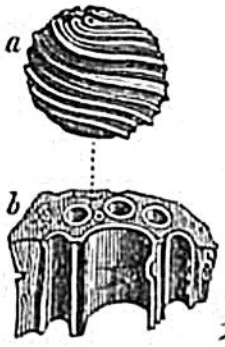
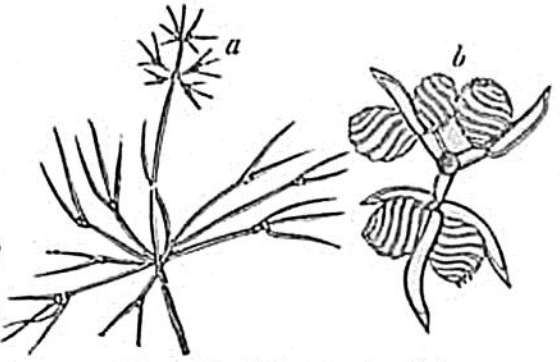
stems, as well as the seed-vessels, of these plants occur both in modern shell marl and in ancient freshwater formations. They are generally

Fig. 53.



Chara medicaginula; fossil. Upper Eocene, Isle of Wight.
a. Seed-vessel, magnified 20 diameters.
b. Stem, magnified.

Fig. 54.



Chara elastica; recent. Italy.
a. Sessile seed-vessel between the divisions of the leaves of the female plant.
b. Magnified transverse section of a branch, with five seed-vessels, seen from below upwards.

composed of a large tube surrounded by smaller tubes; the whole stem being divided at certain intervals by transverse partitions or joints. (See *b*, fig. 53.)

It is not uncommon to meet with layers of vegetable matter, impressions of leaves, and branches of trees, in strata containing freshwater shells; and we also find occasionally the teeth and bones of land quadrupeds, of species now unknown. The manner in which such remains are occasionally carried by rivers into lakes, especially during floods, has been fully treated of in the "Principles of Geology."*

The remains of fish are occasionally useful in determining the freshwater origin of strata. Certain genera, such as carp, perch, pike, and loach (*Cyprinus*, *Perca*, *Esox*, and *Cobitis*), as also *Lebias*, being peculiar to freshwater. Other genera contain some freshwater and some marine species, as *Cottus*, *Mugil*, and *Anguilla*, or eel. The rest are either common to rivers and the sea, as the salmon; or are exclusively characteristic of salt water. The above observations respecting fossil fishes are applicable only to the more modern or tertiary deposits; for in the more ancient rocks the forms depart so widely from those of existing fishes, that it is very difficult, at least in the present state of science, to derive any positive information from ichthyolites respecting the element in which strata were deposited.

The alternation of marine and freshwater formations, both on a small and large scale, are facts well ascertained in geology. When it occurs on a small scale, it may have arisen from the alternate occupation of certain spaces by river water and the sea; for in the flood season the river forces back the ocean and freshens it over a large area, depositing at the same time its sediment; after which the salt water again returns, and, on resuming its former place, brings with it sand, mud, and marine shells.

* See Index of Principles, "Fossilization."