

furnished with four long setæ. Each of these setæ is attached at the root to its fellow from the neighbouring cell, the result being the formation of the chain. The terminal faces of the cells are otherwise separate, so that there are openings between them. In the winter and spring *Chaetoceras decipiens* is furnished with thick cell-walls and stout setæ, and the interstices between the cells are quite inconsiderable (see Fig. 221, *b*); but in summer the walls are thin and the setæ extremely fine, and the openings in the chain between the cells then become large, round or oval gaps, which are almost as big as the cells themselves (see Fig. 221, *a*). Corresponding variations occur in other species of *Chaetoceras*, and in other diatoms, such as *Biddulphia aurita*. Along the arctic coasts, for instance, *Biddulphia* has a rather gross structure, and is almost cylindrical, with short conical projections at the corners, but off the south of Norway it has a comparatively much larger surface, and the corners develop into long, slender outgrowths.

We find a variation of a different nature in the case of



FIG. 222.—CELL OF *RHIZOSOLENIA HEBETATA-SEMISPINA* ( $\frac{30}{10}$ ).  
One end of the cell belongs to the typical arctic *hebetata* (on the right), the other to the Atlantic form *semispina*.

Dimorphism. *Rhizosolenia hebetata*. It occurs in two perfectly distinct forms, that were formerly regarded as good species. The first, which belongs to arctic waters, is thick-walled and gross, and is the true *R. hebetata*. The second, *R. semispina*, has thinner walls and is proportionately longer, and it is furnished with a long hair-like point at each end. Its distribution extends over practically the whole Atlantic, though it is chiefly to be found in the neighbourhood of the cold currents. These two "species" can originate from one another reciprocally as the result of one cell-division. During the course of transition a cell may be *hebetata* at the one end and *semispina* at the other (see Fig. 222). Dimorphism of this kind is known, moreover, in the case of other species.

Still, in the open sea conditions of existence are comparatively uniform compared with what we find in coastal waters, where the temperature and salinity vary considerably. Most of the diatoms which belong particularly to the coastal waters have a special adaptation, the so-called resting-spores, which must be regarded as a means of protection against such altered conditions. The contents of the cell can shrink into a denser

Resting-  
spores.