

ON THE RECENT SPECIES OF THE GENUS *VULSELLA*.<sup>1</sup>

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## PLATE XI.

HAVING recently had occasion to identify a specimen of this genus from the Natal coast it became necessary to study the group as a whole and to examine the literature of the subject, more particularly the reviews of the genus by the Marquis A. de Gregorio (Bull. Soc. Malac. Ital., vol. x, pp. 49-72, 1884) and A. H. Cooke (Annals and Magazine of Natural History, vol. xvii, pp. 59-67, 1886). In the first place it seemed imperative to determine with certainty the six recent species included in the genus by Lamarck, who was the first to characterize it. For this purpose I applied to the Paris Museum for loan of some of the Lamarckian specimens, and through the kindness of Professor Germain I have had an opportunity of studying *Vulsella lingulata*, *spongiarum*, *mytilina*, and *orata*.

The two other species, *V. hians* and *V. rugosa*, were described by Lamarck from specimens in his own collection, now in the Geneva Museum. On applying to that institution for drawings of these, Dr. E. F. Weber very kindly had excellent photographs taken of each, and also had coloured drawings made. I beg to express my thanks to him for so kindly acceding to my request. With the aid of the actual specimens from Paris and these photographs I am now in a position to recognize the Lamarckian species, which otherwise would have been impossible from the original inadequate descriptions. I also wish to express my sincere thanks to the Marquis A. de Gregorio for sending me in a most friendly manner the material described in his work.

The recent species of *Vulsella* have been listed or monographed several times.

1798. Boltzen (Mus. Bolt., p. 156) quoted two species, *V. major* and *V. minor*, the former being the same as the *Mya vulsella* of Linnæus.

1819. Lamarck, Hist. Anim. sans Vert., vol. vi (1), pp. 220-2. Six species described: *V. lingulata*, *hians*, *mytilina*, *rugosa*, *spongiarum*, and *orata*.

1858. Reeve, Conch. Icon., vol. xi, spp. 1-17, pls. i, ii. In addition to the Lamarckian species eleven additional names were proposed: *V. attenuata*, *trita*, *corollata*, *lingua-felis*, *phasianoptera*, *isocardia*, *crenulata*, *pholadiformis*, *rudis*, *limæformis*, and *Tasmanica*. In my opinion only one of these is retainable as a distinct species, namely *V. attenuata*.

1864. Munier-Chalmas, Bull. Soc. Linn. Normandie, vol. viii, pp. 97-110.

A list, without any comments, including the six Lamarckian and eleven Reevian species, also *minor*, Chemnitz.

1871. Dunker, Jahrb. deutsch. Malak. Ges., vol. ii, pp. 1-3.

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Three species admitted, viz., *V. lingulata*, Lamk.; *minor*, Chemn.; and *hians*, Lamk.

1884. De Gregorio, Bull. Soc. Mal. Ital., vol. x, pp. 49-72, pls. i-v; vol. xi, pp. 120-2. In addition to the already named so-called species, the author has here invented twenty-one names for supposed distinct forms. Nearly all of these are, I consider, mere mutations, and hardly that, of *V. rugosa* of Lamarck.

1886. Cooke, Ann. Mag. Nat. Hist., vol. xvii, pp. 59-67. No new forms described. A criticism of the species described by Reeve and by Lamarck, the latter of which he had never seen. The works of Bolten, Munier-Chalmas, Dunker, and de Gregorio appear to have been *unknown* to Mr. Cooke! *V. Nuttalli* of Conrad included in his list belongs to the genus *Malleus*.

1890. Clessin, Küster's Conch. Cab., Malleacea, pp. 16-25, pls. v-vii. This monograph is a very poor production, founded mainly on Reeve's work, and most crudely illustrated, the figures in many cases being merely bad reproductions of those in the *Conchologia Iconica*.

After carefully studying the works mentioned, and the collections at my disposal, I am of opinion that four species are retainable, namely, *V. vulsella*, *V. attenuata*, *V. rugosa*, and *V. spongiarum*. I do not agree with Mr. Cooke in the manner in which he has referred some of Reeve's specimens to these; for instance, *crenulata*, *isocardia*, *dilatata*, *lingua-felis*, part, and "*rugosa*, Reeve (non Lam.)", I place under *V. rugosa* and not under *spongiarum*. Also *V. trita*, Reeve, is certainly only a stunted *V. vulsella*, and not *V. spongiarum*.

The work of de Gregorio has made the study of this genus hopeless for those who cannot have his types for examination. I regard his paper as descriptive of individual specimens only, often in bad, dead condition, or young shells. Then there is the uncertainty of their habitat. Although the author was assured by the seller of the sponges from which they were extracted that they were Mediterranean, it seems almost certain that they came from the Red Sea.

## Genus *VULSELLA*, Bolten.

### 1. *VULSELLA VULSELLA* (Linn.).

*Mya vulsella*, Linn., Syst. Nat., 10th ed., p. 671, 1758; 12th ed., p. 1113; Gmelin, vol. vi, p. 3219.

*Vulsella vulsella*, de Gregorio, Bull. Soc. Mal. Ital., vol. x, p. 66, pl. v, figs. 1-1c.

*V. major*, Bolten, Mus. Bolt., 1798, p. 156.

*V. lingulata*, Lamarck, Anim. s. Vert., vol. vi, p. 221, 1819; Encycl. Méthod., pl. 178, fig. 4; Reeve, Conch. Icon., vol. xi, fig. 6; Adams, Genera Moll., pl. cxxii, figs. 4, 4a; Clessin, Conch. Cab., Malleacea, pl. v, fig. 4; Dunker, Jahrb. deutsch. Malak. Ges., 1875, p. 2; Vaillant, L'Institut, No. 1645, p. 222, 1865; Comptes Rendus, vol. lxvi, pp. 1122-5, 1868; Ann. Sci.

- Nat., vol. ix, pp. 281-310, pl. xii, 1868, anatomy; Menegaux, Recherches Circulation Lamellib., 1890, pp. 44-8, figs. anatomy.  
*V. mytilina*, Lamarek, op. cit., p. 268, abnormal; Reeve, fig. 4, worn and faded specimen; Clessin, pl. vi, fig. 6.  
*V. hians*, Lamarek, op. cit., p. 221.  
*V. trita*, Reeve, op. cit., fig. 17, worn and stunted shell; Clessin, pl. vii, fig. 7, after Reeve.

*Hab.*—Red Sea, Madagascar, Tranquebar, Singapore, North Borneo, Philippines, Japan, North Australia, New Caledonia.

Dunker<sup>1</sup> has already suggested that *V. mytilina* is a form of *lingulata*, at least he considered the shell figured by Reeve a worn abnormal specimen of it. Having now seen the very large shell named by Lamarek *mytilina* (Pl. XI, Fig. 1) and also that figured by Reeve under that name, I quite agree with Dunker in his decision. Lamarek described his shell as 'alba', which it certainly is not. It is of a livid tint, and exhibits in places quite distinct brown lines like those which are so characteristic of *V. vulsellæ*. In the shell figured by Reeve these lines are also observable, although no mention of them is made by that author. I do not think Chemnitz's figures (Conch. Cab., vol. vi, pl. ii, figs. 8, 9) which Mr. Cooke places in the synonymy of *mytilina* have anything to do with it, nor can I agree with his statement respecting the want of colouring in Reeve's specimen of *mytilina*, for, as I have already stated, the brown lines are quite discernible.

*V. trita*, Reeve (fig. 17), is probably a stunted or half-grown specimen of *V. vulsellæ* in a dreadfully worn condition, having only a trace of brown lineations at the lower margin. I cannot associate it with *V. spongiarum* as Mr. Cooke has done. Its condition, however, is so bad that it is hardly possible to determine with any degree of certainty to what species it really belongs. Well may Mr. Cooke observe, "only those who have seen the type of this shell can realize to what depth species-makers can descend." He might also have made the same remark respecting *pholadiformis*, Reeve. Since the above was written I have obtained specimens in good condition from Messrs. Sowerby and Fulton which prove beyond a doubt that *V. trita* is only a young stage of the present species.

The photographs and drawing of Lamarek's type of *V. hians* (Pl. XI, Figs. 2, 3) clearly show that it is a short example of *V. vulsellæ*. The character of the lineation and the fine granose sculpture are precisely the same as in the typical elongate form, and the non-divergent umbones are also characteristic. Reeve (Conch. Icon., fig. 16) has figured a form *V. rugosa* as *V. hians*.

In his review of this genus the Rev. A. H. Cooke<sup>2</sup> has made a most remarkable mistake in connection with *V. vulsellæ*, the present species. How such an error could have been committed it is difficult to conceive. He has given a rough translation of Rumphius's observations on the habitat of an *Ostrea* attached to stems of mangrove, being under

<sup>1</sup> Jahrb. deutsch. Malak. Ges., vol. ii, p. 2, 1875.

<sup>2</sup> Ann. Mag. Nat. Hist., vol. xvii, p. 63, 1886.

the impression that it referred to the present species. *V. vulsella* is badly figured by Rumphius on his pl. xlvi, fig. A, and the description quoted by Cooke refers to pl. xlvi, fig. A. The account given by Rumphius so obviously applies to one of the forms of oysters, such as *Ostrea folium*, that it is inconceivable how it could be supposed in any way to refer to *Vulsella*.

## 2. *VULSELLA ATTENUATA*, Reeve.

? *Vulsella minor*, Bolten, Mus. Bolt., p. 156, founded on Chemnitz, Conch. Cab., vol. vi, p. 23, pl. ii, figs. 8, 9.

*V. attenuata*, Reeve, Conch. Icon., vol. xi, fig. 5; Clessin, Conch. Cab., Malleacea, pl. v, figs. 1, 2.

*V. spongiarum*, Reeve (*non* Lamarck), fig. 15; Clessin, pl. v, fig. 3, after Reeve.

*V. ililima*, de Gregorio, Bull. Soc. Mal. Ital., vol. x, p. 69, pl. v, fig. 5.

*V. Assabensis*, de Gregorio, op. cit., vol. xi, p. 121.

*V. pholadiformis*, Reeve, op. cit., fig. 1, a young abnormality probably; Clessin, pl. vii, fig. 8, copy of Reeve.

*Hab.*—Red Sea, Suez, Gimsah, Assab; also at Tongaat, Port Shepstone, Alexandra Junction, and Umkomaas, all in Natal (H. Burnup).

This species is smaller than *V. vulsella*, and has the umbones divergent, so that there is a deep triangular ligamental fossa visible in each valve. The anterior margin of the valves, towards which the umbones incline, is prominent. This feature is shown in Reeve's figs. 15, 1, 5. Although the general form of the shell is variable there is a tendency in most adult specimens to attenuation or narrowing posteriorly. Young shells are short and ovate, but soon begin to lengthen as they increase with age. In the brown lineation and sculpture the species is rather like *V. vulsella*. The description of the hinge given by Chemnitz of his "*Mya vulsella minor*" (*Vulsella minor*, Bolten) applies well to that of the present species, and his specimens were said to have come from the Red Sea. It is therefore quite possible that they belonged to the present species, although no mention is made of radiating colour-markings.

A small example of this species with abnormally divergent umbones and very large ligamental areas to the valves was wrongly determined as *V. vulsella* (Smith, Ann. Natal Mus., vol. ii, pt. ii, p. 213). At the time I did not sufficiently estimate the specific value of the divergent umbones and hinge-area.

## 3. *VULSELLA RUGOSA*, Lamarck. Pl. XI, Figs. 6, 7.

*Vulsella rugosa*, Lamarck, Anim. s. Vert., vol. vi, p. 222; Delessert, Recueil, pl. xviii, figs. 3a-c; Reeve, Conch. Icon., vol. xi, figs. 7, 8, dark var.; de Gregorio, Bull. Soc. Mal. Ital., vol. x, p. 69, pl. v, fig. 2; Clessin, Conch. Cab., pl. vii, fig. 1, copy of Reeve; fig. 6 as *limæformis*, Reeve, which it is not.

*V. margaritacea*, Risso, Hist. Nat. Europe Mérid., vol. iv, p. 307, pl. xii, fig. 168, probably.

*V. corollata*, Reeve, op. cit., fig. 14; Clessin, pl. vi, figs. 4, 5.

- V. lingua-felis*, Reeve, part, fig. 13a; Clessin, pl. vii, figs. 2, 3.  
*V. phasianoptera*, Reeve, fig. 11; Clessin, fig. 5, copy of Reeve.  
*V. isocardia*, Reeve, fig. 2; Clessin, pl. vii, fig. 5, copy of Reeve.  
*V. hians*, Reeve (*non* Lamarck), fig. 16; Clessin, pl. vi, fig. 3, copy of Reeve.  
*V. crenulata*, Reeve, fig. 9; Clessin, pl. vi, figs. 1, 2.  
*V. Hügeli* (Parreiss MSS.), Küster, Conch. Cab., Malleacea, p. 16, not figured, 1841.  
*V. peregrina*, *indipa*, *navicula*, *claripta*, *tigrina*, *ringella*, *pulchella*, *scrobula*, *umbotropa*, *cochlearina*, *virginis*, *cilestrina*, *mirula*, *umboversa*, *mitis*, *blanda*, *spongiarum* (*non* Lamarck), *valida*, *vuma*, *cimbula*, and *caramagnæ*, all described and figured by de Gregorio, Bull. Soc. Mal. Ital., vol. x, pp. 58-70, pls. i-v; vol. xi, p. 121.  
*Reniella dilatata*, Swainson (?), Malacology, p. 386, fig. 127, 1840, unrecognizable.

*Hab.*—Red Sea, Aden, Zanzibar, Mauritius, Maldive Islands, Singapore. These localities are probably all reliable. Australia and Philippines respectively for *phasianoptera*, Reeve, *Hügeli*, Küster, and *hians*, Reeve (*non* Lamarck), are more or less uncertain.

The majority of the forms named and described by de Gregorio were supposed to have been extracted from sponges from the Tunisian coast, but it seems very doubtful whether they really occur in the Mediterranean, and the Marchesa di Monterosato<sup>1</sup> has already expressed his doubts upon the matter. He suggests that they were all derived from Red Sea sponges, which seems most probable, as *Vulsella* had never before been recognized as a Mediterranean genus, with the exception of Risso's account of *V. margaritacea*, supposed (but evidently erroneously) to occur on the shores of the Alpes Maritimes. The genus also is not known from any of the Mediterranean post-Pliocene deposits which one would have expected if the recent forms really occurred in that sea.

It would be useless to discuss individually the species or forms described by de Gregorio, as only an examination of the types themselves can show their features and value. I may say, however, it is most astonishing that in some cases (e.g. *tigrina*, *scrobula*, *umbotropa*, *virginea*, *blanda*, etc.) such dead, worn, or young shells should have been described as distinct.

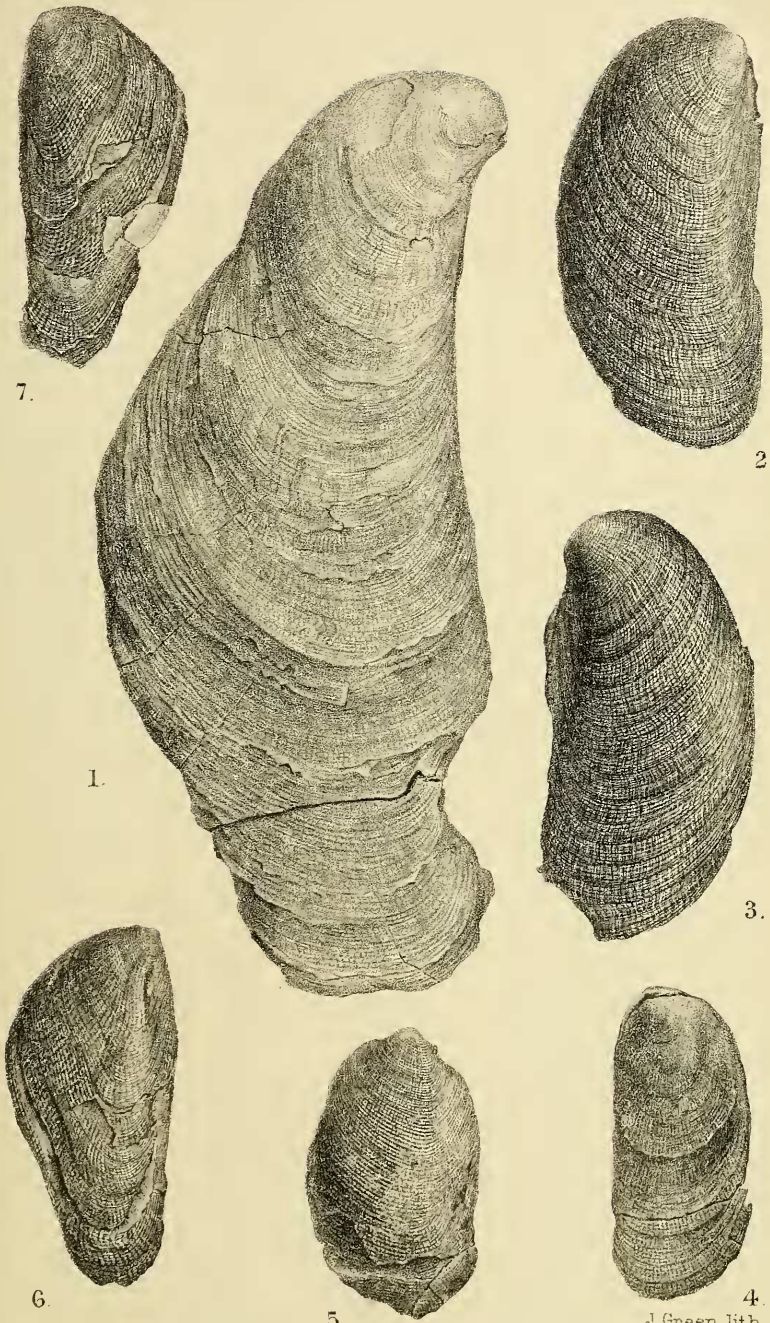
*V. rugosa* never occurs as large as the adult *V. vulsella*, in which species the sculpture seems to be finer, that is, the wavy longitudinal rows of scales are more numerous, and the brown lineations are finer and often darker in tint. The umbones in some specimens of *V. rugosa* are slightly divergent, but not so strongly as in *attenuata*. A whitish variety of *V. rugosa* without any trace of colour-markings occurs at the Mauritius.

A series of specimens collected at Aden by Major Yerbury were recorded as *V. vulsella* (Smith, Proc. Zool. Soc., 1891, p. 434). These are typical examples of *V. rugosa*.

Two specimens of *V. Hügeli*, purchased by the Museum from

<sup>1</sup> *Nomenclatura Conch. Mediter.*, 1884, p. 7.





J. Green lith.

THE TYPES OF LAMARCK'S RECENT SPECIES OF VULSELLA.

