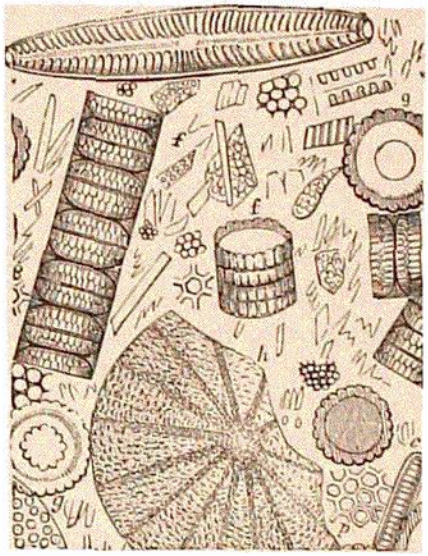
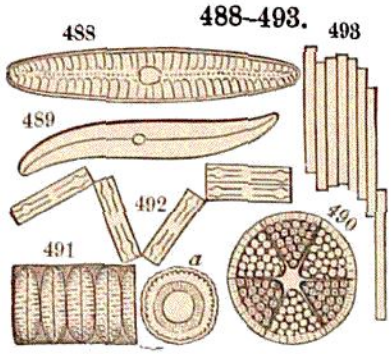
having siliceous shells are *others*. A few species are represented in Figs. 487–493. Another group is that of *Desmids*, which consist of one or a few greenish cells, and secrete little or no silica. They are related to the common Conferva (frog-spittle) of fresh-water pools. Other calcareous kinds take delicate branching forms, as the *Corallines*; or more stony forms, like those of Corals, but destitute of surface cells, as the *Nullipores;* or sponge-like or concretion-like forms, as the calcareous Algæ of the Yellowstone Park. Some related to the last-mentioned occurring in warm waters secrete silica. There are also the minute Coccoliths over the ocean's bottom in deep or shallow waters; they are so named from the Greek for *seed* and *stone*.

487.



488–493.



Figs. 487–493, DIATOMS highly magnified; 487, A group of fossil Diatoms; 488, Pinnularia peregrina, Richmond, Va.; 489, Pleurosigma angulatum, id.; 490, Actinoptychus senarius, id.; 491, Melosira sulcata, id.; *a*, transverse section of the same; 492, Grammatophora marina, from the salt water at Stonington, Conn.; 493, Bacillaria paradoxa, West Point.

The common leathery seaweeds of the seacoast, or the Fucus division, include the Sargassum of the Atlantic, the air-cavities in which enable it to float.

CEPHALIZATION, A GENERAL PRINCIPLE BEARING ON SYSTEM AND GRADE IN THE ANIMAL KINGDOM.

Since an animal has, typically, an anterior nervous mass or ganglion determining the position of the head, and antero-posterior conditions in growth, a greater or less subordination to the head in the arrangement of its organs should naturally be looked for. Degree of structural subordination to the head and of concentration headward in body-structure, is referred to under the term Cephalization.

The principle is illustrated in the class of Crustaceans, with special clearness and large distinctive characters, on account of the fewness of the species and their size.

Some preliminary explanations are *here first given respecting Worms, and then the* facts from the class of Crustaceans.

1. **Worms.** — An example of a low decephalized condition among Articulates exists in the Tape-worm, *Tænia solium*, one of the lowest of the so-called Worms. It grows and *elongates by the multiplication* of segments (by budding), until their number is sometimes several hundred, the new segments forming successively just behind the head. The head has its very small nervous ganglion, from which slender nerves pass backward; so that in growth and nerves it is an individual. But it has no mouth, and the body no stomach or intestine. Instead of this, each segment is so far complete in its individuality that it takes its independent nutriment, and has its own reproductive system; *and if separated from* the rest of the series, it has all that is required for propagating the species by ova. Here