Radio & The IGY

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auroral activity, will be received by the six recorders which will measure the strength of the signals and also give some indication of the number of bounces (skips from earth to ionosphere) they have made on the way from Scott Base.

Another form of research into the aurora will be conducted by the Physics Department of Auckland University College. This will be the operation of equipment that will measure the angle of arrival of waves from distant transmitters. This research should tell whether waves go around the auroral zone when the shortest path is through, or whether, in fact, they do go through.

The aurora is an electrical disturbance caused by particles from the sun concentrating at the North and South magnetic poles and exciting the gases in the air—an effect similar to that occurring in a neon tube. But the visual disturbance of waving banners and streamers doesn't necessarily coincide with the electrical disturbance, we were told, so measurements will be made of both to learn more about their relationship. This will be done at Awarua Radio Station (headquarters of the I.G.Y. team) and at Bluff Hill.

At Awarua a spectograph will analyse the colour of the auroral light. From this analysis information can be gained about the reaction between the auroral particles and the particles of the upper atmosphere. This work will be done by a team from the Carter Observatory.

Bluff Hill will be the site of the D.P.L. auroral radar equipment used for measuring the electrical disturbance produced by the incoming auroral particles. Radar, being unaffected by daylight or cloudy conditions, is a valuable tool in the study of the aurorae.

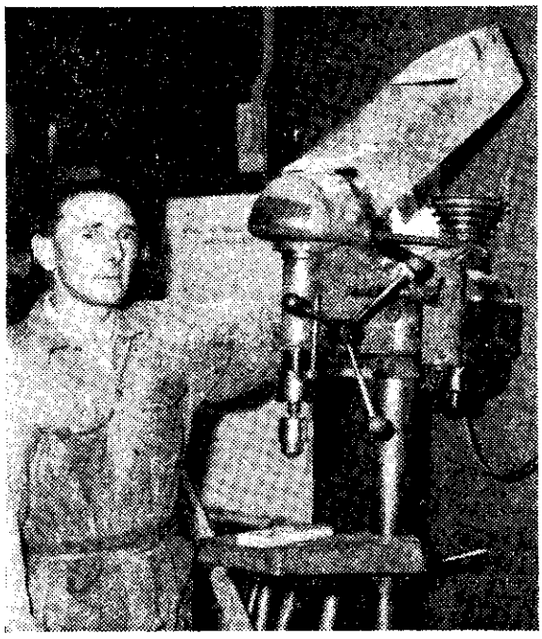
Of the hundreds of "panoramic ionosondes" working all over the world during I.G.Y., New Zealand will be responsible for four. Three of these are of a new type developed and designed by D.P.L., and built by the Canterbury College Industrial Development Department.

A panoramic ionosonde is a device for making a panoramic sounding of the ionosphere. With a marine echo-sounder the time taken for the sound to reach and return from the sea bottom is intepreted into figures for depth. Similarly with the ionosonde, the time lag in the departure and arrival of a pulse indicates the height of the reflecting layers. To get a comprehensive or *panoramic* picture signals are sent and received through a range of frequencies. Thus a nearly instantaneous picture is received of the reflection heights of the various frequencies up to about 250 miles up where the highest frequencies disappear into space. A high speed of operation is necessary in the ionosonde's sweep through the frequencies, first for accuracy, secondly so as not to interfere with normal communications. The three special New Zealand models, for instance, sweep through the frequency band from one to twenty-two megacycles in a space of seven seconds.

Since the effective upper limit of panoramic ionosonde as a research tool is 250 miles, some other method of finding out something about the region beyond is necessary. This method seems to lie in the study of radio "whistlers." These "whistlers" are noises that occur among the crackles and bangs of static heard on a low-frequency radio receiver. One expert at D.P.L. compared them with the second half of a wolf whistle—a sound starting in the high frequencies and going right down. Whistlers heard in New Zealand either originate here or on the other side of the earth, in the vicinity of the South Coast of Alaska. A lightning flash, similar otherwise to those in any thunderstorm, may have the special quality that creates the radiation to send a whistler away out into the atmosphere along the lines of force of the earth's magnetic field and then down to a receiver in New Zealand. Some of the whistlers heard here have started near New Zealand and have been reflected back from Alaska. By an analysis of the characteristics of these whistlers (through the rate of change of pitch) it is hoped that information will be gained about the charged particle density of the outer atmosphere and the strength of the earth's magnetic field.

Though this line of research deals with activity that is not merely hundreds but thousands of miles away from the earth it is still as important as research into the closer atmosphere, for the forces that give rise to the ionosphere and related phenomena appear to have their origin at least as distant as the sun.

Whatever else it achieves, then, in the fields of science and international co-operation, I.G.Y. should at least remind us that the world we live in is not merely the earth, but the universe.



DESIGNED and made in a big Auckland maintenance shop, here's one safety guard that won't be left out of position when a belt adjustment is made—it must fall down into place. "Safety in Industry," a programme about the work of the National Safety Association of New Zealand, written and produced by Arthur E. Jones, will be heard from 1ZB on Sunday, March 31.