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# THE REPRODUCTIVE ORGANS OF *GEOPLANA SANGUINEA* MOSELEY.

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(Figure 1.)

## Introduction.

In a description of New Zealand land planarians Dendy (1896) identified several specimens as *G. sanguinea*, which he considered had been introduced into New Zealand from Australia, where it is endemic. Nevertheless, Dendy was a little doubtful of his identification, as he goes on to say: "There is some difficulty in distinguishing between this species and *G. triangulata* var. *australis*."

In a collection of New Zealand land planarians received on loan from the British Museum for the study of the internal anatomy there was one specimen collected at Invercargill, N.Z., and labelled by Dendy *G. sanguinea*. From its internal structure this specimen proved to be an immature *G. triangulata* var. *australis*, now *Artioposthia australis*. In order to compare this with the real *G. sanguinea* the writer applied for material to the Director of the Australian Museum, Sydney, and was kindly given a selection of specimens of that worm.

## Material.

*G. sanguinea* has a wide distribution all over eastern and southern New South Wales, Victoria and Tasmania, and specimens were chosen from four localities which were widely separated so as to give a fair idea of any variations in the local specimens and their geographical range. Longitudinal sagittal serial sections were cut and stained in borax-carmin and picro-indigo-carmin and from these a reconstruction of the internal anatomy was made. The result was as follows: No. W.1820 (part) from Tasmania had no reproductive organs; No. W.2151 from Blackheath was immature, having simple male and female ducts but no genital pore; No. W.2152 (part) from near Gosford had all the essential reproductive organs, though these were not so mature as in the two specimens No. W.2196 (part) from Victoria. The worms with immature reproductive organs were smaller than the mature ones, but the general structure and arrangement of the organs was the same throughout.

## External Characters.

According to Moseley (1877) the dorsal surface is "a uniform light red which is lighter on the under surface of the body; length of living worm, 70 mm.". Since this was written, von Graff (1899) has included in this species *G. rubicunda* Fletcher and Hamilton (1888) and *G. alba* Dendy (1891). This allows for a wider variation in colour and size, as, for example, Dendy has found specimens of *G. alba* about 100 mm. in length, and Spencer (1891) in describing *G. alba* says: "Specimens vary in colour from almost white to orange, and sometimes brown and grey."

A faint dorsal median stripe has been described for some specimens, but Dendy (1891) says that there are no stripes in *G. alba* and there were no stripes on the specimens of *G. sanguinea* examined by the writer.

The mouth and the genital pore are in the usual position. In a specimen of 54 mm. length the mouth was 36 mm. and the genital pore 42 mm. from the anterior end.

The eyes are not numerous and are arranged in a single row across the anterior end with a few scattered ones down the sides.

#### Reproductive Organs (Fig. 1).

The reproductive organs are very different from those of *Artioposthia australis*, being of the typical *Geoplana* type. The genital pore (*g.p.*) opens into a common atrium (*at.*) which is separated from the male atrium (*m.at.*) by a muscular flap (*fl.*). Paired ovaries lie in the usual ventral anterior position, and from these the two oviducts (*od.*) pass back and join before entering the glandular canal (*g.c.*). This is composed of two parts—a proximal part lined with gland cells which pour their secretion into the cavity, and a distal part into which open numerous ducts of the shell glands (*sh.*) situated in the surrounding parenchyma. The glandular canal widens

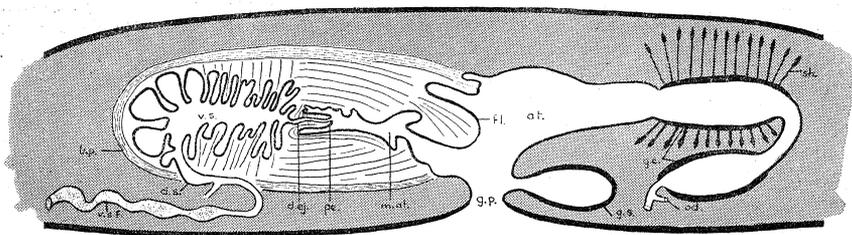


Figure 1.

Diagrammatic longitudinal section of *Geoplana sanguinea* Moseley. *at.*, common atrium; *b.p.*, penis bulb; *d.e.j.*, ejaculatory duct; *d.s.*, seminal duct; *fl.*, muscular flap; *g.c.*, glandular canal; *g.p.*, genital pore; *g.s.*, glandular sac; *m.at.*, male atrium; *od.*, oviduct; *pe.*, penis papilla; *sh.*, shell glands; *v.s.*, seminal vesicle; *v.s.f.*, false seminal vesicle.

into the common atrium without any special papilla. A simple glandular sac (*g.s.*) opens into the common atrium just inside the genital pore on the same side as the glandular canal. This sac is lined with gland cells which produce masses of a thick secretion filling the whole of the sac as well as a large part of the female atrium. It does not appear to have the function of a bursa copulatrix, which is a receptacle for sperms at copulation and therefore is generally empty; moreover, the bursa is, as a rule, more closely related to the oviduct, and very often lies between the oviduct and the penis bulb. The glandular sac, on the other hand, is a sac for producing large quantities of secretion, and its function would appear to be related to cocoon formation, especially as its development lags behind that of the other reproductive organs. An immature worm with simple ducts and closed genital pore has no such sac; an older worm with well-developed glandular canal and seminal vesicle has, in the position of the sac, a narrow outpushing of the atrial wall with no contents. Only in the fully mature worm is any secretion found in the sac and atrial cavity.

The testes lie in the usual ventral position and extend from behind the ovaries to the mouth. Each vas deferens is expanded in the region of the pharynx into a false seminal vesicle (*v.s.f.*) which, as it nears the penis bulb (*b.p.*), narrows to form a seminal duct (*d.s.*) with thick walls of circular muscles and no contents. The two seminal ducts join to form a short duct entering the seminal vesicle (*v.s.*), the lining of which is very much folded and is composed of glandular cells which pour their secretion into the cavity of the vesicle. A short ejaculatory duct (*d.e.j.*) leads through a short penis papilla (*pe.*) to the male atrium.

**Remarks.**

This planarian is characterized by the separation of the male atrium from the common atrium by a muscular flap. Both male and female ducts are very glandular and the separate glandular sac near the genital pore is a very unusual feature.

The writer records her thanks to the Director of the Australian Museum for his help in supplying information about the distribution of *G. sanguinea* and for providing the material for this paper.

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