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With regards
of the author

Pulmonate mollusca
N. S.

J. W. Dawson

[*From the* Quarterly Journal *of the* Geological Society *for November* 1867.]

ON THE

DISCOVERY

OF A

NEW PULMONATE MOLLUSK

IN THE

COAL-FORMATION OF NOVA SCOTIA.

BY

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WITH A DESCRIPTION OF THE SPECIES,

BY

PHILIP P. CARPENTER, M.D.

On the Discovery *of a* New Pulmonate Mollusk [Zonites (Conulus*) priscus, *Cpr.*)] *in the* Coal-formation *of* Nova Scotia. By J. W. Dawson, LL.D., F.R.S., F.G.S. *With a* Description *of the* Species; *by* Philip P. Carpenter, M.D.

The little shell to which the following description refers was found last summer in the course of excavations made under my direction in the bed in Subdivision VIII. of the Joggins Section, between coals no. 37 and no. 38 of Logan's sectional list, already referred to in previous papers † as containing great numbers of shells of *Pupa vetusta*. This bed is 1217 feet below that in which *Pupa vetusta* was originally discovered in trunks of erect Sigillariæ, and about 42 feet below

* *Conulus*, Fitz., 1833 (=*Trochiscus*, Held., 1837, non Sly.; =*Petasia*, Beck, 1837; = *Perforatella*, Schlüt.), is a subgenus of *Zonites*, Montf. (non Leach, Gray), according to Messrs. Adams, 'Genera of Recent Shells,' vol. ii. p. 116, and their follower Chenu, 'Manual de Conch. et de Paléont.', vol. i. p. 422. Those who do not care to enter into the modern divisions of the land-shells, may quote the species as a Zonites—or even, speaking loosely, as a Helix.

† Quart. Journ. Geol. Soc., Feb. 1862, and May 1866, p. 121.

coal no. 37 *, or nearly in the middle of the band of reddish and grey sandstones and shales intervening between coals no. 37 and no. 38. Its immediate associations are as follows, in descending order:—

	ft.	in.
Hard reddish shale with ironstone nodules	4	0
Pupa-bed, a variable layer, in some places of grey indurated clay, with a tendency to concretionary structure, in other parts laminated and carbonaceous with remains of plants.....	0	3
Shale, mottled, arenaceous	0	8
Sandstone, hard calcareous, light chocolate, weathering rusty	1	0
Shale, chocolate and mottled.....	2	8
Grey sandstone	0	6
Shale, chocolate and mottled.....	5	0
	14	1

In digging into the bed, I found that the shells of *Pupa* are irregularly disposed in nests, and are in some spots very abundant, especially in the argillaceous and nodular parts, while in other places, and especially in the more carbonaceous portions, none were found. In the last-mentioned parts of the bed, there are numerous obscure vegetable remains, especially leaves of *Cordaites*, leaflets of *Sphenopteris*, and *Trigonocarpa*, apparently of the same species (*T. sigillariæ*) found with Pupæ in the original repository in the erect Sigillariæ. The appearances were such as to confirm the impression, stated in a previous paper, that the land-shells were drifted along with vegetable matter by some quiet stream, and deposited on the muddy bottom of shallow water.

One object in excavating the bed was to ascertain if any other species of land-animal than *Pupa vetusta* could be obtained from it; and in the first instance the result appeared purely negative, except in the presence of minute fragments of bone, and of what might have been the chitinous integument of insects. On a more careful examination of the large quantity of fragments of *Pupa* obtained, I was able to select a few small specimens, all of them more or less crushed, which seemed to differ materially from the young of *Pupa vetusta* in form and surface-markings. On submitting these to Dr. Philip P. Carpenter he at once recognized their distinctness from *Pupa vetusta*, and has kindly furnished me with the following description and note on the affinities of the species.

Zonites (*Conulus*) *priscus*, Cpr.

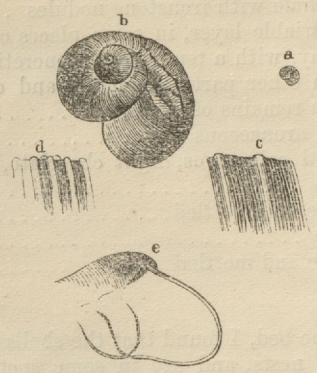
"C. t. parvâ, tenuissimâ, parum elevatâ; nucleo minimo; anfractibus iv., subplanatis, omnino tenuissime rugoso-striolatis, interdum rugulis incrementi magis conspicuis, suturis parum impressis; circa peripheriam angustatâ, vix subangulatâ; basi concavâ, ut

* Incorrectly stated as 12 feet in the paper last mentioned.

supra striolatâ, umbilico majore ; aperturâ subovali, satis regulariter excavatâ ; labro simplici. Long. circ. 1 poll., div. circ. 130°.

" *Hab.* In stratis carboniferis Acadiæ, *Dawson*."

Zonites (*Conulus*) *priscus*, Carpenter.



a. Natural size.
b. Magnified.
c. Portion of surface highly magnified.
d. Portion of the surface of *Pupa vetusta*, highly magnified.
e. Fragment of *Zonites* (*Conulus*) *priscus*, showing lip ; the dotted lines indicate a portion of the columella (crushed) and the umbilicus.

" A few specimens only of this shell were found, in company with numerous individuals of *Pupa vetusta*, Dawson, from which species it differs in form, sculpture, nuclear whirl, and texture. *Pupa vetusta* closely resembles the living race of small Pupæ, and seems to have been (for its size) solid, and coarsely sculptured parallel to the axis. The present species has a different colour, though in the same matrix, and seems to have been an extremely thin shell, of a horny (though not glossy) texture, like the British *Helix* (*Conulus*) *fusca* and similar species. The markings consist of rather irregular striolæ with occasional coarser ridges of growth, somewhat slanting toward the periphery, which is rather flattened though not angular. The base is concave, similarly sculptured, and gradually curving into a rather large umbilicus. At least such is the inference from the only portion that has been cleared from the matrix. The nuclear part in this shell is much smaller than in *Pupa vetusta*. In the Pupa the first whirl is large and swollen, the next suddenly assumes the normal cylindrical form ; and it is not until the end of the third whirl that the normal sculpture is developed. In the present species the growth, form, texture, and sculpture of the shell appear nearly uniform from the beginning.

" It is difficult to state exactly what was the original shape, as even in the most perfect specimen the body-whirl is broken ; but it was probably like *Paryphanta Caffra*, Fér., on an extremely small scale. It might possibly rank with *Hygromia*, or, with the living American species *minuscula* and *exigua*, under *Pseudohyalina*, Morse.

It is, however, until better specimens attest its true relationships, placed with *fusca* in the group *Conulus*, which (according to Messrs. Adams, Gen. ii. p. 116) is a subgenus of *Zonites*.

"It is probable that there is a third species among the fragments which have been found; presenting a shape more resembling the *H. conulus*, and other trochiform snails. It would be premature, however, to venture on a description until more perfect specimens have been obtained."