

### **Continental Drift and Plate Tectonics -- A Brief Overview**

The planet Earth is a zoned or layered or shelled body consisting of a solid iron core, a liquid iron core, a lower mantle of heavier rocks, a transition zone of lighter rocks, the Aesthenosphere (a weak, partially molten layer of lighter rocks), and the Lithosphere (the strong, solid outermost shell of the earth, which is topped by a thin crust at the bottom of the oceans and a thicker continental crust).

The Lithosphere is comprised of a dozen solid plates which comprise the surface of the Earth; and the continents are like large rafts embedded in various plates of the Lithosphere. These plates have been given the following names:

|                  |                      |
|------------------|----------------------|
| Antarctic Plate  | Cocos Plate          |
| Australian Plate | Caribbean Plate      |
| Philippine Plate | North American Plate |
| Pacific Plate    | South American Plate |
| Gorda Plate      | African Plate        |
| Nazca Plate      | Eurasian Plate       |

The concept of Plate Tectonics has become the great unifying theory in geology in the 1970's and 1980's. In this theory, the solid plates of the Lithosphere ride on top of the partially molten Aesthenosphere, and slowly move on the surface of the earth. Some plates diverge or move apart. The opening between the receding plates is filled with melted material that rises from the Aesthenosphere. This material solidifies in the crack and the plates grow as they separate. When plates open in the ocean, the rift is characterized by earthquake activity, volcanism, and a mid-ocean ridge, and the process results in sea-floor spreading. Since some plates diverge, it follows that others must converge. They crash head-on into each other, and create all sorts of geologic activity. The heavier of the plates buckles downward and descends under the edge of the lighter plate into the Aesthenosphere, while the lighter, overriding plate is crumpled and uplifted. At the region of convergence, deep-sea trenches, high mountain chains, volcanoes, and the greatest earthquakes occur. Some plates slip past one another along transform faults, such as the San Andreas fault of California, where the Pacific plate slides past the North American plate in a northwesterly direction. Resultant geological features include large, shallow-focus earthquakes, such as the San Francisco earthquake of 1906.

### **Plate Tectonics and Geographical Distribution**

Plate tectonic theory holds that the solid plates of the Lithosphere have moved considerable distances during the history of the planet Earth. In the pre-Cambrian, it is believed that all of the continents formed one continuous land mass -- a super-continent which geologists call Pangaea -- surrounded by a universal ocean, called Panthalassa. At the beginning of the Cambrian (600 million years ago), Pangaea split apart, and the ancestral Atlantic Ocean opened. In the early Ordovician (500 million years ago), the process reversed, and the ancestral Atlantic began closing again. By the middle Devonian