PLANARIANS FROM THE ANDAMANS.

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(With I text-figure.)

This is a brief account of two new species of planarians, a freshwater and a terrestrial, from the Andamans, which were placed by the late Dr. N. Annandale in my hands for identification. To him I would like to offer my thanks for the privilege of examining the material; my thanks are also due to Marquis Y. Tokugawa for his help most generously given in his Institute.

Planaria andamanensis, sp. nov.

Based upon five specimens obtained from a small jungle-stream in Ross island. The present species looks externally very much like *Planaria annandalei* described by myself from the Inlé Lake, so far as concerns the shape in the preserved state. The head is of a triangular shape and merges behind into the trunk, from which it is indistinctly marked off by a slight neck-like narrowing. The trunk dorsally convex and ventrally flat, gradually widens backwards to the region in front of the pharynx and then begins to taper slowly, to end in a bluntly pointed posterior extremity. The largest specimen measures 9 mm. long by about 2 mm. across at the pharyngeal region.

The dorsal side of the specimen is of a dark olive-like colour, which acquires a much darker tone in the median zone, leaving a somewhat paler space of an irregular contour in the pharyngeal region. The ventral surface is of a much lighter colour than the dorsal.

The two eyes are each of a crescentic form and situated at the inner border of a small oval space without pigment. Generally they occur slightly in front of a line drawn across the broadest part of the head; the distance between them is about equal to that between either of them and the lateral head margin of the same side.

Auricular sense organs are present on each side as very distinct, elongate-oval, non-pigmented spaces on the cephalic lappets.

The epidermis is, as is usual, somewhat thicker on the dorsal than on the ventral surface, and contains a number of rhabdites, evidently situated between the epidermic cells. As has been mentioned by some authorities, the rhabdites seem to be formed in the cells scattered in sparse numbers in the parenchyma just beneath the dermal musculature, such rhabdites being found there as are still contained in the cells. The dermal musculature consists of outer circular, middle diagonal and inner longitudinal fibres. Dorso-ventral fibres occur, running between gut diverticula.

The mouth lies a little behind the centre of the body, leading into the pharyngeal chamber, in which the pharynx is horizontally disposed from the front. The pharynx is of a cylindrical shape and about one-fourth as long as the body. The unpaired anterior main trunk of the

intestine extends far forwards, sending out some pairs of subdivided lateral branches, while each of the posterior trunks gives off a number of branches, those inwardly directed joining together the two trunks, as is frequently the case.

Quite similar to that of *Pl. gonocephala*, each longitudinal nerve-trunk forms anteriorly a well-developed brain-mass, those of the two sides being connected by a number of strong commissures and sending out a few forwardly directed sensory nerves and numerous lateral ones. Posteriorly the longitudinal trunks proceed, running nearly parallel to each other, to the hind end of the body, and are connected together by fine transverse commissures. Lateral nerves are given off from the main trunks usually at points opposite to the union of the latter with transverse commissures.

The genital aperture occurs near the commencement of the posterior third of the body. It leads directly into the narrow vestibulum and receives the opening of the penis-sheath in front. Both the vestibulum and the penis-sheath are lined with a single layer of epithelium of columnar cells resting upon a fine basement membrane, beneath which comes a moderately thick muscular layer.

The testes are extremely numerous and occupy a dorsal position in the body. They are arranged in two lateral zones beginning from the brain region and extending behind near the posterior end of the body. Each testis is made up, as is usual, of sperm-mother cells and spermatozoa in several stages of development, surrounded by the tunica propria. On its lower side the testis gives rise to a fine testicular canal or vas deferens, which, though not clearly made out in the sections available, may frequently unite with its mates to form a wider duct, and then take a course directed towards the vas deferens on either side, which is distinctly discernible in the pharyngeal region. The vas deferens proceeds backwards just inside the longitudinal nerve-trunk on the ventral side and rises upwards to enter the penis-bulb on the side finally to open separately into the lumen of the seminal vesicle.

The penis consists of the hemispherical bulb and the conical intromittent part, which is horizontally disposed in the penis-sheath. The bulbous part contains, as is the case with *Pl. burmaensis*, a relatively narrow and smooth-walled seminal vesicle, which posteriorly narrows gradually into the ejaculatory duct, opening into the penis-sheath near the tip of the penis. In its course the ejaculatory duct exhibits a slight expansion and receives throughout its length the penis-glands, which are profusely present in the body-parenchyma around the penis-bulb.

The ovaries are nearly oval in shape and are present in a pair slightly behind the brain and probably between the first and second pairs of the lateral branches of the anterior gut-trunk.

The oviduct of either side runs just along the outside of the longitudinal nerve-trunk, receiving at numerous points the communication of the vitelline glands, which are very extensively distributed posteriorly from the region of the ovaries and in the interstices between gut diverticula. A little behind the genital aperture it bends mediad rather abruptly, at the same time rising slightly upwards, to unite, unlike *Pl. burmaensis*, with its mate of the opposite side into a short common

duct, which opens into the vestibulum from behind near the outer end of the vaginal canal. The oviduct shows a distinct lumen in its course, its actual wall being formed by a homogeneous and ciliated layer exhibiting no nuclei at all. The nucleus-containing parts are sunk into the surrounding parenchyma, as is the case in *Pl. gonocephala*, *Dendrocoelum lacteum*, etc. The mode of connection of the vitelline glands with the oviduct is quite similar to that found in *Pl. annandalei*, *gonocephala*, *polychroa* and some others, being effected by means of a pyriform or spherical giant cell.

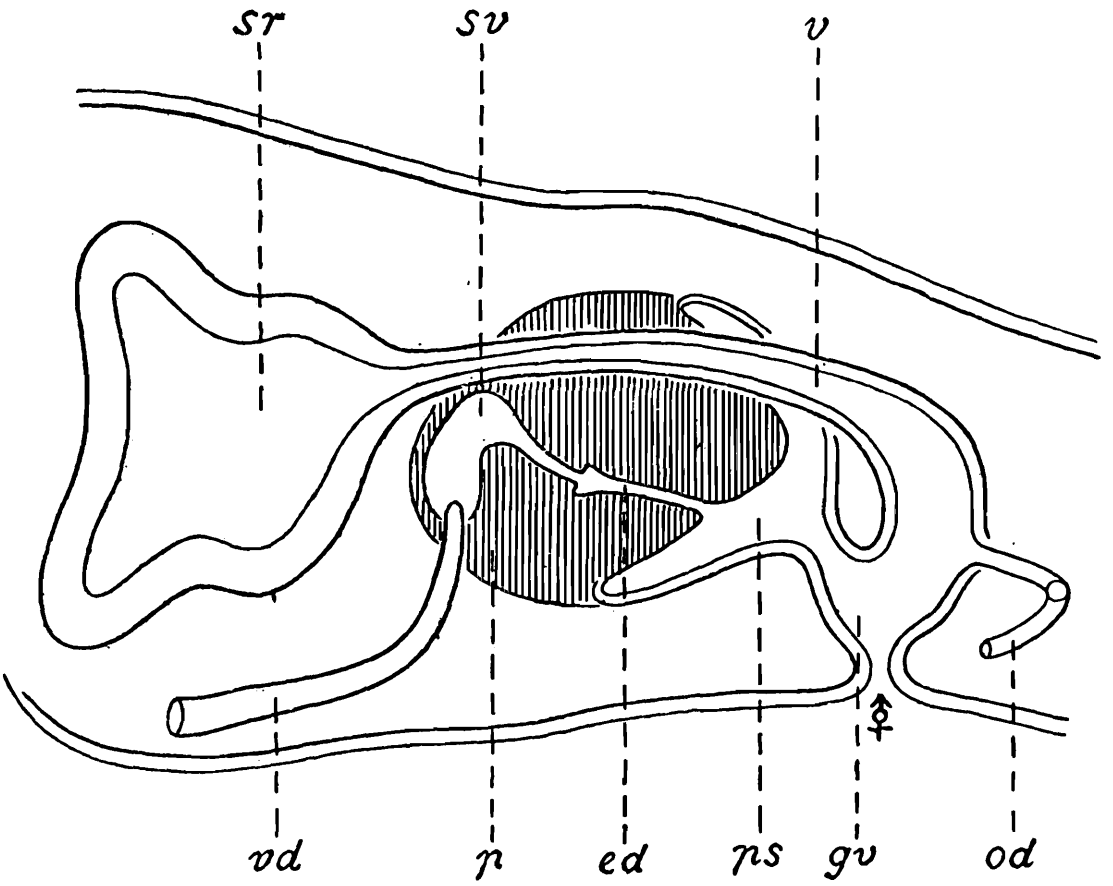

Diagram of genital organs of *Planaria andamanensis* in sagittal section. *ed.* ejaculatory duct, *gv.* genital vestibulum, *od.* oviduct, *p.* penis, *ps.* penis-sheath, *sr.* seminal receptacle, *sv.* seminal vesicle, *v.* vagina, *vd.* vas deferens, ♀. genital pore.

The seminal receptacle is a moderately large sac-like organ lying between the pharyngeal chamber and the penis. Its wall is made up of an epithelium of large columnar cells of a glandular nature, resting upon a delicate basement membrane, beneath which is a very feeble muscular layer. At its postero-superior aspect the receptacle gives rise to the vaginal canal, which runs backwards, passing dorsally to the left of the penis and then dips below to open into the vestibulum. The vagina is internally lined with an epithelium of columnar cells resting on a fine basement membrane. Just external to it is a thin muscular coating.

Bipalium vinosum, sp. nov.

This species is represented by only one specimen which was unfortunately preserved in an imperfect state and presents an aspect closely similar to von Graff's *Bipalium claparèdei* and *simplex*, both from the

islands of Sunda and Java, though differing in some respects from either of them, as will be mentioned below.

Somewhat distinctly marked off from the trunk by a neck-like narrowing is the head, which is, as in *Bip. simplex*, of a small semilunar shape and a little narrower than the broadest part of the body, measuring about 3 mm. Its lobes are a great deal smaller than those of *Bip. claparèdei*. The trunk, which is convex dorsally and flat ventrally, is almost uniformly broad for the greater part of its length, though it gradually tapers for some little distance from the posterior end to a rather pointed extremity. Along the mid-ventral line runs the slender creeping sole, which is scarcely raised above the general surface and a great deal narrower than one-fourth as wide as the trunk, differing from that found in *Bip. simplex*. In this form the sole is about one-third as broad as the trunk and longitudinally divided by a slight median groove. The example before me measures 52 mm. long by 4 mm. across the broadest part of the body. The mouth-opening lies on the sole near the commencement of the middle fifth of the body. The present form, though about twice as large as *Bip. claparèdei* and *simplex*, is still sexually immature.

The posterior half of the body is in spirit of a uniform vinous red colour on the dorsal surface, which gradually fades forwards from the pharyngeal region into a pale buff. No trace of marking is found on the head lobe. The ventral surface is similar but, though much lighter than the dorsal, is pale yellow anteriorly and reddish posteriorly. As is usual, the lower surface is of a much lighter colour.

A number of small eye-spots are arranged in one or two rows along the margin of the head, exclusive of the lobe where they occur in scattered distribution. At the sides of the neck they are much more closely approximated than on the head, extending to the dorsal surface and forming a comparatively large black patch on each side. In this respect the present form is widely different from *Bip. simplex*, in which some eye-spots form ventrally a crowded tract at the sides of the neck. No eye-spots are found extending farther back along the sides of the trunk.