

LXIII.—*A Review of South-African Land-Mollusca belonging to the Family Zonitidæ.*—Part II. By Lt.-Colonel H. H. GODWIN-AUSTEN, F.R.S. &c.

[Plates XII.-XVII.]

IN the first part of this contribution, January 1912, p. 127, under species of *Kerkophorus*: it has been pointed out to me by Mr. H. C. Burnup that the locality assigned to *inunctus* and *poeppigi*, "Alexandra Junction, Maritzburg," is misleading. I was under the impression that the two places were not far apart. What Mr. Burnup writes clears this up, and I quote it in full:—

"*Poeppigi* may certainly have been collected at both Alexandra Junction and at Maritzburg, but it seems most unlikely that *inunctus* should be found so far from the coast as at Maritzburg. The alternative reading, and in the case of *inunctus* the more likely (since you refer to *one* animal, the type), is that Alexandra Junction is at or near Maritzburg. This is quite wrong and the difference in climate, with its vegetation, is considerable, Alexandra Junction being on the coast a little above sea-level, and Maritzburg inland at an elevation of over 2000 feet, with hills around, which would fall into the same locality, rising to 1500 feet further. Maritzburg, in a direct line, is about 40 miles N.W. from Durban, and Alexandra Junction is nearly as far S.W. from Durban. Since giving you the locality the name has been changed from Alexandra Junction to Kelso Junction."

WITH regard to coloration of the suture occurring in specimens of *P. hudsoniae*, mentioned in the first part of this paper, p. 129: Mr. H. C. Burnup, writing since its publication, agrees with me it is not a shell-character, and he attributes to it another origin, which I think is a very likely one and worth putting on record; he says:—"My experience teaches me that a similar *feature*, develops in other genera besides Peltatinæ through a fracture occurring in the liver (perhaps a small fragment being left in the apex) while withdrawing the animal from the shell. A blood-like fluid oozes from the torn liver, and capillary attraction draws it into the almost margined suture, where, unless the shell is carefully syringed, it settles, showing through the transparent shell as a rufous sutural band." In illustration Mr. Burnup sends

me two specimens of *Euonyma lanceolata*, Pfr., which show this even far more distinctly than in the specimens of *P. hudsoniæ* referred to by me.

Species of the Genus KERKOPHORUS.

The most striking feature in the animal of this genus is the great elongation of the lobe above the mucous pore, forming quite a tail-like extension of the extremity of the foot. Major Connolly has given me a copy of his original description made from the first example he saw alive of *Microkerkus symmetricus*, Craven, which will be described in the next portion of this paper. This field-note is of considerable interest and I quote it *in extenso*:—

“Tail as long as fore part of body, indented for $\frac{1}{8}$ inch from the tip with a peculiar cleft or fissure, from the upper end of which grows a small, black, fleshy horn, *which can be withdrawn or slightly protruded at will.*” (The italics are mine.)

Now in this species the lobe or horn is far smaller than in *K. inunctus* and the species described below, and yet it was observed to be retractile; how much more apparent this power of enlargement by the animal and its sensibility would be in the latter species, where the horn has reached its maximum development.

In the Indian genera of the Zonitidæ, such as *Ariophanta*, *Macrochlamys*, *Austenia*, *Girasia*, &c., the lobe, although showing considerable diversity in shape and dimensions, would not be described as decidedly retractile; its size and form is more dependent on atmospheric conditions.

This leads me to refer to a paper which was published in the ‘Proceedings of the Malacological Society,’ vol. i. pt. 6, July 1895, on *Martensia mozambicensis*, Pfr. The species had been recently collected by Dr. J. W. Gregory when on his interesting expedition in Eastern Africa during 1893. I was indebted to Mr. Edgar R. Smith for the two specimens I dissected and described.

This African land-shell has also a peculiarly long horn above the mucous pore, *vide l. c.* pl. xix. figs. 1 & 1a, drawn from a spirit-specimen and therefore very much contracted to what it must be in the living state; muscular rings on the horn point to its extensibility. The shell of *Martensia mozambicensis*, Pfr., differs in every way from the globose, few-whorled, and comparatively thin shells of *Peltatus* and allied genera, being solid or more helicoid in form. Several species are recorded by Prof. E. von Martens in the Monatsb. der könig. preus. Akad. Wiss. Berlin,

April 1878; one species *radiolata*, v. Mart., a very globose banded shell, he made the type of his genus *Zingis*. I gave reasons (*l. c.* p. 283) why these would be better included in Semper's genus *Martensia*, type *mozambicensis*, which had priority by many years.

When we look at the portion of the generative organs (*l. c.* pl. xix. fig. 1 *b*) and compare them with those of *Peltatus* and allied genera, there is a peculiarly close resemblance in type—particularly observable in the form of the spermatheca, an expanded thin-walled sac on the end of a long stalk-like tube; the penis only differing in the absence of a cæcum near the retractor muscle; the grooving on the side of the foot; the division of the sole; while the radula is of precisely the same type. I may even go a step further, and on these grounds, to say nothing of contiguity of habitat—in spite of difference in shell-character and that the formation of shell-lobes has not commenced,—suggest that the genus *Martensia* can be better placed in the subfamily Peltatinæ than in any other.

Kerkophorus inunctus, M. & P.

(Pl. III.* figs. 1, 1 *a*, animal; Pl. XII. figs. 2–2 *e*.)

Locality. Alexandra Junction (No. 3278) †.

Shell not umbilicate, very globose; sculpture very microscopic longitudinal striation, papillate and somewhat irregular; colour pale vinous ochre, with a very narrow indistinct peripheral band pale chestnut in colour; spire low, apex rounded; suture well defined; whorls 4, increasing regularly and rapidly; aperture widely ovate, oblique; peristome thin, rounded above and sinuate on side; columellar region vertical, rounded below, weak, slightly reflected near the umbilicus.

Size: major diameter 17.5, minor 14.5; alt. axis 4.75 mm.

Animal about 40 mm. long in spirit, pale-coloured, with no special markings, the scattered spotting on the visceral sac shows through the shell. Foot divided below; peripodial margin narrow, with the usual two grooves above, from which well-marked widely separated furrows extend obliquely upwards.

The hinder part of the foot above is rounded, not keeled; the lobe above the linear mucous pore is large and rises considerably, ending in a long overhanging sharp point.

* Plates I.–VII. were given with Part I. of this paper ('Annals,' Jan. 1912).

† The numbers refer to specimens received from those who have assisted me in this work; they may prove useful for future reference to the spirit-specimens and mounted objects.

The right shell-lobe (Pl. III. fig. 1) is large and broad, the left (fig. 1 *a*) quadrate; the two, when extended in life, must cover the greater portion of the shell. The dorsal lobes are well developed, and the left one is in two parts, the posterior portion being small. The visceral sac is the same colour throughout, sparsely mottled with small black spots, over the kidney there are a number close together forming a dark band, seen through the shell.

The generative organs (Pl. XII. figs. 2, 2 *a*) are similar to those of *phædimus*, M. & P., with this exception, the vestibule is large, globose, solid, having thick walls, externally with a rough warty surface, very conspicuous as shown in fig. 2; when this is cut through and opened out as in fig. 2 *a*, on the walls of the internal surface some four strong, muscular, pillar-like folds are seen, not observed in any other South African species I have as yet examined. The free oviduct (ovithecæ?) is intensely black, in strong contrast to the rest of the generative organs. The penis has an accessory gland near the retractor muscle; the epiphallus is very short, as in No. 3379 *phædimus* (Pl. V. fig. 3) and *poeppigi*?, and the flagellum very long. The spermatheca is a large pear-shaped sac on a long solid duct. The formula of the radula (Pl. XII. figs. 2 *c-e*) is

60 . 1 . 15 . 1 . 15 . 1 . 60, or 76 . 1 . 76.

The centre and admedian teeth are on large plates, the latter with a cusp on the outside. The 16th tooth is transitional with no cusp. The succeeding marginals are curved and aculeate up to about the 65th tooth, when a slight notch appears low down below the point on the outer side, rising higher and higher and at the same time larger; the outermost marginals (fig. 2 *e*) are unevenly bicuspid. The aculeate form of the teeth (fig. 2 *d*) in this species separates it well from its congeners. The jaw (fig. 2 *b*) is moderately curved, with a central projection on the cutting-edge.

Another species was received as *Helicarion phædimus*, Melv. & Pons.; the specimens were beautifully preserved. Mr. H. C. Burnup writes from Maritzburg, Natal, 21st March, 1908:—

“There is no doubt about this species being *Helicarion phædimus*, M. & P.; we are quite familiar with the form, but as there are so many of the old species unknown, there is always the possibility of the newer species having been described before. Besides I do not know if it has been satisfactorily ascertained that any of our so-called *Helicarions* really belong to that genus.”

The species which have given me most trouble when

working at this group of molluscs are *corneus*, Pfr., *poepigii*, Pfr., *natalensis*, Krs., *inunctus*, M. & P., and *phædimus*, M. & P., three of the oldest and two of the latest described; and, as Burnup very accurately writes, "the difficulty of recognizing the earlier described species is a terrible barrier to completion."

I asked him what is *corneus*? to which he replies:—

"It seems reasonable to suppose that, however many *rare* shells they may have found, the early discoverers would find most of the commonest ones. *Phædimus*, M. & P., is very plentiful at Port Natal, *i. e.* Durban, as elsewhere in the province of Natal. Can you realize the possibility of *corneus* being *phædimus*? According to Pfeiffer's dimensions, *corneus* is relatively one of the lowest shells of the group, *phædimus* is one of the lowest of those known to me. That the typical *phædimus* from the mid lands is smaller than what I take to be the same species from the coast need not be considered, there are so many instances of the coast shells being larger than those from the mid and high lands. That *phædimus* from the mid lands almost invariably has a suprapерipheral band, while the same (?) species from the coast only sometimes has, must be an insignificant point." To confirm this Mr. Burnup sends me four specimens of *phædimus* from Maritzburg, all banded; three unbanded with one banded from Durban: they present no difference save in size. The shell of the animal dissected and described by me, supplied by Ponsonby from Maritzburg, agrees exactly.

Kerkophorus phædimus, M. & P. (Pl. V. fig. 3;
Pl. XIII. figs. 1-10.)

Maritzburg.

Animal (figs. 1, 2) very pale in colour, with a long, narrow, keeled foot indistinctly divided, and having a very long arched lobe (fig. 3) above the mucous pore. A broad, large, pointed right shell-lobe (*rs**l*) and a broad left shell-lobe (*ls**l*); they unite behind at the keel of the foot, and in life must cover the greater part of the shell. Right dorsal lobe (*rd**l*) small; the left entire, covering the neck. Peripodial grooves very indistinct, showing better on the anterior margin. On the visceral sac (fig. 5, *vs*) near the rectum (*r*) and heart (*h*) are white mottlings, which extend and increase to a band of that colour towards the apical whorls, the rest of which is black.

Generative organs (Pl. V. fig. 3).—The penis has a long, tapering, rather twisted flagellum, the vas deferens joining near the base. The epiphallus is short. Adjacent to the attachment of the retractor muscle there is a

fairly large free accessory gland (*ac.gld*). The spermatheca (Pl. XIII. figs. 7-9, *sp*) is an elongate thin sac at the distal end of a thick strong tube. The free oviduct just above the base of the spermatheca is a very dark pigmented globose sac (*ot*) (ovithea?), with strong smooth walls into which the oviduct leads. The shaft of the penis is bent in S-form, so that if it were extended it would be of considerable length.

Radula: central tooth tricuspid, admedians with cusp on outer side, as figured in Ann. & Mag. Nat. Hist., Feb. 1908, pl. viii. fig. 1 *d*; laterals are long, beautifully curved and bicuspid; the last of the marginal teeth show pectination on the outer side. Formula is

100 . 3 . 12 . 1 . 12 . 3 . 100, or 115 . 1 . 115.

Jaw (fig. 6) moderately concave on the cutting-edge, with a small central projection.

The branchial cavity is not extensive; the pericardium and adjacent renal organ occupy a subcircular area next it, the kidney being short.

The spermatheca (fig. 9) contained a perfect spermatophore, a beautiful object. It consisted of an elongate capsule, commencing with a mass dark and pointed at one end, terminating in a long gradually narrowing ribbon, having spines set on its edge on one side only. The spines generally branching into three, with bifid points. The ribbon becomes very attenuate at the end and for some distance is spineless.

In the same individual was a spermatophore developing in the flagellum (fig. 10) and portion of the male organ near the junction of the vas deferens. The attenuated portion corresponds to the extreme free end of the flagellum, and the spines are seen in process of forming. The black portion in fig. 10 (Pl. XIII.) represents a hardened mass of spermatozoa.

The spermatophore of *Peltatus* previously described (Ann. & Mag. Nat. Hist., Feb. 1908, p. 132) was immature in process of formation; the fig. 1 *b*, pl. viii., may be compared with fig. 10, Pl. XIII., of *B. phædimus* in a similar stage.

It was interesting thus to find many characters similar to those of *Peltatus aloicola*, M. & P.: the principal differences lying in, (*a*) the expansion of the shell-lobes into large lappets, (*b*) the great development of the lobe over the mucous gland. In (*a*) we are presented with the similar development of the animal as regards the mantle as shown in the genus *Euaustenia* of India, separating it from *Macrochlamys*, with elongate narrow shell-lobe.

Kerkophorus vitalis, M. & P. (Pl. III. fig. 3 ;
Pl. XIV. figs. 1-1 e ; Pl. XV. fig. 2.)

Helicarion vitalis, M. & P., Ann. & Mag. Nat. Hist. ser. 8, vol. i.
February 1908, p. 133, pl. vii. fig. 4 (shell).

Original description :—

“ *H. testa* pertenui, vitrea, vivide ochracea, rimata, globoso-conica ; anfractibus $4\frac{1}{2}$, apice ipso obtuso, cæteris ad suturas impressis, ultimo rapide accrescente ; apertura rotundo-lineari ; peristomate papyraceo, tenuissimo, apud regionem umbilicarem paulum incrassato et reflexo.

“ Alt. 12, diam. 15 mill.

“ *Hab.* Port Shepstone, Natal (*Burnup*).

“ A very beautiful globose, transparent shell, tinted with pale ochre, which seems distinct from all the species hitherto enumerated from this region.”

The animal is very pale in colour as preserved in spirit, which in some cases seems to bleach the things put in it.

The posterior part of the foot very lengthened, the lobe over the mucous gland (Pl. III. fig. 3) very long and pointed. The right shell-lobe broad and very long ; the left triangular and pointed, large, on a broad base. The left dorsal lobe in two parts, the posterior one very small. The visceral sac near the mantle-margin and over the branchial cavity is quite plain ; adjacent to the kidney and heart there are a few white spots. With the liver close white mottling commences, and towards the apex that portion covered externally by the shell is all white.

The generative organs (Pl. XIV. figs. 1, 1 a) compare well with those of *Kerkophorus phædimus*, M. & P., even to the closely coiled state of the penis (*vide* fig. 7, Pl. XIII.). The spermatophore (Pl. XV. fig. 2) was secured in a most perfect state, and is of the same type as in that species, differing in small points of detail. It has 27 branching spines on one side and two on the other next the capsule. On Pl. XIV. fig. 1 b the form of the branches terminating in bifid points is shown.

The radula (Pl. XIV. figs. 1 d, 1 e) has more teeth in the row than any other species of these African genera yet examined by me, having a formula

126 . 1 . 12 . 1 . 12 . 1 . 126, or 139 . 1 . 139.

It is also remarkable by the admedian teeth being finely serrated on the margin, beginning with the thirteenth tooth, and this character continues to the margin.

The jaw (Pl. XIV. fig. 1 c) of the specimen examined shows little sign of the central projection, and is only slightly concave on the cutting-edge.

Kerkophorus melvilli, sp. n. (Pl. VII. figs. 1-1 d;
Pl. XIV. fig. 2.)

Locality. Equeefa, Natal (No. 14, *H. C. Burnup*).

Shell globosely conoid, scarcely perforate; sculpture nearly smooth, very fine, microscopic raised dots, in places showing a longitudinal arrangement; colour bright olivaceous ochre with a green tinge; spire subconoid; suture impressed; whorls 4, the last rapidly increasing; aperture ovately lunate; peristome thin, sinuate; columellar margin very weak, thin, and convex.

Size: major diameter 17·5, minor 15·0; alt. axis 8·0 mm.

The animals were well preserved, two in number; the largest was taken for examination. There is a large right shell-lobe, broad and leaf-like; the left shell-lobe also large and expanding, similar to those of *phædimus* and *inunctus*.

The animal has no markings. The foot is divided and it has a conspicuous long-pointed lobe above the large mucous gland. The ground-colour of the visceral sac is pale greenish grey, much speckled finely and evenly with small black and white spots (pepper and salt would best describe it) over the branchial cavity, kidney, and heart. The black spots become more numerous near the kidney, and coalescing form a conspicuous band; beyond this and towards the part filling the apex of the shell the white spots increase in size, somewhat quadrate in form, and then a narrow, foliated, irregular edged band. The character of the coloration is similar to that of *Kerkophorus inunctus*; in that species the apex is pale-coloured, with no white markings. The respective shells settle and separate the species: *inunctus* has a much lower spire and is finely banded.

In the generative organs the penis is closely coiled, as shown in Pl. XIII. figs. 7 & 8. The flagellum is very long and tapering; the accessory gland is long and bag-shaped, and the strong retractor muscle is given off close to the base of it. The spermatheca is very capacious, elongately pear-shaped at the head of a long duct; the walls of this were not, as is usual in other species I have examined, thick and solid, but were so thin and transparent that particles within it could be seen floating about. In the pear-shaped sac only a small portion of a spermatophore (Pl. VII. fig. 1) was found, not

sufficiently well-preserved to show the form of the spines, a detail which is so important in these African genera.

The radula (Pl. VII. figs. 1 a-1 c) is interesting for its similarity to that of *K. inunctus* in having quite a number of aculeate laterals; these pass towards the margin, and at about the thirty-fifth tooth from the edge into the bicuspid form, with the inner point the longest. The arrangement is about $80 \cdot 3 \cdot 13 \cdot 1 \cdot 13 \cdot 3 \cdot 80 = 96 \cdot 1 \cdot 96$.

The jaw has a central projection.

Of No. 14 Burnup says: "possibly the same species as No. 11."

Of No. 11: "These, I should think, will belong to the same as the largest of No. 10 and No. 14."

Kerkophorus leucospira, Pfr. (Pl. XVI. figs. 1-1 b, animal; Pl. XVII. figs. 1-4.)

Locality. Tongaat (*H. C. Burnup*); twenty specimens.

Shell thin, imperforate, globose; sculpture smooth and glossy to the eye, under high power microscopic, regular, fine longitudinal striation; colour pale sap-green when animal is removed; spire low, apex flatly conoid; suture shallow; whorls 4, regularly but rapidly increasing to the last, which is tumid and well rounded on the periphery; aperture semioval, higher than the breadth; peristome very thin; columellar margin weakly concavely rounded.

Size: major diam. 11.75; alt. axis 6 mm.

Animal (Pl. XVI. figs. 1-1 b).—Before this is removed from the shell the contrast of the black and white on the visceral sac is very striking and characteristic of this species, for it shows through the thin shell (fig. 1), and it appears black beneath, with a very narrow edging of same colour next the suture of the second and third whorls, the first two apical whorls being wholly white.

The foot is divided on the sole and has a long overhanging lobe above the mucous pore. There is a peripodial margin, with two grooves above. The right shell-lobe (Pl. XVI. figs. 1 & 1 a) is narrow, elongate, and tongue-shaped; it is given off from the side of the right dorsal lobe just below the rectum, and in life is evidently extensible for a considerable distance over the upper surface of the shell, as in many species of *Macrochlamys*. (In the specimen figured (fig. 1 a) the lobe terminates in two points, quite an abnormal case, and one, after examining hundreds of specimens, I have never seen before.) There is a long, narrow, finely pointed left shell-lobe (Pl. XVI. fig. 1 b), also extensible, given off from

the edge of the mantle, on the left anterior side. The left dorsal lobe is in two distinctly separate portions, the interval being just to the right of and below the left shell-lobe.

The walls of the branchial cavity are sparsely spotted with pure white, similar to the band of the same colour which, commencing at the rectum, is continuous in a posterior direction, widening considerably over the heart and kidney, and occupies quite half of the circumference of the coil of the visceral sac.

The radula (Pl. XVII. figs. 3, 3 *a*) has the formula 67 . 3 . 9 . 1 . 9 . 3 . 67, or 79 . 1 . 79. The central and admedian teeth have a basal cusp on the outer side, rather distant from the mesocone; the laterals are evenly bicuspid, gradually becoming so from the tenth transition admedian tooth. The marginals are distinctly serrated below the outer cusp (fig. 3 *a*, 65–79). In this character it agrees with *Peltatus hudsoniæ*, but it is far more defined. In the form of the basal plates, as well as in the form of the teeth, this radula does not recall those we know in the genera of Indian Zonitidæ.

The jaw (Pl. XVII. fig. 4) is well arched, with a central projection on a deep concave cutting-edge.

In the generative organs (Pl. XVII. figs. 1, 1 *a*) the penis has an accessory gland, globose and sessile, situated on the epiphallus about one-third its length from the retractor muscle. The flagellum is short. The spermatheca (*sp*) is a globose sac at the end of a strong, thick, and long duct. It contained a very perfect spermatophore (Pl. XVII. fig. 1), protruding in part, having ruptured the wall of the sac. In fig. 2 this is much enlarged, to show its remarkable detail and the beautiful form of the spiny setting. There are some thirty-five tufts following one side of the flume, made up of elongate branches, each side branch bifid at the extreme point; where perfect they are arranged in pairs like the antlers of a stag. The form the spines assume varies in an interesting way in different species of the genus. The capsule is very long, and this may be termed the anterior part of this organ, the flume the posterior. About the middle (see right-hand side of fig. 2) it may be seen that it is joined by a much thinner tube (see Pl. XVII. fig. 2 *b*, *w*). This is of very considerable length, and when a spermatophore is removed from the sac it is resting in, the whip-like end is found extending down the duct and has to be drawn out of it.

Species of the Genus MICROKERKUS.

Microkerkus symmetricus, Craven. (Pl. I. figs. 2, 2 a, animal; Pl. III. fig. 4.)

Locality. Pretoria (No. 4).

Shell globosely conoid, thin, rimate; sculpture very indistinct longitudinal streaking, with well-seen lines of transverse growth; colour ochraceous, with a yellow tint; spire conic, apex blunt; suture shallow; whorls 4, somewhat rapidly increasing, and tumid, the last rounded on the periphery; aperture widely lunate; peristome very thin; columellar margin not thickened, subvertical, a slight reflection near the umbilical region.

Size: major diam. 14·6, minor diam. 12·4; alt. axis 7·5 mm.

Ponsonby and Connolly both agree that this species, No. 4, and that provisionally named *concinus* from Boksburg, near Johannesburg, are the same.

In No. 4 tube I found two species, with locality Pretoria; in two of the specimens the animal was not removed from the shell, and the largest I dissected.

The remaining three specimens must be *Zingis natalensis*, as given in the list of specimens sent me by Mr. Burnup; but what the shell is like it is impossible to say, or to which of the two species his following notes apply:—

“This has been identified as *Zingis natalensis*, Pfr., but local collectors doubt the accuracy of the determination, and I think Mr. Ponsonby now shares the doubt. As the true *Zingis natalensis*, Pfr., is a common shell at Port Elizabeth, its anatomy is probably known, but in any case one of Mr. Ponsonby’s correspondents is likely soon to supply you with examples.”

Animal.—Lobe over the mucous pore (Pl. III. fig. 4) at the extremity of the foot only moderately long, the right shell-lobe (Pl. I. fig. 2) long and very narrow, the left shell-lobe (fig. 2 a) triangular, small. The left dorsal in two parts, the posterior the largest. The visceral sac on the anterior part pale-coloured, with short narrow white streaks extending as far as the kidney; distant rather large spotting follows and continues to the apex. Liver a pale grey-brown.

The generative organs (Plate in next part), although generally like the other species of this South-African subfamily, differ in detail: the accessory organ is very close to the retractor muscle, the flagellum is shorter, and at the head of the shaft of the penis there is a sharp bend concealed somewhat by muscular tissue. The spermatheca contained a

spermatophore, perfectly formed. The spines are all on one side, closely set, branching, and elongate and tapering, of the type of *leucospira*; the flume branches into two, one branch being whip-like.

The radula: central and admedian teeth as in the subfamily, the outermost marginals with two or three serrations below the outer upper cusp.

Formula: 48 . 3 . 11 . 1 . 11 . 3 . 48, or 62 . 1 . 62.

Jaw much arched, with a central projection.

Microkerkus pondoensis, sp. n. (Pl. IV. figs. 2, 2 a;
Pl. XIV. figs. 3, 3 a, animal.)

Locality. Pondoland (No. 47).

Shell unfortunately much injured when extracting the animal; sculpture quite regular longitudinal striation; colour yellow ochraceous, the first two whorls white as in *leucospira*; spire flatly conoid, apex bluntly rounded; suture impressed; whorls 4; aperture broken; peristome broken; columellar margin broken.

Size: major diam. 12.25, minor ?; alt. axis ? mm.

The animal differs from all the species of this group I have as yet seen by having no markings of any sort on the visceral sac, which is milky white throughout. The lobe over the mucous pore smaller than in other species; but the specimen examined is very much contracted in the spirit, so conclusions of this kind are not of great value, and it is to be hoped collectors in the future will make descriptions from the animals when taken alive.

The peripodial margin is broad and closely fringed, as it were.

Foot divided. Right shell-lobe and left shell-lobe small.

The generative organs (Pl. IV. fig. 2) only differ from those of allied species in small particulars. The shaft of the penis is long, the epiphallus very long and much convoluted near the accessory gland, which appears caught up in the coil. The flagellum has a longish cæcum attached to it (*f'*). This is a variation in this particular part noticed also in *K. burnupi*, sp. n., No. 15 (Pl. II.), connected with a corresponding variation in the form of the attenuate end of the spermatophore. This bifurcation also occurs in *Kerkophorus leucospira* (vide Pl. XVII. fig. 1 a).

"Sent to the Cape Town Museum by Miss Pegler from Kentani, near Pondoland. We have begged her to send more either live or properly drowned. The shell appears to be ? *Helicarion leucospira*, Pfr., or *pellicula*, Fér.; but *leuco-*

spira is only distinguished by its white spire, which cannot be seen while the animal is inside the present examples. No one out here knows what *pellicula* is; it may be the young of two or three spp., such as *natalensis*, Krs., *phædimus*, M. & P., *vitalis*, M. & P., &c., or may be = *leucospira*." (M. Connolly.)

I have very recently had an opportunity of carefully examining with Major M. Connolly No. 15, sp. n.? (*vide* p. 128, part 1), from Maritzburg, which I had named provisionally *burnupi*. No. 15 agrees best with specimens in the Natural History Museum named *pellicula*, Fér. There are, however, in the same box two distinct species, one represented by two examples from Natal, the other by one shell from Delagoa Bay. *K. burnupi* comes nearest to the Natal specimens. On looking at Ferrusac's figures of *pellicula* (Desh., Hist. Nat. Moll. pl. ix. A, 1851), they represent a form with a high spire, higher than in *K. burnupi*, the description of which must now come in the third part.

Microkerkus chrysoprasinus, M. & P.

Locality. Thaba N'chu, O.R.C. (Major M. Connolly); three specimens in spirit (No. 72).

Shell very minutely perforate, globosely conoid; sculpture smooth; colour rich ochre, paler at apex, second species streaked transversely with pale narrow bands; spire conic, moderately high, apex blunt; suture impressed; whorls 4, first three increasing regularly, the last much expanded; aperture broadly lunate and broad as high, oblique; peristome thin, slightly sinuated; columellar margin weak, thin, and joining the thin callus on the side.

Size: major diam. 11·6, minor 10·0; alt. axis 6·8 mm.

Animal.—The visceral sac is wholly white, towards the apex becoming ochraceous; there is a thin dark streak, with some white spots parallel to and near the mantle-zone and some white spotting near the region of the heart, with a faint narrow grey band near the kidney. The head and extremity of the foot greyish in one specimen, in the other two all of the same pale ochraceous tint. One of the largest specimens dissected and drawn has a fairly long narrow right shell-lobe and a small, triangular, pointed left shell-lobe. The mucous gland at extremity of foot is covered with a small pointed lobe.

The generative organs are very similar to those of *symmetricus* in having a small accessory gland globose and sessile,

a long epiphallus, and a very long and tapering flagellum. The sheath of the penis is bent into S-form. Spermatheca a globose sac on a long stalk; it contained only the capsule of a spermatophore, all trace of the rest had disappeared.

The radula was very perfect. It is very characteristic, not exactly like any other I have seen. The central and admedian teeth rather more elongate than usual, the latter with a single basal cusp on the outer side; the eleventh tooth rises higher and the plate is much narrower at the fifteenth; the teeth are long, narrow, and nearly evenly bicuspid, becoming very small and still narrower on the margin.

Formula: 56 . 10 . 1 . 10 . 56, or 66 . 1 . 66.

Jaw with a central projection.

Will be figured in the next part.

ANDRARION, gen. nov.

Shell small, flattened, of few whorls, the apical close-wound and rapidly increasing.

Animal (extremity of foot not seen) has a broad, short, right shell-lobe and a small triangular left shell-lobe. Generative organs not yet seen. Radula with inner marginal teeth bicuspid, with a serrated outer edge, the outer tricuspid.

Andrarion pumilio, M. & P. (Pl. XVI. figs. 3-3 b.)

Helicarion pumilio, Melv. & Pons. Ann. & Mag. Nat. Hist. ser. 8, vol. iv., Dec. 1909, p. 490, pl. viii. fig. 11.

Original description:—

“*H. testa parva, planulata, succineata, tenui, breviter obscure perforata; anfractibus 3, quorum apicalis submamillatus, nitidus, suturis impressis, ultimo anfractu effuso; apertura late lunari; peristomate tenuissimo, marginem super columellarem obscurissime reflexo.*”

“Alt. 4, diam. 7 mm.

“*Hab.* Zoutpansberg, Transvaal.

“At once distinguished from all South-African congeners yet known to us by its small size. The anatomical details of this species, as well as *russofulgens*, are at present unknown, but the shells of both seem distinct enough to warrant description.”

Two specimens were received through Mr. Ponsonby; they are not so large as the type shell in the Natural History Museum. The animal was not in a good state, so very little

of the internal anatomy could be made out. There is a broad, short right shell-lobe (Pl. XVI. fig. 3) and a triangular, small left shell-lobe, and a black narrow band bordered the mantle-edge.

The radula (Pl. XVI. fig. 3 *b*) was secured. The central admedian teeth are of usual form; the first marginals are nearly evenly bicuspid, becoming tricuspid about the thirtieth tooth, and several have even four cusps and show a serrated edge.

The formula is 45 . 2 . 9 . 1 . 9 . 2 . 45, or 56 . 1 . 56.

Jaw with a central projection (Pl. XVI. fig. 3 *a*).

Major Connolly suggested to me that these small shells were the young of *M. symmetricus*, Craven, but the serrate teeth described above are not found in that species. So far as known, *A. pumilio* differs from all the species I have as yet seen from South Africa.

EXPLANATION OF THE PLATES.

PLATE XII.

Kerkophorus poeppigi, Mke.? Pine Town, near Durban. (No. 3379.)

Fig. 1. Portion of the generative organs. $\times 4.5$.

Fig. 1 *a*. The spermatophore complete. $\times 12$.

Fig. 1 *b*. Whip-like end of the spermatophore. $\times 24$.

Kerkophorus inunctus, M. & P. (1899). Alexandra Junction.
(No. 3278.)

Fig. 2. The generative organs. $\times 4.5$.

Fig. 2 *a*. The vestibule of same opened out. $\times 4.5$.

Fig. 2 *b*. The jaw. $\times 12$.

Fig. 2 *c*. The central teeth of the radula. $\times 368$.

Fig. 2 *d*. Lateral teeth at different parts of the row. $\times 368$.

Fig. 2 *e*. The outermost laterals.

PLATE XIII.

Kerkophorus phædimus, M. & P.

Fig. 1. Animal, viewed from the right upper side.

Fig. 2. Ditto, from the right side.

Fig. 3. Extremity of the foot, with long overhanging lobe (enlarged).

Fig. 4. Right side, to show the dorsal lobes; the large right shell-lobe has been destroyed (*vide* fig. 2).

Fig. 5. Animal removed from the shell, showing the rectum, branchial sac, heart, &c.

Fig. 6. Jaw. $\times 24$.

Fig. 7. Generative organs. $\times 4.5$.

Fig. 8. Penis partly unrolled. $\times 4.5$.

Fig. 9. Spermatheca sac, with spermatophore inside. $\times 12$.

Fig. 10. The flagellum, with portion of a spermatophore in course of formation. $\times 12$.

PLATE XIV.

Kerkophorus vitalis, M. & P. Port Shepstone, Natal.

- Fig. 1.* The male organ. $\times 4.5$.
Fig. 1 a. The spermatheca and free oviduct, &c. $\times 4.5$.
Fig. 1 b. A short portion of a spermatophore, showing type of spines on side of the flume. $\times 58$.
Fig. 1 c. The jaw. $\times 12$.
Fig. 1 d. Thirty-eighth, thirty-ninth, and fortieth teeth of the radula. $\times 368$.
Fig. 1 e. Tenth to sixteenth, showing the transition-teeth.

Kerkophorus melvilli, sp. n.

- Fig. 2.* The generative organs. $\times 4.5$.

Microkerkus pondoensis, sp. n.

- Fig. 3.* Animal with the shell removed, viewed from the right side. $\times 4.5$.
Fig. 3 a. Ditto, ditto, left side, to show minute left shell-lobe. $\times 4.5$.
 The position of the heart and kidney also shown.

PLATE XV.

Kerkophorus ampliata, M. & P. (No. 7.)

- Fig. 1.* Animal with shell removed, seen from the right side. $\times 3.4$.
Fig. 1 a. Ditto, part of, left side, to show shell and dorsal lobes. $\times 3.4$.
Fig. 1 b. Ditto, seen from above, showing position of generative organs. $\times 4.5$.
Fig. 1 c. Generative organs removed. $\times 4.5$.
Fig. 1 d. A spermatophore, complete. $\times 18$.

Kerkophorus vitalis, M. & P. Port Elizabeth.

- Fig. 2.* A spermatophore, entire. $\times 18$.

PLATE XVI.

Kerkophorus leucospira, Pfr.

- Fig. 1.* Animal, viewed from right side. $\times 1.5$.
Fig. 1 a. Ditto, ditto. $\times 4.5$.
Fig. 1 b. Ditto, left side. $\times 4.5$.

Kerkophorus fusicolor, M. & P. Harrismith.

- Fig. 2.* Animal, mantle-margin, right side. $\times 4.5$.
Fig. 2 a. Ditto, ditto, left side, with branchial sac and kidney. $\times 4.5$.
Fig. 2 b. Extremity of the foot. $\times 8$.

Andrarion pumilio, M. & P.

- Fig. 3.* The mantle-margin detached from body of animal. $\times 4.5$.
Fig. 3 a. Jaw. $\times 24$.
Fig. 3 b. Marginal teeth of the radula, very much enlarged.

PLATE XVII.

Kerkophorus leucospira, Pfr. Tongaat.

Fig. 1. Part of the generative organs, $\times 4.5$, showing the spermatheca with a spermatophore within it, the hermaphrodite duct (*hd*), albumen-gland (*alg*), oviduct (*ov*), &c.

Fig. 1 a. The male organ detached. $\times 4.5$. *fl*, flagellum; *fl'*, accessory portion of flagellum.

Fig. 2. Spermatheca and its duct much enlarged, to show the spermatophore within it more clearly; the latter is seen protruding, the wall of the sac having been ruptured.

Fig. 2 a. Terminal end of the flume (*vide* left-hand side of *fig. 2*, where it is represented terminating abruptly and was indistinctly seen).

Fig. 2 b. Portion of flume at about the middle of its length, to show the form of the spines (also *vide* right-hand side of *fig. 2*, where a very long whip-like part (*w*) is given off and is the last part to enter the spermatheca). *m* is the membranaceous wall of the sac in section.

Fig. 3. Teeth of the radula at different parts of the row, $\times 368$.

Fig. 3 a. Outermost marginals, 65-79.

Fig. 4. Jaw. $\times 12$.

LXIV.—A Revision of the Asilidæ of Australasia,

By GERTRUDE RICARDO.

[Continued from p. 488.]

Brachyrrhopola nitidus, Macq.

Type seen in Paris, apparently a male, from Tasmania, is no doubt a species of this genus, though not recognized as such by Macquart.

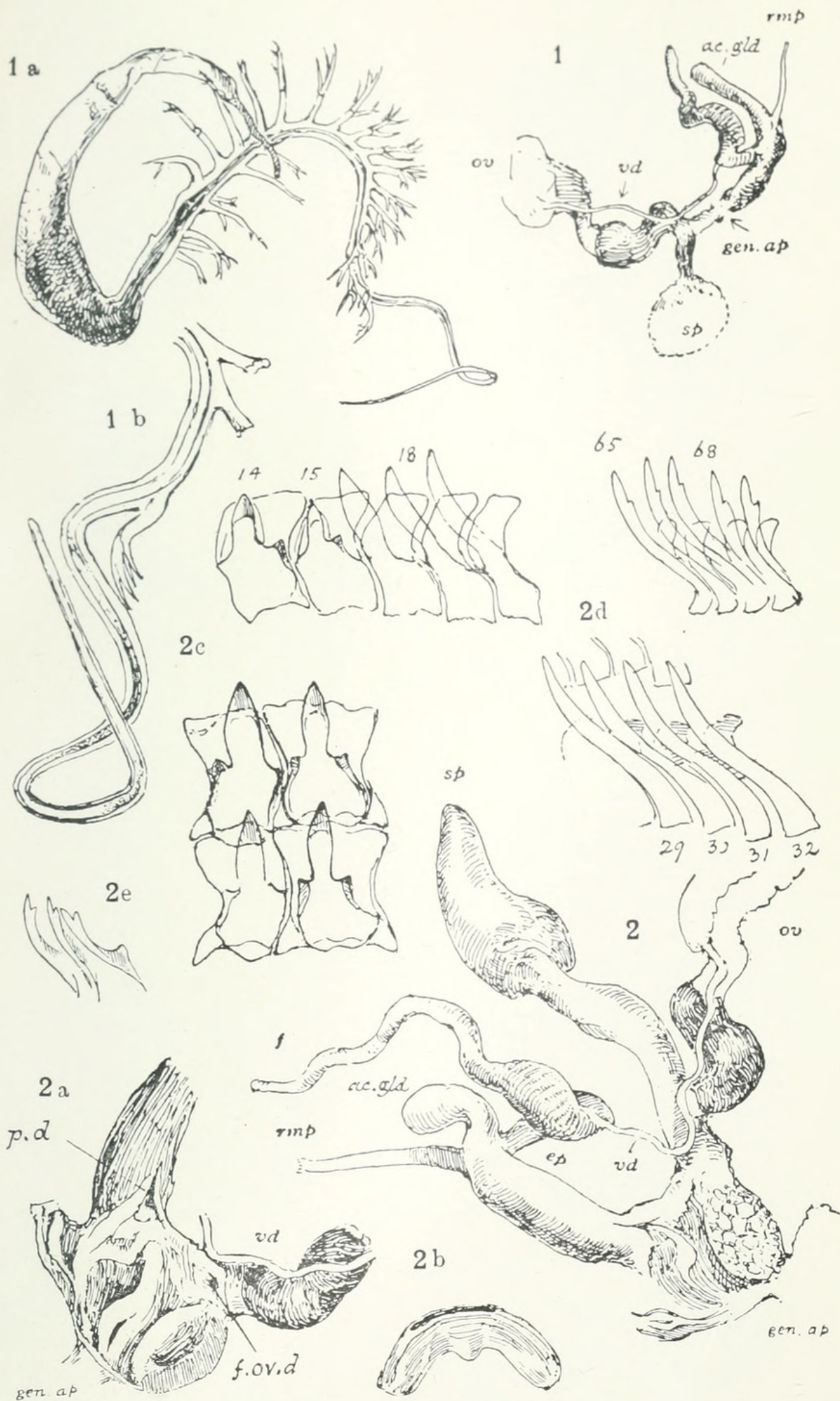
A species with reddish *abdomen* and *legs* and the *wings* clear, slightly tinged dull yellowish on the fore border, with black veins.

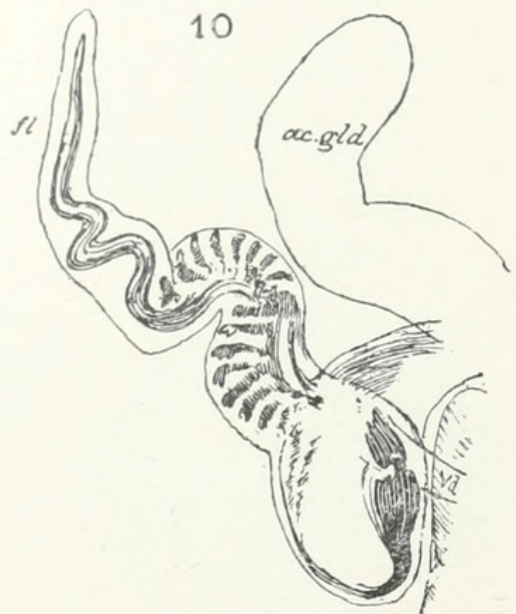
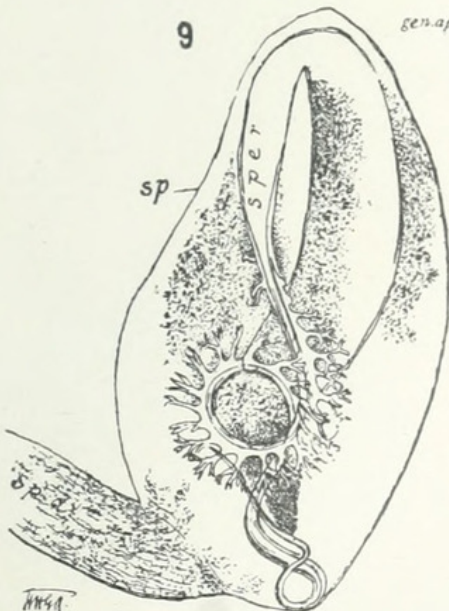
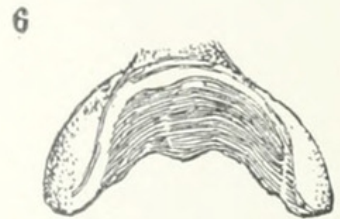
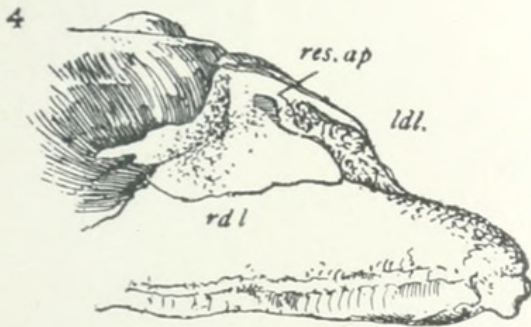
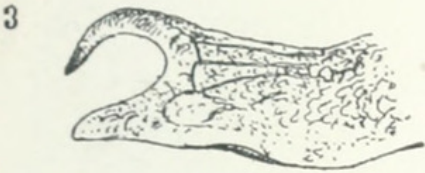
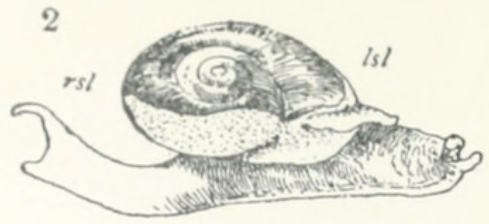
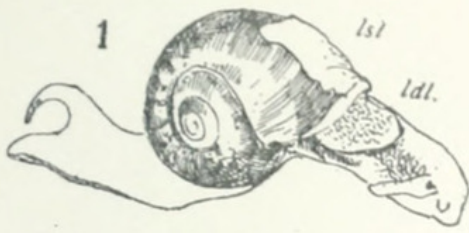
Face with bright yellow tomentum, no tubercle; moustache pale yellow. *Palpi* red. *Antennæ* reddish, the third joint with indistinct terminal spine. *Thorax* red with black markings. *Abdomen* slender, narrower at base; the first segment black, the second partly black, the others with very narrow darker segmentations. *Legs* red, fore tibiae with the curved spine, the femora not incrassate. *Wings* with the fourth posterior cell a little narrower at border, anal cell not quite closed.

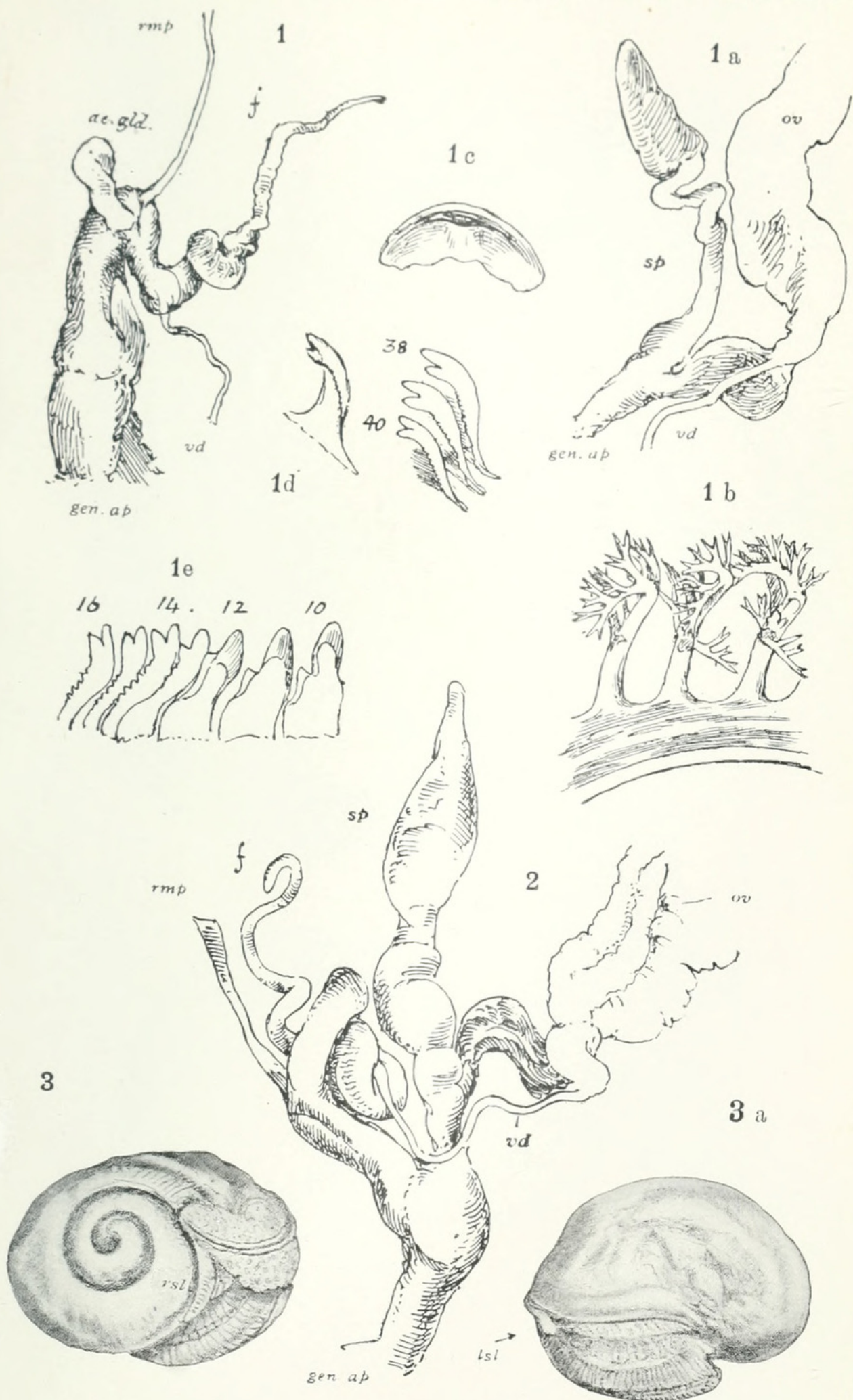
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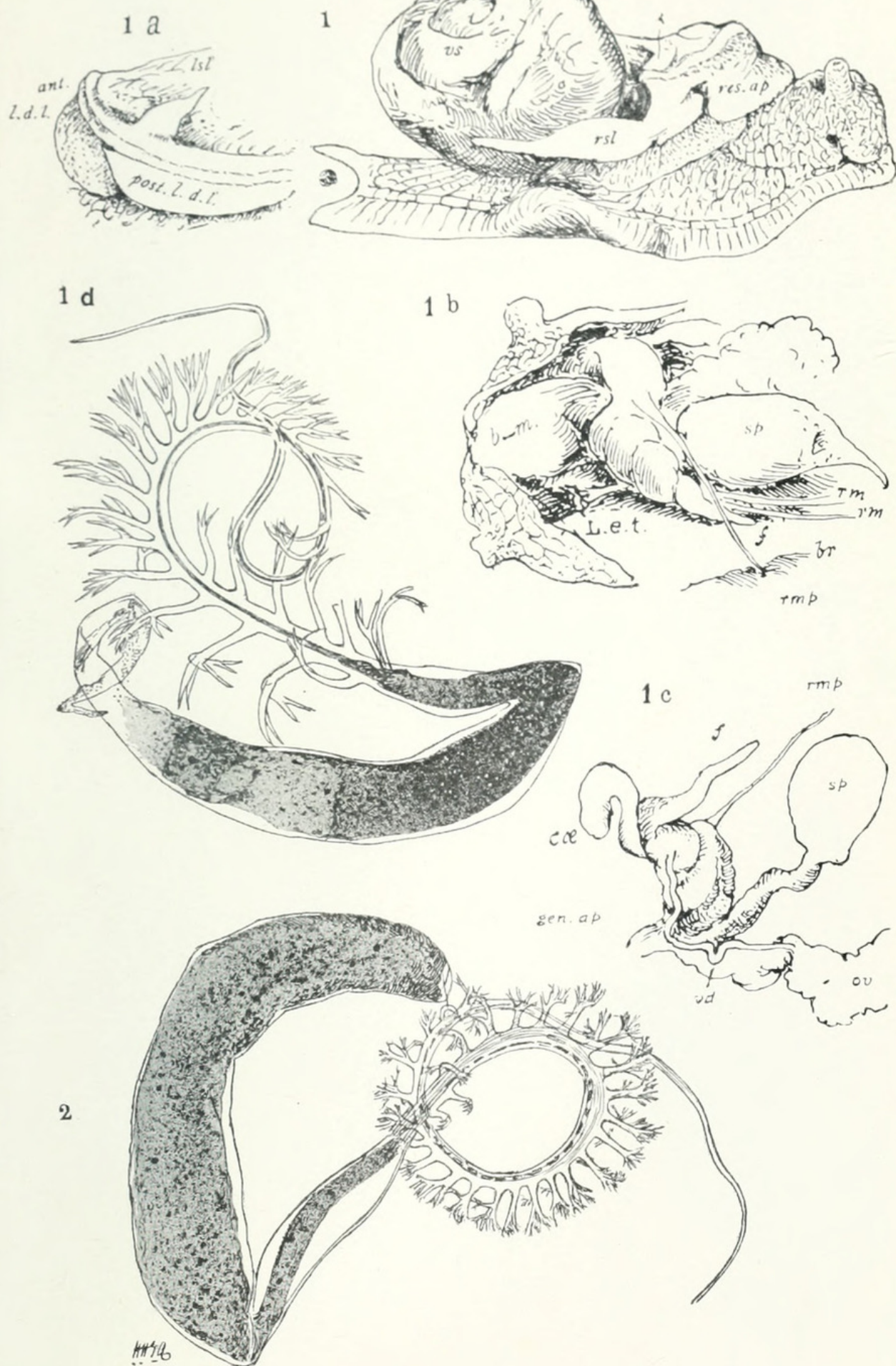
Slender, shining, testaceous. Thorax with brown stripes. Abdomen with black side stripes on the anterior segments.

Ann. & Mag. N. Hist. Ser. 8. Vol. ix.



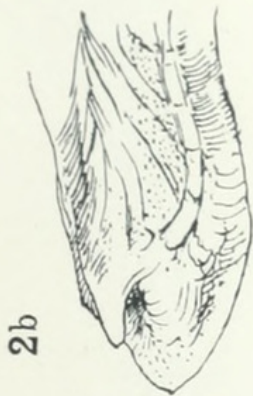








1 a



2 b

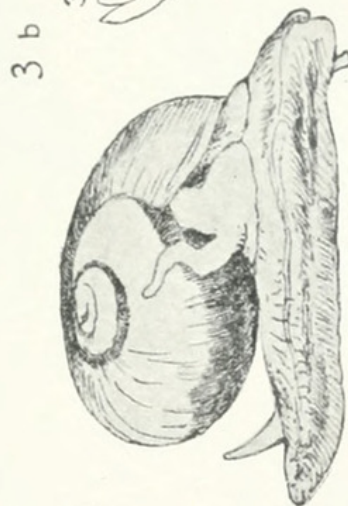


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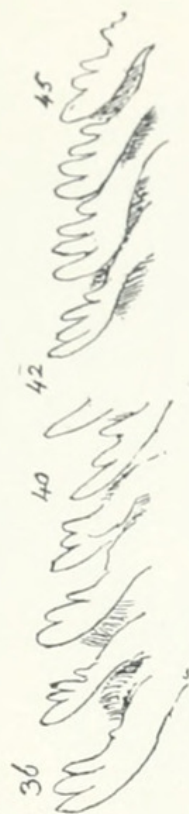
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1

3 b

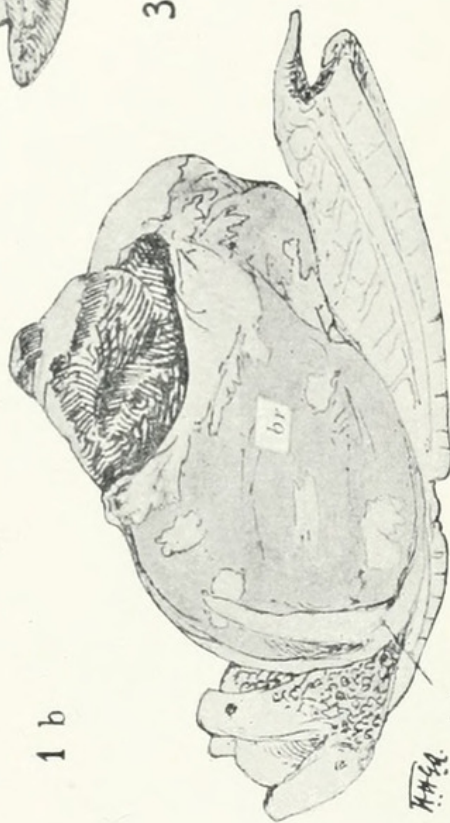


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42

45



1 b



3 a.

ant. ldl.



rdl.

res. ap

3

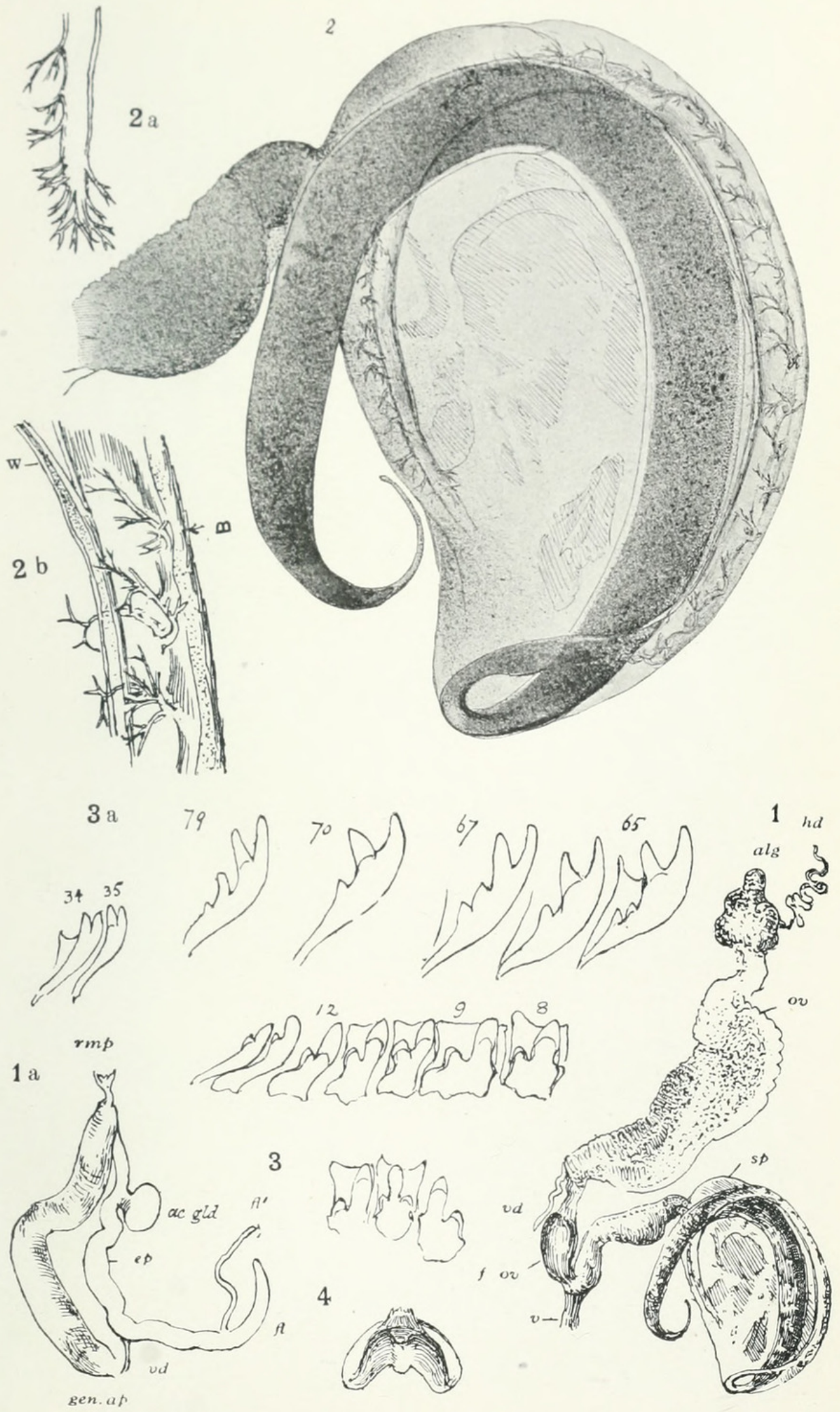


2 a

br

ldl.

post. ldl.





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<https://doi.org/10.1080/00222931208693172>.

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