A STUDY OF DILATATIONAL WAVE VELOCITY IN THE EARTH AS A FUNCTION OF DEPTH, BASED ON A COMPARISON OF THE P, P', AND PcP PHASES

by

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EPICENTER OF THE HAWKE BAY (NEW ZEALAND) EARTHQUAKE AND TRAVEL-TIMES OF CONDENSATIONAL WAVES

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On February 3, 1931, the North Island of New Zealand was shaken by one of the most severe earthquakes experienced there within the memory of man. The earthquake, which had its origin beneath Hawke Bay on the east coast of the island, began at about $10^h\ 46^m\ 46^s$ a.m., local New Zealand time (February 2, 1931, $22^h\ 46^m\ 46^s$, Greenwich Meridian Time), and was felt as a swaying motion over the whole of New Zealand (1). Some two hundred and fifty persons lost their lives in the disaster and about fifteen hundred were injured. Property damage due to the earthquake and the fire resulting therefrom amounted to from fifteen to twenty-five millions of dollars (2). The towns of Napier and Hastings were almost totally destroyed, and very severe loss was also suffered at Greenmeadows, Taradale, Scinde Island, Havelock North, Gisborne, Woodville, Waipikurau, Wanganui, Waipawa, and Wairoa. The intensity of the shock measured by the damage wrought and by other macroseismic evidence in the district would doubtless be placed at X in the Rossi-Forel scale of intensity (2). Further indication of the severity of the shock is given by the exceedingly large amplitudes recorded at stations in the neighborhood of the antipodes of the epicenter; some of these attained a range of eighteen centimeters for the double amplitude.

This earthquake was chosen as the subject of a detailed investigation, not only because of its intensity and the clear records it produced, but also, and especially, because there is in the region of the antipodes of the epicenter a wealth of European stations with excellent instruments and accurate time. These facts make it possible to obtain much valuable information concerning the phases which are recorded in and beyond the shadow zone.

A total of 113 groups of records were received from as many sta-