

oscillations of level, I have endeavored to show in my description of that country;\* and the freshwater shells of existing species and bones of land quadrupeds, partly of extinct races preserved in the terraces of fluvial origin, attest the exclusion of the sea during the whole process of filling up and partial re-excavation.

In many cases, the alluvium in which rivers are now cutting their channels, originated when the land first rose out of the sea. If, for example, the emergence was caused by a gradual and uniform motion, every bay and estuary, or the straits between islands, would dry up slowly, and during their conversion into valleys, every part of the upheaved area would in its turn be a sea-shore, and might be strewed over with littoral sand and pebbles, or each spot might be the point where a delta accumulated during the retreat and exclusion of the sea. Materials so accumulated would conform to the general slope of a valley from its head to the sea-coast.

*River terraces.*—We often observe at a short distance from the present bed of a river a steep cliff a few feet or yards high, and on a level with the top of it a flat terrace corresponding in appearance to the alluvial plain which immediately borders the river. This terrace is again bounded by another cliff, above which a second terrace sometimes occurs: and in this manner two or three ranges of cliffs and terraces are occasionally seen on one or both sides of the stream, the number varying, but those on the opposite sides often corresponding in height.

Fig. 102.



River Terraces and Parallel Roads.

These terraces are seldom continuous for great distances, and their surface slopes downwards, with an inclination similar to that of the river. They are readily explained if we adopt the hypothesis before suggested, of a gradual rise of the land; especially if, while rivers are shaping out their beds, the upheaving movement be intermittent, so that long pauses shall occur, during which the stream will have time to encroach upon one of its banks, so as to clear away and flatten a large space. This

\* Second Visit to the U. S., vol. ii. chap. 34.