

Wireless Weekly

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INCORPORATING "RADIO IN AUSTRALIA & NEW ZEALAND"

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FRIDAY, FEBRUARY 22, 1929

(Registered at the G.P.O., Sydney, for transmission by post as a newspaper).

SEE THE CENTRE DOUBLE SPREAD
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MULTI-ELEMENT
TUBES —



The A442 and the B443

Genuine Radio Ghosts

Why are Soubrettes?

By Ewart Chapple

Those Alluring Short - Waves

By Don. B. Knock

Hints for Beginners

By Ray Allsop

PHILIPS

"MINIWATTS"

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Why Are SOUBRETTES?

(This dissertation was broadcast from 2FC, on New Year's Eve, by Mr. Chapple, whose sense of quiet humor is equalled only by his knowledge of his subject. We print it in response to many requests by listeners, both to us and to the studio)

By EWART CHAPPLE



Some of the charming young things which worry him.

WHY are Soubrettes? One still asks the question after a long sojourn in a broadcasting studio.

There is a subtle change in the atmosphere of the studio on the day Miss Twinkletooth is programmed to sing at 4 p.m. This young lady has come through the ferry ordeal of a trial at eleven o'clock on Wednesday morning. We suspect that the gentleman listening to the trials looked at this beauty furtively through the control room window, instead of concentrating on the voice coming through the loud-speaker.

As the clock chimes four, the manager is heard to say to the telephonist, "Please tell Mr. So-and-so that I am detained at the studio this afternoon on an important conference." Simultaneously two office boys appear,

who were not due at the office until 4.45 p.m. (with Stock Exchange information and market reports), and find something to do in close proximity to the studio. Gentlemen of the control room are seen adjusting ties and combing hair. The announcer dons his coat, despite the heat, and swallows a favorite throat lozenge. Everyone seethes with excitement—except the accompanist (Ewart!)

The tall grandfather's clock in the studio palpitates with the excitement of youth, and ticks out seconds in double quick time. The sensitive microphone becomes even more sensitive—

"I await the sound of her feet,
My diaphragm would hear them and beat,
Were it earth in an earthy bed,"
in the words of the Pote.

At last! The scene of an Eastern garden rises from the lift well—
—Coty's, Godet's,

and Houbigant's combined. She comes! In his very best voice the announcer tells the waiting world the title of Miss Twinkletooth's masterpiece "When You're With Someone Else I'm at the Pictures." The poor accompanist's eyes start out like organ stops. He is trying to decipher a dreadful manuscript, and wonders what the weird signs like Railway Signals and Bicycle Wheels mean. The control room staff is monitoring as it has never monitored before. It's needed, too. The manager in his sanctum sits with the earphones glued to his head. The voice coming from a loud-speaker holds the office boys enthralled.

At last, the song is done. The eyes of the accompanist return to normal. The announcer falters over his next item as Miss Twinkletooth sweeps from the studio. Relaxation. The manager goes back to his dictation. The office boys remember market reports.

The control room gentlemen resume their unbiased attitude towards the programmes. Once more the station has survived. Once more it is itself. Only a weary accompanist, aiding a sorrowful comedian with a sorrowful comic song, wonders sadly "Why ARE Soubrettes?"



Mr. CHAPPLE looking very bored.

ALEX GURNEY

BETWEEN YOU AND ME AND THE MICROPHONE

Not At All

A LETTER to one of 2FC's announcers ends on this note: "Also, a little flattery. I consider your announcing Perfect—possibly the best on the air." What we want to know is: Is this flattery or is it not?

Will You Be So Good....?

DURING the Test matches 2BL had many telephone inquiries for the scores, as many people seemed to think that the radio stations would have the latest news. So numerous were the inquiries that the telephonists were instructed to give no results or scores over the 'phone. Then came the period of excuses. They ranged from "My set's out of order; can you give me the scores?" and "My batteries are run down; can you tell me...?" to "I just tuned in and heard the Sheffield Shield results; how'd the Test go?" and "The static's bad out here; will you please...?" Run-down batteries gain first place in the list. You would be astonished at the number of forgetful people there are in Sydney

I SAY WILL YOU TELL ME THE SCORE! THE CHAP NEXT DOOR HASNT GOT HIS LOUD-SPEAK GOING



Radio-Telepathy

TO Captain Stevens, at 2BL: "I heard a record, 'I Love You Truly,' during your morning session, and, joking with my people, I said, 'Play that again, Captain Stevens,' as I wished to play it on the violin. Three minutes later you played it again. Was that telepathy?" Captain Stevens gives evidence as follows: "This is a genuine instance of mental telepathy. I hardly ever repeat a record of my own volition." He adds that most Highlanders (he is a Highlander) are steeped in superstition, and gifted with second sight; and in the absence of any suitable joke about using the same needle twice we accept the Captain's explanation.

Con Bowlerhate

"ANDANTE CANTABILE. The Mood of the Evening Song." Mr. Bryce Carter, playing in the Quartette at 2BL, noticed these



words at the top of the page, and was lost in dreaming. We mean to say, he must have been lost in dreaming, because he took up a beautiful black bowler hat from a near-by chair and placed it absent-mindedly and rakishly on his head, where it remained until the andante cantabile movement was completed. We do not know why Mr. Carter did this, and we are afraid it will always remain a mystery. But we place it on record as a record which not many other prominent 'cellists will dare to assail.

It Was Ever Thus--

COMPOSED in the control room while a soubrette was singing.
First voice: "Good girl!"
Second voice: "Good voice!"
Third voice: "Good figure!"
Fourth voice: "Married!"
Chorus: "Good night!"

Mineral Waters Interference

A THEORY has been advanced that the troubles with radio reception in Wiesbaden, Germany, come from electrical discharges caused through chemical reaction of the mineral waters under the town. At certain times during the day Wiesbaden listeners hear miniature explosions, sharp cracklings, deep rumblings, and other unpleasant sounds. It has been suggested that some of the sufferers taking the cure may be broadcasting. This leads us to ruminate on reception above Tooth's.

RADIO TRAGEDY No. 6

The Announcer was gay, the Announcer was bright,
And he said, "Jacky Smith had his birthday to-day,
And so we are pleased to call Jacky to-night—
We hope that his party is merry and gay;
And if Jacky will look
In his cupboard or chest
He'll find a new book—
It is one of the best—
It's all about Elephants, Tigers, and such.
And I'm sure little Jacky will like it SO much!"

So Jacky Smith went to his cupboard or chest—
His father was drunk, and his mother was dead,
And hopes of a present, as you may have guessed,
Had never before entered Jacky's thick head—
And he had a good look
In his cupboard or chest
To find a new book—
It was one of the best—
It was all about Elephants, Tigers, and such:
"I'm sure," muttered Jacky, "I'll like it SO much!"

The present was not where he thought it would be,
Because Jacky Smith didn't know what we know—
Two Jacky Smiths had the same birthdays, you see.
But still we are sure, if young Jacky could go
And have a good look
In his cupboard or chest
And find a new book—
One of the best—
All about Elephants, Tigers, and such.
Young, ignorant Jacky would like it SO much.

Discernment

A BOWRAL resident congratulates a 2FC soprano. "Her technique seemed to embrace the complete art of singing," he said, "especially as she sang free from static." This indicates an advance in listeners' critical tastes, as, not long ago, it was quite the usual thing for a listener to mistake a soprano for static or static for a soprano. It shows that Australians are getting used to the fine distinctions and nuances of artistic expression.

Families

RADIO Uncles may talk of their large families, but Uncle Bas, of 2BL, recently sent a birthday call to an old lady with two hundred and fifteen children, as follows:—11 children, 75 grandchildren, 125 great-grandchildren, and 4 great-great-grandchildren. One picture Uncle Bas calling over their names during a family re-union.



Radio Soliloquy

IN England a B.B.C. official stated that the radio drama of the future will contain more psychology than action; and prophesies a return of the soliloquy. This is interesting, because the New Zealand station 2YA has been broadcasting scenes from the plays of William Shakespeare, acted by Mr. Allan Wilkie and his company. Now, Shakespeare is essentially the dramatist of the mind, and his soliloquies are many and very beautiful. Moreover, Shakespeare is essentially the poet. He wrote for stages without scenery, and made up for his lack of background and atmosphere with the perfection of his metaphors. We may see a great revival. It will be interesting to know how the New Zealand Company's broadcast came through.

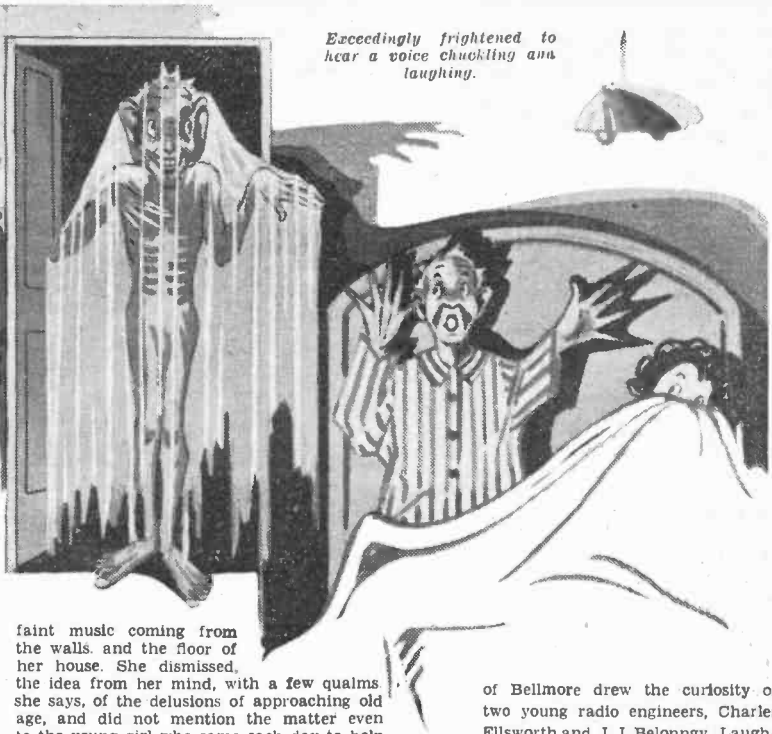
Raindrop Prelude to.....

THE night was dark and stormy; and it was Sunday night; and the Manly Band was broadcasting from its rotunda; and the sound was being sent through 2BL to listeners-in throughout New South Wales, for their amusement, delight, and uplift. Suddenly, disturbing the stillness of the control room, came the sound of the telephone bell, insistent, sharp, and assertive as any rent-collector. "The water's coming 'in on the Band," said the voice, "and they're all soaking wet. What'll we do?" "Ask them if they are thoroughly wet," said Mr. Jack Barnett, who was relieving announcer for the night. "They are," answered Mr. Tom Innes from the control room. "Then tell them to keep on playing," said Mr. Barnett; "they can't be any worse." But things did not fall out in this manner. The band floated off the air; and Mr. Barnett made an announcement and played some gramophone records to make up the lost time.



RADIO GHOSTS

Remarkable freaks of natural radio phenomena have been responsible for many uncanny experiences. Those related in this article are perhaps unequalled for their persistency.



Exceedingly frightened to hear a voice chuckling and laughing.

WALLS always have had ears, but it has remained for radio to furnish them with voices, and provide baffling and authentic "spirits."

Talking wire fences telegraph posts, and other vocal freaks, have sometimes been reported by readers (such a one appears in our "Safety Valve" page this week), but they have not always been believed, and there must be many such cases which are never reported, because of this scepticism, or because of the observer's reluctance to believe his own ears.

Such a case was that of the house of Mrs. Sarah Greenmyer, an elderly lady, living alone in her home at the country town of Bellmore. It is remarkable, because of the unusual persistence of the supposed "spirit" sounds, and stands as an example of natural radio phenomena unequalled in our experience.

Mrs. Greenmyer was not naturally more superstitious and nervous than most people, but on several occasions during the existence of the "spirit" voices she feared her own sanity. One night she thought she heard

faint music coming from the walls, and the floor of her house. She dismissed the idea from her mind, with a few qualms she says, of the delusions of approaching old age, and did not mention the matter even to the young girl who came each day to help her with the housework, poultry, etc.

The music did not occur again for some time, until one wet night in July. On that night she heard the music again, and, in addition to the music, a man's voice talking indistinctly in a long monotone. The sounds continued intermittently throughout the day and night.

Mrs. Greenmyer had never listened to a radio receiver, and there was no apparatus which might have produced the sounds within a mile or so. She, therefore, was completely mystified by the sounds, which continued intermittently, especially on wet nights or during thunderstorms. Then, with the flickering lightning and the rain and the wind, the queer sounds, which seemed to become maliciously angry, frightened her completely.

She was finally convinced that the place was under a spell, or else that she herself was under a spell of unsound mind.

Finally she decided to vacate the house and rent it.

Mrs. Greenmyer leased the house several times, but prospective tenants, hearing the strange music and voices emanating apparently from nowhere left quickly. One man, who was exceedingly frightened one night to hear a voice chuckling and laughing, and (according to his story) singing blasphemous hymns while he and his wife were in bed, threatened to sue Mrs. Greenmyer.

The affair blew over, but the attention it attracted in the local press

of Bellmore drew the curiosity of two young radio engineers, Charles Ellsworth and J. J. Belongny. Laughing

at the local superstition, they investigated the phenomena for several months, but were unable to locate the cause or source of the music and voices. However, they established one fact, which routed the local idea that "spirits" were abroad, for on one night when the sounds were clearer than usual they were able to recognise one of the voices as that of an announcer of a local broadcasting station.

Still puzzled, they wrote to Clifford Himoe, a professional ship's wireless operator, whose acquaintance they had made, and who visited the "haunted" house during his next leave.

Himoe was of the opinion that the whole thing was a practical joke, and the three again made a thorough search of the house for possible concealed radio apparatus. Walls and metallic fittings were taken apart, and rooms ransacked, but nothing was found.

Himoe later searched the cellar. An old water system there particularly attracted his attention. It consisted of a tank, a pump and pipes, which were encrusted with green corrosion. He noticed that the electric conduit, which carried the lighting wires from the local power-house for the house hung loosely in the air, and was touching one of the corroded water pipes. Upon lifting the conduit the contact was broken, and the music stopped.

He then found that by placing his ear to the floor upstairs he could hear the music in its greatest volume. The vibrations then seemed to originate in the old water system, which in turn transmitted its vibrations to the heavy floor beam.

The three decided the corrosion on the water pipe was acting as a rectifier, and the charge built upon the water in the tank was acting as a condenser, and vibrating synchronically with the music. The water and the pipe then transmitted the vibrations to the floor.

Thus a complete radio receiving station was formed by natural causes. An electric conduit was the aerial, the water pipe was the ground wire, the corrosion on the pipe was a crystal rectifier (the Kuprox system),



Astonished to hear faint murmurings from the bath heater.

the water was the condenser, and the dining-room floor, actuated by the vibrations in the pipe, was the loud-speaker. The better reception during wet weather was explained by the better contact made in the damp cellar and the filling and the therefore altered capacity of the water tank condenser.

Thus a perfect plot for a detective yarn was acted in real life. Many similar stories have been recounted by listeners, but none in which the evidence and explanation was so definite.

There is the report of the listener who was astounded one day, while seated in his bath, to hear faint murmurings from the bath-heater. Being a radio fan, however, and, therefore, well acquainted with broadcast music, and of an inquiring turn of mind, he soon discovered the cause, which was, in effect, the same as that recorded above.

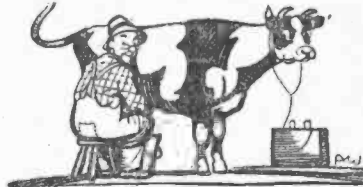
Other radio phenomena of a similar nature remains to be explained. For instance, this report from a listener:—

"We live in an age of marvels," he writes (a clergyman). "Recently an American stated that a cow gave twice as much milk

when a radio set was installed in the out-houses and the set was in action when the milking was done. An Italian has also claimed that a dozen hens that were brought up in a pen in which a wireless set operated all the afternoon increased their egg production a hundredfold. These claims may be true or not. For four years I have had a row of chrysanthemums ten yards in length in my garden. Two yards of the row at one end produced much better flowers than the rest of the row the first year, and I

wondered how on earth it was. As far as I could remember, no extra manure or care had been bestowed on that particular spot. The second year I had moved the roots that produced the good blooms to the other end so that they might get more sunshine. But again it was the same end that produced the blooms that everybody admired, whereas those the other end were quite ordinary. It dawned on me the third year that my wireless "earth" was buried under the earth where the blooms gave such satisfaction, and I came to the conclusion that the ether waves had something to do with the extra growth and extra beauty. No gardener who knew something about electricity was able to assist me very much, so I decided to experiment further. This year I buried my "earth" wire in such a way that it would affect the whole row of chrysanthemums equally. I had a most wonderful show of blooms. One wonders where radio's results will end!"

The more we hear of such things the more respect we have for the ancient wizards and sorcerers, whose accounts may not often all be the result of pure imagination.



Gave twice as much milk

March of Radio Progress in Great Britain

By
J. E.
GRAHAM

(London
Correspondent
of "Wireless
Weekly")

The Transatlantic Telephone

ONE does not hear much nowadays about the transatlantic telephone, for, after the blaze of newspaper publicity which heralded its opening it sank into obscurity—as far as the general public was concerned. But

nevertheless, it continues to do its work, as a few facts will show.

At the end of one year of working daily calls had quadrupled. To meet this another complete system was installed, and now a third is being constructed, and will be put into operation about next July. A fourth circuit is also contemplated.

Originally the service was between London and New York. Now it embraces on this side, Great Britain, France, Germany, and 10 other European countries; on the other side any part of the U.S.A. and the chief towns of Canada, Mexico, and Cuba.

The Post Office practically guarantees that no call shall be wasted—if the person asked for is within reach of a telephone he is found. Thus recently a call to a man in London was switched through to Paris. It missed him there also, and was put through to Berlin, where he was finally located. If the person absolutely cannot be reached a "search" charge only is made.

The fee has been reduced from £15 to £9 for a three-minute conversation, with extensions at the rate of £3 per minute. It is found that very few conversations stop after three minutes, but almost all are extended.

So it can be seen that the trans-Atlantic telephone has fully justified its existence. And now there is talk of a London-Australia service. What a boon that would be! I'm sure every other Australian in England joins me in hoping it will come to pass.

Broadcasting House

THE B.B.C. announces that it has decided to build itself a new headquarters worthy of the broadcasting organisation in this country. The present Savoy Hill accommodation is very inadequate, and accord-

ingly a site has been obtained near Oxford Circus, in the heart of the West End of London, and work on the new premises will begin almost immediately. It is estimated that the building will be completed in 1931, and will cost about £500,000. All the studios will be in the vast central tower of the building, and will be surrounded by wide corridors and thick brick walls to cut them off from external noises. This tower will not contain any vertical steelwork, as by this means it is hoped to eliminate sound interference between studios.

There will be about nine studios, and four of these will be at least 50 feet by 45 feet. There will also be a "super" studio, three stories high, and capable of accommodating an audience of 1000, in addition to a large orchestra. Each of the four large studios will have its ante-rooms, viz., waiting room, engineer's room, announcer's room, listening room, and echo room. There will also be eight rehearsal rooms, six waiting rooms, a reception suite, and a dramatic effects studio.

It may be added that the listener's license fee (10/ per annum) is not to be increased to pay for Broadcasting House. Apparently the B.B.C. has already accumulated enough to pay for its new home.

New Apparatus

THE latest addition to the gramophone pick-up is the special "carrier," a kind of dummy tone-arm for the pick-up. The usual gramophone tone-arm is supported by the needle when playing, and when the comparatively light sound-box is removed and a heavier electrical pick-up substituted, it is found that record wear is much more rapid. These "carriers" are fixed so as to give only horizontal movement, and thus impose only the weight of the pick-up on the record. They also give accurate "tracking," especially the "Raytrak," which moves along a rod in a straight line from the outer edge to the centre of the record. Its price is 35/ (duty into Australia about 12/3). A cheaper make, but none the less a good one, is the "Wamel" at 7/6 (duty 2/9).

Phillips have brought out a pick-up which they claim is as light as an ordinary sound-box. It certainly looks very attractive and sells for 50/ in England. They also announce a two-valve gramophone amplifier, using Mullard valves (there are no Phillips

valves in England). The second valve is a penthode, and the outfit sells for £6/10/ without batteries or loud-speaker.

The manufacturers of moving coil loud-speakers have apparently discovered that there are not many people in England who can afford to buy them at present prices. Accordingly they are again devoting their attention to cone speakers. Balanced armature reed drives have been on the market for some time, but lately their number has been greatly increased, and now a number of firms are offering aluminium "crack" frames, with centring devices, etc. Apparently the phenomenal success of the Ampillon "Lion" has boosted the cone once again.

Westinghouse metal rectifiers are increasing in popularity, both for charging accumulators and for "B" eliminators. For the latter type H.T.1 passes 200 volts at 100 mA., and seems very satisfactory. No valves to break, no liquid, no noise—it sounds very attractive. And the manufacturers of dry "B" batteries are "getting the wind up" about it!

Picture Transmission

"FULTOGRAPH" apparatus for the reception of pictures is now on sale, and the price of the complete installation is about £25. It is connected to the ordinary receiver, in place of the loud-speaker, and is remarkably simple to operate, automatically starting and stopping itself.

Two improvements to this system are to be made shortly. The first is connected with transmission, and will allow the original picture to be transmitted by means of a photo-electric cell. At present a copy of each picture is made, and the "pen and rotating cylinder" system of transmission employed.

The second improvement is concerned with reception, and it is announced that a special sensitised paper will be available, which will not need "doping" before it is fixed to the cylinder. It will only have to be dipped in distilled water before use and dried in front of a fire afterwards.

Both these improvements should make for better and clearer pictures and easier operation.

Daventry, 5XX, and several Continental stations continue to broadcast pictures daily.

"A" and "B" Class Broadcasters in New Zealand

How Radio is Faring in the Dominion is Told in This Article.

By a N.Z. Correspondent

LISTENERS in this Dominion follow keenly all broadcasting developments in Australia, for it was the enterprise of the Commonwealth stations that gave the first big impetus to the sale of receiving sets here. The state of flux in which Australian broadcasting now lies is of natural interest to Maorilanders, for conditions on this side of the Tasman are very different, and broadcasting has not yet attained the popularity that it has reached in Victoria and New South Wales, nor does it yet cater so fully for public requirements.

The right to receive 25/ of the 30/ annual receiving set license fee collected by the Government is a monopoly granted to the Radio Broadcasting Company of New Zealand, now operating stations at the four main centres of population. One of these stations, 2YA, Wellington, is of about the same power as 2LO and 2FC, but does not compare with either of these in quality of transmission or in programmes. Naturally, in a community of fewer than one million and a half, isolated as it is, there are big difficulties in securing varied talent, and there are recurrent complaints of monotonous repetition in the nightly broadcasts from many of the 45,000 listeners now licensed.

Here there is virtually no co-operation with theatrical interests, the microphone being a stranger to most of our big theatres, though there are regular relays of picture orchestras. Sporting interests are well catered for, but the authorities controlling racing and trotting have lately placed a ban upon broadcasting from their courses the descriptions of events as they are run. Now horse-racing is described, with varying success, "over the fence," and listeners are very indignant at the curtailment of a privilege which they regarded as a right. Bookmaking is an illegal occupation which flourishes in New Zealand, one of the main reasons advanced for the prohibition of racing descriptions and results being that it was all to the benefit of the illegal bookmaker and to the detriment of the totalisator.

In addition to the "YA" stations controlled by the company, which has a monopoly of listeners' revenue, there are several small privately-owned broadcasting plants throughout the Dominion, but only one of these, 3ZC, Christchurch, which transmits both on the broadcast band and upon low wave, has any pretensions to power.

A movement is afoot for a federation of what are termed "B" class transmitters to operate in all of the centres, and to run an "all-day" service, without financial support from listeners. These "B" broadcasters, as in Australia, hope to defray expenses by the selling of time on the air. Naturally the N.Z. Broadcasting Company opposes this proposal, for presumably it foresees that at the end of its present monopoly, three years hence, there may come a demand for a division of the spoils.

The radio trade, which is numerically a big body, and is organised throughout the Dominion, sponsors the new proposal, and listeners would undoubtedly welcome the advent of additional stations with increased power and longer hours of transmission. Application has been made to the Government for official recognition of the scheme pro-

pounded by the amalgamation of the small private stations, and, if the weight of radio opinion counts in the decision, there is a certainty that New Zealand will have more good stations on the air, and longer hours of service.

Since exclusive privileges were granted over three years ago there has been a change of Government, and the United Party, new in office, may not be as sympathetic towards the existing system as were its predecessors.

The present Postmaster-General, the Hon. J. Donald, is himself a keen radio enthusiast.

and listeners who are not content with current conditions are looking to him to institute reforms which will be for the betterment of our service. There is the probability that the coming months will witness a number of reforms and innovations which are necessary, for conditions have changed materially since certain rights and privileges were granted to our very earnest but much discussed and criticised Radio Broadcasting Company. Australia certainly has given us a lead, and has shown far greater enterprise in handling its radio problems.

Development in New York

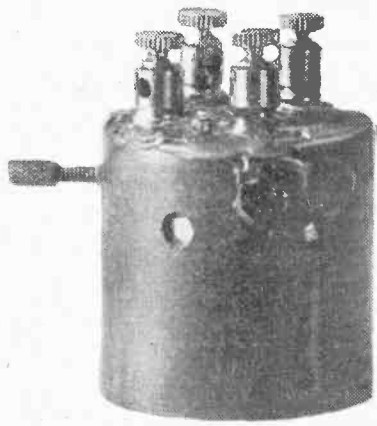
THE overseas representative of the New South Wales Broadcasting Company, Limited, writing under date of December 20, from New York, makes interesting reference to the progress of radio in the U.S.A. during 1928, and also deals with the prospects of broadcasting during the new year. He says:—

"As the year 1928 draws to a close, it may be of interest to review the growth of radio in America during the preceding twelve months. The year 1928 has been exceptionally good for the radio business here. Several major causes for this success may be cited. In the first place, the transition period of 1927, during which time the manufacturers were changing over from the battery-operated sets to the A.C. receivers, has now been definitely passed, and the latter type have

been brought to a point of compactness and simplicity which has materially helped in gaining the public confidence. A.C.-operated receivers now outsell other types at the rate of about 10 to 1. The Presidential election was another major factor in increasing the interest in, and sales of, radio during recent months. In addition, the high standard of the programmes, over the various chain systems, has contributed to a great extent in the continued growth of the industry.

"Each year the question of 'saturation point' crops up, but the actual figures, for this year at least, show that this point need not be considered for some time to come, if at all. For example, a very large percentage of the present sales are replacements. In this direction the public opinion is being moulded, both by the advertisers and by the Radio Commission itself, to the realisation that those owning receivers of the 1924-5 vintage are receiving also the quality of that period. The older sets were not designed to reproduce the lower frequencies and overtones which distinguish the better grade of receivers to-day. At present there are no radical changes in sight that will tend to make obsolete the sets now on the market. Television is still some years ahead as far as the public is concerned. Such changes as the increased adaptation of the dynamic speaker and the new screen-grid valves, both of which will be featured in the 1929 receivers, are of minor importance.

"The quality of the better type of receivers, and of the transmitting equipment, is of such a high order that I doubt if the quality can be improved upon for some time to come. The speaker, however, is still the weak point in the chain, and it is to this that we must look for future improvements. Eye-value, as exemplified in the wide selection of period furniture, has been another factor in enlarging the sales of receivers. In some quarters art consoles are being sold in greater quantities than the table models. A highlight in the broadcasting schedule for 1929 will be the Presidential inauguration ceremonies. In addition, the broadcasting companies are making arrangements for several series of operatic and symphonic presentations, that augur for continued development along the programme side. Taking the above facts into consideration, it is not surprising that all sections of the trade are optimistic with regard to the continued growth of business in the New Year."



Mr. S. Pauly, of Waverley, noticed some minute receivers illustrated in "Wireless Weekly" recently. He read the caption, "Can you beat this?" so he tried, but failed, for the original receivers were considerably smaller. However, it is a very good effort. This little crystal set is contained in a valve-base. The knob seen is for rotating the catwhisker on the crystal. The coil is wound on a match.

Charging Your Own WET "B" BATTERY In Half an Hour

How to charge your wet "B" Batteries by using the power from an A.C. main. A simple rectifier published at the request of a number of correspondents.

ALL ACCUMULATORS, or storage batteries, as they are sometimes called, require direct current for charging purposes. Difficulty is met by the city listener, owing to the fact that in most cases alternating current only is available. This is because A.C. is more easier to distribute. Therefore, those readers whose receivers are supplied with plate current and voltage from wet batteries, have to carry these cumbersome articles to a charging station, unless some means for rectifying the A.C. current is at hand.

Briefly, by rectifying A.C. we change an electrical flow which has no evident polarity into a flow in which the positive and negative leads are constant. With the simple rectifier explained in this article, wet "B" batteries can be charged at any moment.

WHAT YOU WILL REQUIRE

The parts can be assembled at small expense, and with little difficulty. You will require a large jam-jar, approximately four inches in diameter, and six inches deep, a strip of lead, 1-16th of an inch thick, two inches wide, and six inches long; one strip of aluminium to the same specifications as the lead strip; four bakelite head terminals; one electric light socket; one forty-watt electric globe; one socket (as used on the power end of an electric iron, for plugging into the mains); twenty feet of twin flex; and half a pound of ammonium phosphate (pure). It is very important that the ammonium

phosphate and the aluminium strip be as pure as possible, otherwise the rectifier will work poorly, if at all. The globe should also be of good type if best results are required

CONSTRUCTION

The construction is clearly shown in the illustration, and very little explanation will be necessary.

First, paint a piece of three-ply wood, measuring 4 1/2 inches diameter, and cut to circular shape, with shellac varnish. It will soon dry. In the centre of this piece of wood, which is to form the cover for the rectifier, mount the lamp socket, and where the two inlet holes reach the wood bore two holes.

To one hole connect the lead strip. This

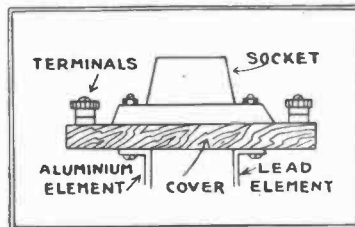


Figure 3.—Showing the method of adapting the socket to rectifier head.

should be done by bending the end of the strip about half an inch from one end, and then carrying a connection to one side of the socket. Treat the aluminium strip in the same manner, only take it to the other side of the socket. Make certain both ele-

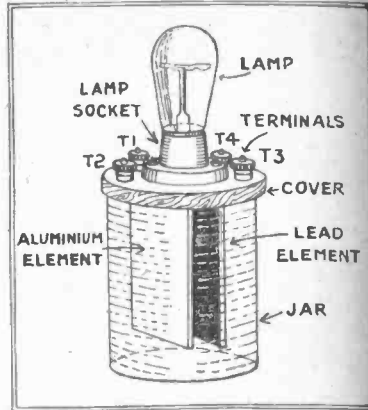


Figure 1.—The Finished Rectifier.

ments are rigid, otherwise the mains may be blown, owing to a short circuit.

The four terminals should be mounted one in each corner of the lid, as shown.

Next, mix the solution, by dissolving half a pound of ammonium phosphate in two quarts of water. This should be poured into the jar.

To wire the rectifier connect one side of the power socket to one side of the lamp socket, and thence to one of the terminals (T1). From the other side of the power socket carry a lead to T2, which is that terminal on the same side of the rectifier as T1. Connect T2 to T3, and thence to the negative terminal of the battery to be charged. Return now to the other side of the lamp socket, and connect this to the lead plate. This can be done in a simple manner, if reference is made to the diagram. Next, connect the aluminium plate to the remaining terminal (T4), and thence to the positive terminal of the battery to be charged.

To avoid any error it is advisable to mark terminals T1 and T2, "Input," and terminals T3 and T4, "Output." Special care must be taken to see that the aluminium plate of the rectifier connects to the positive terminal of the battery to be charged, otherwise you would ruin your battery by charging it in the wrong direction.

Be careful, also, that the screws inserted on one side of the cover do not come into contact with the screws projecting from the other side, as this might cause a short circuit. To prevent the creeping of the solution, which is termed "electrolyte," float a little paraffin oil on the surface.

The lid should not be clamped down, as gases must escape. If the lead and aluminium plate hold the lid too tightly to the top of the rectifier, it would be advisable to drill a few small holes in the wood top to allow these gases to escape. When using a 40-watt lamp, a medium size battery can be charged in half an hour, others in proportion.

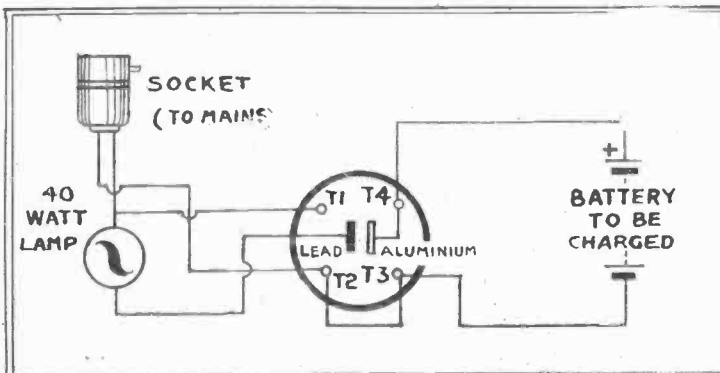


Figure 2.—Circuit Diagram.

2FC SHORT WAVE-LENGTH ALTERATION

UNDER the re-arrangement of short wave-lengths, as the result of the recent International Broadcasting Convention, held in Washington, the low wave-lengths used by Station 2FC on their short wave transmissions, viz., 28.5 and 31.5, have now been cancelled, and the new wave-length that has been allotted to the New South Wales Broadcasting Company, Limited, for use from its 2FC station is 31.28. Short-wave enthusiasts should make a note of this alteration.

PROGRAMME PERSONALITIES



Maestro

MR. G. VERN BARNETT (opinions vary as to the ultimate significance of the "G") was born in Victoria, and spent his early childhood days there. Then he was taken to England, where he stayed for five years, and commenced his schooling. When he was ten years old he came back to Australia; even unto our own charming city and its most beautiful harbor.

When he was fourteen years old he was playing a church organ. At eighteen he was introduced to the Town Hall organ, and for twenty years has maintained the acquaintance.

It was all cut and dried that he should follow in the footsteps of his father, and become a dentist; but either because he found the duties of this profession too extracting, or because, as he says himself he preferred making the keyboard ivories jump, he did not follow in the footsteps of his father and become a dentist. Although he says that if he had taken his father's advice he might by now have been one of the despised rich, instead of a muddling-along musician.

We very much doubt it. Look at the head of Mr. Barnett on this page and see if you can imagine it leaning over you with a drill in its hand, so to speak. It has not the atmosphere one would expect from a dentist's head. Nothing like it. We feel inclined to congratulate Mr. Barnett on his escape; and we can say definitely that, were he a dentist, we should refuse to take advantage of his services. He doesn't look the part. Besides the man is positively cheerful.

Now a churchwarden can be cheerful, because it is his Christian duty to be of good cheer. We once heard of a comedian who was cheerful; but this was only because he thought the novelty would add to his salary. But Mr. G. Vern Barnett is always cheerful for no reason whatever. People say, "Why is Vern (he is known among the intelligentists as Vern) always so cheerful?"—and the re-



MARJORIE FRITCHARD

ply is always. "We do not know why Vern is always so cheerful, although we suppose it is just natural." He says silly, childish things. He pulls ridiculous faces. He makes puns. (2BL wobbled on its foundation on the night he adjudged a man "a crocodile for allegations.") But his most cheerful moments are those when he is most serious. He can argue for hours on abstruse subjects in which he takes no interest, with

a perfect sincerity and a touching conviction; and his joke is in proportion to your belief in his arguments. He can talk nonsense with the intensity of Mr. Bruce delivering a policy speech. And he can mimic anyone. In fact, he has all the characteristics of the child and the dreamer. If you can imagine such a man as a dentist, we can't. We think that the tooth-pulling profession should be protected from leg-pullers. We think that it is lucky for people with toothache that Mr. G. Vern Barnett has embraced the comparatively harmless profession of music.

Mr. G. Vern Barnett is believed to be not without honor in this profession. During the past 18 years his name has appeared here and there and from time to time, as a pianist or accompanist or organist or conductor or teacher or et cetera. He was associated with the Philharmonic Society as organist and deputy conductor for eleven years. He has been associated with all the leading musical societies of Sydney, including the Sydney Madrigal Society, the Apollo Club, the Welsh Choral Society. He toured with the London Concert Company, the Albert Goossens Company, with Frazer Gange, Amy Evans, Elsa Stralla. He has been roped in as adjudicator by most of the principal elisteddods in Australia and New Zealand. He has accompanied many world-famed artists, and has appeared as accompanist at over one thousand concerts in Sydney alone.

He has been associated with broadcasting for the past three years, and has become very well known as "The Man Nobody Knows." That is, he is the 2BL pianist and accompanist. He is also the musical director. When the announcer says, "Mr. O'Shea will now sing," he does not say, "and Mr. G. Vern Barnett will accompany." But we have an idea that everything in the gardening would

not be so beautiful if Mr. G. Vern Barnett were to fade away. Baritones and altos, sopranos, tenors, and basses, violins, cellos, and quartettes bloom in their seasons; but Mr. Barnett, Mr. Barnett the Evergreen, the Hardy Perennial, must bloom in, er—Vernal sweetness throughout the year.

We almost forgot to mention that Mr. G. Vern Barnett has been announcing during the 2BL evening sessions for the past few weeks. His chief worry was whether he should say "Good-night, everyone! Sleep well!" or "Good-night, everybody! A good night's rest." He chose the latter adjuration, because the penny came down tails.

A Singing "Story Teller"

FOR four years Mr. Alfred Cunningham has been settled in Australia, and during the past nine months he has toured Australia with the Metropolitan Opera Stars, a company including Rene Maxwell, Madame Lillian Gibson, and John Priora. At the close of his season in Melbourne Mr. Cunningham will return to Sydney, to say farewell or au revoir, whichever the future will make it, to Australia. He will say it through 2BL on February 28, and through 2FC on March 5. This is because Mr. Cunningham is going over the bounding seas to Canada to join the Westminster Glee Singers under the conductorship of Edward Branscombe, in whose company he came out to Australia some years ago.

Mr. Alfred Cunningham has travelled over the best—and worst—part of the world. Africa has seen him, and Canada and England and India and Australia and New Zealand—also China. He was first professional to broadcast from the Shanghai station about five years ago.



Mr. Alfred Cunningham.

His Australian broadcasting began three years ago from 2BL. After twelve months he went to 2FC, and has sung from that station intermittently ever since.

The microphone has no terrors for Mr. Cunningham. "Singing," he says, "is glorified story-telling. It is not a method of exploiting the voice. It is not an end in itself. The singer must visualise his song, and sing it so that everyone will understand it. To do this he must be sincere, and he must believe in what he is singing. I do not

worry about microphone technique, because I am sure there is no such thing. There is only voice production." Therefore, he sings just as he would sing in a concert hall, and people write in and say that they would like to see if he looks as happy as he sounds. These principles were tried by Mr. Cunningham during 2FC's famous Empire programme last year. His laughter and his

singing of Simon the Cellarer were highly praised in the cables for their clarity.

Mr. Alfred Cunningham believes that broadcasting is going to lead to the Brotherhood of Man. He believes that it will ensure universal thought, and universal language; and he thinks that this language will be the English language.

"I am satisfied," said Mr. Alfred Cunningham, "that broadcasting will prove to be one of the most potent factors in bringing about the 'Brotherhood of Man,' through the greater understanding of every nation by every other nation, which can only come through the facilities of such close intimacies as those provided by the wonders of wireless. Then, again, I am always grateful for the opportunity the radio presents of bringing the atmosphere of goodwill and good cheer to the unfortunate inmates of hospitals and sick-chambers, and the otherwise isolated people in the back of beyond."

Javan Massonoff

FEW vocalists have had a more interesting career than Javan Massonoff, the international tenor, who proclaims that he is a Russian by birth and English by adoption. He commenced his vocal training at the Royal Academy, London, under Professors King and Leithard, and completed his musical education in Italy under Signor Terrasi. He is well known throughout Russia as an operatic tenor, and sustained the leading role in many operas, and gained a distinct personal triumph.

Whilst in England he did many seasons of high-class vaudeville work, appearing at the London Coliseum, with many distinguished artists, and it is interesting to learn that in addition to many engagements with the B.B.C. he was one of the first artists to make a test at the Devonport broadcasting station, which proved highly successful.

He is a well-known and very popular vocalist in South Africa, and when the Capetown Band, of 75 performers, went to England on tour, he was selected to accompany them, being chosen from many applicants.

When in South Africa he had the pleasure of singing the beautiful "Kol Nidrei" at a gala concert, and was warmly complimented by the Princess Beatrice and the Duke of Athlone. He has made many gramophone records, and, from his extensive repertoire of gems from the works of French, German, Italian, and Russian masters, he is always able to select something that will make a wide appeal to listeners of all degrees of musical tastes.



Javan Massonoff.

2FC's New Announcer

MANY complimentary comments have been received by the New South Wales Broadcasting Company, Limited, on the descriptions given by the new announcer through both the company's services. He happens to be Mr. C. R. Hall, whose talks on Persia have been one of the features of 2FC for some considerable time. Mr. Hall won the Radio Elsteddfod in the section devoted to Impromptu Announcers, and one listener, writing this week, says: "We have recognised the voice of the new announcer as the one who won the Radio Elsteddfod." Mr. Hall's description of a city newspaper going to press was very vivid. His next intention is to go underground in overalls and describe the City Railway from the many tunnels beneath the Sydney Town Hall.



2 BL'S NEW ANNOUNCER

MR. A. C. C. STEVENS has been appointed by the N.S.W. Broadcasting Company, Limited, to carry out the duties of announcer, following on the resignation of Mr. J. Knight Barnett, who has taken up the position of organist at the Capitol Theatre. Mr. Stevens has had an unusually varied career, the particulars of which he supplies below.

1. Born in India (Singassa—Tirhoot Presidency) of Scotch and English parentage.
2. Educated in England, Clifton, Bath, and Aberdeen University.
3. Originally destined for the medical profession, I relinquished same in 1900 to take part in the Boer War in South Africa, and received a University Commission in the Royal Field Artillery, and nearly died of enteric in South Africa.
4. In 1902, after being invalided home from South Africa, went to West Africa and joined the West African Frontier Force (W.A.F.F.) to whom I was attached for five years. Later I was lent to the Political Department as a resident (District Officer) in Bassa Province, N. Nigeria. My chief was Sir Frederick Lugard.
5. After my term of service in N. Nigeria—proceeded to India to rejoin my Battalion. Served with R.F.A. for five years in India in various stations (Jubbulpore, Tremulgherry, Bangalore).
6. Resigning from the British Army I came to Australia and after a spell of civil life—during which I was for a time a member of several of J. C. Williamson's shows, including "The Taming of the Shrew," with Margaret Anglin and Henry Kolver; "The Sign of the Cross," with Julius Knight and Beatrice Day; "The Duchess of Danzig," Florence Young and Reg. Roberts. I joined the Royal Comies (J. C. Williamson) and went on tour with "The Merry Widow," the "Girls of Gotenburg," to New Zealand. I understudied the principal baritone. Mr. James Hughes.
7. In New Zealand I decided to try my hand at farming and left the stage to go into partnership with an old friend. We ran a dairy farm at Papatoetoe, near Auckland. This was the hardest work I have ever done.
8. Upon the arrival of Lord Kitchener to advise on defence matters, trained officers were in great demand and I was appointed to the New Zealand Staff Corps, and served with them right up to the Armistice, 1918, when I resigned to enter civil life as a journalist in Sydney. I left the army after 18 years service with the rank of captain.
9. Since 1918 I have been in turn Journalist ("Sunday Times," "Daily Telegraph"), and publicity man. Whilst serving on the "Sunday Times" and "Daily Telegraph," I acted as music critic, and wrote "Notings in Music" for several years for the "Theatre Magazine."
10. Of late years I have been interested in organising work, and my greatest success was in 1927 when I helped to raise £130,000 for Cancer Research in seven months, at a cost of only 2 per cent. for organising expenses.
11. My recent activities as an announcer are known to you.
12. I sing, and play the violin, sketch, and am a fair golfer. As a young man I got my Caps at College "University" for football and rowing, and whilst in the army did a lot of boxing in the heavyweight class. My pet hobby is trout fishing. I have also played a lot of polo and done a good deal of big game shooting.

William James

ONE of the best-known "Famous Australians" heard over the air is William G. James, the well-known pianist and composer, who, when he took a trip to England some little time ago, not only added a considerable number of laurels to his already extensive wreath, but upheld, in a very decided manner, the prestige of "musical Australia."

Born in Melbourne in 1895, Mr. James received his first lessons from his mother, who was a very brilliant pianist, and, at the age of fourteen, he entered the Melbourne University Conservatorium, winning a three-year scholarship, and gaining a prize for composition. After this he went to Europe, where he studied under the world-famous Albert de Greef, who, by the way, was a pupil of Liszt. One day William Boosey, of the well-known music publishing firm, heard him play, and was so impressed with his skill that he asked him to perform at the famous Boosey Concerts, that are held throughout the season at the Albert Hall, London, and from that time the young musician has never looked back.

Like the good Australian he is, Mr. James persistently refuses to blow his own trumpet, but a cursory glance through his press book shows that he has won golden opinions in the musical centres of the world, and from the most exacting critics, and, in the position of accompanist and supporting artist, has been associated with some of the great artists of the concert world, among whom the name of our own Peter Dawson stands out with distinct prominence. One notable critic wrote: "Mr. James is an artist, each of whose ten fingers seems to possess an individual brain. The movements of his hands are bewildering and fascinating."

During his sojourn in England he composed the music for one of those ethereal "unusual" little plays, "By Candle Light," in which the characters are merely styled "Candle," "Light," "Heat," and so on. This was a marked artistic success, and was promptly followed by one of his most popular compositions, a song cycle of "Six Australian Bush Songs," which were an instantaneous success in England, and hold pride of place in the repertoire of many famous concert artists.

Whilst in England it is interesting to note that Mr. James married the famous Russian prima donna, Saffo Arnov, who carried off the scholarship at the Milan Conservatorium, and who was a personal friend of Leoncavallo, the gifted composer of the favorite opera, "Pagliacci."

A Century Birthday Call

LAST week the New South Wales Broadcasting Company, Limited, was notified that Mr. Robert Cox, of Cundle, Manning River, had reached his 100th birthday. A call was given over the air, in which congratulations were given to Mr. Cox on passing his century, and it was pointed out that in cricket, reaching 100 was always looked upon as an outstanding event, but in real life it was indeed an achievement. The hope was expressed that Mr. Cox's innings would continue, and it was stated that if he maintained his present form, young Hammond, Bradman, and Jackson would have to look to their laurels as century-makers.

Points for the BEGINNER

This week Mr. Allsop leaves the realms of "higher radio" for the beginner, whose delights and difficulties he chronicles with expert knowledge.



By
**Ray
Allsop**

(Associate
Technical
Editor)

THE pleasure of building one's own radio set is only exceeded in intensity when, to one's acute surprise, it works—first time.

The problems to be faced by the beginner are numerous and puzzling, and before he starts on the job he should make up his mind on the following points:—

1. To what expenditure he can go on parts.
2. Bearing point 1 in mind, what type of set he wants to build suitable to operate under the conditions of its location—a crystal set, a one-valve, or a multi-valve arrangement.

START MODESTLY.

If the beginner has a good supply of spare cash he is in danger of falling into the trap of making his first set an ambitious effort; he may decide to build a Super-Het, or something beyond his technical ability. In nine cases out of ten the results will be disappointing. There is an art in home construction, a technique which has to be acquired by a good deal of experiment and practice.

I advise the beginner in home construction to start modestly. Later, when he has learned to use tools, the proper way to drill a panel, and the way to solder a joint correctly, he may indulge in a more ambitious effort with a greater chance of success.

BUY CAREFULLY.

The best plan for the beginner is to commence by building a crystal or one-valve set, the wiring of such sets being extremely simple, and the lay-out of the components a matter of no great difficulty. The first thing to do is to make up a list of the parts required, even down to the last screw. It is no good buying the components haphazardly, just as it is no good building a house without a prepared plan, and calculating the amount of material required.

Draw out the circuit, and if you are going to use a bakelite panel, make sure the right size is purchased. It is no use buying a small panel and then finding that the parts to be mounted will not fit on it, and it is waste of money to use a panel larger than required.

IMPORTANCE OF PANEL.

Most home constructors make up sets from the instructions given in the radio magazines. In most cases, panel lay-outs are shown in diagram form, and a complete list of the components to be used in the make-up.

In the event of a set failing to work, in nine cases out of ten the following points are the cause:—

1. Smaller panel than specified, cramping of components, and alteration of lay-out.
2. Deviation from parts specified.

If you ignore the designer of the set you want to copy

you have only yourself to blame if the set does not operate satisfactorily. Good lay-out and good wiring are essential. Soldering, if it is done carelessly, will mean bad electrical contact, and that means an inefficient set.

GOOD MATERIAL.

Another important point when constructing a set is the choice of material. Do not spoil the results of your labors by trying to save a few shillings in the cost of the components.

Admittedly, if one is planning to build a multi-valve set, one wants to keep the expenses down as low as possible. But on the other hand, if this is carried to excess and cheap or unsuitable components are used, in preference to those which, although costing more, can be relied upon, then one is likely to finish the set, and find that a good deal of the money spent has been wasted because certain parts in the set prove inefficient.

DO NOT WASTE ENERGY.

If audio transformers are going to be used, always buy the best possible; and, again, when buying valves, don't purchase a cheap variety.

Select a panel of good quality. Surface leakages will ruin a set's efficiency if the panel on which the components are mounted is of inferior quality.

It must always be remembered that in a radio set one has to make the most of very small quantities of energy. You cannot afford to waste anything. This is even more important when building a crystal set, and, consequently, the slightest leakage due to bad insulating material will considerably reduce the efficiency of the set as a whole.

DO NOT RUSH.

Take your time when building the first set. There is always the temptation to rush the first job. The circuit is chosen, the parts are purchased, and the job is started. The one idea is to get it finished, connected to the aerial, and tested. Hurried work like this will never result in an efficient receiver, and it is more likely that wrong connections will be soldered up, and the set will not work at all. Or, worse still, connections will be made which will discharge the "B" battery, and perhaps burn the valves out.

The Microphone Presents—

Hospital Concert Party for Camden

ON March 9 a party of 12 2FC artists, comprising members of the Hospital Concert Party, will journey to the Carrington Hospital, entertain the patients there, and, after tea, will go to the Empire Theatre, Camden, and there present a programme in aid of the funds of the Camden Hospital. Artists include Charles Lawrence, producer; Ad Cree, Margaret Grimshaw, John Warren, Arthur Prince, Peggy Dunbar, Dorrie Ward, "Uncle Ted," and "Sandy."



Dorrie Ward.

"Hit the Deck"

NOW that this bright musical show is at Her Majesty's Theatre, listeners will have an opportunity of hearing transmissions from this show in the near future.

Describing Sydney from 200 Feet Up

VOLUNTEERS have been called by the New South Wales Broadcasting Company, Limited, for a description of Sydney at the end of a rope dangling from a crane on one of Sydney's tallest buildings. It is thought that someone with a power of description could give listeners a thrill if he described his own sensations, and, incidentally, the wonders of Sydney, as he was hauled up yard by yard to the top of the crane. All applications will be considered in the order they are received, if addressed to the Stunt Manager, New South Wales Broadcasting Company, Limited, 96-98 Market Street, Sydney. Should more than 1000 people apply, the name of the winner will be drawn from a hat.

Leslie V. Harvey

LESIE V. HARVEY has not been heard on the air since he was at the Console of the Wurlitzer organ at the Prince Edward Theatre. He was on his way back to America, but was persuaded to stay in Sydney, and preside at the new Christie organ, which has been installed in the Victory Theatre, Kogarah. This is a very fine organ, and an opportunity will be given to listeners of hearing this artist through 2BL on March 16 and 17. There are a number of stops on this organ which should broadcast very well.



Leslie V. Harvey.

Annual Music Teachers' Conference

IN Easter week will be held the 2nd annual conference of the Music Teachers of N.S.W., an organisation which has quickly sprung into existence and now embraces teachers from all parts of this State. The idea in the first place came from the Musical Association of N.S.W., and a council, consisting of some of the leading musicians in

Sydney, was formed, to which was added an advisory board consisting of some well-known people. The chairman will be this year Mr. G. Faunce Allman, the vice-chairman Mr. Frank Hutchens and Mr. Laurence Godfrey Smith, the organising secretary Mr. G. de Cairos Rego, and the advisory board is as follows:—Messrs. Oswald Anderson, Albert Fisher, Roland Foster, Reginald Gooud, Alfred Hill, Florent Hoogstoel, Arthur Hull, Thomas Lobban, Moore M'Mahon, Livingstone Mote, Rex de Cairos Rego, Walter Thorman, H. F. Treharne, Gerald Walenn; assistant secretary, Miss Ann E. Jenkins.

Last year 2FC made arrangements with the conference to broadcast practically everything of interest, including the daytime sessions devoted to musical lectures and the various concerts at night. These transmissions were a great help to country listeners. An opportunity of hearing the leading professors in Sydney is one that could not be missed, and a great number of letters was received by station 2FC last year thanking them for this privilege. This year it is hoped that arrangements will be made by the New South Wales Broadcasting Company, Limited, to carry out similar broadcasts through both 2BL and 2FC. The principal lecturers for this year are:—Messrs. Frank Hutchens, Cyril Monk, Spencer Thomas, Arundel Orchard, Lindley Evans, Oliver King, Laurence Godfrey Smith, Lionel Lawson, Alfred Hill, H. F. Treharne, Madame Goossens-Viceroy, Miss Eleanor Ross, to mention just a few. The conference commences on Tuesday, April 2, and goes through until Saturday, April 6.

Rodeo On the Air

IN the second week in March the New South Wales Broadcasting Company, Limited, hope to transmit a description of the Australian Championship Rodeo to be held under the auspices of the Merriwa Agricultural Society at Merriwa. The prize money altogether totals over £200, and the buckjumping competition carries a first prize of £100. Events are also being staged for local riders on both horses and bullocks. Mr. M. A. Ferry, the company's racing commissioner, who has had considerable experience in judging rodeo contests both here and in England, has been invited to judge these events, and he will also give a description, which will be carried over a land line to Pennant Hills and then broadcast.



M. A. Ferry.

Nut-cracker Suite

THE Sunday afternoon programme of the World's Best Records arranged by 3AR for February 24, is worthy of special mention, for it includes such favorites as "The Nutcracker Suite," by Tschaiakowsky, played by the B.B.C. Symphony Orchestra, under the direction of Percy Pitt, and selections by the Halle Orchestra under the direction of Hamilton Party. Solos from Clara Butt, the world-famous contralto, and Mischa Elman, are also included, and listeners are thus afforded an opportunity of listening to the finest music in the world.

St. David's Day Broadcast

ST. DAVID'S DAY, which, as all good Welshmen know, falls on March 1, will be marked at 3LO by an attractive programme given by the Cambrian Glee Party, who will sing solos, glees, and folk songs in Welsh. Prominent among the soloists is Eric Jones, who will be remembered as the vocal champion at Ballarat (1928), and other well-known artists include Miss Mal Morgan and Miss Iris Turner. The Cambrians are under the direction of Mr. R. H. Owen, of the Welsh Delegation, who recently spoke from 3AR in connection with their forthcoming trip to Europe.



R. H. Owen.

Another Old-time Night

ANOTHER feast of fun and hilarity will be broadcast from 3LO on February 25, when the Old-time Dancers will once again take the floor to the very excellent music provided by Hoffman's No. 1 Dance Band. All the old favorite dances will be included—"The Varsovia" and "The Highland Schottische," and the choruses, sung by the Radio Merry-makers, assisted by the dancers, are a source of never-ending enjoyment to those who love the songs of yesterday. The Huxham Serenaders are also on the programme with a budget of good things and a thoroughly enjoyable time may be anticipated.

Gilbert and Sullivan Artist at 3LO

MISS GWEN HART, whose operatic soprano voice has made her most popular with listeners, will be broadcast from 3LO on Thursday, February 28, when she will add greatly to the artistic side of the programme. Many listeners will remember Miss Hart in connection with the last Gilbert and Sullivan opera season, and also with the Rigo Grand Opera Co., when she played in the delightful "Hansel and Gretel." She was also chosen by the popular Miss Muriel Starr to sing in the sextette in the production "The Royal Divorce," and, whilst travelling through New Zealand with the Gilbert and Sullivan Opera Co., she had the unique experience of singing in a Maori haka.

The Interview

A REFRESHING and witty little one-act play, "The Interview," will be broadcast by those two clever artists, Mr. and Mrs. Maurice Dudley on February 25, from 3LO. It would spoil the anticipation of listeners to reveal too much of the plot, but it may just be mentioned that "The Interview" takes place between a particularly successful (and inaccessible) young playwright, and a fascinating lady reporter, who, in order to extract a little information allows the playwright to think she is one of his countless admirers. Needless to say these two popular and gifted players make the most of their witty lines and the intriguing situation.



Maurice Dudley.

The Daylight Transmission of Wireless Waves Over Sea Water

A report of a series of experiments made by Mr. R. O. Cherry, M.Sc. (Research Physicist of the Natural Philosophy Laboratory of the Melbourne University), in connection with the transmission of 3LO. The experiments were conducted as a result of 3LO's special grant to the University.

IN recent years, field intensity measurements of wireless signals from a large number of broadcast stations have been made. Except for the earliest work carried out by Duddell and Taylor in 1905, the observations have been concerned with transmission over land, and the results indicate that the problem of the transmission of wireless signals is far more complicated than is to be expected from theoretical considerations. The presence of hills, trees, as well as the composition of the ground, play an all-important part in determining the actual intensity at any given point, and variations due to all these factors have been found by the writer in connection with intensity measurements around 3LO, Melbourne. Even when conditions are as simple as possible, e.g. no hills, few trees, and approximately uniform ground, unexpected variations have always been observed. Measurements over sea water were at once suggested, as affording the simplest and most uniform conditions for the transmission of the ground wave.

Two series of measurements have been taken, the first series up to 35 miles with readings approximately every mile, and the second series up to 87 miles with readings every 31 miles (approximately). The first series were taken on July 7th and 13th, and the second on August 24th, 1928.

METHOD

A simple loop, condenser, and valve voltmeter circuit designed for this class of measurement, and described by the writer in another paper, was used. This apparatus was mounted on the open roof of a saloon at the stern of a steamer. Although there were some metal deckrails, stanchions, davits, etc. within a few yards of the loop aerial, the conditions throughout the test were kept the same, and relative values of the intensity will be unaffected.

The distance of each observation from the transmitting aerial was determined in the following manner:—The time of passing known points, e.g., Gellibrand and West Channel Pile Lights, headlands, etc., were noted, and hence the speed of the steamer was computed. The time of each reading of signal intensity was taken, and hence the position of the ship at that time could be computed with reference to the known points. This method assumes that the speed of the vessel remains constant, but over the period of the observations there should not be any serious error caused by variations in this speed.

FIELD INTENSITIES UP TO 35 MILES OF SEA TRANSMISSION

The apparatus was mounted on S.S. "Reliance," visiting St. Leonards, Queenscliff, Portsea and Sorrento. The results are shown in graphical form in Fig. 1, Graph I, in which logarithm (Field Intensity x Distance) is plotted against distance. "This is the usual form of showing these results as from it we can deduce the effect of absorption upon the transmission of the signals. In the present case the transmission is, except for the first 5 miles, over a uniform sheet of sea water, and the graph should be a straight line with a slope proportional to the absorp-

tion losses in sea water. The irregularities observed may arise from—

- (1) Variations in the output from the transmitting aerial.
- (2) Variations in the receiving apparatus.
- (3) Irregularities introduced during transmission.

The accumulated evidence of all the observations taken over land during the last six months seem to eliminate the possibility of the first two causes being the chief ones, and the variable factor appears to be the intervening medium between the transmitter and the receiver. The following explanation is suggested:—The regularity of the crests and troughs in Graph I of Fig. 1, is the same as that which would be obtained from the interference of two waves of the same frequency arriving at a point in different phases. This phase difference would be caused by a difference in the length of path travelled by the two interfering waves. In the present case there is propagated along the surface of the earth or sea a ground wave which provides the daylight intensity at all points, and under certain conditions we may also have a reflected wave. The latter has been detected at night at distances as small as 20 miles from the transmitter, and is caused by the reflection of the electro-magnetic wave at the lower boundary of the

Heaviside layer, at a height of the order of 50 miles above surface of the earth. This reflected wave is of far less intensity than the ground wave up to distances of, say, 70 to 100 miles from 3LO, Melbourne, and interference of these two waves when of the same order of intensity at these and greater distances is partly the cause of the well-known fading and distortion occurring at these distances at night. During the day, however, this atmospheric wave is supposed to be absorbed in the air. The interference pattern in Fig. 1 suggests that this atmospheric ray may exist even during the day, but much more detailed investigation would be necessary before its existence could be definitely shown.

The observed variations are all small (approx. 5 per cent. of mean), and would be quite undetectable by aural methods. It is interesting to note that the irregularities obtained for transmission over flat land (see Fig. 1, Graph II, shows a typical graph obtained from measurements along the Geelong Road) are similar to those for transmission over the sea, but they are even more pronounced for land transmission indicating that variations in ground conditions have a further disturbing action.

FIELD INTENSITIES UP TO 87 MILES OF SEA TRANSMISSION

The apparatus was set up at the stern of S.S. "Onah," and readings were taken throughout the daylight part of its regular trip to Burnie, Tasmania. The results are shown in graphical form as before in Figure 11.

The results for that part of the journey outside "The Heads" are not quite so accurate as inside for the following reasons:—

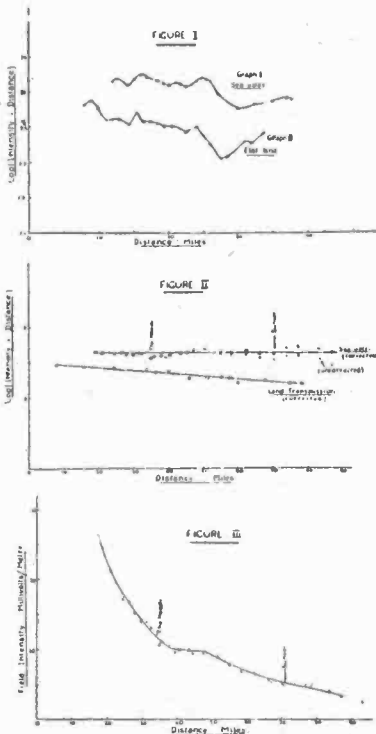
- (1) The motion of the steamer affected the galvanometer used for reading the intensity and uncertainties up to 1 millivolt metre were introduced.
- (2) The position of each observation has to be obtained by assuming that the measured speed of the steamer inside the Heads remains constant for 3½ hours after entering Bass Strait. In this length of time small variations are bound to occur.
- (3) After passing Queenscliff, the course of the steamer is oblique to the direction of 3LO, Melbourne, and a small correction for azimuthal intensity of the transmitting aerial should be made. This correction to the field intensity has been neglected on account of the larger uncertainties which affect it.

In Figure III, is shown the graph of "signal intensity" plotted against "distance."

The graph shows the usual small variations from the average, but these are neglected, the general nature of the transmission only being investigated.

At distances greater than 45 miles a correction has to be made for the effect of curvature of the earth. This correction is deduced from similar work by Ratcliffe and Barnett carried out in England, and two of the graphs in Fig. II, are corrected for the curvature of the earth. The correction increases rapidly with distance, amounting to as much as 50 per cent. increase at 85 miles.

(Continued on Page 26.)



Wireless Weekly

Incorporating "Radio In Australia and New Zealand."

FRIDAY, FEBRUARY 22, 1929.

The Decline of the Complaining Listener

A CORRESPONDENT, writing to the New South Wales Broadcasting Company, devotes five closely typewritten pages to a constructive criticism of the programmes of 2FC and 2BL, in which he carefully tabulates his likes and dislikes, and examines the reason for his preferences.

This is not a record, but it stands out to-day because such a letter is so unusual as to be unique. The correspondence of the Broadcasting Company, considering the number of licensed listeners, is comparatively small, when we remember the violent controversies of two or three years ago. The company finds to-day that its correspondence increases only when listeners are requested over the air to express opinion about certain features, or when promise of a photograph, or postcard, or souvenir is offered as an inducement.

Enemies of broadcasting attribute this attitude to apathy, but there is a far more satisfactory and convincing explanation than that. The suggestion of apathy is immediately dismissed when the rapidly-rising license figures are studied. Any further proof required is shown by the conditions in Victoria, where, although a vigorous controversy over the programmes is continually raging, licenses are steadily declining in number.

The real cause of the comparative slackening of the Broadcasting Companies' correspondence is due to a wider understanding of the problems of broadcasting on the part of the listener-in, and as a result a more general satisfaction with the programmes. The continued emphasis in the press of the necessity for selective listening, and the consideration of the interests of other listeners, has had a widespread effect, and the time is past when listeners expected everything of radio, and were disappointed or disgruntled when their expectations were not realised.

It is a tribute to the sound commonsense of the N.S.W. broadcasting public that almost all correspondence is now of a constructive nature. The Broadcasting Company welcomes criticism, and even complaints, for, it states, a complaint these days enables it to tackle a difficulty right at its source.

TENDERS FOR NEW STATIONS

TENDERS for one, two, or four radio stations having a power of three kilowatts in the aerial, and for one, two, or four stations having a power of five kilowatts in the aerial, have been invited by the Postmaster-General's Department. They will be used for broadcasting when the Government assumes control next July.

Each station is divided as follows:—

- (1) Studio apparatus, complete.
- (2) Radio transmitter, with modulating equipment, complete.
- (3) Radiating system, with its supports, complete.
- (4) Power plant, complete, assuming main supply from electric transmission lines, and reserve supply from engine-driven generators within the radio station.

The specifications "outline the main features of a plant for radio telephone broadcasting, which shall provide high quality transmission as a unit in a national broadcasting service"; and it is interesting to note that the lowest power specified (three kilowatts in the aerial) is greater than that of any existing A class station.

No indication of the sites for the new stations and studios is given; but the locations

will be given to the contractor after the contract has been accepted. The department will supply buildings, furnishing, et cetera, and electric power from the mains of the power authorities.

The radio transmitter is to be of the double side-band radiated-carrier type, and is to be provided with a separate frequency con-

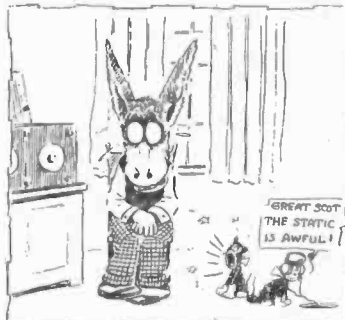
trolling element either a tuning fork controlled oscillator or a piezo-electric oscillator (crystal control). The preferred system of modulation is that in which modulation takes place at a low power, and in which the resulting products are amplified up to the output power

level. Preference will be given to a type of transmitter that permits 100 per cent. modulation of the radio carrier without introducing band-frequency distortion. Preference will be given to a design of transmitter in which is incorporated a final radio power amplifier assembled on the unit principle, permitting the raising of the power output at some future date, if it be so desired, by the installation of additional units. Tenders close on March 12.

Tenders will also shortly be solicited by the Commonwealth Government for the supply of programmes.

LICENSES.		
	Total in	Ratio
	Jan. Force,	to 100.
N.S.W.	972	92.681
Victoria	597	141.279
S. Australia ..	303	22.420
Queensland ..	453	24.791
Tasmania	87	4.204
W. Australia ..	8	1.820
Commonwealth ..	277	289.165
SUMMARY FOR SIX MONTHS FIGURES TO 31/1/29.		
	Increase	12.484
N.S.W.	Increase	3.521
Victoria	Increase	2,101
South Australia ..	Increase	526
Queensland	Increase	1,032
Tasmania	Increase	54
West Australia ..	Increase	19,718
Commonwealth ..	Increase	

Have You Ever Shared These Feelings?



His Feeling After Blowing Six New Tubes



As He Feels After Talking With a Radio Expert



As the Dealers Feel About Him When He Begins to Part Them



As He Feels When The Set is Working O.K.

THE SAFETY VALVE



Readers are urged to express their opinions on matters pertaining to broadcasting. If you have some grievance, if you have some constructive criticism to offer, here is your chance for expression--your safety valve. The

editor assumes no responsibility for statements made by readers and published on this page. As opinions of correspondents do not represent our editorial policies or beliefs. Anonymous letters are not considered.

"Ghost" Voices

Dear Sir,—Some time ago I read in your paper a letter from a listener who had heard a telephone conversation on his wireless set. Well, at present ours is tuned in to 2FC broadcasting a concert from "Bodington Red Cross Home," and ever since the beginning of the concert the programme has been interspersed with telephone conversation, "hullos," and telephone numbers. One number was 495, but I could not catch where.

As our aerial is at the back of the house, and the nearest telephone lines on the opposite side of the street, and the Wollongong Exchange four streets away, it is rather a puzzle as the messages are evidently coming from an exchange.

If any other correspondent has had a similar experience, I wish he would let me know, as I am wondering whether the microphone is picking up the messages at the other end.

I have just heard some man say "Hullo! How are you? Rotten weather," in amongst one of Mr. Charles Lawrence's jokes.

9.40 p.m.: The transmission is now from the studio, and the telephone messages have ceased.

Yours etc.,
MRS. G. REIHER

Wollongong.

La Barba-Smith Fight

Dear Sir,—On behalf of a number of Mudgee listeners and, no doubt hundreds of other countrymen, I would like to cast a bouquet to 2BL. Last Saturday evening there were plenty of people—self included—who thought they were to be denied the privilege of hearing the La Barba-Smith contest at the Stadium. The reason given over the air was that the Stadium was not to be broadcast, for business reasons.

Perhaps it was thought that a number of city folk would stay at home and listen in instead of going to see the contest. Maybe this is the case where two lesser lights are concerned, but my opinion is that no sport would rather listen than see two such great men in action. Imagine the delight of countrymen when 2BL announced that they had successfully interviewed the Stadium manager, and that the fight would be broadcast. Mr. Withrow excelled himself, and the fight was easy to follow by his description.

It is hoped that the Stadium will allow all the big contests ahead to be broadcast for the benefit of those who have no chance of going to the Stadium.

Yours etc.,
"BUSH WHACKER"

Mudgee.

Go-getter Results

Dear Sir,—I have built your "Go-Getter," and after a few months' experiment, I have this set working O.K. on short and long wave. So far my receptions:—

Short Wave:—2ME, 2HT, 2FX, 2NO, 2HM, 2ME, 3JK, 4MW, 5SW, PCJJ, Paris Experimental Station, PCLL, ANE.

Long Wave:—2FC, 2BL, 2GB, 2KY, 2UW.

2UE, 2BE, 3LO, 3AR, 4QG, 5CL, 7ZL, 2YA. All on good 'phone strength. I cannot speak more highly on the efficiency of our circuits.

Yours, etc.
L. EINERY.

Manly.

A Punster

Dear Sir.—In your issue of "Wireless Weekly," 18/1/29, "Queenslander," beyond claiming to express the opinions of all listeners, "with some idea of English grammar and correct pronunciation," contents himself with a pun at the expense of my pen name, and possibly prides himself on having punned the punless; pun punnable in pandom; but I consider his punny performance particularly puny, painfully poor, and positively paltry.

He is "not surprised" that 4QG's announcer satisfies me, but this particular announcer of the "Early Morning News Session" may also satisfy quite a number of those listeners whose opinions Spleen (my mistake) Queenslander, claims to express, but who, unlike Queenslander, are not quite so fastidious, a little more tolerant, and more concerned with the news itself than the announcer's pronunciation. Possibly, were they to hear such pronunciation, or as Spleen (dear! dear!) Queenslander would have it, "extremely distasteful" pronunciation from one of the many gentlemen who deliver addresses to the Constitutional Club at lunch hour on Thursdays, or from any one of those who are down on the programme for talks on various subjects, perhaps then they may consider it time for complaint. So much for Spleenslander.

Euter "Another Queenslander," with an off-ical mournful dirge. "The G" in length is as silent as the Z in raspberry. How dreadful! His criticism is decidedly constructive, however. He would administer a few doses of elocution, or was it "electrocution"? Possibly then, when he had produced the "last word" in announcers, he would subject all listeners willy-nilly to similar treatment, so that his "hot-house" plant would be both appreciated and understood. I agree with him that an Englishman may not betray, by accent, his country, but he does betray, to a keen listener, his nationality, be his English ever so cultured.

What "Queenslander" and "Another" seek is the perfect programme, and then at least we shall have that listener's Utopia, wherein shall be—

"No fading, mushiness, or thunder. No odious announcer's blunder; Yet shall Spleenslanders moan and mumble Because there's nothing left at which to grumble."

Finally, my advice to both is to consult their respective family surgeons with a view to having that organ of their anatomy—that accumulator of bile—the root of all their trouble—in other words, the liver, extracted h'cue bolus.

Now, dust your specs Spleenslander—I'm about to sign,

Yours punfully,
K. HOBO.

Tweed River.

Would Like More on Sunday

Dear Sir.—I read Mr. H. Russell Crane's letter to the B.B.C. printed in "Wireless Weekly," and I wish to say I think it very good indeed. I agree with him, that once one gets a short-wave station the thrill soon wears off because most of them put over such bad programmes. When the American stations are coming through well I think they are best. I would always sooner hear market reports, news, etc., rather than music.

If only our friend at 5SW, when he gives his announcement at 10.25 p.m., would say a few more words, such as, "It is a nice day," or read a little news, I am sure we would all like it better. Don't you think it a pity that so few short-wave stations are to be heard on a Sunday? Would it not be a good idea to ask anyone sending in reports to say we would like more on a Sunday because most of us have time to spare on Sundays?

I have been getting good results from 5SW (at night), PCJ, PHI, PCL, PLG, PLE. I find PLF generally bad. 2ME and UPB, Suva, and the station at Berlin which 2ME has been testing with, I have had on the speaker, and very loud at 6 p.m.

Yours, etc.,
T. A. EVERETT.

Guyra.

Should be Excommunicated

Dear Sir.—I feel it my duty as a listener to reply to A. L. Gunn's attack on us "low minded" and "depraved" listeners, as he styles us. I think it is as well for radio that a highbrow like "Gunn" has nothing to do with the broadcasting stations or else there would soon be a lot of depraved listeners. What he wants is a gramophone and then he could listen to his own programmes and leave us satisfied listeners alone.

Yours, etc.

Bauple.

Might Explode!

Dear Sir,—Reading with amusement in Safety Valve A. L. Gunn's two letters, it brings to mind the spoilt child who wanted something and, when he got it, didn't want it. Mr. Gunn seems to underrate the people's intelligence. He does not understand poor fellow, that at present to the public wireless is an amusement, not a science. All the listeners (as he infers) are not low-minded and depraved (with one exception: of course), but they like to enjoy themselves in their spare moments, and do not wish "Dead Marches" and "Oh, Let Us Be Loving" sort of stuff rammed down their throats always. Also his reply to V. Shane O'G. is in very bad taste, and insulting from a man of his so-called artistic ideas. I am a little surprised the Safety Valve printed it, but, on second thoughts, I see the reason—fairness to both sides. Put the safety catch on that Gunn, or it might explode the wrong way. There is such a thing as recoiling in a gun.

Yours, etc.,
W. R. SHERIDAN.

Pitzroy.

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<p>ALUMINIUM PANELS CUT TRUE AND FLAT. 27 x 7, 3/4 12 x 71/6 26 x 12, 5/6 9 x 7. 1/2 18 x 7, 2/3 18 x 8. 2/6</p>	<p>The Amplo "B" Battery Eliminator A BEAUTIFULLY FINISHED INSTRUMENT Which will supply ample milliamp to your set at voltages up to 150. Suits sets up to 6 Valves. 4 "B" taps. Complete and ready for use, £3/19/6.</p>	<p>THE ECO CRYSTAL SET. Selective and Efficient, from 2 to 6 stations. (Three Models.) 32/6, 27/6, 36/.</p>
<p>MIDGET VARIOMETERS for reaction control in multi valve sets. PRICE, each 6/.</p>	<p>UX 201A 5/6 UX 200A 9/6 UX 199 6/9 UV 199 6/9 "ECONOTRON" VALVES.</p>	<p>POLISHED RADIO PANELS. LUZERNE HARD RUBBER 12 x 7 x 3-16. Price, 4/3 15 x 7 x 3-16. " 5/3 18 x 7 x 3-16. " 6/6 21 x 7 x 3-16. " 7/6 24 x 7 x 3-16. " 8/6</p>
<p>PHILIPS CHARGERS. 450 £4/15/- Trickle ... £3/10/-</p>	<p>K. & C. 2000 ohm. SINGLE HEADPHONES, With Leather Covered Headband, 5/-</p>	<p>HEAVY DUTY PORTABLE 6-VOLT ACCUMULATORS. While They Last, £3/19/6.</p>
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Corner Church and
Macquarie Streets.
'Phone, UW 9601.

ORANGE
120A Summer Street.
'Phone, Orange 735.

THOSE ALLURING SHORT-WAVES

In an article on general short-wave reception for the broadcast listener looking for variety and new fields to conquer. How to avoid the common complaints of the short-wave listener.

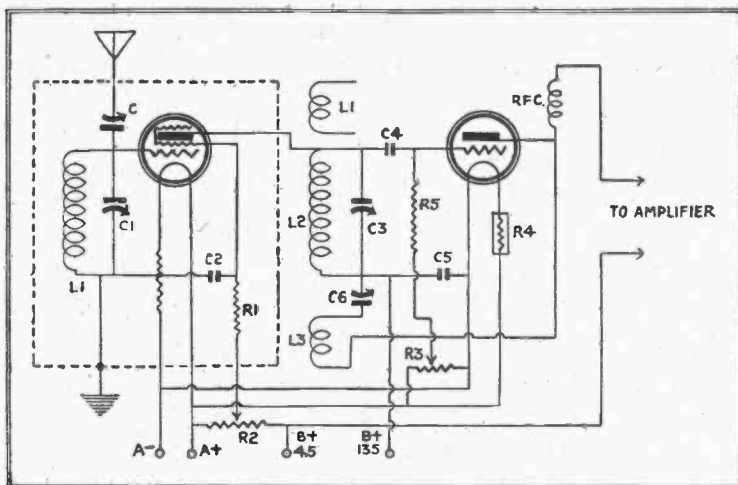


Fig. 1 (left).—A suggested arrangement for a screen grid R.F. stage, using a tuned input circuit. Note the potentiometer control of the screen-grid potential and the grid return.

By DON B. KNOCK (Associate Technical Editor).

ONE can go on talking about short-wave reception continuously, and still never run out of interesting material. Only a comparatively short while ago most broadcast listeners were content to build receivers or buy them and spend countless hours searching around the waveband from 200 to 600 metres in quest of something new. The wish was father to the thought, and that wish was one of distance, or, as we know it in radio parlance, "DX."

No matter how efficient a receiver designed for use on the normal broadcast band may be, it has its limitations: These limitations being governed largely by the frequencies covered. Even so, surprising results have been obtained at times with quite ordinary receivers of the Armstrong or Reinartz type, and in New South Wales alone there are a few old-time enthusiasts who can recall occasions in the earlier days when fairly good reception was had from KGO and KFI on the west coast of America. There is an unaccountable thrill when hearing long distance transmissions for the first time, and I suppose that everyone who has handled a radio receiver has had this experience.

Excluding international telegraphy, my own first experience of long distance telephony reception was on the first occasion that the well-known pioneer broadcasting station, WJZ, in Newark, U.S.A., was heard across the Atlantic. In those days, the directly interested radio enthusiasts were few and far between. 2LO had just started up at Marlborough House, PCGG was busy over at The Hague, with his famous "Sunday afternoon concerts," and a few amateur transmitters were paving the way to better modulation, grinding out gramophone records and testing microphones by the hour. Telephony transmissions representing any-

thing like quality were scarce, and when one tuned in an amateur who sounded as if he really hadn't got pebbles in his mouth, the effect was like manna from Heaven and the said amateur transmitter became the most interesting thing on the receiver dials.

It was three in the morning (I still look for DX at this time), and my pet amateur 'phone station had just told the fellow he was testing with that if he couldn't put out better speech, etc., and that his chemical rectifier was boiling, he had better raid a churchyard for fruit utensils, when I dropped on to a fairly strong but very pure carrier wave around 360 metres. A musical item was in course of transmission—"Land of Hope and Glory"—and I thought that this was where my pet amateur fell into disfavor, as this newcomer was superb to listen to.

Expecting to hear. . . "This is experimental station 2 something or other testing" . . . my surprise was intense at hearing, "This is station WJZE-ee Nooark, Noo Jolsey," and the American accent left no doubt. Of such was my greatest radio thrill, and it was counteracted for a day or two by the sneers of colleagues and indifference of the editor of a well-known journal until, like a bolt from the blue, confirming reports rolled in from one or two other night owls.

Then the craze for DX started, and men became wealthy overnight, and the "wireless widow" came into being—all for the thrill of straining after those elusive carrier waves originating across the pond. Owing to the persistency of these amateurs who stuck to their guns when "200 metres and below" was thrown to them as a bone to a dog, it was discovered in a remarkably short space of time that by using hitherto unthought-of short waves, enormous distances were bridged with very low power and more reliable-

bility. Soon the whole world reported reception of KDKA on his new 63-metre wave, and the disinterested casual listener began to sit up and take notice of the short waves.

Since then a great deal has happened. The two ends of the earth are in reliable telephony intercommunication and the listener in Sydney may on most occasions tune his short-wave receiver to Radio, Paris or Chelmsford, with as little concern as if it were 3LO he is hearing. Perhaps Mr. Listener has lost his thrill, but do not let us overlook Mr. New Listener, who is just entering the realms of short-wave reception.

For him the excitement is very real, but he is liable to obtain a wrong impression owing to the peculiar tricks short waves will play from time to time. It certainly is disconcerting for a man to spend a lot of money and time on a good short-wave receiver and then, for a time, find nothing but morse signals spread all over the dials. A very weak telephony carrier may be heard at times, and this state of affairs may continue for a week or so—and suddenly Mr. Short-wave Listener is transported to the realms of high delight on hearing that previously weak carrier come up to great strength and resolve itself into a full programme from WGY or 2LO. By this I mean to imply that when short-wave reception is poor, owing to conditions over which mere man has no control, it is well to leave it alone, unless you are an adept at morse, but when conditions are good short-wave reception is truly wonderful.

Remember that short-wave broadcasting is still very much in an experimental stage, and going through ups and downs similar to those encountered by the regular broadcasting stations in the early days. This very fact is one of fascination to the short-wave listener, as there is always the chance

THREE SHORT-WAVE DETECTOR CIRCUITS TO CHOOSE FROM

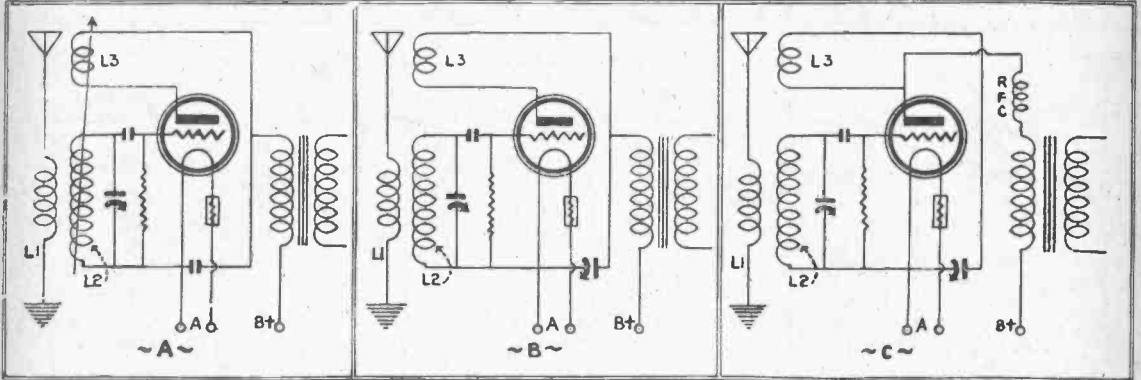


Fig. 2.—Here are three types of regenerative circuits in common use. A and B should preferably have an R.F. choke in series with the primary of the Audio transformer. Circuit C is the one recommended for smoothest oscillating control.

of hearing some new station, and there is a great deal of well-justified pride in being able to report a new station.

There are a lot of factors contributing to the difference between short-wave broadcasting and regular broadcasting. For instance, a short-wave in the region of 30 metres and below may go further and be heard better in the day rather than at night. This is not constant, however, as European stations are at the present time well audible in Sydney round about 20 metres from 11 p.m. to 6 a.m.

Some idea of how distance may be regarded when considering short waves may be obtained from the fact that a short-wave may often travel half way to the sun and come back again. This effect is very marked at times on some well-known commercial telegraphy stations, and notably on the powerful 33-metre station, LP-1, at Buenos Aires, the dots and dashes will appear to have tails, which produce an echo or time-lag effect. This station often sounds just as if it is placed in a long tunnel.

Some people have the idea that static is eliminated by the use of short-waves. Such would be an ideal which we are far from realising, but as a rough estimate the static on the wavebands below 60 metres is about 20 per cent. of the total static on regular broadcast bands. The higher the frequency the less the percentage of static, but the higher we go in frequency, the more we are prone to suffer from extraneous interference. Many short-wave listeners will have noticed that particularly on the 20-metre band acute interference is often present from passing automobile ignition systems and this interference is at times far more annoying than static.

It is very interesting if the receiving room is situated in such a position that the roadway is in sight, to note the distance where the ignition noise of some automobiles becomes audible and where it dies away as the vehicle passes by. Short-wave impulses are generated from various unexpected sources, and in some localities reception is often completely ruined. I have known instances in my own experience where, when situated in North Sydney, it was often impossible for a week at a time to hear even a powerful local short-wave signal owing to incessant interference from the 10,000-volt power lines running near the aerial. Faulty high voltage insulators will often

leak with a corona discharge, and, whereas this discharge is not an actual voltage breakdown, and is normally invisible without close inspection, it will set up the most appalling noise in short-wave receivers located anywhere near the power lines.

The simplest way for the regular broadcast listener to avail himself of the delights of short-wave reception is (assuming that he has a good broadcast receiver) by means of an adaptor or converter. It is no use even considering this unless the audio amplifier of the existing broadcast receiver is of the highest quality.

There is no reason why you should not put those distant international telephony stations through the loud-speaker when conditions are good, and no matter how good the detector portion may be, unless the amplifier is of the very best, the inherent distortion accompanying high speed fading will be seriously added to by a poor amplifier. The greatest attention must be given to the adaptor itself, and this not only in the design, mechanically and electrically, as a complete short-wave receiver.

The coil system must be rigid and the tun-

ing condenser of the very best, otherwise it will be found next to impossible to locate a station and hold it on say 24 metres. The slightest movement in the turns of wire on the coils, or any side play with the condenser, will result in a floppy signal.

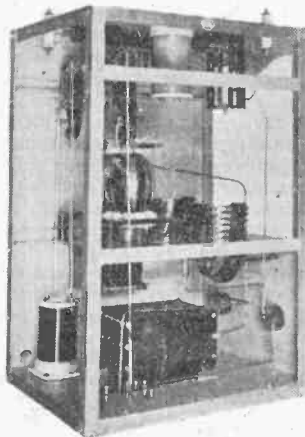
In earlier days many experimenters paid little attention to the rigidity and mounting of their coils, and the slightest vibration on the receiving table would produce a warbling unsteady note, which actually at the transmitter may have been rock steady.

Two years ago I paid a visit to a well-known commercial station in Sydney, at which time the authorities concerned were beginning to realise the value of short-wave communication. Although the Australian experimenters had been operating on the particular waveband for a long while previously, they were looked upon with disfavour, unofficially, and if it was at any time possible to lodge a complaint alleging off-wave working, this particular station was very much to the forefront.

On entering the operating room, the operator on watch happened to pass a caustic remark about "these amateurs and their poor transmissions." He passed me the headphones and much was my surprise on noting that the station which had aroused his ire was one of our best-known Victorians, a crystal-controlled station of rock steady frequency, but whose signal was apparently dancing all over the scale.

Taking the liberty of opening the lid of the receiver, the cause of the unsteady signal was at once apparent. The coils were of the basket-weave type, four inches in diameter, wound with 22 double cotton covered wire and relying for their sole support on the bared ends of the coils held by telephone type terminals. It was only necessary to lean against the operating table and all the coils did a wonderful shimmy. By the aid of two lead pencils and a few turns of cotton the three coils were lashed together so that the whole were rigid, and the operator, who never thought of that, scratched his head, and looked with more kindly thoughts upon "these amateurs."

Briefly, a short-wave adaptor is the detector portion alone of a short-wave receiver, with provision for plugging the output into the input of any audio amplifier. This is accomplished by making the connections through an old UX valve base, so that by simply removing the detector valve (and RF



An example of a compact 250 watt short-wave transmitter, manufactured by A.W.A.

THREE METHODS OF VOLUME CONTROL FOR S.W. RECEIVERS

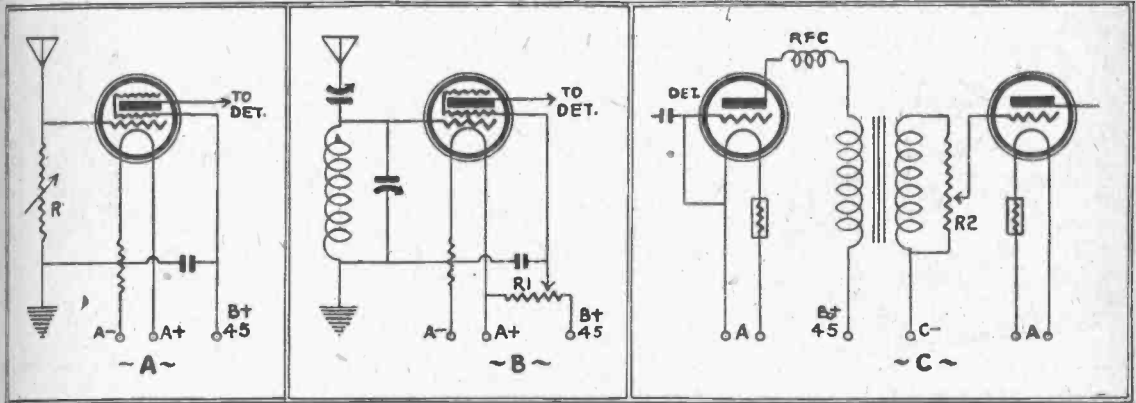


Fig. 3. Suggested volume controls for short-wave receivers. The regeneration control may be used with all three as an extra volume control.

valves, if any) of a broadcast receiver, the audio amplifier may be used by inserting the plug in the detector socket. An adaptor may be designed to operate in the first RF socket, and in this position the control is easy, but when used in the detector socket a little patience is required where the operator is unaccustomed to fine tuning.

If you possess a superheterodyne broadcast receiver, an adaptor may be used with this by plugging into the first detector socket. With this type of receiver the results with an adaptor are usually of the best, as the superhet. gives a very high amplification. Even if the adaptor is very carefully constructed and covers efficiently the wavebands required, remember that it is a case of good receiver, good results; poor receiver, poor results.

So much for the adaptor, which solves the short-wave problem for those who do not wish to go to the expense of a second receiver. It is possible to build a combination long and short wave receiver, but this is a practice I do not recommend unless the person undertaking the construction thoroughly understands the difficulties likely to be encountered. A broadcast and short-wave receiver may both be contained in the same cabinet and arranged to use the same A and B battery supply, but unless one is prepared to entirely disconnect the batteries from one and re-connect to the other receiver, the switching system may give trouble by introducing stray capacity, especially where a screen grid RF amplifier is used on the short-wave side.

In the design of a short-wave receiver for broadcast reception there are several points to be considered in order to turn out a satisfactory product. The first is that the oscillation control must be perfectly smooth without extraneous noises. In this I refer to the audio amplifier—as often an audio amplifier, which may be fairly silent in operation on the normal broadcast band of wave-lengths, will produce a very annoying high noise level when used at high frequencies or short waves.

It is just as important that a short-wave receiver should be as easily controlled as the average broadcast receiver, so that the user will not have to learn any new procedure, and it is really essential that the receiver should cover an adequate range of wave-lengths for the reason that the short-wave broadcasting

stations are not yet of a permanent status, and operate under experimental licenses, which may mean a change of wave-length at any time. There have been a great number of short-wave receivers fully described in the pages of "Wireless Weekly," mostly until recently of the oscillating detector type, without RF amplification. These included the "De Luxe Short-wave Receiver," the "Go-getter," and the "Wasp All-wave Receiver."

The newcomer will do well to build any of these three, owing to the simplicity of construction and ease of operation. Astounding results may be obtained at times, and the "Go-getter" will be found well capable of loud-speaker reproduction of PCJ and 5SW under good reception conditions. Any of these receivers will show a vastly improved performance by the addition of a screen grid RF amplifying stage, before the detector, and this is typified by the "All Empire," "Midget RF Four," and Mr. Allsop's "Relay Super-net," with a screen-grid RF amplifier preceding the first detector.

Apart from the high amplification gain delivered to the detector, one great advantage of the use of the screen-grid valve for short-wave reception is that one is not troubled with "dead spots" or "holes" where the receiver tends to cease oscillation. These "holes" are due to the fact that when the set is tuned to the natural wave-length or sub-multiples of the natural wave-length of the aerial used, so much energy is taken from the tuned circuit to stop the detector valve from oscillating. This may be overcome by using a very small variable condenser in series with the aerial, thus shifting the harmonics by its variation, but this system has the great disadvantage that it upsets the calibration of the receiver, and one may find the same station in two or three different places according to the setting of the micro-condenser.

Loosening the coupling where an aerial coupling coil is used will also have the same effect, although the alteration of calibration is not so noticeable. The screen-grid valve at once overcomes this objectionable feature, and permits a band of wave-lengths to be swept by the tuning condenser without other adjustments other than a slight touch to the regeneration control. The "Uni-International Four," recently described, makes use of the screen-grid valve in the easiest manner. The RF stage is untuned, and, although the sensitivity is not up to that of those receivers using a tuned RF stage, yet the gain is appreciable over the ordinary detector type of receiver, and the control of this receiver is simplicity itself.

The operation of a short-wave receiver is really very simple. With suitable valves in the sockets, and with the battery voltages according to the circuit diagram, place one of the coil units in position. Keep the regeneration condenser at zero capacity and turn up the detector filament rheostat half on. Then, advancing the regeneration control to a certain point, the detector valve should slide into oscillation with a soft swish, accompanied by considerable hissing and an increase in static.

If the detector refuses to oscillate with the regeneration condenser or control full in, the filament rheostat should be turned up further. If oscillation takes place sharply or with a growl or howl on the edge of oscillation

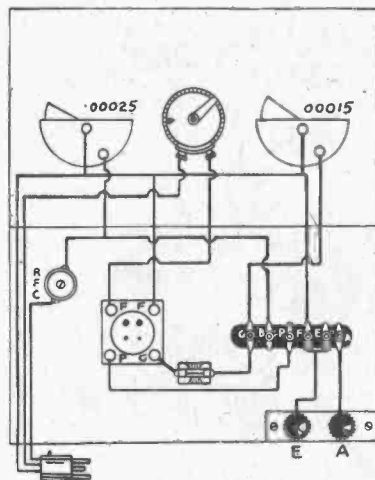


Fig. 4. Wiring diagram for a simple short-wave converter to be added to an ordinary receiver.

tion, the rheostat should be retarded to a point where the desired smoothness can be obtained.

After oscillation is obtained, the waveband covered by the coil may be swept with the tuning condenser always manipulating the regeneration control at the same time in such a way as to keep the detector just on the edge of oscillation. When a telephony transmission is located, a distinct heterodyne whistle will be heard which will be chopped up by the modulation. Tune to the zero point of the modulated carrier and retard the regeneration control until the circuit is just out of oscillation.



The original Go-Getter Receiver, which has proved the most popular described in "Wireless Weekly."

The setting of the tuning condenser may then be corrected for maximum signal strength, and the regeneration control advanced with an increase in signal strength up to the point of oscillation.

With the receiver using a tuned stage of RF amplification the same procedure applies throughout, except that the RF tuning dial must be synchronised with the detector tuning. An enormous increase in signal strength takes place when this condition is reached, and all signals with a receiver of this type may be put through a loud-speaker—head-phone reception being entirely unnecessary.

A few circuit diagrams, which will prove of value to the short-wave enthusiast, are given. These illustrate different types of regenerative circuits in use, including the application of the screen grid valve and three suggested volume controls for short-wave receivers.

New Jazz Band at 3LO

THE Radio Revellers, successors to the Radio-Aces, who are to make their bow before the microphone in 3LO studio on February 25, are a talented band of syncopators under the baton of Ernest Hall, who will dispense the very latest and most up-to-date form of "jazz." Each member of the "Revellers" is a soloist of repute, and their concerted items are bound to meet with the approval of the many thousands of listeners who enjoy this form of entertainment.

New Apparatus Tested & Approved



Voices and Music From the Sky

AN interesting experiment of fitting speech amplifiers to air craft was recently carried out in Sydney by Air Travel, Ltd., and the British General Electric Co., Ltd., Clarence Street, Sydney. The idea is new to Australia. As far as the writer is aware this has only been done, so far, in America.

The aeroplane used for the experiment was an Alexander Eagle Rock, and is normally flown by Captain Rupert King, of Air Travel, Ltd., and is used for passenger flying over Sydney. The speech amplifying apparatus used was the "Gecophone" public address equipment, and consists of an "A" or Microphone Amplifier and a "B" Amplifier, which is used for gramophone music and radio.

The amplifier took up a fair amount of room, and the actual fitting of same to the aeroplane was a job which required a great amount of thought. After a preliminary inspection it was decided that it would be necessary to remove the large double seat in the passenger cockpit so as to enable the "B" amplifier—i.e., the gramophone and radio amplifier—to be bolted down on the floor of the machine. The batteries were placed on the floor of the 'plane right up under the petrol tank, and were wedged in to prevent moving. The microphone was mounted on a small metal bracket on the right-hand side of the pilot's cockpit. This enabled the pilot to lean over about 8in. or a foot, and be right up close to the microphone. The loud speakers were of the cone type, and were 4ft. in diameter. One speaker was mounted under each wing. This mounting was found to be very efficient, and it was noticed that the wing itself acted as a baffle, thereby increasing the volume of sound which was heard by those down below. These special speakers were found to be particularly suitable for this work owing to the fact that very little resistance was offered to the air when they were clamped into position underneath the wing.

It was proposed to fit a third speaker underneath the pilot's seat, but it was found that it was not required.

The weight of the whole outfit was in the vicinity of 350lb., and, therefore, Captain King was rather worried as to whether the 'plane would be able to take off with all this weight on board. However, when everything was ready the machine was pushed out of the aerodrome, and Captain King taxied right over to one corner, turned round, and, facing the wind, opened up with a view to taking

off. His first attempt failed owing to the excessive weight, and another attempt was made. This time with greater success; the 'plane just left the ground and cleared the hangar. However, once off the ground altitude was quickly obtained, and, finally passing over the aerodrome at a height of about one thousand feet, Captain King's voice was distinctly heard.

It must be mentioned here, however, that these experiments were carried out with the engine running either at half throttle or shut right off and the machine in a flat glide. The amount of volume obtained with this particular outfit used was not enough to drown the noise of the engine. Captain King later flew over the city of Sydney, and was heard distinctly from the roof of the British General Electric Co., 104-114 Clarence Street, Sydney.

A rather interesting point in connection with these experiments is the fact that the Osram L.S.5 type valves used in the amplifier were found to be quite intact after having been bumped across the aerodrome, both in taking off and in landing—actually two take-offs and two landings.



Switch-on Dry Batteries

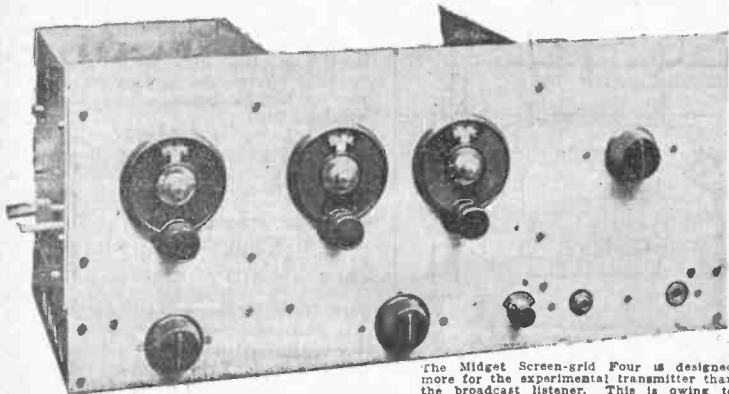
LOOKING at the above battery one sees nothing extraordinary about it except that it is exceedingly neat, and the clip terminals are arranged for convenience (for instance, the negative and maximum positive terminals are on the same side of the battery instead of at opposite corners).

It's the performance that counts. The "Switchon" Power Battery certainly delivers the goods as regard voltage and current. There is no crackle, and one of these batteries will deliver twice the amount of current, or last twice as long as any single 45-volt unit.

One of these batteries was tested on a six-valve receiver. No other batteries were used whatsoever. This battery put up a remarkable performance, enabling the loud speaker to deliver a pure undistorted signal with plenty of punch when it was desired.

The sole Australian agents, W. G. Watson and Co., have several types of "Switchon" batteries, suitable for all electrical needs. Among the types there are Power and Super-Power. It should be mentioned here that the battery under test was just a Power battery. Nevertheless, across a voltmeter, before testing it showed exactly 45 volts. After five hours running on a six-valve receiver, the battery still delivered full voltage. The average battery under equal conditions would have shown a heavy drop in voltage after the first three hours' continual use. This drop is sometimes as much as ten volts.

Attractively made, compact, and electrically efficient, the Power Battery sells at less than the standard heavy-duty 45-volt battery. The cells are tapped every 4 1/2 volts in the standard types, thus enabling one to use run-down "B" batteries for "A" or "C" batteries.



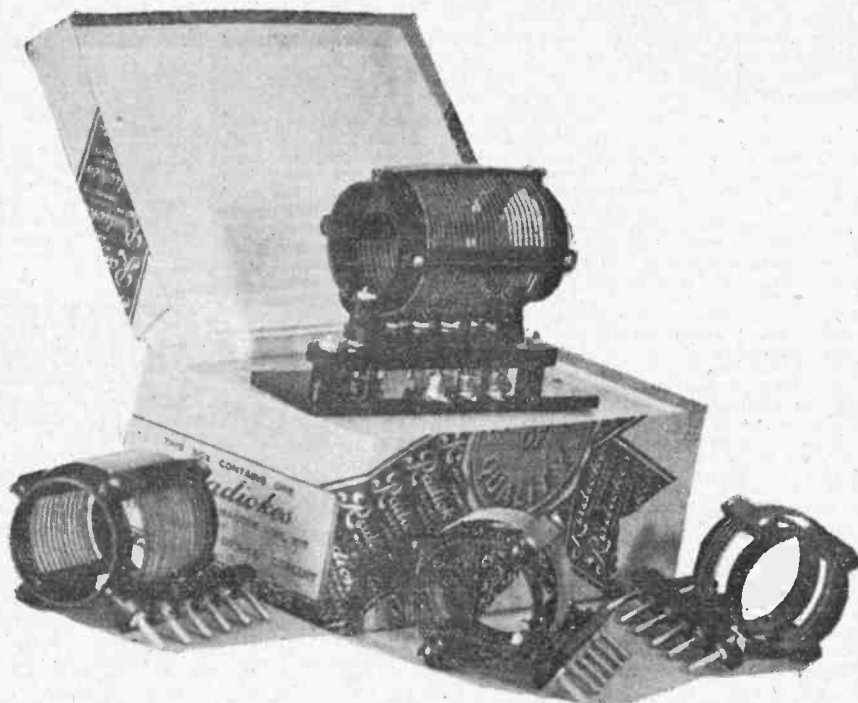
The Midget Screen-grid Four is designed more for the experimental transmitter than the broadcast listener. This is owing to the extreme sharpness of tuning.

SHORT WAVES

ARE BECOMING INCREASINGLY POPULAR

Television is Broadcast on Short Waves

RADIOKES LATEST PRODUCTION is the New Short Wave Screen Grid Coil Kit



This Coil Kit is, without question, the finest Kit ever offered to the Radio Public of this or any other country.

The workmanship is excellent, and the finish is the best that present-day manufacturing can produce.

The design is electrically most efficient, and represents the very latest developments in short-wave practice. Specially arranged to bring out the best that is in the latest Radio Wonder, that is, the Screen-grid Tubes. The efficiency is high because the losses are low. Radiokes' unique construction, which utilises a super efficient winding, supported upon a skeleton framework of highest grade Bakelite, makes for the lowest possible losses, as by this means least solid dielectric is included in coil field.

The use of highest grade Bakelite assists in the maintenance of mechanical rigidity and RADIOKES' method of riveted construction guarantees a reliable strong coil form, which, on account of its very strength, retains the coil calibrations as originally designed in Radiokes' laboratory, and fabricated in the Radiokes' factory.

A new type six-contact mounting base, equipped with a special silver spring system, makes the interchange of coils a pleasure, and the smooth, but positive, velvety action of the contacts will assure that the robust little coils may be interchanged almost indefinitely without damage to themselves or mounting base.

This new Radiokes' Kit consists of four interchangeable R.F. Transformers, as illustrated, a six-contact horizontal type mounting base, and a special antenna coupling choke, and lists for £3/12/6 per kit.

A Broadcast coil is available at a cost of 15/-. to cover the waveband of from 245 metres to 555 metres, using the recommended .00014 m.f. Tuning Condenser.

Radiokes' Products are obtainable from the High-class Dealers, or direct from

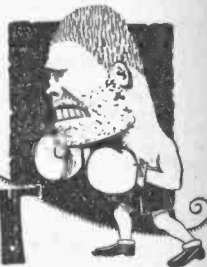
METROPOLITAN ELECTRIC CO. LTD.,

RADIOKES HOUSE, 126-130 Sussex Street, SYDNEY,

OR

YORK HOUSE, Little Collins Street, MELBOURNE.

HITTING BELOW the BROADCAST BELT



Short-wave and Amateur Notes by VK2NO

STATIC conditions have improved a little this week, the little red demon abating his fury somewhat with the advent of slightly cooler weather and torrential downpours of welcome rain. At the same time, international broadcasting has been anything but satisfactory, while, in direct contrast, amateur telegraphy signals from Europe have been remarkable on the 20-metre band from 11 p.m., Sydney time, onward.

As I predicted in receipt of VK3CX's notification of good 20-metre communication, the band has come to life with a rush, and a letter from Mr. St. John, VK2RX, prompted me to blow the dust from my 1929 tune-plate-tuned-grid transmitter, and give a fervent CQ "DX" call. VS3AB, in Johore, Malays, answered the call, and his report gladdened my heart, and brought back memories of days of yore. In the middle of this jubilation my A-battery petered out, and not having another charged at the time, I had to put up with the mortification at hearing Englishmen, South Africans, and Indians disporting themselves in looking for DX contacts, the while I was afraid to answer for fear that by the time the reaction condenser was at full capacity, after chasing the signal with a swiftly discharging battery, that said reply would be lost.

At station VK2AW-2NO we have received a very interesting communication from one, Mr. Trebilcock, in Moonta, S.A. He has been listening for some time to amateur transmitters operating on the 40-metre band by receiving their harmonics on 120 to 130 metres. He has heard signals from all over Australia in this way, and the deduction arrived at is, in my opinion, that the 120-metre band should be very interesting for inter-State working at night.

We have the 160-metre band, so why not give it a trial in the winter evenings? Most likely Mr. Trebilcock, if you listen on 85 metres, you will find a still stronger harmonic from experimental stations operating on 42 metres! Much greater use would be made of these wavebands by Australian experimenters but for the fact that static is usually worse than annoying up there, and that also we have to contend with the harmonics from broadcasting stations.

Tests have been carried out during the last week-end at VK2NO on the difference between a half-wave 42 metre Zepp and a half-wave 21-metre Doublet on 21 metres. The Doublet or folded Hertz wins!

It is noticeable that the Australian transmitter is paying far more attention to 21 than 42 metres, with the result that some remarkable work is being done. 42 metres is too congested, but one at least has a chance on 21. One question we would all like to ask is: "When are the commercial organisations going to play the game and respect the Washington Conference by getting out of the amateur frequencies?" There are quite a few overseas stations usurping territory which does not belong to them, and if this sort of thing continues, then the ama-

teur cannot be blamed if he is not too particular about HIS frequency.

Mr. Russell Crane has again been burning the midnight oil, and through his courtesy his log is published here for the benefit of S.W.B.C. listeners.

Since last log conditions have been even worse. Static very prevalent.

AT CRONULLA: FRIDAY NIGHT (JANUARY 25)

G5SW: At ten thirty this station was good and strong, in spite of bad static, but was quite spoiled by morse, sometimes two loud stations interfering at the one time. Towards 11 it improved. Bulletin: "The improvement in his Majesty's condition noted in the last bulletin continues. Bacteriological examination shows that the right side of the chest is now free of infective organisms." The music following was clear and fairly strong, considering static. Lightning all round.

SATURDAY

Conditions too bad to expect much. Listened for PCJ, but, as usual, could not hear even a carrier. I do not think that they can transmit to schedule; if they did we should sometimes get a sound of them. Nothing interesting Saturday night. Storm about.

SUNDAY (MORNING)

No call. At 2.15 a.m. I heard a station unusually loud, playing good music, lasted about five minutes and then ceased without call; it may have been PCL on about 38 metres. Very strong.

7LO: At 3 a.m. male voice singing, then announcement that record was 31500. The next item is from "La Boheme." Only moderate ear-phone strength; improved with the song, but static very bad, no high speed fading. Announcement not clear. 3.30 a.m.: An announcement about the King, and something about "the little Princess and her grandfather." What followed seemed to be a book review, but almost impossible to follow on account of static and weak sigs. The very strong station mentioned earlier did not come on the air again up to 3.45 a.m.

MONDAY

Huizen: Report on Huizen, a new Phillips station. Reception was good, wave length 16.88.

5SW: This station was poor, but announcements easily copied, except during Morse interruptions.

ANE and PCL usual good strength.

TUESDAY

PCL: Very strong about 9.15 p.m.
G5SW: Strong, but surging, Hotel Cecil Orchestra best item, this after 11.

PCJ: Very loud and distinct telephony with Bandoeng

WEDNESDAY

Bandoeng calling.
PLG also PRE: I do not know these calls, and am writing to Radio Holland, Java, for information. Conversations very clear and full of volume, part of the time working with 2ME trying to arrange a schedule Wednesday 2nd, to put Mr. —, of Villa Manor, Mossman, through to U.S.A., per KDKA, Pittsburg, or Pittsburg; as Java said. After two-

way 'phone PLG continued with very good music at nice L.S. strength. This pro-call. 7 p.m.

gramme was just as clear as any local B.C. station, except when a motor car was near here. Motors of any sort are death to the short waves. PRE then gave music, and several times repeated PRE, as if a call sign. Vide later—Huizen.

THURSDAY

G5SW was very touchy and only moderate strength at 10.45, but bulletin quite easy to copy. "We learned officially this morning from Buckingham Palace that there is nothing further to report about his Majesty's condition." Very free of morse interference.

Foreign station on 26 metres calling Australia; had to leave set, and did not get his call. 7 p.m.

Bandoeng not good to-night; seemed to break down at 9.45, but at 11.10 was calling Amsterdam about usual strength.

FRIDAY (FEBRUARY 1)

PCJ: 4.45 to 6.10 a.m. This was a very fine transmission. At times reception equalled any I have ever had.

G5SW: Unfortunately this station was nothing like as good as PCJ. About R4 to PCJ R8 to 9.

G5SW: Friday night, good L.S. strength, but quite spoiled by morse interference for the first half-hour.

SATURDAY (MORNING)

PCJ again splendid strength during early morning hours.

G5SW: Weak again, compared with PCJ.

(AFTERNOON)

PCJ: This station for the first time for some months was quite good from 2.45 to 4 p.m. It was a programme for Australia, and items were given by Australians for Australians. Reference was often made to our friends in Australia. Hardly L.S. strength, but good on 'phones.

(NIGHT)

OA-2CF: Had a schedule with 2CF on 80 metres; unfortunately, local storms made reception bad on this wave length. Heard him call and play a good item, "The Doll Dance."

Java: Several of the Dutch stations working. Telephony not as good as usual, owing to static. Two Dutch ladies had a long wow about Rabaul and Sourabaya. PCL fair strength.

MONDAY AND TUESDAY (FEB. 4 AND 5)

Nothing special. I made some notes, but have mislaid them. London, G5SW, moderate strength. A good deal of morse interference.

TUESDAY

Huizen or PRE: This night London moderate strength, PCL and Java very good, but the interesting transmission was from Huizen, the little town that first broadcast in Holland.

1 a.m.: Strong carrier, 16.88 metres. Jazz music and male voice. Moderate, high speed fading.

1.10: Announcement; nothing in English, but reference to G.M.T. and Java mid-time or mid-Java time. 1.15: Music again, bad surging, and H.S. fading. 1.30: Short announcement, and then music. At this time

some other foreign station on about 24 m. was transmitting, and was at the least twice as strong as Huizen.

1.45 a.m.: Nothing but very thin voice. just audible, singing.

Bandoeng: 1.50. This station very strong, calling Amsterdam. PCL reply was at good strength, but morse in background. A local storm has been coming up for some time, and lightning is making reception very bad. Nothing from Huizen, but several telephony stations still quite strong. Huizen again at 2.15 a.m., very poor, and as lightning now bad will close down.

WEDNESDAY

G6SW: Very moderate strength, but clear of morse and fading. 10.40 and 10.53: High speed morse very troublesome.

Huizen: 11.45 p.m. Nice 'phone strength, music just about 5SW strength; very 'little fading of any sort. Fine orchestral number finished at 12.13. A rather bad fade at 12.10. Announcement at 12.15, no English. Band music followed, a little stronger. 12.17: Announcement at 12.22, further reference to G.M.T. and Mid-Java time. 12.30: Music a shade stronger than the usual telephony trials at this time, but at no time so far could I use the L.S. 1 a.m.: No improvement in strength; just nice ear-'phone signals. 1.5 a.m.: Announcement; got only a few words. "This is . . . short wave . . . Eindhoven88 metres. We shall highly appreciate reports on this transmission, particularly as regards intensity, strength, and (?)" Fading; a good deal of this was very faint. 1.10 a.m.: Music, very free of any fading, just lacks punch. Off the air at 1.35. There is so little change in strength I will only go on till 2 a.m. Nothing now except weak carrier till 2.10, so closed down.

THURSDAY (NIGHT)

Was in town till 9.30. At 9.45 p.m. Dutch telephony good strength. (?) Huizen: At 10 o'clock music at good strength on Huizen's wave length, surging, but good loud-speaker strength. Jazz music quite good. A succession of records without announcement, mostly jazz, to 10.30; fair to good loud-speaker all through.

G6SW: Very weak to-night; some morse interference.

FRIDAY

Huizen: From 4 to 6 p.m. no sign at all of this station that was said to be testing; a lot of morse at this time that would want very strong signals to break through. 6 to 6.30: Morse only. 7 p.m.: Faint carrier. 7.10: Music just recognisable on the 'phones as a man and woman singing and musical accompaniment. Instrumental to 7.20. Good deal of H.S. fading, and only weak 'phone signals to fair at times. No announcements between items. 7.22: Woman singing, but air spoiled by H.S. fading; sounded like "Waters of Minnetonka."

Huizen: 7.26 p.m.: Instrumental number. In middle of this bad morse interference. 7.30: Item finished (morse in background). Next item another instrumental, about the strongest yet, but still bad H.S. fading and morse interference at 7.31 for about one minute. Bursts of quite loud ear-'phone music every now and again, but music very flat on account of H.S. fading. Item finished loudly at 7.34 p.m. Other items followed, as before fading and morse giving trouble, but strength improving slightly. At 7.39 p.m. a motor car gave me trouble by stopping near my house with engine racing, and in the middle of this disturbance came the first announcement. It seemed loud, was in Dutch only, I think. All I could copy was: "PRE G.M.T., Mid-Java time." 7.45: Music and singing, sounded like opera, but still surging and H.S. fading, spoiling reception. 7.57: Announcement in Dutch, and then shortly in English, asking for reports as before, ended by saying, "We are testing again next Tuesday, at 12 (?) G.M.T." The time was not clear.



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PROVING RADIO!

No. 9 This week we commence with some simple figures dealing with resistances in series and parallel. Some examples are given. Also we make a "Jumping Spring," with which many curious and educative experiments may be performed, and we make a simple shocking machine from apparatus already used.

RESISTANCE is that quality of a conductor, depending on its dimensions and material, which opposes the flow of a current through a conductor. When the elements of an electrical circuit are arranged in succession, like the links of a chain, they are said to be arranged in series. Fig. 1 (a). When two or more of the wires are arranged so as to constitute independent channels between the same two points, as in Fig. 1 (b), they are said to be in parallel.

The joint resistance of wires or cells in series is the sum of their separate resistances. Last week I gave you the formula for resistances in series as $R = r_1 + r_2$ (R or r equals resistance; the capital R represents the sum or total).

The reciprocal (Part 8) of resistance is called conductance.

When two or more wires or elements are arranged in parallel, their joint conductance is the sum of their separate conductances. If C be the joint conductance, then C equals C_1 plus C_2 . Of two branches in parallel, either one may be considered as the main, and the other is usually termed a shunt.

Thus in Fig. 2 there are two resistances in parallel. A is in shunt to B (or B is in shunt to A). The resistance of a wire of unit length is termed the resistivity or specific resistance of the material of the wire. The reciprocal of resistivity is conductivity, or specific conductance.

These points are not hard to grasp if you follow them carefully.

Here are a few examples:—Find the joint resistance of two wires in parallel offering respectively 3 and 7 ohms.

Joint conductance equals 1 over 3 plus 1 over 7 equals 7 plus 3 over 21 equals 10 over 21.

Joint resistance equals 21 over 10 equals 2 and one-tenth ohms, or 2.1 ohms.

Did you follow the procedure? Let us do another one together: Find the joint resistance of two wires in parallel offering respectively 9 and 15 ohms. Write down the joint conductances, i.e., each resistance expressed as a fraction, viz., one-ninth plus one-fifteenth.

Now work out this little sum:—one-ninth plus one-fifteenth equals 8 over 45.

Now reverse the fraction, and reduce it to whole numbers—45 over 8 equals 5 and five-eighths.

And, finally, bring it into decimals—5.625 ohms.

Easy, wasn't it?

If you have two resistances, say, of 12, 8,

6, and 3 ohms in series, the resultant resistance will be the sum of these, i.e., 12 plus 8 plus 6 plus 3, which is 29 ohms.

See if you can do these two little sums yourself, the answers also are given.

Find the joint resistance of 9, 3, 5, 6, 2, 50, 7, 4 ohms in series.

Find the joint resistance of three wires in parallel offering respectively 2, 4, and 8 ohms.

If you have worked correctly, your answer to the first sum will be 96 ohms, and the

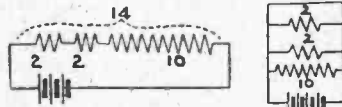


Fig. 1. (a) and (b).

second will be 1 and one-seventh ohms, which expressed in decimals will be 1.1428 ohms.

Now let these things sink well in for a week or so, then we'll be able to progress with further figures. If any reader is not sure of any point, he is invited to write in, or, better still, join the Proving Radio Club, particulars of which have appeared in recent issues.

In the meantime, let us make a jumping spring, with which we can perform many interesting experiments.

The jumping spring is a simple but very wonderful piece of apparatus, which automatically makes and breaks a circuit like a buzzer or an electric bell, but, different from these devices, it does so very slowly, and consequently can be used for a large number of experiments.

Take a piece of 18 S.W.G. (Standard wire gauge) bare copper wire, and coil it into a spring having a diameter of one-seventh of an inch. Now cut out a hardwood block about 3/16 in. thick and 3 in. by 4 in. on the sides, and drill three one-eighth of an inch holes in it (two on one end and one in the centre), see Fig. 3. Next bore a hole three-eighths of an inch in diameter halfway through the block in the middle for the well.

This done, screw a terminal into each one of the front holes, and then set a one-eighth of an inch thick brass wire 8 in. long in the rear hole, and bend the free end of it over 2 in. Run a piece of wire from one of the terminals and let the end of it stick in the well, then connect the other terminal to the brass rod. Fill the well with mercury (that obtained from an old thermometer will do), then hang the coiled spring on one end of the supporting rod, and adjust it so that the lower end just makes contact with the mercury.

This done, connect the two terminals to the negative and positive connections on your battery; the spring will now bob up and down, and in doing so will make and break the circuit.

It is the inductive magnetic attraction of the electric current through the turns of wire that makes the spring contract, and it is the weight of the spring that causes it to expand when the current is momentarily cut off.

With the jumping spring, one can make a "shocking" experiment. Connect up the jumping spring apparatus to 3 dry cells (or your power supply, as explained in previous issues), and then connect a carbon rod about 4 inches long (electric light carbons will do) to each of the terminals, as shown in Fig. 4. Give the carbons to a friend to hold, and start the jumping spring going, and he will receive a shock every time the spring vibrates.

Later, we shall make an electro-magnet, which, when added to the jumping spring apparatus, will give heavy but unarmful shocks.

The Dulwich Hill Proving Radio Group held their meeting on February 8. It was a very wet night, and only six members were present, these being Messrs. R. Caterson, West Concord; V. Worswick, West Concord; Geo. Randall, Marrickville; Stan Clark, Arncliffe; H. Rankin, Dulwich Hill; and C. Y. Hook, Dulwich Hill. The Group decided to meet every Friday, at 7.30 p.m. It was agreed to commence with Static Electricity experiments, performing each in turn as they appear in the "Proving Radio" series.

Probably owing to weather conditions, none of the experiments in Static Electricity were successful to any degree. Notwithstanding this, a keen discussion was indulged in, and by the time members had discussed matters as far as the electro-scope experiment, it was 10.45 p.m. The initial meeting was then concluded and it was resolved that each member should individually run through these experiments and report.

REMARKS: It is an essential factor in static electricity experiments that everything be perfectly dry. In "Proving Radio," part 1, you will find, under the heading, "Making Static Electricity," the remarks: "IN ALL OF THE EXPERIMENTS PERFORMED WITH STATIC ELECTRICITY, THE OBJECTS USED, AND THE WEATHER, MUST BE PERFECTLY DRY." This will explain the reason for your failures. You picked probably the worst possible night for your experiments. Try again when the rain has gone, and everything has had an opportunity to dry off. Remember also that certain substances retain moisture for some considerable time.

The City Proving Radio Group held their meeting at St. Andrew's Place, Sydney, on February 8, 1920. It was a very wet day and

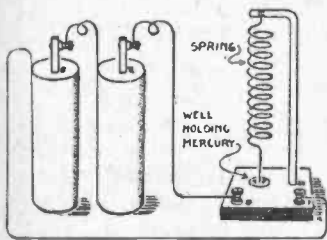


Fig. 3.

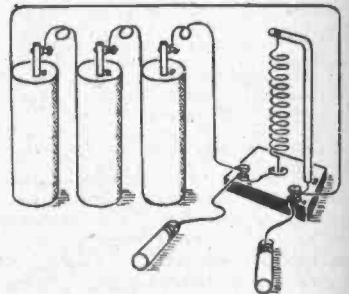


Fig. 4.

the experiment with the glass rod attracting small pieces of paper failed, in all probability due to the prevailing dampness. Those present were: Geo. Manual, Rose Bay; Jack O'Dae, Stanmore; Arthur Fox, City; and C. Y. Hook, Dulwich Hill.

The experiment with the sealing wax was a complete success; the sealing wax, after having been rubbed on the coat-sleeve, immediately attracted to itself small pieces of paper and gold leaf.

The sugar dust experiment with the electroscopie was also tried. This was partly a success, and partly a failure. As we had no violin bow on hand, it was decided to have one available for next meeting.

REMARKS: The wet weather was the cause of your failures. Sugar retains moisture for some considerable time. The reason why the sealing wax experiment was more successful, is because the friction generated by rubbing the sealing wax on the sleeve, caused heat, which helped to dry off the moisture from the sealing wax. In future experiments in damp weather, always warm off the components first to remove moisture, or, better still, wait for perfectly dry weather.

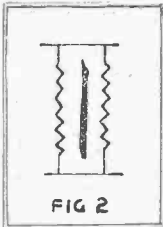


FIG 2

Some Club members ask:—

(1) "Is there any material that, after being rubbed, will repel the paper and gold leaf as the sealing wax was attracted to it?"

Answer: You have not fully grasped the principle, otherwise you would know the answer. Let me explain it this way: When the object is rubbed, it takes on a charge of positive electricity, the negative charge being left behind (as in the case of the newspaper experiment—on the table). Now, in order to attract a body, the positively charged matter must be held near a negative charge, when it will attract. If it is desired to make the elements repel each other, the obvious thing to do, is to positively electrify the paper, and positively electrify the sealing wax, then the like kinds of electricity will repel each other.

(2) "Are we justified in concluding that the charge of static electricity has no polarity until it is placed near another body, e.g., a strip of paper, etc., when it takes on a like charge or unlike charge to the scrap of paper?"

Answer: No, the charge taken on the body by friction is always positive. The negative charge is left behind. If you were to run a piece of paper with your thumb-nail, the paper (if insulated from the table or other supporting object) would take on a positive charge. Your body, being earthed, would take on a negative charge. If this is not clear, let me know immediately.

Intending country members will be pleased to hear that the "Proving Radio" Club has decided to open membership for those interested, and country members will be saved expense and trouble by having the material forwarded them so that they can perform their own experiments. The material must then be returned to the club.

Common Ailments of Farm Animals

A TALK that should be of great interest to every member of the farming community will be given from 3.0 on February 25 by R. J. de C. Talbot, veterinary officer to the Victorian Agriculture Department, who will speak on "Common Ailments of Farm Animals, and How to Treat Them."

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10	1 0 0	0	3 6	80	15 0 0	0	20 0				
15	1 10 0	0	5 0	90	17 10 0	0	22 6				
20	2 0 0	0	6 6	100	20 0 0	0	25 0				
25	2 10 0	0	7 6	110	22 10 0	0	27 6				
30	3 0 0	0	9 0	120	25 0 0	0	30 0				
40	5 0 0	0	11 0	130	27 10 0	0	32 6				
50	7 10 0	0	12 6	140	30 0 0	0	35 0				
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TROUBLE SHOOTING

It is the experience of every listener to have small untraceable faults with his receiver. That is part of the quality which makes radio so fascinating a hobby—it is impossible to remedy trouble directly at its source like an automobile engineer. This article indicates a few avenues for tracking down trouble.

EVEN the very best of receivers are prone to the usual faults, even as the most healthy man is liable to catch a cold. Sometimes the trouble may not be in the receiver itself, but the annoyance may be due to some outside cause.

Often, too, a receiver that has been newly constructed fails to function. Sometimes a receiver that has previously given good results decides to annoy its owner. Then, again, even the factory-made receiver, newly installed, gives very poor results. Quite often a good receiver suddenly refuses to work, or, perhaps, loses volume, develops muzziness, or squeals. Things like this (from personal experience) always happen when you have invited some friends along to listen in. It puts one in an awkward position, but it must be faced.

One of the most difficult faults to trace is the total absence of signals, when the set is put on for the first time. If the receiver has been purchased ready-built from a reliable trader, you may depend on it having been thoroughly tested before being sent to

you, so the fault will invariably be found in the external connections. Check over the battery connections, when a wrong lead may be found. Generally, this wrong connection takes the form of the "B" battery minus being connected to the "B" battery positive terminal, instead of the "A" positive terminal.

Adjust this external fault, and try again. If nothing happens, see that all valves are making good contact, by gently pressing each valve downwards. If you hear a click or a scratch, you will know that the connections inside the socket are not tight enough, and they should be bent up with a toothbrush handle, or some other non-metallic object. Often you will find, too, that you have been trying to receive a station when there are no stations on the air, particularly if you are a newcomer to radio. If in doubt about this question, look at the "W.W." programmes.

Try pulling-out the speaker or 'phone plug. You should hear a click in the speaker or 'phones each time the plug is withdrawn or replaced. If you hear no click, the "B" battery leads are wrong somewhere. Look to the connections on the jack.

Perhaps in transit some wire inside may have become disconnected. In a case like this refer back to the dealer who sold you the set. He will always fix it for you. If you feel competent enough to fix the

wire yourself, make sure you make the correct connection.

The person who has built his own set will have to check his own connections. It is a very easy matter to miss one little wire. I myself have sometimes been an hour on a set only to find that the aerial or "B" plus battery lead has not been connected (externally). In a Neurodyne, a common fault lies in forgetting to connect up the moving plates of the detector coil condenser to the positive "A" battery. If you have carried out the above instructions, with no results, look to the valves. See that the valves light up correctly. If they light up very brilliantly turn the rheostat almost off, and if the brightness continues you will know that the "B" plus is getting on to one of the filament leads. If you cannot find this "short," have a look at the connections inside the valve socket.

If the valves are of the dull emitter type, such as Cossor or Philips (the filaments of these valves do not light up), test the filaments for continuity. Use a pair of telephones and a "C" battery in series. The plate leg of the valve is usually that which is isolated from the others.

The pin immediately opposite to this is the grid, whilst the other two legs are the filament prongs.

TRANSMISSION OF WIRELESS WAVES OVER SEA WATER

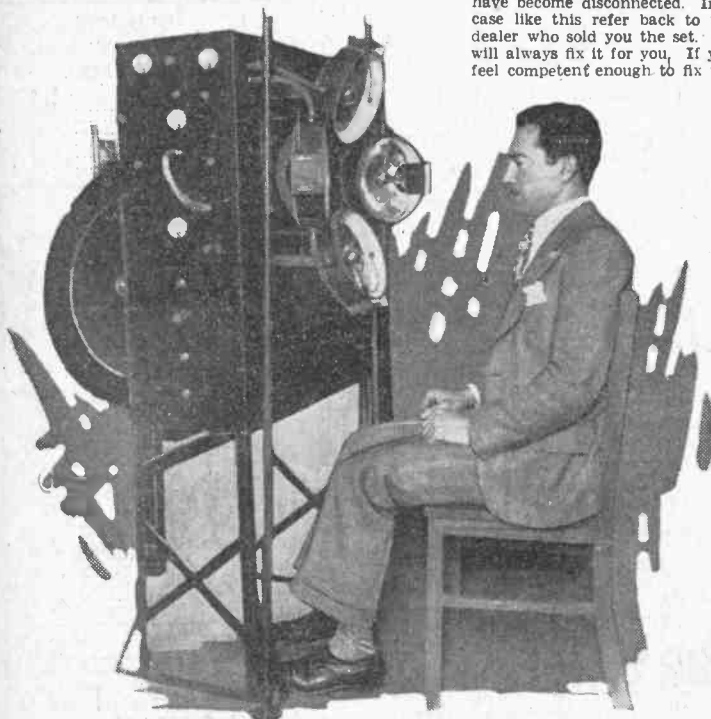
(Continued from Page 13.)

Figure III. shows clearly how rapidly the intensity of a wireless signal falls off due to the earth's curvature. The corresponding graph for transmission over flat land has been included in Figure II. for purposes of comparison.

The average for all the points before sunset is practically horizontal, indicating that when correction for curvature is made no appreciable absorption takes place in electromagnetic waves transmitted 80 miles over the sea. As is shown by the sloping line in Figure II. there is appreciable absorption of waves transmitted over land.

Soon after sunset observations became very unsteady, and they were abandoned as soon as it became dark. Observations were also attempted on the north coast of Tasmania, at Devonport and Burnie, distant respectively 240 miles and 230 miles from Melbourne. The daylight signal strength at both places was less than .5 millivolt/metre, which is the lower limit of the apparatus. Observations were also taken at Burnie between 5 p.m. and 7.30 p.m., but no definite readings were obtained. A heavy squall stopped further observations.

The observations recorded above were made possible by a grant for radio research from 3.L.O. Melbourne, to the University of Melbourne.



A subject in the act of being televised. The large lamps illuminate the features, and the reflection impinges upon the photo-electric behind the scanning disc.

The Part Played by the Land-Line in Broadcasting

The word wireless is a misnomer, since nothing has played a greater part in broadcasting than the ordinary telephone line. In this article we compare various systems used in Australia, England, and America.

JUST a little over two years has elapsed since those controlling broadcasting in New South Wales startled the world with two remarkable long land line transmissions. The first of these covered a speech delivered by the Rt. Hon. S. M. Bruce from Frankston, Victoria, when a trunk line of nearly 700 miles in length was used to convey the transmission to Pennant Hills, from whence it was broadcast to America and England by short-wave, as well as on long-wave, for local reception.

When the newspaper files reached England and the United States of America, cables were sent to Australia asking whether some mistake had not been made in the figures mentioned as to the length of the land line, and subsequently Sir John Reith wrote a letter of congratulation on such a successful effort. The second link-up covered an appeal made by Mr. Collins, Under Secretary for the Treasury, which was decided upon after consultation with those who had carried out the Prime Minister's broadcast. On this occasion the total land line used reached just on 1500 miles, and the Directors of some of the American stations wrote asking for the fullest information as to how the transmission had been carried out.

During last week the National Broadcasting Co. (Inc.) of the United States of America sent to the Directors of the New South Wales Broadcasting Company, Limited, an account of how they had now completed a permanent land line circuit totalling 2200 miles. The Pacific Coast was permanently linked to the nation-wide radio network of the National Broadcasting Company at 6.30 o'clock Monday night, December 24, when a twenty-four hour programme circuit from Denver to San Francisco was hooked up for coast-to-coast distribution of programmes. The final link in the permanent circuit required intensive work for more than a year, and is the final operation in connecting by specially-engineered wires the fifty-eight stations associated with the National Broadcasting Company. The first span in this transcontinental link was completed on June 1, when the line was extended from Omaha to Denver. Maintenance of the permanent circuit will cost the National Broadcasting Company £55,000 a year.

Successful installation of this circuit is regarded by engineers as an achievement of first magnitude. They recall that the first telephone circuit from New York to San Francisco was not completed until 1915, and point out that it is comparatively simple to install telephone circuits in comparison to permanent specially-engineered lines, carrying musical tone. Experiments were made for eighteen months before the 2200-mile circuit was ready. Extensive tests were made to assure uniform transmission of programmes to and from the coast.

This new circuit serves two intermediate transmitters, KSL Salt Lake City and KOA Denver, and enables the N.B.C. to provide the entire country with its network programmes. Amplifiers or "Repeater" points in five States check the transmission of each programme as it passes along the 1000-mile line to the Pacific Coast. From Omaha the circuit goes to North Platte, and from there to Rawlins, Wyoming. Next it is checked

at Salt Lake City and then at Ninnomuca, Nevada. The next tests on the transmission occur at Sacramento, California, and then it goes into San Francisco for distribution to the N.B.C. Pacific Coast system.

The N.B.C.'s eastern circuits serve 69.4 per cent. of the radio audience in the United States, and its Pacific Coast system reaches an additional 12.1 per cent., according to a recent survey. The new link adds 1.2 per cent., and brings to listeners in the mountain district the same programmes heretofore heard only in the East and on the Pacific Coast. Before this link was made, these listeners heard only special network programmes and events of national importance. With the inauguration of this transcontinental circuit practically every major programme heard through the N.B.C. system becomes national in fact.

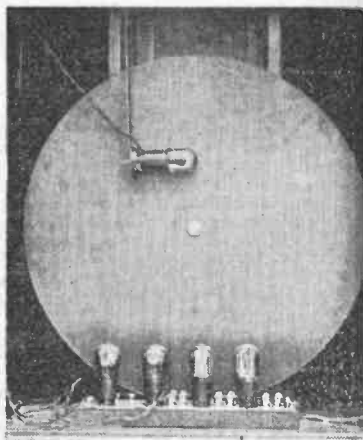
In view of the changes that are contemplated in the control of wireless administration in Australia, when it is anticipated that all mechanical equipment will come un-

der semi-Governmental control, it is interesting to note the great progress that private enterprise in the United States of America is making in land-line transmissions. That the Directors of the New South Wales Broadcasting Company, Limited, have recognised the value of the use of land lines in broadcasting is borne out by the figures published a few weeks ago when it was shown that transmissions had been taken during 1928 from no less than 2190 picking-up points. The aggregate mileage in the network of broadcasting lines used during the past year totals in the vicinity of 20,000, and in making up this total the Company operated from a large number of the leading provincial centres.

The officials of the Postmaster-General's Department have at all times very generously co-operated in an endeavor to make available suitable lines, and give the best service possible, even upon lines which are not adapted for the carrying of broadcasting programmes.

TELEVISION RECEIVER ON VIEW

IT IS TO BE HOPED that the unenviable position of television in England at present will not be seen in Australia. Television itself was scoffed at from the very beginning. An English newspaper challenged Baird to reproduce, by means of television, a number of geometrical objects, but Baird refused to accept the challenge, for good reasons of his own, no doubt, but the result was (according to general report) that the British public stubbornly turned their backs on television. This report was nullified, however, when Baird floated a Television Company, for within one hour of the opening of the market for sale of shares all holdings were completely sold out. The faith of the British public in this case seemed to point out a successful road for Television. Another obstacle was met, however, when the public (most of whom wanted television) declined to buy television receivers until the broadcast-



An inside view of the Television, showing scanning disc.



A front view of the Television at Murdoch's.

ing stations undertook to transmit by television, whilst the broadcasting companies refused to undertake television transmission until they were assured of a fair number of (we shall require a new radio term soon) licensed owners of a television receiver.

Murdoch's, Ltd., Park Street, Sydney, have started the ball rolling for Australia. This firm have on view a new television receiver. The lower picture shows the front, and the upper picture the back view. The special amplifiers can be seen at the foot of the cabinet, whilst almost in the centre of the scanning disc will be seen the photo-electric cell. Murdoch's, Ltd., invite readers to their Radio Showrooms, where the television receiver may be seen.

In the meantime, let us make and maintain an interest in television, for Australia's sake.



List of World's Broadcasting Stations Which Can be Received in Australia on Long and Short Waves

AUSTRALIA.		Metres. Watts.		Metres. Watts.		Metres. Watts.			
New South Wales		255	500	2193	Silent day	808	500		
Metres Watts									
2FC—N.S.W. Broadcasting Co., Ltd., Market St., Sydney, 6700-2230	442 5000	4QG—Queensland Govt. Radio Service, Brisbane, 6800-2200	385 5000	4YA—Radio Broadcasting Co. of New Zealand, Dunedin, 1700-2200	Silent days Mon and Thurs	453	750		
2BL—N.S.W. Broadcasting Co., Ltd., Market St., Sydney 6800-2230	553 5000	4GR—Gold Radio Service, Margaret St., Toowoomba	234 100	GREAT BRITAIN.					
2GB—Theosophical Broadcasting Station, 29 Bligh St., Sydney, 1000-1200	316 3000	South Australia		2LO—British Broadcasting Co., Savoy Hill, London, 1900-0350	861.4	3000	JAPAN.		
2KY—Trades and Labour Council, Goulburn St., Sydney, 0900-2200	230 1500	5CI—Central Broadcasting, Ltd., 39 Franklin St., Adelaide, 1100-2310	409 5000	5XX—British Broadcasting Co., Davenport, 1900-0850	1604.3	5000 10000	JOAK—Tokio Central Broadcasting Co., Tokio, Japan, Jap. stations received best, about midnight on Sunday	375 1000	
2UW—Radio Broadcasting Ltd., Paling Building, Ash St., Sydney, 1230-2230	267 500	5DN—DN Pty., Ltd., 24 Montpelier St., Parkside	313 500	FORRIGN				JOBK—Osaka Central Broadcasting Co., Osaka	335 1000
2UR—Electrical Utilities, Ltd., 613 George St., Sydney, 0730-2330	393 250	5KA—Sport Radio, Ltd., 51 Kinross Av., Prospect	250 1000	UNITED STATES.				JOCK—Nagoya Central Broadcasting Co., Nagoya	360 1000
2MK—Mockler Bros., Ltd., Hawick St., Bathurst	275 350	West Australia		KDKA—Westinghouse Electric and Manufacturing Co., E Pittsburgh Pa.	315.6	50000	DUTCH EAST INDIES.		
2HD—H.A. Douglas, King St., Newcastle	283 100	6WF—Commonwealth Government Broadcasting Station, Perth, 1230-2230	1250 5000	KFI—Earle C. Anthony Inc., 1000 So. Hope St., Los Angeles	468.5	5000	JPC—Batavia Radio, Batavia, Java	220 50	
2BC—Rugin Electric Co., 240 Kent St., Sydney, at present off the air	315 100	Tasmania		KGO—General Electric Co., Ltd., Oakland, California	884.4	5000	PHILIPPINE ISLANDS.		
2LO—Dominions Broadcasting Co., 120A Russell St., Melbourne, 0715-2240	371 5000	7ZL—Tasmanian Broadcasting Pty., 95 Elizabeth St., Hobart	335 5000	KOA—General Electric Co., Ltd., 1370 Krameria St., Denver Colorado	325.9	5000 10000	KZRM—Radio Corp. of the Philippines, Manila	413 1000	
2AR—Dominions Broadcasting Co., 120A Russell St., Melbourne, 1000-2200	484 5000	NEW ZEALAND.		WRAP—National Broadcasting Co., 1950 Broadway, New York	491.5	50000	KZKZ—Radio Corp. of the Philippines, Manila	270 500	
2DZ—O. J. Nilson and Co., Bourke St., Melbourne	819 100	1YA—Radio Broadcasting Co. of New Zealand, 419 Queen St., Auckland, 1500-2203 Silent day Mon	333 500	WGY—General Electric Co., Schenectady N.Y.	378.5	40000	KZIB—Radio Corp. of the Philippines, Manila	260 500	
2DB—Dunlich Bush		1YA—Radio Broadcasting Co. of New Zealand, Wellington, 1500-2200 Silent day Wed.	420 5000	WIZ—National Broadcasting Co., 183 Broadway New York	454.3	30000	INDIA.		
		2YA—Radio Broadcasting Co. of New Zealand, Christchurch, 1500-		KIROPIR			ICA—India Broadcasting Co., Calcutta, Indian stations received best about 1.30 am Monday	370.4 3000	

International Short Wave Stations: Times Stated are S.M.T.

AUSTRALIA.		Metres.		Metres.		Metres.	
2MF—A.W.A. (Syd.), relays 2FC, times irregular, quality Mon, from 0430-0600	28.5	from 0930	45.04	2400 Sat., 0100-0400 Sun.	21	5500 Mon., 0820-0700 Wed., 0900-0520 Sun. Picture transmissions, 0800-1100 Tues and Sat	42.19
2YQ—Ray Allison (Syd.), relays 2BL, times various	32.5	2XAF—Schenectady Tues 0900-1500; Wed., 0930-1430; Fri., 0900-1500; Sun., 0900-1500	32.4	PCU—The Hague, 0300-0800, Wed and Fri; 0800-1400, Sat.; 0100-0400, Sun.	42	AUSTRIA	
2ME—A.W.A. (Melb.), relays 2LO, times various, usually heard about 0430-0530	33	WLW—Ohio, 0900, except Sat. and Mon.	52.02	UNION OF SOVIET SOCIALIST REPUBLICS.		OKK5—Vienna	70
2AG—W.E. Coxon (Perth), relays 6WF, times various, usually 2130-0200 daily	12.9	KDKA—East Pittsburgh, Daily from 0900	43 35.89	RFN—USSR Moscow	29.40 50	OKK2—Vienna Mon., 0400-1100	70
GREAT BRITAIN.		7XAO—Portland, Oregon, Daily from 0900-2300	63.54	RFM—USSR Siberia	40 30	SPAIN.	
2RW—Marconi Co. (London), relays 2LO, 0400-0800 daily, except Sun. and Mon. from 0930 on alternate Saturdays, and 2100-2230 daily	25	WIZ—New Brunswick, regular, usually after 0900	43.25 51.06	FRANCE.		GC—Paris	61
2YT—Marconi Radio, Philadelphia, times various 25, 32, 34	25 32 34	7XAO—Portland, Oregon, Daily from 0900-2300	63.54	YR—Lyon, Daily, 0230-0330	40	FL—Paris, Time alternate, 1750-0558	20
2NM—Gerald Marcuse, Caterham, Surrey, 0900-1000 (Sun), 1000 Thurs, and Sat.	32.5 28	EXG—Rocky Point, from 2400 Mon. and Fri.	16.07	PA—Paris, 1750-0558	20	FW—St. Asasle, At odd times throughout day, 0700-0900	14.7
2GLW—Beam Station, all times (Dorchester)	15.7	2XE—Richmond Hill, Relays WABC daily, from 0800	22.1	WV—Radio Vitis, Paris, 0700-0900	37	WV—Radio Aken, France, Wed and Sat., 0800-0918	39.75
2GIQ—Beam Station, all times throughout day (Gongar)	14.5	WOWO—Fort Wayne, Ind., Relays Columbia stations daily, 0800	22.8	GERMANY.		SWITZERLAND.	
2BH—Beam Station, Grimaby (Beam Station) All times	25.9	8XK—E. Pittsburgh, Relays KDKA 0200-0800 Tues and Wed	26.5	IMJ—Milan	48	ERSD—Zurich, Relay work, Tues, Thurs, and Sun.	85 32
UNITED STATES.		2XAG—New York, Telephony, irregular	24.97	IDO—Italy	33.5	RFH00—Bern, 0500-0600 32	
2XAD—G.E.C., Schenectady Relays WGY, 0230-1300 Mon, 0400-0800 Tues, and Fri., 0800-1300 Thurs and Sat.	21.98	2XAL—New York, Relays WRNY, 0900-1400 Tues.; 1100-1200 Wed.; 1200-1300 Sat.	30.97	IAK—Rome	43	MALAY STRAITS.	
2XZAR—San Francisco, 1000, daily	33	2XAE—New York, Relays WABC and WBOQ daily 0300-0800	58.8	IMA—Rome 0700 Sun.	24.5	6XW—Singapore, 1200-1400	28.5
2XL—Bundbrook Relays Wily, 0230	69.38	2XAA—Houston, Transatlantic telephony	32 99	SOUTH AFRICA.		JAVA.	
2XD—Council Bluffs, Relays Columbian Broadcasting stations	61.08	INDO-CHINA.		IR—Johannesburg	30 35	ANE—Batavia, 31 80	15.93
2XRA—Newark, N.J., Relays WAAM, 1000-1500 Wed., Fri., and Sun.	65.18	HVA—Hanoi, No information available	31.85	JAPAN.		ANH—Malebar, 2240-2440, Sat.	17.9
2XPF—Cleveland, daily from 1800	68.04	HOLLAND.		JHRB—Hankoken, nightly	27.5	INDIA.	
2XAT—Inglewood, daily		PCL—Kootwijk, 2240-2400 Wed., and from 0200 Thurs	21.96	JIPP—Tokio	29	VWZ—Poona, Beam station	16.9
		PCM—The Hague, Irregular	35	JIAA—Iwatoaki	79	FINLAND.	
		PCF—Eindhoven, 0300-0600, Wed and Fri.; 0900-2400 Sat.; 0100-0400 Sun.	31.8	JKZB—Tokio	29	SPM—Helsinki, 1920-0830	51.8
		PCT—Kootwijk, 0300-0600 Wed. and Fri.; 0900-		GERMANY.		IRELAND.	
				AGJ—Nauen Daily, 0.500	58.7	4GG—Brussels, Almost daily, 0600-0900	34.7
				POZ—Nauen, Press and news reports to ships 13	24.4	40U—Brussels, Almost nightly, 0800-0900	43.9
				AGA—Nauen, Press and news, daily	25.3	TUNIS.	
				APC—Nauen, Throughout day	17.2	4KR—Constantine, Sun. only, 0800-1000	42.8
				APK—Nauen, Thurs, Sat., 0500-0900 (Call sounds like "Aber-Car")	47.65	MOROCCO.	
				NORWAY.		AIN—Casablanca, 1940-0830 Weather report	51
				LGN—Bergen, 0300 Irregular	30 31.25		
				—Stavanger, News bulletin 0100	12.14		
				DENMARK.			
				TKK—Copenhagen, Irregular	39.2 32.8		
				IRL—Copenhagen, Tues, Motala Tests irregularly after midnight	42.17 61		
				RDTRL—Copenhagen, 2130-			

Local Programmes, Friday, February 22,

2FC

EARLY MORNING SESSION.

Announcer: A. S. Cochrane.
 7.0: "Big Ben" and announcements. 7.2: Official weather forecast, rainfall, river temperatures, astronomical memoranda. 7.7: "Sydney Morning Herald" summary. 7.12: Shipping intelligence, mail services. 7.15: Studio music. 7.25: Investment market; mining sharemarkets; metal quotations; wool sales; breadstuffs markets; in-State markets; produce markets. 7.40: Studio music. 8.0: "Big Ben." Close.

MORNING SESSION.

Announcer: A. S. Cochrane.
 10.0: "Big Ben" and announcements. 10.2: Pianoforte reproduction. 10.10: "Sydney Morning Herald" news service. 10.25: Studio music. 10.45: A talk on home cooking and recipes, by Miss Ruth Furst. 11.0: "Big Ben." A.P.A. and Reuter's cable services. 11.5: Close.

MIDDAY SESSION.

Announcer: A. S. Cochrane.
 12.0: "Big Ben" and announcements. 12.1: Stock Exchange, first call. 12.3: Official weather forecast; rainfall. 12.5: Studio music. 12.10: Summary of news, "Sydney Morning Herald." 12.15: Rugby wireless news. 12.18: A reading. 12.30: Studio music. 1.0: "Big Ben." Weather intelligence. 1.3: "Evening News" midday news service; Producers' Distributing Society's report. 1.20: Studio music. 1.28: Stock Exchange, second call. 1.30: Popular studio music. 2.0: "Big Ben." Close.

AFTERNOON SESSION.

Announcer: Laurence Halbert.
 Accompanist: Ewart Chap-
 2.30: Programme announcements. 2.32: Musical recital. 2.45: Talk by Freda Sternberg, "Shipping Horses to India." 3.0: Pianoforte reproduction. 3.15: A sketch by the students of the MacCunn School. 3.30: Studio music. 3.45: A reading. 4.0: Studio music. 4.15: A sketch by the students of the MacCunn School. 4.30: Popular music. 4.45: Stock Exchange, third call. 4.47: Studio music. 5.0: "Big Ben." Close down.
 Note:—Cricket results, England v. Western Districts, played at Bathurst, and South Australia v. Brisbane, Sheffield Shield, played at Brisbane, will be given at intervals during the afternoon.

EARLY EVENING SESSION.

Announcer: A. S. Cochrane.
 5.40: The chimes of 2FC. 5.45: The children's session, conducted by the "Hello Man." Letters and stories. Music and entertainment. Madame Ada Baker's pupils. 6.30: Daily's market reports (wheat, wool, and stock). 6.40: Fruit and vegetable markets. 6.45: Stock Exchange information. 6.45: Weather and shipping news. 6.48: Rugby wireless news. 6.50: Late sporting news. 7.0: "Big Ben." Late news service. 7.10: Selected recital of dinner music.

EVENING SESSION.

Announcer: Laurence Halbert.
 Accompanist: Ewart Chap-
 7.40: Pianoforte reproduction.
 7.45: Programme announcements.
 7.48: Cricket results, England v. Western Districts, played at Bathurst; South Australia v. Queensland, played at Brisbane.
 8.0: From the Prince Edward Theatre, the orchestra, under the baton of Alfred Czarlson.
 8.50: From the studio, Charles Laurence and Rae Foster, in popular duets.
 9.0: G.P.O. chimes. Weather report.
 9.1: Light Music Four.
 (a) "Danse Siberiana" (Nicotra).
 (b) "Suite Pastorale" (Ausell).
 9.15: Peggy Dunbar, contralto.
 9.22: Ad Cree, Scottish comedian.
 9.29: Light Music Four.
 (a) Popular songs of Montague Phillips.
 (b) "Dance of the Girls" (Lardell).
 9.44: Charles Lawrence and Rae Foster, in popular duets.
 9.54: Ad Cree, Scottish comedian.
 10.1: Peggy Dunbar, contralto.
 10.3: Light Music Four.
 (a) Selection, "Love Birds" (Romberg).
 (b) "Lacy, Be Good" (Gershwim).
 10.27: To-morrow's programme.
 10.30: National Anthem. Close down.

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2BL

MORNING SESSION.

Announcer: A. C. C. Stevens.

8.0: G.P.O. chimes. Metropolitan weather report. 8.1: State weather report. 8.2: Studio music. 8.15: G.P.O. chimes. News from the "Daily Telegraph Pictorial." 8.30: G.P.O. chimes. News service continued. 8.40: Information, mails, shipping, arrivals, departures, and sailings. 8.45: Studio music. 9.15: Half an hour with silent friends. 9.45: Studio music. 10.0: G.P.O. chimes. Close down.

MIDDAY SESSION.

Announcer: A. C. C. Stevens.

11.0: G.P.O. clock and chimes. 2BL's Women's Sports Association session, conducted by Miss Gwen Varley 11.30: Advertising hints. 11.40: Women's session, conducted by Mrs. Cranfield. 12.0: G.P.O. clock and chimes. Special ocean forecast and weather report. 12.3: Pianoforte reproduction. 12.30: Shipping and mails. 12.35: Market reports. 12.48: "Sun" midday news service. 1.0: Studio music. 1.30: Talk to children and special entertainment for children in hospital. 2.0: G.P.O. clock and chimes.

AFTERNOON SESSION.

Announcer: A. C. C. Stevens.

Accompanist: Kathleen Roe.
 3.45: G.P.O. clock and chimes. Popular music. 4.0: Romano's Cafe Dance Orchestra, conducted by Bennie Abrahams. 4.10: From the studio, A. C. C. Stevens, "Famous Musicians I Have Met." 4.25: Frank Botham (baritone). (a) "Sea Fever" (Ireland). (b) "Lorraine" (Sanderson). 4.32: Popular music. 4.40: Romano's Cafe Dance Orchestra, conducted by Bennie Abrahams. 4.50: From the studio, Ann Stuart Gurr (mezzo-soprano). (a) "My Lover, He Comes on the Skee" (Clough-Lightner). (b) "Pleading" (Elgar). 4.57: "Sun" news service. 5.0: Our serial story. 5.10: Frank Botham (baritone). (a) "A Warwickshire Wooling" (James). (b)

"Praise" (Wood). 5.17: Ann Stuart Gurr (mezzo-soprano). (a) "Deh Vieni" (Mozart). (b) "Little Boy Blue" (Nevin). 5.24: Popular music. 5.35: Poultry report. 5.37: Features of the evening's programme. Note: Cricket results will be given at intervals during the afternoon, England v. Western Districts, played at Bathurst, and South Australia v. Queensland, played at Brisbane.

EARLY EVENING SESSION.

Announcer: Basil Kirke.

5.40: Children's session, conducted by Uncle Peter. Music and entertainment. Letters and stories. 6.30: "Sun" news and late sporting. 6.40: A specially-selected recital of dinner music. 7.7: Australian Mercantile, Land, and Finance Co.'s report. Weather report and forecast by courtesy of Government Meteorologist. Producers' Distributing Society's fruit and vegetable market report. Grain and fodder report ("Sun"). Dairy produce report ("Sun"). 7.25: Mr. Pim and Miss Pam in advertising talks and nonsense. 7.55: Programme and other announcements.

EVENING SESSION.

Announcer: Basil Kirke.

Accompanist: G. Vern Barnett.

8.0: G.P.O. chimes.
 8.0: From the Arcadia Theatre, Chatswood. Nicholas Robins at the Wurlitzer organ.
 8.20: From the studio. Frank Ryan (comedian).
 "Clean Sweep" (Newman).
 8.27: The Savoyans' Dance Band.
 8.42: Bernice Patterson (popular vocalist).
 8.49: The Savoyans' Dance Band.
 9.1: Weather report.
 C. R. Dexter will give last-minute racing information.
 9.15: Terrence Nugent (tenor).
 9.22: Livingstone Gill (trumpet solos).
 9.29: The Savoyans' Dance Band.
 9.41: Bernice Patterson (popular vocalist).
 9.48: Frank Ryan (comedian).
 "Tit-bits" (Ryan).
 9.55: Terrence Nugent (tenor).
 10.2: From the Arcadia Theatre, Chatswood. Nicholas Robins at the Wurlitzer organ.
 10.22: From the studio. Late weather and announcements.
 10.26: The Savoyans' Dance Band.
 10.38: Announcements.
 10.42: The Savoyans' Dance Band.
 10.54: To-morrow's programme and announcements.
 10.58: The Savoyans' Dance Band
 11.30: National Anthem.
 Close down.

2GB

10.0: Music. 10.10: Happiness talk, by A. E. Bennett. 10.20: Music. 10.30: Women's session, by Miss Helen J. Beegling. 11.30: Close down. 2.0: Music. 2.5: Women's radio service, by Mrs. Dorothy Jordan. 2.30: Music. 3.0: Talk. 3.15: Music. 3.30: Housekeeping demonstration, broadcast from Mark Foy's, Ltd. 4.30: Close down. 5.30: Children's session, by Uncle George. 7.0: Stock and market reports by New Zealand Loan and Mercantile Agency, Ltd. 7.15: Music. 8.0: Violin solos by Mr. Cecil Berry. 8.10: Songs by Signor Mario Gustavo. 8.20: A humorous Interlude by Mr. Jack Win and Mr. Heath Burdock. 8.25: Instrumental music. 8.35: Songs by Madame Bennett North. 8.45: Pianoforte solos by Miss Ada Brook. 8.55: A humorous interlude. 9.0: Weather report. 9.3: Address. 9.15: Songs by Signor Mario Gustavo. 9.25: Violin solos by Mr. Cecil Berry. 9.35: Songs by Madame Bennett North. 9.45: Instrumental music. 9.55: A humorous interlude by Mr. Jack Win and Mr. Heath Burdock. 10.0: Orchestral items. 10.30: Close down.



Miss Peggy Dunbar, contralto, who is scheduled to broadcast from 2FC to-night.

Interstate Programmes, Friday, February 22

3LO

EARLY MORNING SESSION.

7.15: Morning Melodies. 7.20: Morning exercises to music. 7.30: Stock reports. Stock Exchange information. Market reports. General news. Shipping and sporting information. 8.0: Melbourne Observatory time signal. 8.1: Morning Melodies. 8.15: Close down.

MORNING SESSION.

11.0: 3LO's Different Dainties for Daily Dinner. To-day's Radio Recipe, Treacle Sponge. 11.5: Grace Tyers will speak on "Great Russian Writers and Their Stories." "Turgenev," "The Living Belic, etc." 11.20: Musical Interlude. 11.25: "Au Fait" will speak on "Fashions—From Long Island to Government House." 11.40: Under the auspices of the Health Department, Dr. Merrilies will speak on "Tromaine or Food Poisoning." 11.50: Description of Sheffield Shield cricket match, Victoria v. Tasmania, at Melbourne, by Rod M'Gregor. 12.40: Stock Exchange information. Newmarket stock sales. Special report by the Associated Stock and Station Agents, Bourke Street, Melbourne. 12.43: Further description of cricket match. 1.30: Meteorological information. Weather forecast for Victoria, New South Wales, South Australia, and Tasmania. 1.40: Close down.

AFTERNOON SESSION.

2.15: The station orchestra. Overture, "The Merry-makers" (Coates). 2.25: John Byrne (bass). "Love Me Not" (Sacchi). "Old Watt and the Rabbits" (Homer). 2.32: The station orchestra. "South-east Yell" (Stoessel). 2.42: Rev. Frank Gorman and Sadie M'Donald (baritone and violinist), in harmony and humor. 2.57: The station orchestra. "Suite Romantique" (Ketyby). 3.2: Miss Frances Fraser will speak on "The English Lake District." 3.7: The station orchestra. "Ballroom Chatter" (Albe). "Agora" (Hadley). 3.30: Hugh Huxham's Serenade Quartette. "Without You, Sweetheart." The Quartette, "Starlight and Lovelight." 3.50: The Imperial Russian Trio (Arved Norit, violin; Ivan Brzinsky, cello; Vassili Ister, piano). The Trio, "Melodie in E" (Rubinstein), "Tzigane" (Massenet). Arved Norit (violin), "Humoresque" (Dvorak). The Trio, "Scherzo" (Van Gogen). 4.10: Jovan Massonoff (tenor), "Eli Eli" (Bruch). "Mountain Lovers" (Gaulpe). 4.17: The station orchestra, "Butterflies" (Seiker). "If Is Night" (Black). 4.24: John Byrne (bass). "Inter Nos" (M'Fadyen). "The Trumpeter"

(Airle Dix), 4.31: A. Anderson (clarinet), "Fantasy on a French Air" (Lazarus). 4.38: Jovan Massonoff (tenor), selections from his "repertoire." The station orchestra, selection, "Poppy" (Jones). 4.42: Mabel Nelson (piano), "The Jugger" (Kowalski). "Humoresque" (Tschakowsky). 8.0: "Herald" news service. Stock Exchange information 5.10: Close down.

EVENING SESSION.

6.0: Answers to letters and birthday greetings by "Billy Bunny." 6.25: Musical interlude. 6.30: "Billy Bunny" will entertain the children for a while.

Announcer: Maurice Dudley. Accompanist: Mabel Nelson. 6.50: Madame Soward, "French Without Tears." 7.5: Stock Exchange information. 7.15: Official report of the Newmarket stock sales by the Associated Stock and Station Agents, Bourke Street, Melbourne. Latest truck orderings for next week's markets. Fish market reports by J. R. Borrett. Ld. Flouring, grain, hay, straw, bute, dairy produce, potatoes and onions. Market reports of fruit by the Victorian Fruitgrowers' Association. Retail prices. Wholesale prices of fruit by the Wholesale Fruit Merchants' Association. Citrus fruits. 7.50: News session. Stumps scores cricket, Victoria v. Tasmania. 7.43: Birthday greetings. 7.45: Out of the Past. 7.49: Under the auspices of the Department of Agriculture, Citrus Culture. Citrus will speak on "Hints on Citrus Culture." 8.0: A Maker of History. 8.1: E. K. Love will speak on "Technicalities." 8.10: Collingwood Citizens' Band March. "The Rosy." The Quartette, "Mince Pies," burlesque oratorio. Hugh and Edith Huxham, "That's What I Think of You." Interlude, arombone solo. "The Parachute." The Quartette, selection from "Brotherly Love." 8.40: Collingwood Citizens' Band. Intermezzo, "Bells Across the Meadows." Hymn, "Rock of Ages." 8.47: The Imperial Russian Trio (Arved Norit, violin; Ivan Brzinsky, cello; Vassili Ister, piano). Trio in G Major" (Haydn). Andante. Adagio. Presto. 9.0: Jovan Massonoff (tenor). Selections from his repertoire. (Acting conductor, J. Searon Crowl) Orchestra, (a) "Symphony No. 10" (first movement), (Beethoven). (b) Pantomime music from "Alceste." 1. Arie di Pantomimo. 2. March (Gluck). Vocal (a) "Ave Maria" (Schubert). (b) "Whittier" (Schubert). Marjorie Baird Orchestra, (a) "Serenade for Strings in C" (Haydn). (b) Ballet music from "Feramorz" (Rubinstein). Vocal (a) "Virgin's Slumber Song" (Max Reger). (b) "My Lovely Cella" (O. English). Marjorie Baird Orchestra, (a) "Valse Lente" (Delibes). (b) Overture, "Merry Wives of Windsor" (Nicoli). 10.7: Eric Weloh will speak on to-morrow's A.A.T.C. races at Caulfield. 10.7: The station orchestra. "The Band Walk, "Thrills." 10.24: Jovan Massonoff (tenor), "For You Alone" (Geel). Selected. 10.31: Collingwood Citizens' Band. Grand march, "Edina." 10.35: Argus news service. British official wireless news from Rugby. Meteorological information. Road notes supplied by the Royal Automobile Club of Victoria. Announcements. Weekly seable gardening rendered supplied by Bromming. 10.47: The Radi-Aces. "Sally Rose" (Friend). "Sincerely I Do" (Davis). "The Prune Song" (Crummey). "Sleepy Baby" (Kahn). Get On and Get Under the Moon" (Tobias). "Out of the Dawn" (Donaldson). "Mother, I Still Have You" (Gillbert). "Dream House" (Fox). "Jeannine" (Julien). "Day Dreams" (Hallam). 11.30: God Save the King.

3AR

MORNING NEWS SESSION.

Announcer: G. J. O'Connor. 10.0: G.P.O. clock says, "Ten." 10.1: "Age" market reports, farm and station produce, fruit, fish, vegetables, etc. 10.25: "Age" shipping reports. Ocean forecast. 10.30: Mail notices. Express train information. 10.35: News service, exclusive to 3AR. 10.59: Weather forecast.

MORNING MUSICAL SESSION.

11.0: Ned Tyrrell's Radi-Aces. "You're in love, I'm in love" (Donaldson). "Adore" (Dilvert). "Please Tell Me" (Miller). "A Stolen Melody" (Fisher). 11.20: Beautiful ballads. 11.28: Ned Tyrrell's Radi-Aces. "The Old American Song." A Big Date with a Little Girl" (Tobias). "In the Woodshed She Said She Would" (Johnson). "Jeannine" (Gillbert). 11.46: Beautiful ballads. 11.50: Ned Tyrrell's Radi-Aces. "Japan" (Klenzky). "Dixon." "Dream House" (Fox). "Ohquita" (Wayne). 12.0: Beautiful ballads. 12.3: Ned Tyrrell's Radi-Aces. "My Dream Sweetheart." "I'm Gonna Settle Up" (Erich). "Dawns" (Klenzky). "Take You To-morrow" (Razay). 12.30: "Age" news service, exclusive to 3AR. Announcements. 12.30: Close down.

EVENING SESSION.

Announcer: John Stuart. 6.0: The station orchestra, interspersed with beautiful ballads on the Seraphina Orchestra, Overture, "The Carnival" (Dvorak). "Chant de l'Alouette" (Tschakowsky). 6.15: Beautiful ballads. 6.25: The Station Orchestra. Selection, "O Lady, Lady." 6.35: Beautiful ballads. 6.45: The Station Orchestra. "The American Song" (Cudman). "In Love" (Primi). 6.55: Beautiful ballads. 7.0: "Age" news service, exclusive to 3AR. Announcements. 7.10: The Station Orchestra. "Butterflies" (Seiker). "Sweet Romanticque" (Ketyby). 7.40: Beautiful ballads. 7.50: The Station Orchestra, "Ballet Suite, Coppelia." 8.0: The station orchestra, interspersed with beautiful ballads on the Seraphina Orchestra, Overture, "The Carnival" (Dvorak). "Chant de l'Alouette" (Tschakowsky). 8.15: Beautiful ballads. 8.25: The Station Orchestra. Selection, "O Lady, Lady." 8.35: Beautiful ballads. 8.45: The Station Orchestra. "The American Song" (Cudman). 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Miss Jackson, soprano. 3.30: Boake Smith's Palms
Orchestra. 3.42: Reg. Harris, tenor. 3.46:
Marion Lightfoot, instrumentalist. 3.54: Bernard
Manning, bass-baritone. 4.0: Boake Smith's Palms
Orchestra. 4.12: Violet Jackson, soprano.
4.18: William Davey, xylophonist. 4.24: Reg. Har-
ris, tenor. 4.30: Marion Lightfoot, instrumentalist.
4.36: Boake Smith's Palms Royal Orchestra. 4.45:
S. C. Ward and Co.'s Stock Exchange Information.
4.50: G.P.O. chimes and close down.

EVENING SESSION
4.50: G.P.O. chimes. 5.1: Birthday greetings, con-
temporaneous songs and stories, by "Miss Wireless."
5.15: Captain Donald Maclean. 5.45: Sonora. 7.0:
G.P.O. chimes. 7.1: S. C. Ward and Co.'s Stock
Exchange Information. 7.5: General market reports.
7.25: S.C.I. sporting service, by "Silvius." 7.45: P.
J. Kobbals, Shakespearean Interlude, "All's Well That
Ends Well," assisted by Miss Bessie Francis.

NIGHT SESSION
8.0: G.P.O. chimes. 8.1: Station Orchestra, selec-
tion, "Lohengrin" (Wagner). 8.7: Beatrice Kingston,
soprano, "Humble Along" (Frankl). "Just a Mem-
ory" (Henderson). 8.13: Marion Lightfoot, instru-
mental. "Alpha" (Kaali). "One, Two, Three, Four"
(Hammann). 8.19: Don Fraser, comedian, selected
comedy. 8.25: Station Orchestra, "Pas des Fleurs"
(Lafite). 8.30: Bernard Manning, bass-baritone,
selections from his repertoire. 8.36: A. V. Noske,
"Wild Rose" (Torschaki). "Andalouse" (Per-
siani). 8.42: An adventure talk, Captain Donald
Maclean will continue his series of "Pirate Stories."
8.48: Marion Lightfoot, instrumental, "Largo"
(Mozart). "Ave Maria" (Schubert). 9.0: G.P.O.
chimes. 9.1: Meteorological information. 9.2: Over-
seas mail report. 9.3: Beatrice Kingston, soprano,
selections "Fiasse", "Japanav". 9.9: An original
improvisation, "A Fantasy in F" (Tom King), to be
performed by Tom King and Station Orchestra.
9.14: Don Fraser, comedian, selected comedy. 9.22:
Miss Jackson, soprano, selections from her rep-
ertoire. 9.28: Station Orchestra, overture, "Stradella"
(Mozart). 9.35: Bernard Manning, bass-baritone, se-
lections from his repertoire. 9.41: Genf. Gold-
smith, violin. "Menuetto" (Popper). "Tarantelle"
(Chytril). 9.47: Violet Jackson, soprano, selections
from her repertoire. 9.52: Station Orchestra, suite,
"Nocturne" (A-madell). 10.0: G.P.O. chimes. 10.1:
S. C. Ward and Co.'s Stock Exchange Information.
10.15: S.C.I. sporting service, by "Silvius"; meteoro-
logical information; road notes by Royal Automobile
Association. 10.30: Modern dance numbers, by the
British Radi-o-Aces. 11.0: "God Save the King."

6WF

2.0: Tune-in. 12.35: Market news, etc. 1.0:
Programme. 1.1: Weather bulletin supplied by the
Meteorological Bureau of Western Australia. 1.3:
Musical selections by the studio trio. 2.0: Close
down. 1.30: Tune-in. 3.35: Music relayed from
the Carlton Cafe. Vocal items from the studio.
4.0: Close down. 6.45: Tune-in. 6.48: Bedtime
music for the kiddies, by Uncle Duffy. 7.4:
Programme by the station trio. 7.30: Commercial and
general information. 7.45: Racing talk, by
the station editor of "Truth" Newspaper Co., Ltd. 8.0:
Programme. 8.1: Weather bulletin supplied by the
Meteorological Bureau of Western Australia. 8.3:
Musical and instrumental items from the studio. 8.15:
Lata sets items, by courtesy of "The Daily News"
Newspaper Co. Station announcements. Ships
departure announcement. Late weather bulletin.
9.0: Wrestling match relayed from the Sunco Oval.
9.15: Close down. 10.1: Programme continued from the
studio. 10.30: Close down. 10.4.5: Metre Trans-
mission: Simultaneous broadcast on 104.5 metres of
programme given on 125.0 metres, commencing at 6.45

7ZL

MIDDAY SESSION
11.30: Selections. 11.34: Midlands weather fore-
cast. 11.35: Selections. 11.55: Tasmanian station's
local weather report. 12.0: G.P.O. clock chimes
the hour. 12.4: Shipping information; ships
departures wireless range; mail notices; housewives'
market; railway auction produce sales. 12.8: Selections.
12.11: British official wireless news. 12.20:
Departures. 12.29: Announcements. 12.33: Selections.
12.38: News service: railway auction produce sales.
12.45: Selections. 1.30: Close down.

AFTERNOON SESSION
1.15: G.P.O. clock chimes the hour. 3.1: Selections.
3.14: Weather information. 3.5: Selections. 4.15:
Musical talk on "Lemon Juice for United King-
dom." 4.40: Close down. During the afternoon pro-
gramme results will be given of the cricket match,
Victoria v. Tasmania, at Victoria.

EARLY EVENING SESSION
6.15: Selections. 6.25: "The Story Lady." 6.40:
Answers. 7.0: Answers to letters and birthday
messages. 7.5: Selections.

EVENING SESSION
7.15: A. M. O'Leary will speak on "Cricket Activi-
ties." 7.30: A studio concert by the Discus Ensemble
musical artists. Lella Read, pianist, selected. 7.35:
Miss Sneddon, soprano, "The Robin Tree"
(Gatty). "My Ain Folk" (Gatty). 7.42: Columbia
Artist's Ensemble, "Silver Threads Among the Gold"
(Gatty). 7.45: L. Maddock, baritone, "The Vulcan's
Song" (Gatty). "Rolling Down to Rio" (German).
7.50: Columbia Artists' Ensemble, "Tis the Last
of Summer" (Friml). 7.55: Ruby Wallace,
soprano, "Comin' Thro' the Rye" (traditional).
8.0: "The Franciscan" (Wagner). 8.3: The Franciscan
Musical Artists' Ensemble, "La Cinqumaine" (Marie). 8.8:
Miss Sneddon, soprano, "Jessie's Dream" (Block-
ade). "The Lea Rig" (Lees). 8.13: Lella Read,
pianist, selected. 8.18: L. Maddock, baritone, "Less
Than Dust" (Woodforde-Finden). "Myself When
(Lehmann). 8.23: Ketyby's Orchestra, "In
the Realm of Suite," 1 and 2. 8.30: Ruby Wallace,
soprano, "Good-bye" (Tosti). "My Prayer" (Sauteret).
8.35: Organ solo, by Patman, "Four Indian Love
Songs" (Finden). 8.45: J. M. Counsel, "A Musical
Journey with the Old Masters," "The History and De-
velopment of Music." 9.45: News session. 10.0:
G.P.O. clock chimes the hour. 10.1: "God Save the
King."



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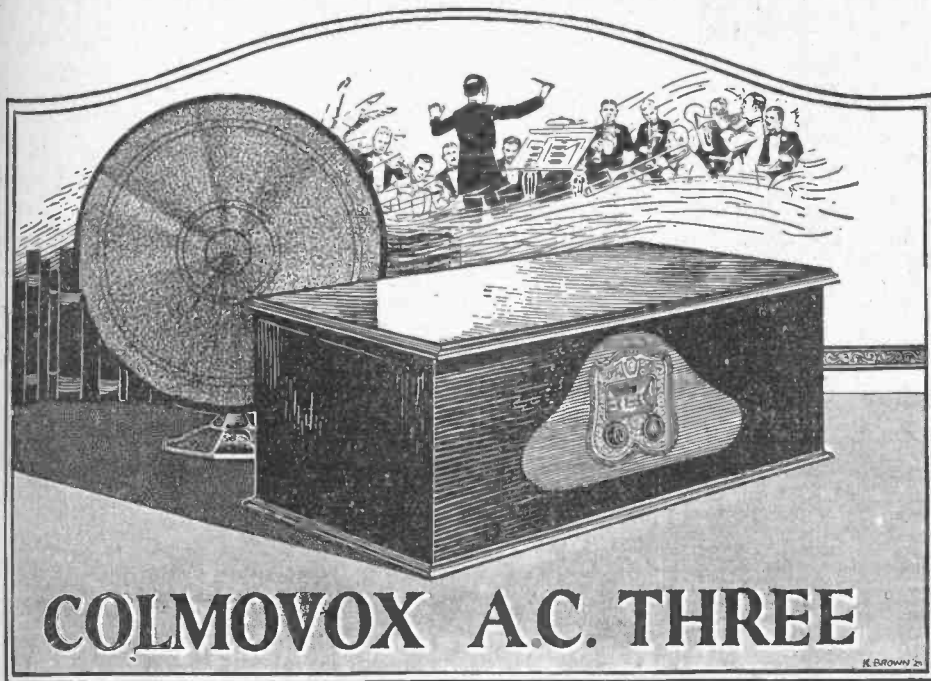
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Local Programmes, Saturday, February 23

3LO

EARLY MORNING SESSION.

7.15 to 8.15: See Friday.

MORNING SESSION.

Announcer: Frank Hatherley. Accompanist: Mabel Nelson. 11.0: The station orchestra. Overture, "Romantic" (Kler. Bela). 11.10: John Byrne (bass). "Onaway Awake, Be-lyved" (Cohen). "Whistlin' Danny" (Lohr). 11.17: Eric Welch will speak on to-day's A.T.C. races at Caulfield. 11.24: The station orchestra. "Virginia" (Haydn Wood). 11.34: Jovan Massonoff (tenor). Selections from his repertoire. 11.41: Dorothy Roxburgh (violin). "Romance" (Popper). 11.48: The station orchestra. "Chinese Suite Poling" (Griml).

MIDDAY SESSION.

Announcer: Frank Hatherley. Accompanist: Mabel Nelson. 12.0: Melbourne Observatory time signal. 12.1: Metal prices received by the Australian Mines and Metals Association from the London Stock Exchange this day. British official wireless news from Rugby. Reuter's and the Australian Press Association cables. "Argus" news service. 12.20: The station orchestra. Overture, "Zampa" (Herold). 12.30: Rev. Frank McLeod. "The Sacred Chor" (Henderson). 12.45: Stock Exchange information. 12.48: The station orchestra. Selection, "Dorothy" (Cellier). 12.55: Hugh Huxham's Serenade Quartette. "The Sacred Chor" (Henderson). Madeline Knight (contralto). "Fairies at the Bottom of My Garden." Orchestral Interlude. Renn Miller and Hugh Huxham. Comedy duet. "The Recorder." The Quartette. "A Heart That's Free." 1.15: Meteorological information. Weather forecast for Victoria, New South Wales, South Australia, and New Zealand. 1.20: Rainfall. 1.22: Station orchestra. Selected. 1.24: Description of St. Clair Trial, 9 furlongs. V.A.T.C. races at Caulfield, by Eric Welch. 1.35: The Imperial Russian Trio. "The Sacred Chor" (Henderson). "Dance No. 1" (Dvorak). Ivan Berzinsky (cello). "Rhapsody Hongroise" (Popper). Vassili Ister (piano). "Requiere de Vierge" (Albeniz). The Trio. "Menuetto" (Beethoven). 1.57: Close down.

AFTERNOON SESSION.

Announcer: Frank Hatherley. 2.15: Description of pennant cricket match, South Melbourne v. Melbourne, at South Melbourne, by Rod McGregor. 2.28: Description of Alma Stakes, 4 furlongs, at Caulfield, by Eric Welch. 2.35: Description of pennant cricket match, South Melbourne v. Melbourne, at South Melbourne. 3.0: Description of Woodfille Handicap, 1 mile, at Caulfield. 3.08: Description of V.A.T.C. races at Caulfield. 3.10: Description of Victorian track and field championships at Motordrome. 3.25: Description of pennant cricket match, South Melbourne v. Melbourne, at South Melbourne. 3.45: Description of pennant cricket match, South Melbourne v. Melbourne, at South Melbourne. 4.0: Sonora racing results. 4.15: Description of Stanley Plate, 1 mile, V.A.T.C. races at Caulfield. 4.20: Description of pennant cricket match, South Melbourne v. Melbourne, at South Melbourne. 4.45: Description of Victoria Handicap, 8 furlongs, V.A.T.C. races at Caulfield. 4.55: Description of Victorian track and field championships at the Motordrome. 5.10: "Herald" news service. Progress notes of Sheffield cricket match, Queensland v. South Australia, at Brisbane, and results of the Quambatook and Katamatite races will be broadcast as they come to hand. 5.25: Description of pennant cricket match, South Melbourne v. Melbourne, at South Melbourne. 5.30: Close down.

EVENING SESSION.

Birthday greetings and stories by "Little Miss Kookaburra." 6.0: Sporting results. 6.0: Answers to letters and birthday greetings by "Little Miss Kookaburra." 6.25: Musical Interlude. 6.30: "Little Miss Kookaburra" will tell about "Nells and Billie in Moonland." Visit of the Man in the Moon to Billy's home, where he tells them how he got into the Moon. A team of fairy dogs await Nellie and Billy to take them to "Fairy Frolic's party in Moonland."

NIGHT SESSION.

Announcer: Maurice Dudley. Accompanist: Mabel Nelson. 8.30: Stock Exchange information. 7.0: Market reports. 7.20: "Herald" news. "Stumps" scores. Sheffield Shield cricket match, Queensland v. South Australia, at Brisbane. 7.30: Birthday greetings. 7.35: Out of the Past. 7.36: Frederick Chapman (E.L.O.). "The Commonwealth Palaeontologist" will speak on "Some Facts and Fancies About Plant Seeds." 7.48: A-Maker of History. 7.50: Dr. J. A. Leach will speak on "Trillers." 8.5: Programmes and announcements. "The Station-man letter from the Courier," Launceston. 8.10: The station orchestra. Overture, "May Day" (Haydn-Wood). "Spirit of the Trees" (Hadley). 8.17: Hugh Huxham's Serenade Quartette. "Land of Romance." Renn Miller (bass). "A Chip of the Old Block." The Quartette, "Swank" (humorous item). Madeline Knight (contralto). "The Valley of the South." Eric Welch. 10.15: The station orchestra. 8.32: The station orchestra. "Elegie" (Tschalkowsky). "Playfulness" (Tschalkowsky). 8.40: Rev. Frank Gorman and Sadie McDonald (baritone and violinist) in modern music. 8.50: Description of the 15-round contest at 9st. between Fidel la Barba, ex-flyweight champion boxer of the world, and Billy Grim, feather, light, and welter weight champion of Australia. 9.15: Eric Welch. 10.15: The station orchestra. "Dream Melody" (Herbert). "Lolita" (Primi). 10.25: Pat McLean and her ukulele will entertain. 10.35: Modern music orchestra. Selection, "H. Frovatore." 10.42: Late sporting news. 10.45: This is the final appearance of Ned Tyrrell and his

Rad-i-o-Aces special numbers will be rendered by Chas. McPee (saxophone), Walter Wall (trumpet). Will Page (xylophone), Roger Smith (trombone), Ned Tyrrell (banjo). All old favorites and request numbers will also be played. 11.30: God Save the King.

3AR

MORNING SESSION.

10.0: G.P.O. clock says, "Ten." 10.1: "Age" Block "Exchange reports. London metal market. 10.10: "Age" market reports. Farm and station produce, fruit, fish, vegetable, etc. 10.25: "Age" shipping reports. Ocean forecast. 10.30: Mail notices. Express train information. 10.35: "Age" news service. 10.59: Weather forecast.

MORNING MUSICAL SESSION.

11.0: Ned Tyrrell's Rad-i-o-Aces. "Lucky in Love" (Henderson). "The Best Things in Life are Free" (Henderson). "Sleepy Baby" (Tierney). "The Kim Kijee" (Tierney). 11.20: Beautiful ballads. 11.25: Ned Tyrrell's Rad-i-o-Aces. "Rio Rita" (Tierney). "A Little Change of Atmosphere" (Brown). "I Wanna Go Von Von Von" (Brown). "Down Upon the Sands" (Winsky). "Malika" (Reel). "You Said Good-night but You Meant Good-bye" (Kahn). 11.50: British official wireless news. Announcements. 12.0: Close down.

AFTERNOON SESSION.

Announcer: C. J. O'Connor. 3.0: Prahran City Band (conductor, Percy Code). March, "Deeds of Daring." Selection, "Oems of Harmony." 3.15: Beautiful ballads. 3.20: Prahran City Band. "Senta" (Hume). 3.32: Beautiful ballads. 3.42: Prahran City Band. Selection, "Operatic Oems" (Rimmer). 3.52: Announcements. 3.55: Beautiful ballads. 4.0: Prahran City Band. "Old Comrades." 4.15: Beautiful ballads. 4.25: Prahran City Band. Overture, "La Coquette" (Laurent). 4.34: Beautiful ballads. 4.44: Prahran City Band. (Humoresque) (Dvorak). March, "Wellington" (Zolite). 4.54: Announcements. 5.0: Close down.

EVENING SESSION.

Announcer: John Stuart. Accompanist: Reg Brown. 8.0: All sporting results. Announcements. 8.0: All sporting results. Announcements.

NIGHT SESSION.

Announcer: John Stuart. Accompanist: Reg Brown. 8.0: Collingwood Citizens' Band. "Heroes of the Flag." 8.35: John Hyne (bass). "Drake's Drum" (Stanford). "The Old Superb" (Stanford). 8.42: The Imperial Russian Trio. "The Sacred Chor" (Henderson). "Menuetto" (Beethoven). "Syncope" (Kreisler). Trio, "Schoen Rosmarin" (Kreisler). Trio, "Barouse" (Liszt). 9.0: John Hyne (bass). "If Thou Wert Blind" (Schumann). "Don Juan's Serenade" (Tschalkowsky). 9.7: Collingwood Citizens' Band. Selected. 9.15: One-act play, "Devil's Lane," by Louisa Perry. Produced by Winifred Moverley. Cast: A very stubborn man, J. E. Clarke; a very angry woman, Elaine Rownsend; a very girlish little girl, Little Miss Kruger; a very tired stungee, J. Watkins. The scene is the kitchen of a farm-house. 9.30: Collingwood Citizens' Band. March, "Rocked in the Cradle of the Deep." Gavotte, "Get Out and Get Under the Moon." March, "The Mountain Lovers" (Squire). 9.54: Collingwood Citizens' Band. Gavotte, "Cherry Time." 9.48: Organ recitation from St. Peter's Church, Entert: Hill, Firm Movement of Sonata No. 1 in C Minor (Rheinberger). Prelude, "Rosymede" (Vaughan Williams). "Cujus Animam" from "Stabat Mater" (Rossini). "The Priestess" (Mozzkowski). "War March of the Musicians" (Mendelsch). 10.8: Collingwood Citizens' Band. Selection, "Comic Opera" News Session. 10.23: "Age" news service, exclusive to 3AR. Announcements.

4QG

EARLY MORNING SESSION.

7.43: Time signals. 7.45: News service. 8.0: Some electric records. 8.15: News service. 8.30: Close down.

AFTERNOON SESSION.

B.A.T.C. race meeting. The race meeting will be described direct from the Albion Park Racecourse. Transmission will commence with the start of the "A.M." race. Details of racing from the studio will be relayed. 5.0: Close down.

EARLY EVENING SESSION.

8.30: Bedtime stories, conducted by "Uncle Ben." 7.15: To-day's race results in brief. 7.20: General sporting notes. 7.30: Sailing notes, by Mr. Fred Smith.

NIGHT SESSION.

8.0: Overture by the Saxony Orchestra. 8.8: A radio comedy, "The Lonely Aussie Soldier." Cast: Mrs. ibrow, Harry Humphreys; Mrs. Ricketty Row, Mrs. Root, Bell Harriet (soprano), "igger (the Lonely Soldier's) Quartette. Scene: Billingsdown at Mrs. ibrow's. Time: During the war. 8.30: Ten minutes' orchestral music. 8.40: Bazel - Williams (soprante). "Put Your Arms Where They Belong." "That Saxophone Waltz." 8.50: Record, selected. 8.55: Bety Chambers (soprano). "The Fuchsia Tree" (Quilter). "A Ferpian Song of Spring." (McBurney). 9.0: Orchestral music. 9.10: Motor-cycle race. 9.30: Dance music. 10.0: News. Weather. Close down.

5CL

MORNING SESSION.

12.0: G.P.O. chimes. 12.1: Last minute selections for Victorian races by Mr. Eric Welch of 3LO, Melbourne. 12.45: News. 12.55: Close down.

AFTERNOON SESSION.

3.0: G.P.O. chimes. 3.1: Caulfield and Balaclava racing results. 3.2: From the Theatre, Wurlitzer and Symphony Orchestra selections, under the direction of Mr. W. R. Cade. 3.30: Caulfield and Balaclava racing results. 3.35: Incidental music. 3.45: Violet Jackson, soprano. "Foot, instrumentalist. 3.57: Bernard Manning, baritone. 4.3: Caulfield and Balaclava racing results. 4.4: Violet Jackson, soprano. 4.5: Lightfoot, instrumentalist. 4.15: Bernard Manning, bass-baritone. 4.20: From Regent Theatre. "Caulfield and Balaclava racing results. 4.35: Close down.

EVENING SESSION.

8.0: G.P.O. chimes. 6.1: Resume of late afternoon results. 6.8: 5-day greetings, "correspondence," songs, and stories, by "The Watlie Lady," "ething More About the Buccaneers," by Captain Donald Maclean. 6.45: Sonora. 7.0: G.P.O. chimes. 7.1: "Herald" news. 7.2: From the Metropolitan Opera. 7.8: Inter-State cricket scores, South Australia v. Queensland, at Brisbane. 7.10: Rev. G. E. Ryan, "Talk on 'The Australian Ecclesiast.'" 7.25: "An 'Oricket," by "Willow." 7.35: C. G. Riley, on "Items of Interest."

NIGHT SESSION.

8.0: G.P.O. chimes. 8.1: Holden's Silver Band. "Chico" (More). "Adieu" (Schubert). 8.2: Violet Jackson, soprano, selections from her repertoire. 8.19: Marion Lightfoot, instrumentalist, "Kauai, Waite" (Kauai). "Staccato" (Kauai). 8.23: Bernard Manning, bass-baritone. 8.21: Holden's Silver Band. "Garden of Happiness," suite "Merchandise of Venice." 8.40: Sonora bold and breezy prize song by the artist, Donald L. Stewart. 8.45: Holden's Silver Band. "Un Fen d'Amour" (Silesu). "Dim" (Pearson). 9.0: From Mayville Showgrounds. 9.0: A description of the speed events, by Mr. Walter Murphy. 9.15: From the studio. Bernard Manning, bass-baritone. 9.21: Marion Lightfoot, instrumentalist. "Banjo Oditty" (Morley). "On the Dan" (Dallin). "The Wizard" (Henderson). "Spirit Flower" (Tipton). "Pierex Mas' Treux" (Senolet). 9.33: Holden's Silver Band. "Cavaliers' brass (Mascagni). "Smiles, Then Kisses" (Augustus). "The Sacred Chor" (Henderson). 9.45: Holden's Silver Band. "Vashti" (Rimmer). "You're a Real Sea-hair" (Friend). 9.54: Linda Ward, soprano. 10.0: G.P.O. chimes. 10.1: "If Thou Weren't a Beauty" (Reger). "If Thou Weren't a Beauty" (Reger). 10.2: A description of the speed events, by Mr. Walter Murphy. 10.15: 5CL's sporting service. 10.30: 5CL's dance numbers, by the Rad-i-o-Aces. 11.0: Close down. "Age" news service, exclusive to 3AR. Announcements.

6WF

12.0: Tune-in. 12.5: Musical programme from studio, including pianoforte solos by Miss A. M. O'Leary, time reports, etc. 1.0: Time signals. 1.1: Weather bulletin, supplied by the Meteorological Bureau of Western Australia. 1.2: Close down. Tune-in. 2.33: Sports results. Commencing at 2.00, racing, cricket, and other sporting results will be broadcast each 15 minutes. 2.50 approx. 2.58: Tune-in. 6.48: Bedtime stories. Auntie Amy. 7.12: Sports results. 7.30: Commencing at 7.00, news, 7.15: "Herald" news. 7.25: "Herald" news. 8.1: Weather bulletin, supplied by the Meteorological Bureau of Western Australia. 8.15: "The Daily News" will give news items by way of a within race announcement. Station announcement. Late weather bulletin. 10.30: Close down. Micro-television. Simultaneous broadcast on 10 metres of programme given on 1250 metres, commencing at 6.45 p.m.

7ZL

MIDDAY SESSION.

11.30 to 1.30: See Friday. 1.30: Running description of St. Clair Trial, nine furlongs, run at Caulfield racecourse, Caulfield, Vic. 1.35: Close down. 2.28: Running description of Alma Stakes, six furlongs, run at Caulfield racecourse, Caulfield, Victoria. 3.30: Close down.

AFTERNOON SESSION.

3.0: Music. 3.3: Running description of Woodhewer Handicap, nine furlongs, run at Caulfield racecourse, Caulfield, Victoria. 3.45: Transmission from the T.O.A. Ground, cricket match, New Town v. Sandy Bay, described by A. M. O'Leary. 3.58: Running description of Futurity Stakes, six furlongs, run at Caulfield racecourse, Caulfield, Victoria. 3.43: Transmission from the T.C.A. Ground, cricket match, New Town v. Sandy Bay, described by A. M. O'Leary. 4.18: Transmission from the T.C.A. Ground, cricket match, New Town v. Sandy Bay, described by A. M. O'Leary. 4.48: Caine's description of Hawksburn Handicap, six furlongs, at Caulfield racecourse, Caulfield, Victoria. 4.53: Sporting results in brief. 5.0: Close down.

EARLY EVENING SESSION.

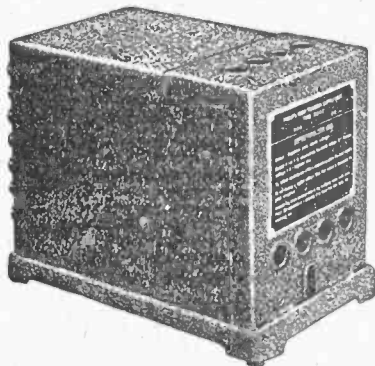
6.0: All sporting results to hand. 6.15: "Uncle David" will entertain the little ones. 6.20: Answers to letters and birthday greetings by "Uncle David." 7.5: Music. 7.15: News session.

EVENING SESSION.

7.30: Under the auspices of the Young Men's Christian Association, H. John Cameron, M.P., Premier of Tasmania, will speak on "The Track." 7.45: Lady Nichols, president of the Tasmanian Association, will speak on "The Track." 8.0: G.P.O. clock chimes the hour. 8.15: Start in transmission from the City Hall, Hobart, Tasmania. 8.15: His Orchestra. 10.20: From the studio. 10.30: Close down.

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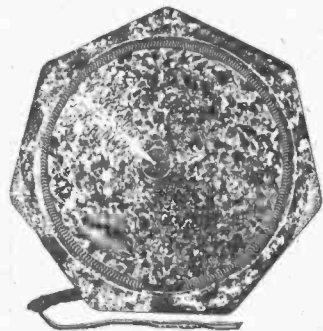
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Local Programmes, Sunday, Feb. 24

2FC

MORNING SESSION.

Announcer: A. S. Cochrane.

- 10.0: "Big Ben" and announcements.
10.2: Studio music.
10.15: News service.
10.30: Studio music.

11.0: "Big Ben." From St. John's Church of England, Balmain, the morning service, conducted by Rev. A. G. Rix.
12.15 (approx.): Close down.

AFTERNOON SESSION.

Announcer: C. R. Hall.

- 2.30: Programme announcements.
2.32: Children's session, conducted by Uncle Frank, of the Cheer-up Society.
3.0: "Big Ben." From the Lyceum Hall, Pitt Street. Pleasant Sunday Afternoon service, arranged by Central Methodist Mission. All musical afternoon—Sacred Cantata—Maunder's "Song of Thanksgiving." Principals—Miss Daisy Tollis, soprano; Miss Emmie Ellen, contralto; Mr. Frank Forrest, tenor; Mr. Herman Tremayne, basso.
Conductor: Mr. V. Peterson.
Organist: Miss Constance Bardsley, L.T.C.O.

- 4.30: From the Studio: Musical items.
5.0: "Big Ben." Close down.

EVENING SESSION.

Announcer: Laurence Halbert.

- 6.0: "Big Ben." Programme announcements.
6.2: Francis Jackson will continue his series of talks—"The Americans in Europe."
6.20: From the Congregational Church, Petersham—Organ, violin, and vocal recital, arranged by A. F. Gibbs, A.L.C.M.
Organ—Selection of Oriental music, "Cairo" (Fletcher).
Vocal—Selected, sung by Herbert Hinton.
Organ—"Tannhauser" Overture (Wagner).
Violin solo, by Mrs. Donald Macdonald—"Andante" and "Presto," from Violin Sonata (Tartini).
Organ—"Priere et Berceuse" (Gullmant).
7.15: Evening service, from Petersham Congregational Church, conducted by Rev. A. P. Doran.

- Invocation and Lord's Prayer.
Hymn—"Praise to the Holiest in the Height."
Psalm 103.
Solo—Mr. J. Pryor.
Lesson.
Hymn—"Father of Mercies."
Prayer.
Anthem.
Hymn—"I Need Thee Every Hour."
Sermon.
Hymn—"Rock of Ages."
Benediction.

8.30: From the Studio—The Empire Trio, in association with Miss Le Brun Brown.
"2nd Trio" (Godard)—The Empire Trio.

- Songs—
"Autumn Evening" (Quilter),
"Frollic" (Bainton),
"Loveliest of Trees" (Peel),
Miss Le Brun Brown.
Violin Solo—
"Andante from E Minor Concerto" (Mendelssohn).
"Dance Espagnole" (Grandados).
Miss Dulcie Blair.
"First Movement Trio," Op. 1 No. 3 (Beethoven),
The Empire Trio.

- Cello solo—
"Adagio, from the Haydn Concerto,"
Mr. Bryce Carter.
Songs—
"The Beat of a Passionate Heart" (Phillips).
"Sea Lullaby" (German),
"A Woman's Last Word" (Bantock);
Miss Le Brun Brown.
"Dvorak Trio," Op. 21,
The Empire Trio.
10.0: Record recital.
10.30: National Anthem. Close down.

2BL

MORNING SESSION.

- 11.0: G.P.O. chimes.
From the Balmain Central Methodist Mission, the morning service, conducted by Rev. S. W. M'Kibben.
Hymn No. 1.
Prayer.
Hymn No. 21.
Lesson.
Solo—"Throne of Grace" (Bonheur), Mr. A. H. May.
Notices and collection.
Anthem, "Ye Shall Dwell in the Land."
Soloist, Mr. J. Nairne.
Organ solo, "Andante" (Baptiste). Organist, Mrs. Denham.
Hymn No. 42.
Address, Rev. S. W. M'Kibben.
Hymn No. 48.
Benediction.

- 12.15: From the studio. "Sun" news service.
12.30: Studio music.
2.0: G.P.O. chimes. Close.

AFTERNOON SESSION.

- 3.0: G.P.O. chimes.
Studio music.
3.30: From the band rotunda, Manly Beach, the Manly Municipal Band, conducted by James Pheloung.
5.0: G.P.O. chimes.
Close down.

EVENING SESSION.

- 6.0: G.P.O. chimes.
Children's session, conducted by Uncle Bas.
7.0: Studio music.
7.15: Evening service from Chalmers Presbyterian Church, Strathfield, conducted by Rev. David F. Brandt.
Grand organ.
Sanctus.
Prayer of Invocation.
Hymn, "O Lord of Heaven and Earth and Sea."
Scripture, O.T.
Prayer.
Psalm 103.
Scripture, N.T.
Solo.
Prayer.
Hymn, "Come, Ye Thankful People, Come."
Anthem and Intimations.
Lord's Prayer.
Sermon, "Harvest Thanksgiving."
Prayer.
Hymn, "We Plough the Fields and Scatter."
Benediction.
8.30: From the band rotunda, Manly Beach. The Manly Municipal Band, conducted by James Pheloung.
9.25: From the studio. Eileen Starr (soprano).
"Nymphes et Sylvains" (Bemberg).
9.32: Studio music.
9.36: Nance Marley (contralto),
(a) "The Pearl Cross" (Marshall).
(b) "Three Fishers" (Hullah).
9.41: Studio music.
9.45: Eileen Starr (soprano).
(a) "Spanish Love Song" (Horne).
(b) "I Travel the Road" (Thayer).
9.51: Studio music.
9.55: Nance Marley (contralto).
(a) "Beside the Well" (Mayne).
(b) "Lie There, My Lute" (MacCunn).
(c) "Invitation" (Barry).
10.0: National Anthem.
Close down.

2GB

- 5.30: Children's session, by Uncle George.
7.0: Lecture from St. Alban's Church, Redfern, by the Rt. Rev. C. W. Leadbeater. 8.0: Music from studio. 8.15: Songs by Mr. Len Howell. 8.22: Violin solos by Mr. Cecil Berry. 8.32: Songs by Miss Florence Gordon. 8.39: Dramatic recital by Miss Mollie Kirwan. 8.49: Songs by Mr. J. Lou Walters. 8.56: Songs by Mr. Len Howell. 9.3: Violin solos by Mr. Cecil Berry. 9.11: Songs by Miss Florence Gordon. 9.18: Recital by Miss Mollie Kirwan. 9.28: Songs by Mr. J. Lou Walters. 9.35: Close down.

Local Programmes, Monday, February 25

2FC

EARLY MORNING SESSION.

Announcer: A. S. Cochrane.

7.0: "Big Ben and announcements." 7.2: Official weather forecast, rainfall, river reports, temperatures, astronomical memoranda. 7.7: "Sydney Morning Herald" summary. 7.12: Shipping intelligence; mail services. 7.15: Studio music. 7.25: Investment market; mining share markets; metal quotations; wool sales; breadstuffs markets; inter-State markets; produce markets. 7.40: Studio music. 8.0: "Big Ben." Close.

MORNING SESSION.

Announcer: A. S. Cochrane.

10.0: "Big Ben," and announcements. 10.3: Pianoforte reproduction. 10.10: "Sydney Morning Herald" news service. 10.25: Studio music. 10.30: The 2FC Racing Commissioner, late sporting news. 10.45: A talk on "Home Cooking and Recipes," by Miss Ruth Furst. 11.0: "Big Ben"; A.P.A. and Reuter's cable services. 11.5: Close.

MID-DAY SESSION.

Announcer: A. S. Cochrane.

12.0: "Big Ben," and announcements. 12.2: Stock Exchange, first call. 12.3: Official weather forecast; rainfall. 12.5: Musical item. 12.10: Summary of news, "Sydney Morning Herald." 12.15: Rugby wireless news. 12.18: A reading. 12.30: Studio music. 1.0: "Big Ben"; weather intelligence. 1.3: "Evening News" mid-day news service; Producers' Distributing Society's market report. 1.20: Studio music. 1.28: Stock Exchange, second call. 1.30: Studio music. 2.0: "Big Ben." Close down.

AFTERNOON SESSION.

Announcer: Laurence Halbert.

Accompanist: Ewart Chapple.

2.30: Programme announcements. 2.32: Educational session, for the schools. A short musical session. A reading. 3.0: "Big Ben"; pianoforte reproduction. 3.10: Progress scores of the cricket match, England v. Southern Districts, played at Goulburn. 3.12: Recital of popular records. 3.30: Ethel Law, mezzo contralto—(a) "Lack-a-Day" (Crampton), (b) "Camel Bells" (Lohr). 3.38: Studio music. 3.50: Irene Duncan, soprano. 3.58: Pianoforte reproduction. 4.10: Ethel Law, mezzo contralto—(a) "Twas in a Land" (Chaminade), (b) "Country Folk" (Taylor). 4.18: Studio music. 4.30: Progress scores of the cricket match, England v. Southern Districts, played at Goulburn. 4.32: Irene Duncan, soprano. 4.40: Studio music. 4.45: Stock Exchange, third call. 4.47: Popular records. 5.0: "Big Ben." Close.

EARLY EVENING SESSION.

Announcer: A. S. Cochrane.

5.40: The chimes of 2FC. 5.45: The Children's Session, conducted by the "Hello Man"—Letters and stories, music and entertainment; "Mara" will entertain. 6.30: Dalgety's market reports (wool, wheat, and stock). 6.40: Fruit and vegetable markets. 6.43: Stock Exchange information. 6.45: Weather and shipping news. 6.48: Rugby Wireless news. 6.50: Late sporting news. 7.0: "Big Ben"; late news service. 7.10: The 2FC Dinner Quartette, conducted by Horace Keats—Request programme: (a) "Strathpey" (Aussell), (b) "Selection of Songs" (Lauder), (c) "O Sole Mio" (Di Capua), (d) "A Highland Scene" (Moore), (e) "The Broken-hearted Sparrow" (Bendix), (f) "Hearts and Flowers" (Tobani).

EVENING SESSION.

Announcer: Laurence Halbert.

Accompanist: Ewart Chapple.

7.40: Pianoforte reproduction. 7.45: Programme announcements. 7.48: Popular

music. 8.0: "Big Ben." A musical programme arranged by Madame Emily Marks. Artists: The Light Music Four, A. G. Ellis, Agnes MacDiarmid, William Jesse. "Gipsy Dance" (Saint-Saens), the Light Music Four A. G. Ellis, baritone, "Nita Gitana" (Newtown); Agnes MacDiarmid, contralto, "Villanelle" (Dell'Acqua); the Light Music Four, suite, "Le Regne de Terpsichore" (Hosmer); William Jesse, "Who is Sylvia" (Schubert), "Passing By" (Purcell); Madame Emily Marks, soprano, "The Lass With the Delicate Air" (Arne); the Light Music Four, "Spanish Dance" (Rehfeld); A. G. Ellis, baritone, "The Pilgrim of Love" (Bishop); Agnes MacDiarmid, contralto, "A Birthday Song" (Woodman), "I Dream of a Garden of Sunshine" (Lohr); William Jesse, "Where E'er You Walk" (Handel); Madame Emily Marks, soprano, "Night" (Rachmaninoff); the Light Music Four, "Three Bohemian Dances" (Elgar). 9.0: Late weather forecast. 9.1: Rev. Rayward will continue his series of talks, "Tales of a Traveller." 9.15: An abridger's version of "The Bohemian Girl" (Balfe)—the story of the opera, told by Madame Marks. Conductor, Harry Sherlock, with chorus and full orchestra. 10.27: To-morrow's programme and late weather. 10.30: National Anthem. Close.

2BL

MORNING SESSION.

Announcer: A. C. C. Stevens.

9.0: G.P.O. chimes. Metropolitan weather report. 8.1: State weather report. 8.2: Studio music. 8.15: G.P.O. chimes. News from the "Daily Telegraph Pictorial." 8.30: G.P.O. chimes. News service continued. 8.40: Information; mails; shipping; arrivals; departures; and sailings. 8.45: Studio music. 9.15: Half an hour with silent friends. 9.45: Studio music. 10.0: G.P.O. chimes. Close down.

MIDDAY SESSION.

Announcer: A. C. C. Stevens.

11.0: G.P.O. clock and chimes. 2BL Women's Sports Association session, conducted by Miss Gwen Varley. 11.30: Advertising hints. 11.40: Women's session, conducted by Mrs. Cranfield. 12.0: G.P.O. chimes. Special ocean forecast and weather report. 12.3: Studio music. 12.30: Shipping and mails. 12.35: Market reports. 12.48: "Sun" midday news service. 1.0: Studio music. 1.30: Talk to children and special entertainment for children in hospital. 2.0: G.P.O. chimes. Close down.

AFTERNOON SESSION.

Announcer: A. C. C. Stevens.

Accompanist: Kathleen Roe.

3.45: G.P.O. chimes. Programme announcements. 3.47: Progress scores of the cricket match, England v. Southern Districts, played at Goulburn. 3.49: Popular records. 4.0: G.P.O. chimes. Romano's Cafe Dance Orchestra, conducted by Bennie Abrahams. 4.10: From the studio. Captain Fred Aarons will continue his series of talks, "Jacques le Mercier." 4.25: Ann Melhuish (soprano), (a) "Little Brown Bird" (Del Riego), (b) "Mell-sande in the Wood" (Goetz). 4.33: Studio music. 4.35: Progress scores of the cricket match, England v. Southern Districts, played at Goulburn. 4.47: Ann Melhuish (soprano), (a) "Nature's Music" (Phillips), (b) "Passing By" (Purcell). 4.54: Studio music. 5.0: G.P.O. chimes. Our serial story. 5.10: Pianoforte reproduction. 5.28: "Sun" news service. 5.32: Studio music. 5.37: Features of the evening's programme.

EARLY EVENING SESSION.

Announcer: Basil Kirke.

5.40: Children's session. Music and en-

tertainment. Letters and stories. 6.30. "Sun" news and late sporting. 6.40: 2BL dinner quartette. (a) "Waltz and Scherzo" (Strauss). (b) "Nocturne in E Flat" (Chopin). (c) "Forty-seven Ginger-headed Sailors" (Sarony), (d) "Schon Rosmarin" (Kreisler), (e) "Softly Awakes My Heart" (Saint-Saens), (f) "Hallelujah" (Youmans), (g) "Serenade" (Gourod), (h) "Sometimes I'm Happy" (Youmans). 7.7: Australian Mercantile, Land, and Finance Co.'s report. Weather report and forecast, by courtesy of Government Meteorologist, Producers' Distributing Society's fruit and vegetable market reports. Grain and fodder report ("Sun"). Dairy produce report ("Sun"). 7.25: Mr. Pim and Miss Pam in advertising talks and nonsense. 7.55: Programme and other announcements.

EVENING SESSION.

Announcer: Basil Kirke.

Accompanist: G. Vern Barnett.

8.0: G.P.O. chimes.

From the King's Cross Theatre—Joseph Wayne at the Wuriltzer organ.

8.15: From the studio—Robert Gilbert (baritone).

8.22: Foster and Finlay in Musical Memories.

8.32: Dulcie Starkey (soprano).

(a) "Ah! Quanto e Vero" (Cestli).

(b) "Che Angoscia, Che Affanno" (Pomo d'oro Cestli).

8.40: The Savoyans' Dance Band.

8.50: Charles Lawrence (entertainer).

9.0: G.P.O. chimes.

Weather report and forecast.

9.1: A saxophone solo by George Ellis.

9.8: Robert Gilbert (baritone).

9.16: Foster and Finlay in Musical Memories.

9.26: Dulcie Starkey (soprano).

(a) "Songs from a Cherry Orchard" (Alec Rowley).

1. "Cherry Song."

2. "Twenty Maids."

3. "The Cherry Tree."

4. "My Sad Blossom Tree."

(b) "Charity" (Hageman).

9.34: Cello solos by Basil Grey.

9.42: The Savoyans' Dance Band.

9.52: Charles Lawrence (entertainer).

10.2: From the King's Cross Theatre.

The King's Cross Theatre Orchestra, conducted by E. J. Roberts.

10.15: From the studio.

Late weather report and announcements.

10.50: The Savoyans' Dance Band.

10.30: Announcements.

10.32: The Savoyans' Dance Band.

10.42: Resume of following day's programme.

10.44: The Savoyans' Dance Band.

11.30: National Anthem.

Close down.

2GB

10.0: Music. 10.10: Happiness talk by A. R. Bennett. 10.20: Music. 10.30: Women's session by Miss Helen J. Beegling. 11.30: Close down. 2.0: Music. 2.5: Women's radio service, by Mrs. Dorothy Jo???. 2.30: Music. 3.0: Close down. 5.30: Children's session by Uncle George. 7.0: Stock and market reports by New Zealand Loan and Mercantile Agency, Ltd. 7.15: Music. 8.0: Songs by Miss Edith Allen Taylor. 8.10: Pianoforte solos by Miss Mollie Jones. 8.20: A humorous interlude by Mr. Jack Win and Mr. Heath Bur???. 8.25: Songs by Mr. Cecil Houghton. 8.35: Orchestral music. 8.45: Songs by Miss Dorothy Lee. 8.55: A humorous interlude. 9.0: Weather report. 9.3: Address. 9.15: Songs by Miss Edith Allen Taylor. 9.25: Pianoforte solos by Miss Mollie Jones. 9.35: Songs by Mr. Cecil Houghton. 9.45: Instrumental music.

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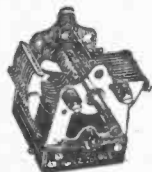
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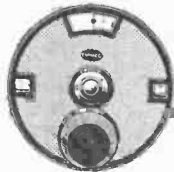
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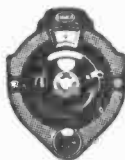
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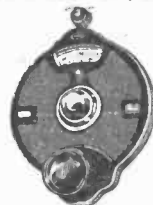
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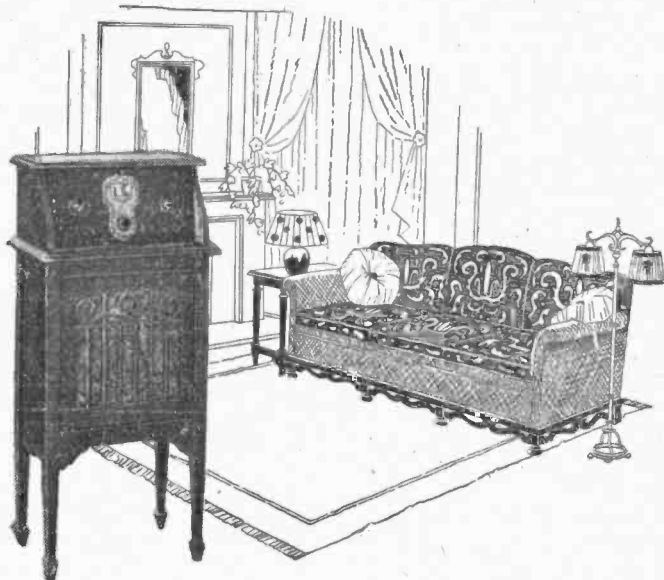
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FARMER'S

PITT, MARKET AND GEORGE STREETS, SYDNEY

6WF

10.30: soprano, "Bolvelg's Song" (Orleg), "Love is Meant to Make Us Glad" (German), 8.12: Lewis Jones, violinist, "Valse Triste" (C. Scott), "Oriental" (Cui), 8.18: J. E. Winnall, bass, "The Admiral's Broom," "The Mighty Deep," 8.25: Capt. Donald Macken will tell more sensational stories about buccaners and pirates, 8.32: Violet Jackson, soprano, "Down Vauxhall Way" (O'Brien), "God Remembers When the World Perpetrator" Bond, 8.45: Lewis Jones, violinist, "Concerto in A Minor" (Vivaldi), "Madrigals" (Monteali), 8.55: J. E. Winnall, bass, "The Floral Dance" (Moss), "Red Devon by the Sea" (Clarke), 9.00: Hoffman's Dance Band, Valetta, "The Chocolate Soldier," 9.7: Renn Miller, bass, "Queen of the East," 9.11: Hoffman's Dance Band, "Schottische Empire," 8.18: Announcements and greetings to all "Old-Timers," 9.23: Hoffman's Dance Band, lancers, "Shamane Girl," 9.40: Edith Huxham, soprano, "Whisper Throat," 9.44: Hoffman's Dance Band, with "The Blue Danube," 9.51: Old-time choruses, Graham Burgin and the Boys of the Village, "Cockles and Mussels," "Bylyle," "Stay in Your Own Backyard," "The Miner's Dream of Home," 9.57: General news service; meteorological information; score of Sheffield Shield match, Queensland v. South Australia, at Brisbane, 10.8: Hoffman's Dance Band (from 3LO, Melbourne), Alberts, "Dolly Time" (Old-time choruses, Graham Burgin and the Boys of the Village, "Every Ship Will Find a Harbor," "Where Did You Get That Hat," "Won't You Buy My Pretty Flowers," "Just as the Sun Went Down," 10.31: Madeline Knight, contralto, "Ben Hur," 10.35: Hoffman's Dance Band, Varsoviana, "Serenade," 10.41: Hugh Huxham's Serenader Quartette "Doan Yer Cry, Ma Honey," 10.45: Hoffman's Dance Band, "The Royal Irish," 11.0: Close down.

12.30: Tune-in. 12.35: Markets, news, etc. 1.0: Tune signal. 1.1: Weather bulletin supplied by the Meteorological Bureau of Western Australia, 1.3: Five-minute Hour, relayed from Messrs. Musgrove's, Ltd. Eric House, 2.0: Close down. 3.30: Tune-in. 3.35: Programme relayed from the Carlton Cafe. 4.00: Items from the studio, 4.30: Close down. 6.45: "Home-in" 6.48: Bedtime stories for the kiddies, by Dick Duffy, 7.5: Light music by the station *rio. 7.30: Commercial and general information, 7.45: Talk by Lieut.-Colonel le Souef, Director, Zoological Gardens, South Perth, 8.0: Time signal, 8.1: First weather bulletin supplied by the Meteorological Bureau of Western Australia, 8.3: The Salvation Army Silver Band will play the following items: March, "Triumph of Faith," Selection, "Songs of Britain" Selection, "Heavenly Treasures," Selection, "A Pee Into India," Cornet solo, "A Periwinkle Day," Meditation, "Rockingham," Song selection, "The Evangel," Selection, "Thanksgiving," Selection, "American Melodies," Meditation, "My Prayer," March, "Forward Go," 9.0: Late news items by courtesy of "The Daily News" Newspaper Co. Late weather bulletins. Station announcement. Shots within range announcement, 9.15: Programme continued from the studio, 10.30: Close down. 10.45: Metre Transmission: Simultaneous broadcast on 104.5 metres of programme given on 150 metres, commencing at 6.45 p.m.

7ZL

MIDDAY SESSION.

11.30 to 1.30: See Friday.

AFTERNOON SESSION.

10: G.P.O. clock chimes the hour, 3.1: Music 8.4: Weather information, 3.5: Music, 3.15: A piano concert—Planola and Columbia Lerner String Quartet, 3.22: Kirby Lunn (contralto), 3.29: Patti Masola, 3.34: E. Brown (violin solo), 3.44: Ernest McKinley (tenor), 3.51: Patti Planola, 3.55: Uncle Ike (vocal, with orchestra), 4.3: J. Szegiet (piano solo), 4.10: Patti Planola, 4.15: "Aunt Elsie" will speak on "Ribbons, Neckwear, and Trimmings," 4.30: Close down.

EARLY EVENING SESSION.

8.15: Music, 8.30: Little Sheila Carrol will recite "Martha," "My Ships," 6.45: Music, 7.0: Answers to letters and birthday greetings, by "Uncle David," 7.5: Request numbers by the Discus Enthusiast, 7.15: News session.

EVENING SESSION.

8.30: Geo. Collis, Tasmania's champion wrestler, will speak on "Physical Culture" under the auspices of the Child Welfare Association, 7.45: Mrs. C. M'Phee will speak on, "A Baby and You," 8.0: G.P.O. clock chimes the hour, 8.6: Music, 8.15: Transmission from the Memorial Congregational Church Brisbane Street. A concert arranged by James Marsh, a well-known Tasmanian organist. 8.57: News session, 10.0: G.P.O. clock chimes the hour, 10.1: Close down.

Huxham Serenaders Return

AFTER a brief absence from 3LO during which time they have been touring Tasmania and Victoria, the Huxham Serenaders are returning to 3LO on February 11, where they will present a further series of their excellent programmes. Listeners who enjoy the brilliant soprano solos of Edith Huxham find it difficult to realize that a few years ago, comparatively speaking, she was a real bush girl, a crack shot, and a fearless rider. However, her innate love for the stage triumphed, and the success achieved in her first part, "Serpente" in "Les Coches de Corneville," sealed her fate. Much of the popularity of the serenaders is due to her versatility, for, whether in operatic, ballad, or comedy number, she always bestows the "personal touch," which goes so far to either make or mar a production.

Local Programmes, Tuesday, February 26

2FC

EARLY MORNING SESSION.

Announcer: A. S. Cochrane.

7.0: "Big Ben" and announcements. 7.2: Official weather forecast; rainfall; river report; temperatures; astronomical memoranda. 7.7: "Sydney Morning Herald" summary. 7.12: Shipping intelligence; mail services. 7.15: Studio music. 7.25: Investment market; mining share markets; metal quotations; wool sales; breadstuffs markets; inter-State markets; produce markets. 7.40: Studio music. 8.0: "Big Ben." Close down.

MORNING SESSION.

Announcer: A. S. Cochrane.

10.0: "Big Ben" and announcements. 10.2: Pianoforte reproduction. 10.10: "Sydney Morning Herald" news service. 10.25: Studio music. 10.30: Last-minute sporting information by the 2FC racing commissioner. 10.40: Studio music. 10.50: Pianoforte reproduction. 11.0: "Big Ben." A.P.A. and Reuter's Cable Services. 11.5: Close down.

MID-DAY SESSION.

Announcer: A. S. Cochrane.

Note:—Race results will be transmitted. 12.0: "Big Ben" and announcements. 12.2: Stock Exchange, first call. 12.3: Official weather forecast; rainfall. 12.5: Musical items. 12.10: Summary of news, "Sydney Morning Herald." 12.15: Rugby wireless news. 12.18: A reading. 12.30: Studio music. 1.0: "Big Ben." Weather intelligence. 1.3: "Evening News" mid-day news service. Producers' Distributing Society's market report. 1.20: Studio music. 1.28: Stock Exchange, second call. 1.30: Studio music. 2.0: "Big Ben." Close down.

AFTERNOON SESSION.

Announcer: Laurence Halbert.
Accompanist: Ewart Chapple.

Note:—Race results.
2.30: Programme announcements. 2.32: Educational session for the schools. A short musical recital. A reading. 3.0: "Big Ben" Pianoforte reproduction. 3.10: Progress scores of the cricket match, England v. Southern Districts, played at Goulburn. 3.12: Popular music. 3.22: Phillipa Alston, contralto. (a) "Kashmiri Love Song" (Finden). (b) "Eleanore" (Taylor). 3.30: Pianoforte reproduction. 3.45: Esther Herford, soprano. (a) "The Away, Pretty Aohy" (Lehmann). (b) "I Dreamed we Walked in a Garden" (Lohr). 3.52: Studio music. 4.0: Freda Sternberg will continue her series of talks, "Poona and Child Widows in India." 4.15: Phillipa Alston, contralto. (a) "Morning" (Speaks). (b) "Now Sleeps the Crimson Petal" (Quilter). 4.22: Studio music. 4.30: Progress scores of the cricket match, England v. Southern Districts, played at Goulburn. 4.32: Esther Herford, soprano. (a) "When the Almond Blossoms Fall" (Finden). (b) "Just a World of Roses" (Forster). 4.40: Studio music. 4.45: Stock Exchange, third call. 4.47: Popular records. 5.0: "Big Ben." Close down.

EARLY EVENING SESSION.

Announcer: A. S. Cochrane.

5.40: The chimes of 2FC. 5.45: The children's session, conducted by the "Hello Man," assisted by Aunt Eily. Letters and stories. Music and entertainment. 6.30: Dalgely's market reports (wool, wheat, and stock). 6.40: Fruit and vegetable markets. 6.43: Stock Exchange information. 6.45: Weather and shipping news. 6.48: Rugby wireless news. 6.50: Late sporting news. 7.0: "Big Ben." Late news service. 7.10: The 2FC Dinner Quartette, conducted by Horace Keats. (a) "Pas des Volles" (Deibes). (b) "Bird Songs at Eventide" (Coates). (c) "The Blue Danube" (Strauss). (d) Selections from Gilbert and Sullivan's Operas. (e) "Ara-besque" (Debussy).

EVENING SESSION.

Announcer: Laurence Halbert.
Accompanist: Ewart Chapple

7.40: Pianoforte reproduction.
7.45: Programme announcements.
7.46: Popular music.
8.0: "Big Ben." "The Mellow Fellows."

8.10: Vincent Aspey (violinist)—
(a) "Indian Lament" (Kreislser).
(b) "Praeludium und Allegro" (Kreislser).
8.18: A sketch by Scott Alexander.
8.30: Minnie Hamblett, English pianist—
(a) "Tempo di Gavotta" (Craxton).
(b) "Three Old French Dances, from recently-discovered Suite (arr Masse), (first performance).
(c) "Prelude and Fuge" (Bach).
(d) "Romance F sharp Major" (Schumann).
(e) "Etudes" (Chopin)—
(1) "Revolutionary,"
A-flat Major,
Black Key.
8.55: Wilfrid Thomas, basso.
9.3: Late weather forecast.
9.4: Vincent Asprey, violinist—
(a) "Melody in F" (Auer).
(b) "Minuet" (in oden style), (Hochstein)
9.12: Bryson Taylor, tenor.
9.20: A sketch by Scott Alexander.
9.32: Carlton Fay, novelty pianist.
9.42: "The Mellow Fellows."
9.53: Studio dance band, conducted by Cec. Morrison.
10.5: Jill Valentine, popular songs.
10.13: Studio dance band, conducted by Cec. Morrison.
10.25: Late weather forecast.
10.32: Jill Valentine, popular songs.
10.33: Studio dance band, conducted by Cec. Morrison.
10.57: To-morrow's programme.
11.0: Studio dance band, conducted by Cec. Morrison.
11.30: National Anthem. Close down.

2BL

EARLY MORNING SESSION

Announcer: A. C. C. Stevens.

8.0: G.P.O. clock and chimes; metropolitan weather report. 8.1: State weather report. 8.2: Studio music. 8.15: G.P.O. clock and chimes; news from the "Daily Telegraph Pictorial." 8.30: G.P.O. chimes; news service continued. 9.40: Information, mails, shipping, arrivals, departures, and sailings. 9.45: Studio music. 8.15: Half an hour with silent friends. 9.45: Studio music. 10.0: G.P.O. chimes; close down.

MIDDAY SESSION

Announcer: A. C. C. Stevens

Note: Race results. 11.0: G.P.O. clock and chimes; 2BL's Women's Sports Association session, conducted by Miss Gwen Varley. 11.30: Advertising hints. 11.40: Women's session, conducted by Mrs. Cranfield. 12.0: G.P.O. chimes; special ocean forecast and weather report. 12.3: Studio music. 12.30: Shipping- and mails. 12.35: Market reports. 12.48: "Sun" midday news service. 1.0: Studio music. 1.30: Talk to children and special entertainment for children in hospital. 2.0: G.P.O. chimes; close down.

AFTERNOON SESSION

Announcer: A. C. C. Stevens
Accompanist: Kathleen Roe

3.45: Programme announcements; G.P.O. chimes. 3.47: Progress scores of the cricket match, England v. Southern Districts, played at Goulburn. 3.49: Pianoforte reproduction. 4.0: G.P.O. chimes; Romano's Cafe Dance Orchestra, conducted by Bennie Abrahams. 4.20: From the studio—Mab Fotheringham, soprano—(a) "Fairies at the Bottom of Our Garden" (Lehmann), (b) "Little Brown Owl" (Sanderson). 4.28: Popular records. 4.40: Romano's Cafe Dance Orchestra, conducted by Bennie Abrahams. 4.50: From the studio, progress scores of the cricket match, England v. Southern Districts, played at Goulburn. 4.52: Thelma Houston, contralto. 5.0: G.P.O. chimes; our serial story. 5.10: Mab Fotheringham, soprano—(a) "God's Lullaby" (Chevalier), (b) "Mighty Like a Rose" (Nevin). 5.17: Popular music. 5.27: Thelma Houston, contralto. 5.35: Producers' Distributing Society's poultry report. 5.37: Features of the evening's programme.

EARLY EVENING SESSION

Announcer: Bastli Kirke

5.40: Children's session; music and entertainment; letters and stories. 6.30: "Sun" news and late sporting. 6.40: 2BL Dinner Quartette—(a) "March Militaire" (Schubert), (b) "Some Day Somewhere" (Rapee), (c) "Humoresque" (Tschaiakowsky), (d) "Manon Lescaut" (Puccini), (e) "Everywhere I Look" (Carew), (f) "Serenade" (Toselli). 7.1: Australian Mercantile Land and Finance Co's report; weather report and forecast, by courtesy of Government Meteorologist; Producers' Distributing Society's fruit and vegetable market report; grain and fodder report ("Sun"); dairy produce report ("Sun"). 7.25: Mr. Pim and Miss Pam in advertising talks and nonsense. 7.55: Programme and other announcements.

EVENING SESSION

Announcer: Basil Kirke.

Accompanist: Mr. G. Vern Barnett.

8.0: G.P.O. chimes; from the Rose Bay Wintergarten Theatre—the Rose Bay Wintergarten Theatre Orchestra, conducted by Lionel Hart.
8.20: From the studio—Amy Osting, contralto—
(a) "The Birds Go North Again" (Willeby).
(b) "Sealed Orders" (Willeby).
(c) "Stolen Wings" (Willeby).
8.28: Josef Kaartinen, saxophonist—
(a) "Zardas" (Monti).
(b) "Vema" (Wietfort).
8.35: Jack Cannon, baritone.
8.43: The Music Makers—
(a) "The Purple Vine" (Ancliffe).
(b) "Andante Deligioso" (Goltermann).
8.55: S. H. Bowden will give his talk "Week by Week."
9.10: Weather report and forecast
9.11: Josef Kaartinen, saxophonist—
(a) "Song of India" (Rimsky-Korsakoff).
(b) "Saxophobia" (Wietfort).
9.19: The Music Makers—
(a) Overture, "Norma" (Bellini).
(b) Ballet Suite, "Minnesota" (Fresco).
9.35: Amy Osting, contralto—
(a) "Little Pilgrim" (Willeby).
(b) "The Voice of a Dove" (Willeby).
(c) "Near Thy Window" (Willeby).
9.43: The Music Makers—
Selection "La Favorita" (Donizetti).
9.53: Jack Cannon, baritone.
10.0: From the Rose Bay Wintergarten Theatre—the Rose Bay Wintergarten Theatre Orchestra, conducted by Lionel Hart.
10.20: From the studio, late weather report and announcements.
10.22: The Music Makers—
Suite, "Gipsy Idylle" (Piercy).
10.28: Resume of following days programme.
10.30: National Anthem.
Close down

2GB

10.0: Music. 10.10: Happiness talk by A. E. Bennett. 10.20: Music. 10.30: Women's session, by Miss Helen J. Beegling. 11.30: Close down. 2.0: Music. 2.5: Women's radio service, by Mrs. Dorothy Jordan. 2.50: Music. 3.15: Close down. 5.30: Children's session, by Uncle George. 7.0: Stock and market reports by New Zealand Loan and Mercantile Agency, Ltd. 7.15: Music. 7.30: Feature story. 7.40: Talk from the radio service department, by Mr. Stan Crittenden. 8.0: Songs by Mr. Maurice Helsen. 8.10: Instrumental music. 8.20: A humorous interlude by Mr. Jack Win and Mr. Heath Burdock. 8.25: Songs by Miss Elsie Condon. 8.35: Violin solos, by Mr. Lionel Hargreaves. 8.45: Songs by Mr. John McCaffrey. 8.55: Instrumental music. 9.0: Weather report. 9.3: Address. 9.15: Songs by Mr. Maurice Helsen. 9.25: Violin solos by Mr. Lionel Hargreaves. 9.35: A humorous interlude by Mr. Jack Win and Mr. Heath Burdock. 9.40: Songs by Miss Elsie Condon. 9.50: Instrumental music. 10.0: Orchestral items. 10.30: Close down.

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Interstate Programmes, Tuesday, February 26

3LO

7.15 to 8.15: See Friday.

MORNING SESSION.

11.0: 3LO's Different Dainties for the Daily Diet. To-day's Radio Recipe: Rosettes. 11.55: Miss E. Noble will speak on "Gas Cookery." 11.20: Musical interlude. 11.25: Mrs. Dorothy Silk will speak on "Homecrafts." 11.40: Musical interlude. 11.45: Miss Doreen Berry will speak. 12.0: Melbourne Observatory time signal. Express train information. 12.1: British official wireless news from Rugby. Feuter's and the Australian Press Association cables. "Argus" news service. 12.15: Newmarket stock sales. Official report of the sheep market by the Associated Stock and Station Agents, Bourke Street, Melbourne. 12.20: The station orchestra. Overture, "La Flute Enchantee" (Mozart). 12.30: Bernard Manning (bass-baritone). 12.37: Stock Exchange information. 12.40: The Imperial Russian Trio, Vassili Ister (piano). "Valse" (Chopin). Arved Nrcbit (violin). "Stellano e Rigandoo" (Francœur-Krosch). Ivan Berzinsky (cello). "Etude" (Chopin-Glazounov). The trio, "Danse Espagnole" (Mozskowski). 1.0: Jovan Massonoff (tenor). "The Last Watch" (Pinsuti). "My Little Irish Cottage" (Summers). 1.7: The Radio Revelers. "Scenes Foliques" (Godard). 1.17: Meteorological information. Weather forecast for Victoria, South Australia, New South Wales, and Tasmania. Ocean forecasts. River reports. Rainfall. 1.24: Bernard Manning (bass-baritone). 1.31: The station orchestra. selection. "The Red Widow" (Gobest). 1.37: Jovan Massonoff (tenor). "Gladiata na Looch" (Russian folk song). G. Strunoff. "Memories of a Song" (Nichols). Close down.

AFTERNOON SESSION.

Announcer: Maurice Dudley. Accompanist: Agnes Fortune. 1.58: Description of Maiden Plate, 5 furlongs. Woodend races. by Eric Welch. 2.5: The Radio Revelers. "Little Log Cabin of Dreams" (Harley). "Last Night I Dreamt You Kissed Me" (Kahn). "Who Knows" (Dixon). 2.14: Syd. Hollister (comedian). "Five Minutes Fun." 2.21: The Radio Revelers. "To-day, To-morrow, Forever" (Nicholas). "Baskatchewan" (Leslie). 2.28: Description of Handicap Pony Race, 5 furlongs. Woodend races. 2.35: Eme Armstrong (contralto). "Ancient Irish Air" (Needham). "Lovesong" (Lang). 2.42: The Radio Revelers. "Down Home Rag" (Sweetman). 2.55: Description of Maiden Plate, 5 furlongs. Woodend races. 2.58: Description of Flying Handicap, 5 furlongs. Woodend races. 3.0: Huxham's Serenader Quartet. Quartet. "Doodle-olle-dee." Renn Miller (bass). "Invictus." Humorous quartet. "The Tale of a Flea." Interlude. Agnes Fortune (piano) selected. Quartet. "Mississippi Mud." Renn Miller and Hugh Huxham (tenor and bass). "Stroll on the Block." Quartet. "Carmena." 3.28: Description of the Stand Handicap, one mile, at Woodend races. 3.35: Description of Maiden Plate, 5 furlongs. Woodend races. 3.40: The Radio Revelers. "A Bamboo Garden" (Donaldson). "Anything You Say" (Donaldson). "That Melody of Love" (Donaldson). 3.44: Sydney Hollister (comedian), more Merriment. 3.51: The Radio Revelers. Constantinople" (Carlton). "Maybe I'm Wrong" (Harris). "Hum and Strum" (Meyers). 4.0: Eme Armstrong (contralto). "A Nanking Bowl" (Arundale). "A Set of Sevens" (Arundale). 4.7: The Radio Revelers. "Lady of Love" (Nausbaum). "Mexican Serenade." "In My Bouquet of Memories" (Lewis). 4.14: Description of the Novice Handicap, 6 1/4 furlongs. Woodend races. 4.20: The Radio Revelers. "Pansies" (Nichols). "Red Head" (Embury). "Jeannine" (Silbert). 4.29: Tom Sempie (tenor). "Carissima" (Penn). "O Mistress Mine" (Quilter). 4.36: The Radio Revelers. "Dream House" (Fox). "Im

Scris. Sally (Kahn). 4.42: Description of Two-year-old Handicap, 8 1/2 furlongs. Woodend races. 4.49: Special weather report for the benefit of listeners in the Redcliffe district. 4.50: The Radio Revelers. "When You Know Me" (Baden). "Tell Me To-night" (Little). "Let a Smile be Your Umbrella" (Fain). 5.0: "Herald" news service. Stock Exchange information. 5.10: Close down. During the afternoon progress reports of the Sheffield Shield cricket match, Queensland v. South Australia, will be broadcast as they come to hand.

EVENING SESSION.

8.0: Answers to letters and birthday greetings by "Bobby Bluegum." 8.25: Musical interlude. 8.30: "Little Miss Kookaburra" knows some more about "Welle and Billy in Moonland."

NIGHT SESSION.

Announcer: Frank Hatherley. Accompanist: Agnes Fortune. 7.5: Stock Exchange information. 7.15: Market reports. 7.30: News service. Stumps scores, Sheffield Shield cricket match, Queensland v. South Australia. 7.43: Birthday greetings. 7.45: Out of the Past. 7.46: Under the auspices of the University Extension Board, G. F. Brown will speak on "Spot in the Days of Elizabeth." 8.0: A Maker of History. 8.1: The Victorian Public Service Military Band. 8.10: Bernard Manning (bass-baritone). 8.17: The Victorian Public Service Military Band. 8.28: Colin Thomson (tenor). "On Wings of Song" (Mendelssohn). "Daphne" (Coningsby-Clarke). 8.35: The Imperial Russian Trio. "Trio in D Minor" (Mendelssohn). Andante con moto. Allegro assai. "Rusomane" (Schubert). 9.0: Dawn Harding (mezzo-soprano). "Prayer to Vishnu" (Bantock). "Song of the Glock" (Burchill). 9.7: One-act play. "Fancy Free," produced by Terence K. Crisp. 9.30: The Victorian Public Service Military Band. 9.40: Huxham's Serenader Quartet. The quartet. "Chloe." Edith Huxham (soprano). "Devotion." Interlude. Hugh and Edith Huxham (duet). "I Do Kind of Feel I'm in Love." The quartet, comedy. "A Coster's Ouling." Interlude, the quartet. "A May Morning." 10.0: "Herald" news service. Stock Exchange information. Eric Welch's selections for to-morrow's races at Mentone. 10.10: Victorian Public Service Military Band. 10.17: Dawn Harding (mezzo-soprano). "Easter Snow" (Stanford). "The Joy of a Rose" (Tarbox). 10.24: The Victorian Public Service Military Band. 10.34: Colin Thomson (tenor). "Sailing Westward" (Elgar). "All For You" (Eusthopye Martin). 10.41: Announcements. 10.41: The Radio Revelers. "Anything You Say" (Donaldson). "In a Bamboo Garden" (Donaldson). "Get Out and Get Under the Moon" (Tobias). "That's My Weakness Now" (Steph). "Nebraska." "Forever More" (Burnett). "Roses of Yesterday" (Bern). "I Goes Like This" (Caesar). "The Dance of the Blue Danube" (Fisher). Good-night Waltz, Good-night Song. 11.30: God Save the King.

3AR

Announcer: John Stuart. 10.0 to 10.59: See Friday.

MORNING MUSICAL SESSION

Announcer: John Stuart. 11.0: A bravura of beautiful ballads and orchestral chief d'ouvre, including: "Oh, for the Wings of a Dove." "Long, long ago, As I Through the Night." "Silent Night." "Then You'll Remember Me." "Ben Bolt." "A Farmer's Song." "Now is the Month of Maying." 12.20: British Official Wireless news. Announcements. 12.30: Close down.

EVENING SESSION

6.0: The Station Orchestra (conductor, Fred Hall), interspersed with beautiful ballads on the Studio Seraphina. The Station Orchestra: Overture, "Boh-

mian Girl" (Balfe). "Dream Dances" (Coleridge Taylor). 6.15: Beautiful ballads. 6.27: The Station Orchestra. Selection, "Lady in Ermine" (Bomberg). 6.30: Beautiful ballads. 6.45: The Station Orchestra. Selection, "Lady Billy" (Terry). 6.55: Beautiful ballads. 7.0: News service. Announcements. Results of cricket, England v. Southern Districts. N.S.W. v. Goulburn; Queensland v. South Australia, at Sydney. 7.10: The Station Orchestra. "Evolution of Diana" (Lake). 7.20: Beautiful ballads. 7.28: The Station Orchestra. Suite, "The Shoes" (Ansell). 7.38: Beautiful ballads. 7.48: The Station Orchestra. Selection, "Going Up" (Hirsch). 7.58: Announcements.

NIGHT SESSION

Accompanist: Reg. Brown. 8.0: Under the auspices of the Town Planning Association, Lance Le Souef will speak on "Golf." 8.15: A. W. Jackson will speak on "Golf." 8.30: The Radio Revelers. "That Melody of Love" (Donaldson). "Anything You Say" (Donaldson). "In a Bamboo Garden" (Donaldson). 8.40: Syd. Hollister, comedian. "A Humorous Interlude." 8.43: The Radio Revelers. "We'll have a New Home in the Morning" (Buck). "Down Home—Rag" (Sweetman). "To-day, To-morrow, for Ever" (Nichols). 8.53: Milton Chick, baritone. "How Sweet the Moonlight" (M. Hill). 8.58: The Radio Revelers. "Ah, Sweet Mystery of Life" (Herbert). "Who Knows" (Dixon). "Little Log Cabin of Dreams" (Harley). 9.0: Syd. Hollister, comedian. "Merry Moments." 9.9: The Radio Revelers. "Tin Pan Parade" (Gillespie). "Last Night I Dreamed You Kissed Me" (Kahn). "Chiquita" (Wayne). 9.19: Milton Chick, baritone. "As I Lay in the Early Sun" (Slater). 9.22: The Radio Revelers. "Blue Berry Land" (Bryan). "Delirium" (Schmitt). "Lullaby" (Schmitt). 9.32: The Radio Revelers. "Felix the Cat" (Nausbaum). "In the Woodshed She Said She Would" (Johnson). "Polly" (Zamenick). 9.42: Syd. Hollister, entertainer. "Bright Bits." 9.48: The Radio Revelers. "Back in Your Own Back Yard" (Jolson). "Let a Smile be Your Umbrella" (Fair). 9.55: Mouth Organ Competition final. Selections by the winners of 3LO Mouth Organ Competition. 9.57: Announcements. 10.0: The Radio Revelers. "Tell Me To-night" (Little). "When You Know Me" (Baden). "I'm Sorry, Sally" (Kahn). 10.0: Beautiful ballads. "The Radio Revelers." 10.13: The Radio Revelers. "Dream House" (Fox). "Jeannine" (Gilbert). 10.20: News service. Announcements. Results of cricket, England v. Southern Districts. N.S.W. v. Goulburn; Queensland v. South Australia, at Sydney. God Save the King.

4OG

EARLY MORNING SESSION.

7.45: Time signals. 7.45: News service. 8.0: Some electric records. 8.15: News service. 8.30: Close down.

MORNING SESSION.

11.0: Music. 11.5: Social news. 11.15: Lecturette, talk on "Home Crafts," by Mrs. R. L. Reid. 11.30. Music. 11.35: More social news. 11.45: Music. 12.0 (noon): Close down.

MID-DAY SESSION.

1.0: Market reports and weather information. 1.29: From the Wintersgarden Theatre, Wurlitzer organ. 2.0: Close down.

AFTERNOON SESSION.

3.0: A programme of electrically reproduced records. 3.30: Mail train running times. 4.15: This afternoon's news. 4.30: Close down.

EARLY EVENING SESSION.

6.0: Mail train running times. Mail information, shipping news. 6.5: Some electrically reproduced records. 6.25: Commercial announcements. 8.30: Evening stories and weather. (Note: See 7.0 news in brief. 7.5: Stock Exchange news. 7.8: Metal quotations. 7.7: Market reports. 7.25: Fenwick's stock report. 7.30: Weather information. 7.40: Announcements. 7.43: Standard time signals. 7.45: Lecturette: A talk on photography, by Mr. F. L. South (Kodak's).

NIGHT SESSION.

8.0: From the studio: Pat M'Onigly (soprano). "Jeannine" (Skilker). Jack Land (tenor). "Once Again" (Bullfinch). W. L. Burch (bass). "When Song is Sweet" (Sans Souci). Part-song. "Blue Danub" (Strauss). John Steele (bass). "Ah, Yes, That's Mine" ("The Traveller"). "Fiddi, Jilly Manners" (soprano). "The Nightingale's Trill" (Gounod). Anzes Kerr (contralto). "Swing Low, Sweet Chariot" (Fisher). Quartette. "The Spinning Chorus" ("The Flying Dutchman"). "Low Lamber" (baritone). "Nirvana" (Adams). Pat M'Onigly (soprano). Vera Parker, duet. "Garden of Happiness" (Wood). W. L. Burch (bass). "The Floral Dance" (Moss). Part-song. "The Star in the Sky" (Fisher). "The Star in the Sky" (Fisher). Pat M'Onigly (soprano). "Mother, You Know the Story" (Mascagni). Quartette. "London Town" (Jerman). John Steele (tenor). "Morning Song" (Quilter). Jilly Manners (soprano). "The Herald" (Martin Shaw). Part-song. "A Cycle of Nautical Songs" (Branscombe). Agnes Kerr (contralto). "The Sky Boat Song" (Boulton). "A Pat L'il Feller Wid His Mammy's Eyes" (Gordon). Jack Land (tenor). "An Evening Song" (Blumenthal). Part-song. "The Blue Bells of Scotland." Pat M'Onigly (soprano). "Coo" (Monokton). Part-song. "The Marsellaise" (de Lisle). Lou Lambert (baritone). "The Curtain Falls" (d'Hardelet). Vera Parker (contralto). "My Ain Folk" (Lemon). Part-song. "Sweet and Low" (Barnaby). 10.0: The "Daily Mail" news, the "Courier" news, weather news, "Queenslander" bi-weekly news service for country listeners. 10.30: Close down.

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Information from any Branch of the

Commonwealth Savings Bank of Australia

(Guaranteed by the Commonwealth Government.)

5CL

MORNING SESSION

11.0: G.P.O. chimes. 11.1: Sonora. 11.15: Kitchen craft and menu talk. 11.30: Musical interlude. 12.9: G.P.O. chimes. 12.1: Sonora. 12.15: General news service. 12.35: British official wireless. Scores of Sheffield Shield match, Queensland v. South Australia, at Brisbane. 12.40: Favorite songs. 12.52: Railway information. 12.53: S. C. Ward and Co.'s Stock Exchange information. 12.58: Meteorological information. 1.0: G.P.O. chimes. 1.1: Station Quartette. 1.10: Violet George, soprano. 1.16: Sydney Henry, comedian. 1.22: Station Quartette. 1.33: Woodend races. 1.54: Violet George, soprano. 1.40: Station Quartette. 1.46: Geoff. Goldsworthy, cellist. 1.52: Station Quartette. 2.0: G.P.O. chimes. 2.1: Races of Sheffield Shield match. 2.2: General news result of Handicap Pony Races.

AFTERNOON SESSION

1.9: G.P.O. chimes; scores of Sheffield Shield match Queensland v. South Australia, at Brisbane. Woodend races, results of Flying Handicap and Handicap. 3.2: Rev. G. E. Hale, B.A., will speak on "The Folly of Hating." 3.10: Station Quartette. 3.25: Walter Aiston, bass. 3.31: Seth Smith, vocalist. 3.37: Violet Jackson, soprano. 3.43: Station Quartette. 3.48: Woodend races. 3.50: Sydney Henry, comedian. 4.0: Vern Rogers, cornetist. 4.6: Violet Jackson, soprano. 4.12: Station Quartette. 4.11: Woodend races. 4.18: Jean Finlay, pianist. 4.24: Sydney Henry, comedian. 4.30: Seth Smith, vocalist. 4.38: Walter Aiston, bass. 4.42: Vern Rogers, cornetist. 4.48: Station Quartette. 4.57: S. C. Ward and Co.'s Stock Exchange information. Scores of Sheffield Shield match, Queensland v. South Australia, at Brisbane; racing resume. 5.0: G.P.O. chimes and close down.

EVENING SESSION

6.0: G.P.O. chimes. 6.1: Birthday greetings, correspondence, songs, and stories by "The Waikato Lady." 6.30: Capt. Donald Maclean will take you to imagination to the haunts of the buccaners. 6.45: Sonora. 7.0: G.P.O. chimes. 7.1: S. C. Ward and Co.'s Stock Exchange information. 7.3: Meteorological market reports; scores of Sheffield Shield match Queensland v. South Australia, at Brisbane; Country Cricket Week, resume of day's matches, by Mr. C. H. Harris, secretary and organizer, Country Cricket Association. 7.10: 5CL's sporting service, by "Silvius." 7.18: Miss Laurie McLeod will talk on "The Art of Dancing." 7.36: Dr. Herbert Braden in an Australian talk.

NIGHT SESSION

8.0: G.P.O. chimes. 8.1: Station Orchestra, overture, "Hungarian Lustspiel." 8.8: Melba Stacey, contralto (winner of 1928 Community Singing Scholarship), "The Little Diamond" (Novel), "My Heart is West" (Thomas). 8.14: The Cotton Pickers, instrumentalists, "Breeze" (Hanley), "Dreamland Blues" (Berlin). 8.20: James Glennon, violinist, "Pezoso" (Martin), "Mozart in A Minor" (Kreisler). 8.26: Violet Jackson, soprano, "April is a Lady" (Phillips), "The Violet" (Mozart). 8.32: Station Orchestra, suite, "The Fairy Realm" (Ketelbey). 8.40: Will Runge, humorist, assisted by the Station Orchestra and Miss Melba Stacey will present a psychic story, "The Man Who Flew Down." 8.52: Station Orchestra, "By the Blue Hawaiian Waters." 9.0: G.P.O. chimes. 9.1: Meteorological information. 9.2: Overseas grain report. 9.3: Harold Tidemann, baritone, "Flower of the Desert," "Sea Fever" (Ireland). 9.8: The Cotton Pickers, instrumentalists, "Mother's Mine" (Hampton), "Yesterday" (Harrison). 9.15: James Glennon, violinist, "Chanson Triste" (Tschalkowsky), "Serenade." 9.21: Violet Jackson, soprano, "My Eyes" (Barratt), "Open Thy Blue Eyes." 9.27: Station Orchestra, "Dance of the Hours." 9.38: Geoff. Goldsworthy, cellist, "Londonderry Air." 9.44: Harold Tidemann, baritone, "Love I Have Won You" (Ronald), "Tally Ho" (Leon). 9.50: Will Runge, humorist, selected numbers. 9.56: Melba Stacey, contralto, "By the Waters of Minnetonka," "Madrigale" (Chaminade). 10.3: Station Orchestra, "Andante" (Reiger), "Rocking Horse Parade" (Hager). 10.15: General news service; meteorological information; 5CL's sporting service, by "Silvius" including Woodend race results; scores of Sheffield Shield match, Queensland v. South Australia; Country Cricket Week, the day's scores. 10.30: By courtesy of 3LO (Melbourne), dance numbers by the Radi-o-Revellers. 11.0: God Save the King.

6WF

11.0: Tune-in. 11.5: Wool sales session. 11.30: Close down. 12.30: Tune-in. 12.35: Markets, news, and cables. 1.0: Time signal. 1.1: Weather notes supplied by the Meteorological Bureau of Western Australia. 1.3: Musical selections by the studio trio. 2.0: Wool sales session. 3.30: Tune-in. 3.35: Musical programme from the studio, including piano solo by Miss Audrey Dean. 4.30: Wool sales session. 6.45: Tune-in. 6.48: Bedtime stories by Miss Westralia and Dream Daddy. 7.5: Light music by the studio trio. 7.30: Commercial and general information. 7.45: Talk by Dr. J. S. Barry, B.A. 11.8: 8.0: Time signal. 8.1: Weather bulletin supplied by the Meteorological Bureau of Western Australia. 8.3: Vocal and instrumental items from the studio. 8.0: Late news items, by courtesy of "The Daily News" Newspaper Co. Ships within range announcement. Station announcements. Late weather bulletin. 10.30: Close down. 10.45: Metre Transmission: Simultaneous broadcast on 104.8 metre of programme, given on 1250 metres, commencing at 6.45 p.m.

7ZL

EVENING SESSION

1.30: Under the auspices of the Radio Research Club Trevor Watkins will speak on "Short-wave Reception." 7.45: W. E. Fuller will speak on "Literary Lapses and Library Lists." 8.0: G.P.O. clock chimes the hour. 8.6: Transmission from Naval Base, Dominica, Hobart, description of R.N.R.8, being championships, described by "Olympus." 8.6: News session. 10.0: G.P.O. clock chimes the hour. 10.1: Close down.



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Local Programmes, Wednesday, February 27

2FC

EARLY MORNING SESSION

Announcer: A. S. Cochrane.
 7.0: "Big Ben" and announcements. 7.2: Official weather forecast; rainfall; river reports; temperatures; astronomical memoranda. 7.7: "Sydney Morning Herald" summary. 7.12: Shipping intelligence; mail services. 7.15: Studio music. 7.25: Investment market, mining share markets, metal quotations, wool sales, breadstuffs markets, inter-State markets, produce markets. 7.40: Studio music. 8.0: "Big Ben"; close down.

MORNING SESSION

Announcer: A. S. Cochrane.
 10.0: "Big Ben" and announcements. 10.3: Pianoforte reproduction. 10.10: "Sydney Morning Herald" news service. 10.25: Studio music. 10.45: A talk on home cooking and recipes by Miss Ruth Furst. 11.0: "Big Ben" A.P.A. and Reuter's cable services. 11.5: Close down.

MIDDAY SESSION

Announcer: A. S. Cochrane.
 Note: Race description and results from Moorefield. 12.0: "Big Ben" and announcements. 12.2: Stock Exchange, first call. 12.3: Official weather forecast, rainfall. 12.5: Musical item. 12.0: Summary of news, "Sydney Morning Herald". 12.15: Rugby wireless news. 12.18: A reading. 12.30: Studio music. 1.0: "Big Ben"; weather intelligence. 1.3: "Evening News" midday news service; Producers' Distributing Society's market report. 1.20: Studio music. 1.28: Stock Exchange, second call. 1.43: Studio music. 2.0: "Big Ben"; close down.

AFTERNOON SESSION

Announcer: Laurence Halbert
 Accompanist: Ewart Chappie
 2.30: Programme announcements. 2.32: Musical session. 3.0: "Big Ben"; pianoforte reproduction. 3.12: Popular music. 3.25: Florence Yates, contralto. 3.32: Popular records. 3.55: Loch M'Kay, baritone—(a) "The Floral Dance" (Moss). (b) "Friend o' Mine" (Sanderson). 4.3: Studio music. 4.10: Florence Yates, contralto. 4.15: Pianoforte reproduction. 4.30: Loch M'Kay, baritone—(a) "The Sailor's Paradise" (Richards). (b) "Angus MacDonald" (Roedel). 4.38: Studio music. 4.45: Stock Exchange, third call. 4.47: Studio music. 5.0: "Big Ben"; close down.

EARLY EVENING SESSION

Announcer: A. S. Cochrane.
 5.40: The chimes of 2FC. 5.45: The children's session conducted by the "Hello Man," assisted by Uncle Ted and the "Sandy" letters and stories. 6.30: Music and entertainment. Chat about the Cheer-Up Society, by Uncle Frank. 6.35: Dalgety's market reports (wool, wheat, and stock). 6.40: Fruit and vegetable markets. 6.43: Stock Exchange information. 6.45: Weather and shipping news. 6.48: Rugby wireless. 6.50: Late sporting news. 7.0: "Big Ben"; late news service. 7.10: The 2FC Dinner Quartet, conducted by Horace Keats—(a) "Maveresque" (Coates). (b) "Poupee Valsante" (Poldini). (c) "Sizilietta" (Von Blon). (d) "Summer Days" (Coates). (e) "Serenade" (Gonod). (f) "Romance" (Sibelius). (g) "Nymphs of the Nile" (Herson).

EVENING SERVICE

Announcer: Laurence Halbert
 Accompanist: Ewart Chappie
 7.40: Pianoforte reproduction.
 7.45: Programme announcements
 7.48: Popular music.
 8.0: "Big Ben"; classical programme arranged by Oliver King—
 (a) Tenor solo, Lance Jeffree, tenor and Oliver King, bass—"Serenade" (Schubert).
 8.5: Violin solos, Gerald Walenn—
 (a) "Romance" (Beethoven).
 (b) "Hungarian Dance" (Joachim).
 8.17: Soprano solos, Ila Turnbull—
 (a) "A Night in May" (Brahms).
 (b) "Denotion" (Schumann).
 8.23: Cello solos, Cedric Ashton—
 (a) "Largo" (Chopin).
 (b) "Bourne" (Handel).
 8.29: Bass solos, Oliver King—
 (a) "The Rose Complained" (Franz).
 (b) "Thou'rt Lovely As a Flower" (Rubinstein).

(c) "To-day" (Silberta).
 8.38: Pianoforte solos, Dagmar Roberts—"Adagio and Rondo" from "Waldstein Sonata" (Beethoven).
 8.50: Tenor solo, Lance Jeffree—
 (a) "Slowly the Daylight departs" (Borodine).
 (b) "Tchabod" (Tschakowsky).
 (c) "Hark, Hark, the Lark" (Schubert).
 9.0: "Big Ben"; late weather forecast.
 C. R. Hall will continue his series, "Out and about Iraq and Persia."
 9.15: Second half of classical programme, arranged by Oliver King.
 Violin solos, Gerald Walenn—
 (a) "Berceuse" (Faure).
 (b) "Moment Musical" (Kreisler).
 (c) "Caprice Viennoise" (Kreisler).
 9.28: Ila Turnbull, soprano solos—
 (a) "Serenade" (Strauss).
 (b) "Iris" (Ware).
 9.34: Cello solo, Cedric Ashton—"Larghetto" (Mozart).
 9.41: Bass solos, Oliver King—
 (a) "Ye Twice Ten Hundred Duties" (Purcell).
 (b) "When a Maiden Takes Your Fancy" (Mozart).
 (c) "Edge Roses" (Schubert).
 9.51: Pianoforte Solos, Dagmar Roberts—
 (a) "Fush Ho" (Hongkong) (Chastins).
 (b) "Valse" (Rubikoff).
 (c) "Prelude" (Besly).
 (d) "Lullaby" (Kyerull).
 (e) "Toccata" (Debussy).
 10.15: Tenor solos, Lance Jeffree—
 (a) "Row Gently Here, My Gondolier" (Schumann).
 (b) "When thro' the Piazzetta" (Mendelssohn).
 (c) "On Wings of Song" (Mendelssohn).
 10.20: Approx: Late weather forecast and tomorrow's programme.
 10.30: National Anthem.
 Close down.



MR. OLIVER KING, who has arranged to-night's classical programme.

2BL

MORNING SESSION

Announcer: A. C. C. Stevens
 8.0: G.P.O. clock and chimes; metropolitan weather report. 8.1: State weather report. 8.2: Studio music. 8.15: G.P.O. chimes; news from the "Daily Telegraph Pictorial." 8.30: G.P.O. chimes; news service continued. 8.40: Information, mails, shipping, arrivals, departures, and sailings. 8.45: Studio music. 9.15: Half an hour with silent friends. 9.45: Studio music. 10.0: G.P.O. chimes; close down.

MIDDAY SESSION

Announcer: A. C. C. Stevens
 11.0: G.P.O. clock and chimes, 2BL's Women's Sports Association session, conducted by Miss Gwen Varley. 11.30: Advertising hints. 11.40: Women's session, conducted by Mrs. Cranfield. 12.0: G.P.O. chimes; special ocean forecast and weather report. 12.3: Studio music. 12.30: Shipping and mails. 12.35: Market reports. 12.48: "Sun" midday news service. 1.0: Studio music. 1.30: Talk to children and special entertainment for children in hospital. 2.0: G.P.O. chimes; close down.

AFTERNOON SESSION

Announcer: A. C. C. Stevens
 Accompanist: Kathleen Roe.
 Note: Race results will be transmitted by courtesy of "Sun" newspapers. 3.45: Programme announcements. 3.47: Pianoforte reproduction. 3.55: Studio music. 4.0: Romano's Cafe Dance Orchestra, conducted by Bennie Abrahams. 4.10: From the studio, H. C. Gilson, tenor. 4.18: Record recital. 4.30: Talk by Basil Kirke. 4.45:

Romano's Cafe Dance Orchestra, conducted by Bennie Abrahams. 4.50: Studio music. 5.0: Our serial story. 5.10: H. C. Gilson, tenor. 5.18: Pianoforte reproduction. 5.28: Racing resume. 5.32: Studio music. 5.37: Features of the evening's programme.

EARLY EVENING SESSION

Announcer: Basil Kirke.
 5.40: Children's session, conducted by Uncle Bas; music and entertainment; letters and stories. 6.30: "Sun" news and late sporting. 6.40: 2BL Dinner Quartet—(a) "Minuette" (Borenson); (b) "Prelude" (The Deluge), (Saint-Saens); (c) "2nd Hungarian Rhapsody" (Liszt); (d) "Spiritual" (White); (e) "Pierrette" (Chaminade); (f) "Secrets" (Ancliffe). 7.7: Australian Mercantile and Finance Co.'s report; weather report and forecast, by courtesy of Government Meteorologist; Producers' Distributing Society's fruit and vegetable market report; grain and fodder report ("Sun"); dairy produce report ("Sun"). 7.25: Mr. Pam and Miss Pam in advertising talks and nonsense. 7.55: Programme and other announcements.

EVENING SESSION

Announcer: Basil Kirke.
 Accompanist: G. Vern Barnett.
 8.0: G.P.O. chimes.
 The H. W. Varna Company will present the play, "The Bells," by Erckmann Chatriaux.
 Mathias H. W. Varna
 Walter H. J. Saller
 Hans Foster Dean
 Christian Gordon Trilling
 Mesmerist William Hume
 Dr. Zimmer H. de Witt
 Catherine (Mathias's wife), Muriel Conner
 Annette (his daughter) Felix Clark
 Tozei (his maid) Miss Cory
 The scene is laid in Alsace

9.0: G.P.O. chimes.
 Weather report and forecast.
 9.1: The Savoyans' Dance Band.
 9.15: Talk on general sporting by Claude Corbett.
 9.30: Grace Savieri, popular vocalist.
 9.38: Euphonium solo by Andrew Madden.
 9.45: Harry Croot, baritone—
 (a) "Love Lily."
 (b) "Why Shouldn't I?" (Russell).
 9.53: The Savoyans' Dance Band
 10.0: Grace Savieri, popular vocalist.
 10.7: Xylophone solos by Lisle Lee.
 10.14: Harry Croot, baritone—
 (a) "Beating up the Channel" (Sanderson).
 (b) "A Rose and You" (Stoneham)
 10.22: The Savoyans' Dance Band.
 10.30: Late weather report and announcements.
 10.35: The Savoyans' Dance Band.
 10.45: Resume of following day's programme.
 10.47: The Savoyans' Dance Band
 11.30: National Anthem.
 Close down.

2GB

10.0: Music. 10.10: Happiness talk by A. E. Bennett. 10.20: Music. 10.30: Women's session, by Miss Helen J. Beegling. 11.30: Close down. 2.0: Music. 2.5: Women's radio service, by Mrs. Dorothy Jordan. 2.50: Music. 3.0: Labor-saving demonstration from Nock and Kirby. 4.0: Close down. 5.30: Children's session, by Uncle George. 7.0: Stock and market reports, by New Zealand Loan and Mercantile Agency, Ltd. 7.15: Music. 7.30: Feature story. 7.40: Short talk by Miss Beegling. 8.0: Songs by Mr. Breffni Rorke. 8.10: Instrumental music. 8.20: Mr. Jack Win and Miss Nora Windle in original selections from their repertoire. 8.30: Flute solos by Mr. Leslie Sproule. 8.40: Songs by Miss Elsie Brown. 8.50: Pianoforte solos by Miss Ada Brook. 9.0: Weather report. 9.3: Address. 9.15: Songs by Mr. Breffni Rorke. 9.25: A humorous interlude by Mr. Jack Win and Mr. Heath Burdock. 9.30: Instrumental music. 9.40: Songs by Miss Elsie Brown. 9.50: Flute solos by Mr. Leslie Sproule. 10.0: Mr. Jack Win and Miss Nora Windle. 10.10: Orchestral items. 10.30: Close down.

Interstate Programmes, Wednesday, February 27

3LO

MORNING SESSION.

10.50 Eric Welch will speak on to-day's races at Mentone. 11.0: J.L.O.'s Different Dainties for the Day Dinner. To-day's Radio Recipe, Syrup for Biscuits. 11.05: Miss I. D. Heaven will speak on "Sweet-made Confectionery." 11.20: Musical interlude. 11.25: Mrs. M. Callaway Mahood will speak on "Color in Decoration." 11.40: Musical interlude. 11.45: Mrs. Clarence Weber, "Learning Useless Habits through Autosuggestion. Adopt good habits and unlearn bad ones. Make your unconscious mind work for you without conscious effort." 12.0: Melbourne Observatory time signal. 12.1: British official wireless news from Rugby. Reuter's and the Australian Press Association cables. "Argus" news service. 12.15: Newmarket stock sales. Cattle and sheep report, bullocks and calves, by the Associated Stock and Station Agents, Bourke Street, Melbourne. Accompanist: Maurice Dudley. 12.20: Musical interlude. 12.25: The Radio Revellers, "Tokio" (Condon). "Where the Cot-cot-cotton Grows" (Klien). "Canecon Cake" (Bernard). 12.29: Syd. Hollister, "Just for Fun." 12.30: Stock Exchange information. 12.40: Hugh Huxham's Serenader Quartette, "I Ain't Got Nobody." Madeline Knight (soprano). "When Snowdrops Sing." Interlude by the Radio Revellers. Quartette, humorous item, "Dot Car, Be Too Careless." Huxham (tenor). "Carmena." 1.0: The Radio Revellers. "Parade" (Zamecni). "Avalon Town" (Brown). "You Are Wonderful" (Ash). 1.15: Meteorological information for Western Australia, Victoria, South Australia, Tasmania, and New South Wales. Ocean forecasts. River reports. Rainfall. 1.16: Syd. Hollister (comedian) will entertain some more. 1.23: Hugh Huxham, "The Law Against That" (Friend). "Oh My!" (Fruch). 1.30: Speeches from the Rotary Club luncheon, transmitted from the Freemasons' Hall, Collins Street, Melbourne. 2.0: Close down.

AFTERNOON SESSION.

Announcer: Maurice Dudley. Accompanist: Agnes Hatherly. 2.15: Description of Two-year-old Handicap, six furlongs, at Mentone races, by Eric Welch. 2.15: The Imperial Russian Trio. Overture, "Zampa" (Berlioz). 2.30: Bernard Manning (bass-baritone). "The Sailor's Grace" (Sullivan). "Roses Red in the Garden" (Ronald). 2.37: The station orchestra. "Cobweb Castle" (Lehmann). 2.43: Description of Open Handicap, six furlongs, at Mentone races, by Eric Welch. 2.50: Winifred Gardner (mezzo-soprano). "The Poet's Song" (Parry). "Lullaby" (Cyril Scott). 2.57: The station orchestra. Selection. "The Pearl Diver" (Bizet). 3.7: Jovan Massonoff (bass). "El, El" (Bruch). "Mountain Lovers" (Mozart). 3.14: Description of Brush Steeplechase, one mile 1 furlong, at Mentone races. 3.20: The station orchestra. Selection. "The Only Girl" (Bernard Manning) (bass-baritone). "O Haverly Mine" (Quilter). "Come Away, Death" (Quilter). 3.37: A. Anderson (clarinet). "Up, God of Paris" (Donizetti). 3.42: Description of Mentone Handicap, six furlongs, at Mentone races, by Eric Welch. 3.47: The Imperial Russian Trio. "Trio in D Minor" (Mendelssohn). (a) Allegro molto. (b) Scherzo marked. "Auf Fluegeln des Gesanges." "On Wings of Song" (Mendelssohn). 3.53: Description of Trial Plate, six furlongs, at Mentone races. 4.20: Jovan Massonoff (tenor). Selections from his repertoire. 4.27: The station orchestra, Suite. "Life with" (Coleridge Taylor). 4.35: Winifred Gardner (mezzo-soprano). "Adoration" (Franz Bridge). "Life with Death" (Coburn). 4.42: Description of Special Purse, 1 mile, Mentone races. 4.50: Special weather report for the benefit of listeners in the Bendigo district. 4.52: Close down. 5.0: Herald news service. Stock Exchange information. During the afternoon progress reports of the Sheffield Shield match, Queensland v. New South Wales, also results of the Wychebrook races will be given as they come to hand.

EVENING SESSION.

6.5: Answers to letters and birthday greetings by Mary Mary. 6.55: Musical interlude. 6.58: "Mary Mary" will tell a story from "Grimm's Fairy Tales." "The Nose," and then a tale from the Greek mythology, "Arachne."

NIGHT SESSION.

Announcer: Frank Hatherly. Accompanist: Agnes Hatherly. 7.5: Stock Exchange information. 7.15: Meteorological information. 7.30: News service. Stumps scores, Sheffield Shield cricket, Queensland v. South Australia. 7.43: Birthday greetings. 7.45: Out of the past. 7.48: Under the auspices of the Department of Agriculture, D. B. Adam, plant pathologist, will speak on "The Garden of the Future." Acting conductor, J. Button Crow. 9.15: Donald McArthur will speak on "The Gun for Sport." 9.20: The Imperial Russian Trio (Arved Nord). Violin and North (violin). "Danse Espagnole" (Sarasate). The Trio. "La Serenata" (Toselli). "Insouciance" (Debussy). "Le Dernier Rendezvous" (Rebikov). "Danse Espagnole" (Sarasate). 9.50: The Radio Revellers (mezzo-soprano). "All Love But" (Gilbert). "Obstination" (Pontenailles). 10.1: The station orchestra. "Fantasie" (Haydn). 10.1: Syd. Hollister has arranged a little sketch. "A Star in the Sky" 10.17: "Argus" news service. Meteorological information. 10.27: The station orchestra. Selection. "The Girl in the Train" (Leo Fall). 10.37:

Olive Painter (mezzo-soprano). "O Ship of My Delight" (Phillips). "Kentucky Babe" (Geibel). 10.45: The Radio Revellers. "Forever More" (Burnett). "Nebraska" (Revel). "Mexican Serenade." "I Love to Put a Hunk of Sponge Cake" (Castillo). "Because my Baby Don't Mean Maybe Now" (Donaldson). "Beloved" (Kahn). "Just Like a Melody Out of the Sky" (Donaldson). "There's a Ricketty-racketty Shack" (Turk). "Japanese Mammy" (Donaldson). Selected. 11.30: God Save the King.

3AR

Announcer: John Stuart. 10.0: G.P.O. clock says "Ten. 10.1: "Age" market reports; farm and station produce, fruit, fish, vegetables, etc. 10.25: "Age" shipping reports; ocean forecast. 10.30: Mail notices; express train information. 10.35: "Age" news service exclusive to 3AR. 10.59: Weather forecast. 11.0: Gramophone records; some recent items and orchestral selections of the master musicians. 12.20: British official wireless news; announcements. 12.30: Close down.

EVENING SESSION.

6.0: A gramophone record of hand items, including "Turkish Patrol" (The Black Diamonds Band), "Hunting The Black Diamond Band", "Wine, Women, and Song" (Regimental Band, Grenadier Guards), "In a Clock Store" (Regimental Band, Grenadier Guards), "Round and Round the Village" (Sousa's Band), "London Bridge" (Sousa's Band), "William Tell" Overture (British Guards' Band). 7.0: News service; announcements; results of cricket, Queensland v. South Australia, at Brisbane. 7.10: Gramophone recital continued.

NIGHT SESSION.

Announcer: Reg. Brown. 8.0: Under the auspices of the Boy Scouts' Association, Commissioner W. D. Kennedy will speak on "A Scout's Honor." 8.15: Captain C. H. Peters will speak on "Books, Wise and Otherwise." 8.25: The Collingwood Citizens' Band. "Death or Glory," overture. "The Nightingale." 8.40: Jovan Massonoff, tenor. "Vale" (K. Russell). "Alice, Where Art Thou?" 8.47: Collingwood Citizens' Band. "Amorette" 8.54: Hugh Huxham's Serenader Quartette. "In a Clock Store." Madeline Knight, contralto. "The Pixie Piper Man." Interlude by the Collingwood Band. "Selected." Quartette. "The Tin Pan Parade"; humorous item. "The Tale of a Flea." Interlude by the Collingwood Band. request number; Quartette. "The Nightingale." 9.14: Collingwood Citizens' Band—March. "Old Faithful" gavotte. "Hypatia." 9.24: Jovan Massonoff, tenor. "The Last Waltz" (Finzi). "Can't You Hear Me Say 'Love You'" (Burton-Brown). 9.31: Collingwood Citizens' Band—March. "Reliant;" intermezzo from "Tales of Hoffman." 9.41: Bernard Manning, bass-baritone. "The Admirals Yarn" (Rubens). "The Christening" (Fisher). 9.48: Collingwood Citizens' Band—euphonium solo. "Asleep in the Deep." 9.53: Rita Hilton, comedienne, selected. 10.7: Collingwood Citizens' Band—cornet solo. "Your Eyes Have Told Me So." 10.17: Bernard Manning, bass-baritone. "I Luv Zomeone in Zummerzet" (Bennett). "Friar of Orders Grey." 10.23: News service; announcements; results of cricket, Queensland v. South Australia, at Brisbane. God Save the King.

4QG

EARLY MORNING SESSION.

7.43: Time signals. 7.45: News service. 8.0: Some electric records. 8.15: News service. 8.30: Close down.

MORNING SESSION.

11.0: Music. 11.5: Social news. 11.15: A talk on "Artistic Uses of Sealing Wax and Crepe Paper." 11.25: "Denise" (Finzi). 11.35: More social news. 11.45: Wurlitzer organ.

MIDDAY SESSION.

1.0: Market reports and weather information. 1.15: The Postal Institute Orchestra. 2.0: Close down.

AFTERNOON SESSION.

3.0: A programme of electrically-reproduced records. 3.30: Mail train running times. 3.31: A recital by Mr. George Sampson, F.R.C.O. (cellist organist). 4.0: Afternoon news. 4.30: Close down.

EARLY EVENING SESSION.

6.0: Mail train running times; mail information; shipping news. 6.5: Wurlitzer organ. 6.25: Commercial announcements. 6.30: Bedtime stories conducted by "Denise" (Finzi). 7.0: News service. 7.1: Brief. 7.5: Stock Exchange news. 7.6: Metal quotations. 7.7: Market reports. 7.25: Penwick's stock report. 7.30: Weather information. 7.40: Announcements. 7.45: Standard time signals. 7.45: Lecture arranged by the Queensland Agricultural High School and College.

NIGHT SESSION.

8.0: Alf. Featherstone and his Dance Orchestra—Rhythmic paraphrase, "Nails" (arr. Lange); rhythmic paraphrase, "Il Trovatore" (arr. Lange). 8.10: The Albert Trio—ten minutes' music and mirth. 8.20: Alf. Featherstone and his Dance Orchestra—fox-trot, "I Never See Magic Alone" (Finlay). fox-trot, "All's Well That Ends Well" (Conrad). 8.30: Daisy McDowell and Mrs. A. F. Stoddart—vocal duet, "Golden Breeze" (Finzi). 8.35: Hugh Huxham (tenor). "La Donna Mobile" (Verdi). 8.40: Alf. Featherstone and his Dance Orchestra—waltz "My Dream Sweetheart" (Hall). 8.45: Mary McArthur (soprano). "The Piper of Love" (Cargill). 8.50: Alf. Featherstone and his Dance Orchestra—fox-trot, "My Sugar" (Britt); fox-trot, "Old Man Sunshine" (Dixon). 9.0: Metropolitan weather forecast. 9.1: Winnie Dunoon (soprano)—"I Wonder Why Love is a Dream" (Forsker). 9.5: Alf. Featherstone and his Dance Orchestra—medley fox-trot, "Thistles and Heather" (arr. Black); medley

fox-trot, "Yanko-Mania" (Rudolph). 9.15: The Albert Trio—ten minutes' music and mirth. 9.25: Alf. Featherstone and his Dance Orchestra—jazz-waltz, "Nicolette" (Batten). 9.30: Daisy McDowell and Mrs. A. F. Stoddart—vocal duet, "April Morn" (Batten). 9.35: Hugh Huxham (tenor). "The Certainties of Love" (Dunn). 9.40: Alf. Featherstone and his Dance Orchestra—fox-trot, "Oh, You Have No Idea" (Dougherty); fox-trot, "Old-fashioned Locket" (Wintrow). 9.50: Winnie Dunoon (soprano)—"Ringing Time" (Brahe). 9.55: The "Daily Mail" news; the "Courier" news; weather news. 10.15: Alf. Featherstone and his Dance Orchestra—three-quarters of an hour's dance music. 11.0: Close down.

5CL

MORNING SESSION.

11.0: G.P.O. chimes. 11.1: A Sonora recital. 11.1: Kitchen craft and menu talk. 11.30: Sonora recital. 12.0: G.P.O. chimes. 12.1: A group of favorite records. 12.15: General news service; British official wireless news; Queensland v. South Australia, at Brisbane. 12.40: A vocal and instrumental concert by popular artists. 12.52: S.A. railway information; S. C. Ward and Co.'s Stock Exchange information; meteorological information. 1.0: G.P.O. chimes. 1.1: Further vocal and instrumental numbers. 1.48: Mentone races, result of Two-year-old Handicap. 1.49: New numbers on the Sonora. 1.59: Meteorological information. 2.0: G.P.O. chimes and close down.

AFTERNOON SESSION.

3.0: G.P.O. chimes. 3.1: Scores of Sheffield Shield match, Queensland v. South Australia, at Brisbane. Mentone races, result of Open Handicap and Brush Steeplechase. 3.2: Station Quartette. 3.18: Mentone races, result of Mentone Handicap. 3.19: Winifred Gardner, soprano. 3.25: Helene Fisher, violinist. 3.31: Smith and Williams, banjo duettists. 3.38: Frank McCabe, baritone. 3.42: Station Quartette. 3.47: Results of Trial Plate Mentone races. 3.48: Winifred Gardner. 3.54: Helene Fisher, violinist. 4.0: G.P.O. chimes. 4.1: General news service; cancering stories. 4.18: Mentone races, result of Trial Purse. 4.19: Station Quartette. 4.35: Frank McCabe, baritone. 4.41: Smith and Williams, banjo duettists. 4.47: Station Quartette. 4.55: S. C. Ward and Co.'s Stock Exchange information; scores of Sheffield Shield match, Queensland v. South Australia, at Brisbane; racing resume, Mentone races. 5.0: G.P.O. chimes and close down.

EVENING SESSION.

6.0: G.P.O. chimes. 6.1: Birthday greetings, correspondence, songs, and stories by "Miss Wireless." 6.30: Capt. Donald Maclean will tell you more about pirate, plunderers, and pillagers. 6.35: Sonora. 6.55: Mentone race results; scores of Sheffield Shield match, Queensland v. South Australia, at Brisbane. 7.0: G.P.O. chimes. 7.1: Country Cricket Week. 7.2: Resumé of day's matches, by the Country Cricket secretary and organiser of Country Carnival Cricket Association; S. C. Ward and Co.'s Stock Exchange information; general meteorological report. 7.10: Rev. E. S. Kiek, a talk on "The Black Prince," the story of Cressy and Poitiers, and how the English succeeded for a time in practically annexing France. 7.25: Boy Scouts' Club Corner, at the Scouts' Club. 7.40: 5CL Bluebird Girls' Club, an entertainment by "The Bird Lady."

NIGHT SESSION.

8.0: G.P.O. chimes. 8.15: 5CL Flinlay pianists. "Juba" (Dett). "Prelude" (Schutt). 8.8: Violet Jackson, soprano. "To a Miniature" (Brahe). "Hindu Song" (Korsakov). 8.15: A night of novelty, by the Imperial Russian Trio. "The Nightingale" (Finzi). 9.30: Jean Finlay pianists. "Chant Polonais" (Liszt). 9.35: Violet Jackson, soprano. "In an Old-fashioned Town." 9.40: Humphrey Bishop and his musical comedy company. 10.30: General news service; meteorological information; racing resume; Mentone races; scores of Sheffield Shield match, Queensland v. South Australia, at Brisbane; overseas train report; Country Cricket Week, the day's scores. 10.45: By courtesy of 3LO, Melbourne, on with the dance, modern dance numbers by the Radio-Revellers. 11.0: God Save the King.

7ZL

AFTERNOON SESSION.

3.0: Running description of Brush Steeplechase, two miles 18 chains, run at Mentone racecourse, Melbourne, Melbourne, Victoria. 3.15: Weather information. 3.7: Music. 3.30: Running description of Mentone Handicap, run at Mentone racecourse, Mentone, Melbourne, Victoria. 3.35: Music. 4.0: Running description of Trial Plate, run at Mentone racecourse, Mentone, Melbourne, Victoria. 4.0: Music. 4.30: Running description of Trial Purse, run at Mentone racecourse, Mentone, Melbourne, Victoria. 4.35: All sporting results to hand. 4.40: Close down.

EARLY EVENING SESSION.

6.10: Mentone race results. 6.15: Music 6.30: Bertha Southey Brammell, "The Wise Black Crow." The "The Girl in the Train" (Leo Fall). "The Wench of Life" (Henry). 7.0: Music. 7.5: Answers to letters and birthday greetings by Bertha Southey Brammell. 7.15: News service.

EVENING SESSION.

7.30: Geo. Nation will give a talk on "Propagation." 7.45: J. M. Counsel will speak on "Tasmanian Art Exhibitions." 8.0: G.P.O. clock chimes the hour. 8.5: Recital of instrumental and vocal items by leading international artists, specially arranged by Paton's Music Warehouse. 10.0: G.P.O. clock chimes the hour. 10.1: Close down.

Local Programmes, Thursday, February 28

2FC

EARLY MORNING SESSION

Announcer: A. S. Cochrane.

7.0: "Big Ben" and announcements. 7.2: Official weather forecast, rainfall, river reports, temperature, astronomical memoranda. 7.7: "Sydney Morning Herald" summary. 7.12: Shipping intelligence; mail services. 7.15: Studio music. 7.25: Investment market, mining share markets, metal quotations, wool sales, breadstuffs markets, inter-State markets, produce markets. 7.40: Studio music. 8.0: "Big Ben", close down.

MORNING SESSION

Announcer: A. S. Cochrane.

10.0: "Big Ben" and announcements. 10.2: Pianoforte reproduction. 10.10: "Sydney Morning Herald" news service. 10.25: Studio music. 10.30: Last-minute sporting information by the 2FC Racing Commissioner. 10.40: Studio music. 11.0: "Big Ben"; A.P.A. and Reuter's cable services. 11.5: Close down.

MIDDAY SESSION

Announcer: A. S. Cochrane.

12.0: "Big Ben" and announcements. 12.2: Stock Exchange, first call. 12.3: Official weather forecast; rainfall. 12.5: Musical item. 12.10: Summary of news, "Sydney Morning Herald". 12.15: Rugby wireless news. 12.18: A Dickens reading, by A. S. Cochrane. 12.30: Studio music. 1.0: "Big Ben"; weather intelligence. 1.3: "Evening News" midday news service; Producers' Distributing Society's report. 1.20: Studio music. 1.28: Stock Exchange, second call. 1.30: Studio music. 1.50: Last-minute sporting information by the 2FC Racing Commissioner. 2.0: "Big Ben"; close down.

AFTERNOON SESSION

Announcer: Laurence Halbert.

Accompanist: Ewart Chapple.

2.30: Programme announcements. 2.32: Educational session, for the schools; a short musical recital. 2.45: Raymond Watt will speak on "The League of Nations." 3.0: "Big Ben", popular records. 3.20: Anne Luciano, soprano. 3.28: Studio music. 3.35: Carlos Fakola, novelty pianist. 3.45: Studio music. 4.0: Anne Luciano, soprano. 4.8: Popular records. 4.18: Carlos Fakola, novelty pianist. 4.28: Studio music. 4.45: Stock Exchange, third call. 4.47: Pianoforte reproduction. 5.0: "Big Ben"; close.

EARLY EVENING SESSION

Announcer: A. S. Cochrane.

5.40: The chimes of 2FC. 5.45: The children's session, conducted by the "Hello Man", letters and stories; music and entertainment. 6.30: Daley's market reports (wool, wheat, and stock). 6.40: Fruit and vegetable markets. 6.43: Stock Exchange information. 6.45: Weather and shipping news. 6.48: Rugby wireless news. 6.50: Late sporting news. 7.0: "Big Ben", late news service. 7.10: The 2FC Dinner Quartet, conducted by Horace Keats—

- (a) "A Summer's Morn" (Halmes).
- (b) "Winds in the Trees" (Thomas).
- (c) "Mary" (Hirsch).
- (d) "To the Spring" (Grieg).
- (e) Valse Lyrique (Sibelius).
- (f) "Song of the Volga Boatmen" (arr. Lake).

EVENING SESSION

Announcer: Laurence Halbert.

Accompanist: Ewart Chapple.

7.40: Pianoforte reproduction. 7.45: Programme announcements. 7.48: Popular music. 8.0: "Big Ben" From the Capitol Theatre—The Capitol Unit Entertainment. 8.20: From the studio, Virginia Bassetti, contralto. 8.28: Professor von Hoffman, pianoforte solos. 8.36: Browning Mummy, Australian tenor, principal of the late J. C. Williamson-Melba Opera Company. 8.48: "Vignettes of Humanity, by the Story Teller. 9.5: Weather forecast. Virginia Bassetti, contralto. 9.14: From the Capitol Theatre—the stage presentation.



Browning Mummy, the famous Australian tenor of the Grand Opera Company, who is scheduled to broadcast from 2FC and 2BL to-night.

9.30: From the studio—Browning Mummy, tenor. 9.43: Professor von Hoffman, pianoforte solos. 9.50: Nea Hallett, in popular songs. 9.58: From the Hotel Australia—Cec. Morrison's Dance Band. 10.10: From the studio—Nea Hallett, in popular songs. 10.15: From the Hotel Australia—Cec. Morrison's Dance Band. 10.28: From the studio—late weather forecast and announcements. 10.30: From the Hotel Australia—Cec. Morrison's Dance Band. 10.57: From the studio—to-morrow's programme and announcements. 11.0: From the Hotel Australia—Cec. Morrison's Dance Band. 11.30: National Anthem. Close down.

2BL

MORNING SESSION

Announcer: A. C. C. Stevens.

8.0: G.P.O. chimes. Metropolitan weather report. 8.1: State weather report. 8.2: Studio music. 8.15: G.P.O. chimes. News from the "Daily Telegraph Pictorial." 8.30: G.P.O. chimes. News service continued. 8.40: Information; mails; shipping; arrivals; departures; and sailings. 8.45: Studio music. 9.15: Half an hour with silent friends. 9.45: Studio music. 10.0: G.P.O. chimes. Close down.

MIDDAY SESSION

Announcer: A. C. C. Stevens.

11.0: G.P.O. chimes. 2BL Women's Sports Association session, conducted by Miss Gwen Varley. 11.30: Advertising hints. 11.40: Women's session, conducted by Mrs. Cranfield. 12.0: G.P.O. chimes. Special ocean forecast and weather report. 12.3: Studio music. 12.30: Shipping and mails. 12.35: Market reports. 12.48: "Sun" midday news service. 1.0: Studio music. 1.30: Talk to children and special entertainment for children in hospital. 2.0: G.P.O. chimes. Close down.

AFTERNOON SESSION

Announcer: A. C. C. Stevens.

Accompanist: Kathleen Roe.

3.45: Programme announcements. 3.47: Pianoforte reproduction. 3.56: Popular record. 4.0: Romano's Cafe Dance Orchestra, conducted by Bennie Abrahams. 4.10: From the studio, Ella Goodman (soprano). 4.17: Studio music. 4.20: Romano's Cafe Dance Orchestra, conducted by Bennie Abrahams. 4.30: From the studio, Ella Goodman. 4.33: Marcus Burkitt (blind pianist). 4.40: Romano's Cafe Dance Orchestra, conducted by Bennie Abrahams. 4.50: Ella Goodman (soprano). 4.54: Studio music. 5.0: Our serial

story. 5.10: Marcus Burkitt (blind pianist). 5.20: "Sun" news service. 5.30: Studio music. 5.37: Features of the evening's programme.

EARLY EVENING SESSION

Announcer: Basil Kirke.

5.40: Children's session—music and entertainment; letters and stories. 6.30: "Sun" news and late sporting. 6.40: 2BL Dinner Quartette—(a) "Tambourine Dance" (Dunhill), (b) "La Rose" (Ascher), (c) "A Song Remembered" (Coates), (d) "Merrie England" (German), (e) "Loin du Bal" (Gillet), (f) "You Lovely Thing" (Anderson). 7.1: Australian Mercantile Land and Finance Co.'s report; weather report and forecast by courtesy of Govt. Meteorologist; Producers' Distributing Society's fruit and vegetable market report; grain and fodder report ("Sun"); dairy produce report ("Sun") 7.25: Mr. Pin; and Miss Pam in advertising talks and nonsense. 7.55: Programme and other announcements.

EVENING SESSION

Announcer: Basil Kirke.

Accompanist: G. Vern Barnett.

8 p.m.: G.P.O. chimes. From the Band Rotunda, Manly Beach: The Manly Juvenile Band. 8.15: From the Studio: Farewell appearance of Alfred Cunningham (baritone), prior to his departure to Canada. (Listeners are asked to send in request numbers). 8.25: Carrie Tennant and Partner (sketch). 8.35: Dorothy Rose (mixed quartet). 8.45: From the Band Rotunda, Manly Beach: The Manly Juvenile Band. 9.0: From the Studio: Weather report and forecast. 9.1: Alfred Cunningham (farewell appearance). Note: Mr. Cunningham will make his farewell appearance from 2FC on Tuesday, March 5, when he will again sing request numbers). 9.12: Edward Gregory (saxophonist)—(a) "Sax-Serene" (Wiefelt). (b) "Sax-Simplicity" (Chenette). 9.19: Dorrle Ward (soprano). 9.26: Carrie Tennant and partner (sketch). 9.36: From the Band Rotunda, Manly Beach: The Manly Juvenile Band. 9.50: From the Studio—Dorothy Rose (mixed quartet). 10.0: G.P.O. chimes. Edward Gregory (saxophonist)—(a) "Valse La Lu" (Glantz). (b) "Sax-o-Phun" (Wiefelt). 10.8: Dorrle Ward (soprano). 10.16: G. Vern Barnett (piano solos). 10.26: Late weather report and announcements. 10.28: Resume of following day's programme. 10.30: National Anthem; close down.

2GB

10.0: Music. 10.10: Happiness talk, by A. E. Bennett. 10.20: Music. 10.30: Women's session, by Miss Helen J. Beegling. 11.30: Close down. 2.0: Music. 2.5: Women's radio service, by Mrs. Dorothy Jordan. 2.50: Music. 3.30: Cookery demonstration from Mark Foy's. 4.30: Close down. 5.30: Children's session, by Uncle George. 7.0: Stock and market reports by New Zealand Loan and Mercantile Agency Ltd. 7.15: Music. 7.30: Feature story. 7.40: Short talk by Mr. Jordan. 8.0: Songs by Miss Dorothy Toppin. 8.10: Instrumental music. 8.20: A humorous interlude by Mr. Jack Win and Mr. Heath Burdock. 8.25: Songs by Mr. Robert Scott. 8.35: Pianoforte solos by Miss Amy Mallett. 8.45: Songs by Madame Bennett North. 8.55: Instrumental music. 9.0: Weather report. 9.3: Address. 9.15: Songs by Miss Dorothy Toppin. 9.25: A humorous interlude by Mr. Jack Win and Mr. Heath Burdock. 9.30: Instrumental music. 9.40: Songs by Mr. Robert Scott. 9.50: Pianoforte solos by Miss Amy Mallett. 10.0: Songs by Madame Bennett North. 10.10: Orchestral music. 10.30: Close down.

Interstate Programmes, Thursday, February 28

3LO

EARLY MORNING SESSION.

7.15 to 8.15: See Friday.
MORNING SESSION.
 11.0: 3LO's Different Dainties for the Daily Dinner. To-day's Radio Recipe, Cucumber and Pineapple Salad. 11.5: Sonora Recital. 11.25: Matron Maudlin will speak on "Mothercraft." 11.40: Musical Interlude. 11.45: S. W. Hedger, superintendent and secretary of the Royal Victoria Institute for the blind, will speak on "The Housewife and the House."

MIDDAY SESSION.

12: Melbourne Observatory time signal. Express train information. 12.1: Prices received by the Australian Mines and Metals Association from the London Stock Exchange this day. British official wireless news from Rugby. Reuter's and the Australian Press Association cables. "Argus" news review. 12.15: Newmarket stock sales. Report of the cow market and the number of cattle trucks used for next week's markets, by the Associated Stock and Station Agents, Bourke Street, Melbourne. 12.30: Community singing. Old-time choruses, transmitted from the King's Theatre, Russell Street, Melbourne. Conductor, Frank Hatherley. 12.40: Stock Exchange information. 12.43: Community singing headed "Hugh Huxham." 12.45: The quartette will entertain. 1.45: Meteorological information, Weather forecast for Victoria, New South Wales, South Australia, and Tasmania. Ocean forecasts. River reports. Rainfall. 1.52: Close down.

AFTERNOON SESSION.

Announcer: Maudie Dugdale. Accompanist: Agnes Pertwee. 1.15: The station orchestra. Overture, "Samlet" (Tschakowsky). 2.25: Jovan Massonoff (soprano). "Do You Hear Me Say I Love You" (Burton Brown). "Doreen" (Hart). 3.20: The station orchestra. "Romance and Two Dances" (German). 2.42: Jean Brunton (contralto). "Lie There, My Love" (MacCunn). "Go Not, Happy Day" (Bridge). 2.49: Percy Code (trumpet). "Remember a Voice is Calling" (Tate) (by request). 19: The station orchestra. "Selection, No. 10 No. 10 No. 10." 3.1: Hugh Huxham's Serenade Quartette. The quartette, "Dear Old Songs." Renn Millar. "Stoneracker John." Orchestral interlude by the station orchestra. "The Quartette, 'Fussy' in de Wall." Hugh and Edith Huxham. "That's What I Think of You." Orchestral interlude by the station orchestra. The quartette, "Castelano." 3.25: The station orchestra. "Reve Anglique" (Ruisseau). 3.30: J. Howard King (bass-baritone). "Ahl Wep No More" (Tschakowsky). "I Will Not Omit" (Schumann). 3.37: The Imperial Russian (The Arved Nord, violin; Ivan Berzinsky, cello, Saul Lister, piano). "Trio in B Flat" (Beethoven). 3.40: Allegro Moderato. 3.5: Scherzo Allegro. "Berzinsky" (Ejlsnik). Selected. 4.0: Hulio, Stawell (The station orchestra). "Selection, 'Rienzi'" (Wagner). 4.13: Jean Brunton (contralto). "An Evening" (Bischoff). "Little Old Garden" (Grieg). 4.20: Joseph Bartle (flute). Selected. 4.25: Jovan Massonoff (tenor). "The Flower Song" (No. "Lise Time" (Schubert). 4.32: The station orchestra. Spanish suite, "Andalus" (Africano). 4.40: J. Howard King (bass-baritone). "Twas in the Lovely Month of May" (Schumann). "Tears and Grief" (Schumann). 4.47: Special weather report for the benefit of listeners in the Redcliffe district. 4.48: Agnes Pertwee (soprano). "The Garden" (Rubinstein). 4.54: The station orchestra. "Eugene Onegin" (Tschakowsky). 5.0: "Herald" news service. Stock Exchange information. Acceptances and carrier positions for the V.R.C. races at Flemington next Saturday. 5.15: The station orchestra. During the afternoon results of the Yarra Glen races will be broadcast as they come to hand. 6.0: Answers to letters and birthday greetings by "Bobby Bluegum." 6.15: Musical interlude. 6.30: "Bobby Bluegum" in song and story.

NIGHT SESSION.

13: Stock Exchange information. 7.15: Market reports. 7.30: News session. 7.43: Birthday greetings. 7.45: Out of the Past. 7.46: "Pop" Cory, now appearing in "The Desert Song," will speak from his new program at the Maytime" (Brake). 8.1: The Radio Revelers, "Nebraska" (Blisk). "Forever More" (Burdette). "Notes of Yesterday" (Berlin). 8.0: Stanley J. Allen (tenor). "Beigh-ho, the Sunshiner" (Phillips). 9.3: The Radio Revelers. "It Goes Like This" (Gossard). "Just Keep Singing a Song" (Simpson). "Minnesota" (Wallace). 9.12: Bernard Manning (bass-baritone). "Thy Sentinel Am I" (Waltz). 9.15: The Radio Revelers. "The Dance of the Blue Danube" (Strauss). "In the Wooded She Shed" (Hollister) (Johnson). "Japan" (Hollister). 9.15: Syd. Hollister (comedian). "More Hollisterisms." 9.17: The Radio Revelers. "Dream House" (Fox). "Oh Blackbirds are Bluebirds Now" (Friend). "I Can't Do Without You" (Trent). 9.26: Grace Jackson (contralto). "There's a Song Down Every

Roadway" (Haydn Wood). 9.39: The Radio Revelers. "I'll Just Roll Along" (Trent). "Oh, Ya, Ya" (Frich). "There Ought to be a Law Against That" (Friend). 9.48: Stanley J. Allan (tenor). "Pull Moon" (Woolmer). 9.51: The Radio Revelers. "Hot Ictries" (Sinastra). "Chiquita" (Wayne). "Just Like a Melody Out of the Sky" (Donaldson). 10.0: "Argus" news service. British official wireless news from Rugby. Meteorological information. Announcements. Sporting notes by "Olympus." 10.15: The Radio Revelers. "You Are wonderful" (Ash). "Avulsion Town" (Brown). "Paradise" (Zamcenik). 10.24: Bernard Manning (bass-baritone). "At Sunrise" (Ronald). 10.27: The Radio Revelers. "Cinnamon Cake" (Bernard). "Where the Col-tot-cotton Grows" (Kilen). "Tinkle" (Condor). 10.36: Syd. Hollister (comedian). "Vaudevilineries." 10.39: The Radio Revelers. "You're a Real Sweetheart" (Friend). "Under the Burma Moon" (Davis). "Colombo" (Nichols). 10.48: Grace Jackson (contralto). "Love, Here is My Heart." 10.51: The Radio Revelers. "High Up on a Hilltop" (Baer). "Do You" (Plantadosi). "Dawning" (Silver). 11.1: The Radio Revelers. "Ready for the River" (Bartle). "Toy Town Artillery" (Carlton). Selected numbers. 11.9: Allan Adcock (soprano). "I'm a Soldier." 11.12: The Radio Revelers. "Latest and Brightest." 11.21: Gwen Hart (soprano). "I Dream of a Garden of Sunshine" (Lohr). 11.24: "The Radio Revelers." "Latest and Brightest." 11.33: Thelma Reid (banjo). "Maiden" (Minn). 11.35: Radio Revelers. "Latest and Brightest." 11.45: Allan Adcock will entertain some more. 11.48: The Radio Revelers. "Latest and Brightest." 11.57: Gwen Hart (soprano). "Sing, Sing Blackbird" (Phillips). 12.0: The Radio Revelers. Some Midnight Melodrama. 12.5: Thelma Reid (banjo). "Longing" (Kinsella). Allan Adcock will keep you awake a bit longer. 12.27: The Radio Revelers, on with the dance. 1.0: God Save the King

3AR

Announcer: John Stuart. 10.0: G.P.O. clock says "Ten." 10.1: "Age" market reports; farm and station produce, fruit, fish, vegetable, etc. 10.25: "Age" shipping reports; ocean forecast. 10.30: Mail notices; express train information. 10.35: "Age" news service, exclusive to 3AR. 10.59: Weather forecast. 1.0: Orchestral and vocal selections on the gramophone. 12.30: British official wireless news; announcements. 12.30: "Close down." 4.45: Transmission from St. Paul's Cathedral, Melbourne. 5.30: Close down.

EVENING SESSION.

6.0: Sweet solace on the Seraphina. 7.0: News service; announcements. 7.10: B more solace.

NIGHT SESSION.

Accompanist: Reg. Browne. 8.0: Dr. Loftus Hills. "Life's Facts and Fancies." 8.15: Under the auspices of the Victorian Nursesmen and Seafarers' Association, E. Wiseman will speak on "Plants for Winter Flowers." 8.30: The Station Orchestra—Overture, "Bartle of Beville" (Rossini). "Eastern Romance" (Korsakoff). 8.45: Jovan Massonoff, tenor. "Geikonia is de Ziel." from the opera, "Bar Kochba" (Goldfaden), request item. 8.52: Transmission from the choir, Organist, Miss F. Thurman, concert by Mr. R. J. Oehr. Frank R. Thomas, solo, anthem, "Where Thou Reignest" (Schubert). L. Thornton, Mrs. Abery, A. J. Etheridge, Frank R. Thomas, quartette. "Love's Knee" (Waltz). Wita (Gounod), Chorus. "Gentle Night." Calvary (Spohr). Mrs. Abery, solo. "The Lord is My Rock" (Wooler). L. Thornton, A. J. Etheridge, Frank R. Thomas, trio. "On the Earth Longing Sin Awaits." "The Creation" (Haydn). Chorus. "Unfold, Ye Portals Everlasting." "The Redemption" (Gounod). 9.32: Back to the studio; suite, "Cobweb Castle" (Lehmann); "Frolics and Fancies." 9.42: One-act play, "Lonesome Like," produced by Betty Rae. Cast: Sarah Ormerod, Betty Rae, Emma Brierley, Ruby May, Rev. Frank Allevne, Eric Donald; Sam Horrocks, Terence Orp. The scene is laid in a Lancashire village. 9.57: The Imperial Russian. Trio: Violin, piano solo. "Valse" (Chopin); Arved Nord, violin solo. "Siciliano e Rigandolo" (Francoeur-Kreisler); Ivan Berzinsky, cello solo. "Etude" (Chopin-Glazounoff); trio. "Dance Espagnole" (Mosskowsky). 10.15: Jovan Massonoff, tenor. "Just a Cottage Small" (Hanley). "Can't You Hear Me Say I Love You" (Burton Brown). 10.22: News service; announcements; acceptances for the V.R.C. races at Flemington and carrier positions. God Save the King.

4QG

EARLY MORNING SESSION

7.43: Time signals. 7.45: News service. 8.0: Some electric records. 8.15: News service. 8.30: Close down.

MORNING SESSION

11.0: Music. 11.5: Social news. 11.15: Gardening talks by "Tecon." 11.30: Music. 11.35: More social news. 11.45: Music. 12.0 (noon): Close down.

MIDDAY SESSION

1.0: Market reports and weather information. 1.15: From the Constitutional Club—A lunch-hour address. 2.0: Close down.

AFTERNOON SESSION

3.0: A programme of electrically-reproduced records. 3.30: Mail train running times. 4.15: This afternoon's news. 4.30: Closing down.

EARLY EVENING SESSION

6.0: Mail train running times; mail information; shipping news. 6.5: A program of electrically-reproduced records. 6.25: Commercial announcements. 6.30: Bedtime stories conducted by "The Sandman." 7.0: News in brief. 7.5: Stock Exchange news. 7.8: Metal quotations. 7.7: Market reports. 7.25: Fenwick's stock reports. 7.30: Weather information. 7.40: Announcements. 7.45: Standard time signals. 7.45: Lecture, "On the Wattle," Rural Reminiscences," No. 5, by Mr. J. F. Reid (editor, "Queensland Agricultural Journal").

NIGHT SESSION

Part 1—Mr. Archie Day's party—a classical programme arranged by Mr. Archie Day. 8.0: From the Studio—Morris Cran (violinist) and Archie Day (pianist)—duet, "Sonata in E Minor" (Corelli); Verna Morcom (soprano)—"Ah fors e lui" (Verdi); Archie Day (pianist)—"Sonata in F Major" (Mozart), first movement; Fred Homer (baritone)—"The Two Grenadiers" (Schumann); Morris Cran (violinist)—"La Gitana" (Kreisler); Verna Morcom (soprano) and Fred. Homer (baritone)—vocal duet, "In a Gondola" (Edith Harby); Verna Morcom (soprano)—"Who Called You Here?" (Wolf); "Love in Spring" (Gounod); Archie Day (pianist)—selected; Fred. Homer (baritone)—"To the Forest" (Tschakowsky); Morris Cran (violinist)—"Snata Dance" (Burlique); "Rondo" (Mozart). Part 2—8.0: Metropolitan weather forecast. 9.1: For motorists—a talk by "Garogyle" on "Oil Color." 9.11: J. P. Keenan (soprano)—"Bedouin Love Song" (Pisanti). 9.15: G. Waller (contralto)—"Les Belles Americaines" (Eatonmann). 9.18: Jeanette Smales (soprano)—"Waltz Song" from "Tom Jones" (Ed. German). 9.24: Mabel Ralston (soprano)—"Peter" (Scott Gatty). 9.26: G. Waller (contralto)—"Londoner" (Piano). Part 3, Band Concert. 9.30: An impromptu programme of music by the Brisbane Citizens' Band (conductor, K. Kneser); between band numbers the following will be broadcast: "Les Belles Americaines" (soprano)—"Wake Up" (Phillips); J. P. Keenan (baritone)—"Young Tom o' Devon" (Simpson). 10.9: From the Studio—the "Daily Mail" news; the "Courier" news; weather news. Close down.

7ZL

MIDDAY SESSION

11.30 to 1.30: See Friday.

AFTERNOON SESSION

3.0: G.P.O. clock chimes the hour. 3.1: Records. 3.4: Weather information. 3.5: Records. 3.6: Australian and Pianola. Light Opera Company. 3.22: Edna Thornton (contralto). 3.29: Patti Pianola. 3.34: Joanette Kersar, piano-scorden solo. 3.41: Goodrich Silverton Quartet. 4.8: Patti Pianola. 4.9: Donald Lindley, trumpet solo. 4.0: Malcolm M'Eachern, bass. 4.7: Patti Pianola. 4.12: Gresham Singers. A representative of the Child Welfare Association will speak on "Happy Babies." 4.30: Close down.

EARLY EVENING SESSION

6.15: Records. 6.25: "The Story Lady" will tell a story to the wee folk. 6.40: Betty Braithwaite will play the piano for the little ones, "Le Papillon" (The Butterfly) (C. Lavallee). "Frelde in E Minor" (Peller). 6.45: Records. 7.0: Answers to letters and birthday greetings by "Uncle David." 7.5: Records. 7.18: News session.

EVENING SESSION

7.30: Under the auspices of the "Come to Tasmania" Organisation, L. Norman will speak on "Tasmania for Health." 7.45: A. Tebrin will give a talk on "Dividing of Man Power and New Source of Power." 8.0: G.P.O. clock chimes the hour. 8.15: "The Butterfly" (C. Lavallee). "Frelde in E Minor" (Peller). 8.45: Records. 7.0: Answers to letters and birthday greetings by "Uncle David." 7.5: Records. 7.18: News session.

RADIO A BATTERIES AT HALF PRICE

40 only, slightly marked on case on one side, but this does not impair their utility. Guaranteed for 3 months from date of sale.

6 Volts. Capacity 60 Amps
 Usually £4/10/- NOW £2/5/-
 4 Volts Capacity 25 Amps
 NOW £1/15/-

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Ferranti Radio Meters

Murdoch's offer the experimenter the finest range of Meters in Australia. For accurate measurements, we recommend the "Ferranti" Meter, as listed below.

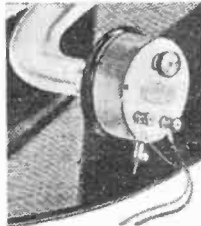
No.	Description.	Price.
1	0.5 milliamps	37/-
2	0.15 "	37/-
3	0.50 "	37/-
4	0.150 "	37/-
5	0.75 amps	37/-
6	0.1.5 amps	37/-
11	0.150 volts (200 ohms per volt)	37/-
12	0.250 volts (200 ohms per volt)	43/-
13	0.150 volts (1000 ohms per volt)	52/3
14	0.250 volts (1000 ohms per volt)	58/6

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'LISSEN' ELECTRIC PICK-UP

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Price, - - - 15/-



"LISSEN" "B" BATTERIES

Full 60 volt, and guaranteed to give a long life. Tested 13/6

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Radio Parts post free, except on Batteries, Accumulators, Radio Sets, etc., which are sent half freight free to nearest Port or Rail. Station

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MURDOCHS

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Park and George Streets, Sydney,
Specialists in all Radio Requirements.

Trouble-finding By Elimination

I HAVE HEARD that in some out-of-the-way place, where the population is black, and witch doctors abound, it is a common thing to find a trouble-maker by a means of elimination. Briefly, the witch doctor carries out a little ceremony (the ceremony is different each time I have heard or read of it), sometimes making each suspect sit down and chew a handful of bees. The guilty person is stung! Curiously enough, explorers and writers on the subject are adamant on one point. Only one person is stung, the rest are unaffected, and apparently it always turns out that the person stung is guilty.

I am, perhaps, digressing a little from the subject of my heading, but, nevertheless, it will serve to illustrate what is meant by "Elimination."

"Wireless Weekly" have, in the past eight or nine years, published many original receivers, which have enjoyed considerable popularity. Manufacturers have even made special coil kits for a great many of our receivers. Constructors usually manage to build our receivers correctly, because every detail is explained, not only by words, but also by diagram, yet in many cases some small fault exhibits itself, much to the constructor's chagrin. In these cases, the first thought that usually enters the constructor's head, is that "Wireless Weekly's" circuits, etc., are wrong. They, therefore, write to us, complaining that the receiver is not worthy of its name—and so forth. Sometimes, according to the size of our mail, he is kept waiting considerable time before his answer finds room in the Information Service.

Thus it was that with the new issue of "Wireless Weekly" the queries section was considerably enlarged. With this improvement, queries have piled up even more. Sometimes as many as fifty letters are received each day. Sometimes the number is more, but it seldom falls below the thirty mark. On an average, we receive up to 500 letters per week, and in the case of extremely interesting receivers, the number often reaches a thousand letters per week.

In readers' interests, we have, therefore, compiled a Trouble Chart. If your set becomes faulty, or your newly-constructed set will not function properly, make reference to the trouble chart first. If this does not eliminate the causes, then write to us, enclosing the query coupon, and a diagram of your receiver if possible. Never forget to state the parts used in the receiver, and deviations made from our specifications.

The Trouble Chart will not be published weekly. The space cannot be spared, so cut out the chart, paste it on a board, and always keep it handy.

If your receiver gives trouble, first check valves, aerial, earth connections, and the first transformer primary. Then follow the elimination method.

Should you desire any further information, let us know. Always mention in your letter if you have followed the instructions given with the Trouble Chart. If no mention is made of this fact, it will be taken that no reference has been made to the chart.

And when you send in those queries, tell us your query first, and explain afterwards. Leave out the news "bulletins" if you can, if not, place them last.

The Trouble Finding Chart will help those that try to help themselves,

The WIRELESS WEEKLY

RADIO INFORMATION

Under the direction of

Ray Allsop

and

Don B. Knock

Associate Technical Editors

Correspondence Answered

only through

these

Columns

(See Coupon Below)

A.D. (Bourke).—"I made an underground aerial...

Q. "I have had my valves for twelve months..."

Q. "The information page is great, and, though..."

Q. "I would you suggest a change?"

Q. "I have made a poor attempt at the wiring..."

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Q. "I would you suggest a change?"

advise them for short waves. (2) "How could I obtain different R.F. voltages..."

Q. "I would it be O.K. to run these two in parallel..."

Q. "I have the primary of an old transformer which..."

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Q. "I have the primary of an old transformer which..."

(2) "Would a 5-1 transformer be O.K.?"

Q. "I would it be O.K. to run these two in parallel..."

Q. "I have the primary of an old transformer which..."

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QUERY COUPON. If you are in difficulties about reception or set-construction, let us know, and we will endeavor to see you right. Make your questions brief to the point, and, where possible, show layout and wiring design. Under no circumstances will answers to queries be made by letter or by telephone. All answers will appear in the columns of this department. Your cordial co-operation is requested in the order in which they are received. The Radio Information Service, 10, WINDMILL LANE, WIMBORNE, Dorset. Please enclose the accompanying queries in this coupon in order to indicate that I am a bona-fide reader.

(4) "You may, or may not, be quick enough to note this precious coupon is always cleverly placed as to ruin the article on the other side of the page Observe 1.2.27—Trouble Chart."

Answer: This matter has been under discussion. In order to make a paper look neat it is necessary to place the coupon in its proper place, in the corner of the page. Where possible, some advertisement is used to back up this coupon, in order that no technical matter need be cut. It is, of course, not possible for us to insert advertisements in the midst of queries, therefore where queries or other matter appear on the back of the page the coupon can quite easily be obtained from another issue where the removal of the coupon will not deface technical matter.

(5) "Noticed something also to this effect.—"When writing again, please supply fresh sketches, etc." as previous drawings would not be kept. I suppose my little effort, my drawings or sketches (some job for me too), has gone West per medium of the W.P.B. Well, so be it."

should be connected to the first turn of the same coil. The first turn of the 15 turn coil should be connected to the fixed plates of a variable condenser of .005 mfd. The moving plates should be connected to the last turn of the 15 turn coil. Parts required—one crystal detector, four terminals of earth, aerial, and 'phones. One variable condenser .005 mfd. One pair of 'phones.

G.V.T. (Ipsbourne).—I feel I must write to thank you for your courtesy in answering my queries so promptly, and at the same time to congratulate you on your paper throughout. I have been a regular subscriber to "Wireless Weekly" since the very first number—which consisted of twelve small pages. Gradually the paper has improved, until now it will be exceedingly hard to beat. I might say, also, that through receiving your answers to my queries, I carried out your suggestions, and now reception is perfect. A radio friend of mine was unable to trace the fault. Referring back to the paper, if I may, I should like to compliment the staff, both technical and journalistic, on their matter. Everything is just as a good reader will

(2) "I want to learn the business thoroughly, so would be obliged if you would tell me the best way to start properly."

Answer: Read up the "Proving Radio" series.

(3) "I am thinking of building the 'Klug' crystal receiver. Would the Loveless aerial suit?"

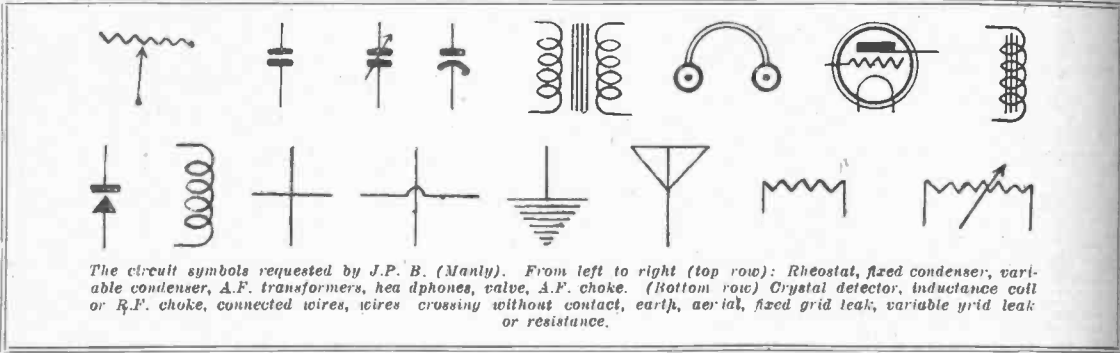
Answer: The Loveless aerial is not suitable for crystal sets.

(4) "Where can large cardboard formers be obtained?"

Answer: Economic Radio Stores.

(5) "If the Loveless aerial would not suit, what type would you suggest. I am rather cramped for space necessary for an outdoor aerial."

Answer: It is essential that the aerial system for the "Klug" crystal receiver be efficient, otherwise you cannot hope to duplicate results obtained. It would use an aerial inside the house, running along the corridor for as long a distance as possible. Even this will not be as efficient as an outdoor aerial.



The circuit symbols requested by J.P. B. (Manly). From left to right (top row): Rheostat, fixed condenser, variable condenser, A.F. transformers, head phones, valve, A.F. choke. (Bottom row) Crystal detector, inductance coil or R.F. choke, connected wires, wires crossing without contact, earth, aerial, fixed grid leak, variable grid leak or resistance.

Answer: If your drawings have gone in the direction you mention, your queries have been answered through these columns. I really believe the drawings, etc., went in another direction, for they didn't come near "Wireless Weekly."

(6) "The information I require can be had from another wireless publication; and, I think, just as reliable as that offered by "Wireless Weekly." Answer: So be it. Nevertheless, we are very sorry to find that even one of our many thousands of readers has found cause to grumble. Remember, too, that even had we received your previous letter we were under no obligation to answer it, for no coupon was enclosed. We always welcome healthy criticism. Would you like to repeat your queries? Please send two coupons.

C.H.V. (Eastwood).—"As a novice, I shall be glad if you would let me have further particulars of the crystal receiver which you advised E.P.T.I. (Glenorie) to build in "W.W." of 8/2/28. I have on hand a three-inch former, some 22 and 26 gauge D.C.C. copper wire, which I should like to use instead of 24 gauge. Please state what other parts I shall need to obtain. I have a small box with panel 7in. x 5in., which I should like to use if suitable."

Answer: The circuit is published in these columns. On the three-inch former wind 50 turns of 26 gauge wire. Over the centre of this wind 15 turns of the 22 gauge wire. Connect the first turn of the 50 turn coil to one side of the crystal, then connect the other side of the crystal to one side of the 'phones. From the other side of the 'phones take a lead to the last turn of the 50 turn coil, and thence to the earth terminal. The aerial terminal

like it. The technical articles are made perfectly clear. Mr. Knock's articles, and also Mr. Alloo's. Then "Proving Radio" is, I think, one of the best series ever run by a radio paper. This series is so delightfully simple and interesting—no personal parts and write-ups never did interest me until you followed out your new original lines. The Safety Valve is a fit place to stow away all that is nautical. Queries are extremely interesting, and many a time I have helped myself. With sincere congratulations.

Answer: Thanks for your kind remarks. We are glad you like the new paper.

D. C. M'D. (MALVERN).—"I have been a reader of your very fine "Weekly" for the last two years, and for the first time I am making use of your information service. I have a C.A.T. 50 volt 40 accumulator which I purchased late in 1926. It does not hold the charge very long, and all cells vary in their degree of charge; I was thinking of giving it a clean-out, but never had one so far to see if this would improve matters. I know a good bit about storage batteries, but I would appreciate a few hints as to how to go about this cleaning process. I must congratulate you on your excellent paper."

Answer: A storage battery gives good service for approximately eighteen months only, and the best thing to do is to procure a new one. However, the method of cleaning a storage battery is as follows: Place a table over the gas stove or other heating source until the blade is hot, then carefully carry the edge of the blade around the insulation matter until the element is loose, and can be eased out. All matter at the bottom of the cell should be cleaned out, and the container should be thoroughly cleaned out with cold distilled water, to which a little ammonia has been added. This ammonia must be got rid of before replacing the element, by leaving distilled water in the container for an hour or so. The element should also be thoroughly cleaned in distilled water, care being taken not to knock any paste from the plates. The paste has come away and collected at the bottom of the container. It will be necessary to replace this paste. The reason why your cells do not hold the charge is probably owing to the fact that the paste has formed a sediment at the bottom of the container, and is shorting the plates.

J.B.R. (EPPING).—"I desire to thank you for your prompt reply through the "Radio Information Service." You will be pleased to hear that my set is now working O.K. Now I want to ask you a dinkie-die question. Did you know at once what was wrong or did you just fudge it?"

Answer: At present we are busy hiding blushes.

J.P.B. (MANLY).—"I have just decided to take on radio as a hobby, and consequently I am very busy on all matters concerning same. I intend reading "W.W." regularly, as I think it an excellent help. Could you conveniently purchase coil or fixed condenser: variable resistance or rheostat: fixed condenser: variable condenser: transformer—audio frequency type: headphones; valve; audio-frequency choke; crystal detector; variable condenser; A.F. choke; connected wires; wires cross but do not make contact; earth; aerial; fixed grid leak; variable grid-leak or variable resistance."

Answer: Sorry, but space does not permit us publishing a full list of symbols. We have pleasure, however, in publishing all the more important ones. Read from left to right, the symbols are:—Variable resistance or rheostat; fixed condenser: variable condenser; transformer—audio frequency type; headphones; valve; audio-frequency choke; crystal detector; variable condenser; A.F. choke; connected wires; wires cross but do not make contact; earth; aerial; fixed grid leak; variable grid-leak or variable resistance.

D.M.I. (Ashfield).—"Some time ago I became interested in wireless and started to build a set, but up to the present I have not finished it, as each week there appear new circuits which make it difficult to decide on a particular one, also, as I am a new recruit to the ranks of listeners-in, I am not sure which circuit would suit my requirements, so perhaps you can help me. I would like a circuit of a three or four valve set, suitable for overseas reception with single-dial control, also so constructed that I can plug in a gramophone pick-up without having to change the valve when I want to use the gramophone, which I could put into operation with a switch."

Answer: Most overseas stations transmit on short waves, i.e., below 80 metres, therefore a short-wave receiver would be necessary. Suggest the Mid-get Screen-grid Four. If you desire a broadcast receiver, the best DX-getter will be the Marco Four, though this cannot be used on short-waves unless the R.F. stage is a screen-grid valve. No arrangements are made for a pick-up in either of these receivers, but this addition could easily be made by following the ideas given by Mr. A. Alexander in a recent "Radio" in his article on the Radio-Gramophone.

C.R. (Newcastle).—"Herewith circuit of a one-valve receiver. Will it be O.K. for use in Newcastle? The coil has 50 turns of 24 D.C.C. wire, tuned by a condenser of .0065 mfd. I have tried some circuits out of your book, but they do not work."

Answer: The circuit shown is not very selective. It could be made better by winding an aerial coil of 20 turns. Connect the aerial to the first turn of this coil, and the earth to the last turn. The spacing between the aerial and the secondary coil should be about a quarter of an inch. The variable condenser should be placed in parallel with the secondary coil.

V.C.H. (Camperdown).—"I have a five-valve Neurodyne, and cannot get inter-State stations. When touching the tuning dial the set squeals and squeaks. I want to try Philips valves, but they do not work." Answer: The circuit shown is not very selective. It could be made better by winding an aerial coil of 20 turns. Connect the aerial to the first turn of this coil, and the earth to the last turn. The spacing between the aerial and the secondary coil should be about a quarter of an inch. The variable condenser should be placed in parallel with the secondary coil.

Answer: Apparently the receiver is not neutralised. Instructions for neutralising receivers appeared in queries columns a week or so ago. See that the moving plates of the tuning condenser contact to the filament and not the grid circuit. The correct Philips valve to use would be (in order) 1st B.F. A605, 2nd B.F. A605, detector, A611, in audio, A609, 2nd audio, A609. If you desire a one-valve in the last stage you could use a C603 or 603.

B.M. (Kempsey).—"In my letter of even date I forgot to enclose coupon re queries. However, I am very keen about having my questions answered, so am enclosing it now."

Answer: No letter other than the one published above has been received from you within the past two days. Perhaps it has been delayed in the post. If you had repeated your queries in the second issue, they would be answered through these columns time and time again, your queries would have been answered in this issue. Thanks for the coupon.

I.K.R. (Newcastle).—"Would you kindly inform me if the rectifier published in "Proving Radio," January 18, 1929, could be used for charging a six-volt 'A' battery?"

QUALITY!!!

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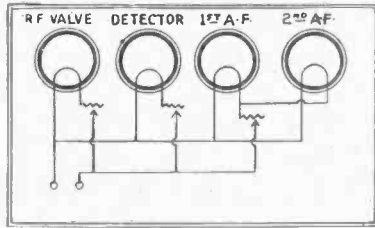
O'DONNELL, GRIFFIN & Co., Ltd.,

53 Druitt Street, Sydney.

Phones: M 2991 (3 lines).

Answer: It could be used as a trickle charger... If your battery was fully charged it could be kept in this state by the trickle charger.

J.W. (Newcastle).—"I am contemplating building the Browning-Drake receiver... I am asking, per your description, if it is possible for you to supply me with the necessary data regarding the different sizes of formers and number of turns to use, also gauges of wire to use... I may state I have books on 20 D.S.C. Also, I would like wire filament consists of 77 turns of 20 D.S.C. with the secondary at the 14th turn, and is tuned with either a .00025 or a .00035 variable condenser... The reaction coil is wound on a 2-inch former, and consists of 30 turns of 28 D.S.C. wire... I have suspended inside the secondary coil, and may be capable of being rotated... The circuit shows a box to control the filaments of your valves... I am required to show here.



Controlling each valve filament voltage separately. Circuit requested by "J.W." (Newcastle).

Answer: Here are instructions for winding your own Browning-Drake coils. These coils are O.K. for tuning condensers. The aerial coil consists of 50 turns of 20 D.S.C. wire on a 3-inch former, tapped at the centre for the aerial condenser, and is used in conjunction with a .0005 variable condenser. The secondary of the regeneration consists of 77 turns of 20 D.S.C. with the secondary at the 14th turn, and is tuned with either a .00025 or a .00035 variable condenser. The reaction coil is wound on a 2-inch former, and consists of 30 turns of 28 D.S.C. wire. I have suspended inside the secondary coil, and may be capable of being rotated. The circuit shows a box to control the filaments of your valves as required is shown here.

A.B. (Lithgow).—"I am interested in crystal circuits and wish to know the best locality... I would like to know the fact that I am living in Lithgow... I would like to know if it is rather far for a crystal set. Could you advise me where I could get a circuit suitable for this occasion?"

Answer: It is doubtful whether you would have much results with a crystal set in your locality. However, you could try the Kig Crystal set published in this paper a week or so back. A one-chamber set would be more suitable—the Countryman's Co.-valve will suit your requirements admirably. Another good circuit for crystal is that reproduced in this issue. It is very selective, volume is not needed in any way. Wind 50 turns of 24 gauge D.C.C. on a 3-inch former. In the centre, and on this coil, wind 15 more turns. Connect the first wire of the 50 coil to the aerial and to one side of the crystal, then the other side of the crystal to the other side of the 'phones. The other side of the 'phones should be connected to the bottom of the 15-turn coil and also to earth. The first turn of the 15 coil should be connected to the fixed plate of a .0005 variable condenser, and the moving plates of this condenser should be connected to the last turn of the 15 coil.

A.R. (Balmains).—"I have a five-valve set which does not oscillate, and would like to know how to fix it. Some receivers are constructed so that they will not oscillate. If this is the case, your best bet would be to add regeneration to the set by the Henratz method. Circuit appeared in these columns 11 weeks back. See that valves are in order.

J.W. (Belmore).—"I have a five-valve Giffiland set, using an eliminator and six-valve accumulator, and three C batteries and dynamic 80 speaker. I seem to get a lot of distortion. I have had the set examined, and can get no satisfaction. Could you advise me how to rectify the trouble. I may say that the battery eliminator is tested, and the 'A' battery is always well charged."

Answer: Perhaps you are overloading the amplifier. Experiment also with "C" battery voltage. Use valves, transformers, and rectifier of eliminator. The speaker.

F.M.E. (Wentworth Falls).—"I have been a subscriber to W.W. for three years, and this is my 214th application for information through your columns. I don't suggest that my knowledge of radio is 100 per cent.; as a matter of fact, it is rather to the contrary, but I always follow the news very closely each week, and any information required generally comes along in due course. Now for business. I propose building the Marco Four, and seek the following information: (1) Have 3-inch formers on hand, and what is the increase of turns when you want coils L1, L2, L3, and L4 on the 3-inch formers?"

Answer: No; it is not necessary. It will only mean that you will tune-in, say, 2PC about 3 steps higher than would have been the case had you used the formers mentioned.

(2) "Could a .00035 variable condenser be used instead of a .0005 as the reaction condenser?"

Answer: Yes; quite O.K.

(3) "Are coils L3 and L4 a continuous winding of 8 turns with a 1/4-inch space after the 45th turn, but the L3 and L4 actually form one continuous winding?"

Answer: Yes. L3 and L4 actually form one continuous winding in the wiring diagram that the grid and grid condenser are placed separate in the circuit. Is this necessary, or could they be placed together as is usual?"

Answer: The arrangement is not necessary, and does not differ from the usual arrangement of placing the grid wind in parallel with the grid condenser. This method may be followed.

(4) "I presume Philips valves in the following order would be correct for the Marco Four?—R.P. A55, detector; B415, first audio; B415; second audio; B466."

Answer: No. A better arrangement would be R.P. A35, detector; A415; first audio, A409; second audio, B400.

E.A.P. (Auburn).—"What would be a good five-valve set capable of bringing in Brisbane in daylight at Bolina, N.S.W., about 180 air miles from Brisbane?"

Answer: The Martin Screen-grid Five, published in "Radio," volume 2, No. 3, page 26, consistently pulled in New Zealand in daylight from Sydney, so this should suit your requirements. Have not seen your previous letter. Will look through queries answered for the circuit you mention.

T.A.E. (Guyra).—"Could you tell me the call-sign of the station at Berlin, Germany, who have been leaving with 2ME? I have heard this station several times lately, but could not understand the talking."

Answer: The station is situated at Nauen. I believe. The call-sign is AGJ. They have been heard quite a lot lately; it was a pity you were unable to hear what was being said, because it was rather funny. 2ME could not understand what the German was saying, and kept repeating, "I can un-der-stand you, if youo spik good English," but the German seemed to get annoyed. At the time, he was reading from history (Norman conquest period), and he finished up his talk to 2ME by saying slowly, "And they conquered the English." 2ME eventually had to get an interpreter. I believe.

E.W. (Mascot).—"What cheap-to-run and inexpensive type of valve would be the most suitable for the receiver enclosed?"

Answer: A Philips A-200; a Radiotron UX-199, a G.G. 210; a Marconi D.E.H. 210; a Six-sixty; S.S. 210; an Osram DEH-210; a Mullard P.M.L.P. or any valve with a low filament voltage and consumption.

(2) "What stations could I get with it?"

Answer: Probably 2PC, 2BL, 2CB, 2CK, 2CW, and 2BE. You would get better results if you connected a coil of 40 turns in series with the plate lead.

D.W. (Millroy).—"I have a five-valve Radiator set, which, until lately, has been giving excellent results. A few days ago it developed a continuous whistling noise, which continues the whole time the set is in operation, and sometimes it can be stopped by removing valves. I have had the set 18 months, and am using five Radiator valves, UX 20A."

Answer: I think you will find the 'B' batteries are getting flat. Also look to transformer windings.

T.G. (Roselle).—"Could you give me through your information service a circuit for a good crystal set, using one condenser? I built the circuit enclosed and could only get 2BL, who could be heard all round the dial."

Answer: Build the crystal circuit appearing in these columns December 7, 1920. The circuit forwarded should be very selective. You evidently erred somewhere, or perhaps used a very poor set of valves. On this same circuit, Mr. Y.E. Vance advises us he can get 2PC, 2BL, 3LB, and other distant stations, and the set is very selective.

J.A.M. (Camperdown).—"I want to make a three-valve loop receiver, and an enclosing circuit. Is the tuning condenser arrangement correct, and is the regeneration condenser in the right place?"

Answer: Yes; everything is O.K., imagining the loop to be an inductance coil, and you will see that the system is the same as a Reinartz. The centre tap should be taken to the positive filament.

A.J. (Leichhardt).—"I would a midget condenser be preferable?"

Answer: In place of what? A midget condenser may be used to control reaction.

Answer: "If so, how many plates?"

Answer: Eleven plates for a reaction midget condenser.

(3) "Would a crystal A be better than my carborundum crystal?"

Answer: No.

(4) "Why won't a carborundum crystal work?"

Answer: A batch of damaged crystals were recently on the market. I had some myself, and found they could be smoothed by sharply banging one end of the crystal with a hammer. If you would like to try another crystal, you will be pleased to hear that another consignment of these crystals has recently arrived in Australia, and these are quite O.K.

which is an ordinary three-valver with a grid and tickler coil. I actually got a new station on 16 last week, and I thought this was wonderful. Anyway, I have a few questions to ask. (1) When I connect the aerial on to the A terminal, the set refuses to oscillate, although it works all right with the earth to the E terminal.

Answer: Primary may be too large, or coupling may not be loose enough. Aerial may be too long for the primary used, or tickler may not be large enough.

(2) "What code station working between 30 and 40 metres sends out V three times (and very quickly), and then 8 once (also quickly), then he keeps on repeating V8 for about half an hour continuously?"

Answer: A commercial station carrying out tests. There are quite a lot of these stations to be heard on the 30 and 30 metre bands. They sometimes go for hours, though usually the station sends V three times, followed by its call sign three times. As you only heard "8," afraid we cannot help you.

(3) "I reckoned at that rate he would keep going for ever, because when I came back to the set in about an hour he was still contentedly sending out three V's and one 8. Have you any idea who this might be?"

Answer: No; sorry, but there are so many commercial stations carrying out similar tests. Perhaps you mistook the call sign for some call sign.

(4) "Could you give me the call signs of the beam stations around G-5W? I have heard a very powerful one on about 24.5 metres, then comes 5SW, followed by another beam station on about 26 metres. I am hoping you can solve my difficulties, and wish your paper every success."

Answer: The following are two of the beam stations that may be heard around 5SW: G.L.Q. Ongar, 24.5 G.H. Grimsby, 25.9; B.Y. and V.Z., 26.1, Victoria; also C.J. Canada. Thanks for your kind remarks.

C.H.A. (Undercliffe).—"Which in your honest opinion would be best—a charger or an 'A' eliminator?"

Answer: The charger in conjunction with your accumulator would be better.

(2) "I am using a four-valve accumulator, with four-valve valves with a 'B' eliminator for plate supply. What is your opinion of A.C. sets. Are they a success? What would you advise?"

Answer: A.C. sets are O.K., because 'C' valves are used in these receivers. If you felt doubtful about buying a complete A.C. receiver, you could easily change over your set to A.C. operation in about five minutes, and the Moors are advertising the apparatus at £10 complete.

H.T. (Annandale).—"Will you please give me a copy of the crystal circuit designed by your query answered for Mr. Y.E. Vance?"

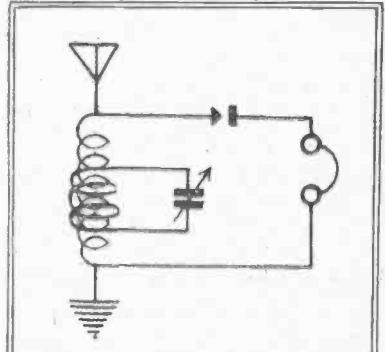
Answer: Circuit published below. Sorry it was missed out last week.

W.A.T. (Randwick).—"I have constructed the Extraordinary One-valver, and cannot get a sound from it. I at first wondered if I had wired it properly, and found it quite correct. I would be thankful if you could advise me as to any mistake I could have made in the construction."

Answer: Details are lacking—slightly! Still, first follow out the Trouble Chart (published recently in Queries Column); then see that (if a Jack is used) the leads are properly soldered. Test the valve, and see that you are making contact in the socket with all prongs. See that aerial and earth are attached and are making good contact; test grid-leak and condensers test "A" and "B" batteries; see that the "A" battery in use can supply sufficient current for the valve in use, i.e. do not use a "C" battery for filament supply for a 201A valve; thoroughly test all connections, and solder any that are loose; see that the rheostat winding is not broken; try another pair of telephones; make sure that plates of variable condenser are not touched; see that A plus or A minus is connected to B minus.

R.F. (Brisbane).—"What short-wave station is it that has a woman announcer? A man's voice can sometimes be heard in the background. A foreign language is used."

Answer: The station is ANE, Java. The man's voice you hear in the background issues from a loud speaker in the same studio, and is the voice of the announcer. The woman whom ANE have been carrying out experiments ANE has now changed its call sign to PLG or PLO, we are not quite sure which yet, and so no alteration will be made in the list of call signs until we have definite information.



A selective and voluminous crystal set, requested by "A.B." Lithgow, and many other readers.

F.D. (Lord Howe Island).—"As soon as I take my hand away from the reaction vernier dial the signal drops to 'phone strength. I am using a detector and two audios."

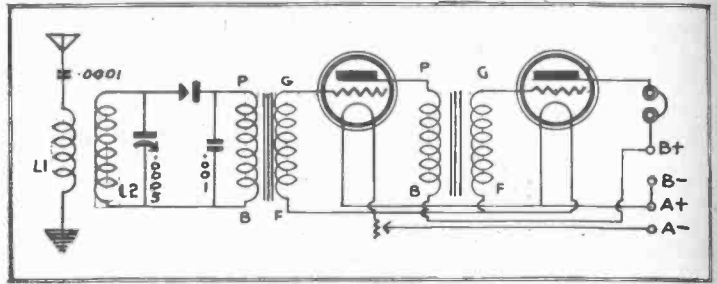
Answer: Reverse the connections to the reaction condenser.

O.K. (Bogabri).—"I have a two-valve Reinartz set, employing two 'Weco' valves (Peanut type) working on two two-volt and one 45-volt battery. The components are listed below: .0025 and .005 variable condensers; one fixed condenser with variometer across it in place of a leak; one Western Electric audio transformer; two rheostats; coil is wound of 24 D.C.C. wire on a three-inch former in a continuous winding with taps at 12 1/2, 30, and 12 1/2 turns. Earth to water-pipe 12 feet. Aerial about 80 feet long. A heavy baring sound comes in when tuning with reaction condenser. Originally I always left the reaction condenser on the 'fully open' position, and tuned with the .0025 aerial condenser, but now the reaction control has become more critical and needs careful control. Why is it different now from the original tuning? Would this set work a Baby Ampion speakers at 'phone strength? I am an interested reader of your Queries Column in 'W.W.' from which I have got considerable help. By the way, the aerial condenser tunes very sharply, and I have no trouble with that condenser. The reaction seems to be the trouble."

Answer: Presume you mean condensers of .0025 and .0005 mfd. capacity? If so, your coils are O.K., but if your condensers have the capacities stated, the grid coil is too large. The heavy baring sound may be due to a stiff condenser. If the shaft of this condenser is not clearing the panel, it will scrape against it, and cause vibration of the elements inside the valves, and this will set up the noise complained of. Also, it seems that your "B" battery is getting flat. This would help to account for the alteration in reaction tuning. Try for yourself. Tune in a station at full volume, then alter the "B" voltage on the detector. You will find that, in order to bring the station back to normal power, the reaction will have to be adjusted. If your receiver gives good head-phone strength, it will work with the Baby Ampion speaker. Glad you glean useful information from "Queries."

B.A.B. (Peak Hill).—"I have a three-valve set, and am using three Philip Miniwatts B406. Could I improve loud-speaker reception by using a B09 or B003 Philips valve or any other make? I am using a 60-volt Lissen "B" battery and three 1 1/2-volt Burgess batteries for 'A' supply."

Answer: The B003 and B004 valves require a six-volt filament supply, whereas you have only 4 1/2 volts. Never use valves of different characteristics in the same receiver. The reason why you are not getting full volume is because you are not using sufficient "B" battery. Connect a 22 1/2-volt "B" battery in series with the one at present in use, and use the high volume control on the amplifiers. When you renew your batteries, get two of 45 volts each.



A crystal set with a two-valve amplifier, that will give loud-speaker results. Published for "R.E.W." (Bondi), and other readers.

ledge in radio. You will soon learn to understand (the various terms used in radio if you follow the course.

(5) "Could you recommend something that would help me to learn the elementary stuff?"

Answer: "The Proving Radio" Club, c/o Mr. C. Y. Hook, 29 Blairgowrie Street, Dulwich Hill. There are several members in the club from Glebe, so I understand. Angus and Robertson and Swains, Ltd., have some very good elementary books, but they will not be absolutely necessary if you join the club, for "W.W." is your text-book.

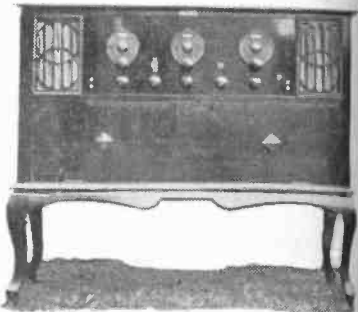
(6) "As an afterthought, how is a knowledge of the number of metres a guide to tuning in distant stations?"

Answer: The knowledge of a station's wave-length is little help. The only way in which this knowledge may be made use of is by comparing the relative position of a known station on the main tuning dial, then approximating the position of the desired distant station by comparing the wave-length. If you use a wavemeter, then the knowledge of the wave-length of the desired station, when used with the wavemeter, will enable you to set your receiver controls on the desired wave. Thanks for your kind remarks. This is the first time we have been advised that a reader buys "W.W.," though it is too technical for him!

L.T. (Neutral Bay).—"I have built the Screen Grid Browning Drake, and cannot get it to oscillate, except when a B406 is in the detector socket and the A415 is in the last audio stage. I have tried several different detector voltages with the same results. Would you tell me if this way of working valves is

correct, tune until the station has been tuned right out, or nearly so, then turn on the R.F. rheostat. Using the valves as at present placed will not harm the receiver in any way.

A.H. (Gular).—"What short wave station was it on telephone (music and conversation) from 5.30 p.m. to 6 p.m. on Saturday, February 9, who repeatedly called 'Hello, Hello, Sydney,' apparently carrying on a conversation with someone in Sydney?"



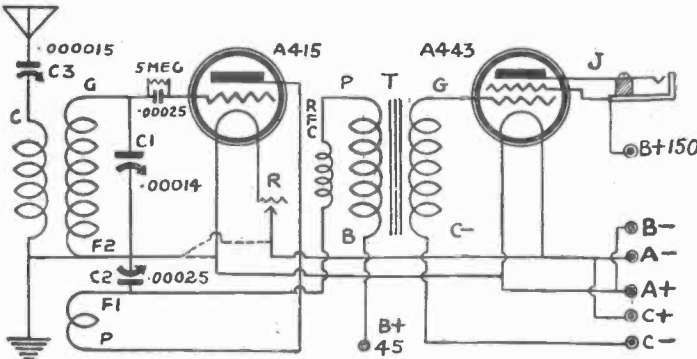
E. Richardson (Penrith) forwards the above photograph of his Marco 4, assembled in an old marble-top washstand.

He spoke in French, mentioned he was getting reception very well, and also that it was a very nice day. It appeared to be German. My adaptor is only new, and I am not conversant with the wave-length he was using. I have been taking "W.W." for some time now, and wish it every success."

Answer: This was the Berlin station at Nauert, and he was speaking to 2ME, Sydney. These two stations have been carrying on two-way telephony tests for some time now. Thanks for your kind remarks.

H.T.R. (North Sydney).—"I have a five-valve set detector, two radio-frequency, and two audio, three dial tuning. First dial tunes from a loop. I get 2FC, 2BL and 2QB ponderously, but 2KY, 2UE, and 2UW can hardly be heard. My chief trouble is that the centre dial causes fading sometimes when my hand is near it. At other times it steps the volume up. I cannot get inter-State. It is not a Neutrodyne. So you see, my hand alternately increases and decreases volume, just as the whim takes it. Can you diagnose from that crude description for me?"

Answer: Reverse the connections to the variable condenser in question. You say "The set is not a Neutrodyne," but you don't tell us what kind of set it is, so that we are unable to help you further.



A two-valve short wave receiver, requested by "D.X." Manly. The condenser C1 may have a capacity of .00015 or .00013, as desired.

The B405 is a power valve that will suit your receiver, but you must give a power valve plenty of plate voltage or it is useless. You should use an accumulator with three valves.

M.C. (Glebe).—"Having purchased a four-valve portable set, I am disappointed at not being able to tune in other than local stations—generally two at once, with an enormous amount of spluttering and cackling. I run my set off an accumulator and an eliminator."

Answer: You must not expect a four-valve portable receiver to pick up any but local stations. It has been done, certainly, but usually under conditions far superior to yours.

(2) "Why does the reaction control not act, except to shriek and whistle, when trying to decrease or increase volume?"

Answer: You are probably using too high voltage on the plate of the detector valve, or you have the rheostat turned on too far. Most portable sets are hard to manage as regards reaction, but with a slight loss of volume can be remedied by reducing the detector plate voltage. Portable sets rely a great deal on regeneration for volume. This is why reaction is generally so fierce.

(3) "There are numerous other faults I could mention if I knew how."

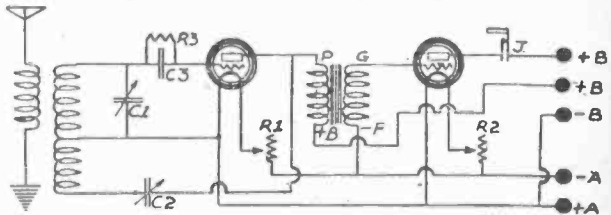
Answer: You should advise the makers of the receiver, who, in their own interests, would be only too pleased to advise you.

(4) "I look forward to 'Wireless Weekly' each week. I don't know why, as the names, terms, and explanations are so 'Dull' to me."

Answer: Come! come! "Proving Radio" is written specially for those who desire to further their know-

harmful to the set in any way? Set is more selective working this way. What should I do to make the set oscillate?

Answer: The valve in question may be faulty. Try a change of grid-leak, and place a 001 fixed condenser across the primary of the first audio transformer. If this fails, you will probably find that the set is not neutralised. To get the turn of the rheostat of the R.F. valve, then tune in a station to full strength, using as little reaction as possible, and removing any fixed condensers that may be in the aerial lead. Next, by means of the neutraliser



The two valve Reinartz circuit, requested by several readers. C1 has a capacity of .0005 mfd., and C2 a capacity of .00025 or .00035 mfd.

Radiotrons Valves

IN all respects, year after year, Radiotrons live up to their reputation for dependable results. Receivers fitted with Radiotrons are better equipped to reproduce the pure qualities of music and speech which only perfect valves can pass faithfully to the loud speaker.

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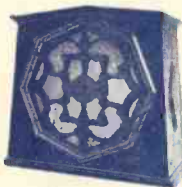
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