Abstracts

with pressure and temperature, for metals and for a wide sampling of rocks and related simple oxides. The data from studies with shock-induced pressures extend to core pressures and temperatures, and establish beyond serious question the chemical difference between mantle and core. Virtually all silicates show phase changes, at pressures of a few hundred kilobars, which may be correlated with the 'transition layer' of the mantle. The composition of the lower mantle remains indeterminate except with respect to heavy metal, or practically, iron (oxide) content. For an Earth model of any composition within the range suggested by elemental abundances, the observable elastic properties and density can be inferred with little recourse to extrapolation.

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Cambridge,
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1965 June.

Zero Frequency Seismology

F. Press

Modern strain and tiltmeters can record sudden and permanent changes as small as $10^{-9}$. It is shown theoretically that this is sufficient to record changes associated with major earthquakes at distances of several thousand kilometres. The calculation represents the earthquake fault as a finite vertical or horizontal dislocation sheet, following the procedure of Steketee, Chinnery and Maruyama.

Both distant and local strain and tilt fields are diagnostic of the vertical extent of faulting and the energy released. Several examples are shown with surprising results. The Alaskan earthquake fault released $10^{25}$ ergs of elastic strain energy. The fault extended to depths of 100-200 km. The Hegben Lake, Montana, earthquake data were consistent with a volume change in the mantle and secondary faulting near the surface.

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Viscosity Distribution within the Earth

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There are three sets of ($L =$ wave length, $t =$ relaxation time) data by using of which we can determine viscosity distribution within the Earth. They are the Fennoscandian uplift, Earth oblateness and a pleistocene lake uplift. Typical $L$ and $t$ values or the above three are (2 000 km, 5 000 years), (20 000 km, several million years) and (200 km, 4 000 years) respectively. Fundamental equations are written