piscivorous Carnivora, naturally keeps them erect and functional in the water, and their increase in length and number supposedly enables *Cynogale* to thrust its head with safety into the lurking-place of its prey, and to ascertain with accuracy the shape and size of the space, while a further function of the mystacial tufts is to supply information as to the exact whereabouts of the hiding fish or crab or mollusc, if these invertebrates form, as perhaps they do, a portion of its usual diet.

From the upward aspect of the nostrils—a character in which these orifices surpass those of otters and seals,—it may be inferred that *Cynogale* is in the habit of lying submerged with only the tip of the nose exposed above the surface. Since concealment under water can hardly be for the purpose of protection from enemies, its object may be assumed to be predatory; and it may be suggested that the modification in question—unique in its extent, I believe, in the Carnivora—is of service to *Cynogale* when lying in wait near the bank of a stream for small mammals or birds that may frequent the banks or come to drink.

If this be the correct interpretation of the facts, it helps us to understand the restriction to the head of practically all the evidences of the amphibious habits of *Cynogale*.

EXPLANATION OF PLATE XIV.

Fig. 1. Muzzle and rhinarium from above, showing the horizontal and dorsal position of the nostrils. The vibrissæ of the left side omitted, those of the right mostly cut short.

Fig. 2. The same from the front, the vibrissæ omitted.

Fig. 3. The base of the ear. *tr.*, tragus; *a.tr.*, antitragus; *a.h.*, antihelix (supratragus); *b.*, bursa.

Fig. 4. Left fore foot from below. 1 and 5, first and fifth digits.

Fig. 5. Left hind foot from below. 1 and 5, first and fifth digits.

Fig. 6. Anal and genital area of adult female. *a.*, anus; *gl.*, orifice of perfume-gland; *v.*, vulva.

Fig. 7. The same of immature female.

Fig. 8. Anal and genital area of immature male. *a.*, anus; *s.*, one sac of scrotum; *gl.*, supposed pores of perfume-gland; *p.*, penis.

XXXII.—On the Genera *Eglisia*, *Callostracum*, *Mesalia*, *Turritellopsis*, and *Tachyrhynchus*. By EDGAR A. SMITH, I.S.O.

MOST of the species referred to in this paper have been referred to *Turritella*, *Eglisia*, or *Mesalia*, some rightly located, others incorrectly.

It was thought, therefore, it might be useful to bring together a list of the described species, giving rather numerous references, and to assign these various forms to what appears to be their true generic position.

It is unfortunate that the animals of *Eglisia* and of the type of *Mesalia* are unknown, and consequently it cannot be stated with certainty whether their relationship is nearest to the Turritellidæ or Epitoniidæ.

EGLISIA, Gray.

- 1840. *Eglisia*, Gray, Synopsis Contents Brit. Mus. 1840, p. 147 (name only).
- 1842. *Eglisia*, id. *op. cit.* ed. 44, p. 61 (name only).
- 1847. *Eglisia*, id. Proc. Zool. Soc. 1847, p. 155. For *Turbo suturalis* (Gray), Wood.
- 1849. *Eglisia*, Reeve, Conch. Icon. vol. v.
- 1854. *Eglisia*, H. & A. Adams, Genera Rec. Moll. vol. i. p. 354.
- 1857. *Eglisia*, Gray, Guide Moll. Brit. Mus. p. 110.
- 1859. *Eglisia*, Chenu, Man. Conchyl. vol. i. p. 318, as subgenus of *Turritella*.
- 1852. *Eglesia* (sic), Sowerby, Conch. Man. p. 149.
- 1878. *Eglisia*, Kobelt, Illust. Conchyl. p. 138.
- 1883. *Eglisia*, Tryon, Struct. Syst. Conch. vol. ii. p. 224.
- 1885. *Eglisia*, Fischer, Man. Conch. p. 778.
- 1887. *Eglisia*, Tryon, Man. Conch. vol. ix. p. 51.

The first description * of this genus is that given by Reeve, but its institution should date from 1847, in which year Gray associated with it the *Turbo suturalis* of Wood, but unaccompanied by any description. Nothing is known of the animal, or hitherto of the operculum, and consequently its systematic position could not be determined. It has been placed in the Turritellidæ by H. and A. Adams, Gray (1857), Chenu, S. Woodward, Kiener, Kobelt, Dunker, Paetel, Boog Watson.

Tryon and Fischer located it in the Epitoniidæ (= *Scalariidæ*).

In describing *Eglisia cumingii* (= *tricarinata*, Ad. & Rve.) A. Adams remarked:—"The obscure longitudinal varices show the true position of this genus to be between *Turritella* and *Scalaria*." Similar "obscure longitudinal varices" occur in *E. spirata*, the type of the genus, and *lanceolata*, Rve., but they are merely the remains of former outer lips, marking periods of arrested growth, and not, as in *Scalaria*, serving as ribs for the strengthening of the shell. Marks of arrested growth may be observed in some of the Turritellas,

* The few words given by Gray in the 'Synopsis Contents Brit. Mus. ed. 44, p. 61, do not constitute a description, since no species is quoted.

but, being thinner shells, they have the appearance of cracks rather than varices.

The general form of the shells and the spiral liration or carination, and also the coloration, show relationship with *Turritella* rather than with *Epitonium*, and the only conchological difference occurs in respect of the aperture. In *Eglisia* the peristome is distinctly continuous, as in *E. spirata* and *tricarinata*, or the columella is joined to the outer lip by a thin callus as in *lanceolata* and *elegans*. The arched columella also is thickened and reflexed.

In *Turritella* the columella is thin and usually separated from the end of the outer lip. Occasionally, however, a thin connecting callus is present in some species.

Another feature common to all the *Eglisias* is the base of the body-whorl being marked off by a keel and the very fine sculpture upon it, of quite a different character from that on the rest of the shell.

I am now able, through the kindness of Mr. J. R. Le B. Tomlin, who possesses a specimen of *E. spirata* with the operculum *in situ*, to describe that feature.

It is horny, roundly ovate, almost black, and consists of about 3-4 not clearly defined, very rapidly increasing whorls, the pit-like nucleus being markedly excentric. It is slightly

Fig. 1.

concave externally and sculptured with well-marked very arcuate lines of growth. In fact, it closely resembles the opercula of *Epitonium* and *Mesalia*, both of which are paucispiral, and not multispiral as in *Turritella* *.

Eglisia spirata (Sowerby).

1825. *Turritella spirata*, Sowerby, Cat. Tankerville, Appendix, p. xiv.

1849. *Eglisia spirata*: Reeve, Conch. Icon. vol. v. pl. i. fig. 1.

1852. *Eglisia* (sic) *spirata*: Sowerby, Conch. Man. p. 337, pl. xxviii. fig. 592.

* Since the above was in type, I have heard from Professor H. M. Gwatkin that, judging from the radula, "*Eglisia spirata* is a clear *Scaluria*."

1854. *Eglisia spirata* : H. & A. Adams, Gen. Rec. Moll. vol. i. p. 354, pl. xxxviii. fig. 5.
 1857. *Eglisia spirata* : Gray, Guide Moll. Brit. Mus. p. 110.
 1859. *Turritella (Eglisia) spirata* : Chenu, Man. Conchyl. vol. i. p. 318, fig. 2287 on p. 317.
 1878. *Eglisia spirata* : Kobelt, Illust. Conchyl. p. 138, pl. xlix. fig. 5.
 1887. *Eglisia spirata* : Tryon, Man. Conch. vol. ix. p. 86, pl. xviii. fig. 58.
 1828. *Turbo suturalis*, Wood, Index Test., Suppl. p. 20, pl. vi. fig. 41.
 1834. *Turritella suturalis* (sic), Sav. ; Griffith & Pidgeon, Anim. King. vol. xii. p. 600, pl. xiii. fig. 5.
 1843. *Turritella suturalis* : Kiener, Coq. Viv. p. 26, pl. ix. fig. 1.
 1897. *Mesalia? suturalis* : Kobelt, Conch. Cab., *Turritella*, p. 74, pl. xxi. figs. 6, 7 (after Kiener).

Hab. The Island St. Thomas (Sowerby) ; Mossamedes, Angola (in coll. J. R. Le B. Tomlin).

This, the largest species and the type of the genus, is distinguishable at a glance by the whorls being flattened or channelled above in such a remarkable manner.

The geographical distribution of this species has hitherto been uncertain, since the only localities quoted were "The Island St. Thomas" (Sowerby) and Japan (Kobelt*). Mr. Tomlin has a specimen, with the operculum, from Mossamedes in Angola, which he obtained direct from that place. It therefore seems fairly certain that Sowerby's locality was the St. Thomas Island in the Gulf of Guinea, and that Kobelt was wrong in quoting Japan.

In the third edition of Argenville's 'Conchyliologie' (1780), pl. xl. fig. J 3, this species is figured, with forms of *Terebra*, *Cerithium*, &c., merely under the general term "Vis" (screw-shells).

Eglisia tricarinata, Adams & Reeve.

1849. *Eglisia tricarinata*, Adams & Reeve ; Reeve, Conch. Icon. vol. v. sp. 3, described, but not figured.
 1850. *Eglisia tricarinata*, Adams & Reeve, Zool. 'Samarang,' p. 49, pl. xii. fig. 8 (enlarged).
 1856. *Turritella (Eglisia) tricarinata* : Watson, Gasteropoda 'Challenger,' p. 479.
 1887. *Eglisia tricarinata* : Tryon, Man. Conch. vol. ix. p. 86, pl. xviii. fig. 60 (copy of Ad. & Reeve).
 1898. *Eglisia tricarinata* : Melvill & Sykes, Proc. Malac. Soc. vol. iii. p. 35, pl. iii. fig. 6.
 1850. *Eglisia cumingii*, A. Adams, Proc. Zool. Soc. p. 204 ; Ann. & Mag. Nat. Hist. 1851, vol. viii. p. 499 ; Petit, Journ. de Conch. vol. iv. p. 205 (1853).

* Illust. Conchylienbuch, p. 138.

1897. *Turritella leptomita*, Melvill & Sykes, Proc. Malac. Soc. vol. ii. p. 171, pl. xiii. figs. 12, 12a, vol. iii. p. 35.

1901. *Eglisia leptomita*, Melvill & Standen, Proc. Zool. Soc. 1901, vol. ii. p. 357.

Hab. China Sea (*Ad. & Ree.*); off Malanipa Island, Basilan Strait, Philippines, 10-20 fathoms (*Watson*); Japan (*A. Adams*); Andaman Is. (*Melvill & Sykes*); Persian Gulf and Arabian Sea, west of Bombay (*Melvill & Standen*).

This species is smaller than *E. spirata*, has fewer spiral threads, and the whorls are not tabulated or channelled at the upper part. The figure in the 'Samarang,' like others on the same plate, is greatly enlarged, the type being only 28 mm. in length, and that given by Melvill & Sykes in 1898 was taken from Adams's type of *E. cumingii*. In Dr. J. E. Gray's collection, preserved in the British Museum, is a still larger specimen, which, if the spire were perfect, would measure 40 mm. in length, and its last whorl is 11.25 mm. in width. It is worthy of notice that even a greater disparity in size occurs in specimens of *Mesalia brevisalis*.

With regard to *E. leptomita*, I have no hesitation in regarding it as identical with *tricarinata*, notwithstanding the remarks offered by Messrs. Melvill, Standen, and Sykes. They observe that "the type has five carinæ at least on the last whorl, and '*tricarinata*' is therefore an inappropriate name." On reading the original description, it is seen that this character is an allusion to the three principal keels on the upper whorls, and the authors, Melvill & Sykes, employ the same word in the description of *leptomita*. They say that the last whorl is "quadricarinato." This is incorrect, for an examination of their type shows that there are six carinæ, as described by A. Adams in *E. cumingii*. There are four principal keels, and above these two others, the upper one nearly at the suture, which consequently is channelled.

In the Proc. Zool. Soc., Melvill & Standen observe that "the extremes seem distinct from *E. carinata*, *Ad. & Ree.*, but the species is evidently, though rare, very widely distributed, and intermediates may, in time, be found to occur." The italics are mine. Since I can discover no differences in *leptomita*, the future need not be taken into consideration.

Turritella conspersa, Adams & Reeve, placed by Tryon as a variety of the present species, is a true *Turritella*, and entirely distinct in every respect.

Protoma pulchrum, Sowerby, from Sierra Leone (Proc.

Malac. Soc. vol. vi. p. 281, fig. 5), has somewhat the general aspect of *E. tricarinata*. It is a true *Turritella*, allied to *T. knysnaensis*, Krauss.

Eglisia lanceolata, Reeve.

1849. *Eglisia lanceolata*, Reeve, Conch. Icon. vol. v. pl. i. figs. 2 a, 2 b.
 1859. *Turritella (Eglisia) lanceolata*: Chenu, Man. Conchyl. p. 317, fig. 2288.
 1887. *Eglisia lanceolata*: Tryon, Man. Conch. vol. ix. p. 86, pl. xviii. fig. 59 (after Reeve).

Hab. Pasacao, Island of Luzon, Philippines, in sandy mud at a depth of 10 fathoms (*Reeve*).

To the description given by Reeve it may be added that, besides the "obscure longitudinal varices" which occur irregularly up the spire, the base of the body-whorl is of a uniform darker brown tint than the rest of the shell.

Eglisia elegans, Melvill.

1909. *Eglisia elegans*, Melvill, Trans. Linn. Soc., Zool. vol. xiii. p. 84, pl. v. fig. 7.

Hab. Saya de Malha Banks, Station C 4, 150 fathoms (*Melvill*).

This locality is situated in the western part of the Indian Ocean, S.E. of the Seychelles Islands.

This pure white shell exhibits at irregular intervals "obscure longitudinal varices" (former lips), and the columella is united to the end of the outer lip by a thin callus.

CALLOSTRACUM, Smith.

- Callostracum*, Smith, Ann. & Mag. Nat. Hist. 1909, vol. iv. p. 229.
Smithia (preoc.), Maltzan, Nachrichtenblatt deutsch. malak. Gesell. 1883, p. 97, fig.

This genus has been placed in *Eglisia* by Tryon, and considered a section of it by Fischer; but, in my opinion, it should be held distinct, since the character of the aperture is considerably different, and the operculum is described as multispiral, with subcentral nucleus.

Callostracum gracile (Maltzan).

Smithia gracilis, Maltzan, l. c. *supra*.

Hab. North side of the Island of Goree, Senegambia, West Africa (*Maltzan*)

The following species have been placed in *Eglisia*, but they do not in reality belong to that genus:—

1. *Eglisia subdecussata* (Cantraine), Fischer, Actes Soc. Linn. Bordeaux, vol. xxvii. p. 115 (1869).

This species is now referred to *Mesalia*.

2. *Eglisia macandrewæ*, H. Adams, Proc. Zool. Soc. 1865, p. 753.

Regarded as a variety of *Mathilda quadricarinata* (Brocchi), and placed in the Pyramidellidæ. Sacco has created a family Mathildidæ for this genus.

3. *Turritella* (*Eglisia*) *symmetrica*, Hutton, Cat. Marine Moll. New Zeal. p. 30 (1873).

Eglisia symmetrica, id. Journ. de Conch. 1878, vol. xxvi. p. 29.

This is a true *Turritella*.

MESALIA, Gray.

1840. *Mesalia*, Gray, Synopsis Contents Brit. Mus. p. 147 (name only).

1842. *Mesalia*, id. *op. cit.* ed. 44, p. 61.

1847. *Mesalia*, id. Proc. Zool. Soc. 1847, p. 155. For *Turritella mesal*, Desh.

1849. *Mesalia*, Reeve, Conch. Icon. vol. v.

1852. *Mesalia*, Sowerby, Conch. Man. ed. 4, p. 200.

1854. *Mesalia*, H. & A. Adams, Gen. Rec. Moll. vol. i. p. 353.

1857. *Mesalia*, Gray, Guide Moll. Brit. Mus. p. 111.

1859. *Mesalia*, Chenu, Man. Conchyl. vol. i. p. 317.

1878. *Mesalia*, Kobelt, Illust. Conchylienbuch, p. 138.

1883. *Mesalia*, Tryon, Struct. Syst. Conch. vol. ii. p. 224.

1885. *Mesalia*, Fischer, Man. Conchyl. p. 694.

1887. *Mesalia*, Tryon, Man. Conch. vol. viii. p. 193.

As in the case of *Eglisia*, the introduction of this genus must date from 1847, when a species was first associated with it.

Gray (Proc. Zool. Soc. 1847, p. 155) quoted, as examples of his genus, *Cerithium mesal*, Adanson = *Turritella mesal*, Deshayes, a *Turritella* sp., and *T. sulcata*, Lamk. He evidently considered the shell described by Adanson as the type of his genus, since he founded the name upon that species. Jeffreys*, therefore, was quite wrong in stating that "the type of Gray's genus is *Turritella sulcata* of Lamarck, a Grignon or Eocene fossil."

Mesalia may be separated from *Turritella* by certain features

* Proc. Zool. Soc. 1884, p. 132.

in the aperture and the operculum, which is paucispiral, like *Littorina*, and not multispiral, as in *Turritella*.

The figures in Adams (Genera Recent Moll. vol. iii. pl. xxxviii. figs. 4a, 4b) represent the operculum of the genus *Turritella*, and not that of *Mesalia*.

This mistake led Dall* into the error of stating that the opercula of *Mesalia* and *Tachyrhynchus* (*Mesalia reticulata*) presented no difference. The fact is, that of the former consists of four or five rapidly enlarging whorls with a somewhat excentric nucleus, whereas that in the latter genus is multi-spiral, with central nucleus.

The opercula of typical examples of *M. brevisalis*, from Goree, in the British Museum, are almost black, rather concave externally in the dried state, and consist of four or five

Fig. 2.

rapidly increasing volutions, somewhat carinate at the suture towards the deep nucleus, and with a raised spiral thread upon them which does not extend to the last two large whorls.

Mesalia brevisalis (Lamarck).

- 1757. *Cerithium mesal*, Adanson, Hist. Nat. Sénégal, p. xcvi, Le Mesal, p. 159, pl. x.
- 1822. *Turritella brevisalis*, Lamarck, Anim. sans vert. vol. vii. p. 58.
- 1843. *Turritella brevisalis*: Kiener, Coq. Viv. p. 40, pl. xii. figs. 1, 1a.
- 1843. *Turritella mesal*, Deshayes, Anim. sans vert. ed. 2, vol. ix. p. 261.
- 1847. *Mesalia mesal*: Gray, Proc. Zool. Soc. 1847, p. 155.
- 1849. *Mesalia brevisalis*: Reeve, Conch. Icon. vol. v. pl. v. fig. 16a (*Turritella*), fig. 2b (*Mesalia*).
- 1852. *Mesalia brevisalis*: Sowerby, Conch. Man. ed. 4, p. 201, pl. xxviii. fig. 591.
- 1854. *Mesalia brevisalis*: H. & A. Adams, Gen. Rec. Moll. vol. i. p. 354, pl. xxxviii. fig. 4, shell (4a, 4b, represent the operculum of *Turritella*).
- 1857. *Mesalia brevisalis*: Gray, Guide Moll. Brit. Mus. p. 111.
- 1859. *Mesalia brevisalis*: Chenu, Man. Conch. vol. i. p. 317, figs. 2284, 2285.

* Amer. Journ. Conch. vol. vii. p. 119.

1878. *Mesalia brevialis*: Kobelt, Illust. Conchyl. p. 138, pl. xlix. fig. 3.
 1887. *Mesalia brevialis*: Tryon, Man. Conch. vol. viii. p. 209, pl. lxxv. figs. 28-29.
 1897. *Mesalia brevialis*: Kobelt, Conch. Cab., *Turritella*, p. 71, pl. xxi. figs. 1-3.

Hab. Goree, Senegal, Sierra Leone.

Var. *varia*.

1843. *Turritella varia*, Kiener, Coq. Viv. p. 42, pl. ii. figs. 3, 3a, 3b.
 1849. *Mesalia brevialis* (partim): Reeve, Conch. Icon. vol. v. fig. 2a.
 1887. *Mesalia brevialis* (partim): Tryon, Man. Conch. vol. viii. pl. lxxv. fig. 27 (after Reeve), fig. 30 (after Kiener).
 1897. *Mesalia varia*: Kobelt, Conch. Cab., *Turritella*, p. 72, pl. xxi. figs. 8-11.
 1902. *Mesalia varia*, var. *imbricata*, Pallary, Journ. de Conch. vol. I. p. 16.

Hab. Mogador, Tangier, Algeciras.

Var. *freytagi*.

1884. *Mesalia freytagi*, Maltzan, Nachrichtenblatt deutsch. malak. Gesell. 1884, p. 68.

Hab. Goree, Senegambia.

Whether *M. brevialis* should be divided in two or more species seems somewhat doubtful, but, from the material examined, I have been unable to find a parting-line of separation between the typical very large form, which seems to be restricted to the Senegambia region, and the smaller var. *varia*, found at Mogador, Tangier, and South Spain*. The difference in size is enormous, but the sculpture, although variable in strength, is of the same character and the oral features are similar.

The typical form is well figured by Kiener (pl. xii. fig. 1), and the upper portion of his figure answers exactly to Lamarck's description "anfractibus convexis, lævibus, prope marginem superiorem unisulcatis" and "elle est fort raccourcie, relativement à sa grosseur. Longueur, 2 pouces."

Another large form is that figured by Reeve (*Turritella*, pl. v. fig. 16b). It is narrower and distinguished by finer spirals than the type. The variety *varia* is also finely ridged, but smaller; however, intermediates in size occur. *M. freytagi* has very convex whorls, most of which are bicarinate and display more colour-markings.

Turritella caribæa, d'Orbigny, said to be from Cuba, was

* Hidalgo has expressed a similar opinion (Journ. de Conch. 1867, vol. xv. p. 394).

founded on a unique worn shell, now in the British Museum. It has been considered by Tryon identical with the variety *varia*. Owing to the bad condition of the shell it is impossible to speak with certainty, but I am inclined to think he is right, in which case the West-Indian locality becomes very doubtful.

Turritella opalina, Ad. & Rve.*, said to be from the China Sea, agrees exactly with the upper portion of a typical *brevialis*. The fine spiral striation is precisely the same and the style of markings (exaggerated in the much enlarged figure) is quite similar. I am therefore inclined to believe that some mistake has occurred in regard to the locality †.

Jeffreys states that *Turritella suturalis* of Forbes ‡, from the Ægean Sea, is the same as *brevialis*, Reeve, partim (= var. *varia*), but the description given by Forbes is so inadequate that it becomes impossible to recognize the shell he had before him, which is described as only $1\frac{3}{2}$ inch in length!

Mesalia flammigera, Locard.

1897. *Mesalia flammigera*, Locard, and var. *simplex*, Expéd. Sci. 'Travailleur' et 'Talisman,' Moll. test. p. 396, pl. xviii. figs. 18-22.

Hab. Deep water. "A l'ouest du Sahara" (Locard).

This may be a deep-water form of *M. brevis*, with flatter whorls than the typical form, and somewhat narrower also. As regards sculpture and coloration, there seems to be little, if any, difference. Very few of the specimens of *brevialis* (typical) I have seen show any colour-marking, but, when they so occur, they take the form of longitudinal, reddish, undulating, irregular flammulations, as described by Locard.

Mesalia pulchella, Pallary.

1901. *Mesalia pulchella*, Pallary, Journ. de Conch. vol. xlix. p. 315, vol. i. p. 16, pl. i. figs. 16, 17.

Hab. Tangier.

M. Pallary describes two varieties, var. *fusca* and var. *varicosa*, differing from the type respectively in colour and sculpture.

The animal radula and operculum are unknown, and from shell-characters this species might equally well be placed in *Turritellopsis*.

* Zool. 'Samarang,' Moll. p. 48, pl. xii. fig. 7. twice natural size of type in Brit. Mus.

† Tryon placed this species in *Mesalia*, Man. Moll. vol. viii. p. 210.

‡ Report Brit. Assoc. 1843, p. 189.

Mesalia melanioides, Reeve.

1849. *Mesalia melanioides*, Reeve, Conch. Icon. vol. v. pl. i. fig. 3.
 1859. *Turritella* (*Mesalia*) *melanioides* (sic): Chenu, Man. Conch. vol. i. p. 317, fig. 2286.
 1887. *Turritella* (*Mesalia*) *melanioides* (sic): Tryon, Man. Conch. vol. viii. p. 201, pl. lxx. fig. 32 (after Reeve).
 1897. *Mesalia melanioides* (sic): Kobelt, Conch. Cab., *Turritella*, p. 74, pl. xxi. fig. 5 (after Reeve).
 1913. *Mesalia exilis*, Sowerby, Ann. & Mag. Nat. Hist. vol. xii. p. 236, pl. iii. fig. 9.

Hab. Unknown to Reeve. West Australia (*Sowerby*).

This species, of which only the shell is known, has an altogether different aspect from that of the type of *Mesalia*, having flatter whorls and numerous oblique costæ upon the upper part of the spire. The characters of the aperture, however, show that it is rightly placed in that genus.

In describing his *M. exilis* Mr. Sowerby observed:—"The actual position of this remarkable shell is uncertain, but I provisionally place it in *Mesalia* on account of the characteristic basal sinus." Such being his opinion, it is surprising that he did not refer to Reeve's Monograph of the genus, published sixty-four years previously, or to other works describing *Mesalia*, issued in the interval. Had he done so, he could not have failed to identify the shell he proposed describing with Reeve's *M. melanioides*. Having compared the type of that species and the actual shell described as *M. exilis*, both being in the British Museum collection, I can testify with certainty to their specific identity.

The figure in the Ann. & Mag. Nat. Hist. is not good; it shows the whorls too convex, and the basal sinus to the aperture is badly depicted.

Mesalia subdecussata (Cantraine).

1837. *Scalaria subdecussata*, Cantraine, Opusc. de Zool. et d'Anat. comp. p. 13; id. Malac. Médit. pl. vi. fig. 24 (1841).
 1849. *Turritella incisa*, Reeve, Conch. Icon. vol. v. pl. xi. fig. 65.
 1851. *Mesalia striata*, A. Adams, Proc. Zool. Soc. 1851, p. 279.
 1855. *Mesalia plicata*, A. Ad. op. cit. 1855, p. 123.
 1867. *Mesalia striata*: Hidalgo, Journ. de Conch. vol. xv. p. 394; Revista R. Acad. Cienc. Madrid, vol. i. p. 405 (1904).
 1868. *Mesalia subdecussata*: Weinkauff, Conch. Mittelm. vol. ii. p. 823.
 1869. *Eglistia subdecussata*: Fischer, Actes Soc. Linn. Bordeaux, vol. xxvii. p. 115.
 1877. *Acirsa subdecussata*: Jeffreys, Ann. & Mag. Nat. Hist. 1877, vol. xix. p. 241.
 1878. *Acirsa subdecussata*: Monterosato, Journ. de Conch. vol. xxvi. p. 151.
 1884. *Scalaria subdecussata*: Jeffreys, Proc. Zool. Soc. p. 132.

1891. *Acirsa subdecussata*: Locard, Coq. Marin. France, p. 128, fig. 112.

1897. *Scalaria (Acirsa) subdecussata*: Watson, Journ. Linn. Soc. vol. xxvi. p. 315.

Hab. Atlantic coasts of France and Spain, Mediterranean, Madeira, and Canaries.

I have compared the types of *Turritella incisa*, Reeve, recorded as from Sydney, Australia, and *Mesalia striata*, A. Adams, stated to be from the Philippine Islands, with Mediterranean and Madeiran specimens, and I am convinced of their identity. I therefore regard the localities given by Reeve and Adams merely as further examples of errors of this kind which occur in the Cuming collection, from which the species were described. It is included in Mr. Whitelegge's list of the fauna of Port Jackson* merely on Reeve's authority.

According to Monterosato, the animal of this species resembles *Scalaria* in the position of the eyes and the form of the tentacles, also in the median longitudinal groove of the foot. The head has no cylindrical and retractile proboscis. He described the operculum as horny, with a spiral nucleus, placed towards the inner side of the mouth, and composed of a small number of whorls and marked with strong lines of growth. Fischer also described the operculum as paucispiral, with a lateral nucleus like that of *Scalaria* and *Littorina*. It will thus be seen that it agrees with that of the type of *Mesalia (M. brevisalis)*, which is incorrectly figured as multispiral with central nucleus by H. & A. Adams (Gen. Rec. Moll. vol. iii. pl. xxxviii. figs. 4 a, b), resembling that of *Turritella*.

There are in the British Museum two specimens of *M. brevisalis*, from Goree, with opercula which agree closely with that of *Epitonium (Scalaria)* or *Littorina*. The shell-characters of the present species (*subdecussata*) differ from those of *M. brevisalis* in some respects. The upper whorls are longitudinally costate, the outer margin of the peristome is not sinuated above, and the basal sinus is only faintly developed. It agrees with *M. melanioides* in being longitudinally costate and the non-sinuation of the labrum, but it has not the marked basal sinus as developed in that species. Since, however, so little is known at present with regard to the animals, I think it preferable to leave this species in *Mesalia* rather than *Acirsa*, or to create a new genus for its reception.

* Journ. Proc. Roy. Soc. N.S.W. vol. xxiii. p. 262 (1889).

Mesalia intermedia (Deshayes).

1832. *Turritella intermedia*, Deshayes, Coq. foss. Environs Paris, vol. ii. p. 283, pl. xxxvii. figs. 17, 18, pl. xxxviii. figs. 3, 4.

1838. *Turritella robusta*, Sowerby, Proc. Zool. Soc. p. 211, pl. xi. fig. 18.

I have included this Paris Basin fossil in this list to call attention to the fact that the shell described as recent by Mr. Sowerby is merely a well-preserved and nicely cleaned specimen of Deshayes's species.

I perceived at a glance it was quite distinct from *Turritella*, and it occurred to me it might be an extinct form, since it was so unlike any known living species. I therefore submitted it to Mr. R. Bullen Newton, who at once identified it with this species. He kindly placed a series of specimens at my disposal for comparison and, consequently, I am in a position to confirm his determination. Mr. Sowerby's type, now in the British Museum, was, as might be expected, described without a locality.

The figure of it is very crude and inaccurate, the whorls being represented too narrow and too convex, and contracted at the lower part. The labrum being broken back somewhat gives the mouth a rounder look than in perfect specimens, and the anterior or basal sinus is less apparent.

TURRITELLOPSIS, Sars.

1878. *Turritellopsis*, Sars, Moll. Reg. Arct. Norveg. p. 186 (shell and radula figured).

1885. *Turritellopsis*, Fischer, Man. Conch. p. 694, as subgenus of *Turritella*.

1883. *Turritellopsis*, Tryon, Struct. Syst. Conch. vol. ii. p. 224, pl. lxxvii. fig. 56 (shell).

1897. *Turritellopsis*, Kobelt, Conch. Cab., *Turritella*, p. 67, pl. xx. figs. 10, 11 (shell), regarded as a distinct genus.

This genus in form and sculpture is very like *Turritella*, but differs in regard to the character of the radula. The operculum is circular, multispiral, with central nucleus.

Turritellopsis acicula (Stimpson).

1851. *Turritella acicula*, Stimpson, Proc. Boston Soc. Nat. Hist. vol. iv. p. 15.

1851. *Turritella acicula*, id. Shells of New England, p. 35, pl. i. fig. 5.

1870. *Turritella acicula*: Gould, Invert. Massachusetts, ed. 2, p. 319, fig. 588.

1871. *Mesalia acicula*: Dall, Amer. Journ. Conch. vol. vii. p. 118.

1878. *Turritellopsis acicula*: Sars, Moll. Reg. Arct. Norveg. p. 186, pl. x. figs. 14, *a-b*; radula, pl. vii. figs. 2, *a-e*.

1886. *Turritella (Turritellopsis) acicula*: Tryon, Mon. Conch. vol. viii. p. 207, pl. lxiv. fig. 12.

1897. *Turritellopsis acicula*: Kobelt, Conch. Cab., *Turritella*, p. 67, pl. xx. figs. 10, 11.

Hab. Off Grand Manan, near Duck Island, and south of Cape Cod (*Stimpson*). Also recorded by other authors from Frenchman's Bay, Labrador, &c. Vadso and Magerö, north coast of Norway (*Sars*).

The animal of this species has not been described, but the operculum, according to *Sars*, is very thin, pellucid, and consists of about ten narrow and regular whorls. *Dall* and *Tryon* (*l. c. supra*) have suggested that *Carpenter's* "*? Mesalia tenuisculpta*"*, from California, is the same as *acicula*. This, in my opinion, is incorrect. The Californian shell is smaller, has a less tapering spire, and much finer sculpture. At a mere glance it is seen to be distinct, and recalls very closely the general form of the type of *Fenella* to which *Carpenter* has made reference; indeed, I think it preferable to locate it in that genus rather than in *Turritellopsis*.

Turritellopsis gratissima, Thiele.

1913. *Turritellopsis gratissima*, Thiele, Deutsch. Südpolar-Exped. vol. xiii. p. 201, pl. xii. fig. 20, pl. xv. fig. 23 (radula).

Hab. Antarctic ('*Gauss*' Expedition).

According to Thiele this species agrees practically in every essential respect with *Turritellopsis*, and although the radula exhibits small differences, it agrees with that of the boreal form (*T. acicula*) in general character.

Turritellopsis latior, Thiele.

1913. *Turritellopsis latior*, Thiele, *op. cit.* p. 202, pl. xii. fig. 21.

Hab. Antarctic ('*Gauss*' Expedition).

TACHYRHYNCHUS, Mörch.

1868. *Tachyrhynchus*, Mörch, Amer. Journ. Conch. vol. iv. p. 46.

1885. *Mesalia (Tachyrhynchus)*: Fischer, Man. Conch. p. 694.

Short descriptions of the animal of the type (*T. reticulata*) are given by Mörch & Jeffreys, and the operculum is said to be "horny, yellow, orbicular, with nine narrow turns, nearly flat." To complete this description it is only necessary

* Proc. Calif. Acad. Nat. Sci. 1866, p. 216.

to add that the nucleus is central, and, in character, the operculum is similar to that of *Turritella*, which is also multispiral, and not paucispiral, like that of *Mesalia*. The genus will include *Turritella reticulata*, Mighels & Adams, *T. erosa*, Couthouy, *T. eschrichtii*, Middendorff, *Mesalia lacteola*, Carpenter.

All of these species have an arctic appearance, being chalky white, and clothed with a thin yellowish-olivaceous periostracum, differing in this respect from *Turritella*, which exhibits scarcely any traces of it, or might even be described as devoid of it.

The radulæ of *T. reticulata* and *T. erosa* are of the same character as that of *Turritella*, and the differences noticeable are probably merely specific.

The base of the aperture in *Tachyrhynchus* exhibits more or less of a sinus, it being most distinctly shown in *T. lacteola*, Cpr. In *Turritella* there is no such emargination or effusion.

Tachyrhynchus is at once separable from *Mesalia* by the different operculum, and its boreal character. Like *Turritella*, *Mesalia* exhibits usually only very faint indications of the periostracum.

Tachyrhynchus erosa (Couthouy).

1838. *Turritella erosa*, Couthouy, Boston Journ. Nat. Hist. vol. ii. p. 103, pl. iii. fig. 1.
 1841. *Turritella erosa*: Gould, Invert. Massachusetts, p. 267.
 1842. *Turritella polaris* (Beck MSS.), Möller, Index Moll. Grønland. p. 10.
 1849. *Turritella erosa*: Middendorff, Malac. Ross. p. 68.
 1852. *Turritella erosa*: Mörch, Cat. Conch. Yoldi, p. 54.
 1857. *Turritella erosa*: Mörch, Rink's Grønland, vol. ii., Naturhist. Bidrag, p. 82.
 1868. *Tachyrhynchus erosa*: Mörch, Amer. Journ. Conch. vol. iv. p. 46, animal.
 1870. *Turritella erosa*: Gould, Invert. Massachusetts, ed. 2, p. 317, fig. 585.
 1871. *Mesalia polaris*: Dall, Amer. Journ. Conch. vol. vii. p. 118.
 1877. *Turritella erosa*: Jeffreys, Ann. & Mag. Nat. Hist. vol. xix. p. 239.
 1885. *Turritella erosa*: Aurivillius, Vega-Exped. vol. iv. p. 322, pl. xii. fig. 7, pl. xiii. fig. 17 (radula).
 1886. *Turritella* (*Turritelopsis*) *erosa*: Tryon, Man. Conch. vol. viii. p. 208.

Hab. Massachusetts (*Couthouy* & *Gould*); Maine (*Blaney*); Labrador (*Bush*); Greenland (*Möller*); Davis Straits ('*Valorous*' *Exped.*); Nova Scotia (*Brit. Mus.*).

The operculum of this species is described by Mörch as similar to that of *reticulata*, and a specimen in the British Museum confirms his description: "Horny, yellow, orbicular,

with nine narrow turns, nearly flat." It is also characterised by Gould as "horny, multispiral."

Jeffrey (*l. c. supra*) has described the living animal and also made some observations upon the composition of the shell and its liability to corrosion. He described the operculum as "round and multispiral, with the nucleus in the centre; the edges of the whorls overlap, as in *T. terebra*."

I cannot, judging from Middendorff's description of *T. eschrichtii*, agree with Tryon (*l. c. supra*) that it is synonymous with the present species.

Tachyrhynchus eschrichtii (Middendorff).

1849. *Turritella eschrichtii*, Middendorff, Malac. Ross. p. 68, pl. xi. fig. 1.

1886. *Turritella* (*Turritelopsis*) *erosa* (partim), Tryon, Man. Conch. vol. viii. p. 208, pl. lxiv. fig. 14 (after Middendorff).

Hab. Sitka, Alaska (*Middendorff*).

This species is closely allied to *erosa*, but the whorls are said to be flatter, and apparently higher, since, if viewed dorsally, the last whorl, it is stated, equals almost one-third of the whole length of the shell, whereas in *erosa* it equals only one-fourth. The base of the body-whorl in the latter is almost flat and circumscribed by a distinct angle. In *eschrichtii*, on the contrary, the periphery and base are rounded. The aperture is longer and oval, whilst in *erosa* it is shorter and rounder. Animal and operculum unknown.

Tachyrhynchus reticulata (Mighels & Adams).

1842 (January). *Turritella reticulata*, Mighels & Adams, Boston Journ. Nat. Hist. vol. iv. p. 50, pl. iv. fig. 19.

1842. *Turritella lactea*, Möller, Index Moll. Grœnland. p. 9.

1849. *Mesalia lactea*: Reeve, Conch. Icon. vol. v. pl. i. fig. 1 (enlarged).

1857. *Turritella reticulata*: Mörch, Rink's Grœnland, vol. ii., Naturhist. Bidrag, p. 82.

1861. *Turritella lactea*: Troschel, Gebiss der Schnecken, vol. i. p. 153, pl. xii. figs. 13-13 b.

1868. *Tachyrhynchus reticulata*: Mörch, Amer. Journ. Conch. vol. iv. p. 46, animal.

1870. *Turritella reticulata*: Gould, Invert. Massachusetts, ed. 2, p. 318, fig. 586.

1871. *Mesalia reticulata*: Dall, Amer. Journ. Conch. vol. vii. p. 118.

1877. *Turritella reticulata*: Jeffreys, Ann. & Mag. Nat. Hist. vol. xix. p. 240.

1886. *Turritella* (*Turritelopsis*) *reticulata*: Tryon, Man. Conch. vol. viii. p. 208, pl. lxv. fig. 25, after Reeve.

1897. *Turritelopsis reticulata*: Kobelt, Conch. Cab., *Turritella*, p. 69, pl. xx. figs. 16, 17.

Hab. Gulf of St. Lawrence (*M. & Ad.*); Labrador and E. Canada (*Bush & Whiteaves*); Greenland (*Möller*).

In the words of the original describers of this species, it "is allied to *T. erosa*, Couth., but is easily recognized by the longitudinal ribs and by its more slender form" (*Mighels & Adams*).

The two forms are considered by Aurivillius to constitute one species, and he describes and figures a very different shell under the varietal name *declivis* *. Judging from the figure, however, it certainly looks quite distinct. The whorls are remarkably convex, without spiral or longitudinal costæ, and much higher in proportion to their width, and, in addition, the peristome is entire. Without examining a specimen I must refrain from suggesting the generic position of this shell.

Tachyrhynchus lacteola (Carpenter).

1864. *Mesalia lacteola*, Carpenter, Report Brit. Assoc. 1863, pp. 603, 655, name only.

1865. *Mesalia lacteola*, id. Proc. Acad. Nat. Sci. Philad. p. 62.

Hab. Puget Sound and Vancouver Isl. (*Cpr.*).

This species has been considered by Tryon synonymous with *T. reticulata*, but in my opinion it is quite distinct. Besides being smaller and shorter, the sculpture is more nodulous and the form of the aperture is different being

Fig. 3.

produced and effuse at the base. The character of the operculum, however, at once distinguishes the species. It is horny, roundly ovate, but pointed above, slightly concave, consists of only 4-5 whorls, which increase rather rapidly, are carinate at the sutures, and marked with conspicuous lines of growth, and the nucleus is a little excentric. As already pointed out, that of *T. reticulata* is circular, multi-spiral, consisting of nine whorls.

* Vega-Exped. Vetensk. Jakttag. vol. iv. p. 324, pl. xii. fig. 9 (1887).

Tachyrhynchus subplanata (Carpenter).

1865. *Mesalia* (? *lacteola*, var.) *subplanata*, Carpenter, Proc. Acad. Nat. Sci. Philad. p. 62.

Hab. Puget Sound, Washington Territory, West N. America; also Neeah Bay (*Cpr.*).

I have not seen this shell, and therefore cannot express any opinion upon its specific value. The author of the species appears to have been doubtful upon this point.

Tachyrhynchus ? costulata, Mighels & Adams.

1842. *Turritella costulata*, Mighels & Adams, Boston Journ. Nat. Hist. vol. iv. p. 50, pl. iv. fig. 20.

1870. *Turritella costulata*: Gould. Invert. Massachusetts, ed. 2, p. 318, fig. 587, apparently after M. & Ad.

Hab. Casco Bay, Maine, U.S.A. Taken from the stomach of a haddock (*M. & Ad.*).

This species, united by Tryon with *T. reticulata*, is evidently distinct. The fine longitudinal costæ and microscopic spiral striæ at once distinguish it from that form. Apparently a rare shell, and known to me only by the description and figure.

A pseudo-Mesalia.

Mesalia decussata, A. Adams, Proc. Zool. Soc. 1851, p. 279.

Hab. Island of Masbate, Philippines.

The type of this species is in the British Museum, and a careful examination of it proves that it belongs to the genus *Mormula* in the Pyramidellidæ.

The form of the aperture, the character of the sculpture, and the thickening of the labrum (the previous labra forming varices at irregular intervals up the spire) are all features characteristic of *Mormula*.

Mr. J. R. Le B. Tomlin has shown me several specimens in his collection from Japan and Lifu, which confirm the distinctness of this species from *Mormula rissoina* of A. Adams*, also from Japan, to which it bears some resemblance.

I might here point out that *Rissoina rex*, of Pilsbry †, is identical with *Mormula rissoina*. Evidently his specimens had not retained their heterostrophe protoconch, and consequently he was misled as regards their true generic location.

* Journ. Linn. Soc. 1863, vol. vii. p. 1; Smith, Ann. Natal Gov. Mus. vol. i. p. 51, pl. viii. fig. 2.

† Proc. Acad. Nat. Sci. Philad. 1904, vol. lv. p. 27, pl. iv. figs. 42, 42 a.