## 2. Preliminary Notes on the Reproductive Organs of Peripatus oviparus.

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Having lately convinced myself by a careful anatomical comparison of the two, that the oviparous Australian *Peripatus* with fifteen pairs of claw-bearing legs is really specifically distinct from the externally closely similar viviparous species found in New South Wales, I have decided to apply the name *Peripatus oviparus* to the egg-laying species. A systematic description of the new species will appear shortly in the Proceedings of the Linnean Society of New South Wales. The external characters of the oviparous species have been dealt with by me in previous papers, in several of which I, as it now appears erroneously, made use of the name *Peripatus Leuckartii*[1].

As far as I have yet been able to discover, the only absolutely distinctive features which characterize the oviparous species lie in the structure of the female reproductive organs and the egg-laying habit.

In the adult female, in place of the usual genital papilla, there is a very conspicuous organ which may be termed an ovipositor. This is an ovoid body of a pale yellow or orange colour, projecting backwards from between the legs of the last (15th) pair. In adult specimens ordinarily contracted in spirit the ovipositor is as large or larger than the legs between which it lies; it is, however, capable of great extension. Its surface is uniformly ornamented with minute, spine-bearing papillae and at its apex it bears a large slit placed parallel to the long axis of the body of the animal. The ovary consists of right and left halves united in front and behind and attached by a mesentery to the pericardial septum in the mid-dorsal line. The oviducts are long and convoluted; they have a common origin from the posterior end of the ovary, to which they are attached. Near to its point of origin each bears an oval receptaculum seminis with two ducts. It is important to observe that each oviduct is divided into three parts. All three parts are narrow except where swollen out by the contained eggs. The first is very short and extends from the point of attachment to the ovary to about the level of the receptaculum; its wall is greatly folded and provided with little excrescences on the side opposite to the receptaculum. The middle and last portions of the oviduct are of about equal length. The middle portion has very thick, apparently glandular walls. The last portion has very thin, membranous walls. At their hinder ends the

[1] All my previous papers dealing with Victorian specimens of *Peripatus* with fifteen pairs of claw-bearing legs refer to *P. oviparus*.

oviducts unite in a thick-walled, triangular sac whose posterior angle is continued into the ovipositor.

I have found eggs in the middle and last portions of the oviduct, but much more abundantly in the last. Their number varies greatly: in one specimen, for example, there were three eggs in each oviduct; in a second there were seven in one and six in the other; in a third there were eight in one and nine in the other.

The eggs at the time of laying shew no appearance of embryos within them. They consist of a quantity of milky fluid, containing very many yolk granules, enclosed in a very thick, tough, but rather soft envelope of a pale yellow colour and beautifully sculptured on the outside. The sculpturing consists of little crumpled papillae, somewhat resembling worm-casts, arranged at fairly regular intervals over the surface, and with much finer, meandering ridges occupying the spaces between them. The eggs are oval in shape and measure about 1·9 by 1·5 mm.

A careful re-investigation of my material has led me to the following conclusions with regard to the egg-envelope. The envelope really consists of three membranes. 1) A very thin, transparent membrane immediately surrounding the yolk and probably to be regarded as a vitelline membrane. 2) A very thick membrane which is apparently formed as a secretion in the thick-walled part of the oviduct. In sections of a female containing eggs in the oviduct this membrane is very conspicuous and is seen to have a thickness of about 0·036 mm. It is of a pale yellow colour and has a very finely granular appearance. In a former paper I erroneously stated that the egg-membrane is smooth or nearly so while still in utero. It is true that the complete sculpture is not formed till the time of laying, but my recent observations have shewn conclusively that the foundations of that sculpture are already present when the eggs are lying in the last portion of the oviduct. These foundations consist of a number of little rounded protuberances regularly distributed over the surface of the thick membrane and each having a diameter of about 0·04 mm. They are not very obvious in fresh specimens and require careful looking for, but in specimens which have lain for a long time in alcohol previous to dissection the thick egg-membrane assumes a rather dark brown colour and the protuberances are conspicuous in surface view as much darker, well-defined circular areas. 3) The fortunate discovery of an egg partially extruded from the greatly distended ovipositor in a specimen preserved in alcohol indicates the formation of a thin, transparent membrane outside the thick one just described. This membrane appears to be formed as a secretion, probably by the walls of the triangular sac at

the base of the ovipositor. The abnormal conditions in the case mentioned have prevented its even deposition and the amber-coloured, chitinous (?) material is mostly collected in a large plug attached to what was the inner end of the egg. I have little doubt that the wrinkling of this chitinous (?) membrane as it dries upon the already embossed underlying membrane gives rise to the complete sculpture of the perfect egg-shell, for the smooth papillae of the thick membrane exactly correspond in arrangement with the crumpled papillae of the perfect shell.

The development of the embryo within the egg-shell appears to occupy a long time, for, as I have stated in a previous paper, one of the eggs laid in my vivarium in Melbourne hatched out after an interval of a year and five months from the time of laying.

In the male the genital papilla is situated in the same position as in the female, but is much less prominent. On either side of it, in the angle between the leg and the body, is a white papilla bearing the aperture of an accessory gland. Behind it and just in front of the anus are a pair of apertures belonging to other accessory glands. Crural glands occur in all the legs from the second to the thirteenth and possibly also in the fourteenth. The aperture of the crural gland is situated on the under surface of the leg, and the nephridial aperture lies inside it except in the fourth and fifth legs. The white papilla which bears the aperture of the crural gland may be either prominent or sunk in a depression, according to the state of contraction, and hence the number of these white papillae on the under surfaces of the legs may appear to vary in different specimens. I have been unable to find any crural glands in the female.

## 3. Neue Frösche und Schlangen von den Liukiu-Inseln.

Von Prof. Dr. O. Boettger in Frankfurt a./M.

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1) *Rana okinavana* n. sp.

Char. Im Allgemeinen ähnlich der *R. lateralis* Blgr., aber kurzschnäuziger und stämmiger. — Vomerzähne in zwei rundlichen Häufchen, die auf einer Linie mit dem Hinterrande der Choanen beginnen und von diesen wie unter einander durch gleichgroße Zwischenräume getrennt sind. Kopf mäßig groß; Schnauze kurz, vorn leicht zugespitzt und etwas vorgezogen, so lang wie der Augendurchmesser, Nasloch von Auge und Schnauzenspitze gleich weit entfernt. Frenalkante winkelig, Zügelgegend der Länge nach leicht eingedrückt; Interorbitalraum kaum breiter als das obere Augenlid; Trommelfell sehr deutlich, $^3/_4$-Augengröße. Finger mäßig lang, der erste länger als der zweite; Zehen mit $^3/_5$-Schwimmhaut und außerdem mit leich-