Various facts appear to suggest that one continuous field of mechanical stress developed in the earth's crust has a certain upper limit for its voluminal extent. The ultimate mechanical stress energy that can be stored up in this whole volume until a break-down takes place in it may be identified with the energy of the largest possible earthquake. The energy deduced on this hypothesis agrees well with those of the actual largest earthquakes. The area A in which aftershocks occur in association with a major earthquake has been found by UTSU and SEKI regularly to increase with the magnitude M of that main shock. This relation, when combined with the magnitude-energy relation due to GUTENBERG and RICHTER, yields a formula

\[ E = 6 \times 10^{5} \times A^{1.5} \]

The numerical values of the coefficient and of the exponent of A in this formula can be well explained by the hypothesis stated above regarding the spatial distribution of the stress energy within the earth's crust.
Earth, Planets and Space
Earthquakes can do significant damage to buildings, bridges, pipelines, railways, embankments, and other man-made structures. The type and extent of damage inflicted are related to the strength of the ground motions and to the behaviour of the foundation soils. In the most intensely damaged region, called the meizoseismal area, the effects of a severe earthquake are usually complicated and depend on the topography and the nature of the surface materials; they are often severer on soft alluvium and unconsolidated sediments than on hard rock. The great Lisbon earthquake of 1755 caused the waters of canals and lakes in areas as far away as Scotland and Sweden to go into observable oscillations. Earthquake: Earthquake, any sudden shaking of the ground caused by the passage of seismic waves through Earth’s rocks. Earthquakes occur most often along geologic faults, narrow zones where rock masses move in relation to one another. Learn more about the causes and effects of earthquakes in this article. Seismic waves are produced when some form of energy stored in Earth’s crust is suddenly released, usually when masses of rock straining against one another suddenly fracture and “slip.” Earthquakes occur most often along geologic faults, narrow zones where rock masses move in relation to one another. The major fault lines of the world are located at the fringes of the huge tectonic plates that make up Earth’s crust. (See the table of major earthquakes.)