HISTORY of BROADCAST STATION 4CM

By Amateur Operator Thomas Elliott

(First Chief Engineer of 4BC).

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Station 4CM is owned by Dr. Val McDowall in Brisbane. The whole of the apparatus, both transmitting and receiving instrument, have separate rooms, and the control work is done in the receiving room. The aerial (an inverted "L" type using two cages) is erected on the top of Preston House, and the lead-in is taken through a window to the apparatus. No counterpoise is used in conjunction with transmitting aerial, as it was found after careful testing that a counterpoise was not necessary. The earthing is done to the water pipe which, in this case, makes a very efficient earth.

Station 4CM commenced broadcasting in February, 1921, on a wave length of 800 metres (375 KHz.) using an input of 20 watts, with a "T" type, having a fundamental of 350 metres. Four Radiatrons U.V. 202 tubes were used; two as oscillators and two as modulators. The tube filaments were lighted from accumulators, and a high tension was obtained from a motor generator which delivered 500 volts. Later, all tubes were used as oscillators. The radiation using plate control method was 1,000 milliamps, and when all tubes were used as oscillators, 1,500 milliamperes were obtained.

The operations of the station proved efficient, with hundreds of reports from all over Queensland, and thousands from local "listeners-in" in regard to their reception. Townsville and Innisfail have reported by letter the full programme. Letters were also received from all over New South Wales, Tasmania, and New Zealand reporting on the transmissions. A speech given by Mr. Gillies (Acting Premier for Queensland) was heard at Ocean Island, a distance of 2,000 miles.

Two hour concerts were broadcasted every Sunday night for two years. Mostly gramophone records were used, however, once a month special instrumental and vocal concerts were arranged. A studio was arranged in an adjoining room to the apparatus with a micro-phone being placed in the studio; no amplification was used during the experiments.

After 12 months it was decided to broadcast concerts from different theatres by means of a telephone line connected between the concert hall and the broadcasting station. First it was decided to broadcast the Aladdin pantomime, being played at the Opera House. Arrangements were made with the management of the show and the Post Office for the use of a special telephone line, with an amplifier loaned from the Brisbane Electrical Co. At the theatre, an ordinary micro-phone, with the mouthpiece removed, was placed in position to the stage. Reports were received congratulating us on our work from North Queensland and New South Wales. This was our first attempt at using landlines for broadcasting.

The next performance we tackled was the Fleet concert, held at the Exhibition Hall, using the experience we reaped from the Aladdin pantomime. The Post Office officials were very good to us in loaning a special micro-phone and stand. The broadcasting of this concert was very fine, and from the station end of testing we thought it 100 percent efficient using amateur apparatus. The third was a broadcast of the Newcastle band with thirty instrumentalists, which was played in the same hall the following night. The micro-phone was 50 feet away from the band, which was the best position. The fourth performance was the Apollo concert, also held at the Exhibition Hall. The first half of the programme was fine, but, alas! In the second half, the local microphonic batteries ran down and the items faded away.

From December 1922 experimental work was carried out using short-waves, as it was found that the best results were obtained when the transmitting wave was equal to the fundamental of the aerial. This was overcome when using an aerial that had a higher natural period than that of the transmitting wave by inserting a condenser in series with the aerial. A heavy choking system was used with a 400 volt generator, which gave a 300 volt drop after passing through windings of the choke coil, giving 100 volts as working voltage. The input being two watts, and the radiation being 100-150 milliamps. Good results were obtained from using receiving tubes as oscillators, and the resulting modulation was far superior to that obtained when using power tubes. Two Radiatron U.V. 201A tubes were used, feeding 12 volts to the filaments, keeping a constant electronic emission as the tubes were not stable using lower voltages.

From 7th December, 1924, until 25th February, 1925, the station was equipped for broadcasting purposes and financed by Brisbane Radio Dealers. During this period the station operated from three landlines connected with the studio, situated in the Shulz Player Piano showroom, the Tivoli Theatre, and the Trocadero Desant, from which the concerts were broadcasted. It is only fair to offer our sincere thanks to the Modern Player Piano Co. for the loan of their showrooms for studio purposes. They placed their handsome parlour at our disposal three nights a week without any kind of payment. We feel sure that listeners-in will readily appreciate this generous act. The management of the Tivoli Theatre and Trocadero Desant have also been very good to allow their excellent music to be broadcast free of charge.

The transmitting apparatus consists of three panels; oscillating, modulating, and amplifying. The oscillating panels encase the coupling coils, condensers, transformers, tubes, and the tube filament controls, with an aerial meter and coupling dials filament voltage meters. The high tension panel with plate current high tension voltage, high frequency chokes, and by-pass condensers are behind. Next is the D.C. controlling switch board, operating the battery charging with fuses and regulating switches. The high tension voltage is obtained from a 500 volt D.C. shunt wound G.E. generator, having a 60 seg. commutator, belt driven at 1,500 R.P.M., with a half horse power D.C. motor. The transmitting apparatus is housed in a six foot square room with all controls being operated from the four foot square testing and receiving room next door, which houses the amplifying panels, receiving apparatus, micro-phone, and transmitting controls, with the relevant meters. For short-wave, a low capacity condenser has been placed in series with the aerial to reduce the wave length. When playing gramophone records, a tone arm operating with one amp at six volts is used with the micro-phone metallically connected to the tone arm, obtaining 90% of the records vibrations.

In closing, we take this opportunity in expressing our sincere thanks to all of those who have "listened-in" to 4CM, and especially those who have by letter or telephone sent words of appreciation. After all, 4CM is only a licensed amateur broadcast station, but we have endeavoured to broadcast worthy programmes, and have spared no effort to this end.

From the book "*Australian Radio History*" by Bruce Carty Ph.D.