

adaptations from one generation to the other. Still, now and then even this, too, is possible. I found during the Atlantic expedition of the "Michael Sars" that the subtropical *Ceratium platycorne*, both of the posterior horns of which are developed ordinarily into flat wing-like suspension-organs, changed gradually into a form with cylindrical horns belonging to the Gulf Stream in the Norwegian Sea, that I had myself previously described under the name of *Ceratium compressum* (see Fig. 228).

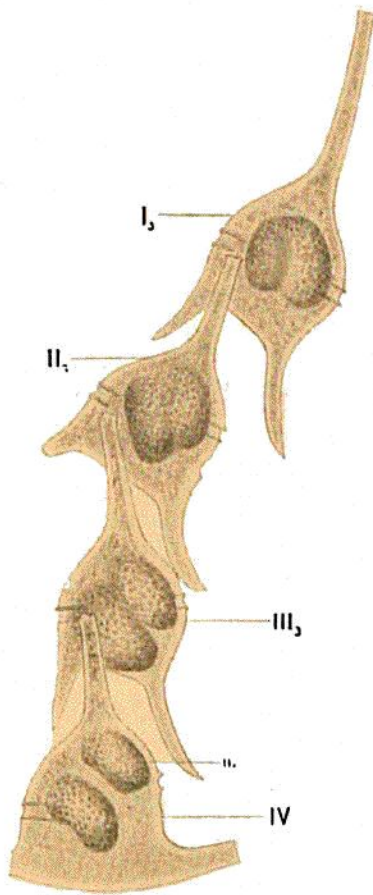


FIG. 229.

CHAIN OF *CERATIUM TRIPOS*.
Only one cell (IV.) shows the character of the type, the others (I.-III.) belonging to the type of *Ceratium californiense* (279). (Kofoid.)

Discontinuous variations have been found as well as continuous ones in the species of *Ceratium*. Lohmann has shown that the ordinary Baltic form, *C. tripos*, can set up an intermediate generation of a totally different type, much smaller and with short, straight horns, corresponding to the forms described under the name of *C. lineatum*. Kofoid has met with similar variations in American species (see Fig. 229). The signification of these development forms has not yet been discovered. Jörgensen, who has recently published a monograph on the genus, is inclined to regard them as degenerate forms that have been produced under abnormal conditions of existence. It seems to me, however, more probable that these small, extremely mobile, cells are normal formations, which have a definite function to perform in the imperfectly known

Lohmann.

Jörgensen.

development-cycle of the species of *Ceratium*. It is still questionable whether peridineæ propagate sexually, even though Zederbauer claims to have discovered sexual propagation in the ordinary fresh-water form (*Ceratium hirundinella*). But, *a priori*, it is quite possible that the above described intermediate generation may be a sex-generation. Just as little as these "mutations" do we understand the significance of the gemmation which Apstein has lately described in *Ceratium tripos*, nor do we know what conditions of existence cause gemmation instead of normal cell-division.

Zederbauer.

Apstein.

Another important genus with many species, *Peridinium*, *Peridinium*.