

differs in various ways from *Ceratium*, though systematically it is not far removed from it. The cells, however, lack the brown pigment-granules (at any rate, this is so in the case of marine species), and the contents are pale yellow or pink. It is improbable that it can assimilate carbonic acid, and it must therefore somehow or other obtain organic matter for its nourishment. Unfortunately nothing is known regarding its mode of nourishment. These forms do not live so close to the surface as the species of *Ceratium*, but all observations made hitherto indicate that they belong exclusively to parts of the sea to which light penetrates, where they exist along with the other

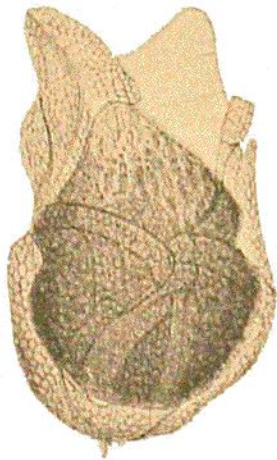


FIG. 230.

*GONYAULAX POLYGRAMMA.*

The cell-contents form a zoo-spore, shed out from the bursting cell-wall ( $\frac{2}{3}$  &  $\frac{1}{2}$ ). (Schütt.)

algæ. Their cells are much grosser than those of the species of *Ceratium*, and the projections corresponding to the horns of *Ceratium* are short or entirely wanting. The membrane-curtains along the furrows are only slightly developed, and the cell itself is much more globular. The species of *Peridinium*, and some other genera (*Gonyaulax*, *Goniodoma*), have thus at best only imperfect suspension-organs, but the mobility of the cells makes up for this deficiency. The way they are formed, too, is different from what we notice in *Ceratium*. There is no proper cell-division, but the cell changes its contents to one, two, or four naked spores, which

are shed out from their original covering (see Fig. 230). Each spore afterwards gradually evolves a new cell-wall for itself, within which it develops as the wall expands, and bands, due to accession of growth, intervene between the laminae composing the structure. This has been demonstrated by Broch. The genus *Peridinium* includes a large number of species distributed throughout all the seas of the world, but the systematic arrangement of the species is extremely difficult, and has not so far been sufficiently investigated. A large amount of material has, however, been brought home by our expedition, and it is to be hoped that we shall now be able to ascertain the characteristics to which we can ascribe chief systematic importance. A good beginning, at all events, has been made by Kofoid and Broch.

Broch.

Dinophysidæ.

The family Dinophysidæ possesses the most remarkable suspension-organs of all the peridineæ. In northern waters its representatives are limited to a number of species all