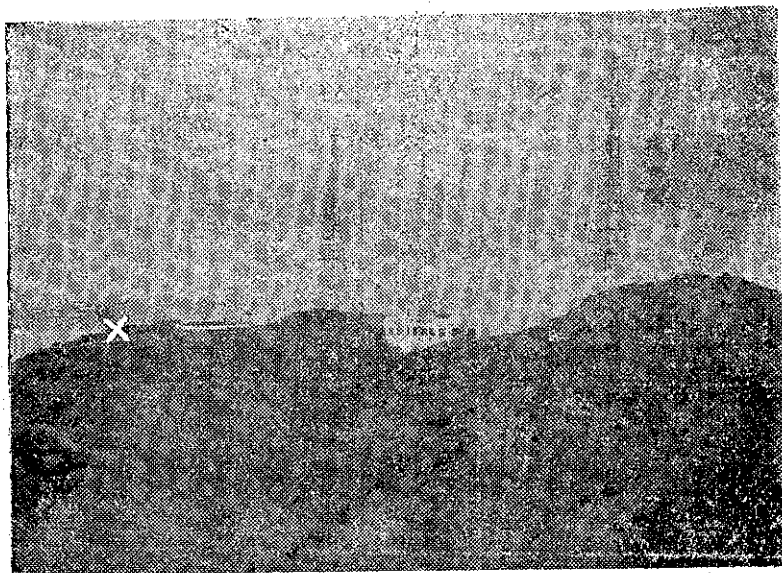




2YA's Transmitting Masts on the top of Mount Victoria. A new mast for "2YA Auxiliary" has been erected at "X".

MANY Wellington listeners will no doubt have noticed that recently 2YA's two transmitting masts on the summit of Mount Victoria have been joined by a third smaller one, standing to the northward. This mast, which is 100 feet high, has been built to support one end of the aerial of the new 2YA auxiliary station. The other end will be attached to one of 2YA's masts. Unlike its taller brothers, which are of steel, the new mast is built of oregon, in three sections, well stayed to withstand the terrific gales which often sweep the summit.

"2YA Auxiliary" is intended primarily as a standby in the event of breakdown of the larger station or of failure of the mains supply. In such an event, the new station will be supplied with power by an oil engine directly coupled to an alternator, which develops the same voltage and frequency as the power mains. A simple switching arrangement enables a change-over to be made in several minutes. The studio equipment has been duplicated at the main studio in Featherston Street and at the transmitter on Mount Victoria, so that the station may be operated from either. Both transmitters can be operated simultaneously on separate programmes from the main studio.

In order to ensure that the transmitter is kept in good running order ready for any emergency, it will be placed on the air for approximately one hour each day—between 7 and 8 in the evening. The transmission will be on 1010 kilocycles (297 metres). All that remains to do now is to suspend the aerial system and connect it to the transmitter, so, all being well, the station should be on the air within a week.

An interesting contrast is afforded between 2YA's transmitter, which was installed six years ago, and the new transmitter, embodying the latest improvements, which stands alongside it. Not only is the new plant, which was manufactured by Amalgamated Wireless (A/asia.), Ltd., far more economical and efficient than 2YA, but the quality of its transmissions will be superior.

Both high and low note response of the new station is much better than that of 2YA. The frequency response claimed for the old transmitter is from 50 cycles to 7000 cycles per second, or roughly from about the tenth lowest note on the piano to the fourth highest. This appears to be a wide enough range, yet it must be remembered that every note from any instrument is not absolutely pure, but contains overtones and harmonics of varying higher frequencies which give it its characteristic sound. These enable us to detect the difference, for example, between a note played on the piano and the same note played on a violin.

With 2YA's transmitter, all harmonics and overtones are practically cut off above 7000 cycles, but with the new station the range is extended to 10,000 cycles per second. In the lower register, too, the range is extended downward. 2YA's lowest frequency response is about 50 cycles, but the auxiliary plant will reproduce notes as low as 30 cycles per second, resulting in more faithful reproduction of bass notes. With most modern receivers, reproduction of the new station's transmissions will be unusually life-like, but with older sets very little difference will be noticed, because many of them are incapable of reproducing any note outside a limit of from about 100 to 4000 cycles per second.

Another attractive feature about the new transmitter is the depth of modulation it is possible to obtain—a full 100 per cent., without distortion. With the older type of transmitter such as that employed by the YA stations in other centres, the maximum percentage of modulation permissible is about 50, because if greater depth is attempted distortion results. 2YA, which was built a little later, is capable of about 70 per cent.

"2YA Auxiliary"

Latest in Transmitting Equipment

The main advantage of deep modulation is that greater coverage at higher quality can be obtained with less power. A bigger percentage of the energy radiated is used to bring speech and music to receiving sets, and this is why "2YA Auxiliary," which has a power of 200 watts aerial energy, will have a slightly greater field strength than the old transmitters, 1YA, 3YA and 4YA, which all have a power of 500 watts aerial energy. In other words, other things being equal, a listener in Christchurch will be able to hear "2YA Auxiliary" at slightly louder strength than a Wellington listener would hear 3YA.

The improved frequency stability of the new transmitter is another important feature. Originally the frequency (or wavelength) on which 2YA worked, was kept constant by means of a master oscillator valve. After a year or two of service, crystal control was installed, but no provision was made for keeping the crystal at a constant temperature, which meant that any appreciable change in temperature resulted in a slight alteration of the station's wavelength. The new station has crystal control, and the crystal is automatically kept at a constant temperature by means of a thermostat.

FOR the more technically-minded reader, additional frequency stability is given by two buffer stages between the crystal and the modulated amplifier. This prevents any dynamic instability, or variations of frequency with modulation. If no provision is made for this, distortion results which is noticeable more by distant listeners when the ground waves and the sky waves are being received at equal volume. Also, if these waves are being received out of phase, mushiness results. This is apart from the mushiness and distortion caused by selective fading, which results when the Heaviside layer reflects some frequencies in different degrees from others. This particular type of distortion is to a large extent unavoidable, but fortunately it is most evident only in a belt from 50 to 100 miles from the transmitter, depending on the wavelength employed.

The new station is very economical, due both to the high percentage of modulation and to the fact that no moving machinery is used to supply power, which is converted direct from the city mains to the required values by means of rectifiers of various kinds. Of late years there have been many improvements in the design of rectifiers, the mercury vapour type particularly being much more efficient than those used at the time 2YA was designed. This means that the power required for the new transmitter will be used much more effectively than in the case of 2YA, which is powered partly from motor generators and partly from earlier-type rectifiers.

THE signal from the microphone or pick-up in the main studios at Featherston Street passes through a mixing panel, incorporating a five-stage amplifier with suitable volume controls and indicating meters, to the connecting line to the transmitting station on Mount Victoria. At the transmitter it passes through an equaliser, which is installed to ensure an even frequency response, and is then passed through another speech amplifier of two stages, the last of which is the modulator. The carrier wave is developed in the crystal stage and then passes through two buffer stages to the modulating amplifier. At this stage the signal from the modulator is introduced to the modulating amplifier, and the two are combined, the resulting signal passing through a linear amplifier into the aerial.

"2YA Auxiliary," which is intended primarily as a standby in the event of breakdown of 2YA or failure of the mains supply, will operate on 1010 kilocycles (297 metres), with an aerial input power of 200 watts. Transmissions are expected to commence within the next week.