

Reproduction in Scenedesmus.—Although *Scenedesmus* is a very familiar alga, the details of its reproduction had not been investigated, doubtless because the cells are so small. SMITH¹⁴ has studied the cell structure and reproduction in all of the three species. The cells are strictly uninucleate, contain a single pyrenoid, and have a cell wall consisting of two layers. When 4-celled colonies are formed, the steps are as follows: The first nuclear division is followed by a transverse cleavage of the cytoplasm, and nuclear division in the two resulting protoplasts is followed by cleavage furrows at right angles to the first furrow. The pyrenoid then disappears and the uninucleate protoplasts elongate until they extend the entire length of the mother cell. A pyrenoid is now formed *de novo* within each of the four cells, and cell walls appear. The young colony escapes through a longitudinal rupture in the wall of the mother cell and assumes the characteristic arrangement by unrolling. In the formation of 8-celled colonies, there are three nuclear divisions, the second and third being followed by cytoplasmic cleavages. The material for the study was grown in pure cultures. Sections were cut from 3–5 μ in thickness and stained in Flemming's safranin-gentian violet-orange combination.—C. J. CHAMBERLAIN.

The embryo of Gyrostachys.—The origin and development of the embryo sac of *Gyrostachys*, more commonly known as *Spiranthes*, is described for two species, *S. gracilis* and *S. cernua*, by Miss PACE,¹⁵ whose previous work allows her to speak with authority upon this subject. The embryo sac is very irregular in its development, sometimes arising from 4 megaspores, sometimes from 2, and sometimes from only one. At the fertilization stage the embryo sac may contain 4, 5, 6, or 8 nuclei, the 6-nucleate condition, resulting from a lack of one mitosis in the chalazal end of the sac, being the most frequent. The diploid number of chromosomes in *S. gracilis* is 30, and in *S. cernua* 60; consequently, the relation, in this respect, is similar to that between *Oenothera Lamarckiana* and *O. gigas*, and *S. cernua* might be called a tetraploid form. As is well known, *S. cernua* is a larger and more vigorous species, and the gigantism is evident also in the size of the ovary, the ovules, and the size of the cells. Miss PACE suggests that the subject might be worth investigating experimentally.—CHARLES J. CHAMBERLAIN.

Westphalian Calamariaceae.—A revision of the European Calamariaceae, undertaken in conjunction with KIDSTON, impressed upon JONGMANS the fragmentary condition of our knowledge of the Calamariceae of the Rheinisch-Westphalian coal fields, and also the inadequacy of the descriptions and figures. Accordingly, with the cooperation of KUKUK,¹⁶ he examined and described

¹⁴ SMITH, GILBERT M., The cell structure and colony formation in *Scenedesmus*. Archiv für Protistenkunde 32:278–297. pls. 16, 17. 1914.

¹⁵ PACE, LULA, Two species of *Gyrostachys*. Baylor University Bull. 17:1–16. pl. 1. 1914.

¹⁶ JONGMANS, W. J., and KUKUK, P., Die Calamariaceen des Rheinisch-Westfälischen Kohlenbeckens. Mededeelingen van's Rikjs Herbarium. Leiden. no. 20. Text 8vo. pp. 89. Atlas 4to. pls. 22. 1913.



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