

XXVIII.—On certain North American Species of *Zonites*, etc.

BY W. G. BINNEY.

(With Plates XIV and XV.)

Read October 20th, 1879.

Most of the following notes will serve as a supplement to "Terrestrial Mollusks and Shells of the United States," vol. V. The balance are furnished from specimens lately collected at Cape Town, South Africa, by Mr. J. S. Gibbons.

Spiraxis (Euspiraxis) Dunkeri, Pfr.

San Domingo, Mr. J. S. Gibbons.

No central teeth. (Pl. XV, Fig. N).

Glandina.

Mexico. Dr. Edward Palmer.

On pl. XIV, fig. L, I have figured the lingual dentition. There are about 32–1–32 teeth. The centrals are narrow, with a very slender cutting point.

Rhytida vernicosa, Krauss.

Cape Town, South Africa. Mr. J. S. Gibbons.

This species is placed by Von Martens in *Pella*, a subgenus of *Helix*. On examining the animal, however, I find it has no jaw, and that its lingual membrane presents the usual characters of *Rhytida*. Mr. Gibbons informs me "that the animal wants the characteristic labial palpi of the latter genus." There appears no central tooth. The rows of teeth are close together, not widely separated. There are about 14–14 teeth (Pl. XIV, Fig. I).

Stenopus? decoloratus.

Demerara. Mr. J. S. Gibbons.

This species is allied to *Zonites Cayennensis*, Pfr., of Cayenne, a species placed by Von Martens in *Mesomphix*. An examination of the jaw and lingual dentition leads me to consider it a *Stenopus* (see Morse, Ann. N. Y. Lyc., viii, 158, fig. 3). I

cannot judge of the character of the tail from the alcoholic specimens received.

The jaw is low, wide, slightly arcuate, ends blunt and but little attenuated; cutting edge without median projection.

Lingual membrane long: teeth, 23-1-23, the transverse rows arranged *en chevron*: centrals small, tricuspid: no lateral teeth: all the side teeth are aculeate marginals (Pl. XV, fig. K).

Macrocyclis Hemphilli, n. sp.

At Olympia, Oregon, Mr. H. Hemphill collected several specimens of a *Macrocyclis* (pl. XV, fig. M), which appears to be distinct from, though nearly allied to, *M. Vancouverensis*. It may be best described by saying that—

The umbilicus is narrower and not excavated so much—the termination of the last whorl not receding from the umbilicus as in all the forms of *Vancouverensis* and *concava*—in all, the whorls are more or less strongly striated within the umbilicus—often almost ribbed in *concava*; not so in this shell—the texture of the shell is glassy like *Hyalina*, and there is no trace of the microscopic spiral lines found in all the other forms;—beneath, the last whorl is proportionately wider. The greater diameter is 14 mill.; lesser, 10; height, 5.

The jaw and lingual dentition are as usual in the genus (See Terr. Moll. of U. S., vol. V, p. 88). I could not distinguish the characters of the central tooth in this species.

Vitrinizonites latissimus, Lewis.

I have already, in the Bulletin of the Museum of Comparative Zoology, vol. V, No. 16, p. 333, given a description of this genus and a figure of its lingual dentition. I here add a figure of the animal in motion (pl. XIV, fig. A), not fully extended. The caudal mucus-pore is circular, bordered with a narrow transversely grooved rim; and when closed is covered completely. When open the cover is raised along its longitudinal centre, into a sharp carina, leaving posteriorly when seen from behind, an erect triangular opening. It thus differs from the simple longitudinal slit found in most of the American species of *Zonites*, such as *friabilis*, *capnodes*, *fuliginosus*, *inornatus*, *demissus*, *ligerus*, *suppressus*, the last figured in Terr. Moll., V, fig. 47. *Z. laevigatus*, however, has a nearer approach to the circular pore of *Vitrinizonites*.

The lingual dentition (see Bull. Mus. C. Zool., l. c.) is nearer

to that of *Z. laevigatus* than any other American species. Like that, there are no perfect lateral teeth, but only decided transition teeth.

The genitalia are figured on plate XIV, fig. B. The ovary is very large (*ov*) and stout: the genital bladder (*g. b.*) is globular on a short, narrow duct: the penis-sac (*p. s.*) is very long, narrow, cylindrical, receiving the retractor muscle (*r.*) near its basal termination, and merging at its apex into the vas deferens (*v. d.*) The penis-sac has not the accessory process found in *Zonites capnodes*, *friabilis*, *laevigatus*, *inornatus*, *fuliginosus*, and *Rugeli*.

***Zonites capnodes*, W. G. B.**

Living specimens received from near Knoxville, Tenn., through the kindness of Mrs. G. Andrews, have enabled me to figure (pl. XIV, fig. C) the genitalia. The genital bladder (*g. b.*) is large, globular, on a short, narrow duct: the penis-sac (*p. s.*) has the same peculiar accessory process which I have (Terr. Moll., V) figured in those of *Z. laevigatus*, *friabilis* and *inornatus*.

It is in many individuals more easy to distinguish *capnodes* from *fuliginosus* by the genitalia and dentition than by the shell.

***Zonites subplanus*, Binn.**

Roan Mt., N. C. Mrs. G. Andrews.

I have already stated that the dentition of this species resembles that of *Z. inornatus*. I here give a figure of it on pl. XIV, fig. J.

***Zonites Rugeli*, n. sp.**

On Roan Mountain, Mitchell Co., N. C., Mrs. G. Andrews found numerous specimens of a *Zonites*, for which, proving new to science, I propose the name of its discoverer.

Shell (pl. XV, fig. H) depressed globose, perforated, thin, delicately wrinkled, the apical whorls sometimes striate, greenish horn-colored, dark smoky above; spire slightly elevated, apex flat; whorls 6, slightly rounded, the last globose, scarcely excavated at the perforation; aperture large, rounded, oblique; peristome simple, thin; ends slightly approaching; the columellar one scarcely broadened. Diam., larger 19; lesser 15; height 9 mill.

When first received, I believed this to be an extremely globose form of *Z. inornatus*, but an examination of the lingual dentition showed this to be impossible.

On pl. XIV, fig. D, I have given a figure of the genitalia. It will be seen that the accessory part of the penis-sac is in this species continued to a point beyond the retractor-muscle: otherwise the genitalia are very similar to those of *capnodes*, *friabilis*, *inornatus*, *laevigatus*, and *fuliginosus*. The last species I find to have this accessory process also, though it is not given in Leidy's figure.

Jaw as usual in the genus. Lingual membrane (pl. XV, fig. I) as usual: teeth 38-1-38. There are about 4 or 5 laterals; the 8th is a pure marginal on either side of the central line. It will be seen in Terr. Moll., V, that *inornatus*, *subplanus* and *laevigatus* are peculiar in having no perfect lateral teeth, but only transition teeth: *fuliginosus*, *capnodes*, and *friabilis*, as well as *Rugeli*, have well formed laterals, differing in number in the various species: thus the lingual dentition in this group is a good guide in distinguishing the species.

The animal is dark slate-colored: the caudal mucus-pore is a longitudinal slit as in *suppressus* (see Terr. Moll., V).

Some individuals have their apical whorls striate, as in *Z. subplanus*.

***Zonites placentula*, Shuttl.**

On pl. XV, fig. A, I give a figure of what appears to be the true *placentula* as described by Shuttleworth (whose description is translated in Moll., V, p. 124). The shell there figured, and also figured in this paper, pl. XV, fig. E, is either a distinct species, or an elevated edentate form of *lasmodon*.

***Zonites Andrewsii*, n. sp.**

On pl. XV, fig. D, is an illustration of a shell lately received from Mrs. G. Andrews, who collected it on Roan Mountain, Mitchell Co., N. C. It has the general appearance of *Z. significans*, *multidentatus*, and *lasmodon*, but differs so decidedly from each, that I propose to designate it by the name of its discoverer. A full specific description can be given later. Compared with

Z. lasmodon, it has fully 8 whorls, is $6\frac{1}{2}$ mill. in diameter, the umbilicus 1 mill. wide, whilst *lasmodon* with 7 whorls is 7 mill. in diameter, with an umbilicus 2 mill. wide : the Roan Mountain shell has also five parallel lamellæ, while *lasmodon* has only two, or at most three, and does not show the successive rows of lamellæ which are characteristic of *Andrewsi*, radiating from the centre.

From *Z. significans* it differs in its larger size, greater number of whorls, much wider umbilicus, and in the character of its internal denticles, which are long and winding on the wall of the whorl ; while in *significans* the denticles are simply erect and conical, with broad base. The same differences distinguish it from *multidentatus*, which is still smaller than *significans*, and has a much narrower umbilicus.

***Zonites macilentus*, Shuttl.**

On pl. XV, fig. B, I give an illustration of what appears to be the true *macilentus* (see Terr. Moll., III, p. 20), which seems to be distinct from *lasmodon*, judging by specimens lately received.

***Zonites multidentatus*, Binn.**

For the sake of comparison with *Z. significans* and allied species, I give on pl. XV, fig. F, an enlarged view of this species, more satisfactory than that given in Terr. Moll. U. S., III.

***Zonites significans*, Bl.**

By an unfortunate oversight, another shell was used to illustrate this species in Terr. Moll., V, p. 132. I here figure (pl. XV, fig. G) an authentic specimen.

On pl. XIV, fig. F, I have given, for the sake of comparison, an illustration of *Z. multidentatus*, the nearly allied species.

***Zonites cuspidatus*, Lewis.**

In the Proceedings of the Academy of Natural Sciences of Philadelphia, 1875, p. 334, this is mentioned as probably a var. of *Z. cerinoideus*. I have received authentic specimens from

Dr. Lewis, and find them to be rather a variety of *gularis*—one of the many curious forms of that variable species. The internal tooth-like processes, strongly curved one towards the other, form almost an arched space. On pl. XV, fig. C, will be found a figure of this form. Dr. Lewis's specimens were from Munroe Co., Tenn. (Miss Law). I have also received it from Roan Mountain, N. C. (Mrs. G. Andrews).

Tebennophorus, —.

From Dr. W. Newcomb I have received a slug which, from its outward characters, jaw and lingual membrane, surely is a species of *Tebennophorus*. It is mentioned here, as the locality is new for the genus—Brazil, 300 miles up the river from Para.

Mesodon dentifera, Binn.

Vermont.

On*pl. XIV, fig. G, I have figured the genitalia of this species, hitherto unknown.

The genital bladder (*g. b.*) is small, oval, on a short duct which is greatly swollen at a short distance below the bladder: the penis-sac (*p. s.*) is long, stout and contracted, at a short distance below its blunt end: the retractor is inserted in the vas deferens at about the middle of its length.

In another individual, the construction of the penis-sac was not so well developed.

Mesodon Andrewsii, n. sp.

At Roan Mountain, Mitchell Co., N. C., Mrs. Andrews collected numerous specimens of a *Mesodon* which cannot be referred to any known species.

Shell imperforate, globose, very thin, with delicate wrinkles of growth and microscopic revolving striæ; horn-color; spire elevated, conic, apex obtuse; whorls six, convex, the last greatly swollen; peristome white, thickened, slightly reflected, ends separated, the columellar one expanded. Greater diameter 25 mill., lesser 20; height 14 (Plate XV, Fig. L).

The absence of limestone on Roan Mountain accounts for the extreme thinness of the shell.

It can scarcely be said to resemble closely any known species

of *Mesodon*, though somewhat like a gigantic *M. Mitchelliana*.

The jaw has 16 ribs.

The lingual membrane (pl. XIV, fig. F) is long and narrow : teeth 64-1-64, with about 15 perfect laterals on either side of the central line. The central and lateral teeth have no side cusps or cutting points, and only on the extreme marginals does a side cutting point appear. The cutting point of the marginals is long. Thus the dentition is like that of *clausa* and *thyroides*.

The genitalia are figured on pl. XIV, fig. E. The genital bladder (*g. b.*) is large, oval, on a short, narrow duct : the penis-sac (*p. s.*) is long and stout, with a sub-central constriction : the prostate gland (*pr.*) is highly developed.

***Helix (Dorcasia?) globulus*, Müll.**

Cape Town, South Africa, Mr. J. S. Gibbons.

Jaw low, wide, scarcely arcuate, ends not acuminate : no anterior ribs.

Lingual membrane wide, with about 40-1-40 teeth. Laterals as well as centrals tricuspid. Pl. XIV, fig. K, gives a central, with its adjacent lateral and several inner marginal teeth.

Both jaw and lingual membrane are quite different from those hitherto observed in *Dorcasia*, to which sub-genus Von Martens refers the species.

Mr. Gibbons informs me that the eggs of this species are of very large size. It lives on sandy flats close to the sea margin, burying itself in the sand by day.

***Helix (Pella) rariplicata*, Benson.**

Cape Town, South Africa, Mr. J. S. Gibbons.

The jaw has ribs like those figured for *Microphysa Lansingi*, in Terr. Moll. U. S., V,—i. e., flat, crowded, wide, numerous.

The lingual membrane is long and narrow. There are about 16-1-16 teeth, with four laterals on either side of the central tooth. The central tooth has small detached side cusps and cutting points, as in *Strophia*, and the laterals are quite similar—a very unusual arrangement in the *Helicidæ*. The marginals are low, wide, with one inner, oblique, wide bifid cutting point.

The central, with its adjacent laterals and an inner marginal tooth, are given in pl. XIV, fig. H.

Buliminus Natalensis, Kr., var. **Draakensburgensis**, E. Smith.

Cape Town, South Africa, Mr. J. S. Gibbons.

The species is placed by Von Martens in the subgenus *Pachnodus* of *Buliminus*.

The jaw is very thin, slightly arched, low; ends blunt; scarcely attenuated; anterior surface with above forty ill-defined, flat, crowded ribs, scarcely denticulating either margin.

Lingual membrane (pl. XIV, fig. J) long and narrow. Central teeth tricuspid; laterals bicuspid; marginals quadrate, with one long, large, oblique inner cutting point, and one outer bifid cutting point. There are 54-1-54 teeth, with about 14 laterals on each side of the central line.

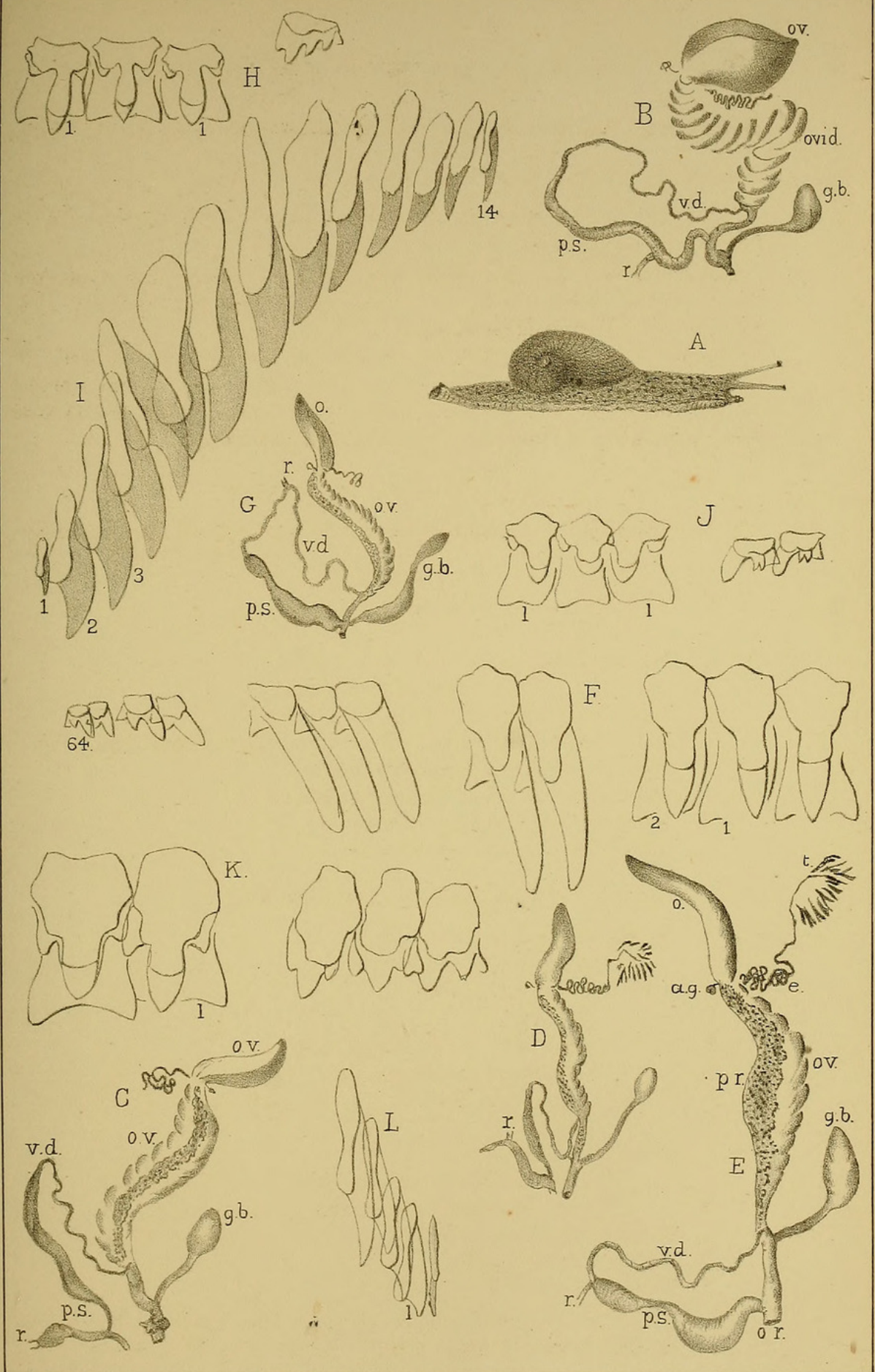
EXPLANATION OF PLATE XIV.

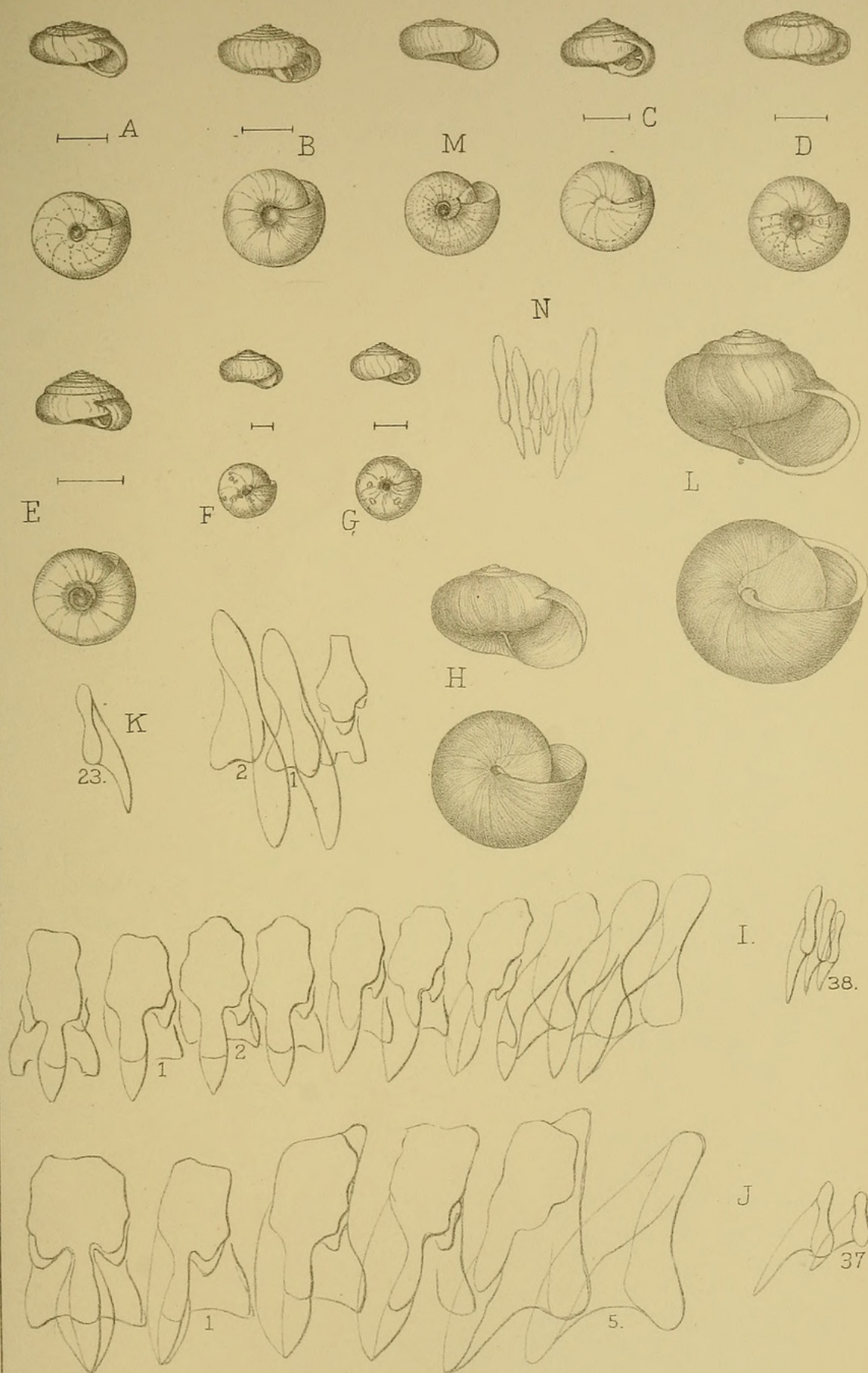
- Fig. A *Vitrinizonites latissimus*, animal in motion, not fully extended :
drawn by Miss Emma Pringle.
“ B “ “ genitalia.
“ C *Zonites capnodes*, genitalia.
“ D “ *Rugeli*, “
“ E *Mesodon Andrews*, “
“ F “ “ lingual membrane.
“ G *Mesodon dentifera*, genitalia.
“ H *Helix rariplicata*, central, adjacent laterals, and inner marginals.
“ I *Rhytida vernicosa*, Kraus, dentition.
“ J *Buliminus Natalensis*, lingual membrane.
“ K *Helix globulus*, lingual membrane.
“ L *Glandina*,—dentition (see p. 355).

EXPLANATION OF PLATE XV.

- Fig. A. *Zonites placentula*, Shuttl.
“ B “ *macilentus*, Shuttl.
“ C “ *cuspidatus*, Lewis.
“ D “ *Andrews*.
“ E “ *lasmodon*, var. ? (see. p. 358)
“ F “ *multidentatus*, Binn.
“ G “ *significans*, Bland.
“ H “ *Rugeli*.
“ I Dentition of same.
“ J “ “ *Zonites subplanus*, Binn.
“ K “ “ *Stenopus ? decoloratus*
“ L *Mesodon Andrews*,
“ M *Macrocyclus Hemphilli*.
“ N *Spiraxis Dunkeri*, Pfr., dentition.

The figures of shells on this plate were drawn from nature by Mr. Arthur F. Gray, of Danversport, Mass.,—those of dentition by W. G. B.







Binney, W. G. 1879. "On certain North American species of Zonites, etc. (Art. XXVIII)." *Annals of the New York Academy of Sciences* 1, 355–362.

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