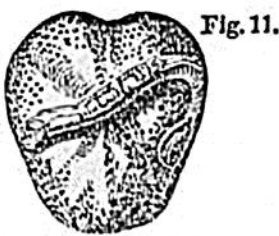
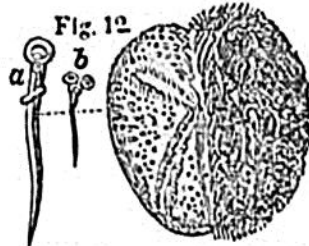


illustration. It is well known that these animals, when living, are invariably covered with numerous suckers, or gelatinous tubes, called "ambulacral," because they serve as organs of motion. They are also armed with spines supported by rows of tubercles. These last are only seen after the death of the sea-urchin, when the spines have dropped off. In fig. 12 a living species of *Spatangus*, common on our coast, is represented with



Serpula attached to a fossil *Spatangus* from the chalk.



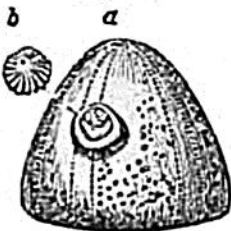
Recent *Spatangus* with the spines removed from one side.

b. Spine and tubercles, nat. size.
a. The same magnified.

one-half of its shell stripped of the spines. In fig. 11 a fossil of the same genus from the white chalk of England shows the naked surface which the individuals of this family exhibit when denuded of their bristles. The full-grown *Serpula*, therefore, which now adheres externally, could not have begun to grow till the *Spatangus* had died, and the spines were detached.

Now the series of events here attested by a single fossil may be carried a step farther. Thus, for example, we often meet with a sea-urchin in the chalk (see fig. 13), which has fixed to it the lower valve of a *Crania*,

Fig. 13.



a. *Echinus* from the chalk, with lower valve of the *Crania* attached.
b. Upper valve of the *Crania* detached.

a genus of bivalve mollusca. The upper valve (b, fig. 13) is almost invariably wanting, though occasionally found in a perfect state of preservation in white chalk at some distance. In this case, we see clearly that the sea-urchin first lived from youth to age, then died and lost its spines, which were carried away. Then the young *Crania* adhered to the bared shell, grew and perished in its turn; after which the upper valve was separated from the lower before the *Echinus* became enveloped in chalky mud.

It may be well to mention one more illustration of the manner in which single fossils may sometimes throw light on a former state of things, both in the bed of the ocean and on some adjoining land. We meet with many fragments of wood bored by ship-worms, at various depths in the clay on which London is built. Entire branches and stems of trees, several feet in length, are sometimes dug out, drilled all over by the holes of these borers, the tubes and shells of the mollusk still remaining in the cylindrical hollows. In fig. 15 c, a representation is given of a piece of recent wood pierced by the *Teredo navalis*, or common ship-worm, which destroys wooden piles and ships. When the cylindrical tube d has been extracted from the wood, a shell is seen at the larger extremity, composed of two pieces, as shown at c. In like