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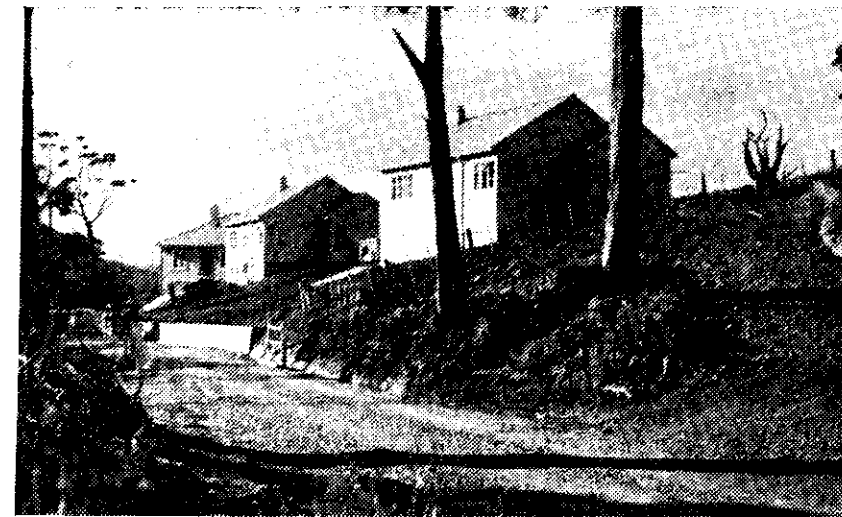
is marred by interference. The Quartz Hill technicians then search round for a clearer station which may be re-transmitting the same programme over another route. Possibly the station at New Delhi, which is frequently received strongly in New Zealand, is carrying the programme required, and it may be better to take it straight from New Delhi by relay.

For radio reception, obviously the aerials are of first importance in so far as they provide the means of pick-up. Among those at Makara are three types—doublet, VEE and rhombic. The staff has a soft spot for the rhombics, which are like huge horizontal diamonds, strung from 70ft. masts. Incoming waves can be blended under what is known as the diversity system, using several different receivers and aerials at the same time, with the result that any programme can be fed to the studio and put out by 2YA with a minimum of surging and interference.

### A Watch Round the Clock

A twenty-four hours' watch is kept at Makara, with London generally as a focal point, so that any news flash received can be recorded immediately. Conditions of reception are regularly noted in a log-book and cabled periodically to London. Thus a mass of information is built up. From this the BBC can decide the best times for broadcasting to New Zealand and the best frequencies and conditions under which the transmissions can be made. The choice of suitable wave-lengths or frequencies is subject to continuous research, always striving towards the goal of perfection.

Charts showing the quality of reception of the various overseas broadcasts are kept, with what is known as a "merit" figure ranging from 0 to 5. On this scale, a particular reception classed as 4 is very good, while 5 would be perfect. The story told by the log varies with the times of the day. At 8 p.m. reception from the United Kingdom at the



Some of the houses occupied by the staff. The receiving station is a quarter of a mile along the road leading to the right.

present time of the year begins to fall off, and from then on until 2 a.m. is usually poor. Then, from 5 a.m. to 7 a.m. it is at its best. These times are subject to regular seasonal changes.

### Sir Echo's Grandfather

It will be seen that the source of our overseas radio reception involves a great deal more than turning a switch and letting the senders do the rest. The whole course of the radio waves is noted and the best routes planned. Occasionally there is an "echo": that is, the listener hears each sound again a seventh of a second later. During this short period the wave has travelled round the world, back to its starting point and continued on to the receiving station a second time, or in some cases, even more.

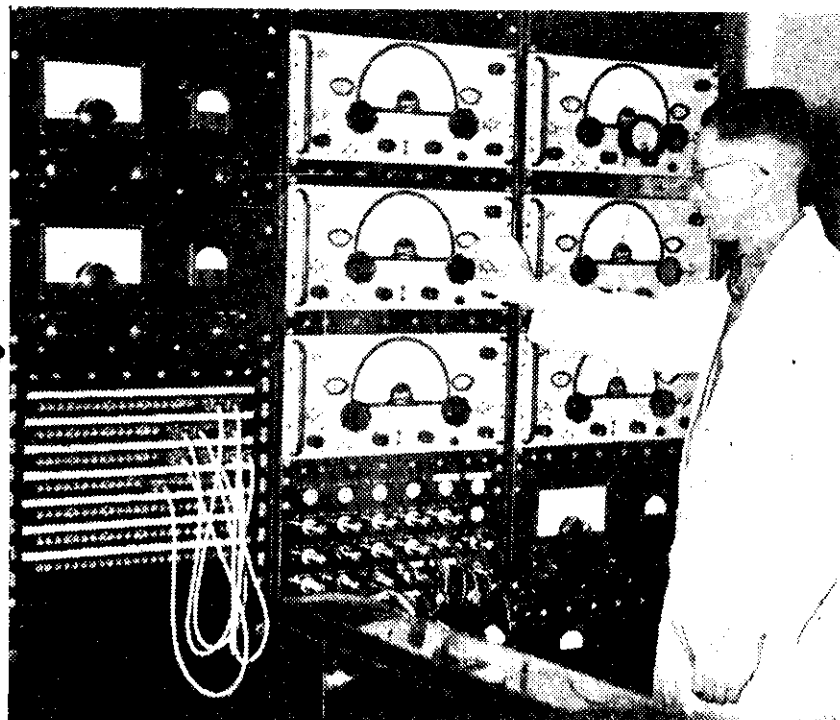
Makara uses all sources for the best reception. "The old days of working on the blind are over," as one technician put it. There is a world-wide organisation which investigates and predicts

radio conditions to enable the best frequencies to be used. This is analogous to weather forecasts which mean so much to the planner of outdoor activities. All sorts of unpredictable things can affect radio and a constant observation is maintained.

### A Touch of the Sun

Sunspots, it is well known, have a marked general effect on reception during their eleven-year cycles. Severe sunspot activity causes unstable receiving conditions over a period of several days and frequently causes complete fade-outs for a limited time.

A large proportion of the Makara equipment was assembled by the NBS technical staff who, naturally, take the greatest interest in the results of their work. Not far from Quartz Hill is a settlement of attractive houses for the staff. There is a good road from the settlement to the station and the men and their wives have formed a compact little community of their own. There is a competitive spirit among the gardeners, whose plants are sheltered by a strip of native bush which, so far, has been disturbed as little as possible. And what is of particular interest to the visitor from the city is the collection of dry firewood in the basements of the houses.



Six of the seven short-wave receivers are shown in the photograph. They are the units with white panels. The seventh receiver is at the right of the operator's desk in the foreground.

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