

## XXII. FRESHWATER PLANARIA

By RICHARD H. WHITEHOUSE, *M.Sc.*, *Zoological Department,*  
*Queen's University, Belfast.*

(Plate xxii.)

The collection of freshwater Planarians made in the Abor country consists of two species only, both found under stones in a hill-stream. I am asked to state that some of the specimens were collected and preserved by Capt. F. H. Stewart, I.M.S.

### *Planaria aborensis*, n. sp.

(Plate xxii, figs. 1-3.)

This species bears a striking resemblance to *Planaria subtentaculata* (Draparnaud) in such features as the shape of the head, the absence of male genital organs and the much branched alimentary canal. The collection also included a number of young specimens which were produced by transverse fission, and which corresponded exactly with the form of newly budded animals of *P. subtentaculata* as figured by Zacharias (4).

However, the very definite colouration the animals possess, and which is quite different from *P. subtentaculata*, as well as some internal anatomy, at least not recorded for this species, seemed to me to justify its separation from *P. subtentaculata*, and I have therefore called it *Planaria aborensis*.

All the specimens were collected in the Yembung stream at an altitude of 1100 ft, and were found on the under surface of stones.

The collection included 22 animals of this species; most of the specimens were much contorted, but a few remained extended. Of these the large ones measured 9 mm. in length and 2 mm. across the widest part of the trunk. The head (fig. 1) is triangular in form, often markedly so, with a prominent lappet on each side, which gives the animal a distinct neck. The posterior end of the body tapers bluntly. In colour, the dorsal side of the body is a rather light brown with a definite line of much darker tone running in the middle line along the length of the body from the neck to the posterior; this darker line expands at about the middle of its course, at the root of the pharynx, into a broad patch.

The crescentic eyes, which are two in number, are situated about midway between the anterior extremity and a line drawn across the head from the extreme points of the lappets at the side;

in those animals with a more extended head region they lie slightly posterior to this position. The eyes are about equidistant from one another and from the side of the head, and each lies in a small area containing somewhat less pigment than the general surface of the body.

A very distinct non-pigmented area occurs on either side, immediately anterior to the neck, and indicates the lateral sensory cephalic groove ("Auricularsinnesorgan" of German writers).

The ventral surface is of a milky white colour and possesses only a single aperture, the mouth; the position of the mouth varies very considerably from 2 to 4 mm. from the posterior end of the animal. This is probably due to the fact that the animal multiplies by transverse fission, those animals with the mouth situated well back being those which have recently budded off new individuals.

Cleared in cedar-wood oil, much of the general anatomy is visible. The pharynx is comparatively long (2 mm. long in a specimen 9 mm. in length); the rest of the alimentary tract consists of the usual single anterior and two posterior trunks; the secondary branches are very numerous, and in an 8 mm. specimen the anterior trunk sent off about 20 on each side, while the branches of the posterior trunks numbered about 33 on each side, 7 alongside the pharynx and 26 posterior to the mouth. The extreme anterior branches of the gut extend as far forward as the eyes.

From entire mounts and also from serial sections, it was found that the animal had no male generative organs; even the rudiments of these organs were missing, as was also a genital aperture. Absence of reproductive organs has been found to be a character of many species, such as *P. subtentaculata* (4), *P. venusta* (1) and *P. vitta*; Zacharias considers it to be a feature of *P. subtentaculata* during the summer months, and that the sexual organs appear in the autumn. He says:—"es scheint, dass die Fortpflanzung durch Quertheilung nur während der Sommermonate stattfindet;" and further: "es müssen zur Herbstzeit Eier producirende, resp. geschlechtlich differenzirte Individuen vorhanden sein, und diese habe ich unter den Händen gehabt." However, he does not describe the genital apparatus. Dugès also referred to the same thing when he mentioned the likelihood of some small specimens of the same species which he found in the autumn being produced from eggs: "Ces individus ne pouvaient avoir une origine par séparation; des oeufs sans doute leur avaient donné naissance" (3).

A search between the anterior branches of the gut revealed a definite compact aggregation of cells comparable to the ovary in other planarians, situated on either side of the body. So consistent in position and nature are these bodies with the ovaries in other species, there does not seem to me to be any doubt that they are ovaries, though at first I had some hesitation owing to the entire absence of any other genital organs. As will be seen from fig. 3 the cells composing this cell mass are undoubtedly

developing egg-cells in different stages of development. However, serial sections reveal no trace of oviducts or uterus, which accessories may be later developments. This condition of things seems to support the suggestion that this and some other species are sexual individuals at one time of the year and asexual at another. The animals examined were collected in January. There is of course the possibility that here we have a dioecious species of *Planaria* only the female of which has been discovered.

***Planaria kempí*, n. sp.**

(Plate xxii, fig. 4.)

Only a single specimen of this species was obtained; it was 9.5 mm. in length, and 2 mm. across the widest part of the body at the root of the pharynx.

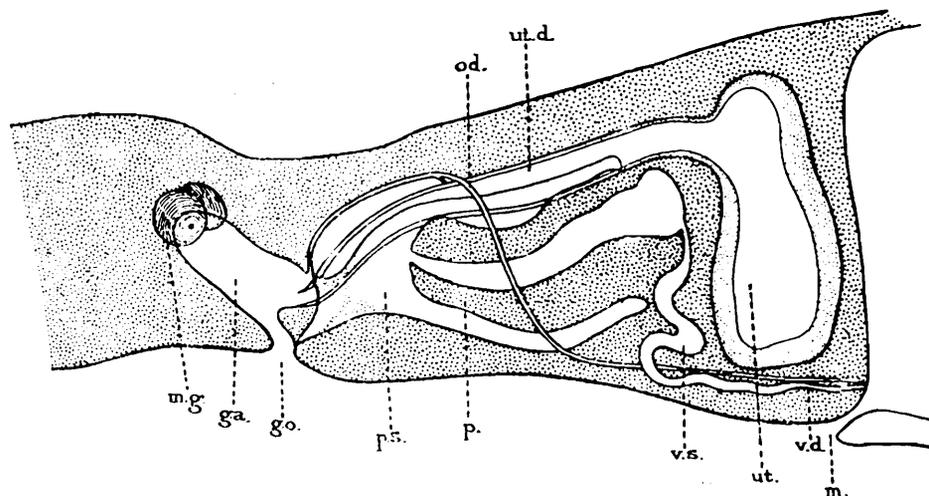


FIG. 1.—Genital apparatus of *P. kempí* (semi-diagrammatic and drawn by reconstruction from serial sections). g.a. genital atrium; g.o. genital opening; m. mouth; m.g. muscular mucous glands; od. oviduct; p. penis; p.s. penis sheath; ut. "uterus" or shell gland; ut.d. "uterine duct"; v.d. vas deferens; v.s. vesicula seminalis.

The head merges gradually into the trunk and thus no neck is differentiated. The hind end of the body tapers very little less than the head. The two eyes are fairly closely approximated, the distance between them being about half the distance from the eye to the margin of the head; each eye is surrounded by a non-pigmented area. The colour of the dorsal surface is a medium brown of even distribution. The ventral surface is much paler in colour than the dorsal side, and possesses two apertures, the mouth 3.75 mm., and the genital aperture 2.75 mm. from the posterior end.

The pharynx occupies a position in the middle of the body, and is about 2.5 mm. in length and less than 1 mm. in width. The rest of the gut conforms to the usual plan, and is much less branched than in the previous species; neither does it extend so far forward.

The genital atrium is divided unequally into two divisions, the atrium genitale commune and atrium masculinum by a projecting ridge; into the former, which is posterior, open the medium unpaired oviduct, the "uterine duct" and the muscular mucous glands; while the latter and anterior division receives the opening of the penis chamber.

The ovaries are situated in the usual position between the first and second anterior secondary branches of the gut, and close to the middle line; the oviduct, on each side, starts from the actual substance of the ovary as a funnel-like opening, richly ciliated and surrounded by glands, passing gradually into a fine duct which runs ventrally; at the region of the penis, it suddenly takes a vertical course to the dorsal side, where it meets its fellow of the opposite side to form a medium unpaired oviduct; this latter, still a narrow duct, continues until it enters the genital atrium anteriorly from the dorsal side.

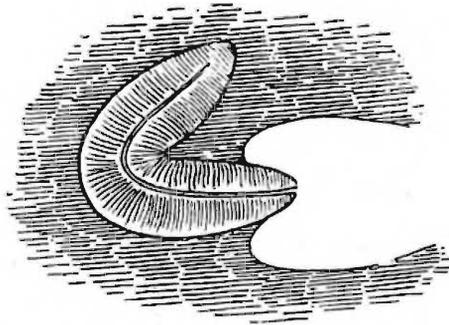


FIG. 2.—Diagram of the muscular mucous gland of *P. kempi* (purely diagrammatic) opening into the posterior part of the genital atrium. The two parts do not lie in quite the same plane.

The "uterus"—better called shell-gland—with its wide duct shows no peculiarities. The muscular mucous glands (muskulöse Drüsenorgane of German writers) are two in number, and each possesses a lumen; a peculiarity of these structures however is that there is but a single exit for the secretion of both glands. As shown in text fig. 2 they are both pear-shaped structures, one of which is entirely embedded in the parenchyma, while the other protrudes by its tapering extremity in the form of a papilla into the common genital atrium; further, the rounded end of each gland forms with the other a common mass through which the two lumina become continuous. Thus there is but one aperture for the two glands. The exact angle of inclination of one gland to the other it was not possible to determine, since only a single specimen was available.

Numerous testes are present dorsally and ventrally, and extend nearly the whole length of the body. The vasa deferentia expand into vesiculæ seminales before entering the cavity of the penis or ductus ejaculatorius. There is no appreciable differentiation of the penis into bulbus, etc.

## LITERATURE.

1. Böhmig, L., Die Thierwelt Deutsch-Ost-Afrikas, Bd. IV  
Die Turbellarien Ost-Afrikas, II, Tricladidea.
2. „ Brauer's "Die Süßwasserfauna Deutschlands." Heft 19, 1909.
3. Dugès, A., Recherches sur l'organisation et les moeurs  
des Planariés. *Ann. Soc. Nat.* I sér.,  
Tom. XV, 1828.
4. Zacharias, O., Über Fortpflanzung durch spontane Quer-  
theilung bei Süßwasserplanarien. *Zeit. f.*  
*wiss. Zool.* Bd. 43, 1886.

