

becoming always much smaller in trees of great age; but Zuccharini, in his estimate, thinks it may be safer to assume 1.6 line as the average, which would even then give the age of 3512 years for this single tree.

The great number of crescent-shaped lakes to the westward of the Mississippi, which formerly constituted bends in its ancient channel, are also monuments of the antiquity of the great plain over which the river has been wandering. Darby, the geographer, observed that, in the steep banks of the Atchafalaya, there are alternations of the bluish clay of the Mississippi and of the red ochereous earth peculiar to Red River, proving that the waters of these two streams once occupied alternately considerable tracts below their present point of union.* Since their junction (an event, the date of which is unknown), the waters and sediment of the Red River and Mississippi have been thoroughly mixed up together, before any deposition of their mud takes place in the lower country. It is evident, therefore, that, when we are enabled, by geological observations such as those of Darby, to distinguish the older from the newer portions, even of the modern alluvial plain, we may obtain more aid in our chronological computations founded on rings of growth in buried trees; for we may then add the years deduced from stumps buried in the modern parts of the delta, to those proved by the structure of trees included in mud of earlier date.

After considering the age and origin of the modern deposits of the Mississippi and its tributaries, we have still to carry back our thoughts to the era of the fresh-water strata seen in the bluffs which bound the great valley. These, in their southern termination, have evidently formed an ancient coast-line, beyond which the modern delta has been pushed forward into the sea. Let *a*, *b* (fig. 10) represent the alluvial plain of the Mississippi, bounded on its eastern side at Vicksburg, as before described, by the bluffs *d*, at the foot of which are seen the Eocene strata, *f*, the upper part of the bluff being composed of shelly loam, or loess, of fresh-water origin, *d*, *e* (No. 2).

At Memphis, Port Hudson, and many other places, loam of

* Darby's Louisiana, p. 103.