

## USE THIS SOUVENIR NUMBER TO SPREAD THE JOY OF RADIO.

*Induce others to join the circle of listeners that they may enjoy  
 & what you enjoy and in sharing your pleasure add to yours &*

and it is here that the wave is generated in the first instance. The master oscillator is mounted in a shielded wood box at the rear of the panel, and consists of a 50-watt tube working in a Colpitts circuit. The circuit is adjusted to the operating wave of the station, and the radio frequency output is applied to the grid of another 50-watt or master separator tube. This tube works into a non-inductive potentiometer from which the power to the modulated amplifier is tapped off at the desired point. The modulated amplifier is of 250 watts nominal rating, and is the first tube in the series on which any modulation is impressed, being coupled by the Heising system to the 250-watt modulators; the modulators in their turn give the amplified output of a 50-watt speech amplifier which is operated from the input from the studio end. From here—the modulated amplifier stage—the system works as a modulated radio frequency amplifier, and the output is tuned and passed to the second stage of amplification, consisting of four 250-watt tubes in parallel. After working into its tuned circuit, the output of this stage is passed overhead to the power amplifier unit.

**Rectifier Unit.**

This unit comprises three water-cooled rectifier tubes, which are mounted on a platform with the associated filament lighting transformers underneath. The purpose of this rectifier is to convert the H.T. alternating current from the three phase high tension transformer, into pulsating direct current. As the filaments of the rectifier tubes are at approximately 10,000 volts above earth potential, the filament transformers and circuits are specially

insulated to withstand this voltage. The plate current of each tube, and the rectified voltage are shown on the meters on the front of the panel. Beneath the window may be seen the water pressure gauge, which indicates the pressure of the tube cooling water, and which is also provided with contacts to cut off the power should the water vary beyond certain limits.

**5. Power Amplifier Unit:** This unit consists of two water cooled tubes each of nominally 10 k.w. rating. The grids of these tubes are excited from the modulated output of the oscillator modulator unit. The plates of the tubes are operated at 10,000 v., and cooling is accomplished by means of a flow of water conducted through a coiled rubber hose. Owing to the fact that the water supply system is not insulated from ground, the hose interposed between the plates and the main water system provided a water column of relatively high resistance, and prevents leakage of the plate supply.

**6. Tuning Unit:** Here are contained the necessary tuning circuits in connection with the tubes in the power amplifier stage, as well as the antenna tuning. The controls for these circuits are arranged on the front of the panel, as also are the closed circuit and antenna ammeters.

AT the rear of these six panels are placed (a) the three-phase high tension transformer for supplying the rectifier unit; (b) the filter choke and condenser system for smoothing out the pulsating D.C. from the rectifier unit; (c) an artificial antenna consisting of an inductance capacity and resistance suitably adjusted to simulate the characteristics of the actual antenna, and used for the purpose of

testing the apparatus without the necessity of actually going on the air.

The whole of the sides and rear of the equipment is enclosed in an expanded metal cagework. Access to the interior is by means of a door provided with a device which automatically cuts off the power should the door be opened while the plant is in operation.

The antenna system consisted originally of a four-wire flat type T, with a cage down lead.

This has recently been changed to a single wire antenna of the multiple tuned type. The lead-in comes through the roof almost immediately above the transmitter through a 110,000-volt lead in bushing. No counterpoise is used. The ground system, which consists of a fan-like arrangement of buried earth wires, has proved satisfactory.

**Recent Adjustments.**

CONSEQUENT on the visit of the Chief Engineer to the United States, certain adjustments were made at 2YA. It had previously been noticed that with 2YA it was impossible to increase regeneration at the receiver beyond a certain point without the reproduction losing its crispness. The cause of this was considered to be due to the fact that regeneration was occurring in one or more of the stages of amplification of the transmitter, thus tending to cut off the sidebands to a certain extent before transmission. The cure for this was obviously to neutralise the various stages. A certain amount of experimental work had to be done before a satisfactory method was evolved, but the final results were all that could be desired, and after neutralising all stages the reproduction became crisp and lost the "double wave" effect which had occa-

sionally been noticed by some listeners. The neutralising condenser for the final stage of amplification may be seen in the photograph on top of the power amplifier unit.

As this condenser is in the high potential circuit, it was necessary to have this specially constructed for the purpose.

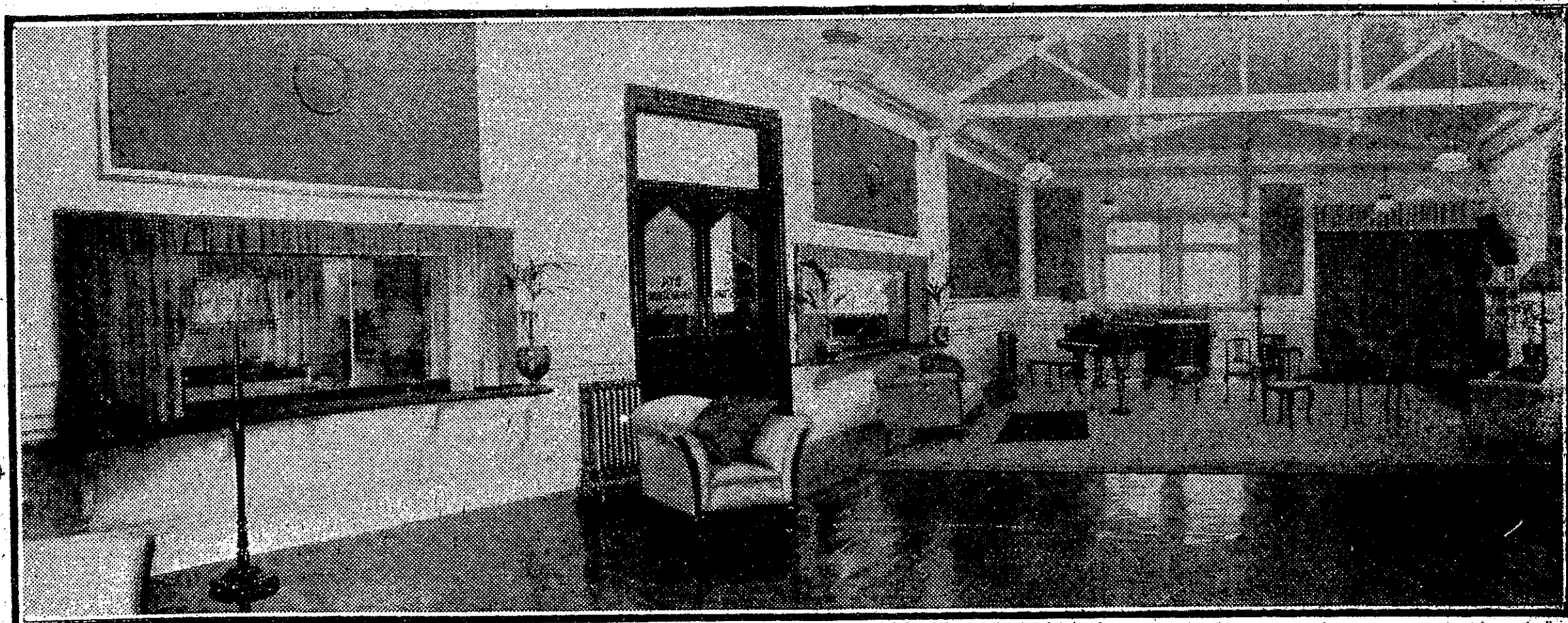
In order to improve the power handling capacity of the modulator circuits, the number of modulator tubes was doubled, and here the effect was obtained of allowing a larger percentage of modulation without the possibility of distortion due to grid current.

**New Antenna.**

ONE of the developments noticed in the United States was that there was a tendency to do away with flat top antennas and use instead single wires or small cages. The advantages of this type are that there is no necessity for energy absorbing spreaders and sway guys, and the lighter antenna can be pulled up much tighter than the multiwire type. There may be a certain reduction of capacity and consequently effective height in the single wire, but this is compensated for by the fact that the physical height is increased. This modification was, therefore, made to the antenna at 2YA. The original flat top was removed, and a single wire antenna was substituted, insulated with a special type of insulator, similar to that used at WJZ and other high-power American stations. This single wire was used as a T type for a few weeks, and then changed to the multiple-tuned type with three tuned down leads.

**Multiple Tuning.**

A WORD here regarding multiple tuning may be of interest. With (Continued on page 19.)



Panorama of the Grand Studio of 2YA, Wellington. This studio is particularly capacious, and is handsomely furnished throughout. It was in this room that the studio was officially opened by the Prime Minister on July 16, 1927, in the presence of a distinguished gathering. Photo. Crown Studios.