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tremors caused by slight settling movements on the various faults in the vicinity of the Lyell Range.

The Murchison Earthquake was a typical product of a sudden movement affecting earth-blocks near the earth's surface. In just the same way, the destructive San Francisco earthquake of April 18, 1906, was caused by an abrupt horizontal movement of about 20 feet along at least 270 miles of the San Andreas fault—a major visible earth fracture bounding one of the western mountain ranges of California. In other cases, the source of the shock is a more deep-seated movement, and there is no accompanying displacement at the surface itself. But in comparison with the radius of the earth (some 4000 miles), the majority of earthquakes of destructive violence originate at very shallow depths—not more than 30 miles below the surface. There are also earthquakes of a much less spectacular nature that originate at depths of as much as 400 miles, and which are termed deep-focus earthquakes.

Surface Effects

An earthquake, then, is a vibration set up in the earth's crust as a result of some abrupt dislocation of earth blocks in the outer part of the earth's crust. What are its effects at the surface? Most obvious of all are the effects upon man-made structures such as buildings, tunnels, dams, etc. In a rough scale of intensity designated by the numbers 1 to 10, a shock of intensity 1 is almost imperceptible, except by instruments. One of intensity 5 is felt by all persons who are awake at the time, disturbs furniture, sets the electric light bulb swinging, and may ring church bells. Intensity 8 is indicated by falling chimneys and cracking of brick buildings, while widespread destruction of buildings and disturbance of the ground occur at the maximum intensity. 10. Structures built of steel or reinforced concrete, and purely wooden buildings are capable of withstanding the stress of vibration and hence survive, when brick or stone structures are levelled to the ground. Other things being equal, buildings erected on solid rock are much less vulnerable than those built on water-soaked sands and gravels. This is one of the reasons for the great damage caused to buildings at Murchison and outlying farms in that district, for the township itself and many of the farms are built upon the gravels of the Buller and tributary rivers.

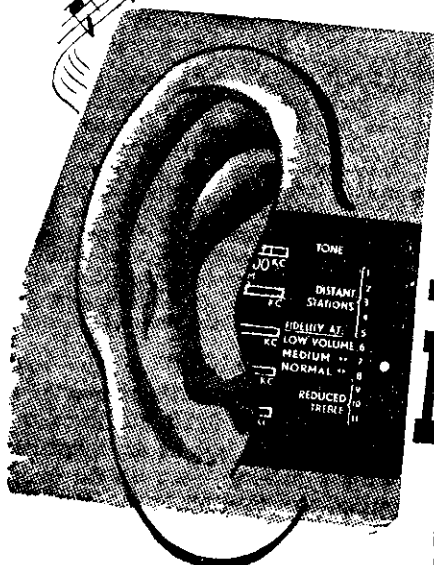
"Tidal Waves"

In steep, hilly country, especially where a high rain-fall keeps the soil and sub-soil in a water-logged condition, landslips commonly occur as a result of earthquakes, as the slip-scarred hills around Murchison still testify 15 years after the great earthquake. Then, in connection with submarine earthquakes, there is the possibility that the nearby sea coast will be swept by the destructive inundations popularly mis-called "tidal waves." These have no connection with tides. But they are due to the shoreward surging of immense waves—some 40 or 50 feet high in some cases—that are set up in ocean waters by the vibration of the sea floor beneath. Curiously enough, these waves are almost imperceptible to ships out at sea, for the distance from crest to crest may be a hundred miles or more.

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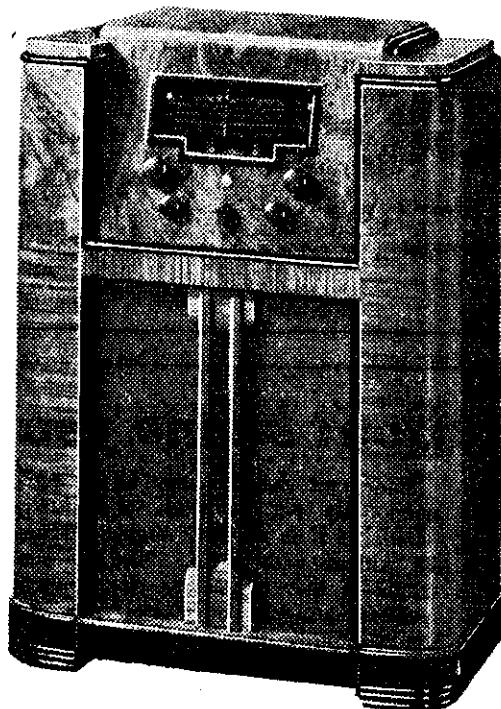
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