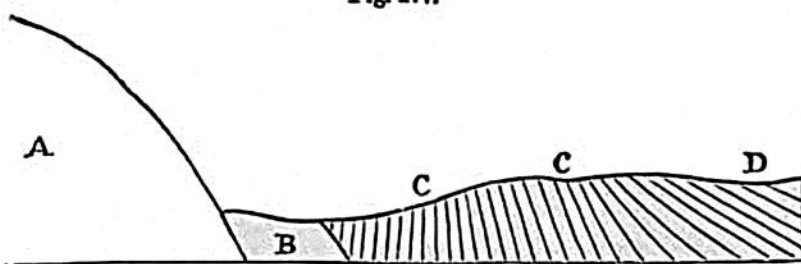


amassed near the northern shores, so in Auvergne the grits and conglomerates before mentioned were evidently formed near the borders.

The entire thickness of these marls is unknown; but it certainly exceeds, in some places, 700 feet. They are, for the most part, either light-green or white, and usually calcareous. They are thinly foliated,—a character which frequently arises from the innumerable thin shells, or carapace-valves, of that small animal called *Cypris*. This animal is provided with two small valves, not unlike those of a bivalve shell, and moults its integuments periodically, which the conchiferous mollusks do not. This circumstance may partly explain the countless myriads of the shells of *Cypris* which were shed in the ancient lakes of Auvergne, so as to give rise to divisions in the marl as thin as paper, and that, too, in stratified masses several hundred feet thick. A more convincing proof of the tranquillity and clearness of the waters, and of the slow and gradual process by which the lake was filled up with fine mud, cannot be desired. But we may easily suppose that, while this fine sediment was thrown down in the deep and central parts of the basin, gravel, sand, and rocky fragments were hurried into the lake, and deposited near the shore, forming the group described in the preceding section.

Not far from Clermont, the green marls, containing the *Cypris* in abundance, approach to within a few yards of the granite which forms the borders of the basin. The occurrence of these marls so near the ancient margin may be explained by considering that, at the bottom of the ancient lake, no coarse ingredients were deposited in spaces intermediate between the points where rivers and torrents entered, but finer

Fig. 177.



Vertical strata of marl, at Champradelle, near Clermont.

- A. Granite.
- B. Space of 60 feet, in which no section is seen.
- C. Green marl, vertical and inclined.
- D. White marl.

mud only was drifted there by currents. The *verticality* of some of the beds in the above section bears testimony to considerable local disturbance subsequent to the deposition of the marls; but such inclined and vertical strata are very rare.

3. *Limestone, travertin, oolite*.—Both the preceding members of the lacustrine deposit, the marls and grits, pass occasionally into limestone. Sometimes only concretionary nodules abound in them; but these, where there is an increase in the quantity of calcareous matter, unite into regular beds.

On each side of the basin of the Limagne, both on the west at Gannat, and on the east at Vichy, a white oolitic limestone is quarried. At