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ULTRASTRUCTURE OF FLAGELLA OF
SPERMATZOIDS OF *LYGODIUM*
FLEXUOSUM (L.) SW.

FINE structure of the flagella of spermatozooids of various plants and plant groups, viz., *Stigeoclonium*⁴, *Polytrichum*⁷, *Marchantia*^{1,2}, *Marsilea*⁸, and *Zamia*^{5,6} has been investigated in detail. Our investigations on the ultrastructure of the flagella of spermatozooids of *L. flexuosum* have brought out certain new facts in the flagellar construction of the fern spermatozooids which are reported here.

Spores of *L. flexuosum* were collected from the garden of Botany Department, Lucknow University, and were sown under sterile conditions in 1% Knop's solution. The temperature of the culture remained at $24 \pm 2^\circ \text{C}$ with light intensity at 600 ft. c:

Spores, germinated on the 4th or the 5th day, though antheridia began to develop after 70 to 80 days. Gametophytes with mature antheridia ready to discharge spermatozooids were fixed in Caulfield's³ fixative at 4°C for 4 hours. After dehydration, the prothallii were embedded in plastic mixture of Epon and Araldite and ultrathin section were cut on LKB ultratome III, using glass knives. Silver grey colour sections were picked on uncoated copper grids. Sections were stained in lead citrate and uranyl acetate and examined under Hitachi electron microscope Hu-11 E at 75 kV. Photographs were taken on Fuji electron microscopic film.

The micrographs of the spermatozooids pass through the region where flagella are attached to Vierergruppe. A giant mitochondrion (M) having numerous cristae in very close association of the Vierergruppe as well as numerous flagella cut transversely (Fig. 1) can also be seen in cross-section.

Interesting features of the flagella as seen in the cross-section of the median portion is that the outer membrane has sharp projections and is star shaped (Fig. 2). This differs from the findings of earlier workers who noticed smooth outer membrane for the flagella. However, basal part of the flagellum has smooth outer wall (Fig. 2 shown by arrow).

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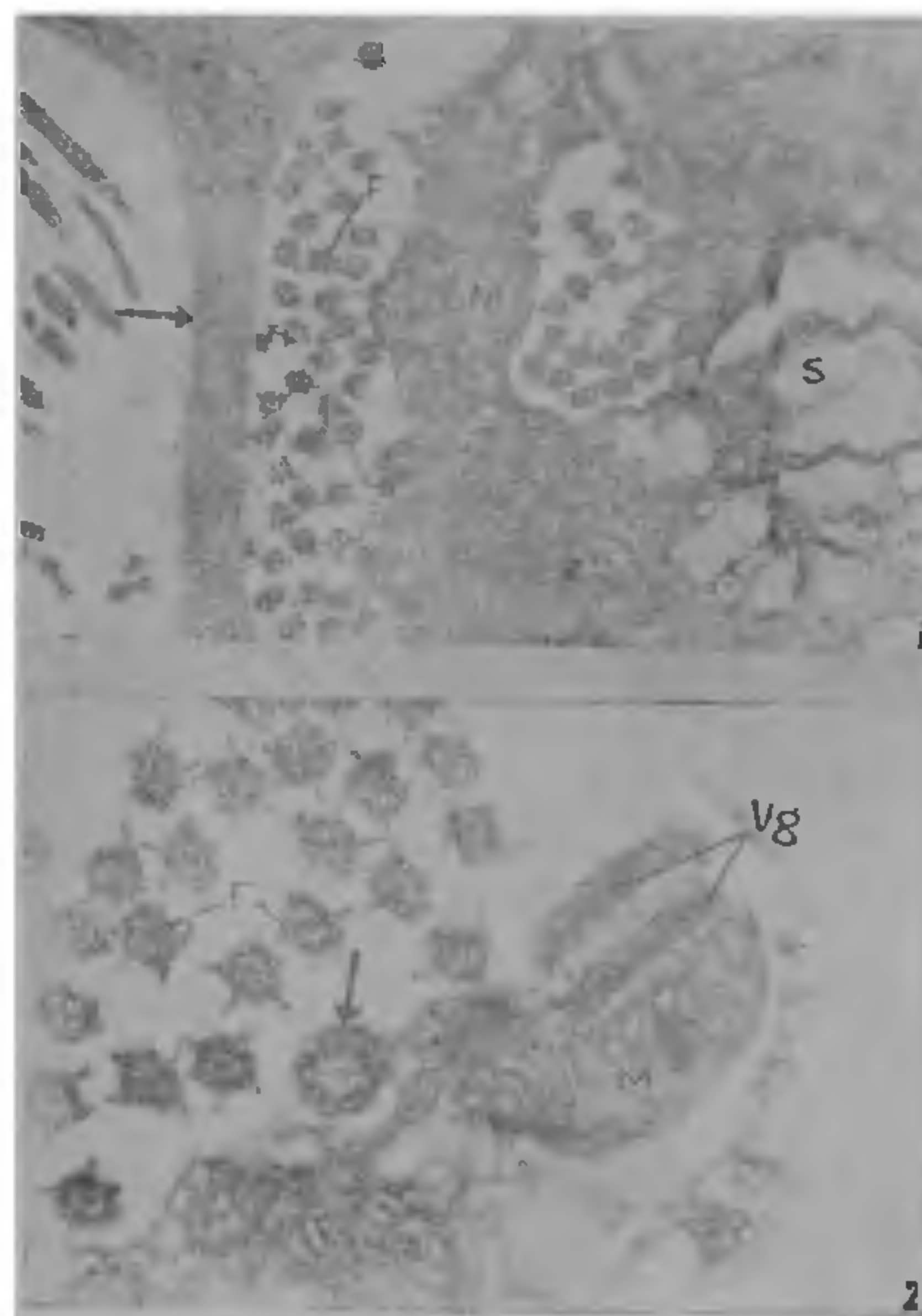


FIG. 1. T.S. through antheridia showing: F.—Star-shaped flagella, M.—Mitochondrion. S.—Starch, Arrow showing cell wall ($\times 15,000$).

FIG. 2. T. S. through antheridium showing: F.—star shaped flagella, M.—Mitochondrion, Vg.—Vierergruppe. Arrow showing T.S. Basal part of flagellum ($\times 30,000$).

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