AT LEFT: Radio New Zealand's transmitting station at Titahi Bay, showing the present aerials for the Australian Service

"JAPAN was in winter. I was very joyful to report your station. If you will for the north pacific beam. We shall be pleased and become more familiar with your programmes. We are go eat your butter behind the war. good by remote friends."—Y. Ishida, Tokyo, Japan.

The English may not be the best but there is no doubt that Y. Ishida was full of joy at hearing Radio New Zealand, and to prove he did hear it, he logged the programmes on January 9, 1955, along with helpful comments on reception, all of which he sent to Radio New Zealand—a practice common among hams.

This was only one of the letters received from Japan, the United States, Denmark, Mexico and elsewhere. To take another case, Charles M. Arnold, of Melrose Park, Illinois, who picked up Radio New Zealand, wants to know more about this country, so he will receive pamphlets and other information.

Mr. Arnold and many like him will also hear plenty about New Zealand in the programmes which are compiled by Ken Avery and contributed to by Programme Section at 2YA and the Talks Department. These include musical recordings by local artists, documentary features on New Zealand (a recent one was on whaling in the Cook Strait), special sporting commentaries and bulletins, features like *Song and Story of the Maori,* New Zealand news bulletins, and four talks a week. Incidentally, Radio New Zealand is always on the lookout for talks—they should be based on personal life in the Dominion from high country mustering, to trawling for flounders in the surf on the Waikuku Beach, to being a housewife in an Auckland suburb.

Beams that Hop

Some of the technical side of Radio New Zealand was explained to *The Listener* by A. S. Chisholm, the engineer most concerned with the station's transmissions. You can imagine an aerial as functioning roughly like an electric light bulb. If the bulb is naked the rays are dispersed at all angles; if, however, a reflector is placed behind the bulb as in a torch, a concentrated beam of light is thrown out. So, too, by erecting two suitably designed "curtains" of aerials one behind the other, radio beams can be directed in any desired direction with any desired degree of concentration.

When the present aerial project is completed at Titahi Bay, there will be five aerials directed to Australia and another five at the Pacific Islands to the north of New Zealand. Each system will cover the 6, 9, 11, 15 and 17 mc. bands. At present, proper aerials have only been available to Australia on 9, 11 and 15 mcs. with temporary aerials in use elsewhere. Incidentally, Radio New Zealand operates as an Overseas Service not as a Home Service, though sometimes conditions are such that it can be heard here. Blanketing the earth is the ionosphere. When an upward directed, high-frequency beam reaches it, this ceiling acts as a conductor bending the beam back to earth, from which it again rebounds. Thus the beam moves across the surface of the earth in a series of hops, and the best position for a receiving set is, of course, at the base of such a hop.

Sunspot Problems

The higher the frequency, the shorter the wavelength, and in general the aim of shortwave broadcasting is to use as high a frequency as possible. Unfortunately, it is not possible to select a high frequency and stick to it constantly. Several factors govern what frequencies can be used. First, there is an 11-year sunspot cycle—when the sunspot activity is low the frequency must be kept low, too, but, as the activity increases a higher range of frequencies can be brought into use. June of last year saw the lowest point of the cycle when there was virtually no sunspot activity.

That is the long term variation. The short term changes are due to the nightly lowering of the effective ionospheric ceiling which enforces lower frequencies. A third variable is seasonal. Due to the longer hours of darkness, the winter months again enforce lower frequencies.

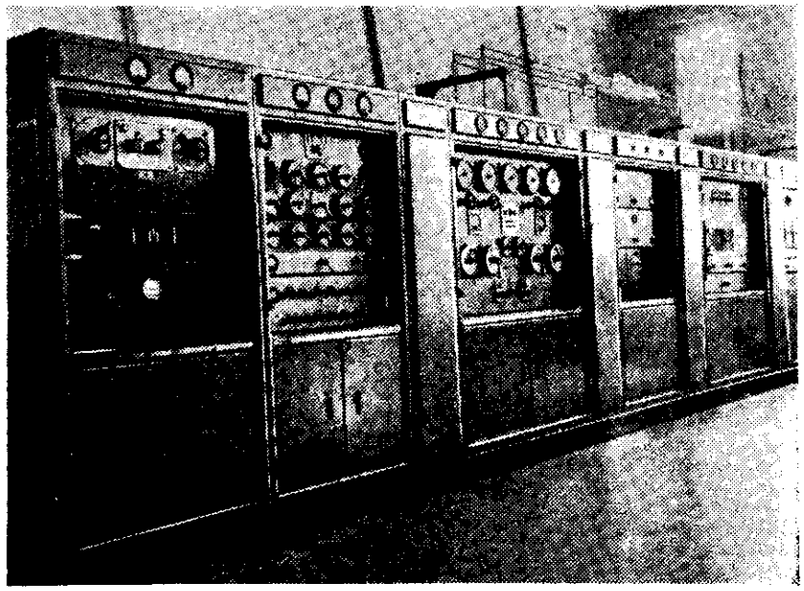
Theoretically, these variables can be used to predict virtual heights and critical frequencies of the ionospheric layers. Thus it is possible to calculate the Maximum Usable Frequency (MUF) and the Absorption Limiting Frequency (ALF) between which extremes lie the operational frequencies.

Reports in Code

But here again, further complications intervene. Radio New Zealand uses two 7.5 kilowatt transmitters compared with, say, Radio Australia's 50 and 100 kilowatt transmitters. Now, certain narrow bands are allotted to shortwave broadcasting and the number of stations wanting to broadcast is really greater than the number of channels available. Also, more powerful stations, although keeping within their own channels, can blot out a weaker station. For this and other reasons, frequency selections according to the above three factors are used in conjunction with certain operational data sent in by observers in the areas beamed to by Radio New Zealand.

These reports, which come from Fiji (both Suva and Nandi), Tonga, Samoa, Niue Island, Rarotonga and Raoul Island are in SINPO code—S for signal strength, I for interference, N for noise, P for propagation disturbance, and O for overall rating. They are made hourly for the first three days of each month.

On the basis of these reports and other experience gradually being accumulated, and by using the new aerial equipment, Radio New Zealand hopes greatly to improve its service to the Pacific Islands, to Australia, and elsewhere.



RIGHT: One of the 7.5 kw. high frequency transmitters used for Radio New Zealand broadcasts to the Pacific Islands and Australia