NOTE ON PENIAL SETAE IN *EUTYPHOEUS QUADRIPAPILLATUS* MICHAELSEN, 1907.

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E. quadripapillatus is a little known species, recorded hitherto only from Calcutta, Saraghat (Bengal), and Sirsiah (Bihar). According to Michaelsen (1909, p. 221), penial setae are lacking –no mention is made of setal follicles (penial or otherwise) in association with male terminalia. Gates (1938, p. 108) not only found setal follicles associated with prostatic ducts, but in one of the three follicles examined microscopically, " a complete, sigmoid seta ", and suggested that the presence of sigmoid setae might indicate that *E. quadripapillatus* is more primitive than any other known species (*Idem*, pp. 57 and 108). A recent collection from Gorakhpur district (U.P.) containing a fairly large series of the species has now provided an opportunity to acquire further information with regard to the ventral setae of segment xvii.

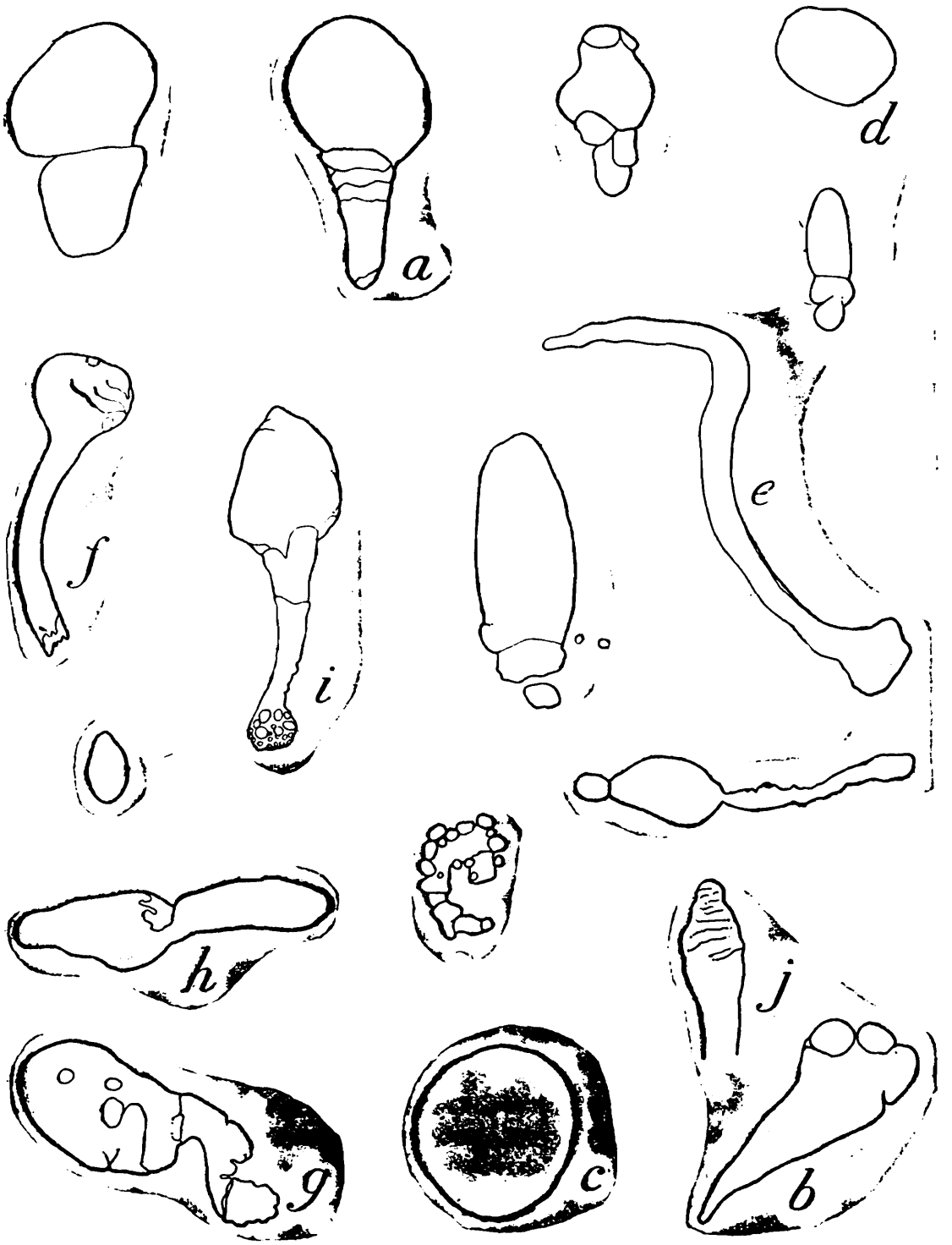
On the median side of each prostatic duct there is always present follicle tissue, which usually protrudes from the parietes only slightly into the coelomic cavity, but which may occasionally reach beyond ental end of bulbus ejaculatorius or even (in one aclitellate specimen) to ental end of prostatic duct. Whether this mass of follicle tissue comprises two discrete follicles, of the *a* and *b* setae of xvii, or only a single follicle, and then of *a* or *b*, is unknown. Accordingly, follicle, in this note, as previously, refers to the whole mass of tissue median to a prostatic duct. One hundred follicles from fifty specimens were examined microscopically.

Each follicle always contains pink setal " fragments " of various shapes and sizes. Most common is a topshape (Text-fig. 1, *a* and *b*) and variations thereon. In one follicle five top-shaped fragments are present and in positions similar to those occupied by reserve setae in a normal penisetal follicle. In this as well as many other specimens, pink spots are recognizable, even under the binocular, at ental ends of penisetal follicles just as bases of penisetal shafts are sometimes recognizable, without dissection, at ental ends of penisetal follicles.

Other fragments may be spheroidal (Text-fig. 1, *c*), ovoidal (Text-fig. 1 *d*) or rod-like and then usually curved (Text-fig. 1, *e*). Fragments often are fissured (not cracked, Text-fig. 1, *f*, *g*, and *b*), or knobbed, with irregular " excavations " (Text-fig. 1, *h*), or more regular light spots that look like vacuoles (Text-fig. 1, *g*).

At ectal end of a top-shaped fragment, setal substance often becomes discontinuous, the shaft represented further ectally by discrete granules of variable shape and size. Similar clusters of granules have been found alone or in association with fragments of other shapes.

The impression one gathers in looking at a long series of follicles is that the process of deposition of the setal substance has gone completely away, and that total mass of setal substance is much less than in normal penisetal follicles.



TEXT-FIG. 1.—*Eutyphoeus quadripapillatus* Michaelsen, 1907. *a—j*. Different kinds of Penial setae.

In each of three follicles only, a single normal seta is present. By normal, in this connection, is meant a seta without knobs, fissures, grooves, cracks, excavations and vacuoles but with a smooth surface and regular margin. Each normal seta is light yellow, rather than pink, as are usually mature or functional penial setae of penisetal species. One shaft is truncate ectally, the tip without sculpturing. The tip of a second is somewhat irregular (Text-fig. 1, *j*). The tip of the third is like that of an ordinary sigmoid seta. All three are unornamented, the shafts nearly straight and without nodulus. Lengths ; 0·25, 0·34 and 0·49 mm.

Omitting further details, information now available with regard to ventral setae of xvii may be summarized as follows:—Follicles are larger than those of sigmoid setae of other segments as well as of lateral setae of xvii. Relationships of follicle to male genital terminalia are same as those of a penisetal follicle. Arrangement of fragments within a follicle may be like that of reserve setae in a penisetal follicle. Number of fragments or groups of fragments may be greater than number of reserves usually associated with follicles of ordinary sigmoid setae but may be similar to number of reserves in a penisetal follicle. Normal setae, found occasionally, are usually not sigmoid, even though ornamentation usually characteristic of penial setae is lacking. The single sigmoid seta that has been found (Gates, 1938, p. 108) may have been retained from a juvenile stage.

All this would appear to indicate that *E. quadripapillatus* formerly had penial setae, even though such setae may not have been highly specialized as to size, sculpturing of tip or ornamentation. Penisetal follicles still develop and still have " formative cells " that retain some ability to secrete setal substance while ability to deposit that substance in form of a normal setal shaft has been mostly lost or inhibited.

Further steps in the evolutionary process presumably will be complete loss or inhibition of ability by formative cells to secrete, loss of formative cells themselves and finally loss of the follicles. That last stage apparently has already been reached by two species of the genus, *E. nainianus* Michaelsen, 1907 and *E. quinquepertitus* Gates, 1930. These species do not appear to be closely related to each other, loss of penial setae presumably having arisen independently.

SUMMARY.

E. quadripapillatus, in very rarely having a sigmoid ventral setae in xvii, now appears not to be primitive. On the contrary, the evidence presented that the species once had batteries of penial setae apparently indicates that the species is highly specialized with regard to one characteristic, and in that connection at least is the most highly evolved of the holandtic section of the genus.

REFERENCES.

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