

A SYNOPSIS OF THE FAMILY VENERIDÆ. PART II.

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I HAVE followed Gray and Deshayes in dividing the Veneridæ into sub-families, but into two only, the Meretricinæ and the Venerinæ, according to the presence or absence of an anterior lateral tooth. By this criterion the genus *Antigona* is separated from the genera *Venus* and *Chione*, but I do not wish it to be supposed that I regard these two sub-families as two distinct lines of evolution. On the contrary, I think each series includes several stirpes or branches of development, and I think that the *Chione* group has been developed directly from the *Antigona* stock by suppression and elimination of the anterior lateral tooth.

On this point I again find myself in disagreement with Dr. Dall, who imagines that there are important anatomical differences between the animals of *Chione* and *Antigona*, and thinks that the possession of an anterior lateral is correlated with such differences. In his own words, "there is not *a priori* any very good reason why the presence or absence of a minute pustule of shelly matter in front of the cardinal teeth should count for much in the classification of species (or) genera, or still less be the criterion for determination of the sub-family to which a species belongs. Yet in making comparisons of the anatomical features of these animals this little tooth or pustule is found an excellent index to important anatomical differences. So, whether it has any intrinsic value or not its correlation with important characters must be admitted."¹

Dr. Dall, however, does not state what these characters are or how the animal of *Antigona*, which he calls *Cytherea*, differs from that of *Venus* and *Chione*. He only states under the head of Meretricinæ that they have "siphons of moderate length with papillose orifices, the tubes united for a great part of their length, the margin of the mantle largely free, more or less papillose, the foot large, hatchet-shaped, not byssiferous"; and that in the Venerinæ "the siphons are usually comparatively short and more or less separate from one another. The foot is hatchet-shaped, and in the adult not byssiferous except among the nestlers". He might also have added that the mantle-margins are free and generally fringed, and that the orifices of the siphons are often cirrhose; and he should have said that the length of the siphons varies much in different genera.

It will be seen, therefore, that in the characters which are generally considered to be of importance for the purposes of comparison there is no essential difference between the animals of the Meretricinæ and Venerinæ, unless he intended to signify that the siphons of the latter are always more separate than those of the former. On this point

¹ Trans. Wagner Free Inst. Science, vol. iii, pt. vi, p. 1281, 1903.

I have made inquiries, more particularly in regard to the *Antigona* and *Ventricola* group, with the following results: in *Clausina verrucosa* the siphons are said to be completely separate, but there is no record about those of *Ventricola casina*; I therefore applied to Professor Herdman, who kindly informs me that in this species the siphons are united for a great portion of their length, i.e. for about half their extension outside the shell. Again, to Mr. H. Suter, of New Zealand, I owe the information that *Ventricola oblonga* has "short and rather small siphons which are united to their tips". There is, therefore, great variation with regard to the union of the siphons in this genus.

There seems to be an equal lack of uniformity in the *Venus* and *Chione* group, though they are usually united for about half their external length. This is the case in *Venus mercenaria* as figured by Dr. Dall himself;¹ also in *Chione gallina* and *Ch. fasciata*, but in *Timoclea ovata* they are united for three parts of their length, and it is stated that the same is the case with some varieties of *Ch. gallina*. In the case of *Ch. grus*, moreover, a West Indian species, Dr. Dall himself states that "the animal has two subequal closely united fringed siphons", so that his own statements are inconsistent with one another.

The facts above are sufficient to dispose of the theory, stated by Dr. Dall as if it were a proved fact, that there is any correlation between the anatomical characters of the animals and the presence or absence of an anterior lateral tooth on the shell. On the other hand I am decidedly of opinion that this anterior pustule or 'dentelon' has an intrinsic value of its own, for if it is the vestigial relic of an anterior lateral tooth, then it represents an important structural element in the dental armature of the hinge-plate.

It may of course be argued that if *Venus* and *Chione* may be descended from species of *Antigona* they should not be placed in different sub-families, and to this there is no answer except that no sub-families could then be recognized, and that it does seem useful to emphasize the importance of looking for this little tooth, and of using it as a basis of classification.

Among the *Venerinae* the groups which I recognize as having the rank of genera are—*Venus*, *Protothaca*, *Samarangia*, *Gomphina*, *Gemma*, *Clementia*, *Cyclina*, *Cyprimeria*, *Marcia*, *Tapes*, *Paratapes*, *Baroda*, and *Venerupis*. A few remarks on the taxonomic values of certain groups may be useful to explain the connotation of these genera and some of their divisions.

In the first place I do not find any differences of real generic importance between *Venus* (= *Mercenaria*) and *Chione*, so that I rank the latter as a sub-genus of the former; nor is there any good reason for the generic separation of *Anomalocardia*, which combines some characters of *Mercenaria* with some of *Chione*. As a matter of fact it would be more reasonable to separate those *Chione* which are destitute of radial sculpture, such as *roborata* and *tiara*. It seems more natural and convenient, however, to regard all these three

¹ Bull. U.S. Nat. Mus., No. 37, pl. lv, 1889.

groups *Chione*, *Anomalocardia*, and *Clausinella* as sub-genera of a comprehensive genus *Venus*.

With regard to *Timoclea*, of which the type is *Venus ovata*, Pennant, I am convinced that it cannot be separated from the typical section of *Chione* either solely or principally on the ground of its external sculpture. There is every gradation between the cancellated forms of *Chione* and the *Timoclea* type, in which the concentric ridges are reduced to scales or nodes on the radial ribs. The distinction must be found in other points of difference, and *Venus ovata* can be grouped with other species which have a similar ovate sub-equilateral shape, the same widely divergent teeth, with an obtuse or rounded pallial sinus; I also find that in all these species the pedal scars are separate from those of the adductors, while in the typical section of *Chione* there is almost always an open connexion between the two scars, which means of course a more or less complete union of the pedal and adductor muscles.

In this connexion it is curious to find that M. Cossmann has proposed to make *Timoclea* a separate genus, but this estimate of its importance is partly due to his confusion of *Chione* with *Antigona*. Moreover, he relies entirely on the characters of *T. ovata*, and consequently he does not give such a comprehensive definition of *Timoclea* as would make it comprise such species as *V. marica*, *V. striatissima*, *V. subnodulosa*, and *V. arakanensis*. It may be noted also that the straight inner border of the hinge-plate, which he mentions as distinctive, is largely a function of the sub-equilateral shape of the shell, for an oblique curvature of the shell naturally produces a curvature of the hinge-line.

Again, the differences between the *Clausinella* of Gray and the *Lirophora* of Conrad (which should have been written *Lirifera*) seem to me so small and unimportant that no good purpose can be served by laying much stress on them. The real fact is that these names, through the types attached to them, belong to exceptional forms of a large natural group. Thus *Venus fasciata* is a European form, which, in its compressed shape and its sculpture of broad flattened ridges, stands quite by itself, while Conrad's type was a fossil nearly allied to the West Indian *Venus paphia*, Linn., a species in which the ridges pass into erect posterior expansions, and also exhibit an obscure radial striation.

Now the natural group to which these species belong is that typified by *Venus tiara*, Dillwyn, *V. berryi*, Gray, and *V. roborata*, Hanley. It was this group for which Mörch, in 1853, used Klein's name of *Circomphalus*, and if subsequent writers had only taken note of this (Tryon, Sacco, and Dall) they would not have chosen *V. plicata* as the type (see *ante*, p. 73). The name *Clausinella*, however, was published in 1851, and has priority, so that obviously the best course to pursue is to adopt it for the whole natural group, though *Lirophora* may be used for the few recent American shells which conform to Dr. Dall's definition, and for their fossil representatives.

Venus gallina, the type of Mörch's *Chamelea*, is another exceptional form which is allied to the *V. tiara* group, and seems to be connected

with it by some fossil species, both in Europe and America. It may therefore be regarded as a section of *Clausinella*, which will thus become a sub-genus of as much importance as *Chione*. In this appreciation of *Clausinella* I find myself in accord with Messrs. Cossmann and Peyrot, but they have made the mistake of including *V. plicata* in the group and several fossil species which do not belong to it.

My reasons for the elevation of the group named *Protothaca* by Dr. Dall to the rank of a genus will be given in the sequel, but, briefly stated, they are that when one species included in the group by that author has been restored to *Chione*, and another one to *Tapes*, the remainder form a small genus which can be satisfactorily defined, and which seems to be intermediate between *Chione* and *Tapes*.

Under the head of *Clementia* it will be found that I have separated certain recent species as a new section with the name of *Terentia*, and I desire to thank Mr. MacAndrew for giving me the opportunity of examining his specimens of these rare species. The Cretaceous fossils, for which I created the sub-genus *Flaventia* in 1908, have again occupied my attention, and the examination of the interior of a left valve of *Fl. ovalis*, preserved in the Royal Albert Museum at Exeter, has confirmed my opinion of the relationship between *Flaventia* and *Clementia*.

I have included *Clementia* and *Cyclina* in this sub-family because of their conchological characters, which, in the Lamellibranchs and for the purposes of classification, I consider to be of more importance than the small differences which are observable in the animals within the limits of a family. I am aware that Deshayes described the animal of *Clementia papyracea* as resembling that of *Dosinia*, and as having completely united siphons and a compressed hatchet-shaped foot; so that if we trusted to the characters presented by the animal of this species we might place *Clementia* in the Meretricinæ near *Dosinia* or *Pitaria*, which latter, according to Adanson, has an animal of similar structure.

But we have no detailed information about other species of *Clementia*, except that Dr. Dall has recently stated¹ that the animal of *Cl. subdiaphana* (an American species) is 'veneroid'. He does not explain what he means by this term, but it can only mean that the siphons are wholly or partially free and that its foot is tongue-shaped, and he has consequently referred this species to his genus *Marcia* (i.e. *Samarangia*). There can be no doubt, however, that the shell and dentition of *C. subdiaphana* is more like that of *Clementia* than that of *Samarangia*, and that it is still more different from the fossils called *Venerella* by Cossmann. Hence I agree with Carpenter in regarding *subdiaphana* as a species of *Clementia*, akin to *C. vatheleti* and *C. cumingi*, and, if their animals differ from that of *C. papyracea*, it may be convenient to establish them as a section or sub-genus. Probably, however, the differences are no greater than those which exist between different species of *Tapes*, as will be made manifest in the sequel.

¹ *Nautilus* for January, 1914, p. 103.

I have made a careful investigation of the shells which have hitherto been included in the genus *Tapes*, with the result that I propose its division into two genera and the transference of the *T. pullastra* group to the genus *Venerupis*. The reasons for this are discussed under the head of *Tapes*.

Genus VENUS, Linnæus.

Animal with frilled or fringed mantle-margins. Siphons rather short and united for half their external length or more. Foot linguiform, thick or compressed, often extensile.

Shell oval or sub-trigonal, more or less inequivalve. Lunule and escutcheon generally well defined. Sculpture concentric or cancellate. Hinge-plate thick, with three divergent teeth in each valve, the left posterior being long, narrow, and adherent, or adjacent to the nymph. Pallial sinus small. In the right valve the posterior dorsal margin is always grooved, but in the left there is seldom any groove. Ventral margins crenulated.

Sub-genera.

Venus (s.s.), Lamarek, 1799. Type, *V. mercenaria*, Linn. Synonym: *Mercenaria*, Schumacher, 1817.

Shell ovate, convex, solid. Sometimes nearly smooth, sometimes ornamented with thin, concentric lamellæ and by faint radial striation on the posterior side. Teeth not widely divergent, not occupying more than a right angle; left anterior straight, right posterior and both medians generally grooved. Pedal scar separate from the adductor, with a thread-like channel between them. Pallial sinus triangular.

This group is restricted to the coasts of North America and Japan; it includes *V. campechiensis*, Gmelin (= *mortoni*, Conrad, and *fulgurans*, Tryon), *V. kennicotti*, Dall, *V. apodema*, Dall, and *V. stimpsoni*, Gould. Geologically it dates from the Oligocene, and several species have been described by Conrad and Dall from the Miocene and Pliocene of the United States.

Chione, Megerle, 1811. Type, *Venus cancellata*, Lam.

Shell oval or sub-trigonal, oblique or sub-equilateral. Sculpture always comprising concentric and radial elements. Hinge-plate short, teeth becoming solid and entire with growth, but both medians grooved when young, each set generally widely divergent.

Section *Chione* (s.s.). Shell oblong or obliquely trigonal, inequilateral, umbones prominent. Sculpture cancellate. Lunule and escutcheon always well defined. Pallial sinus small and angular. Pedal scar confluent with that of adductor. Marginal crenulation sometimes obsolete posteriorly.

This section includes *granulata*, Gmelin, *pectorina*, Lam., *subrostrata*, Lam., *crenulata*, Sow. (= *pubera*, Val.), *grata*, Say (= *histrionica*, Sow.), *undatella*, Sow., *succincta*, Val., *pulicaria*, Brod., *amathusia*, Phil., *gnidia*, Brod. & Sow., *asprerrima*, Sow., *columbiensis*, Sow., *subrostrata*, Lam., *compta*, Sow., and *stutchburyi*,

Gray. These are all American species except the last, which is a New Zealand shell.

Section *Timoclea*, Brown. Type, *Venus ovata*, Pennant.

Shell oval and nearly equilateral, the umbones being generally sub-central and not prominent. Sculpture cancellate, and the radials sometimes stronger than the concentric ribs. Hinge-plate straight, and the anterior teeth directed forward so that there is a wide divergence. Nymphs high and rather short. Pallial sinus obtuse or rounded. Pedal scar separate from the adductor. Valve-margins strongly crenulated all round.

This section includes the following species—*lagopus*, Lam., *gallinula*, Lam., *australis*, Sow., *costellifera*, Ad. & Rve., *scabra*, Wood, *striatissima*, Sow., *marica*, Linn., *recognita*, Smith, *arakanensis*, Sow., *subnodulosa*, Sow., *siamensis*, Lynge, *micra*, Pilsbry, *imbricata*, Sow., *lionata*, Smith, *pygmæa*, Lam. The only American species known to me which can be referred to *Timoclea* (as above defined) is *pygmæa*, which has an obtuse sinus and a separate pedal scar, though it is far from being equilateral.

Anomalocardia, Schum., 1817. Type, *Venus flexuosa*, Linn.

Synonyms: *Triquetra*, Anton after Blainville, 1818; *Cryptogramma*, Mörch, 1853.

Shell trigonal, convex, posteriorly attenuated and angulated. Sculpture mainly concentric, in broad rounded ribs crossed by finer radial riblets. Teeth solid and widely divergent. Nymphs rugose. Pallial sinus very small and sometimes obsolete. Pedal scar opening narrowly into that of adductor.

This is a small section only, including the species *flexuosa* (Linn.), *brasiliانا*, Gmelin (= *macrodon*, Hanley), *cuneimeris*, Conrad (= *rostrata*, Sow.), *subimbricata* (Sow.), *subrugosa* (Sow.), *puella* (Pfeiffer), and *leptalea* (Dall). All these, except the type, are American species. Dr. Dall regards *Venus squamosa*, Linn., as an *Anomalocardia*, and separates it as a section under the name of *Anomalodiscus*, but in my opinion both it and *subrostrata*, Lam., belong to the typical section of *Chione*, for I see no difference except in shape. On the other hand, *Venus impressa*, Hanley, has smooth ventral margins as well as smooth nymphs, and is consequently a remarkable exception to the crenulated margins of the genus. It might be regarded as a section with the name of *Cryptonema*, in allusion to the concealment of the radial striation along the margins.

Clausinella, Gray, 1851.

Synonyms: *Circomphalus*, Mörch, 1853 (no type specified); *Anaitis*, Römer, 1857 (in part), not of Duponchel, 1829.

Shell with dominant concentric sculpture of strong ribs or ridges, radial striation being absent or obscure. Teeth widely divergent and solid in the adult, though the medians are often feebly grooved in young shells. Lunule and escutcheon well defined, but the latter more marked in the left valve. Nymphs striated and sometimes rugose. Pallial sinus very small, angular or rounded. Pedal scar very narrowly connected with that of adductor.

Clausinella, s.s. Type, *Venus fasciata*, Da Costa.

Shell sculptured in regular concentric ridges, which do not rise into erect lamellæ, and seldom show any radial striation. Interspaces finely concentrically striated. Nymphs with one or two longitudinal striæ.

The majority of the species belonging to this section occur in the Indian, Australian, and Pacific regions. They include *tiara*, Dillw., *foliacea*, Phil., *roborata*, Hanley, *isabellina*, Phil., *berryi*, Gray, and *roseotincta*, Sow. In Europe it dates back to the *Helvetian* stage of the Miocene (*V. dertoparva*).¹

Lirophora, Conrad, 1864. Type, *Venus athleta*, Conrad.

Shell sculptured in thick concentric ridges, which are rounded in the centre, but pass into erect lamellæ posteriorly, and often show radial striæ on their ventral sides. The interspaces are concentrically striated. Nymphs more or less rugose.

This group is chiefly American, and includes *V. paphia*, Linn., *V. mariæ*, d'Orb., *V. peruviana*, Sow., and *V. kellestii*, Hinds. In Florida it appears to date back to the Oligocene, and there are many Miocene species.

Chamelea, Mörch, 1853. Type, *Venus gallina*, Linn.

Synonyms: *Ortygia*, Brown, 1827 (not of Boie, 1826); *Hermione*, Leach, 1852 (not of Blainville, 1828); *Chamelæa*, Adams, 1857.

Shell sculptured in narrow close-set concentric rounded riblets, which are often oblique and irregular; the radial striæ are sometimes faintly visible. Nymphs nearly smooth. Pallial sinus angular.

V. interpurpurea, Conrad, of the Caribbean Sea, and *V. crassa*, Q. & G., of New Zealand, may be referred to *Chamelea*, and the group dates back to the Miocene epoch in Europe (*V. cothurniæ*, Dujardin), and to the Oligocene in the United States.

Salacia, Jukes-Browne, 1914. Type, *Venus lamellata*, Lam. Etym.: *Salacia*, the wife of Neptune.

Shell oblong or oval, flattened at the umbones, with distant, thin, erect, or recurved concentric lamellæ. Lunule small and lanceolate. Escutcheon only defined in left valve. Median teeth always bifid. Nymphs smooth. Margins feebly crenulate. Pallial sinus moderately deep. Pedal scar long, narrowly confluent with adductor.

This group seems to be restricted to Australia and New Zealand. It comprises *Chione yatesi*, Gray, and *Ch. jacksoni*, Smith, and perhaps *C. calophylla*, which links it with *Clausinella*.

Bassina, J.-Br., 1914. Type, *Venus paucilamellata*, Sow. (= *V. alata*, Reeve). Dedicated to Lieut. Bass, after whom Bass' Straits were named.

Shell sub-trigonal, thick, convex, brownish, concentrically striated with only a few erect scales on the anterior slope. Escutcheon not defined. Both dorsal margins of the right valve grooved, and those of the left bevelled to fit.

The only species known occurs along the south coast of Australia and round Tasmania.

¹ It was by mistake that this species was referred to *Circomphalus* on p. 74.

Genus *PROTOTHACA*, Dall, 1902.

Type, *Chama thaca*, Molina (= *Venus dombeyi*, d'Orb.).

This group of shells was separated by Dr. Dall in his "Synopsis of the Veneridæ",¹ and placed as a sub-genus of *Tapes*. I have protested against this allocation on two previous occasions, holding that the species which he took as his type, i.e. that usually known as *Venus dombeyi*, is much more closely allied to *Venus* and *Chione* than to *Tapes*. A careful examination of all the species which Dr. Dall then included under the name *Protothaca* has convinced me that they do not form a homogeneous natural group, but a heterogeneous assemblage. One of the species belongs to the typical section of *Chione*, another is an abnormal form of *Tapes*; but the rest (including the type) do present peculiarities which distinguish them both from *Chione* and *Tapes*, and possess characters which make it inconvenient to class them as a sub-genus of either.

The fact is that Dr. Dall's diagnosis only records some of the differences between *Protothaca* and *Chione*, and those are chiefly superficial differences. He dwells chiefly on the external sculpture, and does not say a word about the disposition of the teeth, nor does he sufficiently distinguish the group from *Tapes*. The sculpture, being partly concentric and partly radial, differs little from that possessed by the typical section of *Chione*, and would not entitle the shells to more than sectional value, but there are points of much more importance, and one of these is the closer approximation of the teeth. No doubt this was perceived by Dr. Dall, and was the chief reason for his placing the shells under *Tapes*, although he does not say so, nor does he distinguish *Tapes* from *Chione* by the divergence of the teeth.

It is a fact, however, that in *Protothaca* both the posterior cardinals are shorter than in *Chione*, the left posterior being a short oblique tooth crossing the hinge-plate on a line nearly parallel to the hinder side of the median, while in *Chione* it is a long tooth, parallel to the base of the ligament. *Protothaca* resembles *Chione* in having a strong hinge-plate, and consequently there is a space between the left posterior cardinal and the base of the ligament. The ligament itself is very long, extending nearly to the end of the posterior dorsal slope, the consequence being that the groove, which is usually found on this margin of the right valve, is in *Protothaca* merely a short indentation for the reception of an equally short projection on the left valve. In this respect it differs from *Chione*, and resembles some forms of *Tapes*, such as *T. decussatus* and *T. pullastra*.

The following is a list of the recent species which are referred to *Protothaca* and its section *Callithaca* by Dr. Dall:—

Chione grata, Say (= *Venus discors*, Sow., and *V. histrionica*, Sow.).

Chama thaca, Molina (= *Venus dombeyi*, d'Orb.).

Chione rudrata, Desh.

¹ Proc. U.S. Nat. Mus., vol. xxvi, p. 364, 1902.

Ch. petiti, Desh. (as *Saxidomus*; = *Venus rigida*, Gould, and *Tapes diversa*, Sow.).

Ch. staminea, Conrad (= *Venus mundulus*, Reeve).

Tapes orbella, Carpenter.

T. laciniata, Carp.

T. tenerrima, Carp. (the type of *Callithaca*, Dall).

Of these eight species I consider the first to be a typical *Chione*, for it has the teeth of *Chione* with the left posterior parallel to the nymph, and it may be regarded as the Pacific analogue of the Caribbean *Ch. granulata*, which Dr. Dall himself classes as a *Chione*. The last species on the list is very different from all the others, and I regard it as a form of *Tapes*. The remaining six species do form a special group with characters of their own; they differ from *Chione* in the features already mentioned, as well as in the greater depth of the pallial sinus. The sub-genus of *Tapes* which they most nearly resemble is *Ruditapes* (*T. decussata*), but from this they differ in the following particulars, i.e. in having—

1. A stronger hinge-plate with a broader anterior expansion.
2. Longer and stronger teeth.
3. Smooth nymphs, never corrugated.
4. Left anterior tooth entire, not grooved.
5. Crenulated valve-margins.
6. Pedal scar confluent with adductor.

The fact is that the *Protothaca* group has characters which make it inconvenient to include it either under *Venus* or under *Tapes*, and I therefore propose to consider it a genus, especially as I believe the following species may also be referred to it, *Chione jedoensis*, Lischke, *Ch. hirasei*, Pilsbry, *Ch. costata*, Q. & G., and possibly the shell known as *Petricola elliptica*, Sow. (from Peru). The group is essentially a Pacific one, and may be defined as follows:—

Shell oblong, of dull white, yellow, or brownish colouring, sculpture more or less cancellate, but the radial ribs often becoming dominant. Lunule defined, but escutcheon absent, or only defined in the left valve. Ligament very long and prominent. Hinge-plate strong and deep; teeth separate and rather near together, both medians bifid, and both posteriors more oblique than in *Chione*. Nymphs smooth. Pallial sinus fairly deep and rounded in Californian species, short and subangular in others. Pedal scar confluent at top with that of the adductor. Ventral margin crenulated, but often becoming smooth posteriorly. Ridge and groove on dorsal margins very short.

Dr. Dall describes the animal of the type as having short siphons which are united to their tips, the foot hatchet-shaped (? linguiform), and not byssiferous nor exhibiting even a byssal groove.

There is another shell which I am inclined to place under *Protothaca* in spite of the fact that its margins are entirely smooth, and that it was placed under '*Marcia*' by Dr. Dall. This is the *Venus rufa*, Lam., a large, thick, oval shell which has a curiously curved hinge-plate and teeth, which are quite different from those of *Samarangia*.

I propose to make it a sub-genus of *Protothaca* with the name of *Rhomalea*, from *ῥομαλεος*, strong. It can be defined thus:—

Sub-genus.

Rhomalea, J.-Br., 1914. Type, *Venus rufa*, Lamarek. Habitat, Peru.

Shell similar to *Protothaca*, but nearly smooth; showing faint radial striæ all over the surface, obscured on the anterior side by stronger concentric striæ. Ligament very large and prominent. Hinge-plate curved and both posterior teeth very short. Interior margins smooth, pallial sinus sharply pointed. Pedal scar small and separate from that of adductor. *Venus kennerlyi* may perhaps be associated with *rufa*, as its dentition and sinus are similar.

Genus SAMARANGIA, Dall, 1902.

Shell oval or sub-quadrate, concentrically striated or minutely reticulated. Inner margins of valves smooth. Lunule flat, circumscribed. Escutcheon not defined. Hinge-plate short, with a flat or concave anterior expansion. Teeth divergent, three in each valve, the left anterior and median united at top, and fitting over the right anterior; left posterior generally long and partly confluent with the nymph. Pallial sinus fairly deep. Pedal scar more or less confluent with that of the adductor.

Samarangia, s.s.—Type, *Venus quadrangularis*, Ad. & Rve.

Shell solid, sub-quadrate, dull white. Ligament long. Valve-margins smooth. Pallial sinus horizontal, linguiform, and pointed. Pedal scar oval, very narrowly confluent with that of adductor. So far as my own knowledge goes, this section only includes *quadrangularis*, *lenticularis*, Sow., and *exalbida*, Chem.

Sub-genera.

Mercimonia, Dall, 1902. Type, *Venus bernayi*, Cossmann (Eocene fossil).

Shell sub-orbicular, substantial, convex, concentrically striated. Lunule feebly defined, ligament sunk. Hinge-plate deep, and anterior concavity well developed. Right posterior tooth widely bifid, and both posteriors curved. Left median and anterior united at top and both entire. Posterior marginal groove long. Pedal scar confluent with that of adductor. Pallial sinus variable in depth and shape.

A perusal of the description given by Messrs. Cossmann and Peyrot of *V. dujardini* of the Bordeaux Miocene, and the examination of a left valve, for which I am indebted to Professor Peyrot, have convinced me that it belongs to the same group as the Eocene shells described by M. Cossmann and mentioned by me in a previous volume of these Proceedings (vol. viii, p. 169).

Textivenus, Cossmann, 1886. Type, *Venus texta*, Lam. (Eocene).

Shell small, oval, ornamented with raised obliquely reticulate striæ. Valve-margins smooth. Only right posterior margin grooved. Pallial sinus ascending. Pedal scar narrow, and confluent with that of adductor.

Genus GOMPHINA, Mörch, 1853.

The isolation of *Gomphina* as a genus was discussed and maintained by me in 1909,¹ and at the same time it was pointed out that the small group of shells now known as *Liocyma* seemed to stand in the relation of a sub-genus. Since then I have ventured to affiliate the small American shells called *Psephis* by Carpenter in 1864, but renamed *Psephidia* by Dr. Dall in 1902, and I have also described a new sub-genus under the name of *Acolus*, based on a species from the Falkland Islands which was referred to *Psephis* by Messrs. Preston and Cooper in 1910.² The species of *Gomphina* proper are only found on the western side of the Pacific Ocean from Australia northward to Japan, and the other groups are entirely American.

Generic characters: Shell trigonal or oval, solid, smooth or concentrically striated. Lunule flat, circumscribed. Escutcheon not defined. Valve-margins smooth or tangentially grooved. Right posterior and left anterior dorsal margins grooved to receive the opposite bevelled margins. Hinge-plate short and triangular; teeth equally divergent, and both medians generally grooved. Pallial sinus small. Pedal scar separate from that of the adductor.

Gomphina, s.s. Type, *Venus donacina*, Chem.

Shell trigonal, smooth, and near equilateral. Three teeth in each valve, the left posterior confluent with the nymph, and sometimes rugose, as also the right nymph. Pallial sinus short and rounded.

Sub-genera.

Psephidia, Dall. Type, *Psephis lordi*, Baird.

Shell small, smooth, sub-equilateral. Left posterior tooth free. Inner margins tangentially grooved and microscopically crenulated. Pallial sinus short, triangular.

Acolus, Jukes-Browne. Type, *Psephis foveolata*, Preston & Cooper.

Shell small, trigonal, equilateral. Teeth 3 in the left valve, 2 in the right. Ventral margins smooth, but dorsal margins striated. Pallial line very slightly inflected.

Liocyma, Dall. Type, *Venus fluctuosa*, Gould.

Shell oval, inequilateral, oblique, concentrically striated. Three teeth in each valve. Pallial sinus short and rounded. Valve-margins smooth.

Genus CLEMENTIA, Gray, 1842.

Animal having long siphons, united for their whole length, with plain orifices. Foot compressed and sub-quadrate (or hatchet-shaped) like that of *Dosinia*. Mantle-margins plain.

Shell oval or oblong, convex, thin or substantial, sculpture generally concentric and feeble, but sometimes reticulate. Lunule indefinite or feebly defined. Escutcheon generally depressed, but not defined. Valve-margins smooth, and right posterior dorsal margin grooved. Hinge-plate weak or strong in relation to the thickness of the shell, with a concave expansion in front of the teeth;

¹ See Proc. Malac. Soc., vol. viii, p. 233.

² See Ann. Mag. Nat. Hist., vol. xii, p. 479, 1913.

three divergent teeth in each valve, the right posterior being generally bifid or composed of two laminae; the left posterior is a short tooth crossing the hinge-plate. Pallial sinus variable.

Clementia, s.s. Type, *Venus papyracea*, Gray.

Shell thin, oval, concentrically undulated and striated. Hinge weak, teeth separate, right posterior bifid or composed of two compressed plates, median and anterior near together, left median sometimes bifid. Pallial sinus generally subangular and ascending. Pedal scar large, oval, and opening narrowly into that of the adductor.

Terentia, Jukes-Browne, 1914. Type, *Clementia granifera*, Sow.

Shell thin, oblong, very inequilateral, ornamented with irregular divaricate or reticulate striae. No escutcheon. Hinge narrow, teeth short, and anterior concavity small; all the teeth entire, the right posterior being tall and narrow, the left very slight and feeble. Pallial sinus very large and deep, and partly confluent with the pallial line. Pedal scar large and confluent with that of adductor.

Sub-genera.

Flaventia, Jukes-Browne, 1908. Type, *Venus ovalis*, Sow. (a Cretaceous fossil).

Shell elongate-oval, fairly strong, with a defined lunule. Teeth all entire, except the right posterior, which is widely bifid, the hinder lamina being much longer than the other; left median narrow and oblique, anterior triangular. Pallial sinus deep, ascending and rounded.

Psathura, Deshayes. Type, *Venus fragilis*, Lam. (an Eocene fossil).

Shell thin. Teeth small; right posterior bifid, median grooved; all in left valve entire. Pallial line without inflection.

Genus *CYCLINA*, Deshayes, 1849.

Type, *Venus sinensis*, Gmelin.

Shell orbicular, convex, concentrically striated with subordinate radial striae in the typical section. No defined lunule or escutcheon. Hinge-plate well developed, with a short anterior and long posterior extension, so that the teeth only occupy a small space. Both posterior teeth are short, and traverse the plate obliquely. Right posterior and sometimes left median bifid. Pallial sinus deep and ascending. Pedal scar small and confluent with that of adductor.

Cyclina, s.s. Valve-margins crenulated. Pallial sinus angular in *sinensis*, but rounded in *flavida*, and subangular in *orientalis*.

Sub-genus.

Cyclinella, Dall, 1902. Type, *Dosinia tenuis*, Récluz.

Hinge-plate and teeth like that of *Cyclina*, but valve-margins smooth. Pallial sinus sharply angular, ascending.

Genus *GEMMA*, Deshayes, 1853.

As I have recently described this genus in the *Annals and Magazine of Natural History*¹ and have given a corrected description of it with

¹ Ser. VIII, vol. xii, p. 473, 1913.

reasons for regarding *Parastarte* as a sub-genus, I need only here quote the definitions there printed. It is a small group of small American shells which seems to stand by itself, though, by the characters of the hinge and the crenulation of the margins, it resembles *Chione* more than any other.

Shell small, oval or sub-trigonal, smooth or concentrically striated. Lunule large, superficially defined. No escutcheon. Hinge-plate short. Teeth widely divergent, the left posterior inconspicuous or obsolete, but, when present, parallel to the nymph; left median and right posterior bifid, all the rest entire. Right postero-dorsal and left antero-dorsal margins grooved to receive ridges on the opposite margins. Ventral margins finely crenulated.

Gemma, s.s. Type, *Venus gemma*, Totten.

Shell oval, striate. Three teeth in each valve. Marginal grooves long and deep. Pallial sinus generally rounded, ascending.

Sub-genus.

Parastarte, Dall. Shell thick, smooth, equilateral, and sub-trigonal. Three teeth in the right valve and only two in the left. Marginal grooves narrow. Pallial line only slightly inflected.

Genus CYPRIMERIA, Conrad, 1864.

Fossil shells of Cretaceous age, and represented by one small species in the Eocene of the Paris Basin.

Shell more or less orbicular, smooth or concentrically striated. Umbones small. Lunule superficial and feebly defined. No escutcheon. Hinge-plate prolonged anteriorly to form a concave space. Teeth widely divergent, the right posterior being so broadly bifid that its components form two separate teeth, while the median and anterior are directed forward. Left median thick and sometimes bifid.

Cyprimeria, s.s. Type, *Cytherea excavata*, Morton.

Shell sub-orbicular, compressed. Left median tooth thick, triangular and bifid; left posterior long and nearly parallel to the nymph. Pallial line with a very slight inflection.

Cyclorisma, Dall, 1902. Type, *C. carolinensis*, Conrad.

Shell oval or sub-orbicular, convex. Left median tooth entire, left posterior short and crossing the plate obliquely. Pallial sinus fairly deep, ascending and subangular.

Genus MARCIA, H. & A. Adams, 1857.

This genus and its separation from *Tapes* have been fully discussed in a previous paper.¹ The name was proposed by the Messrs. Adams in their *Genera of Recent Mollusca* in 1857 for a group of shells which they regarded as a sub-genus of *Chione*. By Römer, however, these species were included in his *Hemitapes* and *Katelsysia* groups, the former being regarded as a section of *Tapes*; and in 1887 Fischer recognized *Marcia*, as well as *Hemitapes* and *Katelsysia*, placing them

¹ Proc. Malac. Soc., vol. viii, p. 233, 1909.

all under *Tapes*. It was Dr. Dall in 1902 who first proposed to separate this assemblage as a genus under the name of *Marcia*, but he was mistaken in supposing that a type had been properly indicated, so that it was not until 1909 that *Venus pinguis* was definitely selected as its typical species, and that *Samarangia* was excluded from the genus. The following is an abstract of the generic definition then given by me:—

Shell oval or oblong, inequilateral and oblique, smooth or concentrically striated. Lunule well defined, but escutcheon only defined by absence of sculpture. Valve-margins smooth. Hinge-plate short, with three fairly strong, divergent, and nearly equidistant teeth; the right posterior and median, as well as the left median, are bifid or grooved, and frequently all the teeth are rugose. The right nymph and the left posterior tooth are striated with linear riblets; the posterior right and anterior left dorsal margins are grooved. Pallial sinus of moderate depth and rounded. Pedal scar separate from that of the adductor.

Marcia, s.s. Type, *Venus pinguis*, Chem.

Shell oval or oblong, convex, smooth or obscurely waved, often attenuated posteriorly. Lunule distinct and impressed. Teeth rather small and widely divergent, the left posterior rugose and confluent with the nymph, left anterior and median both grooved.

This group includes *V. nebulosa*, Chem., *paupercula*, Chem. (with the varieties *kochi*, Phil., *ambigua*, Desh., and *kraussi*, Desh.), ? *interrupta*, Koch., and *fumigata*, Sow. (= *laevigata*, Sow.). It inhabits the Indian Ocean from the east coast of Africa to Australia and the Philippine Islands.

Sub-genera.

Hemitapes, Römer, 1864. Type, *Venus rimularis*, Lam.

Shell oval or sub-trigonal, convex, and generally tumid. Sculpture of narrow irregular concentric ribs. Teeth short, the left posterior oblique and only in part adherent to the nymph; both the anterior teeth are tall and entire. Pallial sinus fairly deep.

This group is also East Indian and Australian, including *flammiculata*, Lam., *striata*, Chem., *cor*, Sow. (non Hanley), *philippii*, Desh., *marmorata*, Lam., *variabilis*, Phil. (with its varieties *laterisulca*, Sow., *orientalis*, Desh., *ustulata*, Desh., and *recens*, Sow.), *flammea*, Gmelin (= *radiata*, Chem.), and *recens*, Chem. (not Sow.).

Katelysia, Römer, 1857. Type, *Venus scalarina*, Lamarck.

Shell obliquely oval, compressed or convex, anterior side very short; sculpture of strong concentric ridges which are sometimes corrugated by radial ribs. Teeth nearly straight, but divergent, and all more or less rugose. Pallial sinus small, obtuse, or rounded.

This is a small group of Australian shells comprising *Venus strigosa*, Lam., *V. corrugata*, Lam., *V. peronii*, Lam., *V. aphrodina*, Lam., and *V. regularis*, Desh. To these may, I think, be added the shell described by Deshayes as *Saxidomus decussatus* and said to come from South America, but of which I have specimens from Japan.

The genus *TAPES*.

Even after the separation of *Marcia* and its allies, the shells which have been grouped under the head of *Tapes* form a heterogenous assemblage which is difficult to define in terms that would be applicable to all of them. If we neglect the variations in shape and external sculpture, and confine our attention to the internal characters, we find that the group typified by *Tapes litteratus* differs considerably from that which was called *Textrix* by Römer, and still more from the shell which is commonly known as *Tapes pullastra*, which last is in many respects more closely allied to *Venerupis* than to *Tapes* proper. So great is this resemblance that the cavicular variety of *T. pullastra* was supposed to be a distinct species by Lamarck, and was by him classed as a *Venerupis* under the name of *V. perforans*.

After a careful examination of the two assemblages which have gone under the names of *Tapes* and *Venerupis* I have come to the conclusion that they really form a connected series with *Tapes litteratus* at one end and *Venerupis irus* at the other; and further that it is almost impossible to frame a definition of the one that would exclude the other. Consequently I would either make one genus of them under the name of *Tapes* with *Venerupis* as a sub-genus, or divide the series into three genera which could then be more easily defined and distinguished. On the whole, and having special regard to the characters of the hinge, I prefer the latter arrangement, and find it more convenient to create a new genus for the shells which occupy an intermediate position between the two extremes.

Here, however, we are brought up against the thorny fence of priority in the selection of a name and type for this intermediate genus. The groups of which it can be formed are those for which the following names have been proposed: *Textrix*, *Paratapes*, *Pullastra*, *Polititapes*, *Callistotapes*, and *Protapes*. Of these, *Pullastra* is the oldest, having been proposed by Sowerby in 1826, while the *Textrix* of Römer only dates from 1857, and was, moreover, preoccupied by Sundeval in 1833, so that the next name was *Paratapes* (Stoliczka, 1871). *Pullastra*, however, can only be recognized as a subsidiary group, whereas the type of *Paratapes* is the first species on Römer's list of *Textrix*, so that the one name could stand for the other, and could be defined so as to include the same species.

Under the International Rules, however, the oldest name in any assemblage of groups must be taken as the generic name, and, if we submit to this ruling, *Pullastra* would be the name of the genus, and *Paratapes* would have to rank as a sub-genus. The only other way out of the difficulty is to detach *Pullastra* from the intermediate genus, and to consider it as a sub-genus of *Venerupis*. This indeed I regard as the most convenient and most natural arrangement of the several groups, for *Pullastra* is intimately connected with *Venerupis* through the species which were separated by the Messrs. Adams under the name of *Myrsus*. Some of these species have since been referred to *Tapes* and some to *Venerupis* by different authors, but they are best united under the head of *Pullastra*.

It must here be remarked that a genus *Pullastra* was first proposed by Sowerby in 1826,¹ and it included most of the species which Megerle and Lamarck had respectively allotted to their genera *Tapes* and *Venerupis*. One can only suppose that Sowerby was ignorant of Megerle's name, and did not agree with Lamarck's separation of *Venerupis*. Anyway, the name might have been dropped as a synonym of *Tapes* if it had not been revived by subsequent authors for a section of that genus. The Messrs. Adams used it in 1857 for a group of species which did not include *V. pullastra*, a group which was in the same year called *Paratapes* by Römer. Under the International Rules a genus which contains a species bearing the same name must take that species as a type; consequently Fischer was right in giving *Tapes pullastra* as the typical example of his section *Pullastra*, and Dr. Dall was right in definitely indicating that species as the type of a sub-genus *Pullastra*.

Lastly, with regard to the animals of the different forms of *Tapes*, the differences which exist between them are not in very close correlation with the differences of the shells, and would not lead us to the same generic grouping. If, for instance, we were to group them in genera according to the partial union or the total separation of the siphons, we should get a different classification from that based on the characters of the shells.

Thus *Tapes litteratus* has long and nearly equal siphons which are entirely separate from one another. In *Paratapes euglyptus*, for a specimen of which I am indebted to Mr. Hirase of Kyoto, the siphons are also quite free and separate from one another, but in *Polititapes* (both *rhomboides* and *latus*) the siphons are united for about half their length. Again, in *Tapes decussatus*, the type of *Amygdala*, the siphons are free and separate, but in *Tapes philippinarum* (sent me by Mr. Hirase) they are united for three-quarters of their length.

The differences in the foot also show the same want of correlation. In *T. litteratus* the foot is long and tongue-shaped, but does not possess a byssus, nor even a byssal groove, so far as I could see in the spirit-preserved specimens sent me by Mr. J. Banfield of Dunk Island, Queensland. In *Paratapes* the foot is very large, thick, and elongated, and there is no trace of a groove at its base, while in *P. rhomboides*, and in the *aureus* group, the foot is rather small, with a byssal groove, and *castrensis* is said to have a small byssus. *Tapes decussatus* has a small byssus, while *T. philippinarum*, or, at any rate, the specimen examined by me, has only a groove; both have a broad lanceolate foot, not thick, but rather compressed.

The distribution of these Tapesine genera at the present day is interesting, for the restricted section of *Tapes* is essentially tropical, being only found in the Indian Ocean and in the western Pacific from Japan to the northern parts of Australia.

¹ Genera of Shells, Zool. Journ., vol. iii, p. 134.

Amygdala has a wider range, extending from the west coast of Europe through the Mediterranean and the Indian Ocean to the Philippines, Australia, and New Zealand. *Callithaca* is the only American representative.

The typical section of *Paratapes*, again, is Indo-Pacific, the type being quoted from Natal, India, Tasmania, but *Polititapes* is restricted to the Mediterranean and the western coasts of the Old World.

It has been supposed that the name *Amygdala* could not be used for a mollusc because it was preoccupied for an Echinoderm. This idea was based on a statement of Agassiz, who referred to "*Amygdala*, Van Phelsum, 1774", but Mr. Sherborn found that this was a mistake, and that the name did not occur in Van Phelsum's work on Echinoderms (see Index Animalium, p. 46). Neither can the name be rejected on account of the *Amygdalum* of Megerle (1811); consequently it can be accepted from Römer (1857), and since his first species was *Tapes decussatus*, and this has been given in textbooks as the typical example of *Amygdala*, that species should be regarded as the type.

The several groups above-mentioned are distributed in the three genera *Tapes*, *Paratapes*, and *Venerupis* as follows.

Genus *TAPES*, Megerle, 1811.

Shell oblong, inequilateral, and generally expanded posteriorly; concentrically striated or radiately ribbed. Lunule defined, but escutcheon often obscure. Ligament long and prominent. Hinge with three divergent teeth in each valve, only three of the six being bifid; the left posterior directed backward so as to be nearly parallel to the nymph. Valve-margins smooth. Pallial sinus fairly deep, horizontal, and rounded.

Tapes, s.s. Type, *Venus litterata*, Linn.

Shell rather compressed, with small flattish umbones, concentrically striated or grooved. Escutcheon defined, but narrow. Left median tooth broad, triangular, and deeply bifid. Pedal scar separate from adductor.

Besides the varieties of *T. litteratus* this group includes *T. turgida*, Lam., *T. sulcaria*, Lam., *T. deshayesi*, Hanley, *T. similis*, Desh., and *T. phenax*, Pilsbry.

Sub-genera.

Amygdala, Römer, 1857. Synonym: *Ruditapes*, Chiamenti, 1900.

Shell convex, bearing radiate ribs which are more or less decussated by concentric ridges. Escutcheon not defined. Hinge-plate narrow and curtailed behind, so that the posterior teeth are both very short. Pallial sinus deep. Pedal scar small and narrowly confluent with that of the adductor.

This group includes *Tapes indicus*, Sow., *T. variegatus*, Sow., *T. philippinarum*, Ad. & Rve., *T. bruguieri*, Hanley, and *T. intermedia*, Q. & G.

Callithaca, Dall, 1900. Type, *Tapes tenerrima*, Carpenter.

Shell broadly oblong, sculptured, with fine radial riblets, crossed by distant concentric ridges. Hinge-plate long with a space in front of the teeth. Dorsal margins not grooved; ventral margin feebly crenulated when young, but smooth in adult. Pallial sinus very long and turned up at the end. Pedal scar elongate, separate, with a connecting canal.

This species appears to stand by itself, and its dentition is very different from that of *Protothaca*, with which Dr. Dall placed it.

Genus **PARATAPES**, Stoliczka, 1871.

Synonyms: *Pullastra*, Adams; *Textrix*, Römer, 1857 (not of Sundeval); *Eutapes*, Chiamenti, 1900; *Paphia*, Dall after Bolten, 1902; *Protapes*, Dall, 1902.

Shell smooth or concentrically ribbed; generally coloured with a glistening brownish periostracum. Lunule defined, but not the escutcheon. Hinge-plate narrow, teeth short, near together, slightly divergent, and of nearly equal length. Right dorsal margin grooved. Pallial sinus moderate and rounded. Pedal scar always separate from that of adductor.

Paratapes, s.s. Type, *Venus textilis*, Linn. (= *textus*, Chem.).

Shell oblong-elongate. Two of the teeth in each valve bifid or grooved, and the posteriors curved. Pallial sinus obtuse and ascending.

This section includes *undulatus*, Born, *rotundatus*, Linn., *sulcosus*, Sow., *amabilis*, Phil., *semirugatus*, Phil., *politus*, Sow., *graffei*, Dunker, *schnellianus*, Dunker, *inflatus*, Desh., *meroeformis*, Sow., *liratus*, Phil., *euglyptus*, Phil., *malabaricus*, Chem., and *declivis*, Sow.

Polititapes, Chiamenti, February, 1900. Type, *Venus aurea*, Gmelin.

Synonym: *Callistotapes*, Sacco, April, 1900 (type, *Tapes vetulus*).

Shell oval or oblong, concentrically grooved, with sometimes obscure radial striation. Pallial sinus nearly horizontal.

This is a small group of European and West African shells which seems to take the place of *Paratapes* in those regions. There are a number of Mediterranean forms which some regard as varieties of *aureus*, but *lætus*, Poli, *texturatus*, Lam. (= *petalina*), and *castrensis*, Desh., seem good species. Other species are *rhomboides*, Penn. (= *virgineus*, auctorum), British, and *durus*, Sow., from West Africa. It has fossil representatives in the Miocene and Pliocene deposits.

Genus **VENERUPIS**, Lamarck, 1818.

Type, *Venus irus*, Linnæus.

Shell oblong, often irregular from its nesting habit. Sculpture of radial lines or riblets, crossed by concentric ridges or striæ. Lunule indefinite. Escutcheon not defined, or only on left valve. Hinge-plate very short and narrow, excavated and curtailed posteriorly, so that all the teeth are very short, near together, and nearly parallel to one another. Two of them in each valve are bifid or grooved, but the teeth are often irregular and malformed. Groove on the posterior dorsal margin obsolete. Ventral margin smooth. Pedal scar separate from adductor.

Venerupis, s.s. Type as above. Shell with radial riblets crossed by distant concentric ridges. Escutcheon defined by a ridge in the left valve. Pallial sinus generally short, subangular, and ascending.

Claudiconcha, Fischer, 1887. Type, *V. monstrosa*, Chem.

Shell very irregular and inequivalve, the posterior margin of the right valve so expanded as to overlap that of the left. Escutcheon not defined. Pallial sinus variable.

The typical section of *Venerupis* includes *V. elegans*, Desh., *V. exotica*, Lam., *V. lamellifera*, Conrad, *V. crenata*, Lam., *V. carditoides*, Lam., *V. planicosta*, Desh., *V. mitis*, Desh., *V. pulcherrima*, Desh., and possibly *V. diemenensis*, Q. & G.

Claudiconcha includes *V. cumingi*, Desh., and *V. madreporica*, Jonas.

Sub-genus.

Pullastra, Sowerby, 1826. Type, *Venus pullastra*, Mont.

Shell with shallow radial or corrugated concentric sculpture. Escutcheon not defined. Pallial sinus large and deep, sometimes touching the pallial line below. Pedal scar separate.

The other species are *P. geographica*, Lam., *P. fabagella*, Desh., *P. galactites*, Lam., *P. corrugata*, Chem., *P. cumingi*, Sow., *P. disrupta*, Sow., and ? *P. dactyloides*. I see no reason for separating the four last as a distinct section under the name of *Myrsus* (Adams); some specimens of *P. pullastra* are nearly as rough as *corrugata*, and the pallial sinus varies both in depth and width. Moreover, two species generally assigned to *Venerupis*, viz. *V. rugosa* and *V. siliqua*, have a deep rounded pallial sinus, and are better placed under *Pullastra* than under *Venerupis*.

Genus BARODA, Stoliczka, 1871.

The separation of this genus from *Tapes* was advocated by me in 1908,¹ and at the same time I pointed out the close resemblance between the hinges of *Baroda* and *Venerella*, the former being a Cretaceous fossil and the latter being small oval shells found in the Eocene of the Paris Basin. I see no reason to alter the opinion then formed, because the similarity of the dentition is to my mind of more importance than the dissimilarity of shape; but those who think otherwise will doubtless agree with M. Cossmann in placing *Venerella* near *Mercimonia*. On my view the following is a comprehensive generic description.

Shell oblong or oval, concentrically striated, and sometimes also radiately ribbed. Lunule superficial. Escutcheon not defined. Hinge with three entire teeth in each valve, even the right posterior being entire and very narrow. In the right valve the anterior and median are placed under the umbo and directed forward, while the posterior is directed backward, so that there is a wide space between it and the median with an excavated border. In the left valve the teeth are more equally divergent, and the plate is excavated between each of them. Valve-margins smooth.

¹ Proc. Malac. Soc., vol. viii, p. 171.

Baroda, s.s. Type, *Venus fragilis*, d'Orbigny.

Shell oblong and much elongated posteriorly. Sculpture concentric only. Pallial sinus ample, horizontal, and rounded. Posterior teeth very long and parallel to the nymphs.

Icanotia, Stoliczka, 1871. Type, *Psammobia impar*, Zittel.

Shell similar to *Baroda*, but having well-marked radial sculpture.

Sub-genus.

Venerella, Cossmann, 1886. Type, *Venus hermonvillensis*, Desh.

Shell small, oval, short, concentrically striated. Hinge as above. Pallial sinus fairly deep, ascending, rounded. Pedal scar small, but apparently confluent with that of the adductor.

In the preparation of this account of the Veneridæ I have received much valuable assistance from Mr. J. C. Melvill and Mr. J. J. MacAndrew, who have most kindly lent me specimens in their collections for examination, and also from Mr. E. A. Smith, to whom I am indebted for much information, not only about shells in the British Museum but about matters which required reference to various publications. I have also to thank Mons. M. Cossmann, of Paris, and Professor Peyrot, of Bordeaux, for specimens of Eocene and Miocene species, and for information respecting other species from those formations.

MALACOLOGICAL SOCIETY OF LONDON.

INCOME AND EXPENDITURE FOR THE YEAR ENDED DECEMBER 31, 1913.

Dr.	£	s.	d.	Cr.	£	s.	d.
To Balance from last year	4	10	11	By Cost of "Proceedings"—			
" Annual Subscriptions—				Printing and Postage . . . £79	19	1	
Ordinary Members . . . £33	1	6		Illustrations	11	16	10
Corresponding Members . . . 24	7	5			<hr/>		
	57	8	11		91	15	11
" Annual Subscriptions in arrear—				" Printing Circulars	2	9	0
Ordinary Members . . . £1	1	0		" Cheque-book	0	2	6
Corresponding Members . . . 1	17	6		" Linnean Society—			
	2	18	6	Expenses incurred by use			
" Annual Subscriptions in advance—				of Rooms £3	3	0	
Ordinary Members . . . £3	13	6		Gratuities to Attendants . . . 2	10	0	
Corresponding Members . . . 1	3	0			<hr/>		
	4	16	6	" Secretary's Expenses	3	8	3
" Entrance Fees	5	15	6	" Transfer to Special Fund	7	13	0
" Composition Fee	5	5	0	" Balance	22	0	9
" Sale of "Proceedings"	44	9	8				
" Donations for Illustrations, etc.	6	12	5				
" Dividend on £50 Metropolitan 2½% Stock	1	5	0				
	<hr/>						
	£133	2	5		£133	2	5
					<hr/>		
				SPECIAL FUND.			
To Balance from last year	12	7	0	To Balance in hand January, 1913	£20	0	0
" Transfer from General Account	7	13	0		<hr/>		
	<hr/>						
	£20	0	0				

We have this day examined the accounts of the Treasurer of the Malacological Society of London, and we find the above statement to be correct.

JOHN H. PONSONBY, Hon. Treasurer.
January 31, 1914.

M. CONNOLLY } Auditors.
A. S. KENNARD }



Jukes-Browne, A. J. 1914. "A SYNOPSIS OF THE FAMILY VENERIDE. PART II."
Proceedings of the Malacological Society of London 11, 75–95.

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