

Tsunami Forecasts

March 10, 1960

An improved method of forecasting destructive sea waves set in motion by underwater earthquakes and volcanic eruptions has been devised by William G. Van Dorn, engineer at The University of California's Scripps Institution of Oceanography.

The method depends on the study of records produced on special long-period wave recorders installed on the tiny islands of Wake, Johnston, and Canton in the Pacific. As the destructive waves, called tsunamis, pass these isles, their length, which may be several miles, and height, which rarely reaches more than one foot, are recorded. The recording instruments are especially designed to be sensitive to these waves and no others.

When such waves reach larger islands which slope up gently from the sea floor, such as Oahu, they can increase twenty to thirty times in height. In the past, notably in April 1946, they have resulted in death and severe property damage.

The present Pacific-wide warning system tells only the time, place, and intensity of the seismic activity which causes the waves, Van Dorn says, allowing the islands to be alerted to the risk of high waves, but not providing specific forecasts of wave height. Since the actual height, depends on a variety of factors, among them the depth of the quake beneath the earth's surface, a severe earthquake may in one instance produce waves twenty feet high and in another no extraordinary waves at all. Further study may permit actual heights to be forecast from seismic data alone, Van Dorn says, but this is impossible at present.

By using theoretical studies and field investigations, Van Dorn has worked out a method whereby the open-ocean wave height, as observed at the smaller islands, can be extrapolated to actual heights onshore at larger islands and on the shores of the Pacific.

His work has received support from the Office of Naval Research.