

AN HISTORICAL AND SYSTEMATIC REVIEW OF THE FROG-SHELLS AND TRITONS

By WILLIAM HEALEY DALL

Everyone who has looked upon the numerous "triumphs of Galatea," "births of Venus," and "processions of Neptune," in European picture galleries, scenes dwelt upon by mediæval painters, has noticed the large, twisted, and variegated shells which are the invariable wind-instruments of the lusty Tritons who form the chorus around the sea-born deities depicted. These shells, the "Buccina" of the ancients, became naturally in popular speech the "Triton-shells," and finally the "Tritons" of the conchologist. Even at the present day on many an Italian hillside the sonorous note of these shells, blown by the peasants, serves to call the cattle home at dusk; and they may even be heard occasionally on the alien farms of New England, in use for the same purpose, or as dinner horns.

The elegant denticulation of the outer lip of these shells was copied in ages past by the silversmith, and the special conventional type of ornament thus derived has a name of its own, "gadrooning."

Related to the Tritons is another group of shell-bearing mollusks, variously known to eighteenth century conchologists as "frogs" (from their tubercular ornamentation) or "purses" (from their swollen oval form) and, since the development of a scientific nomenclature, by the more attractive names of *Ranella* or *Bursa*.

The history of the classification of these shells is very complex and has never been fully elucidated. The clearing up of some of the obscurity which has enveloped them and the proposal of a more modern and accurate system of classification for the two groups, is the object of this paper; in which the author has availed himself of the labors of many worthy predecessors, and, it is hoped, has made some advance on their conclusions.

I. NOTES ON RANELLA AND ITS ALLIES

The first attempt definitely to segregate from the heterogeneous Linnéan Murices the group already popularly recognized under the name of "Frog shells," or "Purses," was made in the anonymous Museum Calomianum in 1797. Here they were called *Rana*, a name already in use for the batrachian referred to. The following year

Bolten's posthumously printed catalogue appeared, in which the same group was recognized under the name of *Bursa*. *Murex rana* Linné was separated into some of its component species, beginning with *rana* s. s. Bolten (*spinosa* Lamarck) and including *R. crumena* Lam., *R. foliata* Brod., *B. gibbosa* Bolten (*R. granulata* Lam.), *B. mammata* Bolten (= *M. bufonius* Gmelin, 1792), and *B. bufonia* Bolten not Gmelin (= *spinosa* var.). These are all forms with a posterior canal at the junction of the outer lip and body whorl, and the group includes both nodular and spinose forms. The forms without a posterior sinus, and with or without laterally uniform varices, are put in *Tritonium* Bolten (not Müller) just as was done nearly a century later by Fischer. Owing to the confusion of allied species with one another by Linné, Gmelin, and other early writers, it is necessary to be very careful in making the identifications upon the accuracy of which so much depends.

The next author to take up the group was Link in 1807, whose classification was less natural than Bolten's, since it seems to have been based wholly on the presence of symmetrical lateral varices, and included species like *M. gyrinus* Linné, which have no posterior canal. He includes under the name of *Gyrineum*: *G. cchinata* Link (*R. spinosa* Lam.); *G. rana* (L.) Link (*R. crumena* Lam.); *G. bufonium* (Gmelin) Link; *G. natator* Link (*R. tuberculata* Broderip); and *G. verrucosum* Link (= *R. ranina* Lam. = *Murex gyrinus* L.). This retrograde arrangement has been more or less popular up to the present moment.

Montfort in 1810, saw more clearly and put the ranelliform Tritons by themselves under the name of *Apollon* (which he supposed to be Latin) with *Murex gyrinus* (Linné) Gmelin as type. In his synonymy, as with all the early authors, there is some confusion of similar species or figures of species, exactly as in the case of *Ranella granifera* Lamarck. But Montfort's figure, though rude, is obviously destitute of any anal sinus or gutter, and he adopts the specific name *gyrinus* for his species, identifying it with *Murex gyrinus* of Linné, better known as *Ranella ranina* Lamarck, a species known to be destitute of the anal sulcus. Moreover he contrasts it with the next genus, *Buffo*, which possesses a sinus. I think therefore we cannot do otherwise than recognize that *Apollon* is based upon the Tritonoid forms without an anal sulcus, and accept literally his cited type as the type of Montfort's genus, in spite of the fact that incongruous species are included among those cited in his synonymy.

Very much the same is true of *Ranella granifera* Lamarck, among the synonyms of which are species with and species without an anal

sulcus. The species which is adopted by Fischer to bear the name of *granifera*, has a shallow sulcus, removed from the vicinity of the suture, and belongs in the section *Colubrellina* Fischer, as recognized by Cossinann. This latter identification would place *R. granifera* (Lam.) Fischer, among the *Ranellas*, but it cannot be taken as typical, since Bowdich and Blainville had both selected as the type, from among Lamarck's species, the *R. bufonia* Gmelin, which must be retained in that capacity, since Lamarck himself did not select any type, and Bowdich, his friend and pupil, prepared his "Elements" under the supervision of the elder naturalist. If any one were disposed to fall back on the "first species" they would be obliged to accept *R. crassa* Dillwyn, as that is the type of Montfort's *Buffo* referred to by Cuvier first in the list he gave on the occasion of the first publication of the genus *Ranella*; the French *Ranelle* of 1812 being an absolutely "nude" appellation, not entitled to recognition.

For the *Bursa* of Bolten Montfort proposed the name *Buffo* (not *Buffo* Lacépède, 1788) with *B. spadiceus* (= *M. crassus* Dillwyn or *R. granulata* Lam.) as type. In 1811 Perry gave the name *Biplex* to a group which is the equivalent of *Gyrineum* Link, but which has been retained by Fischer in a sectional sense for the *Biplex perca* of Perry, a remarkable compressed form, first made known in Perry's work. A year later in his *Extrait d'un Cours*, Lamarck indicated his genus by the nude vernacular name of "*Ranelle*," which was introduced into nomenclature by Cuvier, in 1817, under the Latin form of *Ranella*. Cuvier adopts Montfort's *Apollon* and for the pre-occupied *Buffo* substitutes *Ranella*, as of Lamarck; and gives a list of species which makes Lamarck's genus the equivalent of the earlier *Gyrineum*.

In the same year Schumacher proposed a genus *Bufo**na**ria*, which is the equivalent of Montfort's *Buffo*, section *a* being typified by *R. spinosa* Lamarck, and section *β* by *Murex scrobilator* Linné. For the tritonoid form called *Ranella gigantea* by Lamarck, he proposed a genus *Gyrina* (not *Gyrinus* Linné, 1767); and for another, *Murex lampas* Linné, the genus *Lampas* (not *Lampas* Montfort 1808), which is practically identical with *scrobilator* in general characters.

Lamarck made his own first publication of the name *Ranella* in the seventh volume of the *Animaux sans Vertébrés*, 1822, after he had become blind, and in the same year his pupil and friend, Bowdich, in the first part of his *Elements of Conchology*, cites as his sole example or type of the genus *Ranella*, the *R. bufonia* Gmelin.

Three years later Blainville in his Manual divides the genus into two groups, *Ranella* s. s. with *R. granulata* as type¹ (= *R. bufonia* as figured), and *Apollon* Montfort, with *Ranella ranina* Lamareck, cited as type, and *R. gigantea* Lamareck figured as an example.

This practically brings us to a point where we can sum up the status of these older names before taking up more modern treatment of the group and its subdivisions. It seems that we have, in the Tritoniens of the older writers, two groups which have developed in a somewhat parallel manner: one, in which varical periodicity is generally irregular but sometimes regularly restricted to half a circuit of the columellar axis, and in which there is no anal canal in the aperture; another, in which the varices occur almost always regularly but in which there is always an anal sinus, sometimes conspicuously produced in the form of a guttered spine. This distinction was recognized by Bolten, Montfort, and Blainville, among the older writers, and emphasized by Jousseau and Fischer among the modern systematists. I am inclined to accept this view as being the most satisfactory method of dividing a somewhat puzzling family.

It is evident that the first available name for the group typified by *Murex rana* (L.) Bolten, is *Bursa* Bolten, and that this must be adopted for the genus. Eliminating from Link's group the species properly belonging to *Bursa* we have *Murex gyrinus* Gmelin, left to carry Link's name *Gyrincum*, of which *Apollon* Montfort will be a synonym. *Biplex* Perry may be reserved for one of the subdivisions of *Gyrincum*. The subdivision α of Schumacher's *Bufonaria* is typical *Bursa*, but for the subdivision β typified by *Murex scrobilator* Linné, the name may be retained; *Lampas* Schumacher (not of the Museum Calonianum or H. and A. Adams) and *Tutufa* Jousseau, are synonymous. If *Gyrina* Schumacher is regarded as preoccupied by *Gyrinus* Linné, the group so designated must be given a new name.

H. and A. Adams were the next authors to modify the nomenclature of the group to which they added the subgenus *Aspa* and also reinstated *Bursa* and revived the prelinnean *Argobuccinum* for *Murex argus* Gmelin and its allies. Otherwise they rather added to than diminished existing confusion.

In 1881 Jousseau took up the group with a keen eye for distinctive characters. If his researches had carried him far enough to discover the original types of the different named groups, and he had arranged his system accordingly, this author might have had the gratification of finally systematizing the group. But as it was he

¹ Not *R. granulata* of Lamareck.

seems to have chosen types at random for the old names, as if none had been selected before him. His arrangement thus applied the old names to wrong groups, necessitating revision. The group containing *R. ventricosa* Broderip, and *R. californica* Hinds, he named *Crossata*, to *Lampas* Schumacher (but not of the Museum Calonianum) he gave the new name *Tutufa*, and to the small Ranellas with short anal tube, the name *Lampasopsis* later corrected by Fischer to *Lampadopsis*. Fischer, in 1884, accepted in the main the arrangement of Jousseaume, substituting *Colubrellina* for the name *Colubreria* Jousseaume non Schumacher.

Cossmann, in 1903, returned to the point of view of Link and Adams with results which cannot be regarded as happy.

The Ranellas or Bursas shade very gradually into the forms formerly known as *Triton* or *Tritonium*, judged by most of their characters, but the use of the anal sulcus as a distinctive character enables us to differentiate the two groups. In preparing a key to the subdivisions of *Bursa* it was found necessary to propose two sectional names, *Marsupina* for the restricted *Buffo* of Montfort, and *Chasmotheca* for the elegant *Ranella foliata* of Broderip and its allies. Those who prefer to consider species in large masses will properly ignore the sectional divisions, but others will find the closer subdivisions convenient on many occasions, and, since several of them were named by authorities so respectable as Lamarck and Fischer, I have been tempted to make the system symmetrical. The following key will enable any one to refer any of the true Bursas to its proper section. The species destitute of a posterior anal canal are not considered in this arrangement.

Family RANELLIDÆ

Genus BURSA Bolten

Subgenus BURSA s. s.

Shell with the spire elevated and surface sculptured.

Operculum with lateral nucleus.

Varices uniformly lateral and continuous.

Anal sinus at the suture, short.

Shell thin, without a continuous callus on the body.

Varices spinose. Sect. *Bursa* (*spinosa* Lam.).

Varices crenate. Sect. *Marsupina* (*spadicca* Mtf. or *crassa* Dillwyn).

Anal sinus extended as a gutter on the body.

Body with a continuous rugose callus with elevated margin.

Varices subspinose. Sect. *Chasmotheca* (*foliata* Broderip).

Operculum with apical nucleus.

Varices lateral and continuous.

Anal sinus subtubular, at the suture.

Body with a continuous appressed rugose callus.

Shell heavy, nodulous.

Anal sinus produced. Sect. *Ranella (bufonia* Gmelin).

Anal sinus short. Sect. *Lampadopsis (rhodostoma* Beck).

Varices variable, usually lateral and continuous.

Shell thinner, granulous.

Anal sinus shallow, short. Sect. *Colubrellina (conditus* Gmelin).

Subgenus ASPA H. and A. Adams.

Shell with the spire depressed.

Varices uniformly lateral, smooth.

Anal sinus produced as a gutter on the body.

Shell thin, smooth. *Aspa (marginata* Gmelin).

Subgenus BUFONARIA Schumacher.

Shell with elevated spire and sculptured surface.

Varices not uniformly lateral.

Anal sinus short, at the suture.

Surface sparsely tuberculous.

Shell thin, body callus smooth, appressed. Sect. *Crossata (ventricosa* Broderip).

Varices feeble, irregularly disposed.

Body callus continuous, rugose, with raised margin. Sect.

Bufo naria (scrobilator Linné).

Shell with elevated spire and prominent sculpture.

Varices irregular, sharp, elevated, crenate.

Anal sinus shallow, its fasciole tabulating the whorls.

Sculpture reticulate, the spirals stronger, continuous.

Body callus thin, with elevated margin, smooth.

Canal strongly recurved. Sect. *Craspedotriton* Dall, nov. Type, *Triton convolutus* Broderip.

The following synonymy will enable one to follow the fluctuating nomenclature of the group, though not intended to be exhaustive.

Genus BURSA Bolten

Murex (sp.) LINNÉ, Syst. Nat., ed. x, p. 748, 1758.

Rana (Anonymous), Mus. Calonnianum, p. 33, 1797. *M. scrobilator* and *M. rana* L. cited. Not *Rana* L. 1758.

Bursa BOLTEN, Mus. Bolt., p. 128, 1798; 1st sp. cited *B. rana* BOLTEN (= *Ranella spinosa* LAM.); Mus. Bolt., ed. II, p. 91, 1819.

Gyrincum LINK, Beschr. Rostock Samml., p. 123, 1807. Includes species of *Bursa* and *Murex gyrinus* GMELIN + *Ranella ranina* LAM.

Biplax (sp.) PERRY, Conch., expl. pl. IV, V, 1811.

Bufo MONTFORT, Conch. Syst., II, p. 375, 1810; *B. spadiceus* MTF. = *Murex crassa* DILLWYN + *Ranella granulata* LAMARCK.

Bufo naria SCHUMACHER, Essai, p. 251, 1817; α *Ranella spinosa* LAM. (*M. rana* β, L.); β. *M. scrobilator* L.

- Lampas* SCHUMACHER, Essai, p. 252, 1817, *Murex lampas* LINNÉ, not *Lampas* MONTFORT, 1808.
- Ranella* LAMARCK, Extr. d'un Cours., p. 118, 1812; nude name.
- Ranella* (sp.) CUVIER, Règne Anim., II, p. 540, 1817; LAMARCK, Anim. s. Vert., VII, p. 149, 1822, no type selected.
- Ranella* BOWDICH, Elem. Conch., I, p. 36, pl. 10, fig. 6, 1822, sole ex. cited *Murex bufonia* GMELIN. Blainville, Man. Mal., I, p. 400, 1825; type cited *R. granulata* BLAINVILLE (not LAM.) = *R. bufonia* GMEL.
- Bursa* H. and A. ADAMS, Gen. Rec. Moll., I, p. 105, 1853.
- Ranella* SOWERBY, Conch. Ill., 1841, *ex parte*.
- Ranella* JOUSSEAUME, Bull. Soc. Zoöl. France, VI, p. 173, 1881, *R. crumena* LAM., cited as type.
- Bufonaria* JOUSSEAUME, *op. cit.*, p. 174, *R. spinosa* LAM.
- Bursa* JOUSSEAUME, *op. cit.*, p. 174, *R. bufonia* GMEL.
- Colubraria* JOUSSEAUME, *op. cit.*, p. 174, *R. candidata* REEVE, not *Colubraria* SCHUMACHER, 1817.
- Lampasopsis* JOUSSEAUME, *op. cit.*, p. 175, *R. rhodostoma* BECK.
- Colubrellina* FISCHER, Man. Conch., p. 656, 1884; *R. candidata* REEVE.
- Lampadopsis* FISCHER, Man. Conch., p. 656, 1884; *R. rhodostoma* BECK, corr. *Lampasopsis*.
- Ranella* FISCHER, Man. Conch., p. 656, 1884; *R. crumena* LAM.
- Gyrincum* ROVERETO, Atti Soc. Ligustica, X (extr. p. 6), 1899; type *Murex spinosus* DILLWYN (= *Bursa* BOLTEN).
- Ranella* ROVERETO, *op. cit.*, type *R. crumena* LAM.
- Pseudobursa* ROVERETO, *op. cit.*, type *Murex bufonia* GMELIN (= *Ranella* LAMARCK, s. s.).
- Biplex* ROVERETO, *op. cit.* (p. 7), type *R. siphonata* REEVE (= *Ranella* LAMARCK, s. s.).
- Apollon* COSSMANN, Essais de Pal. Comp., V, p. 115, 1903; type *Ranella granifera* LAM. (= *Colubrellina* FISCHER); not *Apollon* MONTFORT, 1810.
- Bufonaria* COSSMANN, *op. cit.*, p. 117, 1903. *Ranella spinosa* LAMARCK (= *Bursa* BOLTEN, s. s.).
- Aspa* COSSMANN, *op. cit.*, p. 118, 1903, = *Aspa* H. and A. ADS.
- Tutufa* COSSMANN, *op. cit.*, p. 89, 1903, *Murex lampas* LINNÉ; (= *Lampas* SCHUMACHER, 1817, not of MONTFORT, 1808; + *Bufonaria* β SCHUMACHER, 1817; + *Tutufa* JOUSSEAUME, 1881). = *Bufonaria* s. s.
- Crossata* COSSMANN, *op. cit.*, p. 89, 1903; *Ranella ventricosa* BRODERIP; (= *Crossata* JOUSSEAUME, 1881).
- Pseudobursa* COSSMANN, *op. cit.*, p. 89, 1903.¹ Type *Murex bufonia* (LINNÉ) GMELIN. (= *Ranella* s. s.).

The incongruous forms which have been associated with *Bursa* or *Ranella* must be somewhat widely distributed.

¹The proposition to replace *Bursa* by *Pseudobursa* is nullified by the fact that Petiver, and Bonanni are both prelinnean authors, and their polynomials are without standing in nomenclature.

Some years ago I showed that *Aspella* Mörch must be referred to the *Muricida*, near *Trophon*.¹

Still earlier Stimpson had shown that a similar disposition must be made of *Eupleura*,² which seems to be nearly related to *Ocenebra*. Ever since Montfort's time a certain proportion of naturalists have recognized the distinction between the groups typified by *Bursa* and *Gyrincum* or *Apollon*. Quite recently Kesteven in a very excellent review of *Lotorium*³ has thrown much additional light upon the subject.

The writer in some earlier publications, not having been able to review the whole history of the nomenclature of this family, used names in the sense in which he found them used by Mörch and others in the literature, and for some years urged the rejection of undefined generic names, and of some works as authorities, which did not seem to him to have been actually published in the strict sense of the word. Recognizing, however, during the years which have elapsed, that the consensus of opinion is that such names should be accepted and several of the works are entitled to citation, in more recent work he has endeavored to conform to the current practice of specialists in zoölogical nomenclature. This explanation seems due to explain some discrepancies of treatment in the nomenclature of certain genera, when earlier and later papers are compared.

II. NOTES ON TRITON AND ITS ALLIES

Very soon after the publication of the tenth edition of the *Systema Naturæ* it became evident that further subdivision of some of the Linnean genera would be necessary, as well as certain changes in the general features of their classification. The first move, however, due to O. F. Müller, was, so far as the present family is concerned, a consolidation in which were included *Buccinum*, *Murex*, etc., of Linné, in fact by implication all the canaliferous Prosobranchs, under a new name, *Tritonium*. This was contrary to the rules of nomenclature and the name cannot be used, although it was accepted by Bolten, Link, Cuvier and various other authors for a portion of the species included under it. The first binomial author to subdivide our group was Bolten, the names used by Klein being prelinnean and polynomial, and only quotable historically. Bolten included a majority of the Lamarckian Tritons under the name *Tritonium*, begin-

¹Report on Gastropoda of the "Blake," *Bull. Mus. Comp. Zool.*, xviii, No. xix, pp. 206-10, 1889.

²*Am. Journ. Conch.*, 1, p. 58, 1865.

³*Proc. Linn. Soc. N. S. Wales*, xxvii, part iii, pp. 443-483, Dec., 1902.

ning with *Murex tritonis* Linné, and covering also a number of the ranelliform Tritons and at least one *Ranella* (*R. candidata* Ch.). Following this, *Bursa* is proposed, as previously noted, for the true Ranellas, and is followed by *Cymatium*,¹ beginning with *Murex femorale* Linné, and including several other species with a long canal. Lastly *Cabestana* Bolten is proposed for species with a short canal, strong spiral ridges, and rather stout whorls, beginning with *Murex cutaceus* Linné, and including *Triton doliarium*, *Purpura trochlea*, and *Ocenebra erinacea* Lamarck. The related genus *Distorsio* is proposed by Bolten for two groups: (1) *Caudata*, containing *Murex annus* Gmelin, and its allies; and, (2) *Truncata*, including Nassas of the group of *N. arcularia*.

Link in 1807, has only three groups: *Tritonium* which is practically identical with *Tritonium* Bolten; *Distortrix* which is equivalent to the first section of *Distorsio* Bolten, thus leaving the Nassas to bear Bolten's name; and *Gyrincum* which is equivalent to *Bursa* Bolten, + the ranelliform Tritons. *Murex gyrinus* Linné, for which the name *Gyrincum* must be reserved; *Ranella tuberculata* Broderip, and *R. ranina* Lamarck, are cited from Martini's plates. I may mention here that the work of Link appears to have been known to Lamarck, who adopts at least one of his genera, and to have been somewhat more widely distributed than I had been led to believe when I printed my remarks upon it in 1876 and 1889.

The next author to concern himself with the divisions of this group was Denys de Montfort, the second volume of whose "Conchyliologie" appeared in 1810 (not 1808 as cited by Kesteven). As he cites and figures but one species in each case, but little question can arise as to the identity of the type. Besides *Apollon*, which has already been discussed, he proposed *Aquillus* for *Murex cutaceus* Linné (= *Cabestana* Bolten); *Lotorium* for *Murex* "*Lotorium* Linné." but the species which he figures is *M. femoralis* Linné (as both belong to the same section of the genus, this does not matter much, and the group is identical with *Cymatium* Bolten); and, lastly, *Triton*, for *Murex tritonis* Linné, with which, like most authors of his time, he confuses several species; the one he actually figures being *Triton australe* var. β of Reeve, coming, as Montfort states, from New Zealand. The name *Triton* having already been used generically by Linné and Laurenti, for other animals, is not available. In 1811 Perry published his Conchology, in which a number of new names are proposed, but no types selected. The

¹Not *Cymatium* Link, 1807, which is a compound of *Latirus (polygonus* and *lineatus* Lamarck and *craticulatus* Gmelin) and *Vasum capitellum* Linné.

first, *Monoplex* contains five species with a single varix on the body, of which two may be identical with *Triton retusum* and *T. clavator* Lamarck, one is allied to *T. olcarium* (L.) Reeve, and was selected as type by Gray, 1847; one, *cornutus* Perry, is unidentifiable, certainly not *exaratum* Reeve, to which it has been referred. The last species is *Tudicla spirilla* Linné. Perry's second group was called by him *Biplex*, and contains a mixture of species of *Bufo* and *Gyrineum*. Fischer following Gray (1847) has retained the name in a sectional sense for the *B. perca* Perry, a remarkably compressed and crested form from Japan, better known as *Ranella pulchra* Gray. His third group, *Septa*, is also a mixture of species belonging to *Cymatium* Bolten, and *Triton* Montfort, and, since the latter had up to this time no valid name, the writer in his Report on the Mollusca of Porto Rico, adopted it for the group of which *Triton tritonis* Linné has usually been regarded as the type. Perry incidentally mentions *S. tritonis* but his largest and most conspicuous species, among those he figures, is *Septa rubicunda* Perry (+ *Triton nodiferum* Lamarck) which may be accepted as the type.

Cuvier in 1817, in the Règne Animal, adopted Montfort's subdivisions, but Schumacher, in the same year, proposed an entirely new series. *Distorta* Schumacher is identical with *Distortrix* Link. *Lampusia* α Schumacher, with *Murex pilearis* Linné, as type. *Lampusia* β , with *Murex tritonis* Linné, taken together are the equivalent of *Septa* Perry. A group not noticed by previous authors is judiciously separated by Schumacher under the name of *Colubraria* with the *Buccinum maculosum* of Chemnitz as type. *Lampas* Schumacher, but not of the Museum Calonnianum, belongs with the *Ranellas* and is identical with Schumacher's *Bufo* β . *Gyrina* Schumacher is founded on *Ranella gigantea* Lamarck, and might be retained if not thought to be preoccupied by *Gyrinus* Linné. *Ranularia* α Schumacher, is founded on *Purpura gutturnium* Martini (= *Triton clavator* Lamarck) while *Ranularia* β is based on a better figure of the same species.

Lamarck, in 1822, included under the name *Triton* almost all the forms above referred to as well as two species of *Tritonidea*. Blainville includes Montfort's groups as subgenera of *Triton*, unhappily adding to them *Struthiolaria*. *Cumia* (*lanccolata* Menke) of Bivona, 1838, is a subgenus of *Colubraria*, and *Luterium* Hermannsen, 1846, a proposed emendation of *Lotorium* due to a mistaken etymology. In 1848 Gistel proposed to substitute *Charonia* for the preoccupied *Tritonium* of Cuvier, and *Nyctilochus* for *Triton*, not being aware, apparently, that the two are synonymous. The

subsequent synonymy becomes very complex from Mörch's attempt in 1852 (in which he was followed by Henry Adams in the 'Genera of Recent Mollusca' in 1853) to revive the prelinnean names of Klein. Mörch made a second attempt in 1877 but the rules of nomenclature bar out any such arrangement. Our readers may follow, in the synonymy with which this article concludes, the fluctuations of opinion as to the names to be used in this group.

In 1853 Gray, following Troschel (1852), definitely separated the Tritons and Ranellas from the *Muricidæ*, on account of their *Tænioglossate* radula, a course which has since been universally adopted.

In 1863 Troschel took up the group and finding well-marked distinctions between the characteristics of the radula in, on the one hand, *Bursa*, *Aspa*, and *Lampas* (Schumacher), and, on the other, *Tritonium* (Link), *Distorsio*, *Cymatium*, *Simpulum*, *Gutturium*, *Cabestana*, and *Apollon*,—he separated the group into two families, *Ranellacca* and *Tritonacca*, and each of these into several genera. In this course perhaps too great a value was assigned to minor features of the radula, but it remains certain that two well-marked groups are extant in the assembly. Gray divided the *Tritonidæ* into four subfamilies based chiefly on differences in the operculum. We may at least divide them into two subfamilies, each containing several minor groups, utilizing for this purpose the characters of shell, dentition, and operculum, besides those of the larval stages where they are known.

In 1881 Jousseau attempted a new and purely conchological classification, not without merit, and the last discussion of importance is by Kesteven in 1902, where valuable data as to the larval shells are put on record, and a classification by unnamed conchological groups is attempted. This kind of an arrangement however is less convenient than one in which the group is not only recognized but is given a name. The difference is analogous to that between polynomial and binomial nomenclature. Sometimes it happens that, in very large groups the clustering of certain forms around certain others, all of which are connected by intermediate gradations, may be expressed in this manner; but in most cases it would seem that it is less inconvenient to ignore such nebular groups altogether, so far as the nomenclature is concerned, or to give them sectional names by which they can be handled easily.

The last attempt at an arrangement of the family is by M. Maurice Cossmann, in his *Essais de Paléoconchologie Comparée*, v, December, 1903. In this the author returns to the ancient confusion caused by regarding the varices and their position as a fundamental char-

acter, and his work is still further complicated by a number of errors in the matter of determining types. Nevertheless M. Cossmann elucidates several groups which had been overlooked and by his figures and descriptions lends aid to those who desire to study the group more thoroughly. A full analysis of his arrangement will be found in the ensuing nomenclatorial table.

The Tritons are nearly allied to the Ranellas and to *Dolium*, representing among the *Tanioglossa* a group analogous to the Murices among the *Rhachiglossa*. Their origin is traced to the Cretaceous where are found some relatively small and delicately sculptured shells having an external resemblance to *Fusitriton*, and possessing varices which are irregularly distributed and more prominent internally than externally, leaving on the surface of the internal casts axial sulci. This genus named by Meek *Trachytriton* has been with much plausibility suggested to be a precursor of the Tritons. This is of course hypothetical since the dentition and the operculum can never be known, yet it is to some extent supported by the presence in the Claibornian Eocene of a somewhat intermediate type, the *Ranellina maclurii* of Conrad. In this form, while the varices are most prominent internally, they are also well marked externally; the nucleus, though small, is of the tritonoid type, while the spirally striated shell has the general form of *Trachytriton*, rather fusoid than torticular.¹

In the later Eocene the Tritons attained a well characterized development, though the species are mostly of small or moderate size, with the canal short, sometimes abruptly recurved, and the sculpture more or less cancellate or nodulous, but usually more delicate than that of the Neocene or living forms. An indication of the characteristics of what, in later geological time, became well-marked genera, is frequently perceptible; as in the *Personella* of Conrad (*P. septemdentata* Gabb, of the Texan Eocene), which, though without the characteristic lobe on the pillar and the wide spread callus on the body whorl, has yet so much of the aspect of the Miocene and Recent *Persona* (Montfort, = *Distortrix* Link) as to have been referred to the latter genus by M. Cossmann. *Persona*, or *Distortrix*, was fully evolved by the time the sedimentation of the lower Oligocene took place in America, a characteristic species, *D. crassidens* of Conrad, appearing in the Oligocene.

In the Miocene Tertiary quite a full representation of the group

¹ I do not know why M. Cossmann supposes that this species has never been found since Conrad's time. It is not common but has been repeatedly collected at Claiborne. A short variety of it seems to have been described by Whitfield as *Pisania claibornensis* (*Am. Journ. Conch.*, 1, pl. xxvii, fig. 2, 1865).

occurs, nearly every recent sectional group being found illustrated by some Miocene species. The only exceptions known to me are the southern type of *Pricne*, and *Lotorium* s. s., which seem, so far, to have been recognized only in the recent state. It should be noted that the southern forms referred by Kesteven to *Lotorium*, for the most part exhibit very peculiar characters in the protoconch. Of the Australian species figured by him only two (figs. 7 and 8) seem to have a protoconch in the least resembling that of the typical group. It is probable therefore that Cossmann is justified in segregating *Austrotriton* and *Semitriton* from the common type.

In considering the arrangement of the members of the group the dentition, the protoconch and nepionic shell, and the operculum must all be considered in any natural arrangement, and with the possible exception of the last are all more important than the conchological sculpture and form. I regard the number and arrangement of the varices as of very little systematic importance, and the defects of M. Cossmann's arrangement are largely due to his depending too much upon this essentially superficial character, which is, at most, of sectional value.

For the dentition of members of this group we depend chiefly upon the data furnished by Troschel. He has shown that the Ranellas are distinguished from the Tritons very much as is *Cassis* from *Dolium* by characteristic features of the radula. The Ranellas have a rhachidian tooth which is narrow but arcuate and laterally produced, generally with a central large and several small lateral denticles on the cusp and on the base a prominent recurved dentiform plate on each side. In the latter character they agree with *Dolium*. The Tritons, however, have a rhachidian tooth less extended laterally, not at all or very slightly arcuate on the base and without basal plates, in the latter feature agreeing with *Galeodea* and *Semicassis*. *Argobuccinum* (*argus*) and *Fusitriton* (*oregonensis*) have mutually similar teeth, much more similar than those of *Pricne* (*scabra*) and *Fusitriton*. The latter differs from *A. argus* only in having the inner lateral simple, instead of denticulate. *Septa* is separated from the other Tritons by its laterally extended rhachidian tooth with a median inflection in front but without basal plates, recalling that of *Cassis*. The Ranellas possess no jaw or mandible, but *Cassis* and the Tritons have it well developed. The operculum is rather variable, as between the various groups, in general tending to the fusoid type with apical nucleus, especially in the Tritons, though the tritonoid *Distortrix* has the nucleus lateral about midway between the ends recalling that of *Cassis*; *Septa* has it subcentral and internal; *Cymatium* (*femorale*)

has it long and narrow with apical nucleus; *Cabestana (cutacca)* concentric with nucleus subcentral; *Gyrina (gigantica)* ovate and slightly arcuate with the nucleus apical as if making an effort toward spirality; *Fusitriton (oregonensis and cancellata)* broad ovate with the nucleus slightly within the anterior lateral margin; *Lampusia (pilcaris)* has it fusoid. According to Adams the Ranellas have the operculum ovate with an apical or subapical nucleus, while Gray speaks of it as half ovate with a central, lateral or internal nucleus; probably it varies in the different groups as in the tritons; in *Ranella foliata* it is figured as concentric with the nucleus mid-lateral. One cannot safely generalize on this character until the operculum of more species is known.

The protoconch and nepionic shell in the Tritons are practically continuous and inseparable, and are apparently very similar if not identical in character in both the tritonoid and ranelloid groups. In one group alone, *Septa*, is there a distinctly marked neanic stage. The nuclei of the Australian fossil forms, as figured by Kesteven, indicate that a protoconch, as distinguished from the nepionic shell, was present in some if not in all these forms: a character of much interest and importance if confirmed by a renewed study of the fossils, which are not accessible to me.

I have observed the larval stage of *Fusitriton oregonensis* swimming free in the ocean in the Gulf of Alaska some 200 miles off shore. It had a horny shell of more than three whorls with numerous spiral keels of periostracum and hardly any trace of a sulcus at the base of the pillar. The operculum was broadly triangular, pointed laterally, with the subspirial nucleus within the margin and forming half a coil. Below the posterior edge of the operculum were two short and wide epipodial lappets, separated by a sharp sulcus. The head was represented by a rather high, pointed, brown papilla above the mouth, and on each side of the body was a rather large epipodial flap or flipper, which the larva used vigorously to propel itself through the water, giving it a curious resemblance to a Pteropod. The branchia and osphradium were already almost normal, but the parts about the oral aperture very little developed. The flippers were of a bright metallic green color, rendering the little animals very conspicuous in the water. There were, as far as observed, no eyes or tentacles developed, and the foot, except as a pedestal for the operculum, hardly existed. The larval shell of *Colubrellina cubaniana* D'Orbigny, from the West Indies is heliciform, with no trace of a siphonal canal, at first distinctly umbilicated and ornamented with numerous spiral series of minute bristle-like hairs, which are soon

lost. The complete nepionic shell has lost its umbilicus entirely, but has not acquired a canal, which only appears with the formation of the first whorl of the adult shell. The larval shell of *Dolium* is similar, though larger, and was even described as a species of *Helix* by C. B. Adams, half a century ago. I cannot help thinking, when we remember how large a proportion of the Tænioglossa have the aperture unsulcated, that the holostomate character of these larvæ is significant and points to the acquirement of a siphonal canal in this group as a case of convergence in development, while the early spirality of the operculum and its subsequent concentric development in *Fusitriton* show the loss of a character once characteristic of the group and an instance of what might be called negative convergence. The group to which these approximations tend is of course the muricoid Rhachiglossa with which naturalists long united the tritons.

We find however that in the completed nepionic shell of forms like *T. costatus* Born (*olcarium* Auct.) a well-developed sulcus exists, and the whole shell has the appearance of a small, stumpy, horny *Astyris*. In the single operculum of this stage which I have been able to examine the form was subtriangular, concentric with the nucleus ill-defined and apparently mid-lateral. The larval shell of *Septa* is identical in general characters but is followed by a neanic stage in which the elegant granular sculpture, and the delicate rose color of the test contrast effectively with the features of the adult, though there is no very pronounced line of demarcation between the two. In all these forms, and the same is probably true of *Dolium* and its allies, the larval shell is furnished with caducous spiral lines of projecting hairs and under them is smooth and polished, or faintly spirally striated, the height of the spire depending upon the length of time the individual floated about in the larval state before finding itself in a location where it might conveniently settle on the bottom. Sometimes there may be as many as seven whorls. With the beginning of the adult type of whorl a lining of shelly matter is deposited on the inside of the horny larval shell. The latter loses first its hairy periostracum, then it may itself disintegrate, leaving the shelly internal cast at the apex of the shell, which is sometimes filled up solid with shelly matter. Sometimes the thin, horny apex of the larval shell in drying may become axially wrinkled, suggesting sculpture, but on wetting the wrinkled part it will usually expand to its normal smooth condition, leading one to reflect how easy it is to make hasty conclusions.

The verge in this group is usually elongate conic with a groove serving as a conduit, the organ is usually bent backward and often

somewhat twisted when not functioning. The peduncles of the eyes are fused with the tentacles externally so that the eyes appear to be sessile on the latter some distance above the tentacular base. The proboscis is stout and retractile. The ovicapsules are deposited on shells, stones, etc., in moderate depths of water. They occur, associated in groups, though each capsule is separately placed, being usually urn-shaped or prismatic in form, taller than wide, and with a flat margined top, through which the young issue. The capsules of *Ranella (californica)* are somewhat similar, but wider than high, and shaped (except for the flat top) somewhat like a thick slice of bread from a square loaf.

According to Krebs, in the West Indies *Septa* is found in twelve feet of water among seaweeds; *Cymatium (femorale)* on blue sandy mud near low-water mark; and such species as *T. tuberosum*, *labiosum*, and *pilcare* in two or three feet of water among stones and coral. *Colubraria (lanccolata)* affects similar situations. The Ranellas of the West American coast appear (*R. californica*) in immense numbers in shallow water to spawn, at times, but not every year; and after spawning they return to depths of ten or fifteen fathoms. The tropical species, at Panama and elsewhere, are dredged in fifteen to forty fathoms. *Distortrix* on the same coast is obtained in ten to over fifty fathoms, but in the Antilles has been dredged living in more than one hundred and fifty fathoms. Indeed the shallow water situs recorded by Krebs may be merely the limit reached in spawning by many Tritons which live, as shown by the Blake dredgings, at times in depths nearly reaching one hundred and fifty fathoms and even more. On the Alaskan coast I have dredged *Fusitriton oregonensis* in four to six fathoms, but the Albatross has obtained it in depths down to one hundred and sixty fathoms. It seems to prefer a mud and gravel bottom, and is almost invariably decollate or eroded at the apex. I have never seen an adult retaining the earlier whorls intact. The Magellanic species also occurs in depths down to sixty fathoms. In general the animals of this group have their soft parts brilliantly colored, often with ocellated markings, the colors being variable in the individuals of a single species. *Septa* is an exception, the animal, in contrast to the shell, being, in all the observed species, relatively dull-colored and without delimited spots or ocelli. Couthouy thought the colors were distributed sexually within the species, but this was probably accidental in the cases he observed, as I have found no uniformity of this sort in the Alaskan species.

Accepting Troschel's division of the groups under consideration

into two families, for the first of which it will be convenient to retain the familiar name *Ranellidæ*, it now becomes a question as to what we shall call the family containing the Tritons, since the names *Triton* and *Tritonium* for these Mollusks are no longer available. *Lotorium* is a synonym of *Cymatium* and need not be discussed further, so *Lotoriidæ* is out of the question. *Lampusia* was originally equal to *Septa* + *Cymatium pilcare* Linné, and if retained at all must be as merely a subordinate section of that genus. Hence, according to the rule governing such matters, it is not suitable as a basis for the family name. The shells forming the genus *Septa* have always been regarded as the typical triton shell and have been so denominated colloquially for two centuries. Though the number of species is not large they attain as individuals a larger size than species of any other group in the family, and indeed are among the largest and most widely distributed gastropods. There seems therefore to be no reason why the family name *Septidæ*, which is shorter and more euphonious than a name which might be formed from *Cymatium*, should not be adopted as suggested by me in 1901.

I have not found that Mr. Kesteven's groups, when tested by comparing the species, could be accepted without some transfers, as indeed he himself suggests may be necessary, but, in the main, they are sufficiently natural. An absolutely final arrangement could be attained only by making a critical study of the nomenclature and characteristics of each of the known species, which would be a work of years. The following grouping, utilizing the names on record, will, however, serve as a step in advance of the present state of the subject. I preserve the geological order.

Family SEPTIDÆ

Genus **TRACHYTRITON** Meek, 1864

Type *T. vinculum* Hall and Meek. Cretaceous.

Genus **PERSONELLA** Conrad, 1865

Type *P. septemdentata* Gabb. Eocene. Recent analogue *Triton quoyi* Reeve. Synonyms: *Sussia (apenninica)* Bellardi, 1873; *Semiranella* De Gregorio, 1880.

It is impossible to say whether the very close similarity in nucleus, size, and shell characters between the fossil types and *T. quoyi*, indicates the persistence of all the characters over such an enormous period of time, but without some evidence to the contrary we are perhaps justified in provisionally assuming it to be so. The Eocene

Monocirsus Cossmann, 1903, seems more closely related to this group than to *Hilda* with which he has placed it. It looks like a precursor of *Linatella*.

Genus RANELLINA Conrad, 1865

Type *R. maclurii* Conrad. Claiborne Eocene. Synonym: *Sanel-lina* Conrad, 1865, a typographical error. This type is extinct, so far as known.

Genus AUSTROTRITON Cossmann, 1903

Type *Triton radialis* Tate. Tertiary of Australia. No recent Triton has a protoconch such as is figured for this species by Mr. Kesteven and I consider that it should be definitely separated from the species he has associated with it on this ground alone, and most of the Australian Tertiary species will naturally fall into the same group.

The groups *Plesiotriton* Fischer, 1884, and *Semitriton* Cossmann, 1903, require further examination before they can be admitted to this family. Sections should be made, to demonstrate whether there are really true plaits on the pillar lip, or whether the so-called plaits are merely lirations connected with adult formations about the aperture. In the former case *Semitriton dennanti* certainly has much the aspect and even the nucleus of one of the *Volutomitrina*, or *Volutocorbis*.

In this connection it may be added that the combination of *Hindsia* (*lyrata*) with this family is of doubtful validity, though it is true that a number of short tritons erroneously referred to *Hindsia* should be placed here. The conchological characters are in some respects quite similar, yet I believe that *Nassaria* or *Hindsia* was more correctly placed by Adams among the Rhachiglossa. A decision on this question must await an examination of the radula.

Triton scalariformis and *convolutus* of Broderip appear to be related to the Ranellas with irregular varices rather than to the present family, as previously pointed out. They exhibit no indications of being related to the *Muricida* so far as the shells are concerned. The operculum is not known to me.

Genus GYRINEUM LINK, 1807

Type *Murex gyrinus* Linné (= *Ranella ranina* Lam.). Recent. Synonyms: *Apollon* Montfort, 1810, Cuvier, 1817, and Mörch: *Gyrinea* Mörch, 1877; *Apollo* Fischer, 1883, Harris, 1897.

✓ This includes the Tritons with continuous lateral varices. *Biplec* (*perca* Perry) Perry, is accepted as a section for species with the

varices flattened and extended. The type has the operculum broad ovate, with the nucleus close to but not reaching the anterior lateral margin.

✕ Genus **EUGYRINA** Dall, n. n.

Type *Ranella gigantea* Lamarck (= *olcaria* Linné, *vide* Hanley). Recent. Synonyms: *Gyrina* Schumacher, 1817, not *Gyrinus* Linné, 1758; *Ranella* Cossmann, 1903.

This comprises the large thin Tritons with irregularly distributed low varices, sculptured narrow body-callus and outer lip, a slender and rather long canal, and the operculum with an apical incurved nucleus. The sculpture is tubercular.

● Genus **ARGOBUCCINUM** Mörch, 1852

Type *Ranella vexillum* Broderip, Chile. Recent. Synonyms: *Argobuccinum* H. and A. Adams, 1858, not 1853; *Apollon* Adams, Gray, not Montfort.

Stout, dull-colored shells with dense periostracum, spiral sculpture, few and inconspicuous irregularly placed varices, and a short canal.

The operculum as in *Gyrincum*.

○ Subgenus **PARALAGENA** Dall, n. n.

Type *Triton clandestinus* Lamarck. Recent. Synonym: *Lagena* Mörch, 1852, not Walker, 1784.

Shell with even spiral sculpture, a moderately long curved canal, the varix single and terminal, and the body almost destitute of callus.

○ Subgenus **FUSITRITON** Cossmann, 1903

Type *Triton cancellatus* Lamarck. Recent. Synonyms: *Argobuccinum* (sp.) Adams, *Priene* (sp.) Carpenter.

Group with the form of *Eugyrina*, the operculum of *Gyrincum*, the radula of *Argobuccinum*, and a thin cancellated shell, the species inhabiting cool temperate waters. There is no callus on the body, and very few feeble varices.

○ Subgenus **PRIENE** Adams, 1858

Type *Triton scaber* King. Recent. Synonym: *Argobuccinum* H. and A. Adams, 1853 not 1858.

Resembling *Fusitriton* but with a much shorter canal, an operculum with apical nucleus (*vide* Tryon) and a slight, more or less lirate body-callus.

Genus *DISTORTRIX* Link, 1807

Type *Murex anus* Linné. Recent. Synonyms: *Distorsio* (*pars*) Bolten, 1798; *Persona* Montfort, 1810, Fischer, 1883; *Distorta* Schumacher, 1817; *Cassida* Dillwyn (in syn.), 1817, not of Linné, 1767.

Genus *CYMATIUM* Bolten, 1798

Type *Murex femorale* Linné. Recent. Synonyms: *Lotorium* Montfort, 1810, Cuvier, Fischer, etc.; *Currus* Lesson, 1842; *Luterium* Herrmannsen, 1846.

Three-sided species with a produced canal and narrow apically nucleate operculum.

Section *Lampusia* Schumacher, 1817

Type *Murex pilcare* Linné. Recent. Synonyms: *Lampusia a* Schumacher, 1817; *Simpulum* Mörch, 1852, Troschel, Fischer, etc., *Simplum* Stoliczka, 1867.

Section *Ranularia* Schumacher, 1817

Type *Triton clavator* Lamarek. Recent. Synonyms: *Ranula* Schumacher, 1817; *Monoplex* Mörch, 1852; *Ranularia* Mörch, 1852, Cossmann, 1903, etc.

This group includes the forms with a short almost turbinate spire, long and slender canal, and a heavy, mostly smooth, deposit of callus on the body continuous with that on the outer lip.

Section *Tritonocauda* Dall, nov.

Type *Murex caudatus* Gmelin (+ *Triton canaliferus* Lam.). Recent. Synonym: *Ranularia* Fischer, 1884, non Schumacher, 1817.

A group of thin shells, in form resembling *Ranularia* but with a thin wrinkled callus on the body. Operculum mid-lateral, slightly within the margin (*C. cynocephalum* Lam.) *vide* Tryon.

Section *Gutturium* Mörch, 1852

Type *Triton tuberosum* Lamarek. Recent. Synonym: *Gutturium* H. and A. Adams, Troschel.

Forms rather regularly fusiform, the cone of the spire and of the canal subequal, the canal moderately long, slender, strongly recurved, a heavy callus on the body.

Section *Turritriton* Dall, nov.

Type *Triton gibbosus* Broderip. Recent.

Forms with short canal and longer spire, heavy varices and flat-topped turriculate whorls.

Section *Tritoniscus* Dall, nov.

Type *Triton lotoisii* Petit. Recent.

Forms with subturbinate body, short spire and canal, subumbilicate, with a single large and heavy terminal varix and narrow callus on the body.

Section *Cabestana* Bolten, 1798

Type *Murex cutaceus* Linné. Recent. Synonyms: *Aquillus* Montfort, 1810; + *Aquilus* Mörch, 1852; + *Neptunella* Gray, Adams; + *Dolarium* Schleuter, Mörch, etc.

Ample, strongly sculptured, subumbilicate, with irregular varices, short recurved canal and thin, mostly smooth callus on the body.

Subgenus *MONOPLEX* Perry, 1811

Type *Murex costatus* Born (= *M. olcarius* Auct. non Linné). Recent. Synonyms: *Monoplex* (Perry) Gray, 1847, not Mörch, 1852; + *Simpulium* H. and A. Adams, 1853, not Fabricius, 1823.

Forms with the shell resembling *Cabestana* but the operculum concentric with subapical nucleus, the varices heavier, and the body-callus closely wrinkled.

Subgenus *LINATELLA* Gray, 1857

Type *Triton cingulatum* Lamarck. Recent. Synonyms: *Linatella* Gray; Mörch, 1852; Fischer, 1884; not of H. and A. Adams, 1858; ? + *Dolarium* Schleuter, 1837; and *Zinatella* Cossmann, 1903.

Thin Dolium-like shells, with feeble spiral sculpture and short canal, a single feeble terminal varix and inconspicuous callosities. Operculum as in *Fusitriton* and *Gyrineum*.

Genus *SEPTA* Perry, 1811

Type *S. rubicunda* Perry, = *Triton nodiferus* Lam. Synonyms: *Triton (australe)* Montfort, 1810, not of Linné, 1758; + *Tritonium* Link, 1807, Cuvier, 1817, Bowdich, Adams, Troschel, Dall, Rovereto, Cossmann, etc., not of Müller, 1776; + *Lampusia* β Schumacher, 1817; *Triton* Lamarck, 1822; + *Tritonia* Bowdich, 1822, not Cuvier, 1817; + *Charonia* and *Nyctilochus* Gistel, 1848; + *Lampusia* Mörch, 1852, Newton, Cossmann, etc.; + *Tritonellium* Mörch, 1877, not Valenciennes, 1858; + *Trompeta* Mörch, 1877; + *Buccinatorium* Mörch, 1877; + *Charonis* Mörch, 1877, in syn.; + *Lotorium (pars)* Kesteven, 1902.

The characteristics of this group have been already referred to at length in the text. The operculum is ovate, with a concentric, laterally subapical nucleus.

This completes the list of groups properly belonging to the *Sep-tidæ*. There still remains, however, a group which for many years has been regarded as a genus of the Triton family, but which now appears to form a family of its own, related not to the Tritons and Frog-shells, but perhaps most nearly to the rhachiglossate genus *Tritonidea*. The type of the principal genus of this group has not yet been anatomically examined, but species of two apparently closely related sections, *Monostiolum* and *Maculotriton*, have been examined by the writer and by Messrs. Pilsbry and Vanatta,¹ and prove rhachiglossate. Since the history of both groups is practically intertwined from the time of their first recognition, both are included here, as well as in the synonymic history with which this article concludes.

Family COLUBRARIIDÆ

Genus COLUBRARIA Schumacher, 1817

Type *Buccinum maculosum* Chemnitz. Recent. Synonyms: *Colubraria* Schumacher, Fischer, Harris, Dall, Cossmann, not Jousseau, 1881; + *Epidromus* Mörch, 1852, H. and A. Adams, 1853; + *Cumia* Bivona, 1838.

Hilda Hoernes, 1884, from the Miocene, has been referred to this group as a subgenus by Fischer, but is regarded as a full genus by Cossmann, from whose figures I should be inclined to regard it as a precursor and near relative of *Lampusia* with only a terminal varix. I have not seen specimens and therefore hesitate to assign it a definite systematic rank, but feel quite sure it should not be united with *Colubraria*, notwithstanding part of the latter genus is restricted to a single varix.

The genus *Colubraria* is naturally divisible into several sections or groups.

Section *Colubraria* s. s.

Type *Murex maculosus* Gmelin, 1792. India.

Solid, heavy shells with elevated spire, appressed sutures, numerous irregularly disposed prominent rib-like varices, a short recurved

¹The paper by Mr. Pilsbry in which he suggests that *Colubraria* may prove rhachiglossate and notes that he and Mr. Vanatta had found *Triton bracteatus* Hinds and *T. decapitatus* Reeve to be so, was received by me only after this paper had been sent to the printer, and it gives me much pleasure to confirm his surmise as far as that may be done by a determination of the rhachiglossate character of "*Epidromus*" *swifti* Tryon.

canal, prominent heavy body-callus, feebly sculptured or smooth, the callus reflected over the pillar and body whorl, the margin of the columellar reflection free and entire, the outer lip denticulate. The nuclear whorls conical but very small. Operculum "triangular with submarginal nucleus" *vide* Tryon. Sculpture nodulose-reticular.

The varices in this group are so swollen that the following whorl is apt to become oblique on the axis and the whole spire is often tortuous. Coloration nebulous, yellow, brown and white.

?Subgenus *CUMIA* Bivona, 1838.

Type *C. decussata* Bivona, = *Triton reticulatus* Blainville, Mediterranean.

Shell small, delicate, spire not torticular; protoconch minute, smooth, lying on a planorboid nepionic shell with deep sutures and rounded whorls. Operculum elongate-ovate with apical nucleus. Varices numerous, irregular. Colors as in *Colubraria* s. s.

Section *Maculotriton* Dall, nov.

Type *Triton bractatus* Hinds, Polynesia.

Shell ribbed axially and sulcate spirally; apex obtuse, spire elevated, with appressed sutures, varices inconspicuous, two or three only. Nucleus of two or three whorls; coloration of black and white, usually conspicuously articulated; operculum?

Section *Monostiolum* Dall, nov.

Type *Triton swifti* Tryon, West Indies.

Shell small, with elevated spire and a single terminal varix; nucleus with the protoconch immersed in the first nepionic whorl leaving an apical pit; next later whorls axially ribbed, the ribs obsolete on the subsequent whorls of the adult; coloration as in *Colubraria* s. s.; sutures appressed; operculum elongate-oval, with apical nucleus. Animal with slender tentacles, the eyes prominent on their outer bases; the verge sickle-shaped and recurved on the back of the neck; the radula long, carrying teeth of a type closely similar to those of *Pisania maculosa* Lamarck, and *P. fusiformis* Blainville, as figured by Troschel, and with the dental formula $\frac{1}{3} \cdot \frac{1}{3} \cdot \frac{1}{3}$, the base of the rhachidian tooth not excavated in front.

Section *Caducifer* Dall, nov.

Type *Triton truncatus* Hinds, Polynesia.

Shell small, subcylindric, the upper fourth of the spire self-amputated in the adult; a single terminal varix; sculpture of axial ribs and spiral threading, sutures appressed. Nucleus? Operculum?

There is a considerable Polynesian group of these normally decollated species.

Section *Taniola* Dall, nov.

Type *Triton decollatus* Sowerby, Polynesia.

Shell small, subconical, the nepionic shell normally decollate; first subsequent whorl or two with faint axial ribs, the remainder with only sharp deep sulci between strap-like smooth spiral ribs; a single prominent and terminal varix; suture appressed, coloration in continuous spiral lineation. Operculum?

The sculpture of this and one other form is in such sharp contrast to that of the other species of the genus that it seems as if it is entitled to a sectional distinction.

Subgenus PHRYGIOMUREX Dall, nov.

Type *Triton sculptilis* Reeve, Polynesia.

Shell small, frequently truncate at the apex, nucleus smooth, visible part subconic or turbinate, test fusiform, not torticular, with subacute spire and short recurved canal; whorls axially ribbed, the posterior ends of the ribs coronating the suture, the interspaces filled with thin crisp axial lamellæ closely crowded, crossed by spiral threads and forming a sort of superficial lace-like coating to the shell, recalling that of *Scala cochlea* Sowerby, or unworn *Aspella*; varices irregularly disposed, callus of the aperture not conspicuous, operculum narrow, muricoid, the nucleus mid-lateral. Color whitish.

The type species has a deep spiral sulcus on the base, bordered by two strong revolving ribs and crossed by the anterior ends of the ribs, thus forming conspicuous pits; there are from one to three varices, chiefly on the last whorl. In *Triton antiquatus* Hinds, which seems to belong to the same group, the shell is more cylindrical, the ribs fainter, the anterior sulcus wanting, and the varices occur on any part of the spire; but are nowhere very prominent.

This group has so many conchological characters in common with the tritons that one hesitates to separate them, but the peculiar surface recalls *Aspella* and the operculum is unlike any other among the true Tritons which I have seen. I am inclined to believe that this section will eventually find a place among the true Trophons or near some of the Purpuroid Murices.

It is noticeable that the canal is never closed in the *Septida*, and any shell, no matter how superficially similar, with a closed canal may confidently be referred to the *Muricida*. But in the cases such as this where the canal is not closed the final allocation must depend upon the characters of the radula.

I close this review with a list of references giving the synonymic history of the *Septidæ* so far as binomial authors are concerned.

SYNONYMIC HISTORY OF THE SUBDIVISIONS OF THE
FAMILY SEPTIDÆ

- Murex* (sp.) LINNÉ, Syst. Nat. ed. x, pp. 748-749, 1758; ed. XII, p. 1213 et seq., 1767.
- Tritonium* BOLTEN, Mus. Bolt. p. 125, 1798; ed. II, p. 88, 1819; not of O. F. MÜLLER, 1776.
- Cymatium* BOLTEN, *op. cit.*, p. 129, 1798; first species *Murex femorale* LINNÉ; ed. II, p. 91, 1819.
- Cabestana* BOLTEN, *op. cit.*, p. 130, 1798; first species *Murex cutaceus* LINNÉ; ed. II, p. 92, 1819.
- Distorsio* (pars) BOLTEN, *op. cit.*, p. 133, 1798; *Murex anus* LINNÉ; ed. II, p. 94, 1819.
- Tritonium* (sp.) LINK, Besch. Rostock Samml., p. 121, 1807.
- Distortrix* LINK, *op. cit.*, p. 122, 1807; *Murex anus* LINNÉ.
- Gyrineum* (pars) LINK, *op. cit.*, p. 123, 1807; *Murex gyrinus* L.
- Apollon* MONTFORT, Conch. Syst., II, p. 571, 1810; *Murex gyrinus* LINNÉ (= *Gyrineum* LINK, *ex parte*).
- Aquillus* MONTFORT, Conch. Syst., II, p. 578, 1810; *Murex cutaceus* LINNÉ (= *Cabestana* BOLTEN).
- Lotorium* MONTFORT, Conch. Syst., II, p. 582, 1810; *Murex femorale* LINNÉ (= *Cymatium* BOLTEN *non* LINK).
- Triton* MONTFORT, Conch. Syst., II, p. 586, 1810; *T. australe* var. β REEVE (= *Tritonium* BOLTEN, not of Müller). Not *Triton* LINNÉ, 1768.
- Persona* MONTFORT, Conch. Syst., II, p. 602, *Murex anus* LINNÉ (= *Distortrix* LINK); Gray, Guide Moll. Brit. Mus., p. 43, 1857.
- Monoplex* (pars) PERRY, Conch., expl. pl. III, 1811. No type selected, but Gray, 1847, selects *T. olcarium* (L.) REEVE, = *Monoplex australasia* PERRY, fig. 3, = *M. costatus* BORN.
- Biplex* (sp.) PERRY, Conch., expl. pl. IV, 1811, *B. perca* PERRY, selected as type by Gray, 1847.
- Septa* PERRY, Conch., expl. pl. XIV, 1811. Contains species of *Cymatium* (BOLTEN) and *Triton nodiferus* LAM.
- Lotorium* (sp.) CUVIER, Règne Anim., II, p. 440, 1817, *M. lotorium* LINNÉ.
- Tritonium* CUVIER, Règne Anim., II, p. 440, 1817, *M. tritonis* LINNÉ.
- Apollon* (MONTFORT) CUVIER, *op. cit.*, p. 441, *M. gyrinus* LINNÉ.
- Distorta* SCHUMACHER, Essai, pp. 76, 249, 1817 (= *Distortrix* LINK).
- Lampusia* α SCHUMACHER, Essai, pp. 76, 250, 1817, *Murex pilearc* LINNÉ (= *Cymatium* BOLTEN, sp.).
- Lampusia* β SCHUMACHER, *op. cit.*, *Murex tritonis* LINNÉ (= *Septa* PERRY, sp.).
- Colubraria* SCHUMACHER, *op. cit.*, pp. 76, 251, *Buccinum maculosum* CHEMNITZ.
- Lampas* SCHUMACHER, *op. cit.*, pp. 76, 252, *Murex lampas* LINNÉ, = *Bufonaria* β SCHUMACHER (*Ranellidæ*). Not *Lampas* Mus. Calonnianum, 1797.
- Cassida* DILLWYN, Descr. Rec. Sh., II, p. 703, 1817, in syn. *Murex anus* LINNÉ (= *Distortrix* LINK). Not *Cassida* LINNÉ, Coleopt. 1758.

- Varicaria* O. FABRICIUS, Fortegnelse over afg. Biskop Fabricius efterl. naturalier. Hafniae, 1823, p. 87. Nude name followed by nude specific names, apparently covering *Tritonium* + *Ranella*, *sensu lato*.
- Gyrina* SCHUMACHER, Essai, pp. 77, 253, 1817, *Ranella gigantea* LAM. Not *Gyrinus* LINNÉ, 1768.
- Ranula* SCHUMACHER, Essai, p. 77, 1817, not of Peters, 1859.
- Ranularia* SCHUMACHER, *op. cit.*, p. 253, *Triton clavator* LAM. (= *Ranula* SCHUM. + *Monoplex* [sp.] PERRY.)
- Triton* LAMARCK, Anim. s. Vert., vii, p. 177, 1822, *ex parte*, = *Tritonium* BOLTEN, Cuvier.
- Tritonium* BOWDICH, Elem. Conch. i, p. 36, 1822, not of Müller, 1776, and
- Tritonia* BOWDICH, *op. cit.*, expl. pl. x, fig. 4, 1822, not of Cuvier, 1798, = *Triton* MONTFORT, = *Septa* (*pars*) PERRY.
- Triton* (*pars*) BLAINVILLE, Man. Mal., i, p. 399, 1825; Sowerby, Genera, part xxx, 1828; FLEMING, Brit. An., pp. 346, 356, 1828; SWAINSON, Malac., p. 297, 1840; SOWERBY, Conch., Man. ed. ii, p. 278, 1842.
- Dolarium* SCHLEUTER, Verzeichn., p. 20, 1838, sole ex. *Murex caduceus* LINNÉ (*ubi?*).
- Currus* LESSON, l'Echo du Monde Sav. II^{me} Ser. vi, col. 65, July 14, 1842, *Triton tigrinus* Brod. (= *Cymatium* BOLTEN).
- Cumia* BIVONA, Car. Nuovo Gen. Conch., 1838; *C. decussata* Biv., = *Ranella lanceolata* MENKE; *fide* Philippi, Moll. Sicilie, ii, p. 183, 1844 (= *Colubraria* SCHUMACHER).
- Luterium* HERRMANNSEN, Ind. Gen. Mal., i, p. 625, 1846; new name for *Lotorium* MONTFORT (= *Cymatium* BOLTEN).
- Charonia* GISTEL, Naturg. Thierr., p. 170, 1848; new name for *Tritonium* CUVIER *non* Müller (= *Septa* PERRY, 1811).
- Nycitilochus* GISTEL, Naturg. Thierr., p. xi, 1848; new name for *Triton* MONTFORT *non* Laurenti (= *Septa* PERRY, 1811).
- Argobuccinum* MÖRCH, Yoldi Cat., p. 105, 1852; first species *Ranella vexillum* BRODERIP.
- Apollon* MÖRCH, Yoldi Cat., p. 106, 1852; heterogeneous assembly.
- Distorsio* MÖRCH, Yoldi Cat., p. 107, 1852; *Murex anus* LINNÉ.
- Epidromus* MÖRCH, Yoldi Cat., p. 107, 1852 (= *Colubraria* SCHUM.).
- Aquilus* MÖRCH, Yoldi Cat., p. 108, 1852 (= *Cabestana* BOLTEN).
- Lampusia* MÖRCH, Yoldi Cat., p. 108, 1852 (= *Triton* MONTFORT).
- Simpulum* MÖRCH, Yoldi Cat., p. 108, 1852; *Triton pileare* LAM. (= *Cymatium* BOLTEN, sp.).
- Cymatium* MÖRCH, Yoldi Cat., p. 109, 1852 (= *Lotorium* MONTFORT).
- Gutturium* MÖRCH, Yoldi Cat., p. 109, 1852; *Triton tuberosum* LAMARCK.
- Ranularia* MÖRCH, Yoldi Cat., p. 109, 1852; *Triton clavator* LAM., after Chemnitz.
- Monoplex* MÖRCH, Yoldi Cat., p. 110, 1852, *M. obesus* PERRY, = *Triton retusum* LAM.
- Lagena* MÖRCH, Yoldi Cat., p. 110, 1852, *Triton clandestinum* LAMARCK.
- Tritonium* H. and A. ADAMS, Gen. Rec. Moll., i, p. 101, 1853; *T. tritonis* (LINNÉ) = *Septa* PERRY.
- Simpulum* H. and A. ADAMS, *op. cit.*, p. 102, 1853 (not of Fabricius, 1823), no type cited, but the genus is ascribed to Klein, whose figured example is *Triton olearium* LAMARCK (= *Monoplex* PERRY) = *costatus* BORN.

- Cabestana* H. and A. ADAMS, *op. cit.*, p. 102, 1853, after Bolten, whose type was *Murex cutaceus* LINNÉ.
- Cymatium* H. and A. ADAMS, *op. cit.*, p. 102, 1853; *Murex femorale* LINNÉ.
- Gutturium* H. and A. ADAMS, as of Klein, *op. cit.*, p. 103, 1853; Klein's figured example is *Triton tuberosum* LAMARCK.
- Epidromus* H. and A. ADAMS, as of Klein, *op. cit.*, p. 103, 1853 (= *Colubraria* SCHUMACHER).
- Lagena* H. and A. ADAMS, as of Klein, *op. cit.*, p. 104, 1853; not of Walker, 1784. Klein's figured example is *Triton clandestinum* LAM.
- Argobuccinum* H. and A. ADAMS, *op. cit.*, p. 104, 1853; *Triton rude* BRODERIP, and *scaber* KING; not *Argobuccinum* of Klein; corrected by Adams in the errata.
- Distorsio* H. and A. ADAMS, *op. cit.*, as of Bolten, p. 104, 1853, *Murex anus* LINNÉ (= *Distortrix* LINK).
- Distortio* H. and A. ADAMS, *op. cit.*, in *index, err. typ. pro Distorsio*.
- Ncptonella* GRAY, P.Z.S. 1853, p. 38. *Murex cutaceus* LINNÉ, sole example (= *Cabestana* BOLTEN).
- Linatella* GRAY, Guide Moll. Brit. Mus., p. 39, 1857; *Triton cingulatum* LAM., sole example. Not *Linatella* H. and A. ADAMS, 1858, in synonymy.
- Apollon* H. and A. ADAMS, I, p. 106, 1853, not of Montfort, 1810; Gray, Guide Moll. Brit. Mus., p. 42, first species *A. vexillum* BRODERIP.
- Priene* H. and A. ADAMS, II, p. 654, 1858, *Triton rude* BRODERIP, and *T. scaber* KING. This is a new name for *Argobuccinum* ADAMS, 1853, not of Klein.
- Argobuccinum* H. and A. ADAMS, Gen. Rec. Moll., II, p. 655, 1858, as of Klein, whose figured example is *Murex argus* GMELIN. Not *Argobuccinum* H. and A. ADAMS, I, p. 104, 1853, but a new name for *Apollon* H. and A. ADAMS, 1853, p. 106.
- Ncptonella* H. and A. ADAMS, Gen. Rec. Moll., II, p. 654, 1858; in errata (= *Cabestana* BOLTEN).
- Tritonium* (LINK) TROSCHEL, Gebiss der Schnecken, I, p. 232, 1863; *Murex Tritonis* LINNÉ.
- Distorsio* (Bolten) TROSCHEL, Gebiss der Schnecken, I, p. 233, 1863; *Murex anus* LINNÉ (= *Distortrix* LINK).
- Cymatium* (Bolten) TROSCHEL, Gebiss der Schnecken, I, p. 233, 1863; *Murex femorale* LINNÉ.
- Simpulum* TROSCHEL, Gebiss der Schnecken, I, p. 234, 1863; *Murex pilcare* LINNÉ, first species. Not *Simpulum* FABRICIUS, 1823.
- Gutturium* TROSCHEL, Gebiss der Schnecken, I, p. 235, 1863; *Triton tuberosum* LAM., first species.
- Cabestana* (BOLTEN) TROSCHEL, Gebiss der Schnecken, I, p. 237, 1863; *Triton cutaceus* LAM.
- Apollon* TROSCHEL, Gebiss der Schnecken, I, p. 237, 1863; *Murex argus* GMELIN (= *Argobuccinum* ADAMS).
- ?*Trachytriton* MEEK, S. I. checkl. Cretaceous fos. N. Am., pp. 22, 27, 1864; *T. vinculum* HALL and MEEK, St. Pierre beds of Dakota (a precursor of *Priene*?); Paleontol. Upper Missouri, p. 303, 1876.
- Distortio* CONRAD, Am. Journ. Conch., I, p. 20, 1865; *D. crassidens* CONRAD, Oligocene of Vicksburg (= *Distortrix* LINK).
- Personella* CONRAD, Am. Journ. Conch., I, p. 21, 1865. Type *Distorsio septemdentata* GABB, Eocene of Texas.

- Ranellina* (as *Saenellina* by typ. error) CONRAD, Ann. Journ. Conch., i. p. 21, 1865; type *Ranella Maclurii* CONRAD, Claibornian Eocene; Conrad, S. I. checkl. Inv. fos. N. Am., Eocene, p. 17, 1866.
- Simpulum* STOLICZKA, Cret. Gastr. India, p. 131, 1867. Apparently a lapsus for *Simpulum* H. and A. ADAMS.
- Sassia* BELLARDI, Moll. Terz. Piemont e Liguria, pt. I, p. 249, 1873; type *Triton apenninicum* SASSI, Miocene of Italy (= ? *Personella* CONRAD).
- Apollon* MÖRCH, Mal. Blatt., xxiv, p. 24, 1877 (= *Apollon* MONTFORT).
- Gyrinea* MÖRCH, Mal. Blatt., xxiv, p. 24, 1877, in synonymy, not *Gyrina* SCHUMACHER, 1817; *Biplax corrugata* PERRY.
- Triton* MÖRCH, Mal. Blatt., xxiv, p. 25, 1877, = *Triton* LAMARCK.
- Tritonellium* MÖRCH, Mal. Blatt., xxiv, p. 25, 1877, in synonymy, = *Triton* LAMARCK; not *Tritonellium* VALENCIENNES, 1858, = *Tritonium* MÜLLER not Bolten.
- Trompeta* MÖRCH, Mal. Blatt., xxiv, p. 25, 1877, in synonymy as of Petiver, = *Triton* LAMARCK.
- Buccinatorium* MÖRCH, Mal. Blatt., xxiv, p. 26, 1877, as of Petiver; *Triton variegatum* CONRAD (= *Septa pars*, PERRY).
- Charonis* MÖRCH, Mal. Blatt., xxiv, p. 26, 1877 (err. typ. pro *Charonia* GISTEL).
- Lampusia* MÖRCH, Mal. Blatt., xxiv, p. 27, 1877, *Murex pilcare* LINNÉ (= *Lampusia* a SCHUMACHER).
- Cymatium* MÖRCH, Mal. Blatt., xxiv, p. 31, 1877, *Triton femorale* LAM. (= *Lotorium* MONTFORT).
- Gutturium* MÖRCH, Mal. Blatt., xxiv, p. 31, 1877, *Triton tuberosum* LAMARCK.
- Linatella* MÖRCH, Mal. Blatt., xxiv, p. 32, 1877 (= *Linatella* GRAY).
- Cabestana* MÖRCH, Mal. Blatt., xxiv, p. 33, 1877 (= *Cabestana* BOLTEN).
- Dolarium* (Schleuter) MÖRCH, Mal. Blatt., xxiv, p. 33, in synonymy, = *Cabestana* BOLTEN, fide Mörch.
- Distorsio* MÖRCH, Mal. Blatt., xxiv, p. 34, 1877 (= *Distortrix* LINK).
- Semiranella* DE GREGORIO, Studi Conch. Med. viv. et fos., 1880. Type *Triton gemmellari* DE GREG. (= *Sassia* BELLARDI, 1871, fide Cossmann, 1903). Eocene.
- Hilda* HOERNES et AUINGER, Abh. K. K. Geol. Reichsanst., xii, 1884, p. 182, pl. xxii, figs. 17-20; *Triton transylvanicus* H. and A., Miocene (= *Colubraria* subg.); not *Hilda* Kirkaldy, *Insecta*, 1900.
- Triton* FISCHER, Man. de Conch., p. 654, 1884; *T. tritonis* LINNÉ (= *Tritonium* CUVIER), sect. *Triton* s. s. = *Septa* (Perry) DALL.
- Colubraria* FISCHER (section of *Triton*), op. cit., p. 654, 1884; *T. maculosus* MARTINI (= *Colubraria* SCHUM.).
- Plesiotriton* FISCHER (section of *Triton*), op. cit., p. 654, 1884; *Cancellaria volutella* LAMARCK.
- Hilda* FISCHER (section of *Triton*), op. cit., p. 655, 1884; *Triton transylvanicus* HOERNES.
- Simpulum* FISCHER (subgenus of *Triton*), op. cit., p. 655, 1884; *T. pilcare* (L.).
- Aquillus* FISCHER (section of *Simpulum*), op. cit., p. 655, 1884; *T. cutaceus* (L.), = *Cabestana* BOLTEN.
- Lotorium* FISCHER (section of *Simpulum*), op. cit., p. 655, 1884; *T. femoralis* (L.), = *Cymatium* BOLTEN.
- Sassia* FISCHER (section of *Simpulum*), op. cit., p. 655, 1884; *T. apenninicum* SASSI (= *Personella* CONRAD).

- Linatella* FISCHER (section of *Simpulum*), *op. cit.*, p. 655, 1884; *T. poulsenii* MÖRCH.
- Priene* FISCHER (section of *Simpulum*), *op. cit.*, p. 655, 1884; *T. scaber* KING (?= *Priene* H. and A. ADAMS).
- Ranularia* FISCHER (subgenus of *Triton*), *op. cit.*, p. 655, 1884; *T. cynocephalus* LAMARCK. Not *Ranularia* SCHUMACHER.
- Trachytriton* FISCHER (subgenus of *Triton*), *op. cit.*, p. 655, 1884 (= *Trachytriton* MEEK, 1864).
- Argobuccinum* FISCHER (subgenus of *Triton*), *op. cit.*, p. 655, 1884; *Murex argus* GMELIN.
- Gyrina* FISCHER (section of *Argobuccinum*), *op. cit.*, p. 655, 1884; *Ranella gigantea* LAMARCK.
- Apollo* FISCHER (section of *Argobuccinum*), *op. cit.*, p. 655, 1884; *Murex gyrinus* LINNÉ (= *Apollon* MONTFORT).
- Biplex* FISCHER (section of *Argobuccinum*), *op. cit.*, p. 655, 1884; *Ranella pulchra* GRAY (= *Biplex* PERRY, *ex parte*).
- Persona* FISCHER, *op. cit.*, p. 655, 1884; *Murex anus* LINNÉ (= *Distortrix* LINK).
- Monocirsus* COSSMANN, Catal. Illustré Eoc. de Paris, IV, p. 116, 1889; *Triton carinulatus* COSSMANN. Eocene.
- ?*Murotriton* DE GREGORIO, Mon. Eoc. Ala., p. 97, 1890; sole ex. *Triton grasator* DE GREG. Recent? Fossil? Habitat? Horizon? (not stated) but from the figures may = *Eupleura* STM., 1865, of the *Muricidæ*.
- Lampusia* NEWTON, Brit. Olig. Eoc. Moll., p. 145, 1891 (= *Tritonium* LINK non Müller. The family name *Lampusiidae* is proposed in place of *Tritonidae*).
- Lotorium* HARRIS, Cat. Tert. Moll. Brit. Mus., I, p. 185, 1897, *Murex lotorium* LINNÉ (= *Triton* MONTFORT + *Lampusia* SCHUM.). The family *Lotoriidae* is proposed.
- Colubraria* HARRIS, *op. cit.*, p. 194, 1897, *C. granulata* SCHUM. (= *Colubraria* SCHUM.).
- Apollo* HARRIS, *op. cit.*, p. 195, 1897. *Murex gyrinus* L. (= *Apollon* MONTFORT).
- Tritonium* ROVERETO, Atti Soc. Ligustica, X (extr. p. 6), 1899 (= *Triton* LAM.).
- Distortrix* DALL, Moll. Porto Rico, p. 416, 1901, *D. reticulata* LINK (= *Distortrix* LINK).
- Gyrineum* DALL, Moll. Porto Rico, p. 416, 1901 (= *Gyrineum* LINK).
- Septa* DALL, Moll. Porto Rico, p. 416, 1901, *Septa tritonis* L. (= *Septa* PERRY, restricted + *Triton* MONTFORT non Linné. The family *Septidae* is proposed for *Tritonidae* AUCT.); *Nautilus*, XVII, p. 55, Sept., 1903.
- Colubraria* DALL, Moll. Porto Rico, p. 416, 1901, *C. lanceolata* MENKE (= *Colubraria* SCHUMACHER).
- Ranularia* DALL, Moll. Porto Rico, p. 417, 1901, *R. tuberosa* (LAM.) = *Gutturium* MÖRCH.
- Lampusia* DALL, Moll. Porto Rico, p. 417, 1901, *Triton pileare* LAM. (= *Lampusia* a SCHUM.).
- Lotorium* DALL, Moll. Porto Rico, p. 417, 1901, *Murex femorale* LINNÉ (= *Lotorium* MONTFORT).

- Lotorium* KESTEVEN, Proc. Linn. Soc. N. S. Wales, xxvii. No. 107, pp. 443-483, Dec., 1902 (= *Triton* LAMARCK *sensu lato*). The family name of *Lotoriidae* is accepted.
- Tritonium* COSSMANN, Essais de Pal. Comp., v., pp. 87, 90, 1903; *Murex tritonis* L. (= *Septa* PERRY, restr. This is not one of the "cassides" of the Museum Geversianum as erroneously stated by Rovereto. The name *Cassida* does not appear in that work, which was prepared by Meuschen).
- Lampusia* COSSMANN, *op. cit.*, pp. 87, 92, 1903. Type *Murex pilcare* LINNÉ. Subgenus of *Tritonium* COSSMANN (= *Cymatium* BOLTEN *pars*).
- Sassia* COSSMANN, *op. cit.*, pp. 87, 93, 1903. Section of *Lampusia* COSSMANN. Type *Triton apenninicum* SASSI.
- Aquillus* COSSMANN, *op. cit.*, pp. 87, 93, 1903. Section of *Lampusia* COSSMANN. Type *Murex cutaccus* LINNÉ (= *Cabestana* BOLTEN).
- Ranularia* COSSMANN, *op. cit.*, pp. 87, 97, 1903. Subgenus of *Tritonium* COSSMANN. Type *Triton clavator* LAMARCK (= *Ranula* + *Ranularia* SCHUMACHER).
- Austrotriton* COSSMANN, *op. cit.*, pp. 87, 98, 1903. Subgenus of *Tritonium* COSSMANN. Type *Triton radialis* TATE.
- Zinatella* COSSMANN, *op. cit.*, p. 87, 1903. Section of *Lotorium* COSSMANN (= *Linatella* GRAY, COSSMANN, l. c., p. 88, type *T. poulsenii* MÖRCH).
- Colubraria* COSSMANN, *op. cit.*, p. 99, 1903; subgenus of *Tritonium* COSSMANN, type *Murex maculosus* GMELIN.
- Plesiotriton* COSSMANN, *op. cit.*, pp. 87, 101, 1903, type *Cancellaria volutella* LAMARCK (= *Plesiotriton* FISCHER).
- Semitriton* COSSMANN, *op. cit.*, pp. 87, 102, 1903, type *Triton Dennanti* TATE. Eocene, S. Australia.
- Persona* COSSMANN, *op. cit.*, pp. 87, 103, 1903, type *Murex anus* LINNÉ (Syn. excl. = *Distortrix* LINK).
- Hilda* COSSMANN, *op. cit.*, pp. 87, 106, 1903, type *H. transylvanica* HOERNES, Miocene.
- Monocirsus* COSSMANN, *op. cit.*, pp. 87, 108, 1903, type *Triton carinulatus* COSSMANN, Eocene; subgenus of *Hilda*.
- Pricne* COSSMANN, *op. cit.*, pp. 87, 109, 1903, type *Triton scaber* KING (= *Pricne* H. and A. ADAMS).
- Trachytriton* COSSMANN, *op. cit.*, pp. 87, 110, 1903 (= *Trachytriton* MEEK). Retained as a subgenus of *Pricne*.
- Fusitriton* COSSMANN, *op. cit.*, pp. 87, 109, 1903, as subgenus of *Pricne*. Type *Triton cancellatus* LAM.
- Ranella* COSSMANN, *op. cit.*, pp. 88, 111, 1903. Type *Ranella gigantea* LAM. (= *Gyrina* SCHUMACHER).
- Biplex* COSSMANN, *op. cit.*, p. 88, 1903; type *Ranella pulchra* GRAY (= *Biplex* PERRY, restr.); as section of *Ranella*.
- Argobuccinum* COSSMANN, *op. cit.*, pp. 88, 114, 1903, as subgenus of *Ranella*, type *Murex argus* GMELIN (= *Argobuccinum* Klein) ADAMS, 1858, not ADAMS, 1853.
- Aquillus* PILSBRY, Proc. Acad. Nat. Sci. Phila., 1904, p. 22. Type *M. cutaccus* LINNÉ (= *Cabestana* BOLTEN). Typical genus of proposed family *Aquillidae*, including the following groups.
- Lampusia* PILSBRY, *loc. cit.*, section of *Aquillus*, type *M. pilcaris* Linné (= *Cymatium pars*, BOLTEN).

- Lotorium* PILSBRY, *loc. cit.*, section of *Aquillus*, type *M. femorale* LINNÉ (= *Cymatium* BOLTEN non LINK).
- Monoplex* PILSBRY, *loc. cit.*, section of *Aquillus*, type *M. cynocephalus* LINNÉ (= *Tritonocauda* DALL).
- Septa* PILSBRY, *loc. cit.*, subgenus of *Aquillus*, type *S. rubicunda* PERRY.
- Distortrix* PILSBRY, *loc. cit.* (= *Distortrix* LINK).
- Priene* PILSBRY, *loc. cit.* as of H. and A. ADAMS.
- Colubraría* PILSBRY, *loc. cit.*, type *M. maculosa* GMELIN (= *Colubraría* SCHUMACHER).
- Cumia* PILSBRY, *loc. cit.*, subgenus of *Colubraría* (= *Cumia* BIVONA).
- Apollon* PILSBRY, *loc. cit.* (= *Gyrincum* LINK, *pars*).
- Gyrincum* PILSBRY, *loc. cit.* (= *Rauclla* LAMARCK).