

Stephenson; they are, however, a striking feature of my worms. They begin about segment vi., and fill up practically the whole cœlomic space of every somite. Each is oval or nearly so in outline, plate-like, faintly granular, and possesses a distinct nucleus; in diameter the corpuscles vary from 10 to 19 μ .

The *Spermatophores*, of the form described by Beddard and Stephenson, show an open mouth at their distal end. The following measurements were made:—Length of stalk, 76 μ ; length of capsule (excluding neck), 122 μ ; length of neck of capsule, 11.5 μ ; width of capsule, 38 μ . In one individual I noticed a spermatophore in each of the atria; it is therefore probable that the spermatophores are manufactured in the male efferent apparatus.

In a few specimens the *Clitellum* extends on to segment x. ($\frac{1}{2}$ x.-xii. = $2\frac{1}{2}$).

Parasites.—Besides the epizotic Ciliata attached, as noted by Stephenson, round the hinder end of most individuals, an astomatous Ciliate was noticed in fairly large numbers in the gut of a few specimens; each was nearly 170 μ long, and had five or six contractile vacuoles.

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- (3) BEDDARD, F. E. "On a Freshwater Annelid of the Genus *Bothrioneuron* obtained during the 'Skeat' Expedition to the Malay Peninsula." Proc. Zool. Soc. 1901.
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III.—Some new or rare Protozoa from British Columbia.

By G. H. WAILES.

[Plates I. & II.]

THE species herein described are from material collected during the past four or five years in the southern parts of the Western mainland of British Columbia and of Vancouver Island; some of it was obtained whilst staying at the Pacific Biological Station at Departure Bay, Nanaimo.

My thanks are due to the Biological Board of Canada for the facilities kindly placed at my disposal there.

Subclass RHIZOPODA.

Order AMÆBINA.

Amæba granulifera, sp. n. (Pl. I. fig. 11.)

Syn. *Amæba radiosa*, var. *granulifera*, Penard. (Fauna Rhiz. Léman. 1902.)

Dactylosphærium radiosum, var. *granuliferum*.

Body small, amœboid, displaying when active usually from 4 to 8 radial, acutely pointed or filamentous pseudopodia capable of bending and waving movements and often assuming a spiral or "corkscrew"-shaped form; the body sparsely covered with small siliceous particles; nucleus small, spherical containing one or several nucleoles; plasma transparent, colourless, finely granular.

Dimensions. Body up to about 30μ in diameter, pseudopodia up to 100μ or more in length.

Habitat. Ponds and pools among aquatic vegetation.

Distribution. Switzerland (*Penard*); Grouse Mountain, Vancouver, B.C.

It is questionable if this species should not be removed from the genus *Amæba* as well as from the genus *Dactylosphærium* (H. & L., 1874), in which *Amæba radiosa* is placed by many authorities; in which case Vaydovsky's genus *Astromæba* (1880), emended, would seem the most appropriate name.

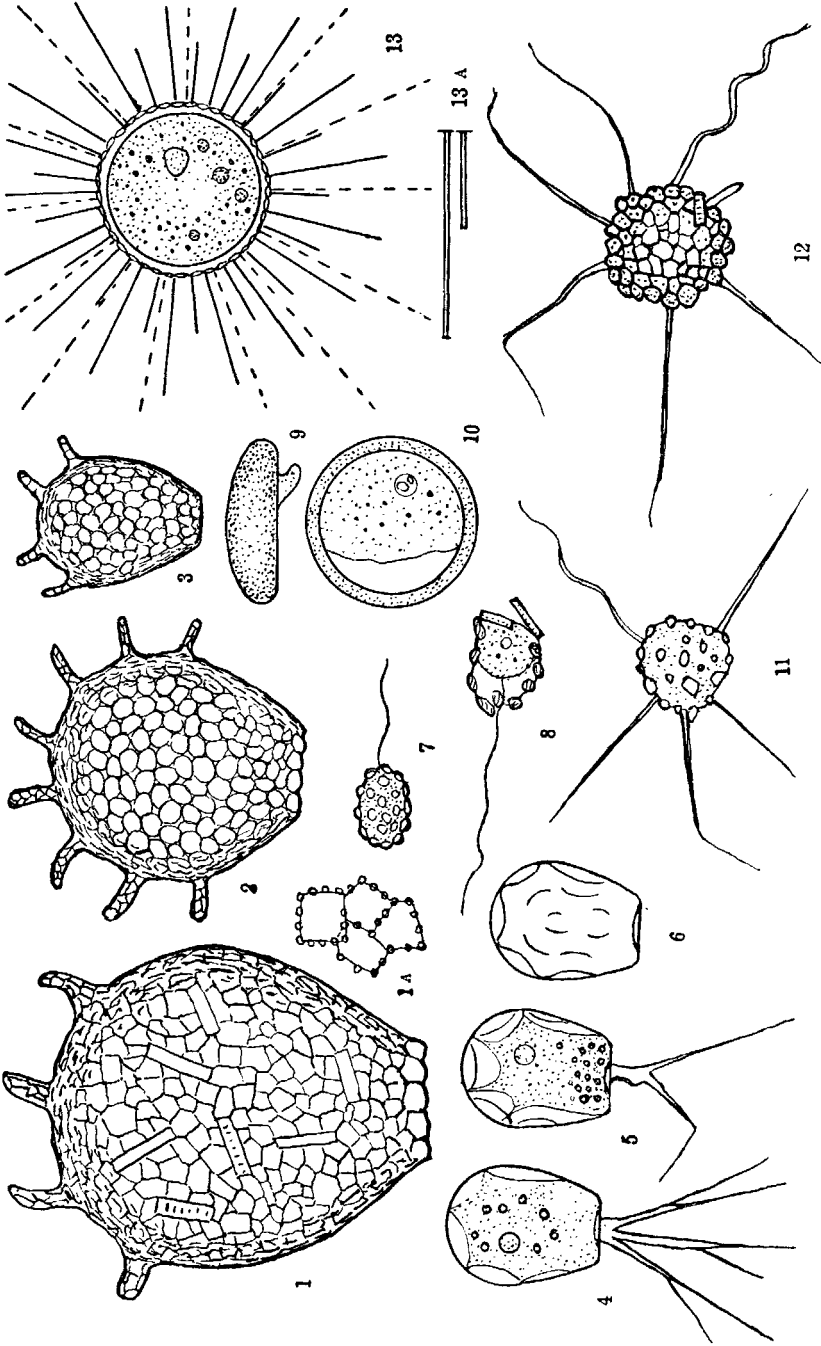
The genus *Dactylosphærium* was established by Hertwig and Lesser to receive the species *D. vitreum*, and, although *Amæba radiosa* has been often recorded as *Dactylosphærium radiosum*, Butschli, it has little in common with *D. vitreum*, and Penard considers it should not be removed from the genus *Amæba*.

On the other hand, as Penard points out, there are reasons why *A. radiosa*, var. *granulifera*, should be considered a separate species, and the occurrence of var. *sphærica*, described below, renders them more cogent.

Var. *sphærica*, nov. (Pl. I. fig. 12.)

Plasma and pseudopodia as in the type; body completely covered by a more or less compact spherical envelope of siliceous particles, through which the pseudopodia emerge at various points.

Dimensions. Envelope $20-25\mu$ in diameter; pseudopodia up to 50μ or more in length.



Sarcodina from British Columbia.

G. H. Wailes del. ad nat.

Habitat. Stanley Park Lake, Vancouver, B.C.

The pseudopodia of this variety have the waving, sharply bent or "corkscrew"-shaped forms and movements that are characteristic of the type, but the covering of siliceous grains is sufficiently dense to hide the body-plasma from view; it may, indeed, be regarded as a linking form between the naked *Amœbina* and the testaceous *Conchulina*.

Order CONCHULINA.

Nebela columbiana, sp. n. (Pl. I. fig. 1.)

Test large, ovoid, compressed, formed of angular plates mixed with diatom frustules; crown semicircular, furnished with a single row of 4-7 hollow spines or horns more or less irregularly arranged; test in narrow side-view pyriform; transverse section elliptical, ratio of axis about 2 to 1; aperture elliptical with irregular margin bordered by large plates; plasma and pseudopodia normal.

Length without horns 174-210 μ ; breadth 140-168 μ ; aperture 50-65 μ ; thickness about half the breadth; length of horns 20-25 μ .

Habitat. Pools in swamp among Sphagnum and other mosses.

Distribution. Cortes Island, British Columbia.

This species has affinities with *Nebela spicata*, Wailes, found in Peru (Journ. Linn. Soc., Zool. xxxii. p. 217, 1913), but is considerably larger; whilst that species may be described as a horned *N. dentistoma*, this one resembles *N. vitrea* provided with horns—the horns, however, are usually fewer in number (4-6), and they are not so regularly arranged.

Nebela spicata, Wailes, and *Nebela caudata*, Leidy, are the only other species of *Nebela* whose tests are furnished with similar spines; illustrations of these at the same magnification are given for comparison (Pl. I. figs. 2, 3).

Platoum repandum, sp. n. (Pl. I. figs. 4, 5, 6.)

Test ovoid, truncate at aperture end, homogeneous, rigid, transparent, corrugated, light brown in colour; fundus hemispherical, tapering convexedly towards the aperture; in transverse section circular or subcircular; aperture terminal, circular; plasma colourless, granular, partly filling the test, containing numerous large granules often collected

near the aperture; nucleus spherical, pale blue in colour, placed posteriorly; one contractile vacuole usually present; pseudopodia filamentous, few in number, simple or forked.

Habitat. Ponds and ditches among algæ.

Dimensions. Length 20–26 μ ; breadth 18–22 μ ; aperture 7–9 μ in diameter; nucleus 4 μ in diameter.

Distribution. Cortes Island and Vancouver, B.C.; Ketchikan, Alaska.

On Cortes Island in a ditch draining a swamp this species occurs numerously, and all the observed individuals were similar, the tests being circular in transverse section, and the large granules included in the plasma, numbering about twenty, were collected near the aperture; the individuals were also remarkably active, the pseudopodia varied from one to three in number.

The individuals found in Stauley Park Lake, Vancouver, were subcircular in section (ratio of axes about 7 to 6), and the large granules were diffused throughout the plasma, also the pseudopodia were more numerous; only a few were seen.

The tests from Ketchikan were in preserved material, and were circular in transverse section.

The genus *Platoom* was founded by F. E. Schulze in 1875 (Arch. f. Mik. Anat. x.) for a small rhizopod which he named *P. parvum*—no active individuals were seen by him; Penard found a small rhizopod which he ascribes to this genus, the test being 16–18 μ in length, but saw no active individuals.

The genus *Cryptodiffugia*, Penard (1890), is very closely allied to *Platoom*, *C. oviformis* being distinguished from *P. repandum* by its uncorrugated test, smaller aperture, and consistent inactivity whilst under observation.

The genus *Platoom* is distinguished from genus *Lecythium* by the tests being rigid with a circular or subcircular aperture that is not deformable or elastic; the pseudopodia are also less numerous and less branched in *P. repandum*.

Pyxidicula scutella, Playfair. (Pl. I. figs. 9, 10.)

Playfair, G. I., Proc. Linn. Soc. N. S. Wales, 1917, vol. xlii. pt. iv. p. 641.

The plasma of this species is clear and finely granular, with some larger granules scattered through it.

The nucleus is spherical, containing two nucleoli; the pseudopodia are lobose.

Dimensions. Diameter 25μ ; height about one-third of the diameter. Nucleus 4μ in diameter.

Habitat. On filamentous algæ in lakes and ponds.

Distribution. Stanley Park Lake, Vancouver, B.C.; Nanaimo, Vancouver Island, B.C.; Australia (*Playfair*).

The test is of a brownish-red colour, and is found attached usually to filamentous algæ.

Since it was first described no record of its occurrence has been published, and I believe no active individuals have been previously observed.

Order HELIOZOA.

Acanthocystis penardi, sp. n. (Pl. I. figs. 13, 13 A.)

Syn. *Acanthocystis spinifera*, Greeff (1869), Penard emend. (1904), 'Les Heliozoaires d'eau douce,' p. 248 and fig., Genève, 1904; Wailes, British F.W. Heliozoa, p. 50, Ray Soc. 1921.

Body of medium size, spherical, enclosed in an envelope formed of small oval scales arranged tangentially with an outer investment formed by the bases of numerous, tubular, truncate spines of two kinds, long and short; plasma usually containing numerous green chlorophyllous cells; endoplasm colourless, granular, placed subcentrally; nucleus placed eccentrically; contractile vacuoles absent except in colourless individuals; pseudopodia long, slightly granuliferous.

Dimensions. Diameter of envelope usually $40-60\mu$. The longer spines about two-thirds or three-quarters of the diameter in length, the shorter spines about one-third.

Habitat. Lakes, pools, ditches, and among aquatic vegetation.

Distribution. Switzerland (*Penard*), Vancouver district, and Vancouver Island, B.C.

A. spinifera, Greeff, is distinguished from this species not only by the character of the plasma, but also by all its spines being sharply pointed and of one length.

A. penardi is not uncommon in the districts from which it is here recorded and is probably widely distributed.

This species is fully described by Penard (*loc. cit.*), who inadvertently attributed it to *A. spinifera*, Greeff; since then he found the latter sp. ver., but no specific name was given to the species here described as *A. penardi*.

Acanthocystis chætophora, Leidy (1879).

Syn. *Trichoda chætophora*, Schrank (1803).

Acanthocystis turfacea, Carter (1833).

Var. *simplex*, nov.

Similar to type, but all the spines are long with notched ends; the short Y-shaped spines being absent.

Dimensions. Usually 60–80 μ in diameter, but may attain 100 μ ; on the average smaller than the type.

Habitat. Lakes, ponds, and among aquatic vegetation.

Distribution. British Columbia, Vancouver district; not uncommon.

Subclass *FLAGELLATA*.*Urceolopsis natans*, sp. n. (Pl. I. figs. 7, 8.)

Test small, ovoid, membranous, thickly covered with small grains of silica and diatom frustules; body partially filling the test; plasma finely granular, colourless, containing a few larger granules; nucleus spherical, placed posteriorly; flagellum placed anteriorly, about three times the length of the test.

Dimensions. Length 13–23 μ ; diameter about two-thirds of the length.

Habitat. Stanley Park Lake, Vancouver, B.C.

This species occurs in association with *U. sabulosa*, Stokes, and *Urceolus cyclostoma*, Stein, but is only from a quarter to one-half the average length of those species. Its test is also less deformable and is devoid of the everted membranous aperture. The covering of foreign particles is more dense than is that of *U. sabulosa*.

It is very active and is seldom seen creeping along with the aperture directed downwards as do the above-mentioned species.

Stokes (Journ. Trenton Nat. Hist. Soc. 1888, p. 96, pl. i. fig. 35) evidently refers to this species, and states that he has frequently met with it in association with *U. sabulosa*, considering a connection with that species to be a plausible supposition.

As, however, no intermediate forms have been observed and the characteristics are constant in the individuals observed both in the Eastern States and in British Columbia, there seems no reason why it should not be regarded as an automatus species.

Subclass *ACINETARIA*.Family *Ophryodendridæ*, Savile Kent, 1882.

Tentacles apparently united, so as to form one or more distinct proboscidiform appendages, the distal terminations of which are naked or cirrate (S. K.).

Key to Genera.

- I. Animals not loricate, tentacles terminating in a tuft of cirri..... *Ophryodendron*.
 II. Animals loricate, tentacle filamentous, without cirri..... *Acinetopsis*.
 III. Animals not loricate, tentacles capitate *Ophryocephalus*.

Genus OPHRYOCEPHALUS, nov.

Animal not loricate, bearing anteriorly a single contractile tentacle devoid of supplementary cirri; nucleus sphaeroidal; propagation by exterior buds.

Ophryocephalus capitatum, sp. n. (Pl. II. figs. 1-6.)

Animal sphaerical, enclosed in a thin membranous covering, pedicellate, provided with a single, long, extensile, capitate tentacle; nucleus subsphaerical, situated subcentrally; contractile vacuole not observed; propagation by exterior buds.

Epizoid on *Ephelota* spp.

Dimensions. Diameter up to 55μ ; length of pedicel $30-50\mu$, diameter $3-4\mu$; length of tentacle up to 100μ , diameter 1.5μ to 5μ .

Habitat. Salt water, epizoid on the stems and loricae of *Ephelota coronata* and *E. gemmipara*. False Narrows reef, Nanaimo, Strait of Georgia.

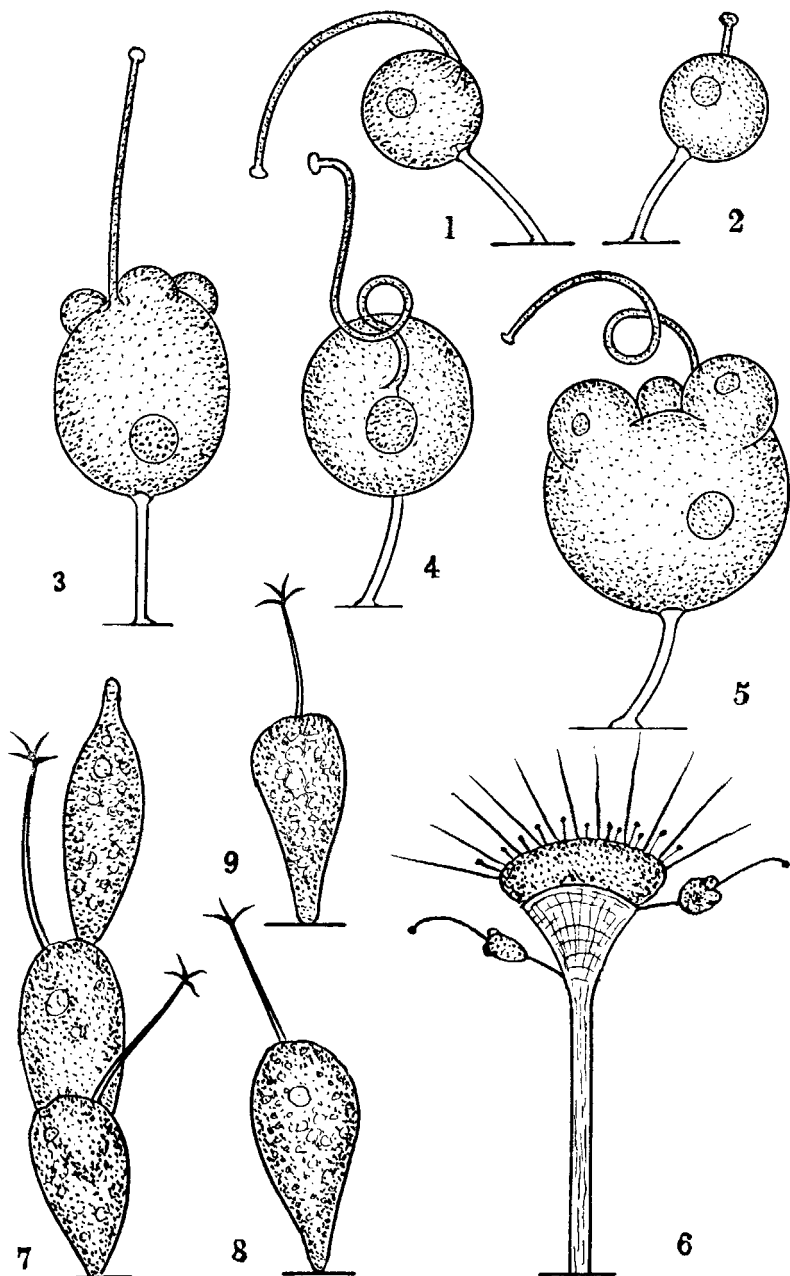
In gatherings made during April 1924 at the above locality this species occurred numerously, many of the *Ephelota* carrying several individuals; although the host is plentiful in neighbouring localities, this was the only place where it was observed.

The type of tentacle in this species presents some interesting features; in the genus *Ophryodendron* the tuft of cirri in which the tentacles terminate is supposed to represent the vestiges of the numerous suckorial tentacles of *Acineta* which have become merged into a single organ; the genus *Acinetopsis*, containing only a single species, *A. rara*, Robin, is characterized by a filamentous non-capitate tentacle, whilst in the present species, *O. capitatum*, the tentacle is an *Acineta*-like capitate organ, and the animal can be likened to an illoricate *Acineta* bearing a single suckorial tentacle.

The type of this genus and species has been deposited with the British Museum.

Ophryodendron belgicum, Fraipont, 1878.

Animal elongate and pyriform, sessile, provided with a



G. H. Wailles del. ad nat.

Tentaculifera from British Columbia.

single proboscidiform tentacle terminating in a tuft of 6 to 8 cirri.

Var. *stellatum*, nov. (Pl. II. figs. 7-9.)

This variety differs from the type in the character of the tentacle, which is more slender and terminates in 3 or 4 divergent acicular cirri; one or two contractile vacuoles are situated anteriorly; the nucleus is inconspicuous. Epizoic or ectoparasitic on the Polychæte worm, *Syllis armillaris*.

Dimensions. Length 80-85 μ ; diameter 30-35 μ ; length of tentacle 35-45 μ ; length of cirri 10 μ .

Habitat. Salt water; on the cirri of *Syllis armillaris*, dredged from 16 fathoms, Gabriola Pass, Straits of Georgia.

In the number of tentacular cirri this variety resembles *O. annulatorum*, De Saint Joseph (1886), but that species is pedunculate and the shaft of the tentacle is much thicker; on the other hand, *O. belgicum* is epizoic on Bryozoa and Hydrozoa, whilst *O. annulatorum* is confined, so far as yet recorded, to Polychæte worms having been found on *Autolytus ebbiensis* and *Nicolea venustula* (M'Intosh, Ray Soc. 1923), and no other species of *Ophryodendron* has up till now been reported as epizoic on Polychæta.

Family Podophryidæ.

Ephelota plana, sp. n. (Pl. II. fig. 6.)

Body attached to the periphery of fan-shaped extremity of pedicel, compressed; in end-view elliptical, in narrow side-view truncate oviform; tentacles of two kinds—one kind long, mobile, pointed, the other kind short, capitate; pedicel long, parallel, with fan-shaped extremity, striated longitudinally with in addition concentric striæ on the expanded portion; nucleus ramifying; contractile vacuoles inconspicuous, propagation by external, stalked, ciliated buds.

Dimensions. Length of body 150-320 μ ; breadth and depth of body about equal, 100-150 μ ; length of pedicel 100-1000 μ ; diameter 40-50 μ .

Habitat. Marine; Gulf of Georgia, near Nanaimo, B.C. On kelp and other algæ, bryozoa, etc. Common.

The striæ on the head of the pedicel are very fine but quite distinctly visible, in the middle area the small squares made by the two sets of lines are about 1 μ in breadth.

The plasma is dark brown usually and masks all inclusions.

Buds were observed occasionally; these measured from 25–60 μ in diameter, were spherical, pedicellate, and the larger ones provided with a ring or tuft of cilia at the apex; in one case the plasma of the parent had entirely disappeared, leaving a thin membrane to which the buds were attached.

EXPLANATION OF THE PLATES.

PLATE I.

- Figs. 1, 1 A. Nebela columbiana*, Wailes. Broad side-view of test. $\times 300$. Fig. 1 A. Portion of test enlarged.
Fig. 2. Nebela spicata, Wailes. Test from Peru. $\times 300$.
Fig. 3. Nebela caudata, Leidy. Test from Vancouver, B.C. $\times 300$.
Figs. 4–6. Platoum repandum, Wailes. *Figs. 4 & 5.* Active individuals from Vancouver (4) and Cortes Island (5).
 Fig. 6. Empty test. All $\times 1000$.
Figs. 7, 8. Urceolopsis natans, Wailes. $\times 800$.
Figs. 9, 10. Pyridicula scutella, Playfair. Side and broad views of an active individual. $\times 1000$.
Fig. 11. Amæba granulifera (Penard), Wailes. $\times 600$.
Fig. 12. Amæba granulifera, var. *sphærica*, Wailes. $\times 1000$.
Figs. 13, 13 A. Acanthocystis penardi, Wailes. $\times 500$. Fig. 13 A. Enlarged view of the two kinds of spines.

PLATE II.

- Figs. 1–6. Ophrycephalus capitatum*, Wailes. *Figs. 1–5.* Showing various stages of growth. $\times 600$. Fig. 6. *Ephelota plana*, with two zooids attached. $\times 50$.
Figs. 7–9. Ophryodendron belgicum, var. *stellatum*, Wailes. $\times 400$.

IV.—*The Invalidity of Sabinea*, Sowerby.

By A. E. ELLIS.

MESSRS. KENNARD AND WOODWARD have lately (Proc. Malac. Soc. xvi. p. 129) revived G. B. Sowerby's genus *Sabinea* ('Conchological Manual,' 2nd edition, 1842, p. 250), of which the typical species is *Turbo ulvæ*, Pennant. *Sabinea* is, however, preoccupied for Crustacea, as it was used by Richard Owen for a shrimp (*Crangon septemcarinatus*, Edward Sabine) on page lxxxii of the section entitled "Natural History" by Capt. J. C. Ross in Sir John Ross's 'Appendix to the Narrative of a Second Voyage in Search of a North-west Passage' (London, 1835).

It appears probable that Sowerby's *Sabinea* may be an error of transcription for *Sabanæa* (W. E. Leach MS., *fide* J. F. Stephens), J. E. Gray (see Ann. & Mag. Nat. Hist. xx.