

RADIO MONTHLY

A Magazine for Everybody



*In
This Issue*

TELEVISION—
WHERE IS IT?

A.C. All-Empire Short Wave Set
4 Valves for the Countryman
Your Favorite Announcers Interviewed

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Pages

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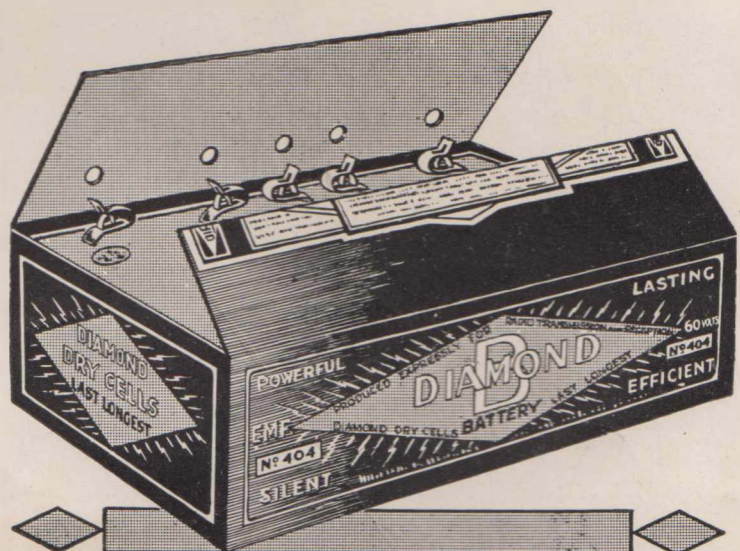
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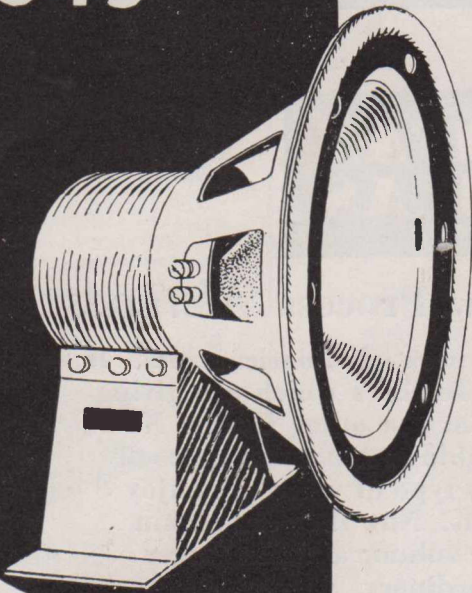
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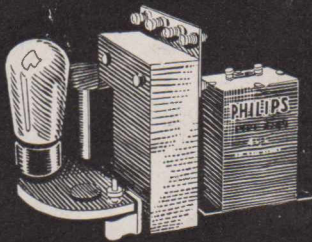


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RADIO

MONTHLY

A Magazine for Everybody

15th December, 1931

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FIRST WITH
THE FACTS

RADIO

MONTHLY

A MAGAZINE
FOR EVERYBODY

Vol. 1, No. 1.

SYDNEY, AUSTRALIA

December 15, 1931

A Policy of Advancement

SOMEONE has asked, "What is the policy of *Radio Monthly*?"

This question of policy is usually rather difficult to define. Some journals with interests diametrically opposed to certain well defined aspects of radio throw whatever weight they possess in the other direction, or grudgingly concede a small measure of support whenever the spirit moves them.

There are many conflicting interests in this business of radio. While we ourselves cannot alter the situation, we can, at least to the limit of our powers, champion the cause of those interests which we believe stand for the good of radio as it affects the man in the street. That, briefly, is the policy of *Radio Monthly*.

Some may query our statement; thousands more, we believe, will concur with us when we say that the real backbone of radio broadcasting has been, and is now, the "B" class stations. Unquestionably, they have raised the standard of popular entertainment. Since their very livelihood depends upon their acceptance by the public, they have sought for, and found, the human, *personal* note in radio, as against the *impersonal* presentations of a large organisation sitting securely upon 50% of the licence fees.

Time and again, when the paucity and stereotyped nature of "A" class programmes has reduced the public to an apathy dangerous to the progress of broadcasting, the "B" stations have filled the gap by providing programmes to which the average listeners turned with relief. Time after time "B" stations have beaten the "A" to events of national importance. Because of this—because of their interpretation of what the public wants—they have established and sustained that interest and enthusiasm which have brought thousands upon thousands of new recruits to the ranks of the broadcast listeners; and all this without receiving one single penny of the licence fees derived directly

from their efforts. If ever there existed a glaring anomaly, it exists here.

Lately officialdom has deigned to notice officially the "B" class stations. Up to the present time the Government has offered no support to them, while receiving into the Treasury thousands per annum won by the hard labour of the very stations whose existence for years was not officially recognised. Their struggle for a niche in the broadcasting world has been an epic. Harassed at every turn—hounded by copyright and performing rights fees—to-day threatened with excommunication by the phonograph record interests, yet they have flourished by virtue of the fact that they won and have held the only thing that will make anything go—public approval.

One "B" station alone—we have inspected the files—receives from listeners between three and four thousand letters every week. An announcer from a Sydney "B" class station visited Newcastle and was given a civic reception. Is there any doubt about the following these "B" stations have secured in the face of official and private obstacles? Can anyone doubt seriously that if a referendum were taken to-morrow 80% of listeners would cast their vote in favor of "B" stations?

We cast no aspersions upon the quality of "A" class programmes—rather do we say they have done nobly, considering the system they work under. That system is to be changed soon for one which, we sincerely believe, will never provide anything but an aloof contact with the public.

For the human, friendly element in broadcasting—for the cheery, versatile programmes—the appeal that keeps trade booming and listeners contented, we must, in the future, as we do now, look to the "B" class stations. Therefore, without constituting ourselves, or being constituted an organ for "B" class stations, *Radio Monthly* makes it clear that its policy is entirely in tune with these stations that have done so much to weld radio into the hearts of the people.

WHERE IS TELEVISION?

TELEVISION is the great dream of all radio enthusiasts to-day; in every country where broadcasting is established and wireless development is followed up, keen expectation exists alongside of intensive research and wide publicity.

On the one hand the optimists are promising wireless television in the home next year, while, on the other hand, pessimists are refusing to see any prospect of useful results. Consequently, there is a tendency toward confusion of the public mind in relation to this important subject.

I am confident that practical television on the scale of broadcasting will be achieved and that the day is coming when we shall be able to sit at home and see and listen to speakers and performers, witness plays and watch distant events as they occur. At the present stage of development, however, I cannot see the prospect of such interesting achievements appearing on any large scale before the year 1935. I am not yet prepared to predict how soon after 1934 television, on the scale referred to, will be in existence.

The foregoing opinion is based on a study of the methods at present employed for television, but the possibility of some new discovery or development along other lines must not be overlooked. It has often happened that a change in the direction of research or a new scientific discovery has brought results hitherto unexpected and has shifted development ahead many years.

The word "television" almost explains itself; literally it means seeing at a distance. Anyone using a telescope or a pair of field glasses is employing one well known system of television. In recent years, however, the word has become popularly associated with wireless, because people accustomed to listening to wireless receiving sets have a natural desire to see as well as to hear. The wireless industry itself has adopted the term "television" and it has consequently become almost exclusively associated with wireless in the public mind.

In England the British Broadcasting Corporation provides regular television transmissions and there are a number of stations in America which do the same

thing. There are already some thousands of people owning the necessary equipment and receiving television images in their homes. All this, however, is on a scale which would not appeal to the great mass of wireless listeners, both as regards transmission and reception; it is as yet in an experimental stage.

The difficulties facing practical television arise because the things we want to see have two or three dimensions, length and breadth or length, breadth and depth, but those dimensions cannot be photographed as a whole on to a wireless wave for transmission. In wireless telephony and in broadcasting, as we know them to-day, the sound wave or its electrical counterpart can be impressed upon the wireless electro-magnetic wave and carried to a distance where it is capable of being faithfully reproduced, but sound is essentially a movement in one dimension. Light also is a movement in one dimension, but eyes are so arranged that they can collect light waves from three directions and interpret them in their proper relationship.

To transmit by wireless a visual representation of something having two or three dimensions it is first necessary to disintegrate the scene or picture and separate it into a large number of spots or a large number of lines, the spots or lines having varying density corresponding to the light and shade of the different parts of the picture. This is one of the difficult problems in television and in most cases it is done by an apparatus known as a scanning disc, the purpose of which is to traverse the entire surface of the picture or scene and to split up the light waves, reflected from that surface, into small varying particles.

After that, these minute and irregular light impulses are thrown on to an instrument which is now commonly known as a photo electric cell. In its modern form this is usually a thing looking something like an electric light bulb or a radio valve. Inside is a mineral substance usually associated with one of the rare gases. Its peculiar property is that it allows more or less electric current to pass through it according to whether it is exposed to a stronger or a weaker amount of light. This photo electric cell can then be substituted for a microphone in a wireless telephone or broadcasting

station and it will impress variations on the wireless wave sent out from the station corresponding with the varying light impulses falling on the photo electric cell from the scene or picture.

At the receiving end the wireless waves can be picked up in very much the same manner as we pick up the transmissions from an ordinary broadcasting station, but instead of causing the varying impressions brought on the wireless waves to operate a loud speaker and so produce sound, the television impressions on the wireless waves are used to operate a source of artificial light, usually a Neon lamp.

This lamp flickers and gives out a varying amount of light which should correspond exactly with the varying amount of light falling on the photo electric cell at the sending station. The varying light does not, of course, produce a picture and the next step is to cut up the beam of light from the lamp into small particles corresponding with those taken from the original and throw them on to a screen. They must be thrown on to a screen in such a manner that every dot takes up its proper position in relation to the thousands of others and corresponding to the position of its original at the sending station, thus building up by means of small spots of light of varying intensity a visible copy of the original scene or picture.

If this explanation in plain language has been understood, it will not be difficult for the reader to grasp the fundamentals, but he will naturally assume that the transmission of a picture of any size will occupy a considerable period of time. There is no great difficulty in transmitting a still picture by such means when it is practicable to take five minutes up to half an hour for each picture. On such lines copies of photographs, fashion plates, columns of newspaper, legal documents, cheques and other things are transmitted by wireless between Europe and America, and on one occasion a photograph of Air Commodore Kingsford Smith was transmitted by Amalgamated Wireless from Sydney to London and reprinted in the London "Times."

Many new and greater difficulties are met with, however, in attempting to transmit moving pictures or actual

By

E. T. FISK

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¶ *The whole world is waiting for television, the next logical step in the march of radio. The radio journals of every country toy lovingly with the word; so much has been said and written about television that the general attitude appears to be, "It is just around the corner." Hundreds of thousands of pounds have been lavished upon the discovery of a system for the transmission and reception by radio of moving pictures. And yet, are we any nearer the real solution of the problem? In this article, Mr. E. T. Fisk, Managing Director, Amalgamated Wireless (Australasia) Ltd., clears away some misconceptions, but expresses a hope of comparatively early achievement.*



scenes as they occur, because for this purpose it is not practicable to occupy from five minutes upwards for each complete picture. It is essential to transmit at least ten complete pictures per second. It is also essential that the apparatus employed for splitting up spots of light and placing them into their proper relationship at the receiving end must work in complete step or synchronism with the similar apparatus at the sending end.

It is not practicable in this article to explain the technical details of the apparatus used for television.

It is claimed that the first successful transmission of a television image was carried out in London by J. L. Baird, in January, 1926. Since then a great amount of research has been carried on in Great Britain, on the Continent of Europe and in America by all the principal wireless companies and their experts. Many hundreds of thousands of pounds have been spent in that direction,

and although considerable success has been achieved television has not yet reached the stage where it can be employed for giving practical service to thousands and even millions of wireless listeners.

If our present broadcasting stations in Australia, which are now approximately thirty in number, were converted for television transmission only three of them could operate simultaneously without causing serious interference. For sound and music broadcasting a frequency band of 10,000 cycles is sufficient, but for television 100,000 cycles are required. Television images which can be received to-day by wireless over any useful distance are uncertain, indistinct and only a few inches square. Some experimenters claim to have overcome such limitations, but practical demonstration on a scale other than experimental has yet to be made.

On one or two occasions pictures several feet square have been shown, but

in those cases over 2,000 wires were used to connect the transmitting and receiving apparatus. Such demonstrations were interesting as showing what is to come.

I think that useful advance is to be expected from the employment of very short waves, also from new methods of scanning the outgoing pictures and illuminating the received pictures. In these directions distinct and hopeful possibilities are appearing from the research laboratories.

When television is perfected it will provide complete entertainment in the home and home life will become more and more attractive. It will ultimately bring the whole world closer together, and I think we may look forward to the day when an important happening or a first class entertainment in London will be seen and heard quite distinctly in every home throughout Australia. That day is not here yet, it may be a long way off, but it will certainly arrive.

The CASE for the "B" CLASS STATIONS

A RECENT investigation of a section of listeners conducted by a Sydney business firm, disclosed that 80% of the listeners interviewed, tuned in regularly to "B" Class Stations, and 20% to the National Broadcasting Service.

While this cannot be accepted as conclusive evidence as to the percentage of licencees who listen to "A" or "B" Station programmes, it shows not only the great and growing popularity of the "licensed" or "B" Stations, but of their success, in spite of their having to compromise between advertising and entertainment in their programmes, in rendering a service to listeners that compares favourably with National Service so freely financed by licence fees.

The recent Annual Conference of the Australian Federation of Broadcasting Stations, in considering the Government proposal to re-organise the control of broadcasting, strongly urged "the Federal Government, that, subject to the supply by licensed stations of adequate service, such stations should be given the utmost freedom to render their service to the public, unhampered and unrestricted by the Government administration and censorship of speeches and programmes, believing that from unhampered inter-station competition in catering for public support, the greatest advance will be made in broadcasting in the future as in the past."

The "B" Stations recognise the obligation placed upon them as holders of licences from the Government to supply an adequate programme; but provided that minimum service is rendered, they contend that free and unhampered competition between "B" Stations themselves, and also between the "B" and the "A" services will continue to advance broadcasting in Australia in the future, as it has done in the past.

With the commencement, in 1926, of 2KY and 2GB in Sydney, and the continuance of 2UE, "B" Class Broadcasting began in earnest. Tremendous difficulties were experienced. The Stations had to struggle against competition, in securing advertising, by the financially stronger "A" Stations, which had also the advantage of higher power and Government assistance. The first real "B" Station success came when 2GB engaged a trio which had been tremendously popular with listeners at

2BL, Uncle George, Little Willie, and Bimbo. These three had built up a popular Children's Session. Another step was the transfer from 2BL to 2GB of Mrs. Dorothy Jordan, the first creator of a large Women's Session. This was a turning point, not only for 2GB, but for all three stations. 2GB was able to compete successfully for advertising with the National Service and blazed a trail which other "B" stations followed actively.

In 1927, as a result of the Report of the Royal Commission, advertising by "A" Stations was prohibited. This marked a second and vital stage of progress, reflected to-day in the enormously increased circle of listeners.

One thing has hampered the more rapid development of "B" Stations, the action of the Postal Department in keeping the "B" Stations in a state of suspense and in constant fear of a termination of their licenses. The original Wireless Regulations of 1924, under which the major "B" Stations were licensed, provided that the license should be for a period of five years, "and shall be renewable annually thereafter". The Government intimated later that the Stations should not interpret this regulation as conveying a right to a renewal of licence. It gazetted new regulations in 1930, issuing licenses for one year instead of five; it declined to promise to give the Stations a clear one year's notice of intention to terminate licenses; it notified Stations that in the event of a license being terminated, no compensation for cost of installation of plant could be looked for.

This was in effect a warning not to spend money on the development of plant, and the installation of new and improved and more modern transmitting gear. It threatened to strangle the development of the Stations.

Notwithstanding this shortsighted Government policy, "B" Stations battled on, contending further with official liberality to "A" Stations in policing the prohibition of "A" Class advertising. They steadily improved transmission and programmes, and developed an ever-improving technique in the broadcasting of advertising, until, to-day, the listening public no longer switches off when ad-

vertising is "tuned in", but realises that advertising can even be entertaining and interesting, and is certainly a shopping service of financial advantage to radio families.

An effort in 1930 by "B" Stations to broadcast in conjunction with National advertisers simultaneously in several States, by means of interstation "Hook Ups", programmes of exceptional merit, was rendered impossible by the unsatisfactory and extremely expensive telephone service between States. For "B" Stations this is a business matter. They must be able to quote advertisers in advance for the cost of telephone connections and guarantee a regular service. However, on account of the necessity of giving preference to the public telephone traffic and preference to the "A" Stations, the position is that a service cannot be guaranteed in advance by the P.M.G. The Stations would be assisted if they were quoted, when ordering telephone lines, an actual charge for a service, but it is generally a period of months after a broadcast before accounts are received, and then they seem abnormally high. However, with the co-operation of the Postal Department, these at present insuperable difficulties may gradually be overcome, and interstate broadcasting by "B" Stations on a large scale, be again attempted.

Without criticising the programmes of the National Service, official opinion that the present national service is not satisfactory to the Government or the listening public, is evidenced by the Government's decision not to renew its agreement with the Australian Broadcasting Company and to appoint a Board to control broadcasting by "A" Stations. At this juncture the Government will be again dependent upon "B" Stations to maintain the satisfaction of the majority of the licence-paying public as it was dependent three years ago. At that time, in 1928-29, the Government had recognised the unsatisfactory service by the Stations of the National Service, and had determined not to renew the licences of the old "A" Stations. During that period and until the new service of the A.B.C. commenced, the decline in the standard of programmes was re-

By
A. E. BENNETT

Managing Director 2GB

NO man has laboured more in the interests of Australian Broadcasting than Mr. A. E. Bennett, Managing Director of 2GB, and Vice-President of the Australian Federation of Broadcasting Stations. It is largely due to his business energy and his understanding of the public needs that 2GB now occupies so important a position in the realm of broadcasting. The Station's regular following is legion—its popular sessions have thousands of supporters, representing all shades of thought and opinion, from small children to men and women of affairs. To conduct a service of this nature, however, is far from clear sailing. Mr. Bennett, in this article, shows how "B" stations have given powerful aid to broadcasting at times when it was urgently necessary to maintain adequate services—he tells something about the difficulties that harass and hamper the expansion of "B" stations. He issues, too, a timely warning that will give rise to serious thought on the part of the Broadcast listener.



tried by the improving service of the "B" Stations. The "B" Stations saved the day for the Government while other firms collected the license fees. And now, in 1931, indeed until June, 1932, when the new National Service will be inaugurated, the Government will again rely on "B" Stations to save the day and to give to listeners a broadcasting service justifying their annual licence of 24/-.

What will be the effect of the advent of further "B" Stations in the capital cities? To establish new stations faster than the expansion in the total advertising revenue available to "B" Stations, may do some temporary harm to broadcasting. Either the service of existing

stations will be hampered by decreasing revenue from advertising or the new Stations will learn that the ownership of a Broadcasting licence requires a stout heart and a large capital reserve to draw on, and that advertising revenue is not unlimited. Unhindered competition, however, will weed out the less efficient services and the stronger will survive, so that in the end the public will gain. Should the proposed Board of Control restrict the "B" Stations in any way and hamper this spur to their competition, prompting the national stations to ever better service; should the day ever come when the competitive spirit of private enterprise and capital are removed from broadcasting,

that day will be a black one for the whole radio trade of Australia. This competitive spirit of private enterprise has induced the progress that has been made in Australian broadcasting to date; it saved the situation for the Government in 1928-29; it is saving the situation now in 1931, and will do so until June, 1932; it will advance broadcasting in Australia in the future.

Should that day ever threaten, then let the radio manufacturers, the radio traders and the listening public cooperate with the Federation of "B" Stations in fighting for development of broadcasting by private enterprise instead of by the socialist method of nationalisation.



☐ *The author at his job in the Wyndham radio shack, VIX—VK 6NK.*

IT is only when a radio engineer is called upon to put his experience to use away in some part of the world, well isolated from the humdrum of civilisation, that he realises fully, how invaluable short wave communication is to those who have no means of quick communication with the outer world.

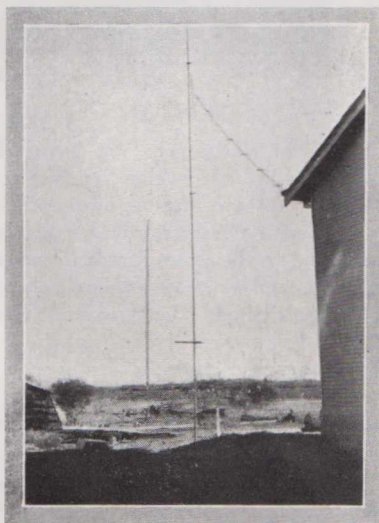
There is something more than fascinating in finding oneself in the fastness of the densest bush, in country where the white man's foot seldom, if ever, treads, and the knowledge that the compact portable radio equipment provides, in intelligent hands, a sure link with human life, away over the mighty distances of the silent ranges. Though not in any sense a bushman, there was always a sense of companionship in the radio apparatus in the writer's case, and thus no feeling that one could be hopelessly lost so long as the radio gear was along, and the batteries holding up well. So much dependence do I place upon portable radio equipment, to work on the channels used for amateur telegraphy communication, that I consider it utter folly for any expedition or party to go bushwise without such equipment.

There is no getting away from the fact, that should it be necessary to seek aid and the help of search parties, then a distress call on the Australian amateur 7000 or 3500 KC hands is sure to attract immediate attention. If you don't believe that the amateur stations would rise to the occasion, then try it, and see how long you go unnoticed before your distress call is logged by sensitive ears! All of which is a fitting opening to a

discourse on using short wave radio in the wildest country on Earth, namely, the Kimberley region of North-West Australia.

It was the fortunate lot of the writer early in 1930, to undertake special radio work for the Wyndham Meatworks Co., situated at Wyndham, W.A., and operated by the West Australian Government.

After a lot of consideration on the futility of using commercial long wave apparatus to cover the mountainous districts between the works and the inland cattle breeding districts, it was realised that the only solution to the problem lay with suitable short wave appa-



☐ *From this aerial system, Mr. Knock's signals were heard in every part of the world.*

Short Wave Radio Communication in the Kimberleys

By DON. B. KNOCK

ratus, with mobile stations capable of standing the rough handling they would receive in transportation through such country.

It fell to the lot of a well known Sydney radio engineer, Mr. S. V. Colville, to get busy and put such apparatus in hand, and the result was, a 200 watt telephone and telegraph station, a 150 watt mobile launch station, and a 50 watt automobile station, all having an efficiency of a very high degree, and designed to give that efficiency on a wave length of 54.95 metres.

This was the wave length granted to the Company by the PMG's Dept., and it turned out that it was a very appropriate allocation in the case of the metal laden Kimberley country. Whereas one could talk for hours about the long journey from N.S.W. to the North-West of Australia, via Perth, sufficient to say that, en route, the traveller begins to get an insight into the mightiness of Australia.

When Broome is reached one sees the sort of place so often read about; Pearling luggers, Kanakas, Japs, Chinese, really tropical heat, cool verandahs and iced lager, in fact, a lively Robert Louis Stevenson community.

It was just after leaving this port on MV Koolinda, that the writer had his introduction to one of Nature's tricks, and the pulsing ship drove perforce headlong for days before a furious Willy-Willy, or "Cockeyed Bob," as the N.W. coast residents so describe it.

The ship stood at all angles and ran headlong before the scurrying clouds with a migration so far from the course, that a few more hours would have landed us off the Java Coast. On

putting into Derby one made a swift acquaintance with the Kimberley fly and got an idea of one of Nature's discomforts for the next few months.

One azure blue morning, the Koolinda nosed her way past La Crosse Island and into the Gulf with its waters of pea-soup consistency with the interesting panorama of the Kimberley country sliding past on either side. After a two hours run, the mighty sentinel of the Bastion overlooking Wyndham, rose up ahead. I was to learn later how that great fortress looking rock spelled havoc to radio waves and that the only way it could be ignored was by the use of short waves. Signals of the 600 metre variety as used for marine communication simply cease to exist when in a direct screening line with this Bastion mountain, and the moment a ship ties up at the Wyndham jetty off the works, signals from a direction South, are blotted out entirely.

The writer well remembers the worried look on the face of the Chief Steward of an English ship, who had bought a powerful broadcast receiver in America. Only 10 miles from Wyndham he was listening to 3LO and 6WF, and on arrival at the jetty, he almost started to pull the set to pieces to find the trouble. The explanation greatly relieved him. In some directions, even 55 metre working is vastly affected by the Bastion mountain when the maximum length of the contour lies between transmitter and receiver.

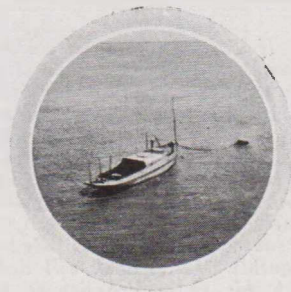
Wyndham Town bears an attractive name, but the first appearance of the little outpost of the North-West seemed very unattractive to me. As soon as one stepped ashore, millions of little bush flies promptly tried to nest in ears,



By Courtesy A.W.A.

¶ The Wyndham aerodrome, landing and hopping-off place for several famous flights.

eyes and mouth, and it was a case of literally scooping them away. If both hands were occupied in any way, the effect was most sulphurous in language.



¶ This launch radio station caused many a headache.

Torrential rain began to fall and the cluster of wooden iron roofed buildings in the distance that marked the town itself, looked truly forlorn and apart from the rest of mankind. As the tremendous

lightning discharges that accompanied the rain dazzled the eyes, one could be excused for thinking, "What price radio work of any kind in this?"

This was still the storm season, in February, when King Static held sway in full fury, but later, in the months of May, June, July, and September, static was almost wholly missing. Unattractive as the first glimpse of the Kimberley country seemed to City eyes, it possessed the faculty of gradually passing its splendid wildness into one's very blood, with the result that later in the year, one left it with pangs of inward regret for the swarming life of Southern Cities. Wyndham Meatworks is to-day the "raison d'etre" for Wyndham, and the Gold Rush days are now memories, of which one or two Old Timers in the town can tell some interesting yarns.

The works lies a mile or so from the town itself and possesses a huge killing and freezing plant, ample power for lighting, etc., an excellent supply of the purest water in Australia which is pumped from a point 25 miles inland, a store in which one may buy at almost city prices anything within reason; a movie theatre, a dance and concert hall, comfortable quarters for all personnel employed on the works, and a spirit of good fellowship from Manager to humblest labourer, which we could very well do with extended throughout all Australia to-day!

The first job for the writer was to find a place for the control station to be operated at the works under the call VIX. Owing to many reasons, the only convenient position happened to be inside a sheet iron building with a massive power house containing two 100 KW DC



By Courtesy A.W.A.

¶ Wyndham meat works, where 36,000 head of cattle are accounted for each season.



¶ *The author tries the saddle and found it harder than short waves.*

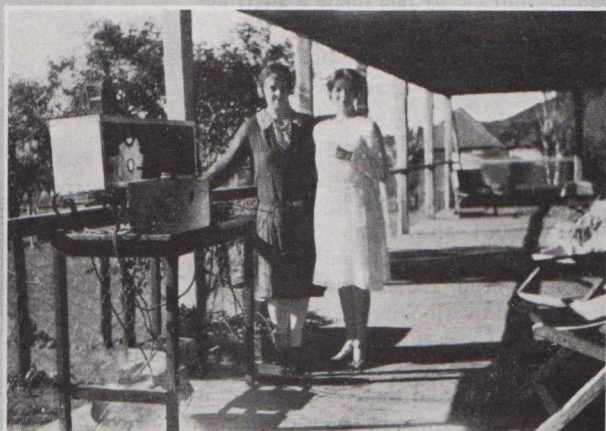
generators less than 100 feet away, not an ideal location, and one in which only short wave reception could be possible owing to the tremendous inductive interference at wave lengths above 60 metres.

Two 80 foot metal poles were erected outside and if any radio enthusiast likes violent exercise for reducing purposes, the writer can strongly recommend putting up iron poles with stranded steel guys with the sun blazing down overhead at 125 degrees, and the flies continually everywhere!

As the station to be used for the 55 metre telephony work under the call VIX, could not under the license be used for amateur communication, a special license had been granted the writer for this purpose, to operate experimental apparatus under the call sign VK6NK. Previous to erecting the 50 watt apparatus used later for this purpose, an experiment was carried out in emergency long distance amateur communication which proved extremely interesting.

When testing the receiver, it was noticed that on the amateur "20 metre" band, Sydney amateurs had been heard in the early evenings at great strength. Intrigued by this splendid reception across Australia, an emergency "baby" transmitter was thrown together with a 201A receiving valve in a Hartley oscillator circuit and the 230 volt DC mains from the works lighting supply put on the plate.

The aerial and counterpoise consisted of two lengths of lighting cable 100 feet long and about 6 feet high from the ground. Without any hope of raising anyone in the far South, a CQ call was made and Mr. Trevor Evans VK2NS,



¶ *The hostess and daughter of Ivanhoe Station in the far Kimberleys, listening to VIX short wave 'phone station.*

in Bathurst, N.S.W., replied and reported signals well readable. After closing with him a long chat was had with Mr. Huey VK2HU, in Chatswood, Sydney, with a strong signal report. Thus the first contact between Sydney and Wynd-

NK, the very real problem of inductive interference presented itself, for with the works machinery in full swing, there would be 50 or more electric motors all going at once. Anyone who has a next door neighbour with a sparking commutator on a vacuum cleaner will know what kind of a noise even a small motor can kick up in a receiver. With 50 and two huge generators all going together, the result can be imagined. Something had to be done about it and the station had to operate where it had been installed!

The first idea tried worked very well indeed, and may provide interesting food for thought for people similarly placed. A vertical receiving aerial was erected consisting of 60 feet of single lead covered wire. The wire inside the sheath was used as the aerial, and the sheath connected through a variable resistance to the metal chassis of the receiver without making any earth connection.

A position was found on the resistance where the interference was considerably suppressed and reasonably loud signals could be copied. (It is interesting to note that at the time this journal goes to press, there is sold on the radio market, special braided screened aerial wire.) The second and most successful scheme was a receiving doublet with half wave characteristics on the amateur "40 metre" band, and using interposed feeders.

With this arrangement a miracle took place and on both the "40" and "20" metre amateur bands, the interference died away to a mere whisper while the motors in the works were running at full blast. This doublet was eventually used for all reception, but was inclined

¶ *If it does nothing else Don Knock's article brings to the city dweller a breath of the wild unknown North West. It shows also how radio is conquering the wilderness, breaking down the barriers of silence and bringing modern communications to the lonely places of the earth. In a subsequent issue of "Radio Monthly" Mr. Knock will deal with his radio experiences in Southern Russia.*

ham direct took place by the aid of a "fly power" transmitter between VK2-HU and VK6NK (temporary on March 13th, 1930.

Upon completion of the control station and the 50 watt outfit for VK6-



¶ *Wally Shiers and the late Dave Smith in the Wyndham Police Station shortly after their rescue. They are indicating the position at which they were forced down.*

to be a little inefficient around 55 metres. It so happened that all the apparatus at the control station had just been completed when the episode of the Smith-Shiers monoplane took place and VK6NK was suddenly launched into emergency traffic with Sydney on behalf of the stranded aviators.

That story cannot be told here, but it is enough to say that the splendid work done in Sydney by Mr. Pike, of VK2JP, who kept watch continuously for the writer's calls, day after day, night after night, is a tribute to the efficiency of the Australian experimental transmitter. The midget transmitter installed on the monoplane before the

From the time the launch chugged away from the Jetty with the writer on board in charge of radio operations the voice of the operator at the works' station boomed in the headphones and vice versa. Suddenly, in the middle of a conversation everything ceased dead, and nothing could be heard.

The launch was stopped and the receiver examined for fault, but nothing found wrong. The natural conclusions were that the works station must have blown a transmitting valve. Putting about, we returned to Wyndham and perspiringly made for the control station to find absolutely nothing wrong . . . transmitter working perfectly

on the distant mainland we could see bush fires signifying native corroborrees; . . . three men . . . miles from civilisation amid the grandeur of wild nature. For radio reception, at that time of the year, La Crosse Island represents the "DX" hunter's paradise. The whole world seemed to be in bold relief around the dials of the receiver.

The strength and clarity of 5SW, London, and W2XAF, in New York, was something to remember with a modest three valve set without any RF amplification. So much for the launch station. The other mobile unit, installed in a car, was a most interesting piece of apparatus with a long, coffin-like cabinet containing both transmitter and receiver in one. The whole outfit was driven from the 12 volt car lighting battery, which hummed round a beautifully-made 1500 volt dynamotor and through resistances, lit the filaments of the receiver valves.

The aerial was quickly erected on two light wooden poles, although it was sufficient to throw the aerial over the nearest scrub trees. With this mobile station perfect telephony contact was had with Wyndham Meatworks over periods covering many weeks and from varying inland points up to a distance of 300 miles. It proved very useful in enabling the manager of cattle breeding stations to make his arrangements for mustering and delivering cattle direct by radio-telephony with the works' executives. Without radio weeks of delay must ensue to get the required information back and forth.

(Continued on page 53)



By Courtesy A.W.A.

¶ These little pets abounded in the waters adjacent to the Wyndham meat works.

aviators left Sydney by Mr. S. V. Colville was an example of the real use of emergency radio apparatus on aeroplanes.

That little battery operated transmitter saved the Civil Aviation Department much expense in what might have been a long search for the stranded 'plane and settled for all time the question whether short wave radio is of value to aviation in Australia. The first mobile station for communication with the works control station was installed on board a launch, used during the cattle season for pilot work on ships entering and leaving the Cambridge Gulf.

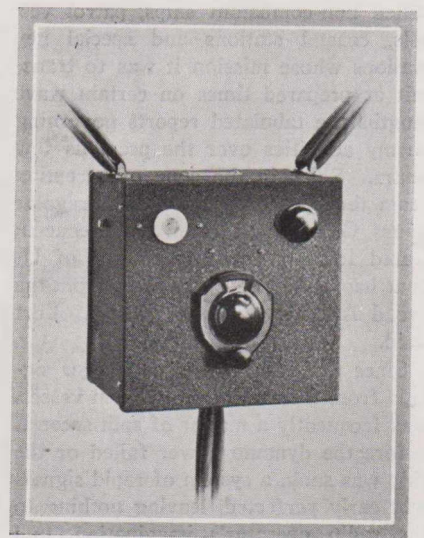
As this was only to be used intermittently, a battery operated telephony transmitter and simple receiver were built and slung in rubber cradles to guard against vibration from the launch engine. The first two-way test provided evidence of the influence of the Bastion mountain on signals, the launch being taken up the King River, 20 miles distant and in a position where the great rock interposed its bulk between the two stations.

in every way. The trouble had been the metallic bulk of that mountain. We had been passing slowly up a bend in the river where at one point the Bastion juts between the aerial of the control station and the position of the launch.

The result was a complete cut-off of both sky and ground waves between the stations owing to perfect screening. The next test on the launch was made in a northerly direction in the form of a 60 mile run down the Gulf to La Crosse Island of De Rougemont fame.

Perfect results were obtained in two-way telephone communication the whole way, and as a night was spent on the launch in a little bay at the island, later in the evening, the transmitter on board was roughly tuned to the amateur "40 metre" band. Little did those amateurs who worked with the station signing XVK6NK that night realise the picturesque surroundings.

There we were, rocking gently on that launch under a blazing canopy of stars, turtles flapping about on the beach;



¶ The actual transmitter used on the Smith-Shiers Monoplane.



By "BRASSO"

Illustrated by Maurice K. Cohen

¶ In the book, "Raiders of The Deep," frequent reference is made by German U-Boat Commanders to "the enemy allo's." It was a word that usually sent chills down the spine of the radio operators who heard it for the first time, for it meant "Urgent attention—a U-Boat has been sighted." "Brasso," the author of this interesting article, explains how and why the word was used by merchant ships during the war.

ONE of the most important factors against the depredations of U-boats and raiders during the Great War was the organised use of radio telegraphy on merchant vessels. Fair game for every prowling raider of the deep, often hunted down and sunk without warning, almost always at a disadvantage in the matter of speed and armament, yet every merchant ship formed a vital link in a widespread radio network designed to circumvent the campaign of "Spurlos Versenken." This network comprised, in addition to so called non-combatant ships, patrol vessels, coastal stations and special key stations whose mission it was to transmit at prepared times on certain wave lengths the tabulated reports governing enemy activities over the previous few hours. Ships in the zone of reception from these stations tuned in at regular hours G.M.T. and received in concentrated form, a complete resume of U-boat happenings in every area, from the broad Atlantic to as far East as Port Said.

Since the transmission of danger signals from threatened or stricken vessels was frequently a matter of split seconds before the dynamo power failed or the ship was sunk, a system of rapid signals was early perfected, leaving nothing to the radio operator's imagination, and telling the whole story in a few words or signals. Every set of circumstances

was covered fully, even to the discovery of a surface raider of the famous "Moewe" or "Wolf" type.

U-boats, of course, created the most havoc. For radio purposes, their attentions were placed under five main headings. They were:—Sighted, Chased, Chased and Gunned, Torpedoed, Escaped. In the first case, as soon as a periscope or the U-boat were sighted, the radio operator of the sighting vessel flashed the following signal:—"Allo, allo, allo, allo, 1432E 2821N 1030 Laconia". The transmission of the whole signal occupied about 15 or 20 seconds. Instantly every coast station within range took up the warning, each one calling LLWW, LLWW, LLWW, repeating the exact signal given and passing it on to stations further on until within a couple of minutes dozens of allo signals filled the air and every ship afloat throughout the whole length and breadth of the Mediterranean was aware that at 10.30 a.m., G.M.T. the "Laconia" had sighted a submarine at position longitude 1432 East, Latitude 2821 North. Assuming then that the U-boat came to the surface and pursued the vessel with intent to do bodily harm, the following radio procedure was observed: "S.O.S., S.O.S., S.O.S., 1432E, 2821N, 10.40 'Laconia' Chased". In this event, the nearest shore station or patrol vessel answered "R" and strict silence was maintained by all stations pending fur-

ther signals from the scene of the drama. The next logical signal was: "S.O.S., S.O.S., S.O.S., 1412E 2821N 1100 'Laconia' Chased and Gunned", which meant that at 11 a.m., in the position indicated, a U-boat had commenced to shell the "Laconia". Usually, by this time, the ship had established radio contact with a patrol which assumed control of the situation by despatching a message to the victim somewhat as follows: "Proceed at full speed towards position so and so". The rest of the shipping thereupon lost interest in the proceedings, knowing that help was speeding towards the "Laconia". A ship actually hit by a torpedo, disposed of the situation as follows:—"S.O.S., S.O.S., S.O.S. 1432E 2821N 10.30 'Laconia' torpedoed". This signal was always followed by deathly silence. As if by magic the aerial clamour was stilled, all stations afloat and ashore closing down instantly so that messages to and from the doomed ship may not be jammed. As a general rule, S.O.S. signals were answered by a shore station; seldom by a patrol; never under any circumstances by a merchantman. Orders to merchant radio operators were definite and clear. Unless actually in danger, the radio transmitter was not to be used. I broke this rule upon one occasion. My ship was about half a mile astern of the "Springwell" when that vessel was torpedoed not far east of Malta.

The U-boat bore down to intercept us, when she was suddenly engaged by a Q ship. During the action (this is fully described in the book, "Q Ships And Their Story"), the Q ship was endeavouring to radio a code message to a distant station which could not get the message clearly. After hearing it repeated several times without success, I decided to lend a hand. Accordingly, I started up the motor and broke in on high power, flashing the message I had copied from the Q ship. This time it was received, so I switched off with a warm feeling of having given valuable assistance to H.M. Navy. Upon the ship's arrival at Port Said, however, a dapper R.N. Lieutenant came aboard, sought me out and in no uncertain language advised me what would happen to me should I ever again disobey orders. The signal to be made by a merchantman sighting a raider was: BBT, BBT, BBT, followed by the vessel's position, but there was no case upon record of a ship having completed this signal, because those who sighted raiders recognised them too late to use the wireless. There was one notable exception to this, the case of the Japanese steamer "Hitachi Maru", which was intercepted by a raider between Colombo and Durban. Despite a signalled warning, the Japanese ship attempted to get out a wireless message and was immediately shelled, the first round blowing the wireless cabin with the operator in it, over the side.

All ships during the war maintained constant radio watches, carried out by either two or three operators. Every signal heard was entered in a log book and urgent messages such as torpedoings, minings, allos, etc., sent at once to the bridge to the officer on the watch. At the beginning of each four hour watch, a slate was handed to the operator on watch. It bore the ship's position for each half hour of the ensuing four, so that in the event of emergency, the operator wirelessed the position indicated nearest to the time of the happening. Since, of course, it was not good policy to disclose the identity of one's ship when using the wireless for any purpose other than distress, a

special three letter call sign was allotted to each vessel and except when actually mined or torpedoed, this call sign was always used. Each ship was issued with a printed list showing the special call signs of all vessels of the British Mercantile Marine. It afforded me a morbid pleasure in placing a red cross beside the names of ships as they were sunk. This exciting game was all the more interesting because frequently one heard as many as seven or eight frantic S.O.S. signals in the short space of an hour. A code book was issued to each ship so that any communications made were unintelligible to enemy listening stations. This book was leather bound and weighted with lead so that it could be dropped overboard in the event of capture. As a general rule, the code book was entrusted to the senior operator, who was held responsible for it, although officially it was supposed to be in the direct charge of the Captain.

In 1916, a world wide radio network of stations was placed along the shipping routes of the seven seas. The primary purpose of these high power stations was to transmit war warnings and press news on defined wave lengths at fixed hours G.M.T. Many a wireless operator, sitting forlornly in the shrouded cabin of some lonesome ship miles out on the trackless ocean has blessed the high, piercing, friendly

note of these stations breaking in on the dreary silence of a lone watch. The signal sent was usually "ABMV, ABMV, ABMV, de BZF, Government war warning begins, no warning issued, ends", or if there were news concerning enemy raiders, this was repeated twice, followed by the war news. These special stations extended down the western and eastern Atlantic coasts, along the Mediterranean, across the Indian Ocean and to the far East. A vessel, for instance, leaving London for Sydney, via Suez, would pick up the following stations: Whitehall, Gibraltar, Malta, Port Said, Aden, Seychelles, Matara (Ceylon), Singapore, Perth, Awanui (N.Z.). Via the Cape, she tuned in, in turn, Whitehall, Gibraltar, Bathurst (Gold Coast), Ascension, St. Helena, Port Nolloth, Durban, Mauritius, Perth. Stations east of Colombo were Singapore and Hong Kong. Down the western shore of the Atlantic, they were St. Johns (Newfoundland), Bermuda, St. Vincent, Demerara, Falkland Island. Thus, at least at night, no British ship was ever completely isolated from the war. Usually, two or more stations could be picked up each night over distances up to even 4000 miles, though their maximum range in daylight was roughly between 400 and 500 miles. In those days there were no valves with their enormously in-

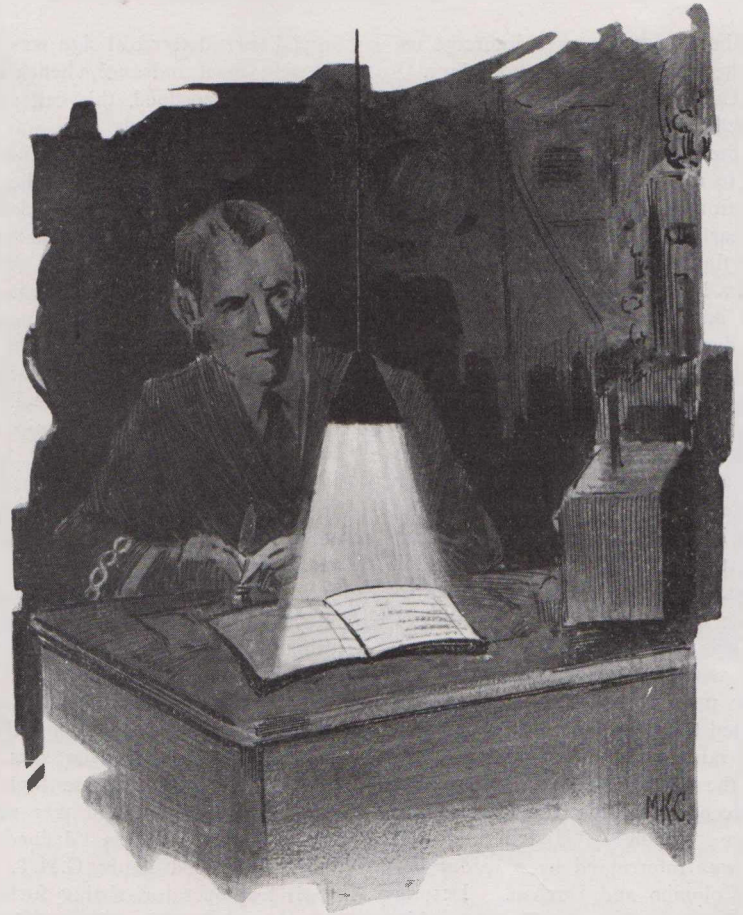
creased reception range. All ships were fitted with either magnetic detectors, known familiarly to operators as "Maggies", or crystal detectors, the latter being much more sensitive but "Maggie" possessing the advantage of withstanding the shock of an explosion that would normally dislodge a crystal and consequently put it out of action.

The most famous station in the world was Poldhu, in Cornwall, the scene of Marconi's early Trans-Atlantic tests. At eleven o'clock G.M.T. every night, Poldhu (M.P.D.) sent out a long press message on a high wave length which, of course, every operator tuned in and copied. As, however, S.O.S. signals were sent on the standard wave length of 600 metres, the Admiralty issued instructions forbidding the tuning of receivers off this wave length while in the danger zone. I



☞ A dapper R.N. Lieutenant came aboard.

was earnestly engaged in breaking this regulation one night, off the Italian Coast, copying the news from Poldhu, when we were suddenly engaged by a U-boat. I sent out the usual "Chased and Gunned". To my surprise, complete aerial silence reigned, none apparently deigning to even acknowledge my call. This occurred two or three times until I suddenly realised that I had forgotten to tune the receiver back to 600 metres. Actually three or four stations had answered instantly. I sought the nearest one, Genoa, and maintained constant touch with that station during the proceedings of the next hour or so when, with a double watch below in the stokehold we pounded along, assisted by shells from the U-boat. During this period, all radio traffic was hushed and hundreds of ears were strained awaiting the outcome of the incident. At intervals, the Italian operator at Genoa sought to encourage me by sending frequent cheer-up messages in screamingly funny English. They didn't sound so funny at the time. While strict rules of radio procedure were laid down, occasionally under stress, they were departed from. On one occasion, I listened in to distress signals sent out by a British steamer over a period of two hours during which she was chased and shelled by a U-boat. She established contact with a French Patrol some distance away. Various messages passed between them such as "Submarine maintaining position", "Speed now 16 knots", etc., as they speeded towards each other. There was silence for awhile until the British operator signalled slowly "Fer Gawd's sake step on the gas". This was quite unintelligible to the Frenchman, who politely asked for a repetition. Communication with neutral ships was strictly forbidden, so that when a Dutch or Swedish ship passing in sight wirelessed QRA QRD, meaning "What is your name and where are you bound for?" a rude silence was the sole reply. These neutral ships were frequently a nuisance through interfering at critical times, until International rules were framed enforcing their silence while in certain areas. Night watches were invariably more interesting than day watches because of the tremendously increased range of reception, although sitting motionless in the semi-gloom of a heavily shrouded cabin listening to the last despairing signals from some stricken ship was a nervy business, especially as at any moment one's own ship might touch off a floating mine or



¶ One light was permitted in the wireless cabin.

make contact with the business end of an unfriendly torpedo. At night, of course, all lights were doused. One light was permitted in the wireless cabin; it was usually a black draped affair hanging low over the log book, diffusing just sufficient glow to illumine its pages. Intensely interesting always was the nightly drama of the ether, every night bringing its crop of sinkings, allos, chased and gunned's and other little incidents that cost the mercantile marine some twenty thousand lives.

Tragedy was there perpetually, the wireless operator chained to his gleaming brass instruments by his earphones often being the helpless onlooker to some grim invisible drama that ended in death for some fellow operator whose hurrying hand on the wireless key sought desperately to summon aid for his shipmates before the swiftly rising waters flooded his cabin and drowned him like a rat in a trap.

Yet there were many incidents that had distinctly humorous sidelights. Once, on a certain transport, I served under a Captain who would scarcely cross his own bridge without official sanction. Shortly after leaving Gibraltar, en route

for Mudros, two sailors died of pneumonia. The Captain handed me a message written in plain language addressed to the S.N.O. Malta, which place we were to reach next day. The Captain was in doubt as to whether he should conduct a funeral at sea or wait for a land burial next day. His message, however, was somewhat ambiguous, reading "So and so died of pneumonia. Where shall I bury?" This I coded and sent off via the naval station at Rinella Bay, Malta. One could perhaps imagine a harassed S.N.O. dealing with a ceaseless flood of naval radio messages, receiving a naive inquiry of this nature. His reply was short and to the point. When I had decoded the message, it read simply, "In the nearest ocean."

NEXT ISSUE

Many people remember the stirring exploits of the German raider "Wolf." She destroyed allied shipping to the tune of some millions of pounds. "Radio Monthly" will publish next issue the story of the capture and sinking of the Union Company's steamer "Wairuna" in the Pacific. This article comes from the pen of the radio officer, who subsequently was a prisoner of war in Germany.

BEHIND THE SCENES

MISS GOODIE REEVE tells us something of life in the studio—something, too, about that much-discussed subject, "Radio Personality."

HULLO Everyone!
Goodie Reeve
speaking!—

Now, it's so long since I've written an article, that I really do not know if it's bad manners to commence like that, but seeing that this is the greeting which successfully wakens thousands of Radio Fans over the air every morning at 7 a.m.—perhaps it is not over-optimistic to hope that it will have the same effect in print.

And yet . . . —will it? For, "oh, the little spoken word," how many things it can convey—with different intonations!

"Hullo"! said with enthusiasm, tone and pep, can do so much to arrest attention — whereas, another "hullo" spoken in a blase tone, can, within its five small letters, speak volumes of conceit, self-satisfaction, smugness and lack of imagination if the speaker be of that calibre.

You know, not so long ago, all the young people were craving to get on the stage, and theatrical managers and directors were paid considerable sums of money to detail the points in character and appearance which were essential for successful stage aspirants. Then the movies came! A new craze commenced, and once again the younger generation, crazy in its desire to enter this new field, asked those in a position to know, what were the true essentials requisite for a successful screen career. "Beauty" said one, "Good figure plus deportment" said another, "Brains" said some, and "Surely personality" said the majority.

With the advent of the talkies—a new essential presented itself which out-shadowed almost all the rest. A FINE SPEAKING VOICE—(Allied, if possible, to a good singing voice) plus, sufficient good looks not to mar the picture.



Auntie "Goodie," of 2GB.

Could such perfect creatures be found? The answer lies in the many wonderful talkies being shown at the Picture Theatres daily—and because, (fortunately for many) the camera CAN lie, the result is, at times almost too lovely to be credited.

But now we come to the Radio!—a problem indeed! Science has not yet found a way to enhance an announcer's personality.

"What, then, are the main essentials required for a successful Radio Announcer" I am frequently asked.

Well, having secured the primary essential "A good Radio Voice"—I would say the Intelligence and Character come a close second. In B. Class Station work (which after all is the most exacting, for it takes a lot of personality in the voice to make people listen to advertisements) it is frightfully important

to be constantly changing the tone and putting light and shade into the voice, so as to convey enthusiasm as opposed to monotony, and this, of course, requires intelligence. Then it is essential to have a varied store of general knowledge to fall back upon, for in the case of daily advertising it is only by drawing upon your own knowledge and experience that you can depart from the monotony of the daily announcement with an occasional "That reminds me" which will always hold a listener's attention.

This brings me to the one thing I have been endeavouring to say for the past few paragraphs and I am sure you will agree with me when I say it—**OVER THE AIR IT IS ONLY YOUR MIND AND SOUL THAT COUNT.**

No matter how clever an artist you are, the tone of your voice stripped of your physical attractions (or detractors) cannot fail to convey to the discerning public exactly **WHAT KIND OF A PERSON YOU ARE!** Listeners may not know if you are rich or poor, but they **DO** know if you are sincere or not, and for this reason successful Radio Announcers will never be too plentiful—for their very souls, whether they like it or not—are amplified over the air.

A much-travelled, well-educated (in the school of life), kind, and tactful soul, is the ideal Radio Announcer to my mind. Tact is terribly important because **SO** many people are listening to you and they all have **SO** many different opinions about **SO** many things? Announcers must never be dogmatic or emphatic about their own little opinions—they must always try to realise the other chap's point of view—

(Continued on page 42)

INTERVIEWS FAVORITE



Q Uncle George, guide, mentor, philosopher and friend of Australia's kiddies.

MR. G. SAUNDERS. 2 G.B.

CAN you imagine "Uncle George" conducting a Bible Class! I really can't, altho' he assured me that he ran one up to the age of eighteen, also a debating society. The latter we can quite believe, knowing his capacity for talking.

I think he must be the busiest man in Sydney for he told me the story of his life in little jerky bits, between telephone calls, community singing, business engagements and dodging persistent admirers who throng the corridor of 2 G.B. apparently in the hope of gazing on his beauteous countenance.

Another feat of his boyhood days, so I eventually gathered, was the forming of a mouth organ band of forty performers! Can't you see him conducting!

He taught them to play not through any passionate love of music, but merely for the purpose of evading drill, which he disliked.

Dr. Martin, now at Sydney University, has a somewhat painful memory of master George, for on one occasion when the good Doctor was teaching at Narrabri, an argument arose between he and our hero with the result that an inkwell, filled to the brim, was emptied down the Doctor's waistcoat.

History draws a veil over the sequel!

During the floods at Narrabri in 1908, there was six feet of water in the street and "Uncle George", in company with other young bloods of the town, dived off the hotel balcony to the general consternation.

Another time when he lived a Bourke he swallowed a tag off a plug of tobacco, fortunately the tag was retrieved by a girl friend who had probably egged him on to the extraordinary feat.

He laughed as he told me the story. "You know," he added, I have an extraordinary memory, which, of course, assists me a great deal in my work."

As a young man he went to America and six years later returned to Sydney.

On the outbreak of War he joined the N.S.W. Recruiting Staff and was instrumental in gaining over one thousand recruits.

Nothing will induce him to speak of the War, he says he prefers to forget it, and moreover he would strive to educate the younger generation so that there would be no more wars.

He is an ardent collector of coins, having more than twelve thousand in his possession. All outdoor sports appeal to him and many people will be surprised to hear that at one time he was a champion boxer in the lightweight division of the A.I.F.

He laughed when I mentioned superstitions. "I'm a fatalist," he said, "what will be, will be. I am very interested in psychology and the Study of Human Nature. But best of all I love to study children from every possible angle. I've always loved kiddies. Long before broadcasting started I used to regularly visit the Hospitals on purpose to chat with the youngsters. They used to call me the 'Story Man'. I have been ten years on the air; I was the first announcer in Australia, starting with 2 G.B. and still as you see, going strong."

His eyes twinkled behind his glasses, a girl stepped forward and handed him a letter which he opened with a murmured apology. A broad smile flashed over his face and at his invitation I read the few scrawled lines.

"Dear Uncle George (it ran) Thank you for the rabbit, I have drawn a photo of it and me."

We studied the masterpiece for a moment striving to discriminate between man and his lower brother, but were forced to give it up.

"The kiddie wanted a rabbit so I sent him one," he explained laughingly. "You know I get some awfully funny letters. A little while ago a woman asked me to see her daughter, who was getting into bad company and generally leading a wild life. I agreed to do what I could and a youngster of seventeen turned up, pretty as paint, but apparently incorrigible. After a short talk I discovered that she had too much time on her hands so I got her a job which she promised to stick, and I believe she is doing well. I only mention this to

WITH YOUR ANNOUNCERS

By IRENE HAWKINS

show you the extraordinary requests I get, now I must go—Community singing waits for no man—hope I've been of some help, good-bye!"

MISS L. HOMFREY. 2 U.W.

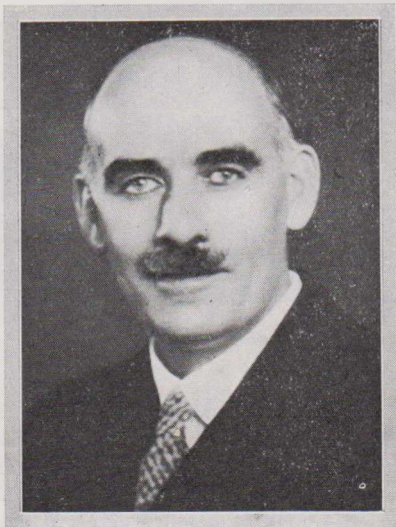
"I have had a freak voice all my life," said Miss Homfrey, of 2 U.W., smiling across at me from the other side of her desk. We were seated in her office and little gusts of music interspersed by terse comments in a masculine voice floated vaguely about us like little pale ghosts lost in the ether.

"When did you first discover it," I asked.

She smiled, "I really don't know. I never possessed a middle register. As a child I was taught to sing "Asleep in the Deep" which as you know is very low, and "Silver Star of Love" from "Florodora", which is very high. I may add that my voice is quite untrained".

Miss Homfrey went on to tell me a lot of very interesting things. She was born in New Zealand, but has lived many years in Sydney. She comes of a theatrical family, all of them intensely musical.

Her first appearance in broadcasting was in the early summer of 1926 when she made her bow to the "mike" at 2 B.L. as the Whispering Lady Baritone.



☞ Captain Stevens, 2BL.

The announcer offered prizes to the listener-in who could best describe Miss Homfrey's appearance from her voice.

Unfortunately the Whispering Baritone was seized with sudden stage fright and wobbling uncertainly up to the "mike" cried "Good evening, everybody," in a shrill falsetto voice.

Collapse of the announcer! Letters poured into the studio from all quarters, but most of the comments were



☞ Mrs. Steltzer, 2GB, broadcasts happiness.

decidedly unflattering, and Miss Homfrey never discovered the identity of the winner.

She was for some time at 2 F.C. in the same role and frequently conducted the afternoon session for women.

Her first talk entitled "Why Shouldn't Family Women Have Careers" brought a spate of protesting letters from irate husbands who found themselves unable to cope with suddenly discontented wives.

Later on she went to London and appeared on the stage in several productions, but found she did not care for



☞ Louise, of 2UW, has never been seasick.

that branch of the business and wisely returned to her first love, securing several engagements with the B.B.C. purely as a singer.

On her return to Sydney she gave talks at 2 F.C. and after a while secured a permanent position with them.

Miss Homfrey is a tall girl with hazel eyes, a good, clear skin and a calm, rather aloof manner.

She loves swimming, riding and tinkering about with mechanical things; she is also an avid reader, devouring all classes of literature.

She told me that one of her proudest achievements was the manufacturing of a crystal set in 1924, with the aid of her mother's best broom handle, and in spite of the storm which gathered about her luckless head, she listened in rapturously to "Tales of Hoffman".

Being fifty per cent. Irish I naturally expected her to be superstitious or at least, to have some pet "bogey" without which no real Irishwoman faces the world, but Miss Homfrey is free from such weakness. It's true that at one time she disliked bumping one elbow and invariably gave the other elbow a little surreptitious knock so as to "save disappointment", but the deep reflections inspired by a lonely sea voyage to Canada convinced her of the folly of "sich nonsense", and she and superstition have parted company for good.

It is her proud boast that she has never been seasick.

MR. WILLIAMS. 2 F.C.

I think I found Mr. Williams in a pessimistic mood. He rather mournfully

informed me that he was born in Ipswich, Queensland, "more years ago than I care to think about," and that he was educated in Queensland and in England.

When I made a tentative reference to broadcasting, he remarked that anyone allying himself to broadcasting must be prepared to travel the rough path of uncertainty. Its constant change of policy made broadcasting the "most chequered thing in Australia".

He went on to tell me that during his visit abroad in 1922-3-4 he went to twenty-seven countries. Broadcasting was in its infancy, but he soon realised that it was a coming influence in public life and on his return to Australia he decided to take it up. He joined 2 F.C. and was given control of the news, commercial, sporting and utility services of that station.

"I may say", he added as an afterthought, "that before entering broadcasting I was interested in Journalism and Politics, so you see I have always been accustomed to long hours and hard work."

I asked him what he considered the most interesting phase of broadcasting and he immediately answered "Election Night, for the enormous audience of listeners-in are feverishly awaiting news that not only settles the fate of individuals, but the entire nation for possibly another three years. The dramatic tension in the atmosphere makes the telling of the story intensely interesting and absorbing. Regarding the future of broadcasting, it must become not only the greatest form of publicity in any country, but must in turn influence public life as no other operation can do."

It was with difficulty that I drew him to the subject of hobbies, but he admitted a love for all outdoor sports, preferring now-a-days, however, to describe them rather than to take a more active part. He is also a great reader.

"I suppose you receive a great many letters," I suggested. He laughed. "Letters! You should see them! Some humorous, some pathetic, some appreciative, others decidedly scornful as to our programmes. In fact, quite a good number tell me how very much better the writer could run a station than the present organisation. Oh, yes, the communications are candid, very candid."

When I asked him to relate some interesting experience that had perhaps come his way, he eyed me warily, misunderstanding I fear, the innocent question.

"Being a married man," he returned



Mr. H. P. Williams, 2FC—news, commercial, and sporting expert.

solemnly, "these experiences seem to pass me by, but they certainly come the way of the fascinating and attractive announcers who, however, still remain bachelors."

Feeling duly crushed, I retired.

MR. PRENTICE. 2 U.W.

Mr. Prentice is a very interesting man, and Mr. Prentice is very interested in Mr. Prentice, which is as it should be for the most interesting thing in all the world is one's own personality.

When Mr. Prentice makes a statement he makes it with an air of being quite certain that it is a correct statement, and being one of the cleverest men in the broadcasting world, he is invariably right.

In the course of our very interesting talk, he told me that he was born near Ballarat, in Victoria, being one of seven children, and that he had a vague recollection of weeping bitterly because he was not allowed to join his father, who was one of the first settlers to open up a district of North-West Victoria. His burning ambition apparently was to dwell among the "abos." He is a widely travelled man and has a good working knowledge of French and German.

He came into broadcasting quite by accident. In the early days of 2 B.L., he gave a talk on Famous Love Stories and was immediately invited to join the staff. That was in 1924. A little later he organised a chain of four stations in New Zealand. He graduated in physiology during a visit to America and has always remained keenly interested in that study.

Astrology also claims his attention and he has done much research work in Spiritualism along the lines of Sir Oliver Lodge and Conan Doyle.

When I asked him if he had been converted to a belief in Spiritualism, he shook his head smiling slightly. "No, I'm afraid I'm still very sceptical, but the study of the occult is a fascinating one."

His scepticism is understandable; he would be, I'm sure, very hard to convince, no trickery, however clever, would be allowed to cloud his judgment, no argument, however subtle, would move him one iota, but once convinced he would hold to his belief tho' the heavens fell in.

A man of remarkable attainments, he impresses you with a sense of deep sincerity and honesty of purpose. He told me, with a ring of pride in his voice, that he always endeavoured to incorporate entertainment and education in his talks over the air and to ruthlessly delete the slightest suggestion of coarseness or bad taste.

A recognised expert on Foreign Affairs and International Politics, his shrewd comments are much appreciated by his unseen audience, while his radio nieces and nephews, of whom there are scores, have a deep affection for "Uncle Jack." He has watched hundreds of boys grow up, many come to the studio, many, whisper it softly, borrow money, but never, so he proudly asserts, has he ever lost a copper.

I enquired rather diffidently as to his hobbies, feeling that his many interests gave him little time for pastimes, but when he jumped up and placed before me dozens of beautiful photographs,

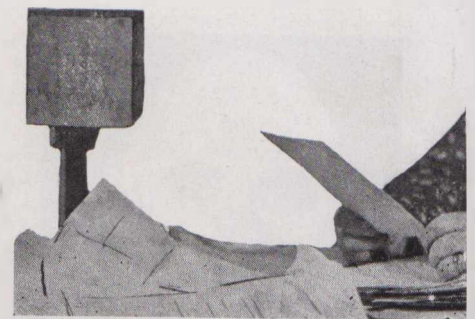


Photo. by Cinecraft Studios.

taken during his various tours abroad, I felt that the pastime was almost in the nature of a business so little did it bear the mark of the amateur. He has a very big mail bag and scarcely a day passes without some interesting happening.

He told me with a twinkle in his eye, that he loves his Saturday night's talk to the children, as he wildly lets his imagination run riot as to the wonderful day he has spent. The listeners enter thoroughly into the fun, because they know that Saturday is his one night for romancing for should he do so during the week the gum leaf that hangs in the studio "trembles with indignation."

Needless to say bushels of gum leaves find their way to 2 U.W.

MR. C. V. STEVENSON. 2 U.E.

Mr. Stevenson did not want to be interviewed, in fact he was rather nervous but I assured him that it was not as bad as having a tooth out so he capitulated.

His is a very interesting personality for altho' so quiet in speech and manner it is easy to see that he is wrapped up heart and soul in his work, in fact he admitted after a little judicious questioning that Radio, and Radio alone, was his hobby!

Twelve years ago he commenced to buy various apparatus from America before broadcasting was done here, and he supplied Mr. Maclurcan with some of the original valves when he started as an amateur.

During the War period his activities ceased, but at the conclusion of hostilities he and a friend decided to open a



¶ Mrs. Dorothy Jordan, 2GB, answers her correspondence.

radio broadcasting station and with the help of the Radio traders, built the first station in Australia which was later turned into 2 B.L.

Later he decided to start a B. Class station, and he received the first license issued to a B. Class station. That was



¶ Jack Prentice, 2UW, talks solemnly to the microphone.

seven years ago. He continues to operate 2 U.E. on that same license.

At one time Mr. Stevenson was an ardent photographer, but he says that now he cannot spare the time.

Mr. Stevenson mentioned that he intended building, very shortly, a big station at Lilli Pilli, near Port Hacking.

He told me an amusing story of a lady who wrote him with a request for birthday greetings to her grandson over the air. She furthermore suggested that Mr. Stevenson should take advantage of the occasion by reading the young man a little homily on the evils of smoking, a habit to which he was addicted.

The young man was two years old!
Some babe!

MRS. JORDAN, 2GB.

Mrs. Jordan claims the distinction of being the seventh child of a seventh child!

Naturally I asked her if she had experienced any psychic phenomenon in her life. She smiled a little mysteriously and replied: "Well, we won't go into that, but you can say that I am what the Scotch call 'fey.' I can 'sense' things in an extraordinary manner."

She related one instance of this peculiar quality when about to give an address at Mark Foys. Turning to a man beside her, she remarked, "We are not on the air."

"Hush!" he replied. "Of course we are."

"Oh, no, we're not," returned Mrs. Jordan with absolute certainty, and at that precise moment 2GB rang up to enquire why they had not switched on!

I asked her how she accounted for

this occurrence, and she replied: "I really don't know, but I felt there was no 'life' in the mike."

Before entering Broadcasting, into which she was introduced, by the way, by Mr. Prentice, she was secretary of a women's organisation relating to welfare work, and during the war she ably assisted the Red Cross in their various activities.

She has been connected with Broadcasting for seven years, and was the originator of the Women's Session.

Speaking of her work she said: "It is so inspiring, one never tires; I specially love helping mothers with their problems connected with young children and with home craft generally. Imagination is of the greatest value to children, for they love noise and colour, and to suppress this instinct is disastrous. There is no limit to a child's imagination. That's why Broadcasting is so effective—it appeals to this essential quality. I believe more in the power of the spoken word than in anything else on earth."

She went on to speak about her daughter, who, although a fine pianist with unmistakable artistic gifts, nevertheless loves anything in the mechanical line, being quite a good amateur electrician! This is a very rare combination. Needless to say, mother and daughter are great pals.

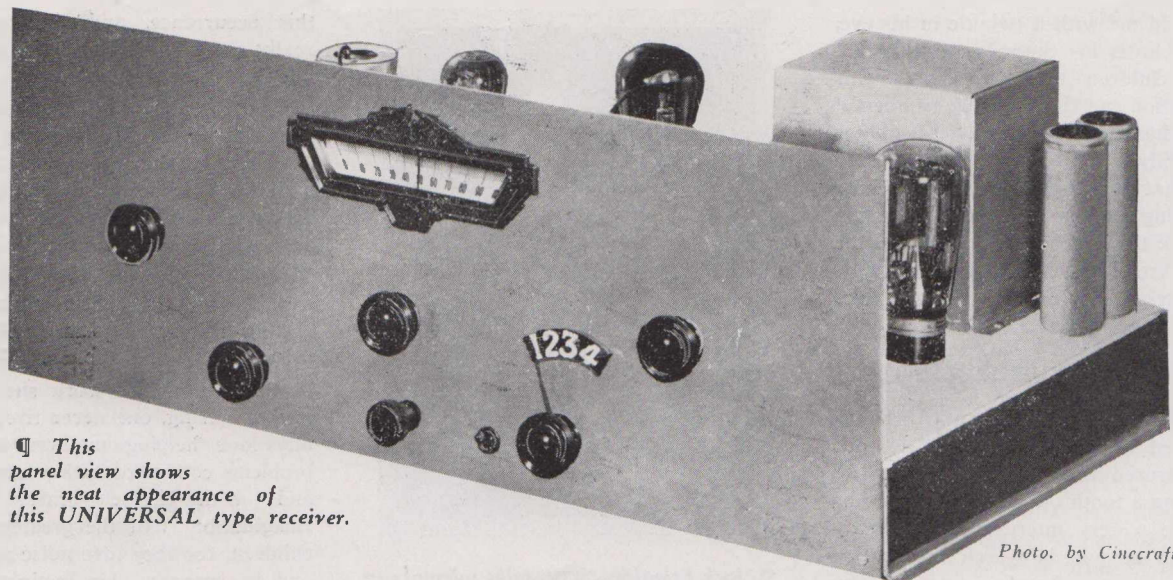
Mrs. Jordan appears to have many hobbies—reading, bridge, surfing, dancing—all playing their parts in her very active life.

She laughingly admitted to a very independent nature, which refused in any way to be driven.

She is an extremely busy woman, for apart from her Broadcasting work she is continually judging cooking and needlework demonstrations in various districts. At a recent demonstration she had to judge four hundred and fifty cakes in four days! She always makes her own Christmas cakes and puddings, and judging by the recipes they must be very good.

In the course of her work Mrs. Jordan receives a tremendous number of letters—on an average two thousand a month. All these have to be carefully read, personal problems dissected, and various appeals and suggestions considered.

Most of these communications express deep pleasure in the Session, and it must be gratifying to Mrs. Jordan to know that her efforts are so truly appreciated.



☐ This panel view shows the neat appearance of this UNIVERSAL type receiver.

Photo. by Cinecraft Studios

The A.C. All-Empire

IS DON. B. KNOCK'S LATEST CONTRIBUTION
TO THE SHORT WAVE FANS

IN opening the Ball for this, the first technical constructional article for our new RADIO MONTHLY, by presenting something which we feel has long been awaited in Australia; we are, as a preliminary, disposed to say a few words dealing with the name given to the subject of the article. A few years ago, three to be precise, it was the lot of the writer to design and describe the first short wave receiver used in this part of the world (and most others) making use of a stage of tuned radio frequency amplification and taking in the then new screen grid valve to advantage. Of course, it was a battery receiver, and it bore the imposing title "All Empire," signifying that in effect it embraced the programmes of the whole British Empire. This it did in no small measure and the proof of whether the claims were substantiated has since those days been amply forthcoming in the countless letters the writer has received in praise of the performance of the original "All Empire."

It is no exaggeration to say that the now veteran "All Empire" receiver swept the Australian home constructor by storm and showed radio dealers that they would have to sit up and take notice as there was "something doing" in the short wave field. We found that a few builders of the set struck



☐ RADIO MONTHLY offers the A.C. All-Empire with full confidence in its excellent qualities. After construction the set was subjected to tests extending over a month by the Editors. So far, a Universal Receiver of this type has not been dealt with by any Australian radio publication.

trouble, but that was all in the day's work, as there will always be a minority who simply will not follow important instructions and stick to specifications. We recall one bright person who arrived at our residence with a frightful assembly of junk under his arm; proceeded to say it was an "All Empire" and it wouldn't work, and as we were the person responsible for the design, it was up to us to get it working! We didn't know anything about "Oh, Yeah" in those days, but we said something equally appropriate.

About a year after the description of

that interesting "All Empire" job in print we were somewhat surprised and then flattered to find in a prominent American radio journal a description of an identically similar set, which had been produced by a well known Radio Corporation.

There was a cryptic sentence in the story, in which the engineers of the Company had been told that "It has never been done before, and if you cannot put it over don't call for your pay cheques." Therefore, under great stress of the pending "sack," the lads had "produced the goods." The reference about "not being done before" was, of course, to the use of *real* RF amplification at high frequencies by the use of the screen grid valve in a tuned circuit.

Comment was superfluous, but the Editor of the overseas journal was forwarded a year old copy of the Australian journal with the "All Empire" story, and the date underlined heavily.

Much water has passed under the Bridge since then, and after careful consideration we have pleasure in stating that RADIO MONTHLY will present each month its outstanding technical features covered by some appropriate name with a bearing on the apparatus itself.

Thus we come to the heading of this article, which, in its title "AC ALL,

EMPIRE RECEIVER," is aptly enough chosen. We shall know what correspondents are talking about at a glance in the future, instead of having to decipher a long rigmarole about "the new set on page so and so, AC operated with tuned RF, regenerative SG detector, 227 first audio and Pentode output."

This receiver, around which this description is written, is an AC operated short wave receiver of the "Universal" type. That calls for a little explanation for the benefit of those who do not know. Until now a Universal type receiver has not been described in any radio publication in Australia and it is very much overdue. The term "Universal" simply means that the set is one which covers not only all the useful short wave ranges, but the normal broadcast channel as well, and all this without having to change, manually, any coils!

Think what this means . . . you are listening to your normal broadcast and getting bored, seek a change. It is there by the flick of the wrist! The operation of a 4 point switch simply takes the receiver on a world tour via the short waves and there are NO COILS TO CHANGE.

That is the important feature, hence the term "Universal," which means "covering everything." There has been a great amount of apathy about short wave reception both in the news Press and otherwise, and we imagine that the reason the Universal set has not been

touched is for the reason that it calls for a little engineering ingenuity on the part of the builder; and when it comes to making a smooth running mechanical switch system as a dual feature on one control, then it is apt to be avoided for something easier.

It is safe to assume that 80% of the radio population still believe that this talk about short wave stuff is like Television—a bit of a myth! Television is still a stuttering twin of the Radio infant, but "Short Wave" is a lusty youth. If not, then how comes it that it is possible to talk from your home here in Sydney with a telephone subscriber in any part of Europe . . . or to hold converse with a friend far distant on an ocean liner? How is it that in Australia we can often listen

to a broadcast programme from London, Rome, Moscow, or New York? Simply by the utility of the "short waves"!

We could talk a lot about all kinds of matters appertaining to high frequencies and accompanying formulae; but we prefer for the sake of the average reader to talk about plain "Short Waves" in a language they can understand. In other words, RADIO MONTHLY will endeavour to avoid the camouflage of super-technicalities in these constructional articles at least. We know then you will read the print twice . . . and understand it.

In planning this AC All Empire receiver due consideration had to be given to the fact that it must be a set that anyone with a little tuition can use suc-

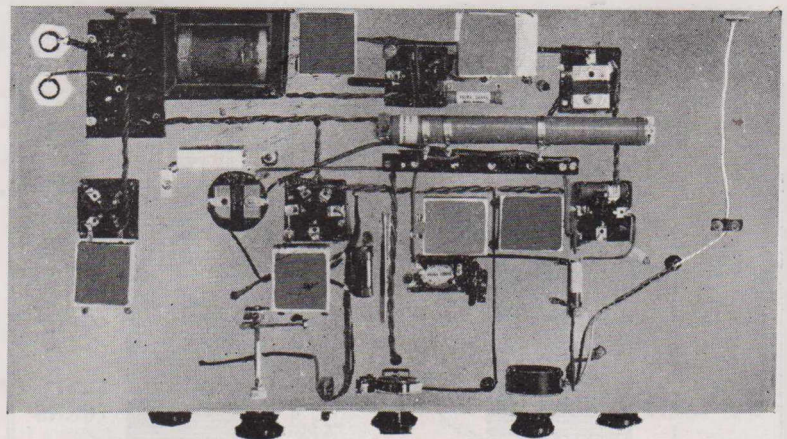
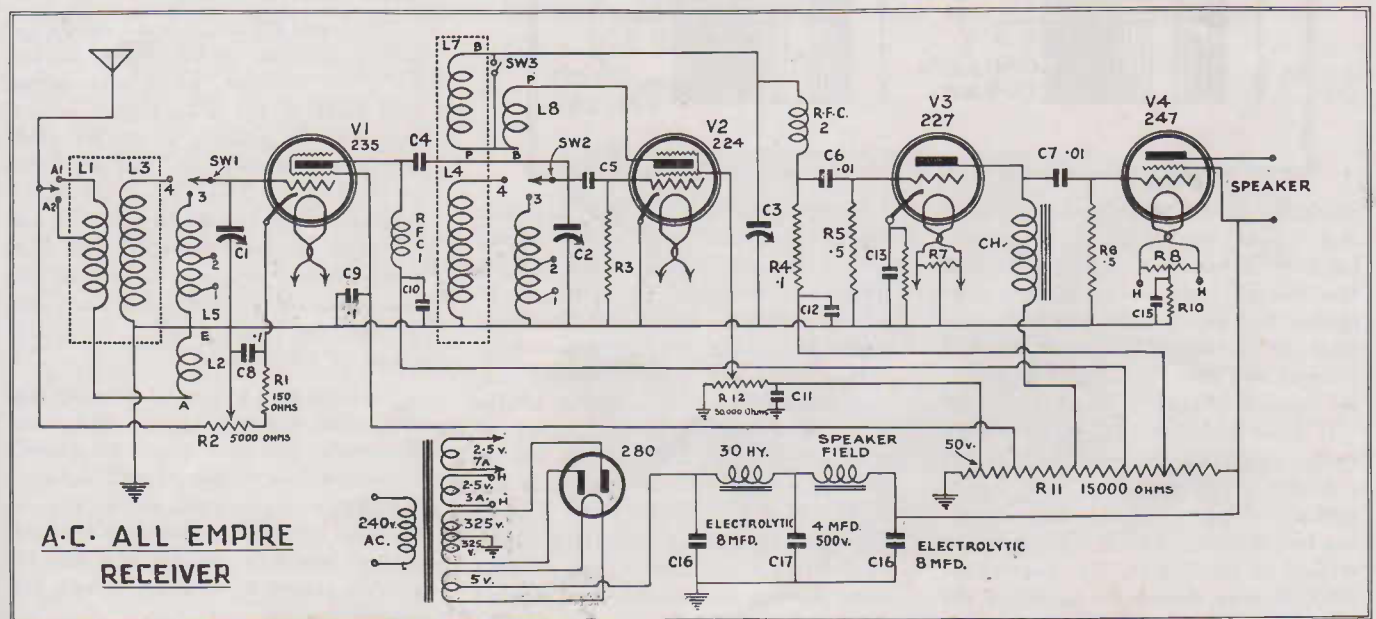
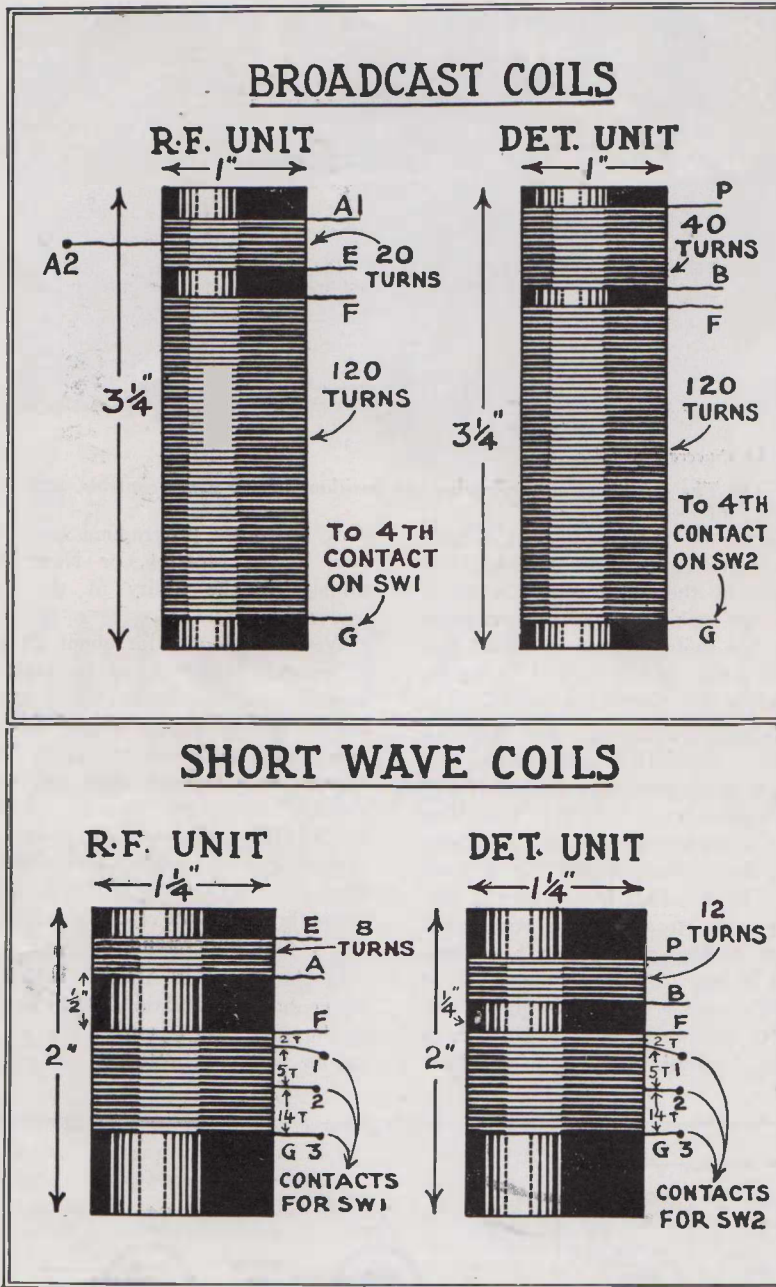


Photo. by Cinecraft Studios.

☐ The sub-panel view, showing the positions of sub-panel controls, etc.



☐ The circuit diagram of the A.C. All-Empire Set. Polarities of the series reaction windings are clearly indicated.



theoretical circuit diagram in Figure 1. We see at once that it is a four valve receiver with a full-wave rectifier of the 280 type. The first valve, V1, is a variable MU in the tuned RF stage. We do not intend here to go into a long talk on what the variable MU valve is, sufficient to say that it possesses, in this receiver at any rate, an enormous advantage over the 224 type. The valve used in this case is a UY235.

To be perfectly fair to the reader, and, incidentally, the radio dealer, we prefer in the case of the tuned RF stage to leave it at that, just plain UY235. The reason for saying this is that every type of 235 at present available on the market was placed in the RF socket of this receiver, and in every instance the behaviour of the RF portion of the receiver was identically excellent.

Owing to the flexibility of the receiver the fact that some of the earlier types of 235 valves were designed for a plate voltage of 180 instead of up to 250 is no detriment. We are not at this juncture going into a long winded business of the technical reasons why this is so, it being of paramount importance to us that the reader will in most cases simply want to read about the set in his own language, and then build it; if sufficiently interested, and if it works well, as it should, he won't worry about the reason why the set works, but will start in to enjoy the thrill of a Universal receiver.

This tuned RF stage in the theoretical circuit diagram is the valve marked V1. The detector, which is a screen grid valve of the UY224 type, is in a very different category to the RF valve and is emphatically not "just any valve of its type." This valve, V2, has a very important service to perform, and it has to do that smoothly. As it is a regenerative detector, it must be one that is capable of oscillating easily and without "forcing" over a very wide range of frequencies.

We issue here a word of warning that this valve must be chosen with care. The reader will have to ask his dealer's co-operation in the selection of the valve for this work, as even in the case of the most reputable makes there are some in each brand of the 224 type that absolutely refuse to oscillate at high frequencies.

Although we have on the market many different manufacturers supplying

cessfully. It took shape with misgivings that it was not going to be so easy, but after an hour or two looking around the dial we came to the definite conclusion that anyone who knows how to tune the good old Reinartz kind of receiver will have no trouble in getting the hang of this set.

It is not half as terrifying as the illustration of the front panel controls makes it look. It may appear to have a multiplicity of controls, but really it only has two seriously active. Owing to the method of coupling the RF stage to the detector, even though the tuning of the RF stage may be considerably out of resonance, yet signals will be heard with the detector circuit oscillating.

Naturally, bringing the RF stage into synchronism will bring up the signal with a wallop! That is not relating to short wave signals alone, for on the normal broadcast coverage, the performance is incredible. In a very poor location in a Sydney suburb this set simply heaves in one after another all the little Interstate B class stations so strongly that one has to wait for an announcement to make sure it is not 2UW or 2KY instead!

Around 11 p.m., on static-free nights, 6WF Perth is well audible, and we don't mean having to put the head against the speaker either.

To get an idea of what comprises the vitals of the set let us refer to the

List of Components for the A.C. All-Empire Set

- | | | |
|---|--|--|
| <ul style="list-style-type: none"> 1 Aluminium chassis, size 24 by 12 by 3 inches. 1 Aluminium panel, 24 by 8 inches, 18 gauge. 1 Radiokes broad vision dial. 2 .00035 AWA variable condensers, C1, C2. 1 .0005 AWA variable condensers, C3. 2 Four point switches (switch arm and contact studs with centre hole fixing), SW1, SW2. 2 Valve Shields
(Prima Donna) 2 Broadcast coils in cans for .00035 condensers, L1 L3, L4 L7 (described in text). 2 Tapped short wave coils, L2 L5, L6 L8 (described in text). 1 Power transformer with case. Windings: 2.5v. 7 amp. 2.5v. 3 amp., 5v.-CT. 3 amp., 325v.-CT., 325v. Henderson or Prima Donna. 1 30 henry 60 ma. filter choke. 2 TCC 8mfd. 450 volt electrolytic condensers, C16. 4 UY wafer sockets and spacers. | <ul style="list-style-type: none"> 1 UX wafer socket and spacer. 1 50,000 ohm Chanex wire wound potentiometer, R12. 1 5000 ohm Chancery wire wound potentiometer, R2. 1 15,000 ohm voltage divider, 45ma., Prima Donna, Radiokes, R11. 1 4mfd. TCC 450v. (working) condenser, C17. 1 4mfd. 500v. Chanex condenser, C15. 2 .1mfd. 500v. (working) Chanex condensers, C8, C9. 3 1mfd. 500v. (working) Chanex condensers, C10, C12, C13. 1 2mfd. 500v. (working) Chanex condenser, C11. 1 .5mfd. 500v. (working) Chanex condenser, C14. 2 .0001mfd. Mica condensers, TCC, C4, C5. 2 .01mfd. Mica condensers, TCC, C6, C7. 1 150 ohm bias resistor, R1, Radiokes, Prima Donna, Renrade. 1 2,500 ohm bias resistor, R9, Radiokes, Prima Donna, Renrade. | <ul style="list-style-type: none"> 1 415 ohm bias resistor, R10,* Radiokes, Prima Donna, Renrade. 1 2 meg. Durham grid leak, R3. 1 100,000 ohm. Durham 2 watt. resistor, R4. 2 500,000 ohm Durham 2 watt. resistors, R5, R6. 2 50 ohm Centre tapped heater resistors, Prima Donna, R7, R8. 1 Radiokes AC1 audio choke, CH. 2 RF chokes, Prima Donna, Radiokes, RFC1, RFC2. 1 Arrow on-off panel switch, SW3. 3 feet $\frac{3}{8}$in. copper braid. 7 Knobs for panel controls. Terminals, lugs, screws, wire, etc., 2 screen grid valve grid clips. Valves: <ul style="list-style-type: none"> 1 UY 235 variable MU., V1. 1 Cossor 224/C (detector), V2. 1 UY227, V3. 1 UY247 Pentode, V4. 1 UX280 type rectifier. Speaker. DC type Dynamic. Field coil resistance 2500 ohms. |
|---|--|--|

the same types, yet there appears to be a vast difference in those types when it comes to using them as oscillating screen grid detectors.

Our best results for the all round purpose of this receiver were obtained with the Cossor 224/C type and this is thus the type of valve we advise for detector. The first audio stage V3 is again, any good 227 type. The reason we put the word "good" in there is because we mean it. A 227 of a reputable make will be suitable in this position, but it must be borne in mind that there is at present on our market a glut of "bootleg" valves of dubious origin, which in most cases are possessed of the most appalling faults in heater design with the inevitable result of AC hum.

Of the output valve, V4, which is a UY247 Pentode, we can say nothing of a special nature. All the 247's we tried in the output were excellent. No difference in either quality or "quantity" was noticeable and three available makes we tried. The same should apply to the reader. The rectifier valve of the UX280 type is a Philips 1560, which, despite the fact that it can be obtained

to-day very cheaply, seems to be faultless in behaviour.

Having thus got the valve question off our mind, we have arrived at the point where we start at one end of the circuit and go through to the other with a description of a non-technical nature. We debated with our conscience, whether to tell the constructor

the truth, the whole truth, and nothing but the truth about the coils used in the receiver, or bring down shoals of frantic correspondence because we decided to leave the coil question entirely to the manufacturer of coil kits.

The decision in this receiver is for the constructor, for the important reason that there is nothing very much

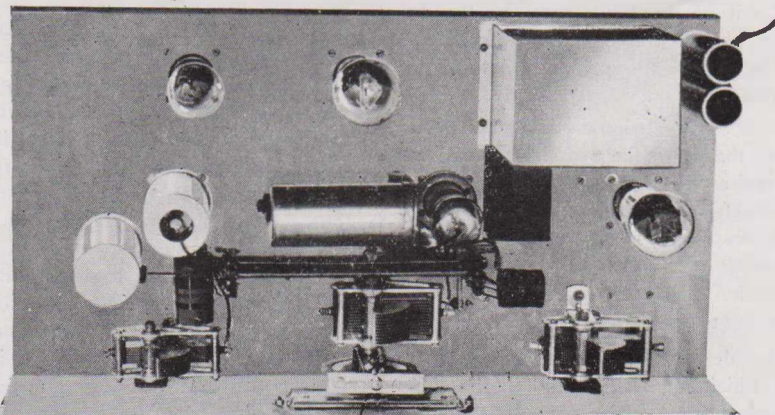
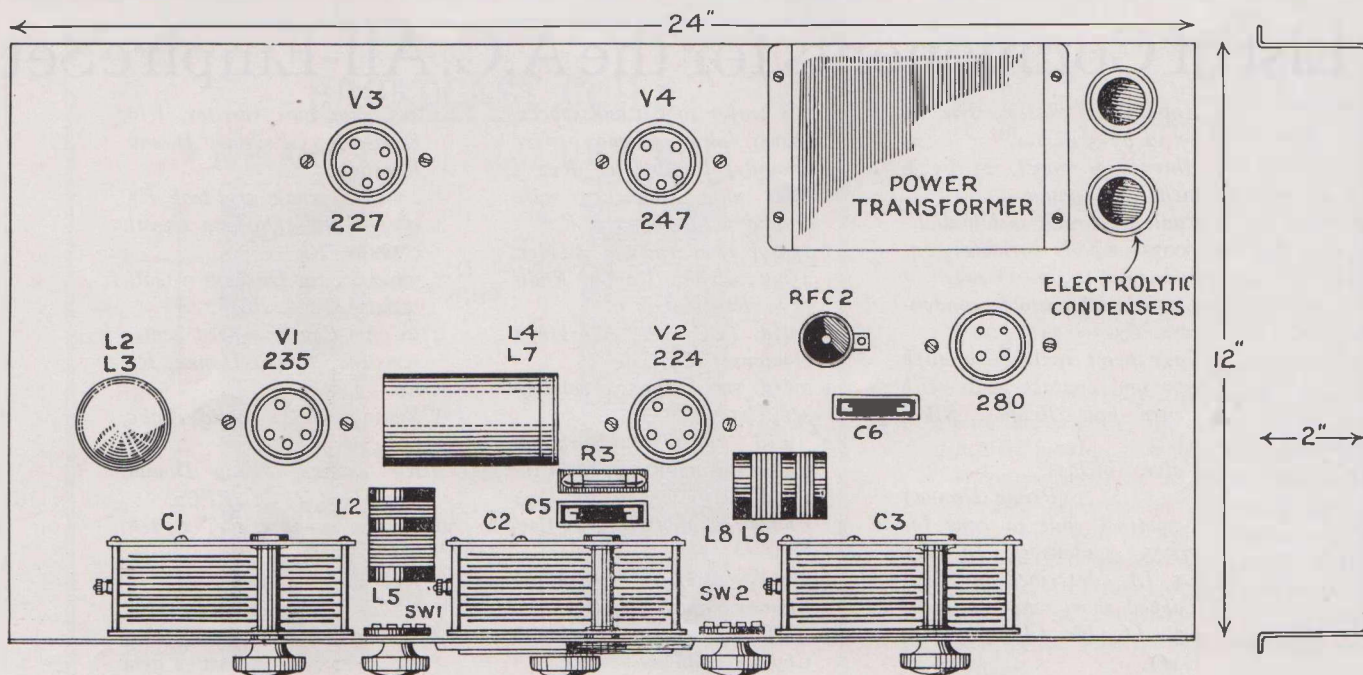


Photo. by Cinecraft Studios.

□ Plan view of the A.C. All-Empire. The horizontally mounted broadcast detector coil unit is seen in the centre, also the ganged switching unit.



In this layout the dual switching device is indicated as two separate switches as explained in the article. Such alteration by the constructor will not be detrimental to the efficiency of the set.

in the coils, and anyone with a little patience can make them in short order. At the same time, any constructor who would rather leave the inductance winding business to those properly fitted for it will be able to get very reasonable quotes from either Prima Donna or Radiokes.

You will notice on looking over the circuit diagram that certain of the coils are enclosed in a dotted line area. This indicates screening. Only the coils covering the normal broadcast range are screened, it being found that with the short wave coils such precaution is unnecessary.

In the broadcast range, coil L1 is the aerial coupling and coil L3 the grid coil of the RF stage. In the detector circuit this range is accounted for by L4 in the grid circuit and L7 for reaction.

Refer now to the diagram which shows the particulars of these broadcast coil units and it will be seen that their construction is simple enough. In both instances they are wound on one inch diameter formers with No. 32 gauge enamelled copper wire. The grid portions have 120 turns.

The detector unit has the reaction coil, which must be wound in the same direction as the grid, spaced one-eighth inch away. This reaction coil consists of 40 turns. The aerial coupling coil in the RF unit is also spaced the same distance away from its grid coil, but

it consists of only 20 turns with a tapping at the centre. This centre tap will be useful from a selectivity point of view in the Metropolitan area. Both these complete coil units are screened completely with flex leads brought out through the base of the can. Before boxing the coils up it is as well to mark these leads to avoid confusion when wiring up later.

Now we come to the very important short wave units for both RF and detector stages. The details of these must be very closely followed to ensure proper overlap coverage of the useful short wave ranges. L5 is the RF SW grid coil and L2 the aerial coupling coil. The diagram of these units shows that they are wound with 28 enamelled copper wire on formers 1 1/4 in. diameter.

The ideal former for these coils is the well known Pilot ribbed type. The ribbing keeps the windings well away from the former itself and in the case of the detector circuit tends to help ready oscillation along considerably. The grid coils are identical in both RF and detector units.

Starting from the low potential end, marked F, two turns are wound and then a tap taken. It is advisable to make these taps properly by raising the wire a little and soldering a fine flex lead on instead of merely twisting the wire up.

Continuing after the first tap, five more turns are wound on and another tap taken (No. 2). After this, four-

teen turns are wound on to complete the coil with a total of 21 turns. This finishing connection is marked Tap 3. The beginning of the reaction coil is started 1/8 in. away from the end of F of the grid coil and consists of 12 turns of the same gauge wire.

After having wound similarly the grid coil for the RF stage, the aerial coupling coil is wound at a distance of not less than 1/8 in. from the low potential end (F). The actual connections for all coils are clearly marked in the diagrams so that there should be no trouble with reversed reaction coils in the detector circuit.

Looking at the diagrams and photographs of the receiver it will be grasped at once that the inductance ranges are shifted at will by a switch system in both RF and detector circuits. These switches are marked SW1 and SW2 respectively, and although they are shown for the sake of simplicity in the plan drawing of the receiver layout as two separate switches, they are actually one ganged switch in the receiver itself as the photographs will show.

This point should not worry the constructor in the least. If he wishes to make the set with two switches separately operated instead of going to the engineering trouble of ganging the two from a localised panel control, that is not going to impair the efficiency of the receiver in any way.

AROUND THE SHORT WAVE DIAL

FOR some time short wave conditions have not been of the best, and if anything they have gone worse. Possibly the solar cycle theory has something to do with this. It has been forecast that with the return to a minimum of activity of disturbances on the surface of the sun that long distance reception as we knew it in the earlier days of radio broadcasting would return with renewed vigour. This theory seems to have been correct so far, for every week one hears of new records in reception with broadcast receivers operating on the usual channel between 200 and 500 metres, some Australian listeners having logged in the early hours of the morning, a great number of European stations. It seems probable that the shorter wave lengths in the vicinity of 20 metres as used by 5SW England, are affected adversely, but whether this is so can only be determined by observation over the forthcoming period of the next two years. Reception of 5SW is very patchy at the present period, but on occasions the signal strength is comparable to the exceptional periods of three years ago. Short wave listeners will welcome the advent of the new Empire Broadcasting station to operate shortly on high power, so far as reception of programmes from England is concerned.

Very closely allied together in the radio art, are the branches of short waves and Television, and it is interesting to note the progress that is being made in other parts of the world in this connection. The short wave and Television Corporation of Boston, Mass., U.S.A. is now completing work on special high power stations to be used on short waves. The frequencies to be used by these stations will be 6,040, 11,800, 22,250, and 21,460 kilocycles. The fact that such frequencies are to be used should be of interest to the long distance short wave fan as there seems no reason why these stations should not be heard in this country when operation commences. Already a number of American stations are now busy broadcasting Television on the higher end of the short wave bands. The following stations may stand a chance of being heard over here should long distance conditions be enhanced generally:—



W1XAV, Boston . . . 104 metres.
W2XR, New York . . 103 metres.
W2XCR, New York . . 146 metres.
W2XCD, New York . . 146 metres.
W2XBS, New York . . 143 metres.

Should reception of these distant Television stations, even at higher frequencies be reliable, amateur Television enthusiasts would, no doubt, encounter difficulties owing to the fact that different sizes of scanning discs are used by the various stations.

Many listeners have concentrated on the powerful station operating on 70.1 metres at Khabarovsk in Siberia, and have commented on the almost total exclusion of musical items in the programme and the continual barrage of talk by the announcers, male and female. One reason why so much talking is to be heard from Russian stations is because the telephone and telegraph still needs much development in the land of the Soviets and so much time must necessarily be devoted to news. Newspapers in the USSR have to rely upon the broadcasting services for their news. The press is entirely under Government control and until there are increased facilities, three high powered broadcasting stations are brought into action during the night. Long news bulletins and communiques are transmitted for a considerable period, and shorthand writers take down the information. By this means, the provincial newspapers are able to publish news simultaneously with those of Moscow and Leningrad.

A direct radio-telephone service is now in operation between Stavanger in Norway and New York. During the daytime a wave length of 15 metres is used, and 30 metres at night.

Experimenters interested in the logging of ultra-short waves may be interested in the transmissions which are carried out daily by the Berlin Central Post Office. The tests are conducted on wave lengths of 6.75 and 7.05 metres.

“Radio in 1940”

Many people must be wondering where the science of radio is heading in the near future, and what will be the applications to come. We give below the views of an American Director of Broadcasting, who has an eye on the future, and whose suggestions are even now rapidly approaching materialisation.

JUST IMAGINE!

By 1940 we shall have learned how to overcome static and magnetic barriers, and by our additional discoveries in the short wave field render International broadcasting as possible and as practicable as the best now being done locally. Ten years from now, to broadcast around the world will be just one item in the day's work and the great broadcasting organizations will be operating their studios and plants on a twenty-four-hour basis. Differences in time will be utilised so that while the rest of us sleep, the night shift will be sending programmes abroad, reaching other countries during their daylight period. We shall be exchanging programmes with every civilised nation in the world.

(Continued on page 60)

A WORD FOR EVERYONE—



BATTERIES

DEALERS.—Diamond dependability means battery confidence, consequently the confidence of your customers.

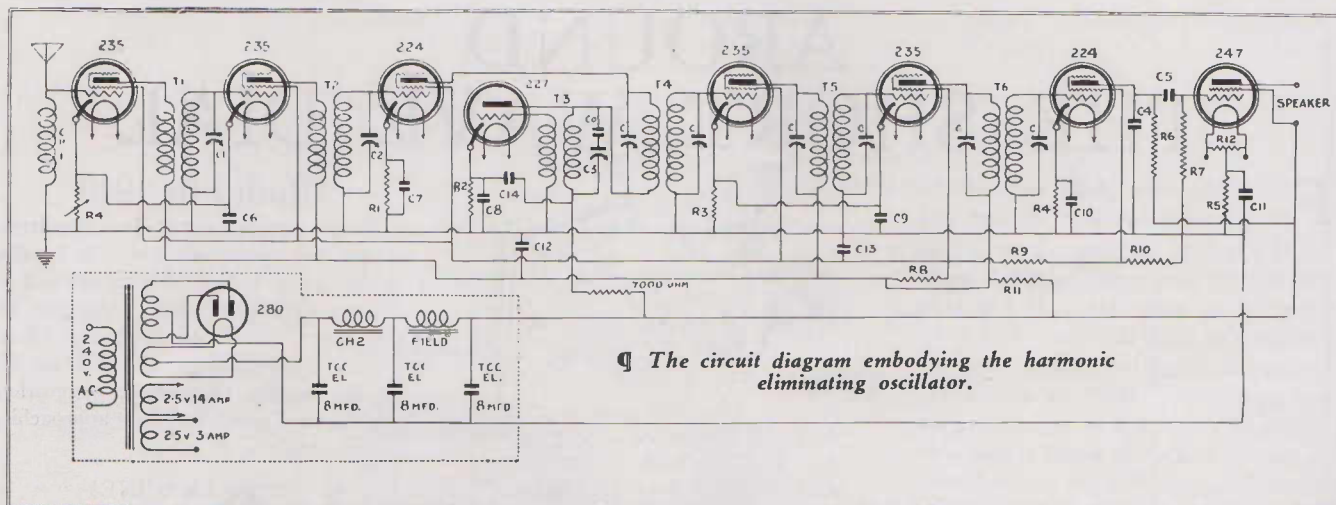
Keep well stocked up with Diamond—a fast-moving line that does not lie on the shelves.

We are official distributors for the complete range of Diamond Batteries. Your orders filled promptly.

W. G. WATSON & CO. LTD.

279 CLARENCE STREET,
SYDNEY.

M 4331 (5 lines)



Two stages of RF amplification before the detector tend to suppress "image" interference.

The Modern Superheterodyne

for the Home Constructor

Designed and Built by

DON B. KNOCK, Technical Editor

J. B. MARTIN, Associate Technical Editor

THE Superheterodyne! A name and an assortment of radio goods to conjure with in these days!

We sincerely hope that the reader will not just glance at the heading and say, "What! another of them," and turn to things less distracting, because we feel sure that after he has delved a little deeper he will realise that this really is a Super for the man in the street armed with average radio knowledge.

The photograph of the set alone should be sufficient to hold attention, as it will be at once apparent that there are no "snags" about the job, it being what one would expect the man with a work-bench and a few tools to look twice at in the Superhet line. There are no trimmings round this little story, and it is not confusingly technical. It is, for the sake of the constructional reader, just what he himself would start in to make after he had mastered a little of the theory of the Super, namely, a dual control Superheterodyne, presented briefly.

At the present period, it is safe to assume that almost every radio factory of any reputation at all in Australia is either contemplating for the next season's output a range of Superheterodyne receivers, or else is well under way actually turning them out. The finished product should, and will in most cases, be beyond reproach, and in nine cases out of ten will blossom forth, as the result of painstaking laboratory research, with the job efficiently operative by a single dial control.

An inspection of our most prominent radio factories will quickly convince the visitor that the engineers responsible for the design of to-day's radio receivers do not work by "cut and dry" methods. There are frequency standards and measuring instruments galore to turn to. Thus, the factory can turn out the precision instrument with every tuned circuit of a complicated receiver accurately "in step" and, if judged necessary, calibrated in frequency to a fractional degree.

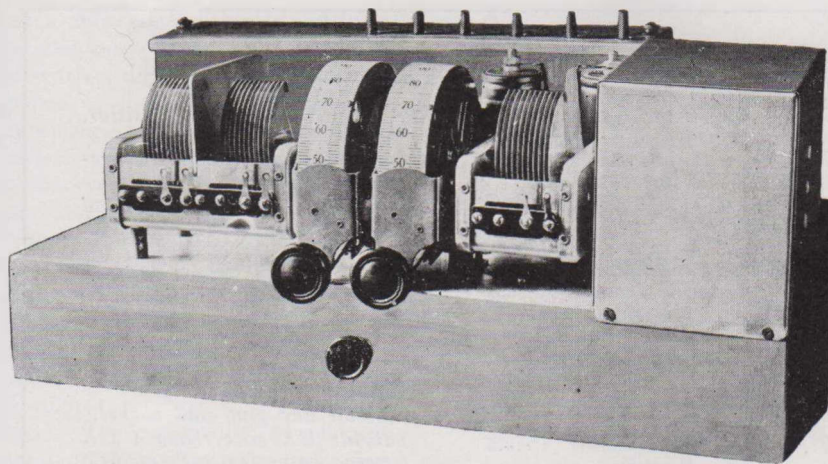
The product of the man who buys himself a lot of parts for some set or other is likely to be of a very different order. With a fair amount of intelligent application and the knowledge that he knows just what he is dealing with, it is possible for him to turn out something closely approximating the big manufacturers' product.

In the case of a modern Superheterodyne receiver as made by the world's leading manufacturers, there would probably be very little difficulty in the constructor being able to duplicate exactly the same job if those concerns manufacturing the finished products were to market complete kits of the

same receiver as manufactured by themselves. The coil kit would be accurately designed to be used with the variable capacity unit to accompany it, and it would simply be a matter of assembling the complete kit, plugging the valves in, switching on and running the single dial around to cover the whole broadcast band effectively with the superlative selectivity of the Superhet.

Having had a recent opportunity of inspecting a few home-made single control Supers, we found only one which was doing the job properly, having been made by a man who knew exactly what he was doing with the set from a theoretical aspect.

The others were not equal in efficiency to the average receiver using two tuned RF stages ganged with a power detector, and suffered from a common complaint. This was, that when tuning the single dial operating all circuits together, the coverage at the full peak of resonance was limited. Starting below 2NC, it was possible to tune to 2UW. At this position it was necessary to reset the compensating condensers on the ganged condenser unit. The



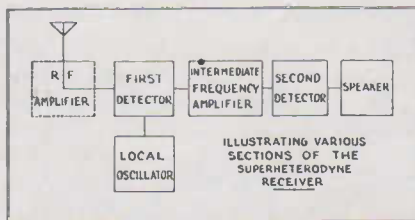
☞ *Dual control is a feature of this powerful Superheterodyne for the Home Constructor.*

same process had to be repeated when 2BL's frequency was reached, and similarly between 2BL and 3AR.

To preclude any possibility of incurring the wrath of the reader, we are thus constrained to put the single control Super delicately on one side and give a few details of "A Modern Superheterodyne for the Home Constructor," namely, a Dual control job. We fail to see why there should be any objection to any receiver possessing two main tuning controls, for such a receiver is not one iota any harder to tune than one using only a single dial, and it is certainly more effective in most cases. We would not suggest that we go back to the days of yore when it was fashionable to spread imposing dials and knobs over a front panel, but we cannot help remarking on the fact that the latest tendency on the part of leading foreign radio manufacturers is to go back to multi-control receivers, for the reason that a radio minded public is demanding such receivers.

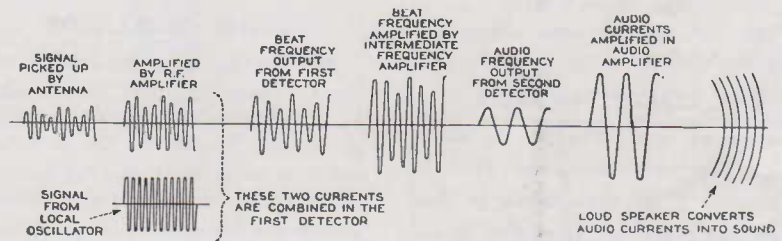
FUNDAMENTALS OF THE SUPERHETERODYNE

Every Superheterodyne consists of essentially six parts, as shown in the



diagrams. An RF amplifier is placed in front of the first detector, although this unit is not really essential so far as the principle is concerned. It is a

great advantage, however, and to build the set without it would be a considerable sacrifice. The signal is picked up by the aerial system and passed into the RF amplifier. From there it goes to the first detector, where it is combined with a signal from the local oscillator. The combined signal from

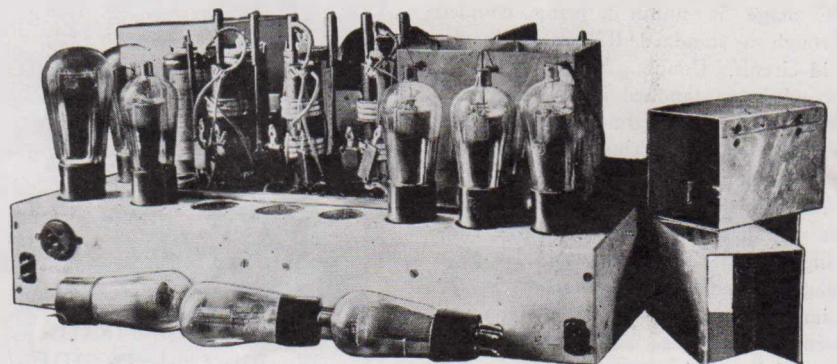


the output of the first detector is then passed into the intermediate frequency amplifier (175 kilocycles, as almost universally used), and thence to the second detector. After this the remaining portion of the receiver is simply the audio amplifier and reproducer. Whenever two radio frequency currents are combined in a detector circuit two "beat" frequencies are produced equal to the

sum and to the difference of the two currents. Supposing we "mix" 1,100 KC with 1,000 KC we obtain two new currents, one with a frequency of 2,100 KC and the other with a frequency of 100 KC. To build an amplifier to work at very high frequencies is more difficult than to build one to work at low frequencies, so that, taking the above example, we would therefore build an RF amplifier to work at and amplify the 100 KC beat note.

The best way in which the newcomer to the Superheterodyne receiver can understand something of the principle is simply for us to say that the Superheterodyne circuit makes it possible to construct an efficient receiver to work at a fixed frequency, with the frequency of all incoming signals being changed to this pre-fixed frequency by means of the oscillator coupled to the first detector circuit. One great advantage of the Superhet over the conventional type of receiver is that the intermediate frequency amplifier can be made extremely selective in characteristics,

since it always works at the same frequency. With the increasing number of broadcasting stations it is natural that, because of the great selectivity possible with the Superheterodyne, the experimenter will always be intrigued by it and will always be ready to try his hand at it. Now with the use of modern valves, possessing selective properties in themselves, the Superhetero-



☞ *Showing the Intermediate Transformers exposed. The screening units are readily detachable.*

List of Parts for the Modern Superheterodyne for the Home Constructor

- List of Parts for the Modern Superheterodyne for the Home Constructor**
- 1 Aluminium chassis, 10½ by 9 by 1½ inches.
- CH1. 1 Standard RF choke. *Prima Donna. Radiokes.*
- CH2. 1 30 HY filter choke 90 ma. *Prima Donna.*
- T1, T2. 2 Standard RF transformers. *Prima Donna. Radiokes.*
- T3. 1 Oscillator coil unit as described.
- T4, T5, T6. Three Intermediate frequency transformers for 175 KC as described.
- C. 6 TCC .0001 type M condensers and shunted compensators as described.
- Co. 1 .01 TCC type M condenser.
- C1, C2. Stromberg Carlson 2-gang .00045 mfd condenser unit.
- C3. 1 Stromberg Carlson .00045 mfd variable condenser.
- C4. 1 TCC .0005 type M condenser.
- C5. 1 TCC .01 type M condenser.
- C6, C7. 2 .1 mfd Chanex condensers in one case.
- C8, C9. 2 .1 mfd Chanex condensers.
- C10, C12, C13. 3 2 mfd Chanex by-pass condensers.
- C11. 2 4 mfd Chanex by-pass condensers in shunt.
- 3 TCC 420-volt working electrolytic filter condensers. 8 mfd each.
- RH. 1 5000 ohm variable resistance. *Chancery.*
- R1. 1 3000 ohm resistor. *Prima Donna. Renrade.*
- R2. 1 1000 ohm resistor. *Prima Donna. Renrade.*
- R3. 1 150 ohm resistor. *Prima Donna. Renrade.*
- R4. 1 35,000 ohm resistor. *I.R.C.*
- R5. 1 400 ohm 5-watt resistor. *Prima Donna. Renrade.*
- R6. 1 250,000 ohm I.R.C. 2-watt resistor.
- R7. 1 1 meg resistor. *Radiokes. I.R.C.*
- R8. 1 5500 ohm 5-watt resistor. *Prima Donna. Renrade.*
- 1 7000 ohm I.R.C. 2-watt resistor.
- R9, R10. 1 10,000 ohm Electrad high wattage resistor, with clips.
- R11. 1 2500 ohm 5-watt resistor. *Prima Donna. Radiokes.*
- R12. 1 50 ohm centre tapped resistor. *Prima Donna.*
- 8 UY sockets. 1 UX socket, sub-panel type.
- 1 240-volt line plug and socket.
- 1 bakelite UX socket and 1 UX valve base, for speaker field and coil connections to set.
- 6 control grid clips.
- 2 Pilot vernier drum dials.
- Wire, screws, lugs, terminals, etc.
- Speaker. 1 DC type dynamic speaker with field coil 2500 ohms resistance.
- Power transformer, by *Prima Donna.* 350-0-350 85 ma. 2.5v. 14 amp., 5v. 3 amp.

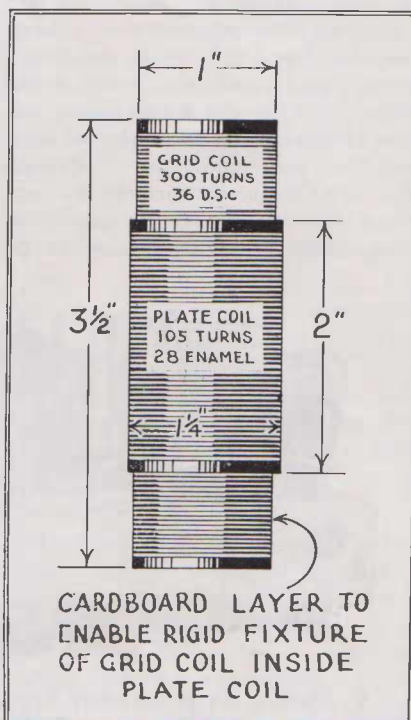
dine has taken on a new aspect and has quite definitely come to stay.

THE CIRCUIT DETAILS

The circuit is different to the usual run of Superheterodynes as used in this country up to the present, in that the oscillator follows the latest practice of British radio engineers. Transmitting amateurs will readily recognise the oscillator as using the familiar "resonant grid coil" and tuned plate arrangement. The advantage of using a frequency changer of this type is that it is practically non-radiating and there is no trouble from unwanted harmonics. In the radio frequency end of the set there are two tuned circuits controlled by the same dial. The aerial RF stage is untuned, being coupled through a standard RF choke in the grid circuit. Coupling this stage to the second is a standard RF transformer with the secondary tuned by C1 of the two-gang condenser unit. This second stage is coupled by another RF transformer to the first detector valve, with the secondary tuned by C2 of the two-gang unit. The oscillator is plate coupled to the first detector via the primary of the first intermediate frequency stage T4, and in succession there follows the second I.F. stage T5, the third T6, the second detector and the resistance coupled Pentode output.

THE OSCILLATOR

At a first glance at the method of frequency changing, many may think that by coupling to the plate of the detector the results would not be up to much, when actually it is more logical. By so coupling, oscillations are introduced before rectification. The diagram of the oscillator coil unit shows the par-



ticulars. With such an oscillator, the untuned resonant grid coil must be approximately three times larger in inductive value than the tuned plate circuit. The grid coil is wound on a one inch former with 300 turns of 36 D.S.C. and the plate coil is of the usual dimensions—1¼ in. in diameter and wound with 105 turns of 28 enamelled copper wire. The grid coil is wrapped with waxed paper or thin cardboard and pushed inside the plate coil as shown. Actually it would not matter if the grid coil were scramble wound and arranged in any convenient position, as an inductive relation between the coils is not essential with an oscillator of this type.

THE INTERMEDIATE FREQUENCY TRANSFORMERS

Details of the construction are given in the sketches and photographs. These transformers are designed and calibrated to peak at 175 kilocycles, being checked in the "Radio Monthly" laboratory by an accurate frequency standard recently obtained. Six bobbins are made from 1 in. tubing, and provided with four flanges to make three slots in each. Each hobbin is filled with 400 turns of 36 SSC copper wire, with 133 turns in the first, 133 in the second, and 134 in the third. The compensating condensers are remodelled Radiokes, screened neutralisers fitted with a new baseplate

and a thin mica dielectric. Although the compensators may be arranged for screwdriver adjustment from under the chassis as indicated in the sketch, a refinement is provided in the original receiver by fitting long extension handles vertically through the screening compartment lid. Each Intermediate winding is shunted in addition by a type M TCC .0001 mfd. condenser of the new highly accurate type (2%). The specified windings together with these capacities bring the frequency approximately to 175 KC, and the final adjustment is made with the compensators. The combination of compensators and "packing" condensers is shown as C in the circuit diagram.

To get at the entire Intermediate frequency assembly, the coil screens are so constructed as to be easily removable, five compartments with a removable lid over the lot housing all the RF transformers as shown.

THE POWER TRANSFORMER

Owing to the extra load taken by the heaters of the eight valves, this winding must be capable of delivering 2.5 volts at 14 amps. The transformer used is specially made by Prima Donna for this receiver, and is provided with a separate 2.5 volt winding for the Pentode if preferred.

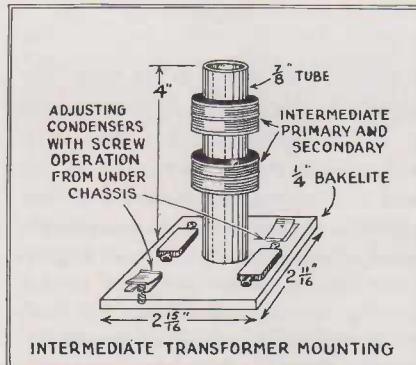
THE VALVES

Radiotrons are used throughout, the RF stages being UY235 VM, the first detector UY224, Oscillator UY227, Intermediate stages UY235 VM, second detector UY224, audio output UY247 Pentode, and UX280 rectifier. That this combination of world-famous

valves is well chosen may be seen from the performance of the set.

ADJUSTMENT OF INTERMEDIATES

Without a standard frequency oscillator, the tuning of each winding will

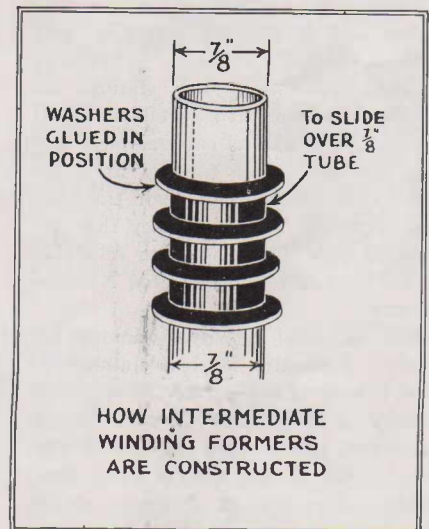


not be difficult by ear. If the coils are accurately made to the specifications, the intermediates will be approximately in tune. Tune in a fairly strong station and gradually adjust each com-

pensator, using the volume control (RH) when the signal becomes too powerful. When this is done, adjust the trimmers on the RF ganged condenser unit and tune in a distant station, repeating the adjustment of the intermediates finally.

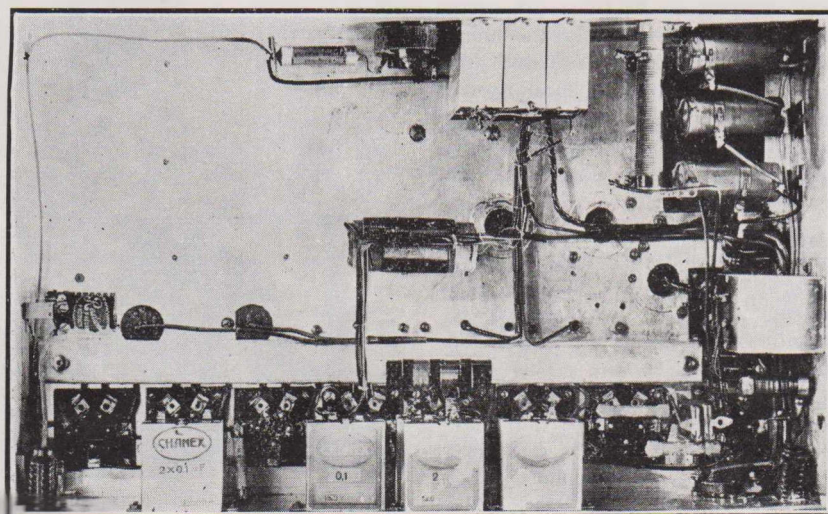
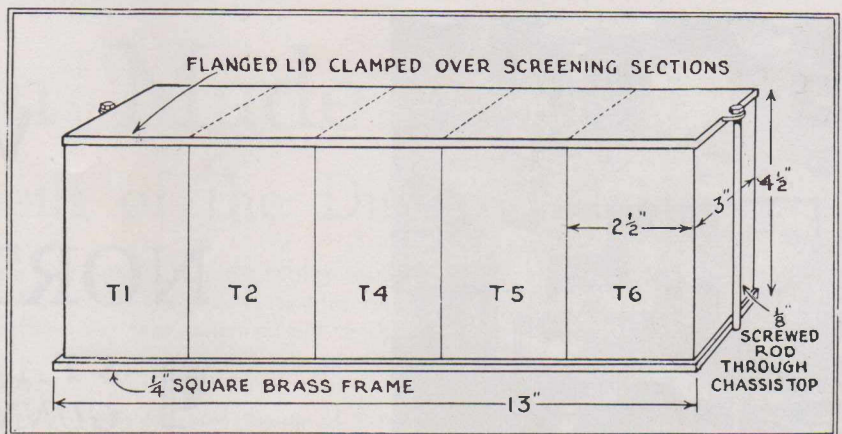
THE PERFORMANCE

We have left this to the last, and we have no hesitation in saying that, after everything was adjusted properly, we were agreeably pleased. The only aerial it was found possible to use with



the set is a piece of wire about 3 feet long. The first tests were made in the late evening, and quickly revealed the fact that no passenger valves were being carried. The two RF stages before the detector accounted for 6WF and 5CL, in a manner which would gladden the heart of the most hardened DX fiend. But for the presence of static these two stations were comparable to the signal normally expected from such stations as 3LO or 3AR. Later tests

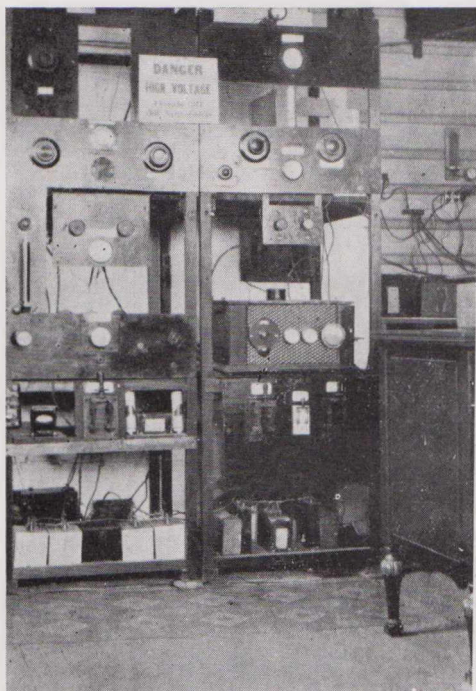
(Continued on page 64)



Sub-panel view of the Home Constructor's Superheterodyne, showing position of oscillator unit.

THE VOICE of the NORTH WEST

STATION 2MO.
GUNNEDAH, N.S.W.



☞ *The Oscillator, Amplifier and Modulator Panels of 2MO.*

SINCE the appearance on the broadcast channel during the past two years of many new B class, or licensed stations, the listener possessing even a receiver of medium sensitivity has been able to explore new programme realms and to identify regularly most of these stations. Although the majority of these smaller B class stations are designed and operated purely to supply a broadcast news and entertainment service for their own country area, yet such is the efficiency of their transmitting apparatus that in Sydney they are received with almost as much reliability as the Interstate high-powered National stations.

Not the least consistent among the medley of country B class stations received with good signal strength in Sydney is the station situated on the Liverpool plains area of North-west New South Wales, namely 2MO Gunnedah. This station is unique in the history of broadcasting in Australia, in that it is practically a "one man broadcasting station," being engineered and operated also from an administrative point of view, mostly by one person, Mr. Marcus J. Oliver, the owner-operator. It is Mr. Oliver who, despite his years, rises early in the morning and looks over his motors and generators, warms up his transmitting apparatus, checks his speech amplifying equipment, and gives his unseen, but ever-present audience the latest news from the "Northern Daily Leader." His evening

programme, in which he is very ably assisted by Mrs. Oliver, is popular over the whole North-western district, and, as correspondence shows, even as far afield as Victoria, Queensland and New Zealand. It was after a considerable period of activity with a 10 watt experimental station under a special license, that Mr. Oliver realised that his location at Gunnedah was ideal geographically for a regular broadcasting service, and after the grant of the broadcasting license by the P.M.G.'s Dept., the present station 2MOWas put into good use. The station was designed and built in collaboration with Mr. D. B. Knock, Technical Editor of this journal, commenced activity on February 7th, 1931, and since then has been kept running to a 4½ hour schedule. Although programmes are mostly of a local nature, occasional relays are undertaken from neighbouring towns, principally Tamworth. As the station depends on the Gunnedah power supply, this being in the nature of direct current, conversion to alternating current is necessary for the filaments of valves. The main plate supply is derived from a 1000 volt generator direct coupled to a 2-h.p. compound-wound motor. This 1000 volt generator has a history in radio transmission, being the generator previously used by the late Philip Spencer Nolan at his experimental station VK2YI in Sydney. A 580 watt rotary converter feeds various transformers for the different filament voltages in

use. As the town of Gunnedah is scheduled to change over to alternating current the transmitter has been constructed so that the apparatus can be switched over immediately the change is made; all the necessary rectifiers, filters and power transformers being built in in readiness. Voltage supplies to microphone circuits, speech amplifiers, etc., are obtained from a bank of accumulators continually floating across the 240 volt D.C. supply. The heart of the 2MO transmitter is the crystal controlled oscillator housed in a screened compartment, with an intermediate amplifier stage using a neutralized Mullard 40 watt valve. The final output amplified system uses two Mullard 40 watt valves paralleled, and an unmodulated aerial current of 2.8 amps. is easily carried without these

(Continued on page 46)



☞ *Morning's news from "The Northern Daily Leader," with Mr. Oliver at the mike.*

Australian Made Batteries

The Achievement of the Diamond Factory

The remarkable growth of the Widdis Diamond Dry Cells Pty. Ltd. cannot be ascribed merely to a series of fortuitous or fortunate circumstances. It could only be by dint of hard, solid work; years of unremitting effort directed to improve and still improve on the quality of their products that the present dominant position of the Widdis organisation has been attained. In the construction of Dry Cells and Batteries no manufacturer can hope for success unless his finished product possesses an outstanding virtue of quality. And in this "quality"—the essential correctness of its constituents and assembly—is the success of the "Diamond" battery.

A visit to any of the four "Diamond" factories is a revelation to those interested in ultra modern methods of manufacture.

Apart from the mechanical equipment, it is interesting to learn that the actual factory area exceeds 30,000 square feet, and that some hundreds of hands are employed.

If all factories of Australian secondary industries were as efficiently equipped as the factories of the Widdis Diamond Dry Cells Pty. Ltd., there would be little to fear in this direction. We understand that during the past six years their chief engineer and manager, Mr. C. W. Evans, has made four trips, covering Great Britain, the Continent, and America.

During the course of these travels Mr. Evans has visited every battery factory of note throughout the world, has seen the conditions under which they work, the machinery they employ, and his resultant knowledge has brought to the Widdis factories the most up-to-date machinery procurable, irrespective of cost.

The existing plant is not allowed to become obsolete, but is added to or scrapped in accordance with scientific advancement of methods of production. As an interesting illustration of the uncanny capacity of modern machinery, we noted one machine in the Widdis factory which in one operation assembles

unit cells into the required battery form, and solders all the 30 or more wire connections and then automatically checks the assembled battery for any possible fault.

Apart from the vast saving of time effected, this machine removes every element of error in construction. A human may err—this machine cannot.

The factories are well equipped with laboratories, while chemists follow their own happy and mysterious ways, ceaselessly delving into formulas, searching for continual improvement.

Only the highest grade raw materials are accepted after rigorous chemical analysis. The zinc cans employed on Diamond cells are all drawn, which, though an expensive process, is the only means whereby a uniformity of gauge and assurance against leakage can be obtained. Drawn zinc cans differ from rolled cans, in that there are no seams to allow of undue chemical action taking place. A seam in a rolled cell has to be soldered, and one minute spot of solder reaching the chemical constituents will immediately set up a local action which quickly destroys the life of the cell, and, consequently, the battery. Each Diamond cell is totally enclosed in an insulated container, ensuring complete insulation of one cell from the other.

These highly scientific methods of insulation remove all possibility of short circuits—of leakage—the enemy of battery life.

The electrodes are pressed out, wrapt, and capped by automatic machines, thus ensuring that every electrode possesses the same standard of dimensions and quality.

And, finally, every "Diamond" battery and dry cell is subjected to check tests at every vital stage of assembly, and the slightest defect is sufficient to bring about their rejection.

To our mind the finest illustration of the consistent quality of "Diamond" batteries is instanced by the sale to the P.M.G. Department of hundreds of thousands of "Diamond" dry cells annually. The postal authorities in their dry cell specifications call for a high standard and a definite output. All cells re-

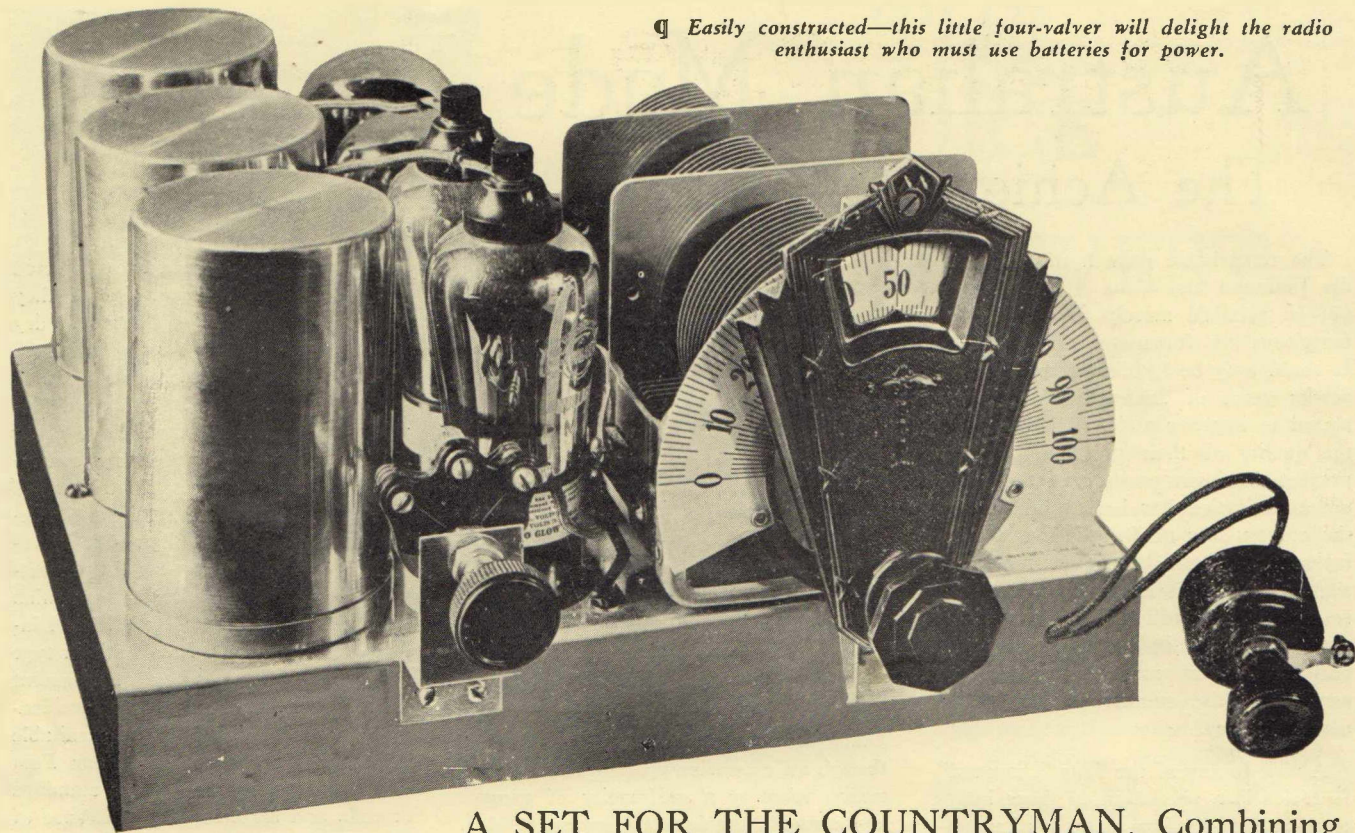
ceived by this department are subjected to rigorous tests to determine if they conform to standard. "Diamond" dry cells have not only met the requirements, but have always afforded 15 per cent. to 20 per cent. above the standard demanded, and in many cases have given as high as 30 per cent. above specifications. In this connection it will be of interest to quote an extract from the report on the tariff inquiry:—"It is interesting here to note that the departmental records showed that Australian cells and batteries made by Widdis Diamond Dry Cells Pty. Ltd., both in type and quality, filled every requirement perfectly; indeed, exceeded the specifications required. This is more creditable to local manufacturers since our Post Office authorities set a higher standard for cells and batteries than do those of Great Britain, due to the greater telephonic distance operative in the Commonwealth. Here the specifications lay down a 60-watt hour capacity—that is, 60 miles to the gallon, expressed to a motoring term—whereas the British requirement is only 50-watt hours. But it was departmentally shown at the inquiry that exhaustive tests proved every local battery to exceed the statutory power, whilst some even reached to 79-watt hours, a quite marvellous achievement."

The extent and growth of the Widdis Diamond Dry Cells Pty. Ltd. is best conveyed by mentioning that in one type of unit cell alone production reaches almost a quarter of a million weekly.

All in all, the Widdis Diamond Dry Cells organisation represent a successful industry of which Australians may be proud. It is no weakling fostered by artificial conditions, but an organisation of strength brought about by years of hard work directed by research, backed up by skill and painstaking care.

For more than 8 years, Reg. Rose and Co., well known in both the radio and electrical world, have been N.S.W. agents for the famous Diamond line of radio batteries. Due to their efforts and the proved Diamond reputation for dependability, these batteries enjoy a remarkable sale.*

☞ Easily constructed—this little four-valver will delight the radio enthusiast who must use batteries for power.



A SET FOR THE COUNTRYMAN, Combining

Four Valves At Their Best

HERE is no doubt that the listener situated away in the country districts of Australia, where the nearest town means a long journey over a bush track, must at this period be feeling that his day has passed so far as his consideration by the radio engineer goes. It is not possible to hold back the great onward march of progress, and least of all, the progress of radio science, and the radio engineer has had perforce to devote most, if not all, of his time to the power-operated receiver. The battery-type receiver has not been neglected by the laboratories, even though it has had to take a back seat for the time being; on the contrary we find that special valves have been developed especially for the needs of the man who is obliged to rely on batteries for his sole source of power. It is mainly owing to the breathless advances in valves for A.C. operation that the Editors of radio constructional journals have had to turn their attention to catering for the majority, it being more so in Australia, where the great majority of radio listeners are clustered

By DON B. KNOCK
Technical Editor

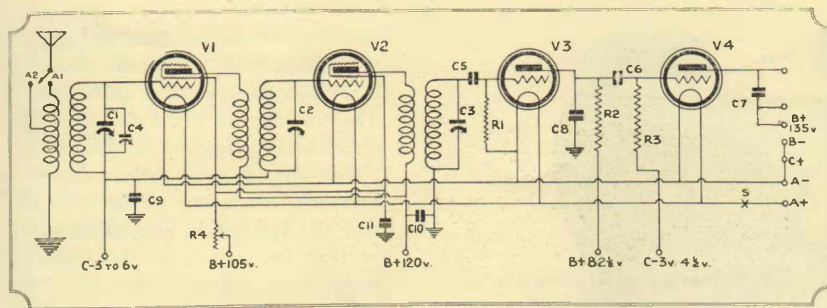
together in the cities, where alternating current in the home is readily available.

We have had ourselves a fair amount of experience of radio reception in the country, and we know how annoying it is to the country radio enthusiast to find technical articles which to him are of no interest, continually appearing in radio journals. A description of something which he can build and use with his battery power is invaluable to him, and he is constantly on the qui vive for something in the way of a modern improvement over the apparatus he has been used to handling. Our experience has been that the country radio listener is far more of an enthusiastic devotee to his apparatus than is the city man, for the reason that in the average country location a set has got to be good to do what is constantly required of it. When we say that the set has got to be "good" we mean that it must be economical to run, and consistent in

daylight results from any particular station required.

There is a lot of room for the battery set in Australia and, it seems, there always will be so long as we have thinly-populated areas of country—at least, when the time arrives for battery operated radio apparatus to be entirely non-existent in Australia, this generation will be long forgotten! It behoves us therefore to do all we can to cater for that section of the radio population who live their radio lives by means of the unassuming battery, and to this effect, *Radio Monthly* will endeavour to keep the ball rolling. It is our intention to deal each month with descriptive articles of suitable apparatus for battery operation, and with new and still newer valves for the purpose in the offing, much interesting material will be forthcoming.

As a commencement we offer for consumption by constructively inclined readers, a "humdinger" little battery receiver which is a modest arrangement of four valves simply applied but intelligently designed especially for use in



¶ Straightforward practice is symbolized in the circuit diagram of this battery set.

tropical climates. We have seen and used many battery sets in tropical parts of Australia and we have had the common experience of the gradual alteration of inductance values due to excessive humidity and varying temperatures. To stand the yearly strain of high temperatures, coils for use in receivers under such conditions must be designed with a view to counter-action of the elements. How many readers of this journal, living in tropical parts of Australia, have had the experience of suddenly discovering that the receiver cali-

bration has been upset, owing to contraction of the formers on which the coils were wound and the consequent slackening of the turns of wire? We would wager quite a few in number.

It is one thing to wind coils on cardboard formers or some other dubious dielectric and quite another to go about the job in a manner which is going to make those coils durable and unlikely to change characteristics. Coils of the latter class are fitted in this four valve battery receiver, and are the result of much experience in the design of apparatus for use in tropical climates by Mr. S. V. Colville, well-known Australian radio engineer.

Numerous requests from clients in New Guinea, the Solomon and Ocean Islands, and the north-west of Australia prompted the design of this particular receiver, which was handed to us for criticism and examination by Mr. Colville. So much were we taken with the originality of the design, and its extreme simplicity and splendid performance, that we have pleasure in passing it on to *Radio Monthly* country readers as something worth making in

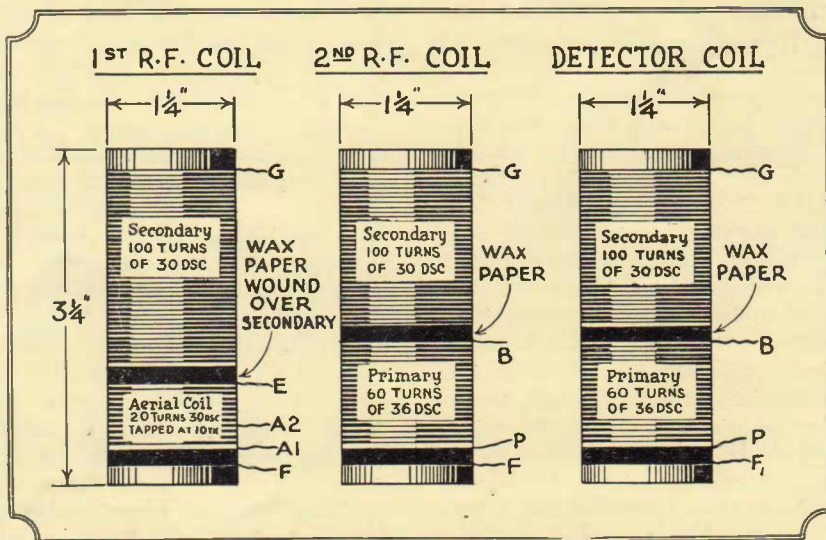
the battery receiver line. Apart from the contra-tropical qualities of the set, the extremely high R.F. gain, and the very low battery consumption are sufficient recommendation alone.

Although the set was in the first place designed primarily as a pure and simple headphone receiver (and we know there are many people who still stick to headphones) the one stage of resistance-coupled audio amplification is quite capable of reasonable loudspeaker volume from most Interstate A class stations. We know that in most country districts far better distant reception is obtained than we can manage to achieve here in Sydney, owing to some geographical reason (or else the presence of steel clad buildings has something to do with it) and when we found that this little battery-set proceeded in our indifferent location to haul in one after another, 2YA Wellington, N.Z., 7ZL, 5CL, 3AR, 4QG and 3LO, all at good speaker volume, we realized that here was a winner for the countryman!

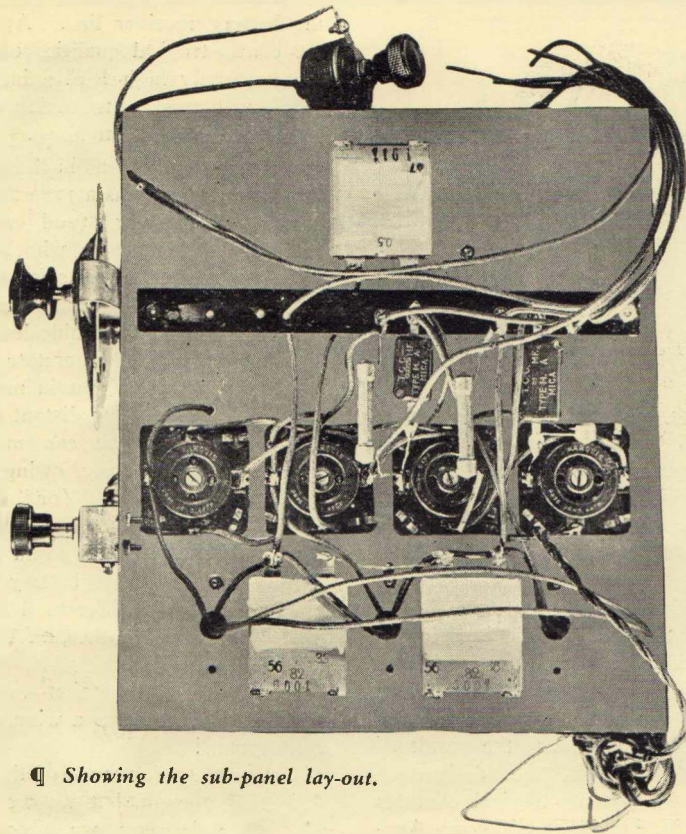
The good performance of the set was satisfying enough, but we were agreeably pleased when we proceeded to check the drain on the B batteries, and found that the total consumption was very slightly under 7 milliamperes. This means that with standard B batteries of medium capacity, the working life of those batteries is going to pan out at a good six months, with full usage day after day. As the filaments of the valves only drain .38 ampere from the A battery, a starter type dry cell may be used to run the filaments over a period of from three to four months. Quite a nice little consideration for the

LIST OF PARTS:

- 1 Aluminium chassis, 10 1/2 by 9 by 1 1/2 inches.
- 3 Coil Units as specified in text.
- 3 Coil screens with base mounting, 2 1/2 in. diameter.
- 4 UX "Marquis" valve sockets.
- 1 Stromberg Carlson 3-gang .00045 variable condenser unit, C1, 2, 3.
- 1 Radiokes vernier dial.
- 1 Radiokes 5-plate midget variable condenser, C4.
- 1 2meg. I.R.C. grid leak resistor, R1.
- 1 100,000 ohm I.R.C. resistor, R2.
- 1 500,000 ohm I.R.C. resistor, R3.
- 1 Pilot Resistograd, R4.
- 1 T.C.C. .00025 condenser, C5.
- 2 T.C.C. .01 condensers, C6, C7.
- 1 T.C.C. .0005 condenser, C8.
- 1 Chanex .5 mfd. 250 volt working condenser, C9.
- 2 Chanex .1 mfd. 250 volt working condensers, C10, C11.
- 1 On-off battery switch, "Arrow," S.
- Valves: V1, V2, Mullard PM16; V3, Mullard PM5; V4, Mullard PM5X.
- B Batteries: 3 45 volt medium duty. Eveready, Diamond, Volta.
- A Battery: 1 6 volt Clyde radio accumulator, or 1 Diamond 6 volt starter battery.
- C Battery: 2 4 1/2 volt Eveready, Diamond, Volta.
- Wiring and battery leads: Belden Fraywire. Screws, nuts, solder, etc.



¶ Details of the coil units.



☐ Showing the sub-panel lay-out.

man who has little or no facilities for charging an accumulator.

The reason that no audio transformer is used in the set is for the same reason that the coils are specially treated—to resist the action of hot, moist, atmospheres. We do not suggest that there are not on the market audio transformers which are practically impervious to moisture, but the possibility of any trouble by using inferior makes is forestalled by cutting the transformer right out and making the resistance capacity coupling fill the bill.

At this stage we will explain the treatment of the coils and leave the accompanying diagram of the coil details to be self-explanatory. When the coils are completed—that is wound to specifications and mounted on the chassis, they are immersed in a special solution of one-part Chatterton's Compound, and three parts of paraffin wax. This solution must of course be molten and consequently at boiling point. The procedure in "doping" the coils is to simply turn the chassis upside down and dip the coils one after another into the solution, just far enough to immerse the windings. Shake the residue from the coils and leave them to set. The result will be a thoroughly impregnated set of moisture-resisting inductances, as this compound is non-hygroscopic. Some technicians will

hold up their hands in simulated horror at so treating coils, with the suggestion that it will increase the dielectric properties, reduce insulation efficiency, and increase the self-capacity of the coils, but the fact is that in actual practice it is an entirely negligible factor!

The details of the set are so simple that the circuit diagram, coil specifications and the illustrations tell the story volubly. There are two stages of screen grid R.F. amplification, both using Mullard PM 16 valves, a grid leak detector, Mullard PM5, and the single audio amplifier Mullard PM5X. A negative grid bias of from 3 to 6 volts is provided on the two R.F. valves, bias being obtained throughout from a 6 volt C battery. Condenser C9, .5 mfd., shunts the R.F. grid bias to earth. The resistor R4 is a Pilot Resistograd, which while providing a variable screen grid potential to the two R.F. stages, also introduces a degree of regeneration as required. This feature will be found a useful asset. This method of allowing a certain amount of regeneration was preferred via the R.F. stages in order that the inductance value in the detector grid circuit should not be upset by the introduction of a reaction winding as a three-condenser ganged tuning unit is used. Each coil unit has its primary winding (aerial in the first R.F. stage)

wound over the low potential end of the secondary, with a layer of waxed paper first wrapped around the secondary. The number of turns for each unit is given in the diagram of the coils.

The chassis used makes the set very compact, measuring $10\frac{1}{2}$ by 9 by $1\frac{3}{4}$ ins., and the lay-out is conveniently simple, as may be seen from the illustrations. Remember that with the D.C. type of screen grid valve, such as the PM16's used, that the plate connection is the terminal on top of the valve, and that the plate pin of the UX socket becomes the screen grid connection. The compensator condenser, C4, is mounted on the left of the tuning dial, and the Resistograd, R4, on the right. This is shown on flex leads in the illustration for the reason that the original set was fitted into a cabinet.

We have nothing more to say about this set, except to repeat that we are sure if it is made as an exact replica of the original, it is going to please those in the country who may put the time into its construction. If you buy a set of ready made junk store coils or a cheap foreign ganged condenser unit of doubtful capacity matching, this little article will have been in vain, but somehow in these days of wise buying, we don't think you will. The parts specified as in the original are the parts to use and they are obtainable from the reliable advertisers whose names may be seen in other pages of *Radio Monthly*.

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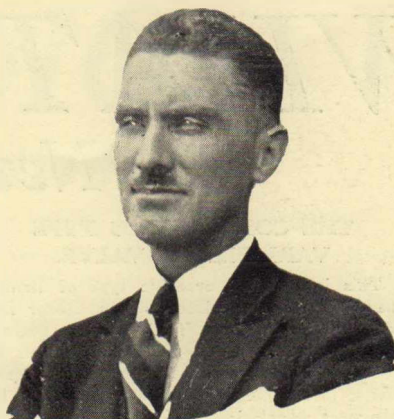


BATTERIES

Full Stocks Always Available

Introducing
 The Associate
 TECHNICAL EDITOR
 of
 "RADIO MONTHLY"

J. B. MARTIN



Well known to the Sydney Radio trade as a highly skilled radio engineer, automobile engineer, and genial personality, Mr. J. B. Martin's association with *Radio Monthly* will be equally as welcome to technically inclined readers as Mr. Martin is to the Editors. His career has taken him through the most rigid phases of mechanical and electrical engineering, and those who have been fortunate enough to visit his laboratory need no further introduction to the man and his work. Mr. Martin's work as an engineer, radio or otherwise, is hallmarked with the stamp: "If a thing is worth doing, 'tis worth doing well." Mr. Martin received intensive training during the war when he left Australia in 1914 with the second Expeditionary force as a motor transport driver. In 1916 he was transferred along with 200 other Australians to the Royal Flying Corps, in which service he was granted a commission. His training as an aero engineer in the R.F.C. stood him in good stead when he took up flying duties as pilot.

Ill health compelled him to revert to ground duty, and he was placed in charge of a technical and wireless section at No. 10 depot, R.A.F., Wormwood Scrubs airship station. Upon his return to Australia he entered the motor trade in Sydney, devoting his spare time to the further study of Radio.

During the past few years he has been closely associated with the Technical Editor of this journal, and has operated extensively in the design of many types of radio apparatus described in technical articles. As Mr. Martin has for some years been a member of the sales staff of Larke, Hoskins Ltd., he has had good opportunity to turn his radio experience to account, and devoted much work to the design of suitable radio receivers for use in automobiles. His latest work in that direction is an achievement in the fitting of

an Austin Seven car with an almost invisible but powerful radio receiver, which may be used without ignition interference while in motion. Power amplifying systems are also another of Mr. Martin's specialties, and Superheterodynes are receiving his worthy attention. Readers of *Radio Monthly* may look forward to many interesting constructional articles written around the comprehensive work of this experienced engineer.

BACK FROM AMERICA

Returning last month from the United States and Canada, Mr. A. R. Persson, manager Hecht & Co., Sydney, announces the early opening of a factory in Sydney for the manufacture of dynamic speakers. These will be made under licence of a leading American concern, and attention is to be directed mainly towards the 8 $\frac{1}{2}$ in. cone model. While abroad, Mr. Persson, who made the trip purely on radio matters, visited Chicago, Pittsburg, New York, Detroit, Springfield (Ohio) and San Francisco, to investigate developments. As a result, Hecht & Co. will shortly be distributing electrolytic condensers made by an Australian company now in process of formation.

Radio Monthly
 Short-wave
 Club

As it is the intention of *Radio Monthly* to pay particular attention to the needs of the short wave listener, we are commencing, right from this first issue, a feature which will help to get Australian short wave listeners acquainted with each other. If you are interested in short waves from any angle, receivers, transmitters, converters, station lists, fault finding, logging, circuits, calibration, coil winding or anything else, you can become a member of *Radio Monthly Short Wave Club*, without any obligation. All you have to do is to fill in and post the attached coupon. Every month, as many names and addresses of members as possible will be published, so that short wave enthusiasts can correspond with one another, and letters of general interest on short wave work will find space in this department.


Fill in the coupon and mail at once.

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 RADIO MONTHLY,
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Please enrol me as a member of
 RADIO MONTHLY SHORT WAVE
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THE NEW

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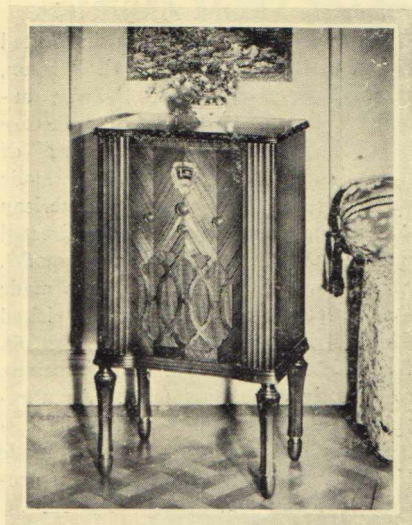
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News and Reviews of

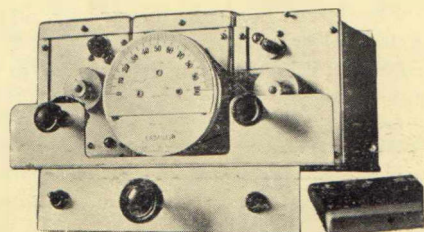


RADIOLA MODEL 35E RECEIVER.

Outstanding among the popular range of three-valve AC operated receivers now on the market is the Radiola 35E. Backed by the experience and reputation of Australia's national wireless organisation, this three-valve model presents a value for money appeal which is irresistible. Radotron valves are employed throughout the circuit, consisting of a stage of screen grid RF amplification, screen grid power detection and Pentode output. As with all modern Radiola receivers, a variable tone control is provided, illuminated wavelength indicator, and dynamic speaker. The tonal quality of the 35E is particularly fine, and with the polished ducoc'd veneered cabinet the complete instrument as a modern radio receiver for perfection in local reception leaves nothing to be desired. The 35E is a product of Amalgamated Wireless (Australasia) Ltd.

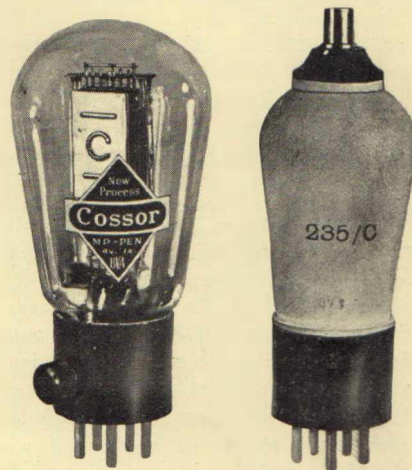
ESSANAY TUNING UNIT.

This production should find ready favour with the designer and home constructor. It consists of a sturdy aluminium chassis carrying three screened compartments with a .00045 mfd. variable condenser in each and provision for RF transformer and valve socket mounting. The three tuning condensers are ganged by means of a bronze strip running over pulleys to a central dial indicator, operated by the knob on the right. The knob on the left operates a volume control potentiometer. Underneath the chassis sub-panel is an extension panel carrying three extra controls, with a potentiometer in the centre and two switches, one on either side. Such a unit represents half the battle in the making of the average set with two or three tuned RF stages. Removable lids to each compartment enables ready access to the condensers, coils, etc. These Essanay units are available for distribution from Wm. J. McLellan, Bradbury House, 55 York Street, Sydney.



THE COSSOR UY235 TYPE VARIABLE MU VALVE.

This is the first available type of British made 235 valve, produced by the Cossor factory under the now famous New Process range of valves. The sample reaches us in the form of one of the new metallised types, which fact alone is sufficient reason for its imminent popularity. Owing to the coating of sprayed metal encasing the valve envelope a special insulated cap is provided to avoid any possibility of contact with the metal surface. The average characteristics of the Cossor 235 under test conditions are:—Heater voltage, 2.5 volts; heater amps, 1.75 volts; plate voltage, 200 volts; screen voltage, 90 volts; grid voltage, 0; average plate current, 8.8 milliamperes; average mutual conductance, 1.5 ma/volt (0 to -1 Vg.).

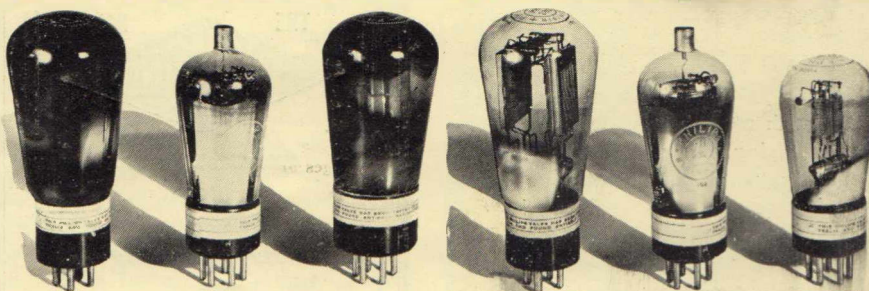


THE COSSOR MS/PEN INDIRECTLY HEATED PENTODE.

This very successful valve is now available in the metallised type, and in exhaustive tests by many of Australia's most prominent radio experts it has shown many remarkable capabilities.

In a letter to Mr. Maclurcan, Rev. R. B. Dransfield, advanced radio mathematician, says:

"Having concluded extensive tests with the MS/PEN in both the radio and detector sockets of a receiver with Loftin-White audio coupling, I beg to make the following observations. Owing to the comparatively low impedance there was no trouble in getting it to work into a standard RF transformer designed for SG valves. The selectivity was very



PHILIPS P.H. SERIES.

With the introduction of the Philips PH Series, the Radio World will make acquaintance with one of the most important series of entirely new A.C. Valves yet manufactured for the Australian market.

The PH Series embraces both the 2.5 and 5 volt range, and the new valves possess outstanding features which stamp them as radically modern and up-to-date.

As will be seen from our illustrations, this latest range of Philips tubes is of remarkably sturdy construction, and obviously well up to

the typically Philips standard of perfection,

They are eminently suitable for all American circuits, and will also be found of tremendous value in building up 2.5 volt home assembled receivers.

The PH235 is a variable Mu. type valve embodying the very latest developments in this new field of valve manufacture, and it is described by the manufacturers as a "Selectode."

The characteristics of the PH series are as follows:—

Characteristics.	PH227.	PH245.	PH224.	PH235.	PH247.	PH280.
Use	Gen. Pur.	Power Amp.	Det. Amp.	V. Mu.	Penthode.	F.W. Rect.
Fil. Voltage	2.5	2.5	2.5	2.5	2.5	5.0
Fil. Current	1.75	1.5	1.75	1.75	1.5	2.0
Plate Voltage	180	250	180	180	250	—
Screen Voltage	—	—	75	75	250	—
Plate Current (M.A.)	8.8	3.2	4	9	3.2	A.C. volts per pl. 350v.
Screen Current (M.A.)	—	—	—	(A.)	7.5	—
Grid Bias (volts)	—12	—50	—1.5	—1.5	—16.5	—
Impedance (ohms)	9000	1750	400,000	200,000	38,000	D.C. output current.
Mutual Conductance	1	2	1	1.1	2.5	125 M.A.
Amplification Factor	9	3.5	400	—	—	—

(A) Not over 1/3 plate current.

IN RADIO

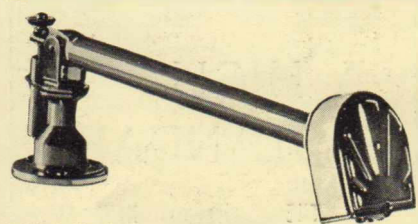
The Latest Productions

much improved. Owing to the presence of the extra Pentode grid the sensitivity and volume attained were easily equal to a 50% increase. As a detector, either with bias or grid leak, it is capable of handling almost any signal, and is twice as hard to overload as any ordinary SG detector. The valve has outstanding qualities when worked in a short wave set, giving absolute freedom from noise, and when used as a short wave detector it will oscillate from 5 to 100 metres, no matter what length or aerial or coupling is used.

The Cossor metallised screen grid valves possess the following advantages over the plain exposed glass envelope valves:—

- (a) Coupling between anode and nearby components eliminated, giving stable working and allowing maximum stage gain to be obtained.
- (b) The metallised coating reduces inter-electrode capacity to about $\frac{1}{2}$ to $\frac{2}{3}$ of the usual value, thus permitting greater stage gain.
- (c) Selectivity is increasing by preventing unwanted signals from short-circuiting the tuned circuits through capacity coupling.
- (d) Reduced possibility of AC hum in the case of Mains types.

The Cossor metallised valves already available here include the following types:—MSG/HA, MSG/LA, 41 M.H.L., and MS/PEN.



THE "WHITING" GRAMO-PICK-UP

Distributed by Noyes Bros. (Sydney) Ltd., the Whiting Gramophone Pickup and Tone Arm combination represents the latest in development in this class of component. On test we found that the maker's claims were fully justified, the reproduction obtained from the unit re-creating every instrument with true fidelity.

The Tone Arm is a real engineering production, with a compensating spring and ball-bearing swivel, minimising record wear to an extent hitherto not present in the average pick-up-tone arm combination. Infinite pressure regulation on the record is effected with a variation from zero to 4 ozs.

The price of £3/10/- places this Whiting Gramo-Pick-up Tone Arm within the reach of those who desire a quality unit of this nature at a modest price.

The famous name of Ferranti is well before the trade and public, Messrs. Noyes Bros. (Sydney) Ltd. having taken over the distribution of these components. The Ferranti range includes all types of audio transformers, radio meters, resistances and condensers which designing radio engineers cannot overlook.

NEW MULLARD VALVES.

Of great interest to the user of battery operated sets is the new Mullard PMIDG valve. As there is an increasing demand from country listeners for a modern battery operated Superheterodyne receiver, this new valve will give a different aspect to the Superhet for battery use by reason of unique features. The PMIDG is a four electrode valve for use in Superheterodynes as a combined oscillator and first detector.

Characteristics are:—Filament voltage, 2 volts; filament current, .1 amp.; plate voltage, 80 volts; impedance, 58,000 ohms; amplification factor, 4.5.

To avoid the necessity for an external inner grid connection, this is provided for by mounting the valve on a UY base with connection to the cathode pin.

The Mullard PM24D Pentone Valve, as illustrated, is a DC Pentode of 25 watts dissipation, particularly suitable for speech amplifiers and theatre amplifying equipment. The undistorted output is rated at 8,200 milliwatts.

Filament voltage, 4 volts; filament current, 2 amps.; plate voltage, 500 volts maximum; impedance, 8000 ohms; slope, 4.

Negative grid bias, 35 volts at 50 milliamperes. Some idea of the size of the PM24D may be realised by the comparative size of the PM24 shown alongside.

The 904V is a Mullard AC valve of the indirectly heated type, and is designed for use as a power grid detector. It possesses the extremely high amplification factor of 85. Included in its many applications are those of amplification of Photo-electric cell stages and early stages of amplification in power operated amplifiers.

Heater volts, 4 volts; impedance, 17,000 ohms; slope, 5.

The new Mullard Photo-electric cell is primarily designed for use with sound-on-film



projection apparatus, and is specially suitable for colour sound tracks. The emission is rated at 18 micro-amperes per lumen. This photo-cell can be calibrated for light intensities and colours and may be applied to photometric measurements. When tested with Kodak Sonochrome Positive film the loss is no greater than 25% with any tint.

Other uses for the Mullard P.E. cell are highly successful applications such as:—Aerodrome lighting operated from the air for aeroplanes landing at night; fire alarms in ships for detecting smoke in air continuously drawn from cabins; improved time-keeping of electric clocks by eliminating mechanical contacts made by a pendulum.

Mullard metallised valves are supplied in many of the original types with a sprayed metal coating on the outside of the bulb. In the case of a metal coated screen grid valve the immediate advantage is that the capacity of the electrode system as a whole to earth and also the inter-electrode capacities of each type are rendered more uniform because the lines of force are terminated at the internal screen and the metallic coating.

The Mullard S4VB 4 volt AC screen grid valve of the metallised type is finding great favour among modern set designers.

RENRADE RESISTORS.

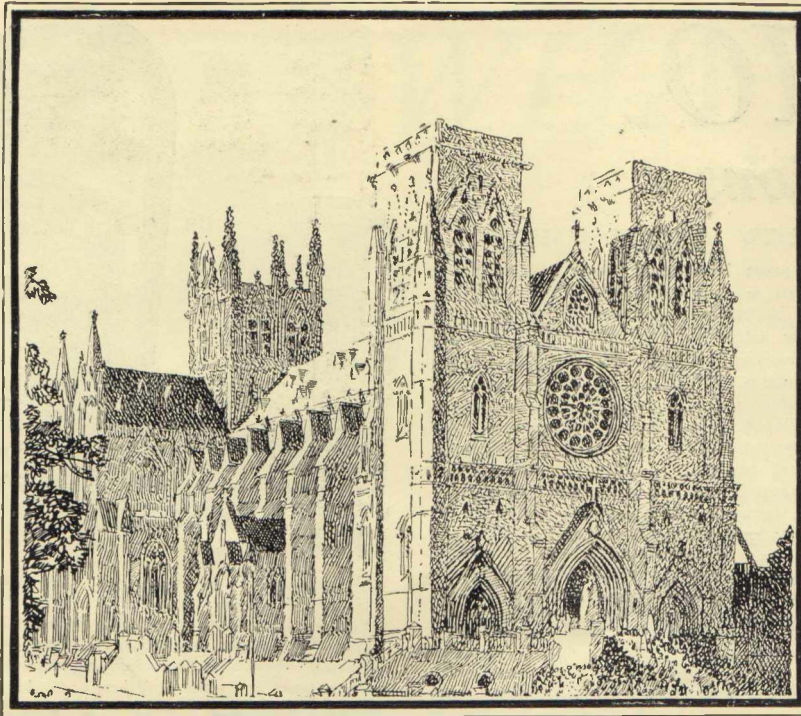
Five different types of New Renrade resistors have been submitted to us for test. A wide range of resistance is available in $\frac{1}{2}$ watt, 1 watt, 2 watt and 5 watt types, with outstanding improvements in the following features:—18 gauge tinned copper pigtails, 2 inches long. Special positive contacts, ensuring noiseless operation. Constant resistance under load. A permissible 50% overload without breakdown.

Manufactured in two classes, with tolerances of 5% and 10% plus or minus, these various types are now obtainable. B₂ ($\frac{1}{2}$ watt) 10,000 ohms to 10 megohms; A₃ ($\frac{1}{2}$ watt) 10,000 ohms to 10 megohms; W₁ (1 watt) 1,000 ohms to 500,000 ohms; W₂ (2 watt) 1,000 ohms to 100,000 ohms; W₅ (5 watt) 1,000 ohms to 100,000 ohms.

The extensive use of Renrade products by Australia's most important manufacturers is well catered for in these new lines. Our laboratory tests amply endorse the claims of accuracy and constancy made by the manu-

facturer—R. W. Reynolds Ltd., 200 Chalmers Street, Sydney.





St. Mary's Cathedral, Sydney, from where services will be broadcast from the new station 2SM, shortly to be established by the Catholic Broadcasting Coy. Ltd. On week days the station will present programmes of general interest. The equipment is now being constructed at the A.W.A. works at Ashfield, N.S.W.

Behind the Scenes

(Continued from page 19.)

that is if they do not want to court a storm of abuse through the post and unless they know a lot about a subject. Even so, it is better not to start a controversy, because no one likes to be made to feel ignorant and badly informed and you would be surprised how unpleasant people can be through the post if you hurt their feelings.

But fortunately such letters are few, and by way of contrast, thousands come pouring in weekly bespeaking nothing but kindness, unselfishness, admiration and sweetness.

The world is a dear old place after all and I would like people who think this country is "going to the dogs," to read some of my regular mail. Within the past five days I have personally received 1,503 letters and of these not ONE contains a word of criticism, complaint or unpleasantness.

What can be wrong with a country when it contains women generous enough to sit down and write four and five pages of praise and thanks to one of their own set? What can be wrong with a Country when it contains men good enough to spare a moment writing to a Radio Aunt, in an endeavour to

improve the character of their Kiddies? And lastly, what can be wrong with the younger generation itself, when I assure you that since last June, thousands of children have been essaying the most difficult tasks each week at my request—with no better reward than a call from my humble self at the close of it—to say "Well done—now try it again."

This may cause the cynical to smile but I consider it no small feat to make a child cease "to bite its nails" or give cheek to its parents, etc., when after all, one is merely a voice to them.

It is yet another instance of the power of the mind through radio, and it is truly wonderful to consider how many Radio Aunts and Uncles in this country and throughout the world, are using their influence in a singular way to train the young folk into better and less selfish citizens.

Getting away from the serious side for a moment, a tremendous amount of humor inevitably creeps into broadcasting—humor which the discerning listener sometimes shares! It is no uncommon thing for a nervous announcer (new at the job) to become so confused with the switches that he leaves the "announce switch" down when a record is playing, and unwittingly informs the

world, that he is quite sure no one would ever buy the stupid article he has just been advertising and booming to the skies! Then there is the careless man who asks you to call his girl-friend's birthday, quite forgetting his wife is that day visiting friends with a wireless set who are particular admirers of yours! The double sided record which, when read in titles, one after another makes a most unfortunate contre 'temps' and the inevitable howlers and anachronisms which always slip out before you have time to correct yourself!

They all help to give smiles both inside and outside the studio and if ever a first prize is offered for a Radio howler, I insist upon entering my own version of the results of the English Derby this year, which were printed so small and indistinctly in the Daily paper that, in my nervousness, I informed a staggered world:—"The King was present as usual, and "THE WINNER CAME FIRST!"

A storm of anxious enquiries a few minutes later over the 'phone reminded me that it might be a good idea to give the name of the horses, but the palm finally went to the anonymous listener who thus addressed me by post:—"Dear Miss Reeve—Am I then to understand that the second horse came second?!"

A HIGH STANDARD



BATTERIES

THE painstaking care with which Diamond Batteries are manufactured is responsible for the setting of a high standard in battery production. This high standard is essential in Australia, where great telephonic distances are operative.

Diamond Batteries are used by the P.M.G.'s Department.

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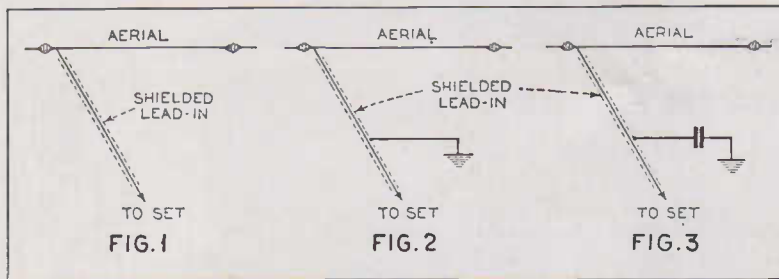
The Radio University

A Training Ground for Beginners and Home Set Constructors

ARE YOU TROUBLED WITH RADIO-INDUCTIVE INTERFERENCE IN YOUR SET?

Many people who suffer continually from "man-made static" in the form of interference caused by the aerial picking up unwanted noise from overhead power lines and other sources, should take

advantage of the special braided-screen aerial wire now obtainable from most radio dealers. In most cases it will be sufficient to use this wire for the aerial lead-in alone as shown in the diagrams, but where short wave reception suffers badly from such interference, the whole receiving aerial can be constructed of this wire, and should (preferably be erected in the form of a vertical aerial about 50 feet long.

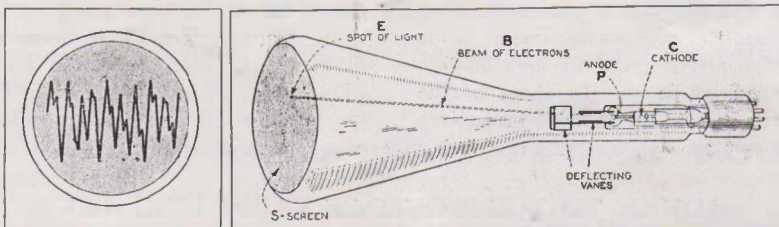


THE CATHODE RAY TUBE

With the rapid advance of Television abroad, readers of radio journals will see constant reference to the Cathode Ray Oscillograph. The principle and the use are worth an explanation to the beginner. The cathode ray oscillograph is a special type of vacuum tube in which a narrow beam of electrons is made to describe certain varying patterns. The source of electronic flow is, similarly to any radio valve, a heated filament. The plate is a cylinder which is charged to a positive voltage of suitable value. The plate attracts the electrons from the filament, or cathode. Most of the electrons fall

into the plate, but some of them travel at such a high speed that they pass through it like a bullet from a gun. After getting through they pass between two sets of parallel plates, these plates being at right angles to each other. If voltages are impressed between these plates the electrons are deflected in proportion to the pressure of the voltage. Finally the electrons strike on a fluorescent screen on the end of the tube, which is flattened, and wherever they strike they cause a spot of light.

The cathode ray oscillograph was produced in the first place to study wave form, comparing frequencies, measuring voltages, and other uses, but its most important use is in Television.



PRINCIPAL FORMULÆ

The principal formulas that a radio student should learn are: Ohms Law for calculating Volts, Amperes, or Ohms from any two of these three constants; the rule for finding the power

from the volts and amperes or from the resistance and current; formulas for finding the total resistance of resistances in parallel or in series; for finding capacity of condensers in parallel or in series; frequency and wave-

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length relations (kilocycles and metres); impedance, or A.C. circuits having capacity, inductance and resistance; wave-length for resonance in cir-

cuit with given values of inductance and capacity; frequency for resonance in circuit with given values of inductance and capacity.

WHAT HAPPENS INSIDE YOUR VALVES?

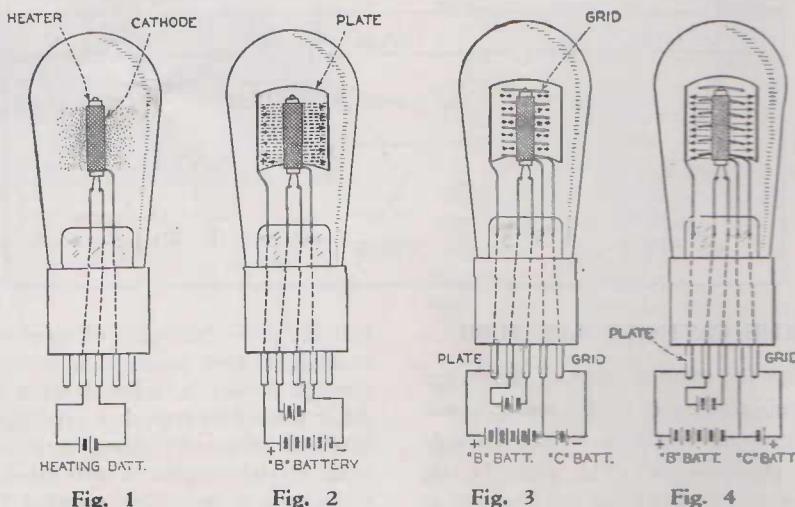
A PICTURISED LESSON

Figure 1.—When the cathode of a valve is heated to a high enough temperature, electrons are discharged from the surface or boiled off as steam is from boiling water.

Figure 2.—When the cathode is heated and the plate is positively charged, a stream of electrons is flowing from the cathode to plate.

Figure 3.—If the grid has a negative charge it will repel any electrons coming near it and send some or even all back to the cathode, depending on the amount of the negative grid charge.

Figure 4.—If the grid is positively charged the number of electrons from the cathode reaching the plate will be greatly increased, because the grid then helps the plate to attract electrons.



Often one hears a comment passed about the UY247 type of Pentode valve to the effect that "evidently the new Pentodes are not too good, judging by the blue glow present to a great degree in some."

This is a great misunderstanding, according to a valve manufacturer who wishes to remove the misconception about the gas content in the Pentode valve. This phenomenon is not gas, but is a cathode ray bombardment inside the valve and is proof of high quality. The condition is brought about by the electrons passing through the grid above or below the plate, and not being

stopped by the plate but receiving an acceleration past the plate and striking the glass. The magnesium deposits on the glass are made to fluoresce with a blue or purplish colour. This fluorescence may only be seen in gas-free valves, and the presence of the phenomenon is definite proof of a gas-free valve. It appears only on the surface of the glass and not throughout the entire valve. A real gas glow in a valve is always in evidence between the filament and plate and often fills the whole valve. Where fluorescence is not present in a Pentode it is an indication of poor quality, not good quality.

PENTODE PECULIARITIES

ADVICE TO THE WOULD-BE RADIO ENGINEER

Remember that no school can MAKE an engineer—it can only supply fundamental principles and general methods of action as weapons to attack problems. The engineer works constantly with things and men as applied to the

pressing immediate needs of mankind. If you wish to be a successful Radio Engineer, learn all the mathematics you can, examine all the Radio equipment you can, and operate an experimental station of your own, but do the latter studiously.

A Tribute to "CHANEX"



"Chanex" paper-di-electric transmission condensers as prescribed by the Australian Government for their "A" class broadcasting stations.

We quote all types transmission condensers.

Factory Representatives:

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The VOICE of the NORTH-WEST

(Continued from page 34)

valves heating up. A double choke and resistor system of modulation at a high level is at present in use at 2MO but a change to low level is contemplated. The radiating system of the station is a single wire cage aerial suspended between wooden masts 75 and 65 feet high with a multi-wire counterpoise system immediately underneath. From an analysis of reports received after eight months of running it appears that radiation is strongest eastwards towards the coast, especially during daylight hours, and New Zealand listeners report remarkable signal strength for the power of the station.

The usual skip area of distortion and bad fading which most stations suffer from has been checked at 2MO by field observation and is indicated to be a band about 15 miles wide in some directions and 50 or 60 miles distant. This is only noticeable when darkness falls. 2MO Gunnedah is remarkable for its consistent daylight range, and in connection with this feature, a prize was given to the listener sending in the furthest accurate daylight report with the competition running over a week. 278 miles won the prize, but after the competition was concluded further letters of daylight reception arrived from the heart of the City of Melbourne and also Northern Queensland towns! The winner was thus eclipsed by more than three times his distance. In conjunction with his broadcasting service Mr. Oliver maintains a radio supply and service business, which is always at the disposal of his increasing host of listeners.

Short Wave Condensers De Luxe.

Most short wave enthusiasts will remember the super vernier Gecophone variable condensers as fitted to the original "All Empire" receiver. Mr. Syd. Colville, of Colville Moore Wireless Supplies, 4 Rowe Street, Sydney, has secured a stock of these excellent products for distribution.

At the low price of 15/- complete with vernier motion and dial, they are a good investment for the short wave fan.

The A.C. All-Empire Set

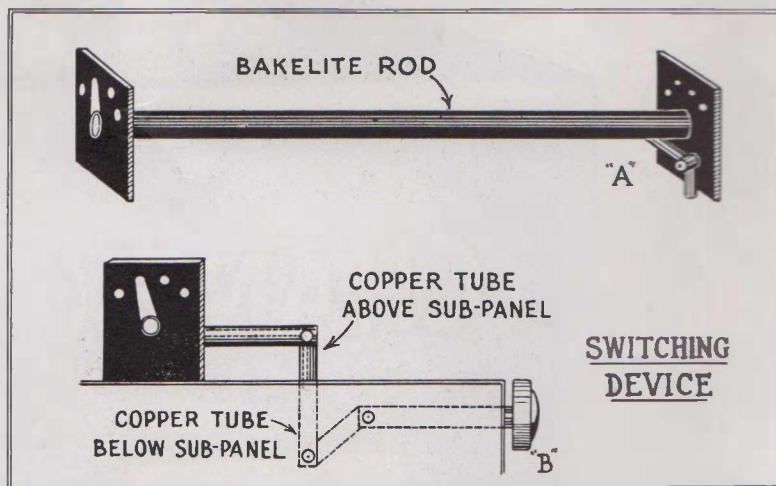
(Continued from page 28)

It simply means that he will always have to be sure that the two switches are in the correct position for whatever range is being covered.

For the sake of the mechanically inclined we are giving a detail sketch which shows how the two switches are operated as one from the panel. All there is to the job is a little work with a file, drills, and some scrap brass and copper tubing. The bushings for the switches themselves, and the switch

ting runs from 30 metres to 68 metres. That includes a host of short wave telephony transmissions, including VK2ME, VK3ME, 7LO Nairobi, W2XAF New York, the amateur 40 metre band, W8XAL Ohio, Radio Saigon, Soerabaja, ZL2XX New Zealand, and others.

The last position, No. 1, covers approximately from 15 metres to 30 metres and that includes many overseas stations, including G5SW England,



Controlled from the panel this switching arrangement is not difficult to construct, consisting mostly of copper tubing and bakelite.

arms and contact studs were picked up by hunting around junk dealers' stores; and our Associate Technical Editor, Mr. Martin, with his unique engineering skill, made a glittering, smooth running mechanism out of the medley.

Position 4 of the switches puts the receiver on normal broadcast reception. This, as will be seen from the diagrams, excludes the short wave sections altogether and includes the screened coils for broadcast work. When the switches are dropped to position No. 3, the whole of the short wave unit is switched into circuit.

With the .00035 mfd. variable condensers, with which all tuning is done, the range covered at this third position is from 65 metres up to approximately 180 metres. This includes the amateur 175 metre band, the amateur 80 metre band, and the frequency often used by the powerful Russian station at Khabarovsk in Siberia.

Position No. 2 takes in a lot of interesting things. The range at this set-

Radio Paris, Radio Rome, and Moscow.

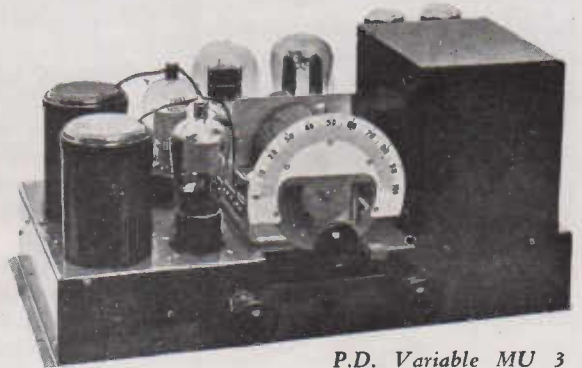
It will be noted that the aerial coils of the RF, BC and SW units are connected in series with each other. The polarity of connections does not matter much here, but in the detector circuit great care must be taken with the series reaction coils. L7 and L8 are shown with the polarities connected as indicated, and there must be no mistake about this or oscillation will not be possible.

Connected across the detector BC reaction coil is a small switch to short out that coil if required. This switch is mounted on the panel of the receiver. It need not be insulated from the metal if it is a switch of the "Arrow" type, which is insulated in itself. This shorting switch saves a lot of playing about with the number of turns on reaction coils.

If when the receiver is switched on to the short wave range oscillation is "cranky," the shorting out of the broadcast reaction coil will stabilise the con-

No finer Sets are Made!

THE full range of Prima Donna Broadcast Receivers covers a set for every radio need. Combining advanced features of design and construction, they constitute the practical adaptation of the latest circuits to the needs of the broadcast listener. Skilled engineers have now made generally possible the use of super-sensitive circuits formerly used only by highly-trained technicians. The result is an exclusive range of ultra modern receivers combining extraordinary distance-getting qualities with simplified control, great volume and wonderful tone.

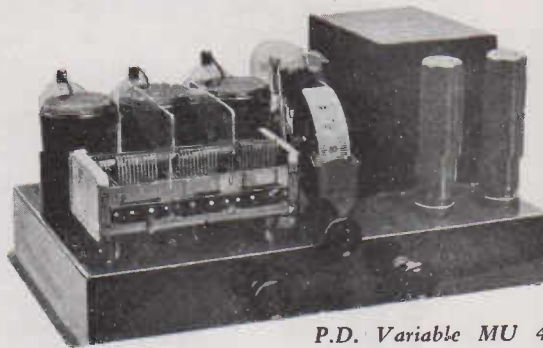


P.D. Variable MU 3

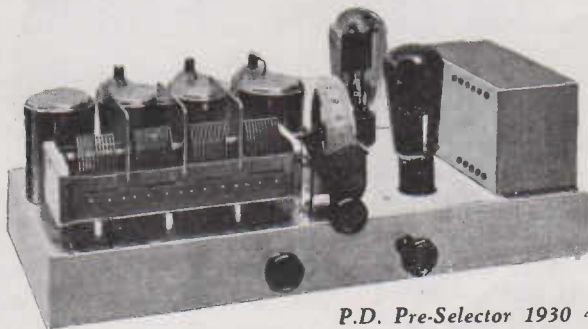
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P.D. Variable MU 4



P.D. Pre-Selector 1930 4

DEALERS—You have long waited to handle a line like Prima Donna, satisfying at once your own critical demands for outstanding performance and the public demand for something different and better. Here is your opportunity. A few territories are open. We will supply promptly details in answer to your requirements.

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trol of oscillation. Remember, though, to "unshort" the reaction coil when normal broadcast reception is wanted, particularly on distant stations.

The two main tuning condensers have a maximum capacity of .00035 mfd. and are the AWA double spaced types. These are marked C1 and C2. C1 is simply controlled from the panel by a plain knob, the operation of which one quickly appreciates. C2, which is the condenser tuning the detector circuit, is operated by the main tuning dial which in the original receiver is one of the new Radiokes broad vision dials.

We have been asked why the RF and detector circuits were not ganged. To that we answer that we believe in giving the reader something he can use *with a minimum of trouble and fullest efficiency.*

To gang the circuits of such a receiver as this would require more than a lot of individual experimentation with coils, condensers, and physical lay-out, and even then it is very doubtful whether the maximum results would be possible over the shorter wave ranges.

As the receiver stands it represents something out of the ordinary to-day in broadcast reception alone. This for

move around in. From a commercial aspect it can be made very considerably smaller, even to the point of compactness, but it will in such a case have to be done with careful thought for the short wave feature of the set.

As the RF stage uses a variable MU valve, full advantage is taken of this to provide a volume control by means of the variable bias, and the consequent selective properties of the valve. This is invaluable on broadcast reception, but of no use whatsoever on short wave work. For that reason the operator of the set must always remember to keep the 5000 ohm variable bias potentiometer R2 full "on" for short wave signals, otherwise the RF amplifier will only be doing part of its work.

The 150 ohm resistor R1 is a limiting bias resistor to ensure that the valve is never without *some* grid bias. One end of R2 is connected straight to the aerial terminal of the set, which terminal is in series with a short flex lead running to either A1 or A2. The RF amplifier is shunt fed, and capacity coupled to the detector instead of the usual tuned plate system. This method makes for greater ease of control of the screen grid detector and is strongly

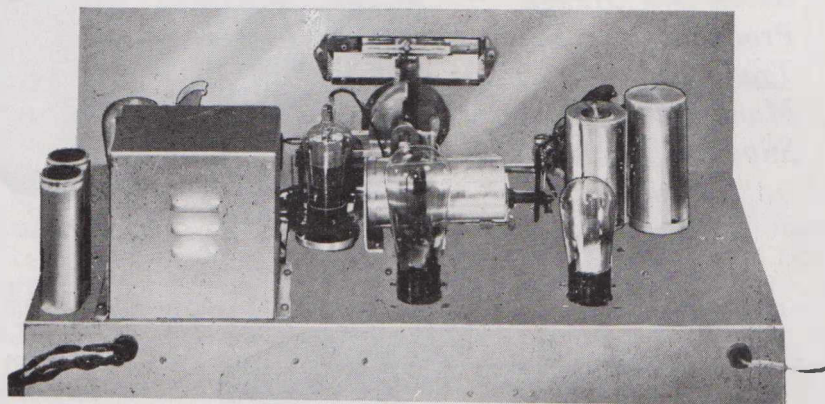


Photo. by Cincraft Studios.

Another view showing the layout of the A.C. All-Empire Set.

the reason that it has an independently adjusted tuned RF amplifier followed by a regenerative detector, an arrangement at which many will hold up their hands in pretended horror as being an ancient idea.

The results obtained more than justify the application and we have yet to meet up with a modern broadcast receiver which will give us more satisfaction than the AC ALL EMPIRE, intelligently adjusted.

The reader can see from the dimensions of the set that it has been made with the idea of giving him space to

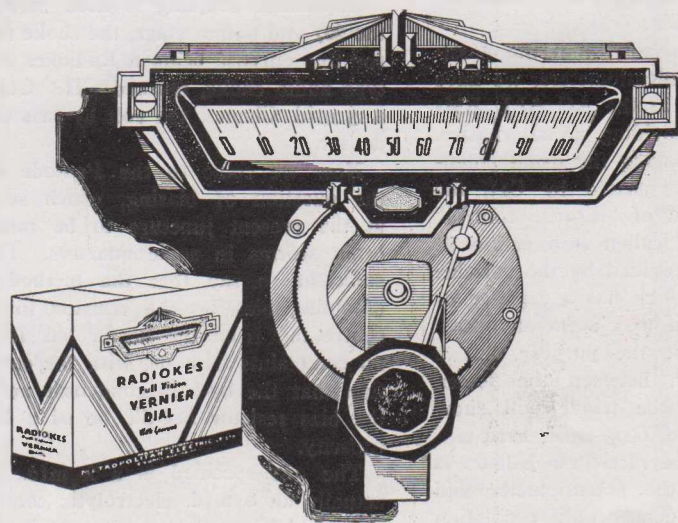
recommended for all short wave receivers using a tuned RF stage, whether battery operated or power.

The plate voltage is taken through an RF choke (RFC1) and filter (C10) direct to the plate of the RF valve, which is also connected through a .0001 mfd. TCC mica moulded condenser C4 to the switch arm of SW2 and thus to the grid circuit of the detector.

The detector circuit and the method of controlling regeneration call for a little attention to a unique feature. Most

(Continued on page 50)

MODERN SETS
 use this **NEW**
FULL VISION DIAL
 for *by* **RADIOKES**
PRECISION TUNING



The best and most modern Radio sets are fitted with the new Radiokes Full Vision Dial. The handsome oxydised and lacquered escutcheon plate adds beauty to your set. The gear driven vernier and knife edge pointer make razor sharp tuning a smooth reality.

Two lamps which indirectly light the dial, throw a soft glow into the room, sufficient for all ordinary purposes with the main room light out.

The dial is mounted equally simply with either straight or right angle layout, when a special spindle and bevelled gears are supplied to take the place of the drum-dial drive.

Whether you build your own set, or buy it ready-made from your dealer, be certain that it is fitted with the new Radiokes Full Vision Vernier Dial.

Write for the new reduced price list to any of the N.S.W. Distributors or your radio dealer.

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AND ALL GOOD RADIO DEALERS

The A.C. All-Empire Set

(Continued from page 48)

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of the receivers we have studied from an overseas source using a screen grid valve as a regenerative detector rely solely on a variation of screen grid voltage to control oscillation, by means of a potentiometer.

This method is quite sound in theory, but in practice we find that it misbehaves very badly unless the potentiometer used for this critical work is entirely above reproach. By this we mean, absolutely noiseless in action.

It is not always sufficient to connect a large capacity condenser across the potentiometer to get rid of the annoying scraping noise which manifests itself as the circuit goes into oscillation, and if the potentiometer should have the slightest tendency to noise this feature makes such method of control alone an annoying operation.

Taking into consideration the possibility of noisy potentiometers, we have gone one better in the AC ALL EMPIRE set by providing an alternative. In addition to having the usual potentiometer, R12, by-passed by C11, the good old method of "throttle control" of oscillation is called into action as well. This is provided by the variable condenser C3, which has a capacity of .005 mfd. That may seem an excessive capacity for the purpose, but a little comparison between the screen grid valve and the triode will show just why we use .005 mfd. here.

In operating the receiver a balance is found between the potentiometer and the variable condenser until oscillation is present smoothly with the condenser at about half capacity. Final silent control can thus be obtained with the condenser control alone, and this smooth operation will be found a useful feature when adjusting the set to a distant under-modulated carrier wave.

The grid condenser C5 is a TCC .001 mfd. mica condenser, and the grid leak a Durham 2 meg. As the detector is resistance coupled to the first audio stage the radio frequency choke RFC2 is not absolutely essential, but is included to be on the safe side. The coupling condenser C6 is a TCC mica .01 mfd., and it must be pointed out that a mica condenser must be used in this position, and also at C7.

If paper condensers are used here high frequency leakage can cause untold trouble, apart from which the

tonal quality of the amplifier may suffer. The resistor R4 feeding the plate circuit of the detector is a Durham 100,000 ohm of the 2 watt. type. R5, the grid coupling resistor to the 227, is a 500,000 ohm of the same make. Automatic bias is, of course, provided throughout, the biasing resistor for the 227 being a Prima Donna 2500 ohm type (R9) and shunted by a Chanex 1 mfd. (150v. working) condenser, C13.

Shown connected across the heater leads of V3 is a centre tapped resistance, 50 ohm type, R7. The heaters of V1, V2 and V3 are run from a common 2.5 volt 7 amp. winding on the power pack which will be referred to later. Condenser C12 is a Chanex 1 mfd. 500 volt type.

Impedance coupling is used between the 227 and output stage, the choke used for this purpose being a Radiokes AC1 type audio choke, marked CH. C14 is a .5 mfd. Chanex 500 volt by-pass condenser.

Now we come to the Pentode and the question of biasing, which seems at the present juncture to be raising brain storms in some quarters. It is sufficient to say that the method of obtaining bias by the resistor in the centre tap from the heater has found no complaints with us, with the exception that the by-pass condenser across the bias resistor **MUST** be of a high capacity.

The one specified is a 4 mfd., but actually an 8 mfd. electrolytic condenser could be used to advantage in this position. This condenser is marked C15 and the bias resistor, which has a value of 415 ohms is R10. The centre tap resistor R8 across the heater of the 247 Pentode is of the usual 50 ohm type. The grid coupling resistor R6 is a Durham 2 watt. 500,000 ohm. The set has been designed to use a DC dynamic speaker of the popular 2500 field resistance type of which there are many available in various makes.

It will be seen that the field of the speaker is used as an additional filter choke in the power circuit, so that if any existing speaker is used with the set in place it will be necessary to connect, in lieu of the field coil in the diagram, a 2500 resistance capable of carrying at least 45 ma.

The power transformer for this set must have the 5 volt rectifier winding

YOU PLAY SAFE WITH THESE PRECISION PARTS!

DURHAM I.R.C. RESISTORS

THE proved superiority of the complete range of I.R.C. Resistors is the fundamental reason why most set manufacturers use them as standard equipment.

- ☞ Designed to be soldered directly into the circuit.
- ☞ Moulded end contacts into which the tinned copper leads are embedded, also forming a seal against moisture.
- ☞ Positively no contact resistance—no loose connections. **NO NOISE—NO APPRECIABLE VARIATION IN RESISTANCE.**

R.F. Characteristics

The ratio of Radio Frequency Resistance to D.C. Resistance is almost unity. Measurements of resistance made at D.C. may therefore be used at Broadcast Radio Frequencies with negligible error.

Noise

Microphonic noise developed by Type K metalized filament is extremely low, even with overload on the resistor.

Permanence Characteristics

No appreciable changes in resistance results from long periods of constant operation at normal loads, the units always returning to their original value. Change in resistance after 100% overload for 10 hours less than 3% (measured on 100,000 ohm. resistor).

TYPE M T.C.C. CONDENSERS

High Insulation Resistance

Encased in green moulded bakelite. Can be suspended direct across the set wiring. Fixing holes are provided through the body of the condenser; soldering tags designed to allow contact to the valve leg. Capacity accurate within plus or minus 10%. Closer tolerances may be had on request.

PAILLARD

Junior Induction Motor (Asynchronous Type)

No Resistances, No Brushes, No Belt

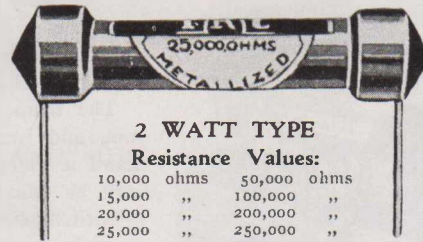
Main spindle is in tempered and burnished steel turning in bronze anti-friction bearings which can withstand long period of running without oiling. Speed can be regulated from 75 to 90 r.p.m. Speed absolutely constant. Current consumption is about one-quarter that of the average electric lamp. Absolutely silent and vibrationless. Dimensions: 4½ x 3¾ x 2½ ins. Voltages: 220 to 250 A.C., 40-60 cyc.

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2 WATT TYPE

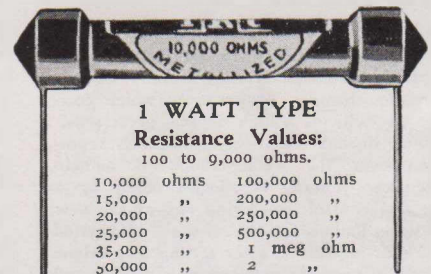
Resistance Values:

10,000 ohms	50,000 ohms
15,000 "	100,000 "
20,000 "	200,000 "
25,000 "	250,000 "

Also 10 to 9,000 ohms

(Available shortly)

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1 WATT TYPE

Resistance Values:

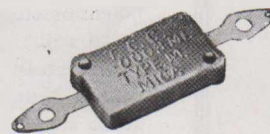
100 to 9,000 ohms.

10,000 ohms	100,000 ohms
15,000 "	200,000 "
20,000 "	250,000 "
25,000 "	500,000 "
35,000 "	1 meg ohm
50,000 "	2 "
75,000 "	5 "

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T.C.C. TYPE M CONDENSERS

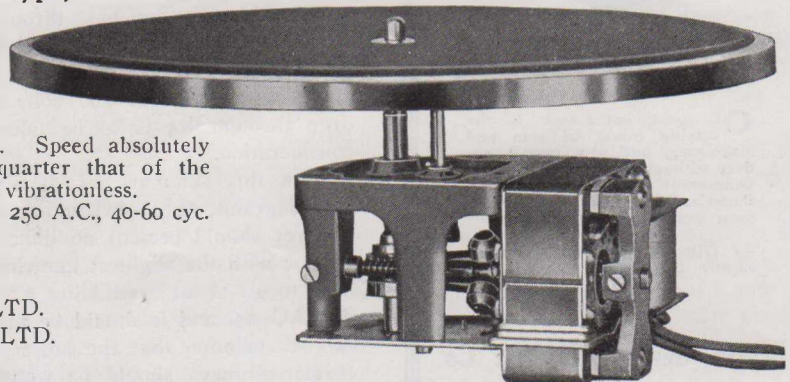
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Capacities: .002 to .01 mfd.



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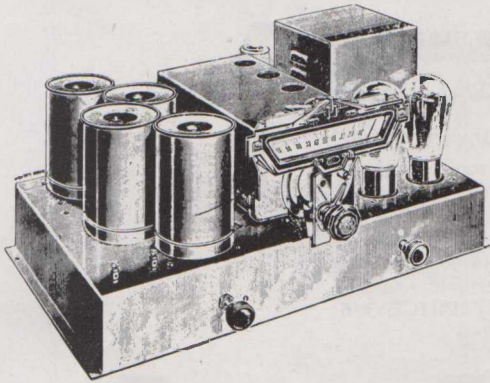
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What's New in Radio

A NEW CHASSIS.

The latest model receiver handled by Bloch & Gerber Ltd. is a five-valve model of quite unique design and features. The engineers responsible have succeeded in putting the variable MU valve to good use in this chassis in making use of this type of valve in the form of power detector. Three stages of radio



frequency amplification are used, preceding the variable MU detector, in conjunction with a Pentode audio stage, the results of the combination being a performance which combines selectivity of a high degree, great sensitivity on distant signals, and faultless reproduction over the whole range of audible frequencies. Tuning is effected solely by a single dial control, employing one of the new attractive Radiokes full vision illuminated dials. Our impression after testing this unique receiver is one of complete satisfaction, and we consider this model worthy of great popularity. Bloch & Gerber Ltd. will supply full details.

The A.C. All-Empire Set

(Continued from previous page)

centre tapped as if the high voltage positive supply is merely taken from one side of the rectifier filament it will be necessary to include buffer condensers across the high voltage secondary to counteract any possible "tunable hum" on short waves.

The transformer used is a Henderson, and for those who may have on hand a Prima Donna PD85 type, this will be found quite suitable with two .1 mfd. 1500 volt buffer condensers connected from each plate of the rectifier to the high voltage centre tap.

The high voltage winding of the power transformer is designed for 350 volts each side. After rectification, filtration is taken care of by a TCC 8 mfd. electrolytic condenser C16, a PD 30C, 30 Henry Choke, a centre section 4 mfd. TCC 450 volt working condenser C17, the speaker field, and another TCC 8 mfd. electrolytic condenser C16.

The remaining item in the power supply is R11, a 15,000 ohm voltage divider of Radiokes or Prima Donna make to carry a total load of 45 ma. This voltage divider must be provided with adjustable clips, five in number, for the adjustment of plate voltages. The first clip from the negative end feeds the detector screen grid, via the potentiometer, and should be adjusted to 50 volts. The second feeds the RF stage screen grid at approximately 75 volts. Number three supplies the 1st audio stage, 227, at 150 volts, and number four the RF valve plate at 180 volts to 200 volts according to the valve used.

The fifth clip supplies, through R4, the plate of the detector valve, and in practice it is found that this should be set at a value of 200 volts as the drop through R4 is to be taken into consideration.

With this summary of details, and the diagrams, the construction of the receiver should present no difficulty to anyone with the slightest knowledge of how to go about assembling a present day AC set, and it should be unnecessary to mention that the power transformer primary should be wound for 240 volts in the Sydney area and 200 in Melbourne and other localities according to the rated power supply.

To avoid any possibility of interlocking between the RF and detector stages,

the control grid leads to the valve clips should be shielded, and may conveniently be made of the special wire now available for the purpose.

On looking at the set, it may be thought that the aluminium panel is old-fashioned practice and not really necessary, but we wish to emphasise that to preclude any possibility of undesirable hand capacity effects when adjusting the receiver over the short wave ranges, it is better to construct the set in this manner. It is the surest way out of such trouble for the home constructor, and with the panel treated with caustic soda to give a matt finish the effect far from unpleasing.

The dealer or commercial manufacturer who may like to turn his attention to this type of receiver for the coming season can easily apply his own ideas as to the final appearance of the set. The physical dimensions of the set are purposely liberal to allow the constructor to get at the job without a lot of worry about trying to fit things in. Without a lot of experience in the design of receivers for short wave work, some people would run up against trouble if the lay-out were made compact as would be the case with a purely commercial product.

If compactness is a desirable feature, then adequate precautions must be taken to avoid interaction between wiring carrying RF currents at high frequencies, particularly in a set of this nature where a Pentode is used in the output. Pentodes can be very fussy in that respect, as they seem to delight in picking up unwanted stray RF currents and making their presence felt in the form of intense hum.

It is obvious that the power transformer must be totally enclosed in a screening box. The filter choke need not necessarily be screened, as it is mounted underneath the chassis where it can normally do no harm, but if for any reason the constructor mounts it on the chassis top, then it must be totally screened from everything.

The view and plan drawing of the lay-out shows the broadcast coil units mounted with the RF stage vertical and the detector horizontal. As they are both screened this is not necessary but is a precaution. The short wave coils are mounted at right angles to each other in a horizontal position to avoid possible coupling.

If two separate switches are used as indicated in the diagram, they will be mounted in a position so that they are in close proximity to each short wave unit

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above the chassis top. The size of the chassis used in the original receiver measures 24 by 12 by 3 inches. The 3 inches depth is to ensure plenty of room underneath the chassis for the mounting of components. The panel is of 18 gauge aluminium, measuring 24 by 8 inches.

Although many may consider it is an unnecessary refinement, the heater leads are all enclosed underneath the chassis in $\frac{3}{16}$ in. copper braiding with a view to further forestalling "tunable hum" which so often creeps into many AC receivers of haphazard design.

Each length of braid is bonded to the chassis which is, of course, the negative and earth right through. If the braid is not bonded there are likely to be parasitic noises owing to electrolytic action between the copper and the aluminium of the chassis. Such noises would not be noticeable for a while, but would develop after the set had been in use some time.

Instead of relying on earthing those components which require so treating direct to the chassis at the nearest point, the safest plan with any short wave receiver is to run underneath the chassis for the whole length, a copper

busbar, and to earth to this by the shortest route.

If the set is rigidly built up with all screws tightened to the limit, and thus no loose rubbing metal surfaces anywhere, there will be no trouble with undesirable noise and crankiness of the set, but, unfortunately, too many builders neglect the engineering side of modern set construction, and one discovers upon examination an assortment of loose bolts and nuts with consequent "craziness" of the set on short wave reception.

If the job is worth doing it **MUST** be done well is the slogan when it comes to designing and building successful short wave receivers.

A word or two about working aluminium may be of use to those who look at the construction of a metal chassis set as a horse would at a white tombstone on a moonlight night!

When drilling aluminium the job can be made clean and easy by the application of a little turpentine on the drill before starting each hole. The $\frac{1}{16}$ in. holes for the wafer sockets may be cut with a plain wood bit in a carpenter's brace with remarkable ease by the aid of a little turpentine.

Drill at each position a $\frac{1}{16}$ in. hole to centre the bit first, and then work around with the cutting point of the bit until half way through the metal. Then turn the chassis over and repeat the process, when the centre will cut clean away. The use of suitable cutting lubricants makes metal work of any kind a pleasure, but an arduous operation without.

The performance of the AC ALL EPMIRE receiver has been referred to earlier on in this article, and all that it is necessary to say is that it will give splendid results with quite a short inside aerial. This applies to normal broadcast reception as well as short wave working by reason of the high RF gain possible with the variable MU stage with its independent tuning control.

Although it may appear on first looking the set over that the .00035 mfd. variable tuning condensers are far too large a capacity for comfortable tuning at high frequencies, this is not the case in practice. We must confess that having been ourselves used to tuning short wave receivers in the past years with comparatively small capacities we anticipated trouble from this

source, but found that around 20 metres even, the set was very little different in tuning characteristics to one fitted with maximum capacities of .00015 mfd.

We do not imply that "a child could use it," but that any intelligent operator will have no trouble in covering all the tuning ranges swiftly and easily. If it were a case of a receiver using detector alone without tuned RF amplifier, we should not consider the use of such high capacity for tuning, but the heavy signal impulse present in the detector from the RF stage renders any but the weakest of carrier waves instantly audible, so that one would have to tune rapidly to miss them.

SHORT WAVE COMMUNICATION in the KIMBERLEYS

(Continued from page 15)

In addition to the contacts between the Meatworks' control station and the mobile units, great assistance was rendered on occasions by the genial operator of the Amalgamated Wireless station, VIW Wyndham, who, being fitted for 32 metre work in addition to 000 metre marine work, was often able to pass on important reports at times when the 55 metre wave was in the "skip area." The operator of VIW is the writer's idea of the perfect telegraphist. Alan Kempling, of VIW, is one of those rarities who can conduct a conversation with someone with one ear, and at the same time read with the other a morse sounder rattling away at 30 words per minute.

The results of my short wave investigations over the north-west of Australia showed that high frequencies are the one solution to communication between isolated points. How badly such a country needs regular short wave stations when landline work may be interrupted by thousands of cockatoos swinging on the lines and breaking them down! The radio engineer whose duties may take him into such country will find that it grows upon him, with its wild magnificence, bush black inhabitants, cattle, cockatoos, crocodiles, flies, gigantic grasshoppers, scrub turkey, snakes, spear grass, camels, and luke-warm drinks at 1/- per glass. Above all, he will realise that it is possible to be well and truly "DX" in one's own country!

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This Section is Entirely Devoted to the Interests of— EXPERIMENTAL TRANSMITTERS RADIO CLUBS AND AMATEURS

VALE, OLD TIMERS!

With this first issue of RADIO MONTHLY and its experimental transmitter's section, we feel that as we recall the amateur days of yore that it is fitting to pay a tribute in these pages to the memory of two silent keys. We refer to those of the late VK2YI and VK7DX, Phil Nolan and Trevor Watkins, respectively.

In the ranks of the Australian experimental transmitter, these two well beloved old timers stood on the very pinnacle of leadership, and were truly pioneers in the development of short wave communication. We are not alone in recalling the early hours of the mornings of a few years ago, when one could be sure that prominent around the old 32 metre dial would be 2YI and 7DX engaged in making the world "look a little fellow."

The American hams spoke of 2YI as "the best Aussie Op", and all and sundry knew 7DX as the finest wielder of a vibroplex key on this side of the Pacific. Both were copperplate examples of what a ham can do with gear, and to-day we wish some of the stations we hear on the air could do likewise. Long may your memory live, OM's.

CONSISTENT? WE'LL SAY!

Who is the most consistent and reliable Aussie ham on the air to-day? Don't all speak at once because we are very sure who you will say. Little old 5HG, of course! Since time immemorial, or at least, since the Aussie ham began to work DX with UX 210's, there has always been noticeable a clear cut steady PDC signal which has never changed, unobtrusively yarning away with the world at large. He signs VK5HG, and if he is not calling W9GV on sked, then it is W2CC or VK6MO.

Even though he works interminable skeds, he has sharp ears, because it doesn't take him long to answer an urgent call slammed at him. We know, because we tried him when we were up in Wyndham, W.A., and sure enough he was on the job. Yes, we think H. M. Cooper VK5HG, is an outstanding example of the spirit of amateur radio.

CONDUCTED BY
THE EDITORS

Between Ourselves AMATEUR EDITORIAL

There is probably no section of the community indulgent in a hobby or private study more enthusiastic about it than the man who in the seclusion of his radio "shack" holds converse with his fellow man by means of radio.

To the uninitiated such diversion is bordering on the mystic, but to those who look upon it with intelligent comprehension, it is a unique and unending experience. The experimental transmitter, or "ham," as he is affectionately styled, is far from being blase, but he is loth to talk about himself.

His realms in the frequency spectrum, wherein he thinks overseas human contact no more of an occurrence than driving an automobila from place to place, are bordering on the sacred to him. Occasionally some exceptional happening will bring to the public eye the fact that there are private individuals who work wonders nationally and internationally with their experimental apparatus.

These things have come to light in dribs and drabs in a reluctant manner, vide the Daily Press, and the result is that the amateur, instead of getting the due credit for his achievements, is either existant under a spirit of tolerance or almost entirely overlooked.

As "Radio Monthly" makes its appearance as "A Magazine for Everybody," no more fitting place to chronicle the doings of the "ham" could be appropriate than its pages. "Radio Monthly" is edited by those who know the "ham" inside and out, are "hams" themselves, and consequently have allotted time to devote to the "ham."

Not only the pages of the amateur section but a goodly portion of "Radio Monthly" will be devoted to matters dear to the heart of the "ham." Constructional articles on transmitters, receivers, and ultra high frequency apparatus will appear regularly.

We emphasise the fact that "Radio Monthly" is the ideal medium for amateur contact otherwise than "Over the Air." "Radio Monthly" wants to hear from each and every Australasian "ham." We shall applaud your achievements and pass them on to the other fellow; we shall criticise your shortcomings, if any, and pass those on, too—all for the good of the game. What do you think of the advent of "Radio Monthly," OM?

OVERDONE KEYING.

It is unfortunate, that some otherwise excellent ham operators have fallen into a careless method of handling the key. No! This is not a reference to long-winded CQ's, but something which has been very prevalent lately. We refer to what we are pleased to describe as "the drawling dot." Get it? Whether those of the gang who have inadvertently fallen into this atrocious habit realise it or not, is hard to say, but the result must be that those who have lapsed so must lose a lot of QSO's. Dots are dots and Dashes dashes, but when one cannot tell which is t'other because the Op. draws the dots out far too long in what he may think is a stylish manner, the effect is obvious in most cases. The fellow at the other end decides not to answer the CQ, because, although he knows the signals are very strong, he is going to have a deuce of a time deciphering what the other lad is talking about. He thus ignores the call and looks around for some station that is sending out the King's English. Too bad! And some of the Ops. doing this dot drawling business are Old Timers, too. It is not a refinement in operating . . . its merely an exasperation at the other end. Come along . . . lets snap those dots out briskly, like a Beam station running slow!

MEET HIM, BOYS!

The W.A. gang may not know that at the present time they have an interesting personality in their midst. Resident in Perth on behalf of R.C.A. Photophone, is Mr. Harry Turner, who was the top kick in the engineering line behind the old A.2NO in 1926. Harry never learned to punch a key as a "Ham"; he was always far too busy on the engineering side of Radio; and what a Rolls Royce job he makes of things too! The Perth gang would do well to nail him for a lecture or two—and Harry CAN talk. His brother, by the way, is old 2TM, Haswell Turner.

SAY OM!

You have read so far; isn't "Radio Monthly" worth your sub. right now? Twelve bob for twelve big issues.



STATION VK2HR Harrington's Radio Club

ONE of the most active among the many Australian amateur stations consistently using telephone is VK2HR, the station sponsored by Harrington's Radio Club, and operated on behalf of the club by that energetic secretary and organiser, Jack Duffy. We have often listened to the tests conducted from this station, and we have no hesitation in saying that the quality of the transmission is always something to be proud of in the realms of amateur telephony. A lot of the amateur 'phone we have been obliged to listen to has been very "amateurish," so much so that we have been driven to exasperation and semi-audible mutterings under the breath, but it is a very different outlook on Ham 'phone when we run across the 1931 stuff that VK2HR puts out. We are not far wrong when we say that VK2HR's audience must be pretty considerable, judging by the way the club has outgrown its bounds in membership, as the short wave listener apart from the amateur transmitter must be pleased to hear an amateur 'phone station operating with the kind of stuff emanating from VK2HR. The location of this station is 16 Stanley Street, Waverley. As is the case with all 'phone stations worthy of the name, a master oscillator power amplifier system

is used, with 120 watts in the power amplifier. Instead of relying on rheostats for second control of filament potentials, the transformer supplying these voltages has been designed with a variable primary ratio, with selection for an input for 230, 240, 250, 260 and 270 volts AC. This works out more satisfactorily in practice, line voltage fluctuations being amply checked by this means. Osram valves are used throughout in this station, the oscillator being an Osram LS6A, with a U8 rectifier for plate supply. The Power amplifier is a DET1, and the modulator a DET1 SW. Two U6 rectifiers look after these latter valves. The speech amplifier is a standard Pilot K-113 amplifier, which consists of two resistance coupled stages, using P227's feeding a 245 type push-pull output.

For reception, a Pilot AC Super Wasp is used. VK2HR does not normally go DX hunting, but the signals reach other parts of the globe on telephony alone, as reception reports from Holland testify.

We learn that VK2HR is planning to do some experimental Television work in the near future on the transmission side. That sounds a good move to us, and we look forward to seeing Jack clanging that gong instead of merely blaring up.

A CAREER IN RADIO Opportunities Increasing

THE youth of to-day has at his command infinite possibilities for advancement in the field of radio. Although we ourselves are well aware in a general sense of the opportunities now existing in the many different avenues that have been opened up during the last decade, we must confess that were we asked to define them, we would be confronted with something in the nature of a problem. Therefore we welcome the arrival of the book, "Radio, The Industry of The Future," just sent us by The Marconi School of Wireless, conducted under the auspices of Amalgamated Wireless (Australasia) Ltd. In its 40 pages, crammed with interesting matter, the book outlines clearly and satisfactorily the answer to the boy's or parent's query, "Is there a career in radio?" Not only is there a career—there are a dozen of them to choose from. Since to-day, however, is an age of specialisation, the need for application and study is early stressed in this book. The natural incentive for advancement being there, it

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remains then for the Marconi School to train the student to qualify for the particular position he has set his heart upon. Nearly twenty years' experience in successfully training radio students lies behind the school, so that the trainee may place himself in its hands with entire confidence.

Let us now examine the various courses that are detailed in this excellent book. Course A covers Radio Engineering, a comprehensive five-year course that takes the student through every phase of this advanced profession. The whole list of subjects, from A to Z, is detailed, from the Constitution of Matter and Electron Theory, through the Theory of Valve Transmitters, Studio Design, Marine and Commercial Transmitters and Receivers, Engines, right up to Sound Reproducers and Talking Picture Equipment. The practical work comprises 26 subjects, the advanced practical work 17. Examples quoted are, for instance, "Prepare a complete specification for a Super-heterodyne receiver, using a separate oscillator, and "Prepare a complete specification for an AC broadcast type receiver." The schedule of fees is plainly outlined.

A two-year course for The Radio Technician comprises Course B. Here, again, a wonderfully comprehensive list of subjects is covered, including arrangements for the student to spend three weeks at Sydney Radio Centre, Pennant Hills, two weeks at La Perouse Receiving Centre, and a week at a Broadcasting Studio.

Course C is for the Radio Operator destined either for Marine or Coastal stations. This course takes in the theory of radio telegraphy and telephony and the practical operation of all apparatus, including spark and valve transmitters, receivers, direction finders. Two years comprises Course C, and Course D is for the Talking Picture Operator. This is conducted partly by means of home study papers and partly by personal tuition of a practical nature. Courses E and F are for the Radio Mechanic; F, Broadcast Studio management, and G, Microphone Technique.

Here, then, are enumerated in "Radio, The Industry of The Future," comprehensive details of practical courses of both youths and grown-ups, giving a very good idea of the openings there are now in radio for the ambitious and enterprising individual. The book should be in the hands of everybody under that heading.



EXPERIMENTAL RADIO STATION VK2JH

It is our pleasure to be able to present a view of station VK2JH. This Australian station is well known to short wave listeners apart from experimental transmitters by reason of the excellent telephony transmissions which are heard at 7 p.m. every evening, on either 42.8 or 85 metres. We have seen illustrations of, and visited many experimental stations which represent something pleasing to the eye and in this latter feature, VK2JH is well in the front rank. The owner-operator has very successfully combined efficiency with neatness and the expression "hay-wire" is not to be found in Jack Hutchinson's dictionary.

We remember well the time when OA2JH joined the ranks of Australian transmitters and in common with most, started off with "hay-wire" gear and indifferent far from PDC signals . . . but . . . listen to VK2JH to-day! This modern station is a real "world-beater," and uses 100 watts maximum power in a crystal controlled rig. We could say a lot about ham telephony, mostly uncomplimentary, but in VK2JH's case nothing more can be said than his 'phone is a shining example of what a ham station on the broadcast emission stuff should sound like.

Modern practice has been followed in this station in every detail and the frequency doubling circuits make Pentodes jump to the job. Indiscriminate telephony transmissions, or "yells" as some of our newcomers call it, are not in the routine at this station and regular

schedules are adhered to with Break-in and duplex working.

As to whether the 'phone from VK2JH gets out or not . . . the QSL's furnish ample proof when English and Spanish short wave listeners have sent reports of speaker reception over there! VK2JH, the property of J. V. Hutchinson, sits on the North Side of Sydney harbour, at No. 1 Hollbrook Avenue, Kirribilli, N.S.W.

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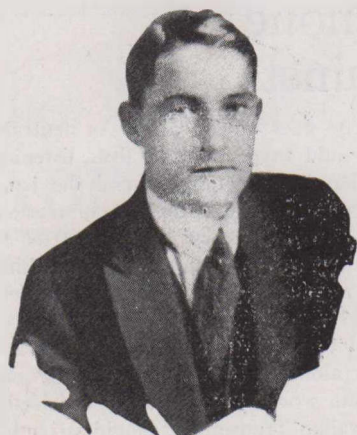
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SYD. V. COLVILLE WELL-KNOWN RADIO ENGINEER

Aviation Radio His Strong Point

ANY of the radio fraternity who know anything at all, at once think of aeroplanes when Syd Colville's name is mentioned. In Australia, Colville is unique as a radio engineer who got keen ideas about radio applied to aviation and went to considerable personal expense (and risk) to substantiate his claims. The risk part of it is there as Syd took his Pilot's ticket in the process! His experience in Radio dates from 1911 when he built the first experimental station operated in Queensland under the call letters XQF. In 1919 he formed the Queensland Wireless Institute and three years later entered the field of commercial radio in Sydney as partner in Colville-Moore Wireless Supplies.

In 1928 he was appointed Radio Adviser to the Siamese Government and designed much short wave apparatus for the Communications Dept. At this period he turned his attention to aviation and by reason of his keen knowledge and enthusiasm was appointed Hon. Radio Engineer to the N.S.W. Aero Club. Very speedily he obtained his flying license and the plane to ground records of his key and phone equipment are well known. In 1929 the W.A. Government sought his services in the



design of suitable apparatus for use in the Kimberley cattle industry which equipment was later installed by Don. B. Knock, Technical Editor of this journal.

Early in 1930, the Smith-Shiers Ryan Monoplane, attempting an Australia-England flight, was fitted with emergency transmitting gear by Colville, and solely due to the high efficiency of this apparatus the two airmen, with their plane, were rescued from the Kimberley bush where they had been forced down inland from Wyndham, W.A. On the closing down of the old Colville-Moore Wireless Supplies, Syd Colville reformed the Company and is now carrying the business on personally, at No. 4 Rowe St., Sydney. The construction of RADIO MONTHLY Short Wave apparatus will be a speciality of the business.

HEARD ON "20."

Searching around the 20 metre regions the other evening, and using a receiver capable of bringing very weak signals up to good readability, we ran across something that makes VK2NO think of even yet another change of QRA. The time was 9 p.m., VIS, and the indefatigable VK2LZ was busy on his excellent phone with music. We know that he gets out with that phone all over the globe, anyhow, besides 2LZ at the time, the rest of the band was deathly silent.

Our ears pricked up when Con finished his record and said, "O.K. now UOCX, Austria, and thanks for your good report on this phone." We looked hurriedly around for the DX and so far as we were concerned the receiver might have had cast iron tubes. We've a good mind to move where we can get something besides skip on the 20 metre band!!!

Characteristic International First Letters Of Amateur Calls

Abyssinia	ET
Afghanistan	YA
Alaska	K7
Algeria	CN
Argentina	LU
Australia	VK
Austria	UO
Belgium and colonies	ON
British Isles	G
Bolivia	CP
Brazil	PX
Bulgaria	CP
Canada	VE
Chile	CE
Costa Rica	TI
Cuba	CM
Curacao	PJ
Czecho-Slovakia	OK
Denmark	OZ
Dominica	HI
Dutch East Indies	PK
Ecuador	HC
Egypt	SU
Estonia	ES
Finland	OH
France and colonies	F
French Indo-China	FI
Germany	D
Guatemala	TG
Haiti	HH
Hawaii	K6
Hedjaz	UH
Holland	PA, PB, PC
Honduras	HR
Hungary	HA
Iceland	TF
India	VO
Iraq	YI
Ireland	EI and GI
Italy and colonies	I
Japan	J
Jugo-Slavia	UN
Latvia	YL
Liberia	EL
Lithuania	RY
Luxembourg	UL
Mexico	X
Morocco	CM
Newfoundland	VO
New Zealand	ZL
Nicaragua	YN
Norway	LA
Panama	RX
Paraguay	ZP
Persia	RV
Peru	OA
Philippines	K1
Poland	SP
Porto Rico	K4
Portugal	CR and CT
Rhodesia	VQ
Rumania	CV
Russia	RA
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Sweden	SM
Switzerland	HB
Uruguay	CW
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40 Metre 'Phone For or Against

We know full well we shall raise a miniature war over this question, but before we say anything at all, we hereby absolve ourselves as neutrals. We have said that this is the ham's stamping ground, and that we have no politics, and that the pages of RADIO MONTHLY are open to all. One or two hams asked us to broach this subject, so that a general opinion may be taken on it. Answers to it from both sides will certainly be published by us. It seems that the 40 metre 'phone racket is getting to be a serious and vital question. The ultimate outlook seems to narrow itself down to this.

Is the 7000-7300 KC channel used in our part of the world as it should be, or not? Let us suppose that an Aussie ham is placed in such a position that he and his equipment provide the sole link for communication in an emergency. It has happened before and may do so again. Suppose a 'plane is forced down in the density of the bush, but is provided with emergency radio which the pilot starts in to put to good use? His SOS is logged by some amateur so placed that signal reflection is full at his location, but skipping in other directions. The amateur calls for a Metropolitan contact to pass news of the emergency on to some proper quarter. A Metropolitan amateur station hears him and attempts to copy him, but is forced to quit owing to heavy QRM from the local overmodulated 'phone lads, or it may be even far distant 'phone. What is the position?

Surely the 7000 KC channel reserved for amateur communication is *the* most vital for general contact and where amateur radio may be considered very valuable in emergencies, it is quite likely to fall flat at our own hands. We do not wish to decry the 'phone men . . . we use it ourselves occasionally, but we would like to hear what the majority of Australasian transmitters think about the use of 'phone on "40". Bear in mind the fact that the transmission of 'phone is approved by the PMG's Dept. in Australia, on this band and that owing to this concession against other parts of the world being barred from 'phone on "40", it may seem foolish to seek restriction. It is a case for the amateur himself . . . what does he think is the best thing for him?

Is he selfishly inclined or does he stop to consider the racket he may make be-

fore he goes on the air? As neutrals, we would suggest that a little listening to what is happening around the band before starting up would help matters a lot. It is a very difficult matter to even broach this subject, but we think that a careful study of the problem should result in an equitable solution. Take the question of RAAF reserve work alone. That is particularly important work, and work in which the Australian Transmitter should strive his utmost, to help along the efficiency of aviation-radio and to make himself proficient as an intelligent operator. But what is the use of trying to make such work 100 per cent. reliable on the part of the amateur when in the middle of important key traffic, he finds he is trying to copy through half a dozen fellows burbling into, raspy "mikes" with loop modulation, or grating record after record filling the band up.

We insist on holding an unbiased attitude on the subject, but we do suggest sincerely to the W.I.A., that here is a matter for the Vigilance Committee to get busy on. Talking alone will not ease the QRM situation. Meanwhile, we shall be pleased to take a census of votes from Australasian transmitters, and we shall, if there is a response, publish the result at the earliest opportunity. "Do we want 40 metre 'phone or not?" Put that on a QSL card with YES or NO, in block letters, alongside it, and send it along to "Radio Monthly."

HOW'S THIS SUGGESTION?

Amateur radio is constantly changing. What we mean in this case is that new calls constantly appear on the air . . . or old ones disappear . . . or new hams appear with old call-signs relinquished by those old timers who have gone out of the game. In view of this latter, we wonder if we could start an International feature just to see if when we QSO an old call, the man behind the key is the original ham or a new recruit. It could be done something like this . . . A new Q call meaning "Are you an Old Timer, if so what year?" symbolised by "QOT?" The answer would be given thus "QOT 1913." Rather interesting to know how long the other OT has been pounding keys, isn't it? What do you think about it, QST?

One of the best jokes we have seen

in Amateur radio, figured recently inconspicuously in the pages of QST, and we are wondering how many of the gang in this part of the world noticed it?

It appeared that a W 2 had been QSO some other U.S.A. ham. Eventually the W 2 received a QSL card which read something like this . . . To W 2—"Mr. H. R. Okinbuk." QST says, figure it out for yourselves. Sez us, too!!!

SINCE WHEN?

Those of the amateur transmitters' fraternity who conduct transmissions at the higher frequency end of the broadcast channel during periods when Australian broadcasting stations are silent, will be surprised to learn, according to an answer to a correspondent in a wireless paper that . . .

"Amateurs here are allowed to roam over the broadcast band when the broadcast stations are not on the air. They do not stick to any particular wave-lengths."

We have always been under the impression that under the flag of the W.I.A., in Victoria particularly, definite frequency schedules and operating times are strictly adhered to by those stations using the 200 metre regions, and that the Australian amateur transmitter is hardly given to "roaming over the broadcast band"!

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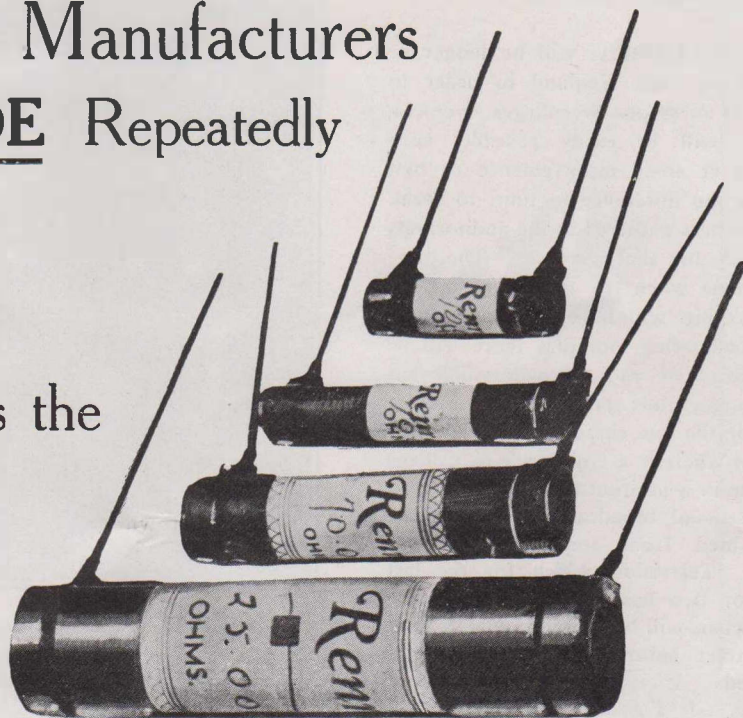
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RADIO IN 1940

(Continued from page 29)

The Oxford lecturer will no longer be obliged to leave England in order to give his messages to colleges overseas, for it will be easily possible, even though at some inconvenience to him due to the difference in time, to speak to audiences gathered in the auditoriums overseas for that purpose. The time will come when the major institutions of learning will have endowed chairs of broadcasting, not that there will be professors of radio broadcasting, but the money thus provided will render possible the line charges and other incidentals whereby a University or College may be in a position to obtain either an International broadcast or a broadcast distributed from some central local point. Television, which for the last year or two has been peeping around the corner, will be walking up and down the street before the next decade is finished. It is already a laboratory success. It simply awaits its development along practical lines and in accord with the desire of the radio audience. This is something which will affect the home more intimately than any one of the great developments of the future. One can picture the modern living room a few years hence, equipped for radio with speakers concealed in the walls, and operated by a simple wall switch. There will be sound movies, compactly installed and easily operated, whereby the family may see and hear the best offerings of the silver screen. Television in its perfected form will render it possible for you to see an actual football game in action as well as hear the announcer's comments. Your radio set ten years hence will be so attuned and synchronised for television that in connection with some radio programmes you will have the pleasure of seeing a prima donna or orchestra as well as listening to the programme. Dramatizations in the studio will be in costume and plays will be given to you by television with a fidelity comparable to a stage presentation. Speaking internationally, radio and television, with other kindred developments that are bound to come will mean the salvation of the world. The more closely we bring people together the less likely will be disagreements and misunderstandings. International conferences will be possible at short notice by radio and television.



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CLUB NEWS

WAVERLEY.

The election of officers of the above club for the coming six months resulted as follows:—President, Mr. Falson; Vice-President, Mr. Wells; Secretary, Mr. Hudson; Treasurer, Mr. Martin; Assistant Secretary, Mr. Garland; General Committee, Messrs. Peacock, Rowles, and Fleming; Technical Committee, Messrs. Wells, Pottie, Martin, and Brownlee; Technical Adviser, Mr. Cottrell; Auditors, Messrs. Bell and Garth.

Several members of the club were successful in the recent A.O.C.P. examination, and will shortly be on the air, thereby increasing the number of transmitting members. The transmitters at present enrolled as members are VK₂HQ, VK₂ZN, VK₂FQ, VK₂VZ, and VK₂KP.

Crystal control has been installed in both of the club's transmitters, and signal reports have been very good. The short wave transmitter has been operating in the 3.5 MC band during the next Zealand tests (organized by the Association of Amateur Radio Clubs), and the operators are to be congratulated on excellent work in keeping the station on the air throughout the test.

The club's Morse class is advancing in fine style, and the instructors are

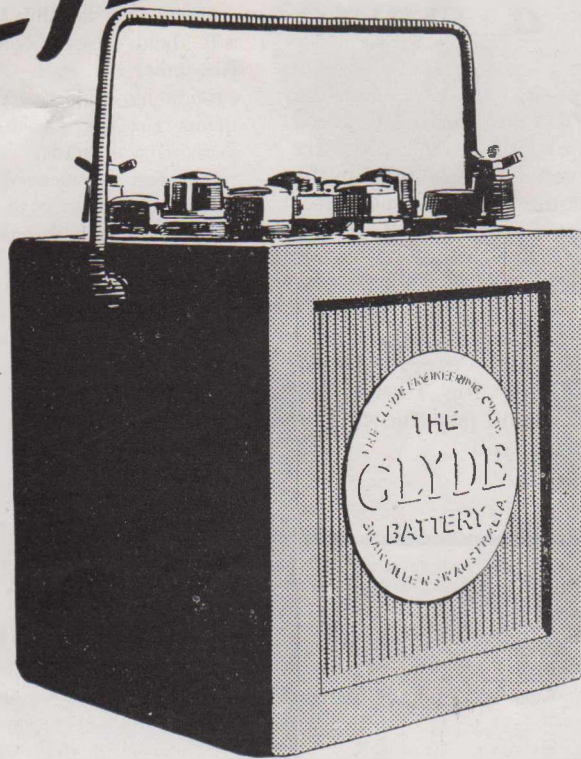
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CLYDE

RADIO BATTERIES

CLUB NEWS

(Continued from page 60)

looking for new pupils, owing to the class having been depleted as a result of the recent A.O.C.P. exam. Members have had some very interesting talks on various radio subjects by Messrs. Wells, Cottrell, and O'Dea.

The membership of the club is increasing weekly, and persons requiring information are invited to communicate with the Hon. Secretary, 13 Macpherson Street, Waverley, or to visit the club on the weekly meeting night, Thursday, 8 p.m., at the above address.

ASSOCIATION OF AMATEUR RADIO CLUBS.

The usual monthly Council meeting was held at Lakemba Radio Club, November 4th, 1931. After a short discussion by delegates, the final arrangements for the 3.5 MC test with New Zealand was made.

The test commenced at 0001 21/11/31 and concluded at 2359 28/11/31, Sydney mean time in both cases. The purpose of the test was to determine which entrant could compile the highest number of complete QSO's with New Zealand stations, thus providing a friendly rivalry between the members of the associated clubs. It is the intention of the Council to make this test a regular feature, as well as arranging for other tests of interest to the amateur transmitter, the experimenter and the short wave listener.

The entrants were VK2BV, VK2BX, VK2DM, VK2DW, VK2GR, VK2HE, VK2HQ, VK2HW, VK2JT, VK2KP, VK2MW, VK2PX, VK2VW, VK2WO, VK2XU, and VK2YB. The most consistent stations were VK2XU, VK2VW, VK2BV, VK2HW, and VK2MU. It is understood that VK2XU had over 230 complete QSO's, and when it is remembered that 24 hours had to elapse between QSO's with one individual station this score is a very fair effort.

Prizes are to be given to the three members who submit the three best logs to the Council. Certificates are to be presented to the New Zealand station with the highest number of Australian QSO's, also to the club member with the best "listener's" log of the test.

Information regarding membership to the Associated Clubs may also be obtained from the Hon. Secretary, 12 Lancaster Crescent, South Kensington, Sydney. The Associated Clubs are Waverley Radio Club, Leichhardt and District Radio Society, Croydon Radio Club, and Lakemba Radio Club.

Northern District Notes

Rumour hath it that Marc Oliver, of 2MO B. class station fame up in Gunnedah, N.S.W., will launch out any time on the Ham bands with an experimental and license. In his spare time, which is very limited, Marc gets down with a short wave receiver and listens to what is going on around 7000 and 3500 KC. A new Ham in Gunnedah whom we welcome to Australian amateur radio, is Mr. Hardman, of VK2KR. Second district Northern notes from 2MO report the following:—"It is said that Sandy Macfarlane's lady who told him his ring stone was "glass" has nothing on 2HC. Xtal sample from 2CR was reported "Glass" . . . however, 2DY cut five good slabs from it. 2CR's xtal mine is on overtime rates and it is rumoured all Northern will soon be crystal controlled. He of the "ruff RAC voice" is reported to be undergoing throat treatment . . . It is a pity ZL 1FI's fb 3.5 mc phone doesn't always reach those intended. 2CR please sit up. It is being asked who pays for the juice at 4JU and 4GG. Going for endurance record George, B406 and all?"

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issue of *Radio Monthly*. You have enjoyed every page of this issue! You are promised even better things in the months to come. Every issue better than the one before. You simply cannot risk the chance of your newsagent selling out. Be a regular subscriber. Let your postman bring *Radio Monthly* to your door next month and every month. Twelve shillings for twelve big issues. Fill in and post the coupon to-day. Thank you.

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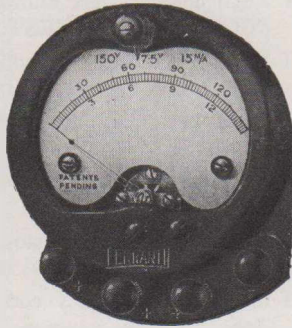
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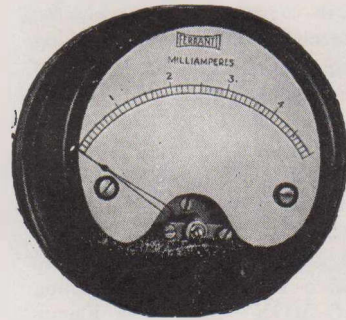
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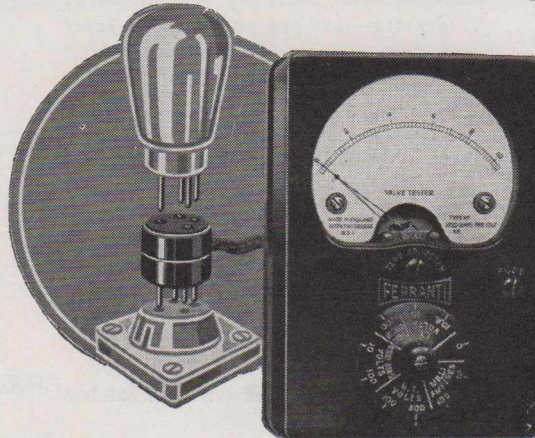
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OUR FIRST HAM SUBSCRIBERS.

It was fitting that the first of the gang to take advantage of the fact that RADIO MONTHLY has arrived is a real Old Timer. We were greeted by a smiling face through the office door, only two days after our notices were mailed to all Australian Hams, the beaming countenance of our old friend Bill Cottrell, of VK2ZN and engineer at 2BL, Sydney. Bill was determined to be the first to welcome us and expressed his heartfelt satisfaction at seeing the birth of a journal wherein the Ham can stretch himself. While fishing out a cheque book and fixing things to be sure of RADIO MONTHLY at his door every month, he pricked our ears up with some interesting information on pending 5 metre and ultra HF experiments. Will we co-operate? And then some!

By mail two of the oldest of Old Timers ran a dead-heat in barracking for RADIO MONTHLY. Reg Fagan, VK2RJ, of Mandurama, and Les Wilson, VK2LM, made us blush with embarrassment with complimentary remarks. Will we look after the country man in our constructional articles, sez Reg and Les? Will we? You watch those battery jobs in the near future! Incidentally, we take this opportunity of complimenting 2RJ on the splendid 'phone which has emanated throughout the past winter from his station on the 80 metre band. Something worth listening to, and down here in Sydney the signal strength at times was tremendous. 2LM is a hero with his engine generator outfit and has been very active also. We well remember the time, Les, when you daily worked G20D on 32 with an inside aerial as a matter of course!

WHO'LL SUPPLY DISTRICT NOTES?

One thing the "Ham" likes to do each month is to look over detailed activities of individuals, clubs, etc., and to quiz what the other fellows have been doing. This can only be done by the amateur himself. What little information we can glean over the air is very limited compared to news direct from the location itself. We are not in a position to run over to Perth, Adelaide or Brisbane to collect the dope of intimate doings of amateurs over there, so we look to some bright lad with a pen to rise to the occasion and tell us all about it. Such news as may be forwarded by District correspondents will be listed under States, and will prove interesting to all.

Now—who is going to be the first to write "Radio Monthly" and appoint themselves District correspondents for amateur transmitter's notes?

LEAVING NOTHING TO CHANCE.

Our old friend, Don Wallace, of W6AM, certainly believes in having plenty of pep in both his receiver and transmitter. The former uses four tuned stages of RF on the ham bands . . . but what price the gear that signs W6AM? He told us the, other evening that he was making good use of 5 kilowatts, and by the sound of his signal, with its beautiful crystal controlled wallop, we would'nt dispute it. What more could a ham wish for than this? When Don travels around the States on business, he always carries with him a complete portable station (also crystal controlled) in a suitcase. This signs W6ZZA with a Zepp antenna hung out of hotel windows. At home Mrs. Wallace is on sked at W6AM at 7 a.m., and she can keep tabs on the OM every morning. Convenient? We'll say!

A STRAIGHT TIP

It matters not where you are—Wyndham, W.A. or Alice Springs, Perth or Wanganui—just put your pen to paper and drop a line to "Radio Monthly," the journal which is 100% with the "ham" and which has no politics. To cut a long story short, Mr. (Mrs. and Miss) experimental transmitter, you are sure of just as much enthusiasm about your doings in the pages of "Radio Monthly" as you are among yourselves.

How Come?

Will someone please tell us what has happened to 2RX?

The 20 metre region does not seem the same without Clive St. John doing some steady overseas key pounding. Maybe it is military pre-occupation that has 2RX busy, or is it swordfishing off New Zealand?

We Think You Will Agree—

that Radio Monthly is the ideal Radio Magazine you have long awaited. With technical matter presented in plain language, and topical talks and descriptions well and plainly illustrated—Radio Monthly fills a definite need.

This is YOUR magazine. You can have it delivered to your home every month for a year for twelve shillings!

VK2NO Thinks That

. . . it would be a great Ham life

- if JBK and ZCI got out of the ham 7000 KC band.
- if some chaps would stick to straight keys instead of "bugs."
- if we awoke to find "200 and below" ours to roam around in.
- if CQ hounds developed right arm paralysis.
- if English hams were allowed to use "CQ" instead of "TEST".
- if BCL's appreciated syncopated key-click music.
- if the Navy eliminated their ICW harmonics.
- if the solar activity cycle does what we are told to expect.
- if the Heavyside layer stopped jazzing about.
- if the phenomenal DX conditions of January, 1927, returned.
- if quartz plates were not so temperamental (puncture proof).
- if meters were not so expensive.
- if we could watch the expressions on some phone hounds faces.
- if the QSL card didn't cost so much to mail in quantities.
- if self excited 'phone transmission was taboo.
- if loop modulation was a criminal offence.
- and if the next International Conference gives three cheers for ham radio!

The Modern Superhet

(Continued from page 33)

with all local stations operating left no doubt about selectivity and tonal quality, there appearing to be large gaps between notoriously "close" stations on the usual TRF receiver.

As a final note, owing to the heavy current which will be imposed on the speaker field normally, it is advisable to shunt the field with a 2500 ohm 45 ma resistor to by-pass some of the load. This resistor is not shown in the circuit diagram.

Although this Super seems a formidable array of valves, it is well worth while, and certainly discredits the idea that Supers are no more sensitive than well balanced multi-stage TRF receivers.

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HELP THAT NEW HAM ALONG OM!

The year is 1931, and in 1929 a general Spring Cleaning of the type of signal put out by amateur transmitters was inaugurated. It had a wonderful effect internationally, and the old "hay-wire" rigs went into the junk heap. The result was sharply tuned PDC signals and receivers to suit, and amateur radio took on a new aspect. Australia has been well to the front in turning out high quality signals, and if you don't think so . . . then listen for a while to such stations as VK2NS, 2HC, 2DY, 3BQ, 3PP, 3RG, 4RJ, 5BY, 5IT, 6AG, 6SA, 7JK, and countless others too numerous to mention. Yet, in an evening's tour of the amateur bands, we find that there are increasing examples of poor signals, rotten operating and general carelessness, not to mention piracy.

Invariably it is a case of a ham new to the game, one who has not had the

doctrine of modern operating standards drummed into him as Old Timers have. It is galling to hear a couple of hundred CQ's and three signs (we heard a ZL do this the other night) Raw AC and continual sweepings of the same across the entire band. Worse than ever, some have taken to using buzzer modulated stuff.

We haven't got an Old Man's kitty to spit at a la QST, but we sure get wild sometimes. This ICW stuff may sound pretty by the time it percolates across the deep blue ocean, but it is a terrible source of local QRM. It does not hurt a chap to tell him the truth over the air . . . it helps him, on the contrary, and undoubtedly a lot of our recent stations would welcome such guidance. Please Mr. Newcomer, use a monitor and listen to your own signal. Above all . . . call CQ three times only and then sign three times. You will get more QSO's with a little thinking beforehand.

Welcome to Our Ranks

With great pleasure we note the arrival in the ranks of the Australian "Ham" of a new brasspounder who has long been an Old Timer in the ken of the editors of RADIO MONTHLY. Dr. George of 2 Edwards Bay Road, Mosman, Sydney, has just been informed that he has sailed through the A.O.C.P. and is now lined up for a VK2 callsign. Dr. George is one of those short wave listeners who after spending a year or two covering the International Broadcast stations has gradually been attracted to the lure of the key. A few months copying of press news put his speed up

to normal, and his technical knowledge of radio being well to the forefront, it was inevitable that the "Ham" bug should bite fairly severely. His plans for his station are ultra-modern practice and the outcome of his ideas will be a welcome addition on the amateur frequencies, being a crystal controlled key and 'phone outfit of the 1931 breed. After seeing Dr. George's collection of high voltage ex-naval filter condensers, we are determined to pay a visit to the next island sale and bid with the rest! Those ex-government auctions seem to be well worth while for the "ham" when it is necessary to charter a launch to get home with the purchases after a very modest financial outlay!

Just in case you overlooked the coupon on page 62, fill this one in and mail it

TO-DAY

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179 Elizabeth Street,
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ADDRESS.....

Heard at VK2HC

It's interesting to note that, particularly on Sundays, the genial voice of VK2HC, from the excellent telephony outfit near Quirindi, is supplemented by the silvery tones of another, lighter in timbre, and certainly very nice to listen to. Fine business Ray, to train the YL in the Ham game! We couldn't imagine a more popular Ham anyway than VK2HC, the one most like a Grenadier Guardsman!

MAKES the Q.R.M. LOOK FOOLISH

ZL4AO may be heard each and every evening from around 4.30 p.m. to 6.30 p.m. Sydney time, working skeds with G2LZ. Judging by the way ZL4AO goes at it on the key, friend Mayer of G2LZ must be receiving him pretty solid, and vice versa. So far, we haven't succeeded in hearing G2LZ, and it looks pretty hopeless trying to hear anything of Englishmen around this time on the 700 kc band, local QRM being what it is. We imagine ZL4AO must either have a pretty good QRA for RX or else his receiver is something well out of the box in the selectivity line. We wouldn't like to guarantee to keep a sked on the 7000 kc band with Europe from our QRA in the evening and we pride ourselves on an outsize in receivers! Oh, well, if Old Timers like G2LZ are going to be on the job with the old DX spirit, we shall simply have to start getting up early once again, or better still, making all night watches of it! Does anyone know if G2OD still pounds a key?



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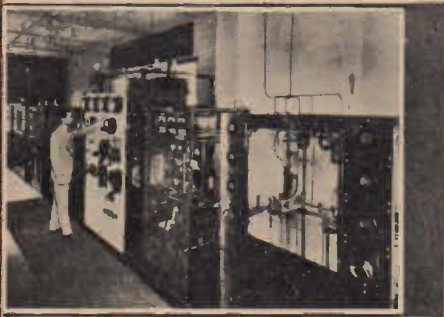
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- Kodak (A/sia) Pty. Ltd.,
379 George Street, Sydney.
- S. Hoffnung & Co. Ltd.,
163 Pitt Street, Sydney.
- A. G. Healing Ltd.,
164 Goulburn Street, Sydney.
- Lawrence & Hanson Electrical Co. Ltd.,
33 York Street, Sydney.
- Noyes Bros. (Sydney) Ltd.,
115 Clarence Street, Sydney.
- Mick Simmons Ltd.,
Haymarket, Sydney.
- Martin de Launay,
289 Clarence Street, Sydney.
- Bloch & Gerber,
48 York Street, Sydney.
- Harringtons Ltd.,
82 Hunter Street, Newcastle.



A Great Australian Organisation



20 k.w. A.W.A. short-wave transmitter installed at Pennant Hills. Used in the A.W.A. Radiophone Service and A.W.A. World-wide Broadcasting Service.



Power generating plant at the Beam Wireless Station, Ballan, Victoria.



Marine Wireless Services. Over 100 ship stations of the Australasian Mercantile Marine are owned and operated by A.W.A.

The evolution of wireless in Australia covers but two decades—from a practically unknown science it has developed to a national industry, providing communication and entertainment facilities throughout Australia and the Pacific and world-wide wireless telephone, telegraph and broadcasting services.

The progress of Australian wireless is the history of Amalgamated Wireless—developing and manufacturing wireless equipment; breaking down the isolation of travellers at sea; pioneering broadcasting; annihilating by means of Beam Wireless and Wireless Telephony the vast distances that separate us from Europe and America, and providing modern communication facilities in the British possessions in the Southern Pacific.

At the modernly equipped A.W.A. Radio-Electric Works at Ashfield, near Sydney—rightly termed “an Australian Factory in an Australian Garden”—the Company manufactures every type of wireless telegraph, telephone and broadcasting equipment.

*Beam Wireless
Wireless Telephony
Broadcasting
Coastal Radio*

*Marine Wireless
Pacific Islands
Radio Manufacture
Wireless Research*

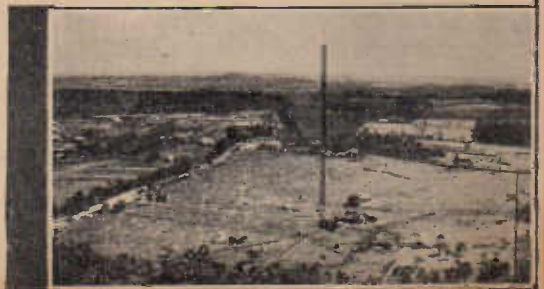
Manufacturers of “THE FISK SERIES” RADIOLA

AMALGAMATED WIRELESS (A'SIA) LTD.

Australia's National Wireless Organisation,
Employing over 1,000 Australians.



Left: “An Australian Factory in an Australian Garden,” A.W.A. Radio-Electric Works at Ashfield.



Right: A.W.A. Radio Centre, Pennant Hills.