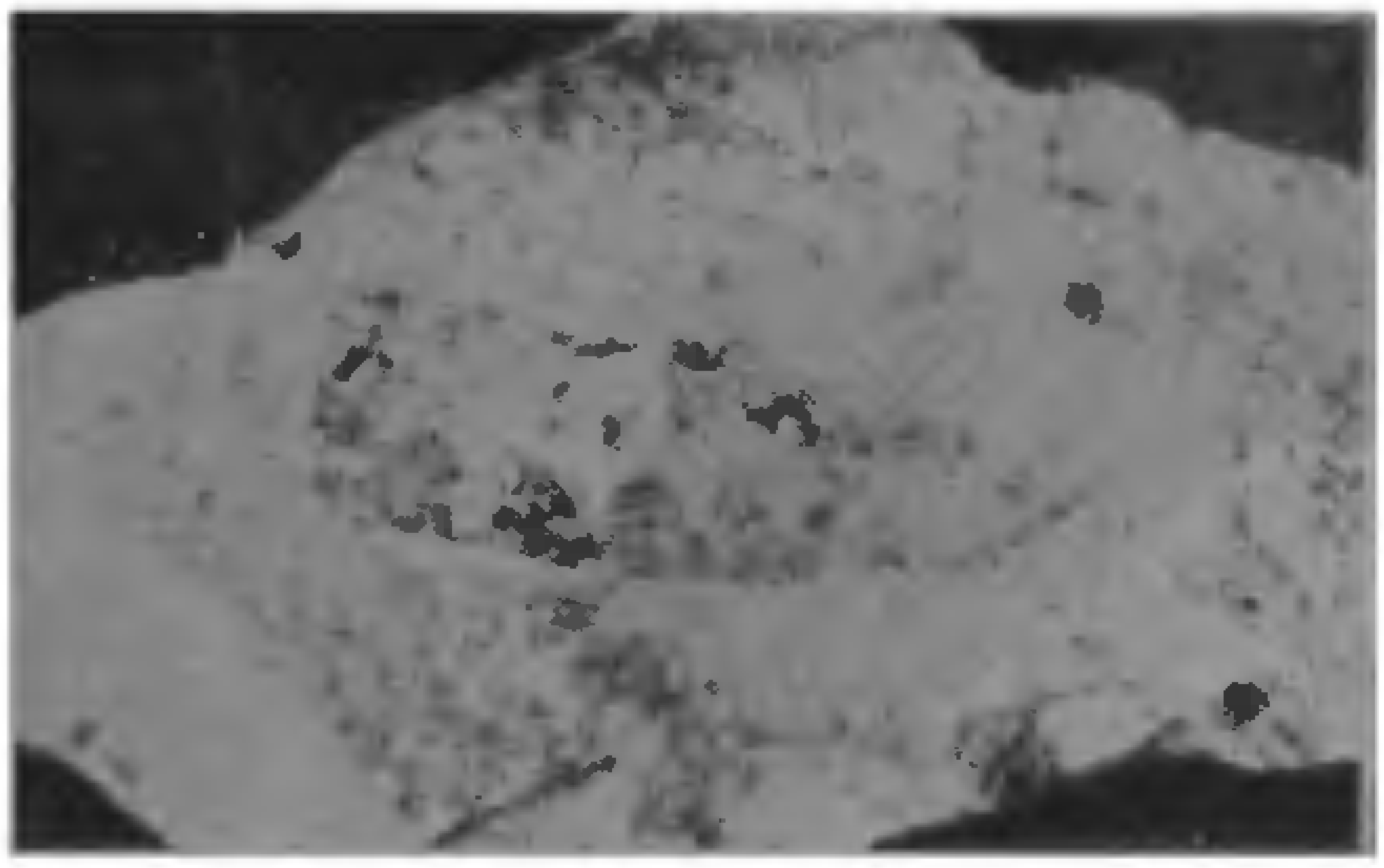

FIG. 2. Tuning fork Graptolite from the lowermost horizon, × 3.

The sequence which is in mudstone throughout, as at present interpreted, is as follows:

Monograptus cf. *dubius* (Suess) Lower Ludlow
3 ft.

Monograptus cf. *vulgaris* (Wood)
27 ft.

F................ ? ? ....F
Didymograptus of tuning fork habit. ? Llanvirn

The succession is rather perplexing in that the tuning fork kinds appear only a relatively few feet beneath the Early Ludlow forms. Faulting has perhaps intervened and made the rocks bearing the tuning fork kinds appear in close stratigraphic proximity to the apparently much younger rocks.

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A REPORT ON THE OCCURRENCE OF AN ABERRANT CNIDARIAN *HALAMMOHYDRA OCTOPODIDES* REMANE, IN INDIAN WATERS

WHILE engaged in the study of the interstitial fauna in the sandy beaches of Waltair coast we have frequently come across specimens of the aberrant hydrozoan *Halammohydra octopodides* Remane along with several other interesting interstitial forms. The form is so far known to inhabit only the European coasts. Remane[1] described the species from the Baltic and the North Sea coasts and later it has been reported from the coasts of Sweden (Dahl[2]), Atlantic (Teissier[3]; Swedmark[4]; Renaud-Debyser[5]) and Mediterranean (Swedmark[6]).

The individuals on this coast conform to the description given by earlier workers (Remane[1]; Swedmark and Teissier[7]). The body column in the European species attains a length of 0·3 to 0·4 mm. while it reaches 0·2 to 0·3 mm. in the local forms. Adult specimens bear 10 to 12 tentacles measuring 0·4 to 1·0 mm. in length when extended, alternating with 6 lithocysts. Remane[1] described the number of the tentacles in the Kiel specimens as 10 to 13 while Swedmark[8] found that the Roscoff specimens had 6–24 tentacles.

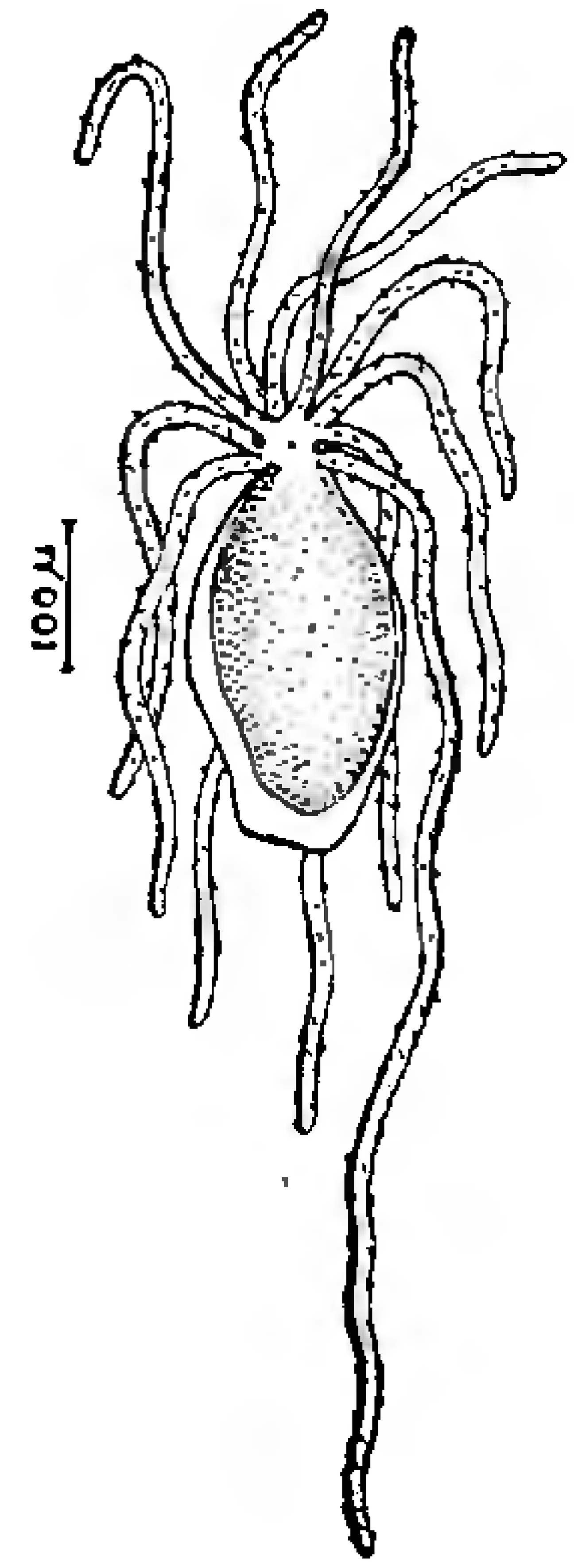

FIG. 1.

The forms occur throughout the year in coarse and medium sands, 10 cm. below surface, between the low and the mid-tide levels of the beach. The species is known to inhabit the finer sand grades also on the European coasts (Swedmark[8]) but locally the forms were never found to occur in fine sands. They showed preference for substrates with coarser sand grades between 300–600 μ in their mean diameter. The temperature in the habitat varies from 26° to 30° C. while the salinity ranges from 24 to 34‰. Observations indicated that the species is omnivorous in its diet, feeding on vegetable and animal matter such as diatoms, protozoans, nematodes, gastrotrichs, copepods, etc.

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MALE AND FEMALE GAMETOPHYTES, AND ENDOSPERM IN *VACCINIUM LESCHENAULTII*, W.

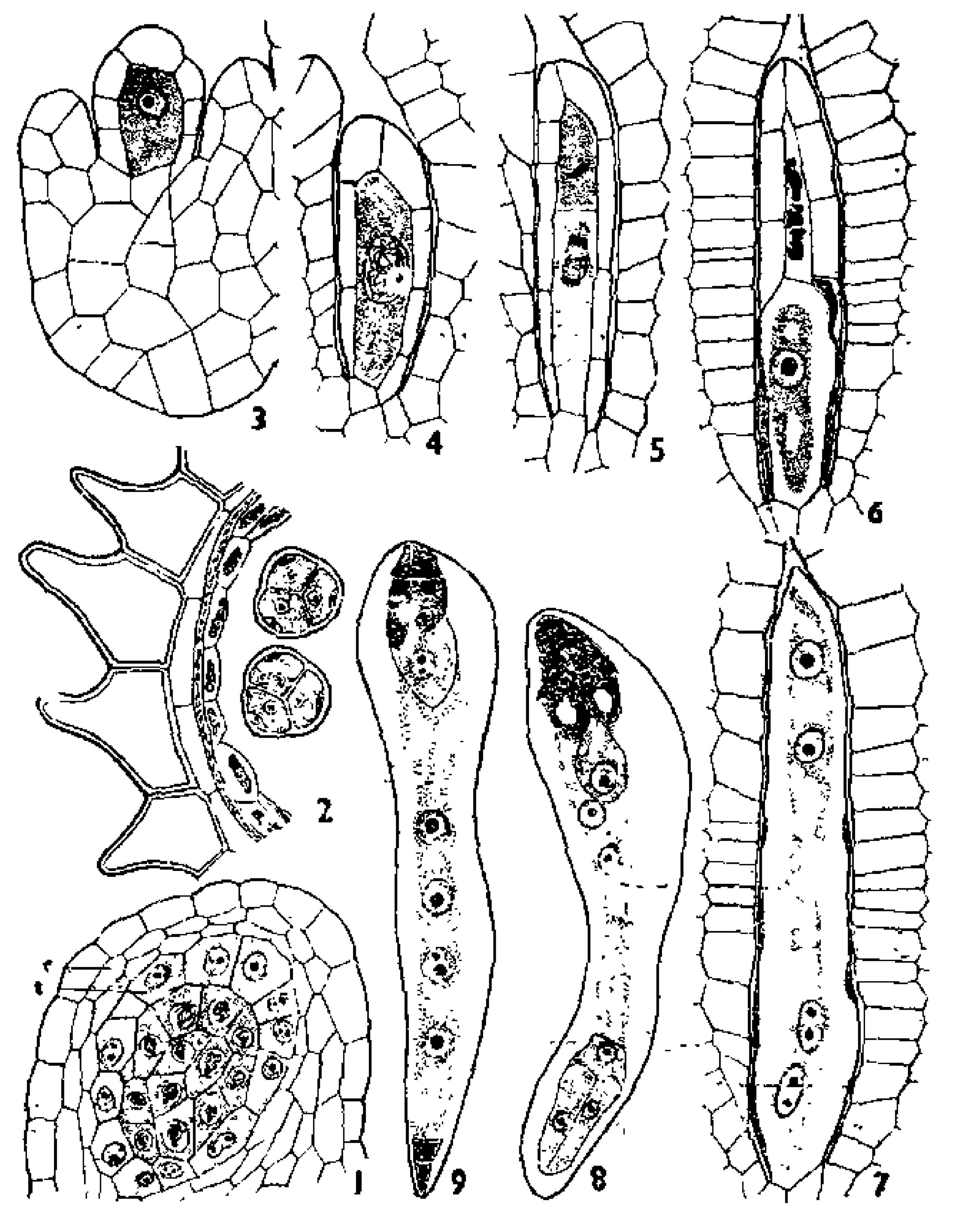
PRELIMINARY observations on the embryology of *Vaccinium leschenaultii* collected from Kodaikanal are reported here. Except *Cassiope*, which shows Allium type (Palser, 1961), other members of the Ericaceæ are reported to have *Polygonum* type of embryo-sac. In the majority of the genera investigated, the endosperm is cellular (*see*, Ganapathy and Palser, 1964).

In transection the young anther is four-lobed and its wall comprises single layers of epidermis, endothecium, middle layer and tapetum (Fig. 1). The epidermis persists in the mature anther and becomes distinctly papillose in the later stages (Fig. 2). By about the time the microspore mother cells enter meiotic divisions the middle layer gets obliterated. The tapetum is glandular and becomes non-functional by the two celled-stage of the pollen-grains. The endothecium does not develop fibrous thickenings, as the pollen is shed through the apical awns of the anthers. Sterility of pollen sacs is very common.

The meiotic divisions of the microspore mother cells are simultaneous forming isobilateral or tetrahedral tetrads. The nucleus in each microspore divides and this division results in a large tube cell and a small generative cell, which lies towards the outer side of the tetrad (Fig. 2). The pollen-grains do not separate but remain in tetrads (Fig. 2).

The ovule is unitegmic and tenuinucellate. A hypodermal archesporial cell differentiates in the ovular primordium (Fig. 3). More than one archesporial cell also occurs. The archesporial cell enlarges and functions directly as a megaspore mother cell (Fig. 4). Rarely two megaspore mother cells are met with and they may be arranged in a juxtaposed or superposed manner. Subsequently only one of them develops further while the other degenerates.

During the first meiotic division of the megaspore mother cell two nuclei are formed and they are separated by a transverse wall resulting in two superimposed dyad cells (Fig. 5). The divisions of the dyad cells are synchronous usually and are followed by walls resulting in four megaspores which are arranged in a linear tetrad. Occasionally the micropylar dyad cell may slightly lag behind. Of the four megaspores the chalazal one usually functions and the micropylar three degenerate (Fig. 6). The degeneration of the megaspores normally starts from the chalazal non-functional megaspore towards the micropylar ones. Sometimes it may begin from the micropylar megaspore.



FIGS. 1–9. Fig. 1. Transection of young anther (*e*, endothecium; *t*, tapetum), × 240. *Fig. 2.* Part of older microsporangium showing two-celled pollen-grains in tetrads, × 400. Fig. 3. L. S. ovule showing archesporal cell, × 400. Figs. 4-5. *Megasporogenesis*, × 400. Fig. 6. Functional megaspore, × 400. Fig 7. Four-nucleate embryo sac, × 400. Fig. 8. Mature embryo-sac, × 240. Fig. 9. *Four-nucleate endosperm*, × 240.

The functional megaspore enlarges in size and vacuoles appear at the micropylar and chalazal ends. The nucleus divides and the two daughter nuclei move towards the opposite ends by the formation of a large central vacuole. The degeneration of the nucellar cells starts when the functional megaspore grows larger and extends towards the micropylar end (Fig. 6). At the two-nucleate stage, the embryo-sac comes directly in contact with the