

within 150 miles of the coast, and thus influences the extent of the Pacific border river systems. The western drainage of the Rocky Mountains, rising partly in the Yellowstone Park, and partly just south of it, has its outlet to the ocean through the Colorado and Gulf of California, and along the Columbia River and streams farther north, the Colorado and Columbia reaching salt water at points 1200 miles apart. Thus it is that the "Great Basin" is without drainage. Again, a subordinate range of this chain, that of the Coast Range, 2000 to 4000 feet high, is a barrier, for 800 miles, to most of the drainage waters of the Sierra Nevada and Cascade Mountains; and consequently the Sacramento and Joaquin rivers, and not the ocean, receive all the Sierra waters for 500 miles, and the Willamette, the waters of the Cascade Range for 150 miles.

South America has an arrangement of interior river systems parallel to that of North America; the Amazon flowing eastward, like the St. Lawrence; the La Plata flowing southward, like the Mississippi; the Orinoco and other streams northward, like the Mackenzie. This adds a fourth to the characteristics exhibiting parallelism in structure between two continents, North and South America (page 22). Africa, on the opposite side of the Atlantic, has the arrangement reversed as regards the east and west streams: the great Niger empties into the western ocean, the Atlantic; the Nile is the northward-flowing stream; but the southward-flowing interior waters are divided between the Congo draining to the southwestward and the Zambesi to the southeastward.

The *lengths* and *drainage areas* of some of the largest of rivers are as follows: Amazon, length (L.) = 3545 miles, drainage-area (D.) = 2,264,000 square miles; La Plata, L. = 2400, D. = 1,250,000; Mississippi, L. = 2800 (but from its mouth to the head of the Missouri 4200), D. = 1,285,000; Nile, L. = 3815, D. = 1,049,000; Congo, L. = 2900, D. = 1,540,000; Yenisei, L. = 2800, D. = 784,500; Amur, L. = 2380, D. = 583,000; Obi-Irtish, L. = 2320, D. = 725,000; Lena, L. = 2400, D. = 594,000; Yang-tse-Kiang, L. = 2800, D. = 548,000; Hoang Ho (Yellow River), L. = 2280, D. = 537,000.

The lengths of the valleys, excluding the minor beds, are: the Amazon, 2600 miles; the Mississippi, 1164; the Nile, 3100.

## II. SYSTEM IN THE RELIEFS OR SURFACE FORMS OF THE CONTINENTS.

**Law of the system.** — The mountains, plateaus, lowlands, and river regions are the elements, in the arrangement of which the system in the surface form of the continents is exhibited. The law at the basis of the system depends on a relation between the continents and their bordering oceans, and is as follows: —

*First.* The continents have in general elevated mountain borders and a low or basin-like interior.

*Second.* The highest border faces the larger ocean.

A survey of the continents in succession with reference to this law will exhibit both the unity of system among them and the peculiarities of each, dependent on their different relations to the ocean.