flows of mud, such as accompany volcanic eruptions. Lastly, these quadrupeds became extinct, and gave place to Pliocene mammalia (see chap. xxxii.), and these in their turn, to species now existing. There are no signs, during the whole time required for this series of events, of the sea having intervened, nor of any denudation which may not have been accomplished by currents in the different lakes, or by rivers and floods accompanying repeated earthquakes, during which the levels of the district have in some places been materially modified, and perhaps the whole upraised relatively to the surrounding parts of France.

Auvergne.—The most northern of the freshwater groups is situated in the valley-plain of the Allier, which lies within the department of the Puy de Dome, being the tract which went formerly by the name of the Limagne d'Auvergne. It is inclosed by two parallel mountain ranges,—that of the Forèz, which divides the waters of the Loire and Allier, on the east; and that of the Monts Domes, which separates the Allier from the Sioule, on the west.* The average breadth of this tract is about 20 miles; and it is for the most part composed of nearly horizontal strata of sand, sandstone, calcareous marl, clay, and limestone, none of which observe a fixed and invariable order of superposition. The ancient borders of the lake, wherein the freshwater strata were accumulated, may generally be traced with precision, the granite and other ancient rocks rising up boldly from the level country. The actual junction, however, of the lacustrine and granitic beds is rarely seen, as a small valley usually intervenes between them. The freshwater strata may sometimes be seen to retain their horizontality within a very slight distance of the border-rocks, while in some places they are inclined, and in few instances vertical. The principal divisions into which the lacustrine series may be separated are the following;—1st, Sandstone, grit, and conglomerate, including red marl and red sandstone. 2dly, Green and white foliated marls. 3dly, Limestone or travertin, often oolitic. 4thly, Gypseous marls.

1. *a. Sandstone and conglomerate.*—Strata of sand and gravel, sometimes bound together into a solid rock, are found in great abundance around the confines of the lacustrine basin, containing, in different places, pebbles of all the ancient rocks of the adjoining elevated country; namely, granite, gneiss, mica-schist, clay-slate, porphyry, and others, but without any intermixture of basaltic or other tertiary volcanic rocks. These strata do not form one continuous band around the margin of the basin, being rather disposed like the independent deltas which grow at the mouths of torrents along the borders of existing lakes.

At Chamalieres, near Clermont, we have an example of one of these deltas, or littoral deposits, of local extent, where the pebbly beds slope away from the granite, as if they had formed a talus beneath the waters of the lake near the steep shore. A section of about 50 feet in vertical height has been laid open by a torrent, and the pebbles are seen to consist throughout of rounded and angular fragments of granite, quartz,

* Scrope, *Geology of Central France*, p. 15.