J Wyman

from A. B. J

DESCRIPTIONS

OF

AMERICAN LIMACIDÆ.

The accompanying paper, extracted from the Boston Journal of Natural History, is published in anticipation of the number which contains it. The author being engaged upon an illustrated work on the terrestrial Mollusca of the United States, which will appear in the course of the present year, is desirous of obtaining further information respecting the various species, and particularly the animals which form the subject of the present paper. He will feel under obligations to any of his friends who will give him their aid either by sending him specimens or written communications, and such assistance will be fully acknowledged. He would be particularly thankful for authentic specimens of species described by others, which will be accurately figured, and inserted under the name given by the describers.

The Limacidæ may be kept alive for any length of time, and transported to any distance, in close tin boxes partially filled with soft decaying wood, which must be kept constantly moist. A. B.

Boston, Jan. 15, 1842.

DESCRIPTIONS OF SOME OF THE SPECIES OF NAKED, AIR-BREATHING MOLLUSCA, INHABITING THE UNITED STATES. By Amos Binney.

Very little attention has hitherto been given in the United States, to the animals belonging to the family of Limacidæ, or Slugs. The only paper on the subject which I have met with, is one published at Philadelphia by the late M. Rafinesque, in the Annals of Nature for 1820, a periodical work projected by him, but which never extended beyond the specimen number. In this paper M. Rafinesque, with his usual dexterity in proposing new genera and species, gives the characters of two genera and six species, from animals noticed by him in various parts of the country, but not since recognised by other naturalists. One of his genera, however, which, under the name of Philomycus, he intended should embrace those species which are entirely *destitute* of a mantle, and which cannot be included in the genus Limax, as hitherto defined, and may with propriety and convenience be retained, has been adopted by M. Ferussac. It will be necessary, for the same reason, to establish another genus for the reception of those species in which the mantle covers the *whole* superior surface of the body, but which are excluded from all the accepted genera. I propose to designate this

genus by the name of TEBENNOPHORUS, signifying *wearing a cloak.*

Its characters would be as follows:

Genus TEBENNOPHORUS.

Mantle covering the whole superior surface of the body; pulmonary cavity anterior, orifice on the right side towards the head; orifice of the rectum contiguous to, and a little above and in advance of the pulmonary orifice; organs of generation united, orifice behind and below the superior tentacle of the right side: without testaceous rudiment, terminal mucus pore, or locomotive band of the foot.

Dr. Dekay, in his Catalogue of Animals of New York, has indicated *by name*, two new species of Limax, the L. *lineatus* and L. *marmoratus*. As no description or figure of these has yet appeared, it is impossible to determine whether they are identical with any of the species described in this paper, or not.

Genus LIMAX, Auctorum.

LIMAX FLAVUS.

L. corpore lutescente, maculis albidis insignito; dorso glandulis elevatis angustis instructo; clypeo ovali, lineis concentricis et maculis orbiculatis ornato; tentaculis cæruleis; carina brevi.

SYNONYMES AND REFERENCES.

Limax flavus, LINNÆUS. *Fauna Suecica*, 2*d edit. No.* 2092.
Systema Naturæ, 12*th edit. p.* 1081, *No.* 7.
PENNANT. *British Zoology*, IV. 41, *No.* 20.
GRAY. *British Land and F. Water Shells*, 114.
Limax variegatus, DRAPARNAUD. *Hist. des Moll.* 127, *No.* 9.
DE ROISSY. *Buffon de Sonn. Moll.* V. 182.
FERUSSAC. *Hist. des Moll.* 71, *pl.* 5, *f.* 1 *to* 6.
Tab. Syst. 21, *No.* 3.
Supplement, 96, 2, *No.* 3.
LAMARCK. *Anim. sans Vert.* 2*d edit.* VII. 722.

DESCRIPTION.

Color brownish, yellowish brown, or ashy brown, with ob-

long-oval uncolored spots which have a longitudinal disposition; mantle with rounded spots; head, neck, and superior tentacles blue, semitransparent; lower tentacles white; base of foot sallow white. Body when extended cylindrical, elongated, terminating acutely with a short but prominent keel; upper part covered with long and narrow prominent tubercles. Mantle ample, oval, rounded at both ends, with numerous very fine concentrical striæ. Sides paler, and without spots. Respiratory foramen large, placed near the posterior lateral margin of the mantle and cleft to the edge. Generative orifice indicated by a white spot a little behind the upper tentacle of the right side.

Length, when fully extended, nearly three inches.

Geographical Distribution. Noticed hitherto only in the city of Philadelphia.

Remarks. The contrast of colors, and the elegant arrangement of the spots and lines, render this a beautiful species. The tubercles of the surface are very fine, and so much compressed as to appear in some lights to be carinated. There is often a well defined row of spots down the back. The upper tentacles are long and delicate, the mantle sometimes terminates posteriorly in an obtuse point, and the locomotive band of the foot is narrow and well defined. There is a prominent ridge on the head and neck between the tentacles, and a furrow marks the edges of the foot. It is active in its motions, turns rapidly, and often bends the body so as to form two parallel lines. It does not secrete mucus so freely as *Limax agrestis*. The carina is often yellowish. The testaceous rudiment is oblong-oval, convex above and concave below, thin and membranaceous, with the superior surface smooth, and the lower uneven. No spiral arrangement is visible to the eye, and it appears to be only a thin testaceous plate imbedded in the mantle.

It inhabits cellars and gardens in moist situations in the city of Philadelphia, where it is considered noxious to vegetation. It feeds upon the leaves of plants in kitchen gardens, and upon the remains of the cooked vegetables, and bread, thrown out from houses. It is common, but not so numerous

as *Limax agrestis*. I have never seen it suspend itself by a mucous thread.

This species is of foreign origin, but the period of its introduction is not known. It may probably exist in other cities as well as in Philadelphia, or even in the country not far distant from the sea-coast. It was noticed by Mr. Say, more than twenty years since.

LIMAX AGRESTIS.

L. corpore albo, griseo, cinereo, rufescente aut nigrescente, unicolore aut maculato, sub-cylindraceo, glandulis elongatis et sulcis fuscis reticulatis instructo; clypeo anteriore, ovali, gibboso, lineis concentricis striato; carinâ brevi; aperturâ laterali postica.

SYNONYMES AND REFERENCES.

Limax agrestis, LINNÆUS. *Syst. Nat. 12th edit. p.* 1082.
MULLER. *2d part, No.* 204, *p.* 8.
DRAPARNAUD. *Hist. des. Moll. p.* 126, *pl.* 9, *fig.* 9.
FERUSSAC. *Tableau Syst. p.* 21.
Hist. des Moll. p. 73, *pl.* 5, *fig.* 7—10.
Supplement, p. 96.
LAMARCK. *Anim. sans Vert. 2d. edit.* 7. *p.* 717.
Limax tunicata, GOULD. *Invertebrata of Mass. p.* 3.

DESCRIPTION.

Color varying from whitish through every shade of cinereous and gray to black, and through various shades of yellowish, or amber-color, to brownish, and sometimes irregularly spotted with small black points or dots; tentacles darker than the general surface, sometimes black; mantle sometimes mottled with a lighter color; base of foot sallow white; sheath of tentacles indicated by black lines extending backwards from their base under the edge of the mantle. Body when in motion cylindrical, elongated, terminating acutely, the sides towards its posterior extremity compressed upwards, so as to form a short carina or keel; foot very narrow. Mantle oblong-oval, fleshy, convex and prominent, rounded at both extremities, equalling in length one-third of the length of the body, its surface marked by prominent, irregularly waved, concentrical lines and furrows, having their centre on

the posterior part, and its edges on the whole circumference unattached. Upper surface of body marked with longitudinal lines, or shallow furrows, darker than the general surface, sometimes black, anastomosing with each other, and forming a sort of net-work; between the reticulated lines are narrow, irregular oblong plates, or smooth, flattened tubercles, giving the surface the appearance of a mosaic work, with lines of dark cement; reticulations less distinct on the sides, and disappearing towards the base; a prominent tubercular ridge extends from between the superior tentacles backward to the mantle, with a furrow on each side. Superior tentacle cylindrical, about one-eighth of the length of the body, with small, black, ocular points on the superior part of the terminal bulb; inferior tentacles immediately under the upper, very short. Respiratory foramen near the posterior lateral edge of the mantle, large, surrounded with a whitish border. Orifice of rectum immediately adjacent, but a little above and anterior to the respiratory foramen. Foot narrow; locomotive band bounded by two distinct longitudinal furrows. Generally about one inch in length, but when fully grown nearly two inches.

Geographical Distribution. Inhabits the neighborhood of Boston, New York, Philadelphia, and other maritime cities. Has not yet penetrated far into the interior of the country.

Remarks. In Dr. Gould's description of *Limax tunicata*, he intimates a suspicion that it may prove identical with *Limax agrestis*, Lin., and further observation has fully confirmed that supposition. It is undoubtedly of European origin, and I have not noticed it at any considerable distance from the sea-coast. It is common in the neighborhood of Boston, under stones at road-sides, and about stables and farm-yards, and in other moist situations, under wet and decaying pieces of wood. It is also found in cellars and gardens, but not in such numbers as to cause much mischief by its depredations. In the city of Philadelphia it is more common, attains a large size, and is more destructive to vegetation. A considerable number of individuals often congregate in the same retreat. Their food appears to be the green leaves of

succulent plants, and sometimes ripe fruits; they feed during the night, and are rarely found out of their retreats in the day time. Their growth is rapid, the animal exuded from the egg in the spring, arriving at full maturity and producing eggs before the succeeding winter. They are active in their motions, and soon escape when disturbed. They defend themselves from injurious contact by instantly secreting at the part touched a quantity of milky-white, glutinous mucus, and suspend themselves, head downwards, and lower themselves from plants and fences by forming a mucous thread which they attach to the point from which they hang. They are occasionally seen in this situation in rainy weather. During the process of exuding the mucous thread, the alternate undulating expansions and contractions of the locomotive band of the foot are seen to take place, in the same manner as when they are in motion on a plane surface.

This species varies very much in color, and descriptions by different authors relying principally upon it, differ greatly from each other; but whatever may be the color, the peculiar character of the furrows and tubercles remains constant. In a state of contraction, the back is arched, the head is entirely withdrawn under the mantle, the glands of the skin are very prominent, making the surface appear rough, the carina is more apparent, and the posterior extremity being a little turned to one side, appears to be oblique. It is described by some authors as constantly oblique, but the obliquity disappears when the animal is fully extended. When in motion, the head extends considerably beyond the mantle, and there is an interval between its margin, and the base of the superior tentacle, equal to the length of the tentacles. The mantle adheres to the body by its posterior central portion, and it is in this part of it that is found imbedded the testaceous rudiment, or shell. This is oval, curved above, very thin and delicate, having a transparent epidermis. At its posterior part there is a slight apicial prominence and the appearance of indistinct concentric lines of growth.

In the Philadelphia variety, the tubercles and furrows are less strongly marked than in that found in the neighborhood of Boston.

LIMAX CAMPESTRIS.

L. corpore succineo colore, cylindraceo, glandulis elevatis elongatis sub-rugoso ; clypeo sub-antico, ovali-oblongo, lineis et sulcis concentricis striato ; caudâ sub-carinata ; aperturâ laterali posticâ.

SYNONYMES AND REFERENCES.

Limax campestris, NOBIS.

DESCRIPTION.

Colour usually of various shades of amber, without spots or markings, sometimes blackish ; head and tentacles smoky. Body cylindrical, elongated, terminating in a very short carina at its posterior extremity. Mantle oval, fleshy, but little prominent, with fine concentrical lines. Back covered with prominent elongated tubercles and furrows. Foot narrow, whitish. Respiratory foramen on the posterior dextral margin of the mantle. Body covered with a thin, watery mucus.

Length, about one inch.

GEOGRAPHICAL DISTRIBUTION. Inhabits all the New England States, New York and Ohio, and was found in Missouri by Prof. Adams.

REMARKS. The resemblances between some of the species of this genus are so great that it is difficult to provide them with distinctive characters, and it is only by close comparison that their differences can be seen. The present species, although considerably smaller, is nearly allied to *Limax agrestis*. Its differential characters are as follows : It is always much smaller, and at all ages possesses a peculiarly gelatinous or semitransparent consistency. The tuberosities of the surface are more prominent in proportion to their size, are not flattened or plate-like, and are not separated by darker colored anastomosing lines, the intervening furrows being of the same color as the general surface. It does not secrete a milky mucus at every part of the surface when touched. Like that species, it is active in its motions, and suspends itself by a mucous thread.

This species appears to be common to all the northern parts of the United States. It is found under decaying wood in the forests and in open pastures, and under stones at road-sides. From its wide distribution, it would seem to be indigenous.

Its testaceous rudiment is minute and delicate in proportion to the small size of the animal.

Genus Arion, Ferussac.

ARION HORTENSIS.

L. corpore albido, aut griseo, glandulis confertis, elongatis striato; clypeo anteriore, ovali, granuloso; cauda obtusa, carina nulla; aperturâ laterali posticâ; margine fasciâ fusca obscurè ornatâ.

SYNONYMES AND REFERENCES.

Arion hortensis, FERUSSAC. *Tab. Syst. p.* 18.
Hist. des Moll. p. 65, *pl.* 2, *f.* 6.
Supplement, p. 96, *a.*
BOUCHARD-CHANTEREAUX. *Catalogue, p.* 24.
Limax hortensis, LAMARCK. *Anim. sans Vert.* VI. *p.* 919.

DESCRIPTION.

Color of upper surface whitish or light ashy, sometimes with a slight tinge of brown; an obscure, ill-defined brownish line extending along the lower margin of the mantle, and of the body on both sides, meeting over the posterior extremity. Body when extended cylindrical, narrow, very much elongated, expanding a little towards its posterior extremity, terminating in a truncated point; the upper surface crowded with fine, oblong tuberosities, its flanks with elongated tuberculated plates, with furrows between. Mantle small, oval, rather narrow, flattened, its anterior margin nearly reaching the head; its surface covered with minute granulations; about one-fourth of the length of the body. Between the superior tentacles a tubercular ridge with furrows on each side. Superior tentacles darker than the general surface; about one-eighth of the length of the body, stout, cylindrical, with black oculiferous points; lower tentacles beneath the upper, very short. Foot whitish, separated from the margin of the body by a furrow, and projecting beyond the body posteriorly, with a flat and rounded termination; locomotive band not distinguished from the foot. At the posterior termination of the body is the triangular sinus, or mucus pore. Respiratory foramen very small, situated near the margin of the mantle,

about one-third of its length distant from its anterior extremity. Length rather more than one inch.

Geographical Distribution. Noticed hitherto only in the neighborhood of Boston.

Remarks. In this species the head alone projects from the mantle, no part of the neck being visible. It is constantly covered with a watery mucus, and suspends itself by a mucous thread, like many other species of this family. I have not noticed any varieties of colors or markings. It occurs only in small numbers, in company with *Limax agrestis*, under stones at road-sides. I give this species with some hesitation, for the foreign descriptions and figures generally do not apply to it, and unless two species are confounded together, the differences of color and markings in the varieties are truly extraordinary. Ferussac's description of the variety, "griseus, unicolor, fasciis nigris," is however so very applicable to ours, and the figure referred to represents it so well, that I cannot doubt that our animal is identical with that variety. From its restricted locality, and small numbers, it is probably an introduced species. It may, however, prove to be a distinct species, and comparison of the foreign and native animals can alone decide its character.

Genus, Tebennophorus.

TEBENNOPHORUS CAROLINIENSIS.

L. corpore albido, fusco irrorato, fasciis tribus male-circumscriptis longitudinalibus, et punctis nigris sparsis, ornato; clypeo lato et elongato, dorsum integrum vestiente, glandulis undulatis confusis conferto; aperturâ laterali anticâ.

SYNONYMES AND REFERENCES.

Limax Caroliniensis, Bosc. *Buffon de Deterville, Coq.* I. *p.* 80, *pl.* 3, *fig.* 1.
Ferussac. *Hist. des Moll. p.* 77, *pl.* 6, *f.* 3.
Lamarck. *Anim. sans Vert. 2d edit.* VI. 719.

Limax Carolinianus, de Roissy. *Buffon de Sonnini Moll.*, V. 183.

Philomycus Caroliniensis, Ferussac. *Tab. Syst. p.* 15.
Supplement, p. 96, *y.*

Limax togata, Gould. *Invertebrata of Massachusetts, p.* 3.

DESCRIPTION.

Color of upper surface whitish, or yellowish white, variegated with clouds and spots of brownish and blackish, so arranged as to form three ill-defined longitudinal bands, one on the centre of the back, and one on each flank, extending from the head to the posterior extremity, anastomosing more or less with each other, and having smaller spots of the same color between them; inferior margin white, or yellowish; foot whitish. Mouth surrounded with a circular row of papillæ. Body elongated, sub-cylindrical, flattened towards its posterior extremity, which is obtuse; superior tentacles one fourth of an inch long, brownish or blackish, stout, terminating in a bulb; ocular points on the superior part of the bulb; inferior tentacles immediately below the upper, white, very short, nearly conical. Mantle fleshy, covering the whole body, its anterior edge tinged with brownish, and falling in a slight curve between the two superior tentacles, reaching on the sides to the superior margin of the foot; posterior extremity rounded; cuticle covered with irregular vermiform glands, anastomosing with each other, and having a general tendency to a longitudinal direction, with shallow furrows between, lubricated with a watery mucus, and susceptible of contractions which produce a slow, undulatory motion, like the flowing of water, over the whole surface. Foot whitish, extending a little beyond the mantle posteriorly, showing a whitish flattened border. Orifice of the organs of generation on the right side at a little distance behind and below the superior tentacle. Respiratory orifice large, on the right side, one fourth of an inch behind the origin of the superior tentacle; anal orifice in close contact, a little above and in front of it; above the respiratory orifice on the back is a deep curved furrow, running upwards and backwards. Locomotive band not distinguished from the lower surface of the foot.

Greatest length, when fully extended, four inches.

Geographical Distribution. Was noticed by the original discoverer in South Carolina; is common in Vermont, the western part of Massachusetts, New York, and Ohio: and was

found in Missouri by Professor C. B. Adams, and by Mr. Haldeman in the south-western angle of Virginia.

Remarks. In some individuals the whole upper surface is irregularly clouded with brownish, without any tendency to longitudinal arrangement; in some, fine black spots are numerous; in others, there are rows of large clouded spots; a single one was almost destitute of coloring. The head never projects beyond the mantle. The tentacles are contractile and retractile, as in the other species. When handled it secretes from the skin a thick, milky, adhesive mucus, but I have never seen it suspend itself by a mucous thread. I have noticed its posterior extremity curved upwards when the animal was in motion; at other times flattened and expanded, and again very much corrugated, and apparently truncated; sometimes there *appear* to be one or more mucous glands at this part, and the secretion of mucus from it is more plentiful than from other parts of the body. The mantle is not cleft from the respiratory foramen to the margin, as in some of the species, but is provided with a deep furrow or canal running from the orifice to the edge of the mantle below it.

It is very inactive and sluggish in its motions. It inhabits forests, under the bark, and in the interior of decayed trunks of fallen trees, among which it is particularly partial to the Bass-wood, *Tilia Americana.*

There can be no doubt that this is the animal originally described by Bosc, under the name of *Limax Caroliniensis,* though his description is so imperfect that it can only be recognized by the arrangement of colors which are peculiar to it. His original drawing, engraved in Ferussac's work, is a tolerably accurate representation of one of the varieties. He makes no mention of the mantle, and it does not appear in the figure; hence Ferussac took it for granted that it is destitute of it, and placed the animal in Rafinesque's genus Philomycus, which is chiefly distinguished from Limax by the absence of this organ. Yet with a singular inconsistency, having adopted this genus with all Rafinesque's characters, he arranges it under that division of the family containing the species entirely covered by a mantle. And as the other

genera included in the same division, were supposed to possess only *contractile* tentacles, by a convenient method of generalization he inferred that in the present species also the tentacles were destitute of the power of *retraction*. The editors of the new edition of Lamarck have again more recently described it as destitute of a mantle, but in truth it possesses a well characterized mantle, unattached to the body at its anterior part, and around its whole margin, and as before remarked, the tentacles are retractile. M. Ferussac also speculated upon the uses of this peculiar organization, which he supposed might enable the animal to resist the heats of warm climates; it is, however, probably intended for some other purpose, for it is found to inhabit the most northern portions of the United States, where the winters are long and severe, and by its habits it is in a great degree removed from the influence of heat.

It may be noticed that the description of Dr. Gould differs essentially from mine; this arises from his description having been drawn up from specimens preserved in alcohol, which had contracted them and entirely changed their aspect.

Genus Philomycus, Rafinesque.

PHILOMYCUS DORSALIS.

P. corpore cylindraceo, postice attenuato; dorso linea longitudinali nigrescente interrupta et glandulis minutis longulis instructo; clypeo nullo; aperturâ laterali parva anticâ.

SYNONYMES AND REFERENCES.

Philomycus dorsalis, NOBIS.

DESCRIPTION.

Color of upper surface ashy, with a shade of blue, an interrupted black line extending down the centre of the back; superior tentacles black, about one eighth of the length of the body; lower tentacles blackish, very short. Body cylindrical and narrow, terminating posteriorly in an acute point; base of foot white, very narrow, its separation from the body not well defined. Upper surface covered with elongated and

slightly prominent glandular projections, the furrows between indistinct. Respiratory orifice very minute, situated on the right side about one eighth of an inch behind the insertion of the superior tentacle.

Length three-fourths of an inch.

Geographical Distribution. Noticed hitherto only in Vermont and Massachusetts.

Remarks. This animal is found in woods and forests, in the soil under decaying trunks and logs. It is lubricated by a watery mucus which is not secreted in quantity sufficient to preserve its life when removed from its native haunts and exposed to the air. It is therefore difficult to preserve it long enough for examination, as it becomes dry, diminishes in bulk more than one-half, and dies. I have seen but three specimens. They were very active in their movements, and one of them suspended itself by a mucous thread, in the manner of the Limaces. My specimens were found in Vermont. Dr. Gould has recognized this or a similar species near Boston.

It is quite possible that this is one of the species described by Rafinesque, but from the poverty of his descriptions I am unable to identify it with either of them.