increased and rigidity obtained by pleating the material. Full control over the volume is provided by a screw at the back of the instrument. In keeping with the light nature of the instrument, all metal work is in aluminium. For the best results the manufacturers advise that this model should be used in conjunction with a power amplifier. Due to the large surface of the diaphragm the sound is equally distributed in all portions of the room, whilst the pleated appearance gives the instrument an artistic finish.

STATIONS HEARD.

E. Salamy, Warrnambool, Victoria, mentions that October was the worst month this year for static. Here is the month's D.X.:

N.S.W.: 2YI, 2BK, 2RJ (fone), 2HT, 2LO, 2CM, 2KC, 2ZN, 2AY.

Victoria: 3LM, 3UX, 3BD, 3OT, 3RG, 3BQ, 3TM, 3XF, 3AF, 3UI.

South Australia: 5BM (fone), 5DN (fone), 5BG (fone), 5DO.

Tasmania: 7AB.

New Zealand: 2AC (N.Z.).



MR. A. S. COCHRANE, ANNOUNCER,
STATION 2FC, SYDNEY.

BOOK REVIEW.

"Experimental Wireless and Broadcast News," published by The Wireless Publishers of Australia, Ltd., Melbourne.

A very attractive monthly, written in popular style, and dealing very fully with all experimental and broadcasting matters. Under the heading of D.X. notes, the observations of "The Owl" lets in a flood of light upon the activities (reputable and disreputable) of Australian transmitters. As the official organ of the Victorian Division of the Wireless Institute, full information is given concerning that body, and a great deal of technical and topical matter makes this journal well worth the shilling charged for it. The subscription rate is 12/6 per annum. Editorial and Business Offices: 443 Little Collins St., Melbourne.

RADIO IN THE ANTIPODES

AN AMERICAN VIEWPOINT OF THE BROADCASTING AND AMATEUR RADIO SITUATION
IN AUSTRALIA

(H. A. Highstone in "Radio," San Francisco.)

THE popular conception of Australia is that of a fairly large island, consisting for the most part of a dry and arid plain and inhabited by kangaroos, wild men, duck-billed platypuses (or should it be platypi?), rabbits, ex-convicts, and radio amateurs. And for all the news we see or hear of concerning this far-off land, radio amateurs might be the only civilized inhabitants, and the logging of the American amateur radio signals their sole occupation. Like most popular conceptions, this is incorrect—quite.

Australia is larger in area than our United States. Sydney, the largest city, can truthfully lay claim to 1,000,000 inhabitants. Everything from lemons to apples are grown commercially in this land where real honest-to-goodness bushmen are as scarce as the American Indian.

Separated by 6,000 miles of water from their nearest seaport, we are out of touch with them in both a commercial and a social sense, for what they cannot manufacture themselves, they buy from England; and a letter requires two months to make a round trip from San Francisco, and ten weeks from New York. So it is only natural that we should be a little hazy concerning the conditions existent in this new America, including of course radio.

Australian radio laws and regulations are not stable. Changes take place frequently, some regulations are strictly enforced, others are not, and cases of actual punishment for violations are unknown. At the time of writing (July) it was believed that a drastic change in the regulations governing broadcasting was to be effected shortly, although amateur regulations were to be modified very little.

Broadcasting, while only a recent development in Australia with but two actual stations in operation, is a dozen times more complicated than in the United States and considerably more expensive to the listener. And these two stations, Farmers' Broadcast and the Sydney Broadcasters Ltd., are running in a deadly and bitter-end opposition which will possibly result in their being absorbed by the government and incorporated into one large company together with the other stations now in the course of construction, after the system used in England. Both operate upon a sealed-set licensed service, Farmers paid and the Broadcasters free.

The former station, 2FC, is owned and operated by Farmers Ltd., a nation-wide chain of department stores. It is a 5000 watt affair, using a wave length of 1100 meters and claims a distance record of 7000 miles. No expense has been spared in the perfection of the studio and the station, both of which in efficiency and elegance compare favourably with the best American installations. The studio is located on the roof of the Farmers' store in Sydney, operating the transmitter at Willoughby, seven miles' distant, by remote control. A switchboard in the studio connects with a number of theatres, public halls, hotels and churches in Sydney and its environs. At Willoughby two lattice steel towers more than 200 feet high, support an elaborate cage antenna, 600 feet long and a small forest of fifteen feet steel masts holds the counterpoise in place. Over £30,000 (about 125,000 dollars) has been spent in the construction and perfection of the station and studio.

The competing station 2BL which is owned by a group of radio dealers and other interested persons, operates on a wave length of 350 meters. Two 250 watt tubes of British manufacture are used and a maximum distance record of 3,500 miles was reported.

The present studio is temporary, located on the roof of Smiths Newspaper building in Sydney, where the apparatus is also housed. Twenty-seven private wires run to various halls, theatres, etc., in the city, allowing them to run almost continuously if they so desired. A new and permanent studio and operating room is now in the course of construction, and when completed will cost approximately 25,000 dollars.

However, radio broadcasting as it is at present in Australia, has proved a dismal failure, as have the laws governing its operation. According to a number of competent authorities, Farmer's broadcasting station has never even approached commercial success. According to a government official in Sydney, this station, after spending well over £30,000, has little more than one hundred subscribers who have paid their three-pound tax for the privilege of listening. Nothing more need be said.

Australia is divided into six States: New South Wales, Victoria, Queensland, South Australia, West Australia, and Tasmania. These, in their respective order, comprise the amateur radio districts, be-

ginning with 2 and ending with 7. There is no first district, it having been originally intended to allot this to New Zealand, but this idea was never put into effect.

High priced apparatus, a heavy tax for license, and stringent power restrictions have a discouraging effect upon amateur radio, to the extent that there are less than 500 transmitting amateurs in all Australia. A policy of secretiveness, adhered to by not a few of those owning transmitters, also tends to discourage the erection of new amateur stations.

The license to operate a transmitting and receiving station is issued after the applicant has passed a written examination and a code test of 12 words per minute. A charge of one pound per year is exacted. Within five miles of any coastal or "defense" station a maximum power consumption of 10 watts is allowed, and within twenty-five miles not more than 25 watts can be used. Power consumption is measured in the plate circuit of the tubes—impressed volts multiplied by milliampères—instead of by the manufacturers' rating, as we do. The maximum power allowed is 250 watts, with exceptions in the case of special licenses. Apparatus in general, including tubes, is from 50 to 100 per cent. higher priced than in the United States, and some of it, especially variable condensers, is of poor quality. New South Wales has 130 transmitting amateurs; Victoria 120; Queensland 20; Tasmania 10; South Australia 30 and West Australia 20. New Zealand boasts of less than 50 transmitting amateurs. Yet, in this radio paradise, the familiar complaint is frequently heard, "The QRM's fierce here sometimes!" Really! Verily, few of us are ever content with our lot in life. The amateur waveband runs from 150 to 250 meters, with each amateur assigned to a definite wave length. Restrictions as to silent hours are unknown, as amateur interference with broadcast listeners is seldom, if ever, experienced. Indeed a great many of the listeners, those having experimenter's licenses and those operating illegally, eagerly await the transmission of phonograph music over amateur radio telephones, which operate upon regular schedules, the times of the various transmissions being printed in every issue of the "Wireless Weekly." Regulations prohibit transmission of music by amateurs; but while knowledge of the continual violations is of course universal; nothing is said or done about it. As a matter of form the music is ostensibly sent as a test of the transmitter to another station, which may or may not be upon the air at the time. The average transmission is one-half hour and allotment of time is settled over the air by mutual agreement.

Even ordinary amateur conversation is listen-

ed to with the greatest enjoyment by the broadcast listeners if they may be termed such, the commencement of a talk being followed instantly by a series of howls and wails on the air as dozens of listeners begin fishing for the wave of the transmitter with their illegal oscillating receivers. Quite the reverse to America; instead of the amateur "busting up" the BCL, the latter interferes with him, at times really seriously hampering communication.

The Australian amateur believes in extracting the last full measure of efficiency from his transmitter and using incredibly low filament and plate voltages works equally incredible distances. How they make a 5 watt tube oscillate with 6 volts supplies to the filament and 150 to the plate is a mystery, the trick is not in the circuit, for the Hartley and reversed feedback are used almost without exception. As in America, chemical and keneutron rectifiers are employed, and for the same reasons.

The goal of the Australian amateur does not lie in covering the greatest number of miles, irrespective of power, but in working the greatest number of miles per watt. Aside from the fact that this plan is the only fair method of comparison between two stations, it is an excellent idea in that it stimulates the amateur to make for increasingly greater efficiency in his transmitter. It is unnecessary to detail the advantages resulting from such an action. Incidentally, it lightens the drain on one's pocket-book not inconsiderably. One Australian displayed three 5-watt tubes which were still "perking" after two years of service, during which time music transmitted from the set was heard in West Australia, 3000 miles distant. His power consumption was 2 watts!

This power consumption is typical of the average Australian station. In some instances tremendous distances have been covered with but a really small fraction of a watt (measured in the plate circuit) while a great many use but 3 or 4 watts of actual power, not the overloaded five-watter of the American amateur with its 1000 or 1500 volts on the white hot plate and developing possibly 50 or 100 watts as measured by the Australians..

Procedure on the amateur telephones is a little startling to a stranger, as witnessed by the following communication: "Hello 2XX, hello 2XX—2YY here, 2YY here, hello 2XX, are you there, 2XX? 2YY here—righto! over!" I need not say that the calls are fictitious.

In the matter of receiving apparatus the Australian appears to be considerably ahead of the American. For one thing, while radio frequency amplification is looked upon with suspicion by most Americans, it is an every day matter to the

Australian, who puts one, two and even as many as four steps ahead of his detector. The Marconi QX tube, with its tiny elements, constitutes a wonderful radio frequency amplifier, and it is quite probable that this tube has much to do with the universal success of R.F. amplification in Australia. The Marconi "R" and "V-24" tubes are used considerably for detectors, while American tubes are prime favourites for audio frequency amplification, and are also frequently used for detectors. American power tubes are used almost without exception. The popular "ham" receiver consists of one step of radio frequency amplification, detector, and one step of audio amplification. And their radio frequency works wonderfully, well up to the wildest flights of fancy indulged in by American ad. writers.

Australia has long had a reputation among American amateurs as being a paradise for receiving, and it is true that the constant reception of American amateur signals there and a lack of reciprocity seems to bear it out. C. D. Maclurcan, probably the foremost radio experimenter in Australia, offered an interesting explanation of this condition, the gist of which is here repeated as faithfully as possible:—

"Due to the network of high and medium powered transmitting stations throughout the United States, the American amateur has always had loud, easily readable signals pounding into his telephones, no matter what kind of receiver, good, bad or indifferent, he might now. He simply hooked up a set and the signals were there, dozens of them, working day and night. If not commercial stations, then a dozen or so amateurs racking the ether with a kilowatt or so. Thus there was no great incentive to add to the efficiency of his receiver; the signals were simply forced upon him. The same applied in the matter of transmitters. When his sending apparatus failed to give him the results he wanted, he simply increased the power until he got them.

"In Australia it is another matter altogether. Transmitting stations, both amateur and commercial, are few in number, the former all low powered, using as a rule about 10 watts of actual power. It followed then, that the amateur had to build a really good receiver to hear any signals at all, and if he wished to listen over any distance he had to put the last ounce of skill and ingenuity into the manufacture of a tuner. And even so, he still had to become adept at tuning and code reading before he could do any real work. Thus he has become skilled, both in the construction of receivers and their manipulation, more so than his American fellows.

"From this I do not want you to get the impression that I believe the Australian to be inherently more skilful or superior to your countrymen. Americans would have done the same thing had they been in our place. It is simply a natural result of circumstances.

"It was the same thing in the transmitting end of the business. We do not get results which can pardonably be termed extraordinary by reason of some benefit quality of the ether in Australasia. We had to make our transmitters right or our little dole of power was lost before it ever got upon the air. And when we failed to reach out we could not simply add another tube or load up the ones we already had; government regulations prohibited it. We had to improve the set, make it still more efficient. Thus bitter necessity has made us skilful, as it would have so made anyone else in our places."

This quite logical argument is well borne out by the fact that dozens of 5 and 10 watt transmitting stations easily work New Zealand, 1500 miles away during the hours of darkness. Mr. Maclurcan, who operates the well known T-2CM, often receives KD KA broadcast programmes, while KGO is heard regularly not only by him, but by not a few other Australian amateur stations.

In this condition we have the peculiar situation of what might be called an antagonistic or restrictive government policy against the amateur, resulting in his eventual benefit. His meagre power allotment only results in his reaching heights of efficiency, which would have otherwise been undreamed of, and at the same time the scarcity and high price of apparatus has kept out of the field the "small boy" element, who are only a detriment to the advancement of the art. This last is not meant as any depreciation of those amateurs of tender years, for even as there are "old maids" of both sexes, so are there "small boys" of almost any age upon the air.

The case of the Australian amateur finds a parallel in that of the American to whom was allotted a band of waves thought to be useless for transmitting over any great distance, and yet who to-day finds himself possessed of the very best portion to be had, the development of which may in time lead to things as yet undreamed of.

In concluding the writer desires to express his appreciation of the aid rendered by A. W. Watt, editor of the "Wireless Weekly"; George A. Saunders, announcer and manager of 2BL; C. D. Maclurcan, 2CM, and others who so kindly aided in collection of facts for this article.

LOCATING TROUBLE IN RADIO RECEIVERS

By W. A. STEWART.

THE set seems dead, there's nothing doing? what's up? In the following few remarks I hope to be able to enlighten you on some of the more common faults cropping up in receiving sets. Faults in the aerial, poor connection due to corrosion or dirty insulators causing leakage to earth. Any of these faults may be the cause of very weak or no signals at all.

The aerial should be looked at occasionally, and care should be taken to see that the lead in does not touch anything on its way to the set.

It is in the tuning arrangements of the set that most of the faults usually originate. If no signals are heard at all, it can safely be put down to wrong connection or a broken one. Care should be taken to see that all switch-arms make good contact on the studs, and in the case of honeycomb coil plugs, especially those of the coupling plug type, particular care should be taken to see that the contact screw is making good contact with the metal portion of the plug, and not merely making contact with the ebonite.

Honeycomb coil holders are a source of annoyance if not carefully looked to, as they have a habit of working loose, and where possible, all connections should be of the "pigtail" type and also soldered.

If weak signals were heard it would indicate that the reaction coil is too large, or not large enough to give reaction, or possibly the tuning coils themselves are not of the right values. In single circuits of the regenerative type, having a series parallel switch, it will often be found that when the switch is in the series position, all that is heard is an A.C. hum. This is a common fault, and is caused by the filament return being connected direct to earth, and not to the end of the coil, or switch-arm, as the case may be. Series parallel switches themselves are usually a source of annoyance, as some of the poorer quality ones have a habit of shorting between blades, causing a loss of signals altogether. If the set refuses to oscillate, providing of course that it is of the regenerative type, it will be found that the reaction coil is reversed, or perhaps it is not large enough. Weak batteries will also cause the set to cease oscillating.

Variable condensers of poor quality are often the cause of much undue noise, and if when they

are rotated, grating sounds are heard, it usually means that there is a poor connection between the moving spindle, and the connecting terminal. This can usually be overcome by attaching a flexible (pigtail) connection to the spindle itself and to the terminal. Noise may also be caused by the plates touching and causing a short. This can be remedied by running a knife in between the plates and straightening the plates which are touching.

With regard to the tuner, you will often hear people say that they can hear one station and not the other. This usually means that the inductances are not the right size, and suitable ones will be needed. Before condemning a set, however, it is advisable to see if the set will work on another aerial; this will show if your location is bad. Of course you cannot expect to tune in a distant station, if you live next door to another station which is working at the same time.

If the amplifier will not pass any sound at all it indicates that there is a wrong or broken connection somewhere, and if jacks are employed for cutting out successive stages, a lot of the trouble can often be traced to them. Care should be taken to see that there is not a short circuit anywhere, as the solder has a habit of slipping down between the leaves of the jack, and causing a short. If dry cell tubes are used, or in fact any tubes, care should be taken to see that good contact is made at all four contacts of the valve.

If signals are heard, but very faintly, it probably indicates that the transformer is connected to the positive, and not the negative side of the filament, and till it is connected properly, the valve will not amplify.

If a persistent howl is experienced, it is an intimation that a fixed condenser is required across one of the transformers, or even a grid leak may be needed across one of them. Care should be taken to see that the transformers are not of too high a ratio; usually a five to one and a three to one ratio gives excellent results. It is preferable to use transformers of the one make, and it is preferable to use American transformers with American valves, and vice versa.

A howl is often caused by having the transformers too close together and where possible transformers should be mounted at right-angles to each

other. Distortion is usually caused by excessive B battery voltages, and also by poor transformers. Of course, to get decent reproduction the transmission would be good in the first place otherwise all the valves obtainable would not make it any better. Batteries are another source of noise, and care should be taken to see that the B batteries are in a good condition, as a faulty B battery causes noise like static, only worse. If the A battery is not well up, the set will lack volume and may even refuse to work at all. It is always a good plan to get the A battery charged at least every two weeks, as this will keep it in good condition, and also supply the required current for the set readily.

The valves should be worked at their rated voltage, and for the Dull Emitter pattern, an ample rheostat should be provided. Usually a thirty ohm is about right.

If the set is working correctly there should be no noise in the phones at all, when the aerial and earth are connected; if the set itself is quiet there will be less of the background noise and the music will be clearer and better.

If the valves have a tendency to flicker, this is an indication that there is a loose connection in the valve socket or at the battery itself.

If the battery terminals are not kept clean the connection is apt to be poor and a huge amount of noise results.

In conclusion I would like to say that it is better to go at any trouble carefully, as it will usually consist of some small fault. It is practically impossible for the connecting wires themselves to break unless the set is badly handled, so that trouble will usually originate in poor connections or more usually incorrect ones.

TRADE NOTES

The question whether a receiver manufactured abroad for use in Australia will function as well as the set made locally is perhaps a matter for argument. Judging by reports received concerning locally made sets which have been installed in the country, a large number of them are giving results which may be reckoned as surprisingly good. For instance, during the last few months, Burgin Electric Co., Ltd., who specialise in the manufacture of sets to suit Australian conditions, have interested themselves in the installing of receivers in country schools. In every instance these sets have more than performed the functions for which they were installed. A receiver of the "Burgin-

phone" type installed at Tenterfield gives loud speaker results with Sydney and Melbourne broadcasting, and at Boggabri, a similar receiver enables the listeners to hear Perth, Melbourne and New Zealand broadcasting stations and K.G.O. quite clearly on a loud speaker. Among other reports is one from Mr. Fisher, Principal of the Public School, Nymboida, South Grafton, who expresses himself as delighted with the performance of his "Burginphone" receiver. The consistently satisfactory record of this firm's achievements will, without doubt, contribute largely to the success of their intended policy of creating a big Australian wireless industry.

Amalgamated Wireless (A/sia) Ltd., advise that they have ample stocks of the following goods: Pausin vernier and plain variable condensers; Dubilier fixed condensers; Brandes' matched headphones; Allen Bradley products; Q.X., D.E.R., 201A, W.D.12, U.V.200, U.V.202, and Kenetron valves.

WIRELESS LECTURE AT SYDNEY UNIVERSITY.

Before a large audience, including the Dean of the Faculty of Science, the Professors of Physics, Electrical Engineering and others, in the Union Hall at the Sydney University recently. Mr. E. T. Fisk, Managing Director of Amalgamated Wireless (Australasia) Ltd., delivered a lantern lecture on the latest developments in wireless telegraphy, wireless telephony and wireless broadcasting.

The lecture was arranged by the University Radio Society, and in the course of an hour's address the lecturer dealt with the fundamental principles of modern radio communication, and described the technical and other applications in its various branches. Marconi's new inventions in the production of powerful ultra short wave transmitters and his new "Beam" system were described, and the descriptions were received with great interest by the audience, which comprised a considerable number of students in the Department of Physics.

Mrs. Lafferty—"Ten stitches did the doctor have to take in me ould man after the fight last night."

Mrs. O'Hara—"Tin? Was that all? Shure, when the doctor seen me poor husband carried in this morning he says: 'Has anyone got a sewing machine.' —Boston Transcript.

INTERSTATE NOTES

VICTORIA.

Melbourne Wireless Trade.

Our brother in the West recently referred appreciatively to notes from this State on the above subject. Looking at it from this distance they seem to manage these things better in Sydney. Let us acknowledge in whispering humbleness that Melbourne is an outlying suburb of the harbour city in many wireless respects. How often do affluent firms over here obligingly offer to "get it over from Sydney" to please a disappointed customer! In one short month to one short customer different firms made this offer in respect to (1) a book (2) a valve; (3) a transformer; (4) a crystal. It would be invidious to refer in these notes to the wireless periodicals published in Sydney, but perhaps it may be permitted to breathe a brief welcome to the "Evening News" Wireless Book recently put on sale in Melbourne at an advance of 6d. on the Sydney price. The book was bought mainly because it appears to be the first of its kind in Australia, and also because it contains a picture gallery of wireless notables—only one, it is regrettable to note, being a Melbournite.

In spite of all the foregoing, however, Melbourne trade does not appear to lack numbers. The annual penalty of £5 imposed by the authorities on anyone who desires to deal in wireless supplies appears merely to have increased the number of potential criminals in that respect. Even the drapers have got the habit, and Messrs. Buckley and Nunn, and the Leviathan, display the latest designs and leading fashions in wireless wear of correct style and cut. Some of the restaurants too invite you to "eat by wireless," and produce meals that harmonise well with pancake and honeycomb coils, served up by waitresses in spider-web frocks with their hair in short or Marcel-wave lengths. It is all in the boom.

A local sweet shop also recently erected an aerial in its window, from which chocolate bars radiated on so short a wave length that considerable impedance was caused by the plate glass, although several amateurs report having picked up fragments from this station in their receivers.

The worst phase of the business is the excruciating contortions perpetrated by metropolitan dealers now attract a crowd of getting 3AR or 3LO on three, four, or even more valves and hurling the results out on to the footpath where they fight

it out with VIM. Naturally passers-by rush up to see the dog fight and are greatly disappointed to find, as the small boy carefully explains: "It's only a Wireless!" Is it really good business O metropolitan dealers, thus to practice vivisection within hearing of the public and invite them to miscall it wireless?

3LO's Long Wave Length.

THE "Age" has raised a bother about 3LO. How much is due to scientific exactitude and how much to the fact that only the "Argus" and "Herald" appear in the news reports of 3LO is beside the point? The main thing is the assertion that long waves are out of date. This sounds curious to those who read in the same paper that Nauen, in Germany, supplies the Orient steamships with news on 3900 metres, and who read elsewhere about the five transmissions of FL on 3200, and Radiola, the Dutch Concerts, the Hague (all telephony) all over 1000 metres, and some over 2000. The trouble appears to be that at present we are all more or less obsessed with short waves. There is an indissoluble connection between the words "short" and "sweet" that seems to predispose us towards associating the same two qualities as desirable in wireless waves. It would be as well for us sometimes to pause and reflect that short waves mean many oscillations, or in other words, high frequency, and high frequency means elusiveness of insulation, and less efficient amplification which in turn means leakage in the set and loss of distortion in the sound production.

It is more than curious that while the Americans are eagerly seeking after short wave transmission they are just as eager about long wave reception, since their pet super-heterodyne is a deliberate stepper-up of short waves so that they all become uniform long ones, as if it were a sort of Procrustean bed with a wireless mattress. Recent letters in the Melbourne Press, notably in the "Herald," complain that 3LO can't be amplified as profitably as 3AR, which sounds topsy-turvy, since amplification of long waves is much more efficient than of short ones. When one reads, however, that 7 valves in a Melbourne suburb were taken to do the job, which only resulted in distortion more pronounced on 3LO than on 3AR, the wonder is

diminished. As the Walrus said to the Carpenter:

"If seven valves at seven miles
Brought 3LO more near,
Do you suppose, the Walrus said,
We'd get the music clear?
I doubt it, said the Carpenter,
And shed a bitter tear!"

As these notes have pointed out before, even Melba through a megaphone must sound harsh and unbeautiful. The loveliest bloom on a rose or even a baby's cheek looks coarse under a high power microscope and if we amplify too much we get the same coarseness as when sitting too close to the finest singer.

SOUTH AUSTRALIA

THE South Australian Broadcasting Company has for the time being ceased transmitting their regular concerts, and listeners in are complaining of the dearth of musical programmes. Broadcast listeners' licenses have been issued in South Australia, but how many, is kept a close secret by the department. What these license holders are getting for their 35/- is a mystery, which evidently the department does not worry about, and what becomes of the money is another mystery, seeing that there is no A class broadcasting station eligible to collect its share.

The South Australian Broadcasting Company have announced in the press that they are under no obligation to broadcast and their transmissions have only been for the benefit of the trade. It has been rumoured however, that a 5000-watt transmitter will be erected and ready for operation within eight weeks. The station is to be erected by the Amalgamated Wireless (A/sia) Limited, who will man, the station with their own engineers, the S. A. Broadcasting Company to be responsible for the programmes. The wave length of the station is announced to be 375 metres.

5DN Still Going Strong.

Station 5DN is still putting it out good and strong and in a very short time he will be transmitting on much higher power. Arrangements have been completed for the transmission of the Conservatorium concerts and these will be heard at any time shortly; it is quite likely that the next Conservatorium concert will be broadcasted. Further arrangements are to be made on the return of Dr. Harold Davies from Sydney.

The 5BG Circuit.

The 5BG circuit is now about the most popular circuit here, as using only two valves it can be built into so small a space and it gives such tremendous volume. Mr. J. R. Harper, who tied with Mr. L. Coombe for second prize in a recent competition with this circuit, has had further success with his set. One evening recently with three fellow enthusiasts he motored to Belair where an aerial was slung up over a tree, a coil of wire thrown into a pool of water for an earth, and with the set on the ground 5DN and 5BG were brought in on the loud speaker so strongly that they could be heard 40 feet away. They also heard 6WF faintly, but static was so bad that it was only occasionally that the music was distinct.

On Tuesday evening, Mr. Harper gave a demonstration at Kent Town and picked up 5DN at considerable strength on the loud speaker using only the earth lead (which was 6 feet long) as an aerial.

Mr. Arthur Wellstead, who won first prize in the competition mentioned above, finds the music rather too loud in his home at Prospect, so he runs a long cord out into the passage and puts the loud speaker out there.

It is even then plenty loud enough in the room. Mr. Wellstead is being kept busy showing his set to the many visitors who call on him for the purpose of gaining information re the construction of this wonderful set.

A Lady Radio Fan.

Mount Gambier possesses quite a clever lady radio fan. This young lady has, according to reports, constructed quite a natty three valve set which works admirably. She got the idea from an English magazine, and the result of her efforts put a lot of the male hams to shame. However, to show their appreciation, a working bee proceeded out to her home on Eight Hour Day and erected two 45 ft. masts, giving her quite a surprise. Now that this young lady has shown what she can do, perhaps many others will be induced to take up this most interesting hobby.

Examination for Experimental Licenses.

Twenty five nomination forms were given out for the examination held early in October, but only six candidates turned up on the day of the examination. It is evident that there will not be many experimental licenses issued under the present regulations.

Church Service Broadcasted.

Mr. Henry Lloyd (5AI), College Park, made history last Sunday week when he broadcasted a

(Continued on Page 28, Col. 2)

A THREE VALVE RECEIVING SET

By "INSULATOR"

RADIO you know is a wonderful thing. The fascination it holds for people is really astounding. Little Johnnie Smith who built his own crystal set always casts longing eyes on the multivalve set and can invariably discuss the salient features of even a super heterodyne. I met a youth of about 13 years of age the other day and he just about dropped me by talking of periodic transformers. And he certainly knew what he was talking about. But let's get on with our porridge and milk. This week the receiver is one employing three valves, the first acting as detector, and the other two rendering service as note magnifiers.

Comfortable loud speaker results should be achieved as far away as 120 miles from a broadcasting station, but of course this depends on the strength of the broadcasting station, and also greatly on the person who handles the receiver. Did you read my remarks on this subject last week?

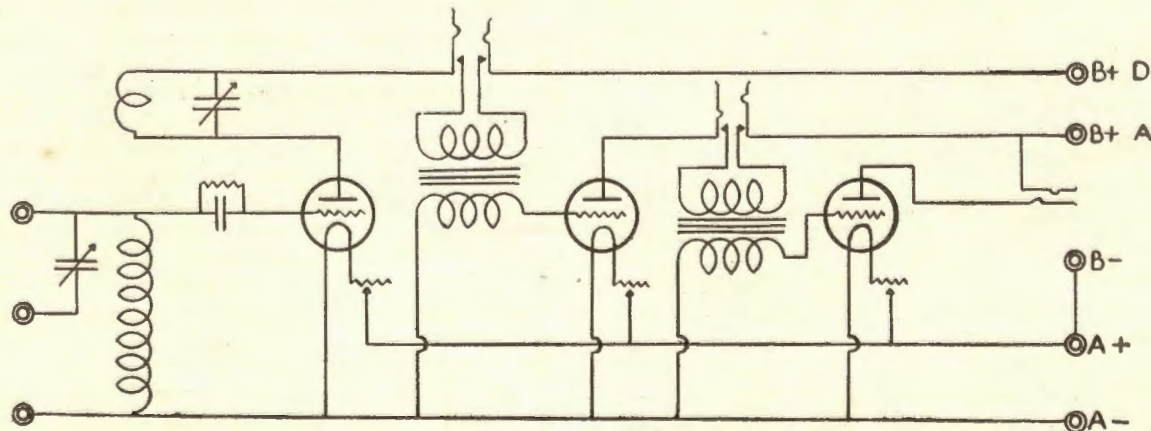
Once again the circuit is the P1 and "eh, maun, it's guid." Say what you like, the old P1 has a comfortable little "possy" in my heart. Rarely if ever, do I depart from it and when I do it is generally to reflex it as instanced by the ST74 and ST100. Freak circuits never appeal to me—I'm the "ca canny" Scotsman and inclined to look askance at many reputed wonderful circuits.

And say folks, you do the same and you will never be far wrong.

Now the difference between this and last week's set is that the set described last week employs radio frequency amplification before it is detected, hence last week's set is a bit better for receiving distant stations. But don't turn your nose up at the set about to be described as it has its advantages. First of all it is infinitely more easily tuned than last week's set, and is certainly less expensive to make up. I should say that \$16 would cover the cost of everything, including dry cell valves, A and B batteries, but less phones and loud speaker, and considering the results it is certainly not dear.

This week the transformers, valve sockets, and battery terminals are mounted on a sub-panel behind the main panel. This sub-panel is attached to the main panel by means of the jacks. A 5/32 hole is drilled in each of the three jacks (on the main arms) and the sub-panel is attached by means of a 1/2 x 1/8 csk. brass screw and nut (see drawing). But, oh! Willie, hold on, you've running away from yourself—I nearly forgot the list of parts required, but here it is:

- 1 bakelite panel 18 x 7 x 3/16.
- 1 2-coil holder.
- 1,001 variable condenser and dial.
- 1 .00025 variable condenser and dial.



The Circuit.

- 3 valve sockets.
- 2 30-ohm, rheostats.
- 2 audio frequency transformers.
- 1 grid condenser and leak.
- 2 double circuit jacks.
- 1 single circuit jack.
- 7 N.P. terminals.
- 5 engraved terminals.
- 1 piece of bakelite 7 x 7 x 1/8.
- Sundry screws, etc.

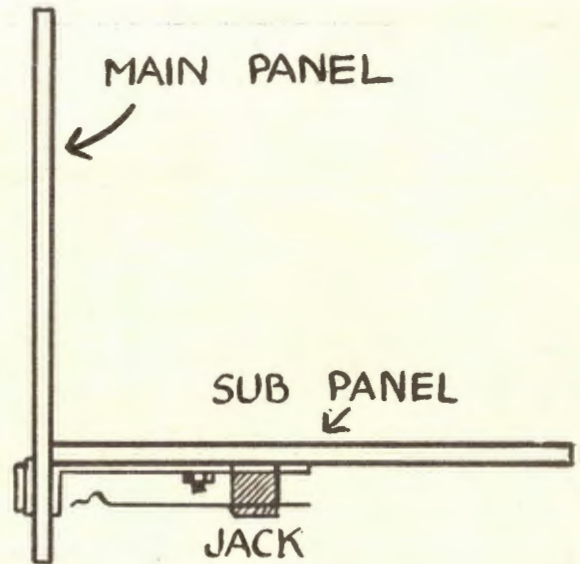
The valves to be used will be left to you, but if you intend using dry cells as an A battery you will find various makes of "toobs" that will yield splendid results. Bakelite is scarce at the moment, but I have seen some samples of substitutes. A good ebonite is quite satisfactory for the main panel but always remove high surface gloss, as it will cause more trouble than it is worth. These highly polished ebonites or eborons, and whatever else they are known as, are always best when a piece of No. 00 sandpaper is used to remove the gloss and leave a matt surface. Other wise you will find little leaks across the panel and these little leaks are suicidal to results. Again, moisture will condense on the surface and "euchre" the proceedings altogether.

"Brasso," who used to write in these columns will bear me out in this; with his sea going experience he will tell you that all ebonite faces were matt finished. These remarks do not apply to bakelite.

The sub-panel may conveniently be fashioned out of 3 ply wood in the absence of bakelite but again you know—please yourself.

The primary coil is tuned by a .001 variable condenser while the tickler coil has a small 5 plate condenser shunting it in order to get finer adjustment. Both of these can be easily seen in the photograph.

Glance now at the photo of the sub-panel and you will see the position of the valve sockets and transformers. When drilling sub panel for the transformers be sure to arrange one at right angles to the other, just as I have done. Can you see the grid condenser and grid leak smuggling closely to the first transformer and also the battery terminals at the back? Now look at the view of the bottom of the sub panel and the jack will be clearly seen. Go ahead and lay out everything and then turn to the wiring. The circuit will help you in this as well as the photographs. I rather regret not being able to draw a back of panel wiring diagram but I am sure you will manage well without it this week. Please pardon me, won't you?



Now I use the following coils:

	P	T
Amateurs	25	35
2BL	25	50
2FC	150	100

Let me wish you the best of luck, so cheerio till next week.

Insulator's article next week will show full details of the construction of a one valve receiver.

(Continued from page 26)

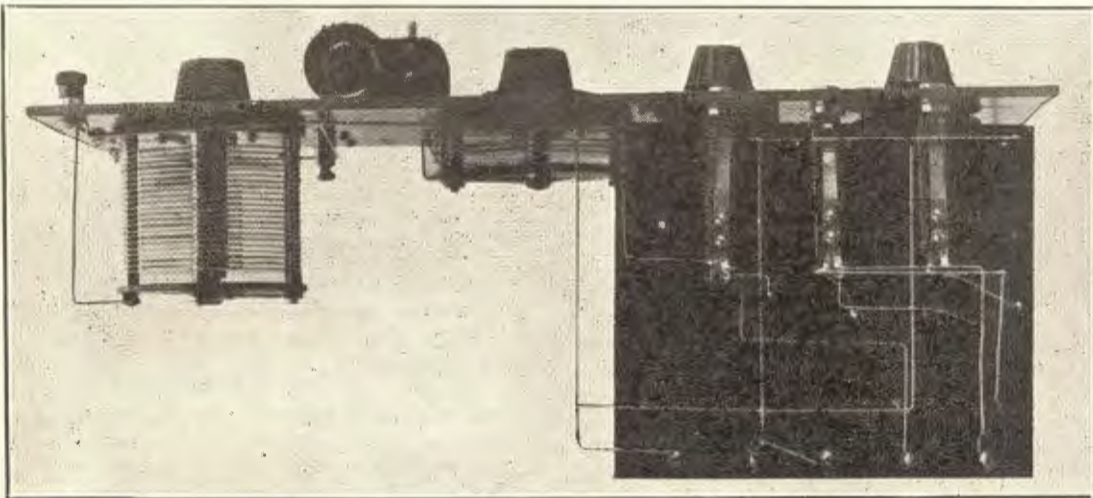
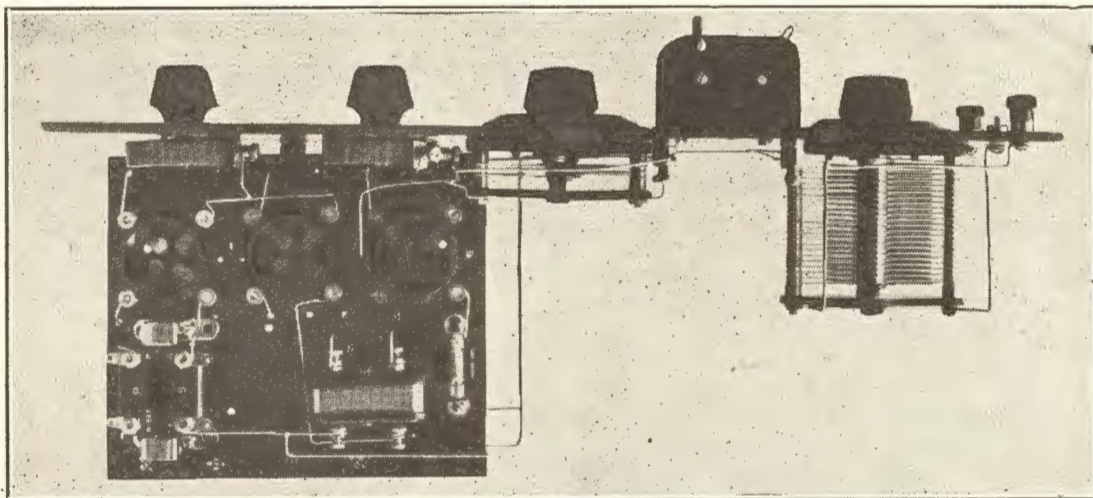
church service for the benefit of the congregation at the anniversary services, of the St. Peter's Baptist Church Sunday School.

In addition to an address by the Rev. Morgan, sacred songs and music were contributed. A loud speaker situated in front of the choir delivered the items with wonderful clearness. The whole of the proceedings took place in Mr. Lloyd's workshop, where a piano had been installed.

Telephone City 4429

CHARLES D. MACLURCAN
Consulting Radio Engineer

MacLurcan & Lane Ltd.
9-13 Brisbane St., Sydney.



Three Photographs, showing the 3 Valve Receiver described by "Insulator."

WAVE TRAPS

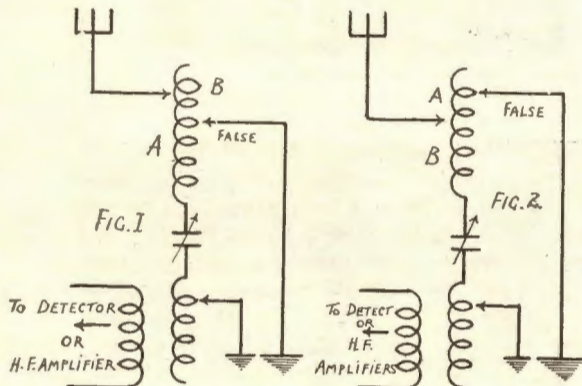
(The first of a series of articles which will cater for the more advanced experimenter, this article will be found of practical assistance. As they are written by a member of our own staff, we welcome any inquiries concerning any particular points mentioned in them.—Editor.)

THE following article is written to encourage both the experimenter and the broadcast listener to experiment in some way to cut out or at least to reduce atmospherics and local interference. With a suitable rejecter or wave trap circuit, it should be possible to hear 3LO Melbourne. Yet how many of us can say we have raised him on our loud speakers during 2FC's transmission?

Atmospheric Interference.

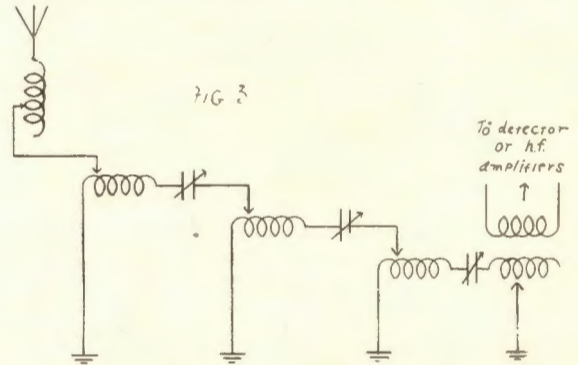
The difficulty of reception through static is familiar to all. The reason why atmospherics will appear, no matter to what wave length the receiving circuit is adjusted, is that the aerial gets charged up to a given pressure then discharges itself at its own natural frequency whatever that may happen to be at the time. Thus, whatever the natural frequency of the aerial, that of the Detector circuit will be the same, so that the atmospherics will be recorded.

This argument is based on the assumption that an atmospheric possesses no true natural frequency of its own, but experience shows that very short waves are immune from interference while of the long waves, one may be considerably more free than others. To cut out atmospherics we may work on the following principles:



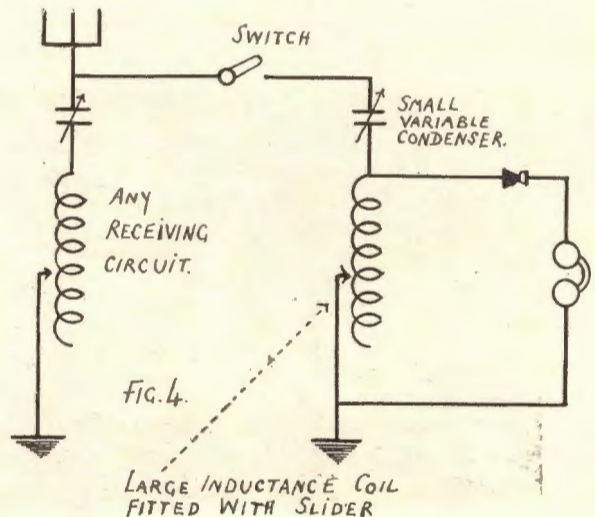
(a) Give the aerial two values, a false one and a real one; we will then hope that the atmospherics will take the false path avoiding the detector, while the signals take the real path, avoiding the false one.

(b) Make the detector circuit so persistent as



to be set in oscillation only by a well sustained train of waves. Figures 1 and 2 employ the principle in (a). The nearer A is to B the greater will be the cutting out effect but the weaker will our own signals become.

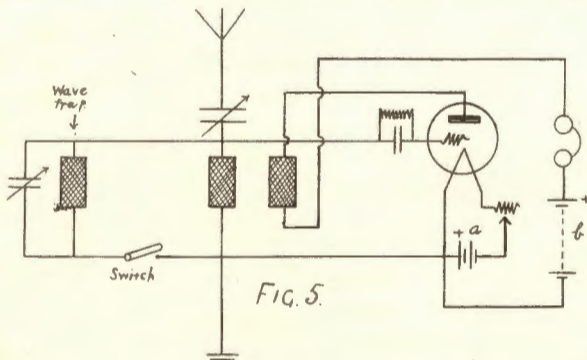
The principle of (a) and (b) is shown in Fig. 3. Each fresh resonant circuit of small capacity and large inductance tends to make the whole circuit more persistent, while each false earth connection tends to provide a path for the disturbance to get to earth without affecting the ensuing portion. Another type of atmospheric drain, worth trying is shown in Fig. 4.



First tune up the Receiving Circuit till signals are strongest, then make switch and vary the small condenser and large inductance till atmospheric are loudest. When this happens you will notice they are considerably weaker in the real receiving circuit. Try it! It must be remembered that loosening the coupling of the primary and secondary will tend to make the detector circuit more persistent and also lessens atmospheric. Fig. 5 shows the every day wave trap circuit and it is only fair to state that the writer, using this circuit cannot get 3LO with any degree of volume while 2FC is transmitting.

Operation.

Keep switch open until set is tuned and maximum volume is obtained. Close switch and vary wave trap condenser until the same volume is obtained, a final re-adjustment of both condensers as



a rule will usually strengthen your signals. The proper size coil must be used of course for the wave length you desire to tune in to. The wave trap coil mount need not be close to the primary; it may be a separate unit, but by all means fit it with a switch so that you can use your plain receiving circuit at will.

The theory of this circuit is that by tuning the wave trap to the same natural frequency as the receiving circuit, oscillations of that frequency only will oscillate in that circuit and that waves of other frequencies will go direct to earth.

GROWTH OF ESPERANTO.

TO the many radio stations which now broadcast regular Esperanto transmissions must be added Winnipeg "CKY" (weekly lessons commencing September 16), Moscow, (the last day of each month, at 14.30h mean European time, 3,200 metres), and Frankfurt on Main (weekly lessons).

The influential advertising firm, Rudolf Mosse, Berlin, has decided to use and to support Esperanto. In its organ "Berliner Tageblatt" will short-

ly appear whole-page lessons in Esperanto twice weekly.

The League of Nations' Assembly has just passed a resolution recommending the States which are members of the League to recognise Esperanto at the usual "clear language" rates for telegraphic use as an auxiliary international language.

The Labour Party Conference, Queen's Hall, London, on October 7-10, had on its agenda a resolution in favour of the acceptance of Esperanto as an official language for International Labour Conferences.

The International Conference of Co-operative Women just held in Ghent, opened each day's proceedings with a co-operative song in Esperanto, and passed resolutions in favour of the introduction of Esperanto into the schools, and of a proposal to establish a co-operative magazine in Esperanto.

LOW LOSS CONDENSERS

WHILE for the listener who is content to enjoy local broadcasting, the average type of condenser is perfectly satisfactory when used in conjunction with other parts of good make, for the man who is anxious to reach out for long distance results—especially for signals on short waves—the question of the type of condenser to use must be given very serious consideration.

Considerable attention has been devoted in this journal recently to low loss tuners of the three coil and other types. The winding of special coils was explained and it was made clear that, if made to specifications, such a receiver would give splendid results, provided a suitable low loss condenser were used. The ordinary standard variable condenser is not efficient for short wave low loss tuners.

Accordingly, a few manufacturers have produced a special type of condenser incorporating high efficiency with very low losses.

It is a matter of great interest that Fox and MacGillycuddy Ltd., are shortly landing a shipment of New York grounded rotor low loss condensers. This type contains a number of important features. The plates are spaced widely and are not secured in slots, meaning no loose connections. The vernier attachment is obtained by large gear and pinion formed from heavy everlasting material, allowing a hair splitting adjustment. Pig tail connections and stop ensure absolute electrical continuity. The bearings are of the sone type, preventing all side shake and end play, giving exceptionally smooth action.

Other features make this condenser one of the most satisfactory and efficient products we have had the pleasure of seeing,

The Name to Know in Radio

Wiles' Wonder

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 384 PITT ST., (Near Goulburn Street)
 23 PITT STREET, Near CIRCULAR QUAY

and Electric

CONSTRUCT YOUR OWN BROADCAST RECEIVING SET. WE SUPPLY

SINGLE SLIDE BROADCAST CRYSTAL SET FOR HOME CONSTRUCTION.

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

14/8

DOUBLE SLIDE BROADCAST CRYSTAL SET FOR HOME CONSTRUCTION.

Similar Parts as Single Slide,
 as above 14/8
 1 Additional Slider and Bar.. 1/9

16/5

HEADPHONES.

Pico, 3000 ohms	£1 5 0
Mello, 4000 ohms	1 5 0
Murdoch's, 2000 ohms	1 5 0
Murdoch's, 3000 ohms	1 7 6
Peerless, 4000 ohms	1 10 0
Frost, 2000 ohms	1 12 6
Trimm's Dependable	1 12 6
Frost, 3000 ohms	1 17 6
T.M.C., 4000 ohms	1 17 6
Western Electric, 4000	1 17 6
Stromberg Carlson	2 0 0
Sterling Lightweight, 4000	2 4 0
Nutmeg, 3000 ohms	2 5 0
Trimm's Professional	2 5 0
Silvertown, 8000 ohms	2 10 0
Baldwin Type C, Mica Dia	3 10 0

LOOSE COUPLER BROADCAST CRYSTAL SET FOR HOME CONSTRUCTION.

1 Maple Base Board	3/-
1 Set Maple Ends	2/6
2 Cardboard Tubes	1/-
4 ozs. 24 Enamel Wire	1/1
4 ozs. 26 Enamel Wire	1/3
1 Slider and Bar	1/9
1 Switch Arm	1/9
10 Contact Studs	10d.
2 N.P. Stops	0 3
1 Yard Bell Flex	0 3
1 Piece Moulded Ebonite	1 0
4 N.P. Terminals	1 4
1 Crystal Cup	0 6
1 Detector Arm	2 9
1 .001 Condenser	0 9
2 Extra Phone Terminals	0 8
2 Secondary Slider Rods	1 6
1 Guaranteed Crystal	1 0

£1 3 2

PARTS FOR 3 VALVE B

1 Bakelite Panel, 18 x 6½ x 3/8
1 .001 Variable Condenser, with
2 30 ohm Rheostats
1 Battery Switch
8 N.P. Terminals
1 42-Panel Plug
1 43-Panel Plug
1 Extension Handle
1 .00025 Condenser and Grid L
3 Valve Holders
2 Jefferson "Star" Transform
1 Single Circuit Jack
Panel Wire, Solder, etc.
Maple Cabinet

ACCE

4 Mounted H.C. Coils, 130 to
3 UV-201A Valves
1 6V-40 amp. Accumulator
2 42volt B. Batteries
Loud Speaker and Head Phones

The parts for these home constructed sets have been carefully tested in the particular Set for which they are intended. We employ a staff of right parts for whatever Set you wish to build. Not the most expensive but the right parts that will perform faithfully whatever is demanded of them by

OUR GUARANTEE.

It is our intention that every article listed herein shall be guaranteed everything you buy from us to be satisfactory in every detail. We are sending us your order, for, unless you are completely satisfied with the goods, send back everything you buy from us, and we will promptly return your money and charges you have paid.

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SAME PRICES.
SAME SERVICE.**

SUPPLY COMPLETE BUILDING INSTRUCTIONS AND ADVICE FREE WITH EACH ORDER.

4 VALVE BROADCAST RECEIVING SET.

14 x 6 1/2 x 3/16	£0 11 3
Condenser, with Vernier	1 10 0
	0 10 6
	0 4 0
	0 2 8
	0 3 9
	0 5 9
	0 1 10
and Grid Leak	0 0 9
	0 12 0
Transformers	2 5 0
	0 4 6
te.	0 2 0
	1 10 0
	<hr/>
	£8 4 0

PARTS FOR 4 VALVE BROADCAST RECEIVING SET.

1 14 x 9 x 3/16in. Bakelite	£1 2 6
1 .001 Variable Condenser, with Vernier	1 10 0
1 .0005 Variable Condenser, with Vernier	1 7 6
2 42-Panel Plug	0 7 6
1 43-Panel Plug	0 5 9
1 44 Extension Handle	0 1 10
3 30 ohm Rheostats	0 15 9
1 Battery Switch	0 4 0
8 N.P. Terminals	0 2 8
4 V.T. Holders	0 16 0
2 Jefferson "Star" Transformers	2 5 0
1 .00025 Fixed Condenser	0 0 9
1 Freshman Variable Leak	0 5 6
Panel Wire, Solder, etc.	0 3 0
1 Maple Cabinet	2 5 0
1 Single Circuit Jack	0 4 6
	<hr/>
	£11 17 3

ACCESSORIES.

130 to 3000 metres	£1 11 0
	4 10 0
ulator	3 3 0
	1 5 0
ad Phones, as selected, see price list.	
	<hr/>
	£18 13 0

ACCESSORIES.

6 Mounted H.C. Coils, 130 to 3000 metres	£2 6 0
4 UV-201A Valves	6 0 0
1 6-volt 40-amp. Accumulator	3 3 0
2 42-volt "B" Batteries	1 5 0
Head Phones and Loud Speakers as selected, see Price List.	

LOUD SPEAKERS.

Grodan, without Unit	£1 10 0
Manhattan Gramophone Attachment	2 0 0
Western Electric, 4000	2 19 6
Sterling Dinkie	3 0 0
Cleartone	3 10 0
Sterling Baby	4 15 0
Amplion, 39	4 0 0
Amplion, 43	5 0 0
Amplion, 3	6 12 6
Western Electric, 4004	7 2 6
Stromberg Carlson	7 10 0
Amplion, 19	8 0 0
Manhattan Adjustable	8 0 0
Magnavox, M4	8 10 0
Amplion, 15	9 0 0
Ethovox	9 0 0
T.M.C.	9 0 0
Sterling Audovox	9 0 0
Magnavox R3	10 10 0

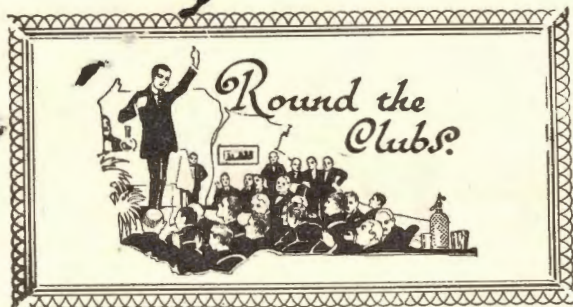
fully tested both individually and together by a staff of experts to test out and find the expensive parts, nor the cheapest, but the best of it by the particular Set being built.

be truthfully described. Therefore, we give every detail. You take no risks whatever in buying with the goods and your saving, you may return your money and all transportation

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Street. SEND FOR PRICE LIST R5.



THE LEICHHARDT AND DISTRICT RADIO SOCIETY.

Members of the Leichhardt and District Radio Society held their 103rd general meeting at the club-room, 176 Johnston St., Annandale, on Tuesday, October 28th.

In spite of the inclement weather which prevailed on that occasion the attendance was quite good, and those members who came along to the meeting were well rewarded by hearing an excellent lecture delivered by Mr. F. Thompson. It was the sixth lecture of syllabus No. 2, and the subject the very interesting one of "Valves." Mr. Thompson was called upon to reply to a number of questions at the conclusion of his talk to members, after which a vote of thanks was carried.

Next Tuesday evening the Society will hold its 105th general meeting, and the main business on that occasion will be a lecture by Mr. E. J. Fox, who will deal with the important subject of "Batteries." On the following evening a select dance will be conducted at the Dispensary Hall, Parramatta Road, Petersham, for the purpose of raising funds for the use of the Society, and everything points to the function being most successful. At a later date the Society will conduct another launch excursion, particulars of which will be published in these columns at a later date.

Inquiries regarding the activities of the Society are welcomed, and should be addressed to the Hon. Secretary, Mr. W. J. Zech, 145 Booth St., Annandale.

STRATHFIELD AND DISTRICT RADIO CLUB.

At the weekly meeting of the Strathfield and District Radio Club, held in the Club rooms on the corner of Albert Road and Duke Street, on 23rd October, the President, Mr. A. J. Jacobs brought under the notice of the members the resignation of the Secretary, Mr. M. Wraxall, who is suffering from ill-health.

The members expressed regret at the loss of the energetic Secretary and the hope that his health will be much improved in the near future. As a

result of nominations to fill vacancy, Mr. K. Campbell was elected Secretary of the Club.

The ordinary business of the meeting having been completed the members divided into groups, some to discuss the merits of their new 1 valve receiver, others to buzzer practice under the capable supervision of Mr. H. Harris, while some discussed their private receiving troubles and pleasures with the more technically qualified officers of the club, who gave helpful advice.

Although the attendance of members has been somewhat irregular of late, it is hoped that there will be a general roll-up at the next meeting which will be held in the club-rooms on Thursday, October 30th, at 8 p.m. This meeting promises to be especially interesting, as the members will bring along various kinds of apparatus, the use of which will be demonstrated. Should a lecturer from the Institute not be available, it is proposed to secure the services of a capable lecturer from a neighbouring club.

New members are cordially invited to make any inquiries regarding the construction or operation of their sets, and application for membership addressed to the Honorary Secretary, Mr. K. Campbell, 44 Bayard Street, Mortlake, will receive courteous and prompt attention.

STRATHFIELD AND DISTRICT RADIO CLUB.

The usual monthly meeting of the club was held at the Club-room at Mr. Powell's residence, corner Albert Road and Duke Street, South Strathfield, on Thursday evening, 30th inst., a fair attendance of members being present.

After the ordinary business of the meeting was attended to, two new members were admitted, and the remainder of the evening was spent in demonstrating apparatus brought along by members, which proved very instructive. The Secretary reported having obtained permission from Amalgamated Wireless Ltd. to take a party of club members out to have a look round Pennant Hills Radio Station on Saturday afternoon, 1st inst.

Messrs. T. and H. Harris volunteered to provide their two cars to take the party out at a very reasonable charge, and their offer was very favourably received, 14 members availing themselves of the opportunity.

On arrival at the Station, the officer-in-charge, Mr. Lamb, took charge of the party and showed us around, carefully explaining the whole of the apparatus, in which he was ably assisted by the operators on duty.

For the benefit of those of us who suffer from interference by VIS when listening in to broadcast-

ing, Mr. Lamb gave a practical demonstration of the negligible effect when VIS has an efficient receiving apparatus when same is tuned in to broadcasting, on his private receiving set.

With his aerial suspended from one of the outer guy stay posts of station's main transmitting aerial, and 4 valves in operation on a loud speaker tuned in to 2FC, the interference caused by transmission from VIS was practically nil.

This demonstration proved very interesting and instructive, and no doubt as a result certain improvements will be effected in a few receiving sets

we know of.

Members thoroughly enjoyed the trip in spite of the wet weather, and were much impressed by the modern appointments of the station, and the courteous and instructive manner in which they were received and shown round.

The weekly meetings of the club are held every Thursday evening, and new members will be welcomed.

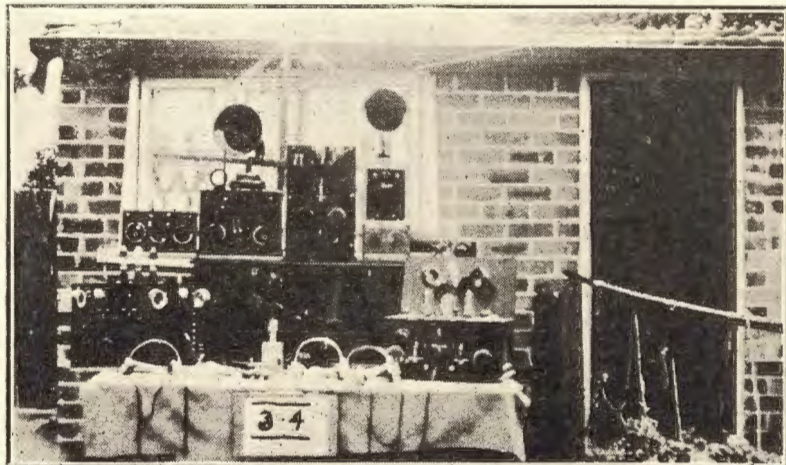
Correspondence addressed to the Hon. Secretary, Mr. K. Campbell, 44 Bayard St., Mortlake, will receive prompt attention.



Members of the Concord Amateur Radio Club: From left to right (standing): Messrs. Gray, Barker, Adams and Smith. (Standing): Messrs. Wetton, MacNamara, Denner and Stephen-son.



Members' Apparatus and the Club's Receiver.



CAMPBIE AND DISTRICT RADIO CLUB.

Meeting of the Campsie and District Radio Club was held at the club-rooms, Beamish Street, Campsie, on Wednesday, 22nd October at 8 p.m.

Members spent a pleasant evening with the club's apparatus, when a much discussed set, operating without a condenser of any description was wired up, and tested on the club's aerial. The set proved equal to the best of single valve receivers, and when coupled to an amplifier, operated an Amplion loud speaker successfully.

On the suggestion of a member of the club, it was decided to assemble and test one of the latest "Reflex" sets, at the next meeting, to be held on Wednesday, 5th November, at 8 p.m.

Particulars of the Club may be obtained from the Hon. Secretary, E. R. Mawson, "Daisydale," Wonga St., Campsie.

WIRELESS SOCIETY OF NEWCASTLE.

THE Wireless Society of Newcastle, which represents the genuinely interested experimenters in this district, held its second annual meeting at the Society's Rooms, Y.M.C.A. Buildings, King St., Newcastle, on Wednesday, 5th inst., at 8 p.m.

The President, Mr. Seward, occupied the chair, and Mr. L. T. Swain, the Secretary, submitted the following annual report:—

"It is with pleasure that the committee presents its second annual report. The year has been most prosperous for the Society, many long standing difficulties having been overcome, and the establishment placed on a secure footing."

Early in the year an internal loan was arranged whereby nine members each loaned the Society the sum of £1 to enable the early establishment of the experimental radiophone. This was got under way on the night of the 10th January, 1924, and reports on the first transmission were received from Hay, Toowoomba and Brisbane. Regular test transmissions from Victoria, Queensland, and New Zealand, placing the Society in the unique position of being the only club whose transmitter has been heard outside Australia. February saw the Society in a position to again pay rent for its club room, and the Committee again took this opportunity of thanking Mr. Denny for his kindness in allowing the Society six months free tenancy of its quarters.

In August a public demonstration of wireless telephony was given in the Y.M.C.A. Building in King Street. This affair was highly successful, the Society having the co-operation and assurance of the Newcastle Y.M.C.A. The proceeds were

equally divided, the Society profiting to the extent of over £7.

The Y.M.C.A. kindly placed a club room at the disposal of the Society recently, entirely free of rent, with only a small charge of 10/- per month for electric power. This gives the society its long wished for quarters in the city, and with the enthusiastic co-operation of members the Committee hopes to make the third year a most prosperous one. In conclusion it might be mentioned that, with the formation of the Delegates' Council in Sydney, this Society was one of the first to affiliate, and it has been represented at Council meetings by Mr. Olsen, to whom the Society is under a debt of gratitude for his enthusiastic representation of its interests.

A new unit receiver covering 2 valves at present is in course of construction and should be in operation shortly."

Mr. J. Shaw, Treasurer, submitted the balance sheet which was considered very favourable.

New rules were submitted and considered, and after several alterations had been made were accepted by the club for the ensuing 12 months.

The next business was the election of officers for the ensuing year which resulted as follows:— Mr. L. T. Swain (President), Mr. S. Childs (Secretary), Mr. G. Seward (Assistant Secretary), Mr. J. Shaw (Treasurer), Mr. N. P. Olsen (Publicity Officer), Messrs. Swain, Filmer, Seward, Childs, and Stewart (Technical Committee), Delegate for Delegates' Council of the Wireless Institute, Mr. N. P. Olsen.

A vote of thanks was passed by acclamation to Mr. Swain as a token of the appreciation of the club for the valuable services rendered during the past 12 months.

It was decided that in future the meetings be held at the Club rooms, on the first and third Wednesdays of each month at 8 p.m.

The Technical Committee has been asked to prepare a syllabus of interesting lectures.

WAVERLEY RADIO CLUB

Waverley Club last week was favoured by a visit by Mr. G. Maxwell Cutts, under the schedule of lectures drawn up by the committee of the Delegates' Council. Mr. Cutts spoke about "Radio and Audio Frequency," and many valuable hints, evidently the result of a wide experience, were given by the speaker.

Matters in connection with the club's dance were also dealt with. The affair was reported a great success.

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SHORT WAVES FOR AMATEURS

GO DOWN, YOUNG MAN!

By A. BURROWS.

AUSTRALIAN amateurs have been requested to keep off the air between the hours of eight and ten in the evening. Only a request certainly, but it carries behind it the probability of near-future official requirements which will be more than "requests." And once again the inevitable broadcast listener is to blame. Truly the amateurs by their works and discoveries, have given birth to a genii which threatens to destroy them! Yet the remedy (or perhaps it is only an alternative, though not many will think so) is in their own hands. The trend of events in America have shown this.

It is generally accepted in America that there are by far too many broadcasters — too many for the number of wave lengths available, and too many for their own or the public's good. That is, the so-called freedom of the air is beginning to have a reactionary effect, with the result that broadcasting shows signs of developing into a cheap, third-class entertainment. Any class of twenty-watt station is allowed to do its best, or worst, in adding its quota to the universal interference without a commensurate return in worth while service. Some months ago, Mr. H. Hoover, Secretary of Commerce for the U.S., said: "There is, the so-called broadcasters. Ultimately I believe there will be two or three chains of powerful broadcasting stations across the continent. I am also convinced that broadcasting is a matter of local distribution. Distance-getting by listeners-in is largely a fad, in my opinion. No one really hunts for far away stations for the programmes they broadcast, but principally for the sake of curiosity." This was preparatory to a convention which was held towards the end of last September, and which had revolutionary effects upon American amateurs.

Early in August amateurs over there were granted bands between 80 and 5 metres: 75 to 80, 40 to 43, 29 to 22; and 4 to 5 metres. These, however, were special concessions, and by no means the ruling average wave lengths assigned to amateurs, which were 150 to 222 metres, broadcasters using the wave length band up to 545 metres. From this it will be seen that, broadly speaking, American amateurs were on a par with Australians so far as wave lengths were concerned, though perhaps a little lower.

Broadcasting, however, reached such a pitch that the allocation for broadcast stations was found

inadequate; provision is only made for 535 stations (which seem to allow less than one metre each) whereas there are close on 600 clamouring for admission into the ether. Pending restrictive regulations for the number of stations, it appeared to be a case of the irresistible force and the immovable object. As it happened, however, the immovable force, which was the amateurs, wasn't so solid as was generally thought, and it consequently shifted—not slightly, but quite a lot.

What Conference Proposed.

The Conference of September 30 made resolutions which are to be passed on to Congress for approval, which means, of course, that eventually, in all probability, they will become law. Here is the recommended schedule for wave lengths below 545 metres; all above that are devoted to Government and marine work, with one or two concessions for universities:

545 to 200 metres: Provision for 550 broadcasting stations.

200 to 150: Point to point commercial and Government land stations.

150 to 143: 11 point to point commercial and 8 Government land stations.

143 to 130: One point to point commercial.

110 to 105: Special amateur stations. (Between this and the previous band there is a break which appears to be unoccupied).

105 to 5: Assigned to 17,000 amateur stations.

What happens below 5 metres is not stated; it is probably given to experiments in pigeon raising or growing vegetables by wireless.

Compare this with the amateurs' previous assignments:

222 to 150 metres: 17,000 amateurs, and various experimental and training stations, and 80 to 75; 43 to 40; 22 to 20; 4 to 5 for amateurs also.

From this the downward trend of amateurs' bands is amply evident. It is presumed that the amateurs were represented on the convention (unlike some in Australia), and agreed more or less to these alterations, which don't allow an amateur above 110 metres. In fact, concerning this matter the New York "Tribune" says: "The Department of Commerce recognises the valuable work done by the amateurs towards the present day development of the art, and does not intend to offend them by arbitrarily shifting them from one wave length to

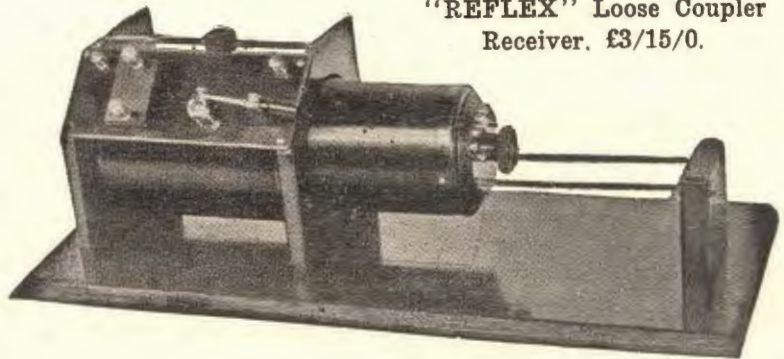
(Continued on Page 40)

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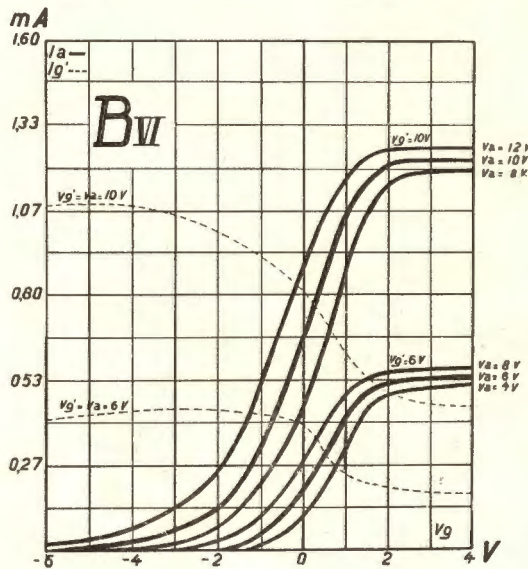
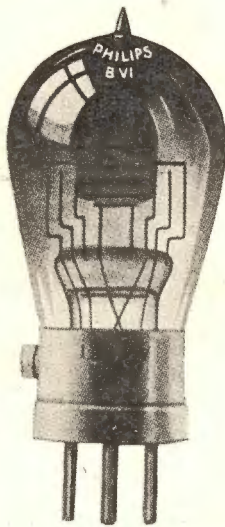
The fact that one or two torch refills will replace the existing 22 to 120 volt B. battery represents a substantial saving both in outlay and upkeep, not to mention the saving in space and weight. The multi-cell B bottery has always been regarded as a source of annoyance, to express it mildly, and few experimenters will regret its curtailment. Readers will no doubt remember an article in this journal stating that successful experiments had been carried out in England and America with 4 electrode valves using the "Unidyne" or "Solodyne" principle of eliminating the B. battery, and using the "A" battery to supply both filament and plate current. This problem

offers a field of research to local experimenters, with the kindly regard of all brother experimenters as a reward, when the "B" battery has been finally interred.

The Philips tetrode valve is made in two types—DVI and BVI. The former requires a filament voltage of 3.5—a current of .5 amps and a plate voltage of 2 to 10 volts. BVI is a miniwatt type requiring a filament voltage of 1.6 to 1.8 volts, a current of .15 amps and a plate voltage of 2 to 10 volts. This valve has a special appeal to the country experimenter, to whom batteries of all kinds are a problem.

These valves necessitate little or no alteration to existing circuits. The second grid is connected to the cap of the valve, and it is merely necessary to run an additional wire from a terminal on the cap to the positive side of the plate battery. In amplifying valves, an improved result is obtained by giving the exterior grid a negative voltage of about 1 volt.

We are informed by Warburton, Franki, Ltd., distributors of Philip's valves that DV1 valves are obtainable from dealers and BVI valves will be available shortly.



Characteristic Curves of Receiving Valves.

Type B VI: i_a —Anode current in mA. V_g —Grid voltage. V_{gi} —Voltage of the inner grid. V_a —Anode voltage.

All voltages are to be considered with regard to the negative side of the filament.

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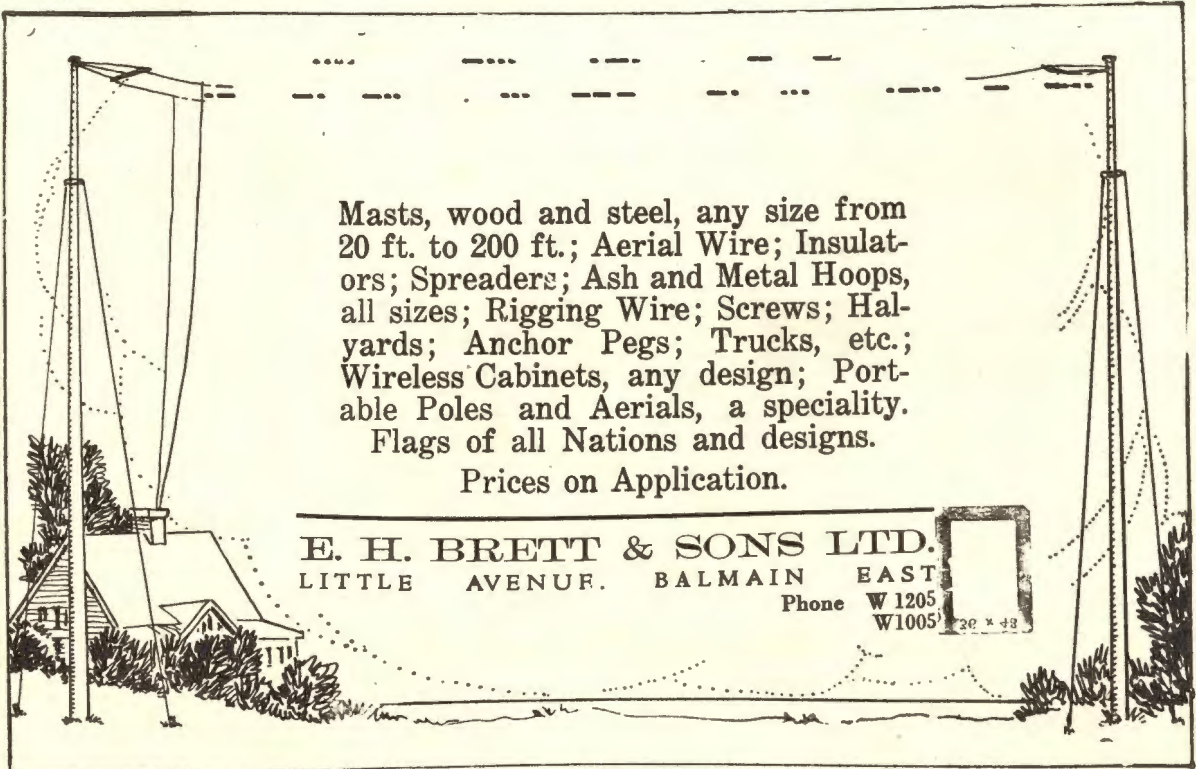
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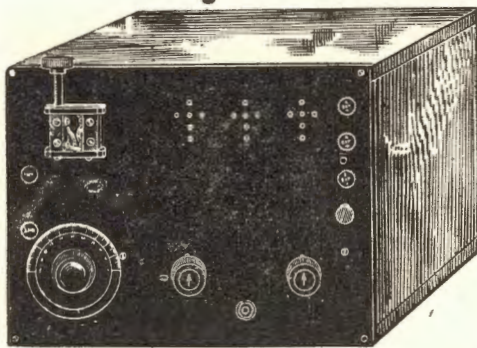
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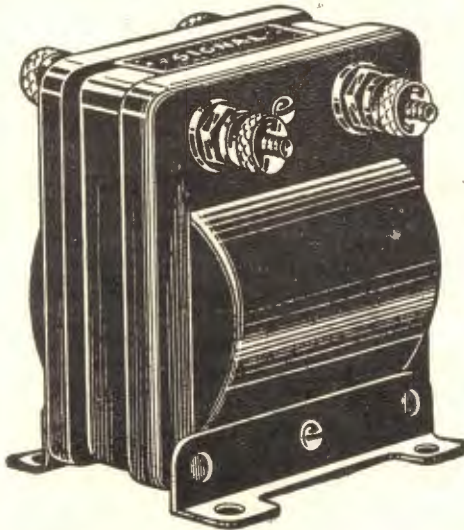
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Radio Set for use in the Home and on your Vacation

By W. G. Keogh, M.W.I.A. (2ZA)

THIS is the time of the year when the prudent radio enthusiast is making his set for use on his vacation outings.

While there are many ways in which a radio receiving set may be used in the summer, the automobile trip or camping trip probably affords the best opportunities for getting practical use from it. For this purpose the now familiar dry cell tube comes to the rescue, by doing away altogether with the storage battery. It is no longer much of a task to construct a set that may be easily transported with the ordinary vacation kit. In the past a tube set was out of the question, but now a small set may be made up or purchased, that will weigh only a few pounds, and arranged in such a way as to be entirely self-contained with all the apparatus and battery within a space of not more than 14 x 8 x 8 inches.

The circuit used of course would be a reflex hook-up using two valves, which would give good loud speaker results on a frame or "rough-up" aerial.

Components Required.

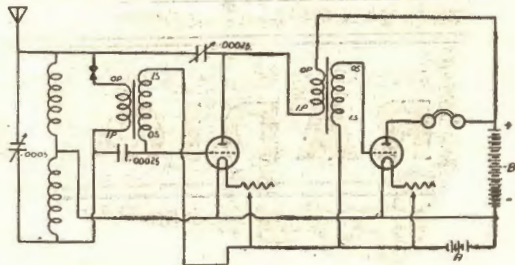
To make this receiver the following parts will be required:

- 1 box or leather case.
- 1 panel, 10 x 8.
- 1 coupling plug.
- 1 panel plug.
- 2 17 or 22 variable condensers.
- 1 30 ohm rheostat.
- 1 A battery switch.
- 2 audio frequency transformers.
- 1 open circuit jack.
- 1 35 turn coil mounted.
- 1 detector.
- 1 50 turn coil mounted.
- 1 100 turn coil mounted.
- 1 150 turn coil mounted.
- 2 U.V. 199 valves.
- 2 U.V.199 valve holders.
- 1 phone plug.

- 1 75000 ohm resistance.
- 1 .0003 condenser fixed.
- 1 .001 condenser fixed.
- 2 dry batteries.
- 2 42 volt. batteries.

During the last month the writer has tried this set out between Sydney and Lithgow, and loud speaker results were obtained throughout.

Before leaving for the Mountains the set was hooked on to the telephone line which was being used as an aerial and by plugging in a two hundred and a two hundred and fifty turn coil, Melbourne, 3LO, could be heard good loud speaker strength in between intervals of 2FC, Sydney. Amateurs too numerous to mention have been logged from practically every State, using spider web coils of 15 and 35 turns respectively.



To tune the set all that is necessary is to plug in the coils for the station desired, e.g., say 2FC, 100 and 150 and place them about a quarter of an inch apart and then take a condenser dial in each hand and turn both in either direction until you hear a shrill whistle, then the set is oscillating. By opening the coils out very gently you will stop the set from oscillating and leave point of oscillation which is a desirable feature for the coils just close enough to have the set on the the reception at telephony.

The receiver is very easy to operate and in addition it is more selective in tuning than those of similar design because of the fact that it is pos-

(Continued on Page 54.)



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Your Christmas holiday will not be complete without one

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1 Crystal Detector	0 8 9	1 Bradley Stat	0 9 6
1 Switch	0 3 0	2 "B" Batteries	1 5 0
1 Pair 'Phones	1 7 6	1 "A" Battery	0 5 0
1 Jack	0 3 6	2 Fixed Condensers.	0 3 0
1 Set Coils.	1 3 6	1 Resistance.	0 1 6

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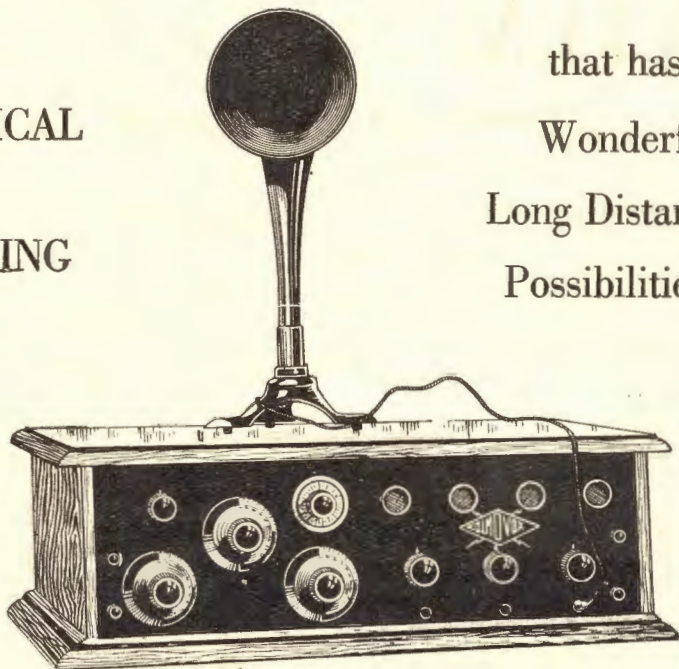


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Loud Speakers, in various designs for use with this set can be supplied at prices ranging from £4 to £12.

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Continued from Page 50.

sible to approach a higher peak valve of regeneration without causing the circuit to oscillate. It is generally accepted that tuning becomes sharper as regeneration is increased and it will be readily understood why this feature is so desirable.

Much erroneous information has been circulated among novices in regard to that mysterious "static" that supposedly renders radio helpless in the summer months. The fact is that static is seldom strong enough to seriously interfere with broadcast reception even during the warm season. The only time that static grows to a volume enough to curtail reception is when an electrical storm is

passing over the immediate neighbourhood. A great deal of joy may be had out of a summer radio installation, in the camp, on the car or boat, or on the farm, at the seaside or at any isolated spot, the writer has used radio in this way for the last two summers, and has concluded that once you have enjoyed the experience of keeping in touch with the big smoke you will never be without it.

Peter—"I'm writing a song."

Paul—"Yes? What's the subject matter?"

Pter—"It doesn't."—Cornell Widow.

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Is it because there are unexpected leaks in your equipment? Are some of the smaller parts—the "little things" you don't pay much attention to—are they draining energy away? Why, man, there's not the slightest little switch, the most unimportant little accessory, that doesn't influence your results. Every

place where there's a connection offers radio energy a chance to escape. And every small part offers you an opportunity to make your result better . . . to make your DX list longer.

MAR-CO small parts will help you—if you'll use them wherever you can—and insist on getting MAR-CO when you buy. Skilled craftsmen make MAR-CO small parts and they make them with the precision of scientific instruments. They make them to stop the little energy leaks . . . to add miles to your range.

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Unassembled

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Short Wave for Amateurs

(Continued from Page 38)

another. It is understood, however, that the amateurs are not averse to such a change and that they are getting very good results on the short wave length bands. On the short wave lengths they are not required to observe silent hours unless the transmitting station is so located as to produce objectionable interference with other stations." (It would be interesting, by the way, to learn what interference is not objectionable.)

Silent Periods Unnecessary.

American amateurs, apparently, are entirely willing to experiment permanently below 110, which means an average wave length of about 80 metres for the 17,000 key-thumpers who are to occupy those limits. And the view is expressed that only in particular instances will silent hours be necessary for experimenters if the shorter bands are used.

Here, in Australia, with half a dozen broadcasting stations distributed over an area some few times larger than all of the United States, and about forty active transmitters using comparatively low power, silent periods have already been asked of the amateurs. And few will deny that the re-

striction, from the broadest common sense viewpoint, was necessary.

The question suggests itself, could Australian amateurs do their best on an average wave length of 80 metres? Judging by the number of the air almost any night below 100 metres it would certainly appear that they could. And, in any case, they could learn. No doubt exists now that the future of wireless lies in the short wave lengths, so it is quite in the order of things that they should use those bands which show the greatest promise. From the point of view of interference alone, the experience of America seems to show that such a shift would be worth while. Australians certainly get low now—but not low enough; and a general move down might solve quite a number of problems.

SPECIAL ANNOUNCEMENT

The Australian General Electric Co., Ltd. have been advised by their New York office that WGY will broadcast on 380 metres on November 13th and 20th, at 5 a.m. and 7 a.m. (New York time). This corresponds with 8 p.m. and 10 p.m., Sydney time.

JUST ARRIVED!

	Fil. Volts.	Detector. Plate Volts.	Amplifier. Plate Volts.
BV1 Phillips 4-Electrode Valves	3.6 to 1.8	2-4	4-10
DVI Do.	3.5 to 4	2-4	4-10
DV2 De Forrest	5	18-22½	60-150
DV3 De Forrest	3	16-22½	60-120
Also in Stock			
B5 B.T.H.	3	18-30	60-100
UV 201A Radiatron	5	18-30	60-150
DI Phillips	3.5 to 4	25-30	
DII Phillips	3.5 to 4		30-70
DIV Phillips	3.5-4	25-30	
DV Phillips	3.5-4		30-70
DE Phillips	3.5-4		60-100
Marconi R.	4	60-80	60-80
PI Cossor	3.5-4	20-30	40-80
PII Cossor	3.5-4		30-60

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THE GRID LEAK

THIS ARTICLE WILL TELL YOU HOW TO MAKE A GRID LEAK, A NECESSARY PIECE OF APPARATUS WHEN USING A VALVE RECEIVER.

TO one newly entering the field of experimental wireless, the grid leak, though tripping light-off the tongue as a phrase, is very much a sealed book as regards meaning.

The thing itself is so simple in construction that it is no wonder apparatus makers try to invest it with as much mystery as possible, and seal it up in their sets in a way that prohibits examination, unless you destroy it in opening to see what is inside.

But why does a grid want to leak? Is it not sealed up inside the glass of the valve so that it cannot leak by any means?

Why the Grid "Leaks."

Let us consider our valve a little in detail. The filament in the centre is glowing with the current from a 4 or 6 volt battery and emitting negative electrons. A high-tension battery of 30 to 60 volts has its positive terminal connected to the plate of the valve, or that plain cylinder of metal which surrounds the glowing filament.

The negative electrons rush across from the filament to the positively connected plate, or would do so but for the grid, a little spiral of wire placed in between the filament and the plate.

Now if this grid started by being neutral, that is, being neither positive or negative, the negative electrons arriving from the filament would settle on it, like swarming bees on a tree branch, and make it so negative that it would positively repel any more negative electrons that tried to settle there. It would then be in a proper dog-in-the-manger position; it would want no negative electrons itself, and bar the way to negative electrons which wanted to get past to settle on the plate.

The Grid Condenser.

If we attach to the grid terminal a high resistance conductor which will allow the congestion of negative electrons to drain away as fast as they congregate, the grid would cease to be repellent to the stream arriving from the filament and avert less repulsion on those streaming through and past which were on their way to the positively charged plate. This high-resistance conductor is called a

grid leak because it allows the accumulated negative charge which was choking the grid and spoiling the action of the valve to leak away.

Now for the grid condenser. Usually attached to the grid in the valve receiving set is the connection to the aerial, by means of which the wireless signals arrive. If we are tuned to receive a 300 metre wave we get 1,000,000 waves in one second, a rate of arrival much too rapid for the human ear to appreciate. We therefore put in the way a "hold on a bit" piece of apparatus called a condenser, the grid-condenser to be exact, and this has the effect of slowing up the breathless pace of 1,000,000 per second into something we are able to appreciate.

The grid condenser then becomes part and parcel of the grid system of the valve, and would get as congested as we saw the grid itself get, but that the grid leak provides for the draining away of unwanted negative electrical charges.

The Materials Required.

It will be instructive for the novice to try it experimentally. Connect up the set without a grid condenser or a grid leak, and tune in for signals. Touch the grid connection with the finger and take the finger away. Good signals coming in will quickly die away, as if being smothered, and can be restored every time the finger touches the grid circuit and acts as a grid leak.

The materials required for making a grid leak are two terminal binding posts with long screws going right through washer, body nut, and terminal nut. Also a thin piece of wood four inches long and two inches wide—cigar box wood will do; two pieces of smooth tinfoil, two and a half inches long and one and three quarters inches wide; one piece of waxed paper or mica, four inches by two; Manila luggage label, four inches by two, or a piece of good drawing paper the same size.

Bore two holes in the wood half an inch from each end to take the screw of the binding post. Lay one piece of the tinfoil on the wood with 1/8 of an inch margin along the sides and

Continued on Page 63.

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No better value in the world. Type B.5—Filament volts, 2.5-3; Filament current, 0.06 amps.; Anode volts, 20-80 volts.

FOR USE WITH DRY BATTERIES.

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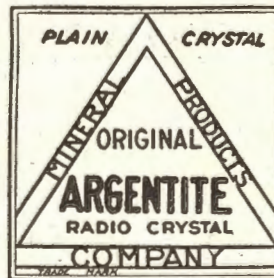
The AmerTran audio transformer can be used in all stages of an audio amplifier with tubes capable of handling the energy and in a properly balanced circuit. Because of the great amplification of this transformer it is seldom necessary to employ more than two stages for greatest volume, and one stage with the AmerTran will, as a rule, give satisfactory results with a loud speaker when used with a



good regenerative receiver or radio frequency amplification... In general it may be said that if the signals can be heard distinctly with headphones with the detector only, a loud speaker can be operated with only one stage of audio frequency, when using the AmerTran, and the results will be startling to those who have been using the ordinary type of amplifying transformer. Ratios 5 to 1 and 3½ to 1 in stock.

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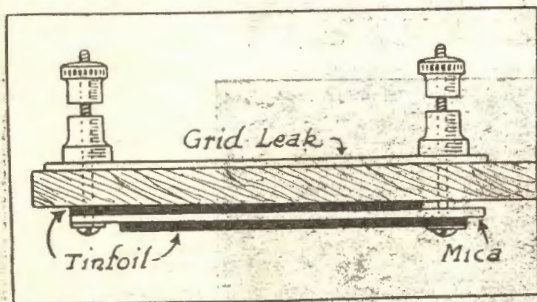
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Continued from Page 59

one end and 1 3/8 inches margin the other end. Next put on the waxed paper or mica, with holes in it corresponding with those in the wood. Put



on the other piece of tinfoil so that the 1/8 inch margin comes at the end where the 1-3/8 inch margin of the other tinfoil was, the idea being that the binding post screw makes contact each with one tinfoil strip, but the two strips must not be in metallic connection with each other. Connecting up.

Stick a piece of stout paper over this to protect the tinfoil. On the other side of the wood now

slip the strip of Manila or drawing paper over the two screws, Blacklead pencil plentifully all round the holes in the paper and screw the body nuts down, allowing some of the blacklead pencil marks to show out from under.

A heavy Blacklead pencil mark, or a number of indian-ink marks should be made joining the binding posts, and the grid leak is complete.

One terminal of the grid leak is connected to the slider of the aerial tuning inductance coil, and the other terminal direct to the grid terminal on the valve panel. A great difference in signal quality and strength will at once be noticeable.

There was once a girlie named Maude
 Who they say was a social fraude;
 In the ballroom, I'm told,
 She was haughty and cold,
 But alone on the sofa—Oh, Gaud.

Rastus—Gwine have a garden this yeah?
 Rufus—Yas, 'deed, if mah wife's back gits
 betteh.—Life. * * *

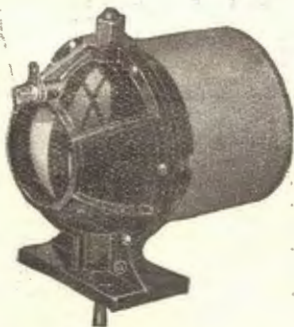
She—"What is the matter, dear? You look worried."

He—"The books at the office won't balance."

She—"Why don't you buy some new ones?"

N. Y. Medley.

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R 125—VARIOCOUPLER—LARGE SIZE.

This coupler, embodying the same general characteristics as the smaller size variocoupler, offers a broader wave length receiving range, which is quite desirable in many instances. Also, fifteen taps are provided on the primary winding, making very close tuning possible. Suitable for either table or panel mounting.

The spherical portion of shell carries a separate internal winding, and when connected in the plate circuit acts as a tickler coil, or, when connected in series with the main primary winding increases the wave length range of the instrument. The wave length reception range covers the bands shown below, though will vary, depending on the characteristics of other apparatus with which used.

R 125 B—BANK WINDING.

Without internal winding in use the following wave length ranges are obtainable:

Tap No.	Maximum Condenser Capacity in Series .00083 MFD.	Minimum Condenser Capacity in Series .00003 MFD.
1	350 Meters	205 Meters
2	510 Meters	240 Meters
3	650 Meters	270 Meters
4	775 Meters	310 Meters
5	925 Meters	550 Meters
6	1100 Meters	700 Meters
7	1200 Meters	780 Meters
8	1325 Meters	875 Meters
9	1450 Meters	960 Meters
10	1550 Meters	1050 Meters
11	1610 Meters	1135 Meters
12	1750 Meters	1200 Meters
13	1875 Meters	1275 Meters
14	2020 Meters	1350 Meters

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MAXIMUM SIGNALS

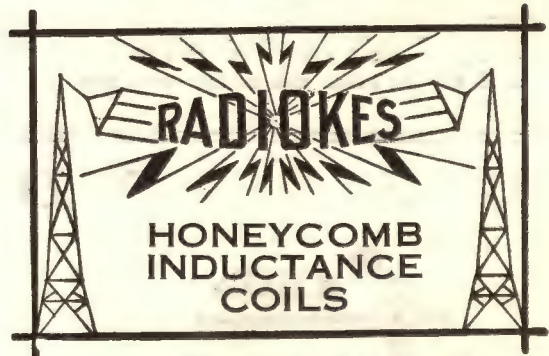
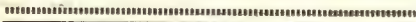
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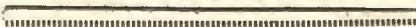
TYPE AH

TYPE DH

TYPE GH



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Approximate Wave Length with .001 Condenser.	Wave Lengths
Turns	Metres
25	60-230
35	85-340
50	150-500
75	200-750
100	280-1000
150	360-1450
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500	1150-5200
600	1350-6100
750	1600-7700
1000	2200-14700
1250	2700-18200
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